ATTACHMENT D3

TOXICITY PROFILES

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UCL Statistics for Uncensored Full Data Sets											
User Selected Options											
Date/Time of Computation			10/29/2015 12:17								
From File			EPC_013Sub.xls								
Full Precision			OFF								
Confidence Coefficient			95%								
Number of Bootstrap Operations			2000								
Manganese											
General Statistics											
Total Number of Observations					15	Number of Distinct Observations					15
						Number of Missing Observations					0
Minimum					200	Mean					497.7
Maximum					1000	Median					423
SD					237.5	Std. Error of Mean					61.31
Coefficient of Variation					0.477	Skewness					0.962
Normal GOF Test											
Shapiro Wilk Test Statistic					0.9	Shapiro Wilk GOF Test					
5% Shapiro Wilk Critical Value					0.881	Data appear Normal at 5% Significance Level					
Lilliefors Test Statistic					0.174	Lilliefors GOF Test					
5% Lilliefors Critical Value					0.229	Data appear Normal at 5% Significance Level					
Data appear Normal at 5% Significance Level											
Assuming Normal Distribution											
95% Normal UCL						95% UCLs (Adjusted for Skewness)					
95% Student's-t UCL					605.7	95% Adjusted-CLT UCL (Chen-1995)					614.8
						95% Modified-t UCL (Johnson-1978)					608.2
Gamma GOF Test											
A-D Test Statistic					0.34	Anderson-Darling Gamma GOF Test					
5% A-D Critical Value					0.739	Detected data appear Gamma Distributed at 5% Significance Level					
K-S Test Statistic					0.138	Kolmogrov-Smirnoff Gamma GOF Test					
5% K-S Critical Value					0.222	Detected data appear Gamma Distributed at 5% Significance Level					
Detected data appear Gamma Distributed at 5% Significance Level											
Gamma Statistics											
k hat (MLE)					5.156	k star (bias corrected MLE)					4.169
Theta hat (MLE)					96.53	Theta star (bias corrected MLE)					119.4
nu hat (MLE)					154.7	nu star (bias corrected)					125.1
MLE Mean (bias corrected)					497.7	MLE Sd (bias corrected)					243.7
						Approximate Chi Square Value (0.05)					100.2
Adjusted Level of Significance					0.0324	Adjusted Chi Square Value					97.5
Assuming Gamma Distribution											
95% Approximate Gamma UCL (use when n>=50))					620.9	95% Adjusted Gamma UCL (use when n<50)					638.4
Lognormal GOF Test											
Shapiro Wilk Test Statistic					0.967	Shapiro Wilk Lognormal GOF Test					
5% Shapiro Wilk Critical Value					0.881	Data appear Lognormal at 5% Significance Level					
Lilliefors Test Statistic					0.121	Lilliefors Lognormal GOF Test					

5% Lilliefors Critical Value					0.229	Data appear Lognormal at 5% Significance Level					
Data appear Lognormal at 5% Significance Level											
Lognormal Statistics											
Minimum of Logged Data					5.298	Mean of logged Data					6.11
Maximum of Logged Data					6.908	SD of logged Data					0.46
Assuming Lognormal Distribution											
95% H-UCL					642.2	90% Chebyshev (MVUE) UCL					678.4
95% Chebyshev (MVUE) UCL					760.6	97.5% Chebyshev (MVUE) UCL					874.8
99% Chebyshev (MVUE) UCL					1099						
Nonparametric Distribution Free UCL Statistics											
Data appear to follow a Discernible Distribution at 5% Significance Level											
Nonparametric Distribution Free UCLs											
95% CLT UCL					598.5	95% Jackknife UCL					605.7
95% Standard Bootstrap UCL					594.8	95% Bootstrap-t UCL					633.9
95% Hall's Bootstrap UCL					627.9	95% Percentile Bootstrap UCL					596.3
95% BCA Bootstrap UCL					602.9						
90% Chebyshev(Mean, Sd) UCL					681.6	95% Chebyshev(Mean, Sd) UCL					764.9
97.5% Chebyshev(Mean, Sd) UCL					880.6	99% Chebyshev(Mean, Sd) UCL					1108
Suggested UCL to Use											
95% Student's-t UCL					605.7						
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). However, simulations results will not cover all Real World data sets.											
For additional insight the user may want to consult a statistician.											
PCB, Total											
General Statistics											
Total Number of Observations					15	Number of Distinct Observations					6
						Number of Missing Observations					0
Minimum					0.05	Mean					3.401
Maximum					5	Median					5
SD					2.343	Std. Error of Mean					0.605
Coefficient of Variation					0.689	Skewness					-0.792
Normal GOF Test											
Shapiro Wilk Test Statistic					0.617	Shapiro Wilk GOF Test					
5% Shapiro Wilk Critical Value					0.881	Data Not Normal at 5% Significance Level					
Lilliefors Test Statistic					0.419	Lilliefors GOF Test					
5% Lilliefors Critical Value					0.229	Data Not Normal at 5% Significance Level					
Data Not Normal at 5% Significance Level											
Assuming Normal Distribution											
95% Normal UCL						95% UCLs (Adjusted for Skewness)					
95% Student's-t UCL					4.466	95% Adjusted-CLT UCL (Chen-1995)					4.263
						95% Modified-t UCL (Johnson-1978)					4.445
Gamma GOF Test											

A-D Test Statistic				2.729	Anderson-Darling Gamma GOF Test				
5% A-D Critical Value				0.774	Data Not Gamma Distributed at 5% Significance Level				
K-S Test Statistic				0.436	Kolmogrov-Smirnoff Gamma GOF Test				
5% K-S Critical Value				0.23	Data Not Gamma Distributed at 5% Significance Level				
Data Not Gamma Distributed at 5% Significance Level									
Gamma Statistics									
k hat (MLE)				0.77	k star (bias corrected MLE)				0.66
Theta hat (MLE)				4.417	Theta star (bias corrected MLE)				5.149
nu hat (MLE)				23.1	nu star (bias corrected)				19.81
MLE Mean (bias corrected)				3.401	MLE Sd (bias corrected)				4.185
					Approximate Chi Square Value (0.05)				10.71
Adjusted Level of Significance				0.0324	Adjusted Chi Square Value				9.897
Assuming Gamma Distribution									
95% Approximate Gamma UCL (use when n>=50))				6.289	95% Adjusted Gamma UCL (use when n<50)				6.808
Lognormal GOF Test									
Shapiro Wilk Test Statistic				0.679	Shapiro Wilk Lognormal GOF Test				
5% Shapiro Wilk Critical Value				0.881	Data Not Lognormal at 5% Significance Level				
Lilliefors Test Statistic				0.412	Lilliefors Lognormal GOF Test				
5% Lilliefors Critical Value				0.229	Data Not Lognormal at 5% Significance Level				
Data Not Lognormal at 5% Significance Level									
Lognormal Statistics									
Minimum of Logged Data				-2.996	Mean of logged Data				0.449
Maximum of Logged Data				1.609	SD of logged Data				1.76
Assuming Lognormal Distribution									
95% H-UCL				50.68	90% Chebyshev (MVUE) UCL				15.32
95% Chebyshev (MVUE) UCL				19.56	97.5% Chebyshev (MVUE) UCL				25.45
99% Chebyshev (MVUE) UCL				37					
Nonparametric Distribution Free UCL Statistics									
Data do not follow a Discernible Distribution (0.05)									
Nonparametric Distribution Free UCLs									
95% CLT UCL				4.396	95% Jackknife UCL				4.466
95% Standard Bootstrap UCL				4.363	95% Bootstrap-t UCL				4.31
95% Hall's Bootstrap UCL				4.202	95% Percentile Bootstrap UCL				4.362
95% BCA Bootstrap UCL				4.362					
90% Chebyshev(Mean, Sd) UCL				5.215	95% Chebyshev(Mean, Sd) UCL				6.037
97.5% Chebyshev(Mean, Sd) UCL				7.178	99% Chebyshev(Mean, Sd) UCL				9.419
Suggested UCL to Use									
99% Chebyshev (Mean, Sd) UCL				9.419					
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). However, simulations results will not cover all Real World data sets.									
For additional insight the user may want to consult a statistician.									
Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be									

reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.			
Uranium-238			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	6
		Number of Missing Observations	0
Minimum	0.432	Mean	1.066
Maximum	1.64	Median	1.066
SD	0.301	Std. Error of Mean	0.0777
Coefficient of Variation	0.282	Skewness	-0.208
Normal GOF Test			
Shapiro Wilk Test Statistic	0.756	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.367	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.203	95% Adjusted-CLT UCL (Chen-1995)	1.19
		95% Modified-t UCL (Johnson-1978)	1.202
Gamma GOF Test			
A-D Test Statistic	2.236	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.737	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.407	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	11.11	k star (bias corrected MLE)	8.933
Theta hat (MLE)	0.096	Theta star (bias corrected MLE)	0.119
nu hat (MLE)	333.3	nu star (bias corrected)	268
MLE Mean (bias corrected)	1.066	MLE Sd (bias corrected)	0.357
		Approximate Chi Square Value (0.05)	231.1
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	226.9
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	1.237	95% Adjusted Gamma UCL (use when n<50)	1.259
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.704	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.421	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.839	Mean of logged Data	0.0184
Maximum of Logged Data	0.495	SD of logged Data	0.335
Assuming Lognormal Distribution			

95% H-UCL	1.278	90% Chebyshev (MVUE) UCL	1.355
95% Chebyshev (MVUE) UCL	1.483	97.5% Chebyshev (MVUE) UCL	1.661
99% Chebyshev (MVUE) UCL	2.009		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.194	95% Jackknife UCL	1.203
95% Standard Bootstrap UCL	1.189	95% Bootstrap-t UCL	1.199
95% Hall's Bootstrap UCL	1.22	95% Percentile Bootstrap UCL	1.181
95% BCA Bootstrap UCL	1.177		
90% Chebyshev(Mean, Sd) UCL	1.299	95% Chebyshev(Mean, Sd) UCL	1.405
97.5% Chebyshev(Mean, Sd) UCL	1.551	99% Chebyshev(Mean, Sd) UCL	1.839
Suggested UCL to Use			
95% Student's-t UCL	1.203	or 95% Modified-t UCL	1.202
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). However, simulations results will not cover all Real World data sets.			
For additional insight the user may want to consult a statistician.			
Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be			
reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.			
Vanadium			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	72	Mean	87.47
Maximum	103	Median	85
SD	10.66	Std. Error of Mean	2.751
Coefficient of Variation	0.122	Skewness	0.192
Normal GOF Test			
Shapiro Wilk Test Statistic	0.917	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.155	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	92.31	95% Adjusted-CLT UCL (Chen-1995)	92.14
		95% Modified-t UCL (Johnson-1978)	92.34
Gamma GOF Test			
A-D Test Statistic	0.497	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.158	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	72.5	k star (bias corrected MLE)	58.05
Theta hat (MLE)	1.206	Theta star (bias corrected MLE)	1.507
nu hat (MLE)	2175	nu star (bias corrected)	1741
MLE Mean (bias corrected)	87.47	MLE Sd (bias corrected)	11.48
		Approximate Chi Square Value (0.05)	1645
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	1634
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	92.57	95% Adjusted Gamma UCL (use when n<50)	93.22
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.924	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.151	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	4.277	Mean of logged Data	4.464
Maximum of Logged Data	4.635	SD of logged Data	0.122
Assuming Lognormal Distribution			
95% H-UCL	92.67	90% Chebyshev (MVUE) UCL	95.72
95% Chebyshev (MVUE) UCL	99.47	97.5% Chebyshev (MVUE) UCL	104.7
99% Chebyshev (MVUE) UCL	114.9		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	91.99	95% Jackknife UCL	92.31
95% Standard Bootstrap UCL	91.84	95% Bootstrap-t UCL	92.58
95% Hall's Bootstrap UCL	91.99	95% Percentile Bootstrap UCL	91.93
95% BCA Bootstrap UCL	91.67		
90% Chebyshev(Mean, Sd) UCL	95.72	95% Chebyshev(Mean, Sd) UCL	99.46
97.5% Chebyshev(Mean, Sd) UCL	104.6	99% Chebyshev(Mean, Sd) UCL	114.8
Suggested UCL to Use			
95% Student's-t UCL	92.31		
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). However, simulations results will not cover all Real World data sets.			
For additional insight the user may want to consult a statistician.			

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:27:47 PM								
5	From File			EPC_013Sub_EU02.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Arsenic											
12												
13	General Statistics											
14	Total Number of Observations					12	Number of Distinct Observations					3
15							Number of Missing Observations					0
16	Minimum					2.99	Mean					9.358
17	Maximum					10	Median					10
18	SD					2.015	Std. Error of Mean					0.582
19	Coefficient of Variation					0.215	Skewness					-3.406
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.371	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.458	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					10.4	95% Adjusted-CLT UCL (Chen-1995)					9.703
31							95% Modified-t UCL (Johnson-1978)					10.31
32												
33	Gamma GOF Test											
34	A-D Test Statistic					3.79	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.463	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.245	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					12.59	k star (bias corrected MLE)					9.496
42	Theta hat (MLE)					0.743	Theta star (bias corrected MLE)					0.985
43	nu hat (MLE)					302.1	nu star (bias corrected)					227.9
44	MLE Mean (bias corrected)					9.358	MLE Sd (bias corrected)					3.037
45							Approximate Chi Square Value (0.05)					194
46	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					189.2
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					11	95% Adjusted Gamma UCL (use when n<50)					11.27
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.354	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.456	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	1.095	Mean of logged Data					2.196
60					Maximum of Logged Data	2.303	SD of logged Data					0.347
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	11.74	90% Chebyshev (MVUE) UCL					12.39
64					95% Chebyshev (MVUE) UCL	13.7	97.5% Chebyshev (MVUE) UCL					15.51
65					99% Chebyshev (MVUE) UCL	19.08						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	10.31	95% Jackknife UCL					10.4
72					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
73					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	11.1	95% Chebyshev(Mean, Sd) UCL					11.89
76					97.5% Chebyshev(Mean, Sd) UCL	12.99	99% Chebyshev(Mean, Sd) UCL					15.15
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	10.4	or 95% Modified-t UCL					10.31
80												
81	**Recommended UCL exceeds the maximum observation**											
82												
83	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
84	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
85	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
86	For additional insight the user may want to consult a statistician.											
87												
88	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
89	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
90												
91												
92	**Iron**											
93												
94	**General Statistics**											
95					Total Number of Observations	12	Number of Distinct Observations					12
96							Number of Missing Observations					0
97					Minimum	17903	Mean					22708
98					Maximum	30751	Median					21530
99					SD	3931	Std. Error of Mean					1135
100					Coefficient of Variation	0.173	Skewness					1.559
101												
102	**Normal GOF Test**											
103					Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**					
104					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
105					Lilliefors Test Statistic	0.307	**Lilliefors GOF Test**					
106					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
107	**Data Not Normal at 5% Significance Level**											
108												
109	**Assuming Normal Distribution**											
110	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
111					95% Student's-t UCL	24745	95% Adjusted-CLT UCL (Chen-1995)					25120
112							95% Modified-t UCL (Johnson-1978)					24831
113												
114	**Gamma GOF Test**											
115					A-D Test Statistic	1.314	**Anderson-Darling Gamma GOF Test**					
116					5% A-D Critical Value	0.73	Data Not Gamma Distributed at 5% Significance Level					
117					K-S Test Statistic	0.293	**Kolmogrov-Smirnoff Gamma GOF Test**					
118					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
119	**Data Not Gamma Distributed at 5% Significance Level**											
120												
121	**Gamma Statistics**											
122					k hat (MLE)	41.05	k star (bias corrected MLE)					30.85
123					Theta hat (MLE)	553.1	Theta star (bias corrected MLE)					736.2
124					nu hat (MLE)	985.3	nu star (bias corrected)					740.3
125					MLE Mean (bias corrected)	22708	MLE Sd (bias corrected)					4089
126							Approximate Chi Square Value (0.05)					678.2
127					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					669.1
128												
129	**Assuming Gamma Distribution**											
130					95% Approximate Gamma UCL (use when n>=50))	24788	95% Adjusted Gamma UCL (use when n<50)					25125
131												
132	**Lognormal GOF Test**											
133					Shapiro Wilk Test Statistic	0.8	**Shapiro Wilk Lognormal GOF Test**					
134					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
135					Lilliefors Test Statistic	0.283	**Lilliefors Lognormal GOF Test**					
136					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
137	**Data Not Lognormal at 5% Significance Level**											
138												
139	**Lognormal Statistics**											
140					Minimum of Logged Data	9.793	Mean of logged Data					10.02
141					Maximum of Logged Data	10.33	SD of logged Data					0.159
142												
143	**Assuming Lognormal Distribution**											
144					95% H-UCL	24777	90% Chebyshev (MVUE) UCL					25822
145					95% Chebyshev (MVUE) UCL	27239	97.5% Chebyshev (MVUE) UCL					29207
146					99% Chebyshev (MVUE) UCL	33071						
147												
148	**Nonparametric Distribution Free UCL Statistics**											
149	**Data do not follow a Discernible Distribution (0.05)**											
150												
151	**Nonparametric Distribution Free UCLs**											
152					95% CLT UCL	24574	95% Jackknife UCL					24745
153					95% Standard Bootstrap UCL	24470	95% Bootstrap-t UCL					27838
154					95% Hall's Bootstrap UCL	39494	95% Percentile Bootstrap UCL					24643
155					95% BCA Bootstrap UCL	25019						
156					90% Chebyshev(Mean, Sd) UCL	26112	95% Chebyshev(Mean, Sd) UCL					27654

	A	B	C	D	E	F	G	H	I	J	K	L
157					97.5% Chebyshev(Mean, Sd) UCL	29794				99% Chebyshev(Mean, Sd) UCL		33997
158												
159						Suggested UCL to Use						
160					95% Student's-t UCL	24745				or 95% Modified-t UCL		24831
161												
162					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
163					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
164					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
165					For additional insight the user may want to consult a statistician.							
166												
167												
168	Manganese											
169												
170						General Statistics						
171					Total Number of Observations	12				Number of Distinct Observations		12
172										Number of Missing Observations		0
173					Minimum	456				Mean		928.7
174					Maximum	2156				Median		709
175					SD	569.1				Std. Error of Mean		164.3
176					Coefficient of Variation	0.613				Skewness		1.824
177												
178						Normal GOF Test						
179					Shapiro Wilk Test Statistic	0.678				Shapiro Wilk GOF Test		
180					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
181					Lilliefors Test Statistic	0.332				Lilliefors GOF Test		
182					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
183						Data Not Normal at 5% Significance Level						
184												
185						Assuming Normal Distribution						
186					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
187					95% Student's-t UCL	1224				95% Adjusted-CLT UCL (Chen-1995)		1291
188										95% Modified-t UCL (Johnson-1978)		1238
189												
190						Gamma GOF Test						
191					A-D Test Statistic	1.297				Anderson-Darling Gamma GOF Test		
192					5% A-D Critical Value	0.735				Data Not Gamma Distributed at 5% Significance Level		
193					K-S Test Statistic	0.266				Kolmogrov-Smirnoff Gamma GOF Test		
194					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
195						Data Not Gamma Distributed at 5% Significance Level						
196												
197						Gamma Statistics						
198					k hat (MLE)	4.154				k star (bias corrected MLE)		3.171
199					Theta hat (MLE)	223.5				Theta star (bias corrected MLE)		292.8
200					nu hat (MLE)	99.71				nu star (bias corrected)		76.11
201					MLE Mean (bias corrected)	928.7				MLE Sd (bias corrected)		521.5
202										Approximate Chi Square Value (0.05)		57.02
203					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		54.5
204												
205						Assuming Gamma Distribution						
206					95% Approximate Gamma UCL (use when n>=50))	1240				95% Adjusted Gamma UCL (use when n<50)		1297
207												
208						Lognormal GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
209					Shapiro Wilk Test Statistic	0.815	**Shapiro Wilk Lognormal GOF Test**					
210					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
211					Lilliefors Test Statistic	0.229	**Lilliefors Lognormal GOF Test**					
212					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
213	**Data appear Approximate Lognormal at 5% Significance Level**											
214												
215	**Lognormal Statistics**											
216					Minimum of Logged Data	6.122				Mean of logged Data		6.709
217					Maximum of Logged Data	7.676				SD of logged Data		0.482
218												
219	**Assuming Lognormal Distribution**											
220					95% H-UCL	1253				90% Chebyshev (MVUE) UCL		1300
221					95% Chebyshev (MVUE) UCL	1476				97.5% Chebyshev (MVUE) UCL		1721
222					99% Chebyshev (MVUE) UCL	2201						
223												
224	**Nonparametric Distribution Free UCL Statistics**											
225	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
226												
227	**Nonparametric Distribution Free UCLs**											
228					95% CLT UCL	1199				95% Jackknife UCL		1224
229					95% Standard Bootstrap UCL	1183				95% Bootstrap-t UCL		1955
230					95% Hall's Bootstrap UCL	2963				95% Percentile Bootstrap UCL		1190
231					95% BCA Bootstrap UCL	1300						
232					90% Chebyshev(Mean, Sd) UCL	1422				95% Chebyshev(Mean, Sd) UCL		1645
233					97.5% Chebyshev(Mean, Sd) UCL	1955				99% Chebyshev(Mean, Sd) UCL		2563
234												
235	**Suggested UCL to Use**											
236					95% Student's-t UCL	1224				or 95% Modified-t UCL		1238
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
241	For additional insight the user may want to consult a statistician.											
242												
243												
244	**Uranium-238**											
245												
246	**General Statistics**											
247					Total Number of Observations	12				Number of Distinct Observations		5
248										Number of Missing Observations		0
249					Minimum	0.513				Mean		0.892
250					Maximum	1.4				Median		0.892
251					SD	0.2				Std. Error of Mean		0.0576
252					Coefficient of Variation	0.224				Skewness		0.972
253												
254	**Normal GOF Test**											
255					Shapiro Wilk Test Statistic	0.727	**Shapiro Wilk GOF Test**					
256					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
257					Lilliefors Test Statistic	0.333	**Lilliefors GOF Test**					
258					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
259	**Data Not Normal at 5% Significance Level**											
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	Assuming Normal Distribution											
262	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
263					95% Student's-t UCL	0.995				95% Adjusted-CLT UCL (Chen-1995)		1.004
264										95% Modified-t UCL (Johnson-1978)		0.998
265												
266	Gamma GOF Test											
267					A-D Test Statistic	1.733	Anderson-Darling Gamma GOF Test					
268					5% A-D Critical Value	0.732	Data Not Gamma Distributed at 5% Significance Level					
269					K-S Test Statistic	0.362	Kolmogrov-Smirnoff Gamma GOF Test					
270					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
271	Data Not Gamma Distributed at 5% Significance Level											
272												
273	Gamma Statistics											
274					k hat (MLE)	22.1				k star (bias corrected MLE)		16.63
275					Theta hat (MLE)	0.0404				Theta star (bias corrected MLE)		0.0536
276					nu hat (MLE)	530.4				nu star (bias corrected)		399.1
277					MLE Mean (bias corrected)	0.892				MLE Sd (bias corrected)		0.219
278										Approximate Chi Square Value (0.05)		353.8
279					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		347.3
280												
281	Assuming Gamma Distribution											
282				95% Approximate Gamma UCL (use when n>=50))		1.006				95% Adjusted Gamma UCL (use when n<50)		1.025
283												
284	Lognormal GOF Test											
285					Shapiro Wilk Test Statistic	0.746	Shapiro Wilk Lognormal GOF Test					
286					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
287					Lilliefors Test Statistic	0.374	Lilliefors Lognormal GOF Test					
288					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
289	Data Not Lognormal at 5% Significance Level											
290												
291	Lognormal Statistics											
292					Minimum of Logged Data	-0.667				Mean of logged Data		-0.137
293					Maximum of Logged Data	0.336				SD of logged Data		0.226
294												
295	Assuming Lognormal Distribution											
296					95% H-UCL	1.015				90% Chebyshev (MVUE) UCL		1.067
297					95% Chebyshev (MVUE) UCL	1.147				97.5% Chebyshev (MVUE) UCL		1.257
298					99% Chebyshev (MVUE) UCL	1.473						
299												
300	Nonparametric Distribution Free UCL Statistics											
301	Data do not follow a Discernible Distribution (0.05)											
302												
303	Nonparametric Distribution Free UCLs											
304					95% CLT UCL	0.987				95% Jackknife UCL		0.995
305					95% Standard Bootstrap UCL	0.982				95% Bootstrap-t UCL		1.002
306					95% Hall's Bootstrap UCL	1.114				95% Percentile Bootstrap UCL		0.986
307					95% BCA Bootstrap UCL	1.004						
308					90% Chebyshev(Mean, Sd) UCL	1.065				95% Chebyshev(Mean, Sd) UCL		1.143
309					97.5% Chebyshev(Mean, Sd) UCL	1.252				99% Chebyshev(Mean, Sd) UCL		1.465
310												
311	Suggested UCL to Use											
312					95% Student's-t UCL	0.995				or 95% Modified-t UCL		0.998

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												
319												
320	**Vanadium**											
321												
322	**General Statistics**											
323	Total Number of Observations					12	Number of Distinct Observations					10
324							Number of Missing Observations					0
325	Minimum					71	Mean					87.83
326	Maximum					108	Median					88
327	SD					11.58	Std. Error of Mean					3.344
328	Coefficient of Variation					0.132	Skewness					0.169
329												
330	**Normal GOF Test**											
331	Shapiro Wilk Test Statistic					0.938	**Shapiro Wilk GOF Test**					
332	5% Shapiro Wilk Critical Value					0.859	Data appear Normal at 5% Significance Level					
333	Lilliefors Test Statistic					0.172	**Lilliefors GOF Test**					
334	5% Lilliefors Critical Value					0.256	Data appear Normal at 5% Significance Level					
335	**Data appear Normal at 5% Significance Level**											
336												
337	**Assuming Normal Distribution**											
338	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
339	95% Student's-t UCL					93.84	95% Adjusted-CLT UCL (Chen-1995)					93.51
340							95% Modified-t UCL (Johnson-1978)					93.87
341												
342	**Gamma GOF Test**											
343	A-D Test Statistic					0.434	**Anderson-Darling Gamma GOF Test**					
344	5% A-D Critical Value					0.73	Detected data appear Gamma Distributed at 5% Significance Level					
345	K-S Test Statistic					0.191	**Kolmogrov-Smirnoff Gamma GOF Test**					
346	5% K-S Critical Value					0.245	Detected data appear Gamma Distributed at 5% Significance Level					
347	**Detected data appear Gamma Distributed at 5% Significance Level**											
348												
349	**Gamma Statistics**											
350	k hat (MLE)					62.8	k star (bias corrected MLE)					47.16
351	Theta hat (MLE)					1.399	Theta star (bias corrected MLE)					1.863
352	nu hat (MLE)					1507	nu star (bias corrected)					1132
353	MLE Mean (bias corrected)					87.83	MLE Sd (bias corrected)					12.79
354							Approximate Chi Square Value (0.05)					1055
355	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					1043
356												
357	**Assuming Gamma Distribution**											
358	95% Approximate Gamma UCL (use when n>=50))					94.25	95% Adjusted Gamma UCL (use when n<50)					95.28
359												
360	**Lognormal GOF Test**											
361	Shapiro Wilk Test Statistic					0.939	**Shapiro Wilk Lognormal GOF Test**					
362	5% Shapiro Wilk Critical Value					0.859	Data appear Lognormal at 5% Significance Level					
363	Lilliefors Test Statistic					0.189	**Lilliefors Lognormal GOF Test**					
364	5% Lilliefors Critical Value					0.256	Data appear Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
365	Data appear Lognormal at 5% Significance Level											
366												
367	Lognormal Statistics											
368					Minimum of Logged Data	4.263				Mean of logged Data		4.467
369					Maximum of Logged Data	4.682				SD of logged Data		0.132
370												
371	Assuming Lognormal Distribution											
372					95% H-UCL	94.41				90% Chebyshev (MVUE) UCL		97.9
373					95% Chebyshev (MVUE) UCL	102.5				97.5% Chebyshev (MVUE) UCL		108.8
374					99% Chebyshev (MVUE) UCL	121.2						
375												
376	Nonparametric Distribution Free UCL Statistics											
377	Data appear to follow a Discernible Distribution at 5% Significance Level											
378												
379	Nonparametric Distribution Free UCLs											
380					95% CLT UCL	93.33				95% Jackknife UCL		93.84
381					95% Standard Bootstrap UCL	93.07				95% Bootstrap-t UCL		94.2
382					95% Hall's Bootstrap UCL	93.07				95% Percentile Bootstrap UCL		93
383					95% BCA Bootstrap UCL	93.25						
384					90% Chebyshev(Mean, Sd) UCL	97.86				95% Chebyshev(Mean, Sd) UCL		102.4
385					97.5% Chebyshev(Mean, Sd) UCL	108.7				99% Chebyshev(Mean, Sd) UCL		121.1
386												
387	Suggested UCL to Use											
388					95% Student's-t UCL	93.84						
389												
390	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
391	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
392	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
393	For additional insight the user may want to consult a statistician.											
394												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:27:17 PM								
5	From File			EPC_013Sub_EU03.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Iron**											
12												
13	**General Statistics**											
14	Total Number of Observations					11	Number of Distinct Observations					11
15							Number of Missing Observations					0
16	Minimum					15990	Mean					21906
17	Maximum					41021	Median					20547
18	SD					6865	Std. Error of Mean					2070
19	Coefficient of Variation					0.313	Skewness					2.47
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.712	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.282	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					25657	95% Adjusted-CLT UCL (Chen-1995)					26957
31							95% Modified-t UCL (Johnson-1978)					25914
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.846	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.729	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.241	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.255	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					14.9	k star (bias corrected MLE)					10.89
42	Theta hat (MLE)					1470	Theta star (bias corrected MLE)					2011
43	nu hat (MLE)					327.7	nu star (bias corrected)					239.7
44	MLE Mean (bias corrected)					21906	MLE Sd (bias corrected)					6637
45							Approximate Chi Square Value (0.05)					204.8
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					199.6
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50)					25631	95% Adjusted Gamma UCL (use when n<50)					26306
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.832	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.223		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.267		Data appear Lognormal at 5% Significance Level				
56					**Data appear Approximate Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	9.68				Mean of logged Data		9.961
60					Maximum of Logged Data	10.62				SD of logged Data		0.256
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	25545				90% Chebyshev (MVUE) UCL		26906
64					95% Chebyshev (MVUE) UCL	29212				97.5% Chebyshev (MVUE) UCL		32413
65					99% Chebyshev (MVUE) UCL	38700						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	25310				95% Jackknife UCL		25657
72					95% Standard Bootstrap UCL	25184				95% Bootstrap-t UCL		30138
73					95% Hall's Bootstrap UCL	41105				95% Percentile Bootstrap UCL		25614
74					95% BCA Bootstrap UCL	26819						
75					90% Chebyshev(Mean, Sd) UCL	28115				95% Chebyshev(Mean, Sd) UCL		30927
76					97.5% Chebyshev(Mean, Sd) UCL	34831				99% Chebyshev(Mean, Sd) UCL		42499
77												
78					**Suggested UCL to Use**							
79					95% Adjusted Gamma UCL	26306						
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	**Manganese**											
88												
89					**General Statistics**							
90					Total Number of Observations	11				Number of Distinct Observations		11
91										Number of Missing Observations		0
92					Minimum	306				Mean		718.9
93					Maximum	2248				Median		601
94					SD	541.9				Std. Error of Mean		163.4
95					Coefficient of Variation	0.754				Skewness		2.597
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.678		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.85		Data Not Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.309		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.267		Data Not Normal at 5% Significance Level				
102					**Data Not Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	1015				95% Adjusted-CLT UCL (Chen-1995)		1124
107										95% Modified-t UCL (Johnson-1978)		1036
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.622	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.215	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.257	Detected data appear Gamma Distributed at 5% Significance Level					
114	**Detected data appear Gamma Distributed at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	3.11				k star (bias corrected MLE)		2.322
118					Theta hat (MLE)	231.2				Theta star (bias corrected MLE)		309.6
119					nu hat (MLE)	68.41				nu star (bias corrected)		51.09
120					MLE Mean (bias corrected)	718.9				MLE Sd (bias corrected)		471.8
121										Approximate Chi Square Value (0.05)		35.67
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		33.58
123												
124	**Assuming Gamma Distribution**											
125				95% Approximate Gamma UCL (use when n>=50)		1030				95% Adjusted Gamma UCL (use when n<50)		1094
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	5.724				Mean of logged Data		6.408
136					Maximum of Logged Data	7.718				SD of logged Data		0.562
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	1062				90% Chebyshev (MVUE) UCL		1064
140					95% Chebyshev (MVUE) UCL	1229				97.5% Chebyshev (MVUE) UCL		1459
141					99% Chebyshev (MVUE) UCL	1909						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	987.7				95% Jackknife UCL		1015
148					95% Standard Bootstrap UCL	974.4				95% Bootstrap-t UCL		1376
149					95% Hall's Bootstrap UCL	2080				95% Percentile Bootstrap UCL		1030
150					95% BCA Bootstrap UCL	1104						
151					90% Chebyshev(Mean, Sd) UCL	1209				95% Chebyshev(Mean, Sd) UCL		1431
152					97.5% Chebyshev(Mean, Sd) UCL	1739				99% Chebyshev(Mean, Sd) UCL		2345
153												
154	**Suggested UCL to Use**											
155					95% Adjusted Gamma UCL	1094						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Molybdenum**											
164												
165	**General Statistics**											
166	Total Number of Observations					11	Number of Distinct Observations					4
167							Number of Missing Observations					0
168	Minimum					0.33	Mean					6.191
169	Maximum					42	Median					3
170	SD					11.91	Std. Error of Mean					3.59
171	Coefficient of Variation					1.923	Skewness					3.285
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.398	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.515	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					12.7	95% Adjusted-CLT UCL (Chen-1995)					15.9
183							95% Modified-t UCL (Johnson-1978)					13.29
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					2.377	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.76	Data Not Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.485	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.264	Data Not Gamma Distributed at 5% Significance Level					
190	**Data Not Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					0.808	k star (bias corrected MLE)					0.649
194	Theta hat (MLE)					7.659	Theta star (bias corrected MLE)					9.546
195	nu hat (MLE)					17.78	nu star (bias corrected)					14.27
196	MLE Mean (bias corrected)					6.191	MLE Sd (bias corrected)					7.688
197							Approximate Chi Square Value (0.05)					6.755
198	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					5.932
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					13.08	95% Adjusted Gamma UCL (use when n<50)					14.89
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.689	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.85	Data Not Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.406	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.267	Data Not Lognormal at 5% Significance Level					
208	**Data Not Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-1.109				Mean of logged Data		1.09
212					Maximum of Logged Data	3.738				SD of logged Data		1.101
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	16.57				90% Chebyshev (MVUE) UCL		10.39
216					95% Chebyshev (MVUE) UCL	12.81				97.5% Chebyshev (MVUE) UCL		16.18
217					99% Chebyshev (MVUE) UCL	22.78						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data do not follow a Discernible Distribution (0.05)						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	12.1				95% Jackknife UCL		12.7
224					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
225					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
226					95% BCA Bootstrap UCL	N/A						
227					90% Chebyshev(Mean, Sd) UCL	16.96				95% Chebyshev(Mean, Sd) UCL		21.84
228					97.5% Chebyshev(Mean, Sd) UCL	28.61				99% Chebyshev(Mean, Sd) UCL		41.91
229												
230						Suggested UCL to Use						
231					95% Chebyshev (Mean, Sd) UCL	21.84						
232												
233					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
234					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
235					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
236					For additional insight the user may want to consult a statistician.							
237												
238												
239	PAH, Total											
240												
241						General Statistics						
242					Total Number of Observations	11				Number of Distinct Observations		4
243										Number of Missing Observations		0
244					Minimum	0.0215				Mean		0.334
245					Maximum	0.5				Median		0.334
246					SD	0.121				Std. Error of Mean		0.0365
247					Coefficient of Variation	0.363				Skewness		-1.568
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.683				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.85				Data Not Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.409				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.267				Data Not Normal at 5% Significance Level		
254						Data Not Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	0.4				95% Adjusted-CLT UCL (Chen-1995)		0.375
259										95% Modified-t UCL (Johnson-1978)		0.397
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	Gamma GOF Test											
262					A-D Test Statistic	2.478	Anderson-Darling Gamma GOF Test					
263					5% A-D Critical Value	0.734	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.487	Kolmogrov-Smirnoff Gamma GOF Test					
265					5% K-S Critical Value	0.257	Data Not Gamma Distributed at 5% Significance Level					
266	Data Not Gamma Distributed at 5% Significance Level											
267												
268	Gamma Statistics											
269					k hat (MLE)	2.941	k star (bias corrected MLE)					2.2
270					Theta hat (MLE)	0.113	Theta star (bias corrected MLE)					0.152
271					nu hat (MLE)	64.71	nu star (bias corrected)					48.4
272					MLE Mean (bias corrected)	0.334	MLE Sd (bias corrected)					0.225
273							Approximate Chi Square Value (0.05)					33.43
274					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					31.41
275												
276	Assuming Gamma Distribution											
277				95% Approximate Gamma UCL (use when n>=50))		0.483	95% Adjusted Gamma UCL (use when n<50)					0.514
278												
279	Lognormal GOF Test											
280					Shapiro Wilk Test Statistic	0.475	Shapiro Wilk Lognormal GOF Test					
281					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.491	Lilliefors Lognormal GOF Test					
283					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
284	Data Not Lognormal at 5% Significance Level											
285												
286	Lognormal Statistics											
287					Minimum of Logged Data	-3.839	Mean of logged Data					-1.277
288					Maximum of Logged Data	-0.693	SD of logged Data					0.864
289												
290	Assuming Lognormal Distribution											
291					95% H-UCL	0.857	90% Chebyshev (MVUE) UCL					0.706
292					95% Chebyshev (MVUE) UCL	0.85	97.5% Chebyshev (MVUE) UCL					1.05
293					99% Chebyshev (MVUE) UCL	1.443						
294												
295	Nonparametric Distribution Free UCL Statistics											
296	Data do not follow a Discernible Distribution (0.05)											
297												
298	Nonparametric Distribution Free UCLs											
299					95% CLT UCL	0.394	95% Jackknife UCL					0.4
300					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
301					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
302					95% BCA Bootstrap UCL	N/A						
303					90% Chebyshev(Mean, Sd) UCL	0.443	95% Chebyshev(Mean, Sd) UCL					0.493
304					97.5% Chebyshev(Mean, Sd) UCL	0.562	99% Chebyshev(Mean, Sd) UCL					0.697
305												
306	Suggested UCL to Use											
307					95% Chebyshev (Mean, Sd) UCL	0.493						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
315	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
316												
317												
318	Vanadium											
319												
320						General Statistics						
321					Total Number of Observations	11				Number of Distinct Observations		9
322										Number of Missing Observations		0
323					Minimum	72				Mean		91.09
324					Maximum	116				Median		92
325					SD	14.07				Std. Error of Mean		4.241
326					Coefficient of Variation	0.154				Skewness		0.434
327												
328						Normal GOF Test						
329					Shapiro Wilk Test Statistic	0.94				Shapiro Wilk GOF Test		
330					5% Shapiro Wilk Critical Value	0.85				Data appear Normal at 5% Significance Level		
331					Lilliefors Test Statistic	0.169				Lilliefors GOF Test		
332					5% Lilliefors Critical Value	0.267				Data appear Normal at 5% Significance Level		
333						Data appear Normal at 5% Significance Level						
334												
335						Assuming Normal Distribution						
336					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
337					95% Student's-t UCL	98.78				95% Adjusted-CLT UCL (Chen-1995)		98.66
338										95% Modified-t UCL (Johnson-1978)		98.87
339												
340						Gamma GOF Test						
341					A-D Test Statistic	0.331				Anderson-Darling Gamma GOF Test		
342					5% A-D Critical Value	0.728				Detected data appear Gamma Distributed at 5% Significance Level		
343					K-S Test Statistic	0.181				Kolmogrov-Smirnoff Gamma GOF Test		
344					5% K-S Critical Value	0.255				Detected data appear Gamma Distributed at 5% Significance Level		
345						Detected data appear Gamma Distributed at 5% Significance Level						
346												
347						Gamma Statistics						
348					k hat (MLE)	47.06				k star (bias corrected MLE)		34.29
349					Theta hat (MLE)	1.936				Theta star (bias corrected MLE)		2.657
350					nu hat (MLE)	1035				nu star (bias corrected)		754.3
351					MLE Mean (bias corrected)	91.09				MLE Sd (bias corrected)		15.56
352										Approximate Chi Square Value (0.05)		691.6
353					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		681.8
354												
355						Assuming Gamma Distribution						
356					95% Approximate Gamma UCL (use when n>=50))	99.35				95% Adjusted Gamma UCL (use when n<50)		100.8
357												
358						Lognormal GOF Test						
359					Shapiro Wilk Test Statistic	0.949				Shapiro Wilk Lognormal GOF Test		
360					5% Shapiro Wilk Critical Value	0.85				Data appear Lognormal at 5% Significance Level		
361					Lilliefors Test Statistic	0.17				Lilliefors Lognormal GOF Test		
362					5% Lilliefors Critical Value	0.267				Data appear Lognormal at 5% Significance Level		
363						Data appear Lognormal at 5% Significance Level						
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365	**Lognormal Statistics**											
366					Minimum of Logged Data	4.277				Mean of logged Data		4.501
367					Maximum of Logged Data	4.754				SD of logged Data		0.153
368												
369	**Assuming Lognormal Distribution**											
370					95% H-UCL	99.57				90% Chebyshev (MVUE) UCL		103.7
371					95% Chebyshev (MVUE) UCL	109.4				97.5% Chebyshev (MVUE) UCL		117.3
372					99% Chebyshev (MVUE) UCL	132.9						
373												
374	**Nonparametric Distribution Free UCL Statistics**											
375	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
376												
377	**Nonparametric Distribution Free UCLs**											
378					95% CLT UCL	98.07				95% Jackknife UCL		98.78
379					95% Standard Bootstrap UCL	97.65				95% Bootstrap-t UCL		99.46
380					95% Hall's Bootstrap UCL	98.03				95% Percentile Bootstrap UCL		97.82
381					95% BCA Bootstrap UCL	97.91						
382					90% Chebyshev(Mean, Sd) UCL	103.8				95% Chebyshev(Mean, Sd) UCL		109.6
383					97.5% Chebyshev(Mean, Sd) UCL	117.6				99% Chebyshev(Mean, Sd) UCL		133.3
384												
385	**Suggested UCL to Use**											
386					95% Student's-t UCL	98.78						
387												
388	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
389	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
390	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
391	For additional insight the user may want to consult a statistician.											
392												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:26:40 PM								
5	From File			EPC_013Sub_EU04.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Cobalt-60											
12												
13	General Statistics											
14	Total Number of Observations					10	Number of Distinct Observations					3
15							Number of Missing Observations					0
16	Minimum					0.00331	Mean					0.0502
17	Maximum					0.097	Median					0.0502
18	SD					0.0221	Std. Error of Mean					0.00698
19	Coefficient of Variation					0.44	Skewness					1.748E-15
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.659	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.4	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					0.063	95% Adjusted-CLT UCL (Chen-1995)					0.0616
31							95% Modified-t UCL (Johnson-1978)					0.063
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.329	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.734	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.483	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.269	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					2.583	k star (bias corrected MLE)					1.875
42	Theta hat (MLE)					0.0194	Theta star (bias corrected MLE)					0.0267
43	nu hat (MLE)					51.67	nu star (bias corrected)					37.5
44	MLE Mean (bias corrected)					0.0502	MLE Sd (bias corrected)					0.0366
45							Approximate Chi Square Value (0.05)					24.48
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					22.67
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					0.0768	95% Adjusted Gamma UCL (use when n<50)					0.083
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.508	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.49	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-5.711			Mean of logged Data			-3.198
60					Maximum of Logged Data	-2.333			SD of logged Data			0.907
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	0.149			90% Chebyshev (MVUE) UCL			0.111
64					95% Chebyshev (MVUE) UCL	0.135			97.5% Chebyshev (MVUE) UCL			0.168
65					99% Chebyshev (MVUE) UCL	0.232						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	0.0616			95% Jackknife UCL			0.063
72					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
73					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	0.0711			95% Chebyshev(Mean, Sd) UCL			0.0806
76					97.5% Chebyshev(Mean, Sd) UCL	0.0938			99% Chebyshev(Mean, Sd) UCL			0.12
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	0.0806						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	Iron											
88												
89	**General Statistics**											
90					Total Number of Observations	10			Number of Distinct Observations			10
91									Number of Missing Observations			0
92					Minimum	17066			Mean			23601
93					Maximum	36780			Median			20377
94					SD	6701			Std. Error of Mean			2119
95					Coefficient of Variation	0.284			Skewness			0.891
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.862	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data appear Approximate Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	27485				95% Adjusted-CLT UCL (Chen-1995)		27724
107										95% Modified-t UCL (Johnson-1978)		27585
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.62	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.275	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.266	Data Not Gamma Distributed at 5% Significance Level					
114	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	14.99				k star (bias corrected MLE)		10.56
118					Theta hat (MLE)	1574				Theta star (bias corrected MLE)		2235
119					nu hat (MLE)	299.8				nu star (bias corrected)		211.2
120					MLE Mean (bias corrected)	23601				MLE Sd (bias corrected)		7263
121										Approximate Chi Square Value (0.05)		178.6
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		173.3
123												
124	**Assuming Gamma Distribution**											
125				95% Approximate Gamma UCL (use when n>=50))		27913				95% Adjusted Gamma UCL (use when n<50)		28753
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.258	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	9.745				Mean of logged Data		10.04
136					Maximum of Logged Data	10.51				SD of logged Data		0.269
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	28166				90% Chebyshev (MVUE) UCL		29618
140					95% Chebyshev (MVUE) UCL	32358				97.5% Chebyshev (MVUE) UCL		36160
141					99% Chebyshev (MVUE) UCL	43629						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	27086				95% Jackknife UCL		27485
148					95% Standard Bootstrap UCL	26932				95% Bootstrap-t UCL		28988
149					95% Hall's Bootstrap UCL	27100				95% Percentile Bootstrap UCL		26923
150					95% BCA Bootstrap UCL	27555						
151					90% Chebyshev(Mean, Sd) UCL	29958				95% Chebyshev(Mean, Sd) UCL		32838
152					97.5% Chebyshev(Mean, Sd) UCL	36834				99% Chebyshev(Mean, Sd) UCL		44685
153												
154	**Suggested UCL to Use**											
155					95% Student's-t UCL	27485						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Manganese**											
164												
165	**General Statistics**											
166	Total Number of Observations					10	Number of Distinct Observations					10
167							Number of Missing Observations					0
168	Minimum					303	Mean					750.9
169	Maximum					1453	Median					541
170	SD					434.9	Std. Error of Mean					137.5
171	Coefficient of Variation					0.579	Skewness					0.81
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.829	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.276	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
178	**Data appear Approximate Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					1003	95% Adjusted-CLT UCL (Chen-1995)					1015
183							95% Modified-t UCL (Johnson-1978)					1009
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					0.61	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.73	Detected data appear Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.247	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.268	Detected data appear Gamma Distributed at 5% Significance Level					
190	**Detected data appear Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					3.613	k star (bias corrected MLE)					2.596
194	Theta hat (MLE)					207.8	Theta star (bias corrected MLE)					289.2
195	nu hat (MLE)					72.27	nu star (bias corrected)					51.92
196	MLE Mean (bias corrected)					750.9	MLE Sd (bias corrected)					466
197							Approximate Chi Square Value (0.05)					36.37
198	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					34.12
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					1072	95% Adjusted Gamma UCL (use when n<50)					1143
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.904	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.214	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
208	**Data appear Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	5.714				Mean of logged Data		6.477
212					Maximum of Logged Data	7.281				SD of logged Data		0.561
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	1170				90% Chebyshev (MVUE) UCL		1153
216					95% Chebyshev (MVUE) UCL	1337				97.5% Chebyshev (MVUE) UCL		1592
217					99% Chebyshev (MVUE) UCL	2093						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	977.1				95% Jackknife UCL		1003
224					95% Standard Bootstrap UCL	967.7				95% Bootstrap-t UCL		1049
225					95% Hall's Bootstrap UCL	933.2				95% Percentile Bootstrap UCL		963.5
226					95% BCA Bootstrap UCL	983.2						
227					90% Chebyshev(Mean, Sd) UCL	1164				95% Chebyshev(Mean, Sd) UCL		1350
228					97.5% Chebyshev(Mean, Sd) UCL	1610				99% Chebyshev(Mean, Sd) UCL		2119
229												
230						Suggested UCL to Use						
231					95% Student's-t UCL	1003						
232												
233						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
234						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
235						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
236						For additional insight the user may want to consult a statistician.						
237												
238												
239	PAH, Total											
240												
241						General Statistics						
242					Total Number of Observations	10				Number of Distinct Observations		4
243										Number of Missing Observations		0
244					Minimum	0.0511				Mean		0.383
245					Maximum	0.5				Median		0.383
246					SD	0.128				Std. Error of Mean		0.0404
247					Coefficient of Variation	0.334				Skewness		-2.162
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.68				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
254						Data Not Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	0.457				95% Adjusted-CLT UCL (Chen-1995)		0.42
259										95% Modified-t UCL (Johnson-1978)		0.452
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Gamma GOF Test**											
262					A-D Test Statistic	2.045	**Anderson-Darling Gamma GOF Test**					
263					5% A-D Critical Value	0.729	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.465	**Kolmogrov-Smirnoff Gamma GOF Test**					
265					5% K-S Critical Value	0.268	Data Not Gamma Distributed at 5% Significance Level					
266	**Data Not Gamma Distributed at 5% Significance Level**											
267												
268	**Gamma Statistics**											
269					k hat (MLE)	4.151	k star (bias corrected MLE)					2.972
270					Theta hat (MLE)	0.0922	Theta star (bias corrected MLE)					0.129
271					nu hat (MLE)	83.02	nu star (bias corrected)					59.45
272					MLE Mean (bias corrected)	0.383	MLE Sd (bias corrected)					0.222
273							Approximate Chi Square Value (0.05)					42.72
274					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					40.27
275												
276	**Assuming Gamma Distribution**											
277					95% Approximate Gamma UCL (use when n>=50))	0.533	95% Adjusted Gamma UCL (use when n<50)					0.565
278												
279	**Lognormal GOF Test**											
280					Shapiro Wilk Test Statistic	0.509	**Shapiro Wilk Lognormal GOF Test**					
281					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.474	**Lilliefors Lognormal GOF Test**					
283					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
284	**Data Not Lognormal at 5% Significance Level**											
285												
286	**Lognormal Statistics**											
287					Minimum of Logged Data	-2.974	Mean of logged Data					-1.086
288					Maximum of Logged Data	-0.693	SD of logged Data					0.674
289												
290	**Assuming Lognormal Distribution**											
291					95% H-UCL	0.742	90% Chebyshev (MVUE) UCL					0.685
292					95% Chebyshev (MVUE) UCL	0.808	97.5% Chebyshev (MVUE) UCL					0.979
293					99% Chebyshev (MVUE) UCL	1.314						
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Data do not follow a Discernible Distribution (0.05)**											
297												
298	**Nonparametric Distribution Free UCLs**											
299					95% CLT UCL	0.449	95% Jackknife UCL					0.457
300					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
301					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
302					95% BCA Bootstrap UCL	N/A						
303					90% Chebyshev(Mean, Sd) UCL	0.504	95% Chebyshev(Mean, Sd) UCL					0.559
304					97.5% Chebyshev(Mean, Sd) UCL	0.635	99% Chebyshev(Mean, Sd) UCL					0.785
305												
306	**Suggested UCL to Use**											
307					95% Chebyshev (Mean, Sd) UCL	0.559						
308												
309	**Recommended UCL exceeds the maximum observation**											
310												
311	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
312	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											

	A	B	C	D	E	F	G	H	I	J	K	L
313	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
314	For additional insight the user may want to consult a statistician.											
315												
316	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
317	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
318												
319												
320	**PCB, Total**											
321												
322	**General Statistics**											
323	Total Number of Observations					10	Number of Distinct Observations					3
324							Number of Missing Observations					0
325	Minimum					0.1	Mean					3.073
326	Maximum					5	Median					5
327	SD					2.49	Std. Error of Mean					0.787
328	Coefficient of Variation					0.81	Skewness					-0.489
329												
330	**Normal GOF Test**											
331	Shapiro Wilk Test Statistic					0.653	**Shapiro Wilk GOF Test**					
332	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
333	Lilliefors Test Statistic					0.381	**Lilliefors GOF Test**					
334	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
335	**Data Not Normal at 5% Significance Level**											
336												
337	**Assuming Normal Distribution**											
338	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
339	95% Student's-t UCL					4.516	95% Adjusted-CLT UCL (Chen-1995)					4.238
340							95% Modified-t UCL (Johnson-1978)					4.496
341												
342	**Gamma GOF Test**											
343	A-D Test Statistic					1.677	**Anderson-Darling Gamma GOF Test**					
344	5% A-D Critical Value					0.765	Data Not Gamma Distributed at 5% Significance Level					
345	K-S Test Statistic					0.397	**Kolmogrov-Smirnoff Gamma GOF Test**					
346	5% K-S Critical Value					0.278	Data Not Gamma Distributed at 5% Significance Level					
347	**Data Not Gamma Distributed at 5% Significance Level**											
348												
349	**Gamma Statistics**											
350	k hat (MLE)					0.655	k star (bias corrected MLE)					0.525
351	Theta hat (MLE)					4.695	Theta star (bias corrected MLE)					5.855
352	nu hat (MLE)					13.09	nu star (bias corrected)					10.5
353	MLE Mean (bias corrected)					3.073	MLE Sd (bias corrected)					4.242
354							Approximate Chi Square Value (0.05)					4.254
355	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					3.59
356												
357	**Assuming Gamma Distribution**											
358	95% Approximate Gamma UCL (use when n>=50))					7.582	95% Adjusted Gamma UCL (use when n<50)					8.984
359												
360	**Lognormal GOF Test**											
361	Shapiro Wilk Test Statistic					0.686	**Shapiro Wilk Lognormal GOF Test**					
362	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
363	Lilliefors Test Statistic					0.375	**Lilliefors Lognormal GOF Test**					
364	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
365	Data Not Lognormal at 5% Significance Level											
366												
367	Lognormal Statistics											
368					Minimum of Logged Data	-2.303				Mean of logged Data		0.19
369					Maximum of Logged Data	1.609				SD of logged Data		1.88
370												
371	Assuming Lognormal Distribution											
372					95% H-UCL	173.4				90% Chebyshev (MVUE) UCL		14.18
373					95% Chebyshev (MVUE) UCL	18.34				97.5% Chebyshev (MVUE) UCL		24.13
374					99% Chebyshev (MVUE) UCL	35.49						
375												
376	Nonparametric Distribution Free UCL Statistics											
377	Data do not follow a Discernible Distribution (0.05)											
378												
379	Nonparametric Distribution Free UCLs											
380					95% CLT UCL	4.368				95% Jackknife UCL		4.516
381					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
382					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
383					95% BCA Bootstrap UCL	N/A						
384					90% Chebyshev(Mean, Sd) UCL	5.435				95% Chebyshev(Mean, Sd) UCL		6.505
385					97.5% Chebyshev(Mean, Sd) UCL	7.99				99% Chebyshev(Mean, Sd) UCL		10.91
386												
387	Suggested UCL to Use											
388					99% Chebyshev (Mean, Sd) UCL	10.91						
389												
390	Recommended UCL exceeds the maximum observation											
391												
392	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
393	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
394	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
395	For additional insight the user may want to consult a statistician.											
396												
397	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
398	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
399												
400												
401	Uranium-238											
402												
403	General Statistics											
404					Total Number of Observations	10				Number of Distinct Observations		5
405										Number of Missing Observations		0
406					Minimum	0.477				Mean		2.004
407					Maximum	4.18				Median		2.004
408					SD	0.915				Std. Error of Mean		0.289
409					Coefficient of Variation	0.457				Skewness		1.163
410												
411	Normal GOF Test											
412					Shapiro Wilk Test Statistic	0.74				Shapiro Wilk GOF Test		
413					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
414					Lilliefors Test Statistic	0.384				Lilliefors GOF Test		
415					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
416	Data Not Normal at 5% Significance Level											

	A	B	C	D	E	F	G	H	I	J	K	L
417												
418						Assuming Normal Distribution						
419				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
420					95% Student's-t UCL	2.535				95% Adjusted-CLT UCL (Chen-1995)		2.594
421										95% Modified-t UCL (Johnson-1978)		2.552
422												
423						Gamma GOF Test						
424					A-D Test Statistic	1.405			Anderson-Darling Gamma GOF Test			
425					5% A-D Critical Value	0.729			Data Not Gamma Distributed at 5% Significance Level			
426					K-S Test Statistic	0.361			Kolmogrov-Smirnoff Gamma GOF Test			
427					5% K-S Critical Value	0.268			Data Not Gamma Distributed at 5% Significance Level			
428						Data Not Gamma Distributed at 5% Significance Level						
429												
430						Gamma Statistics						
431					k hat (MLE)	4.704			k star (bias corrected MLE)			3.359
432					Theta hat (MLE)	0.426			Theta star (bias corrected MLE)			0.597
433					nu hat (MLE)	94.08			nu star (bias corrected)			67.19
434					MLE Mean (bias corrected)	2.004			MLE Sd (bias corrected)			1.093
435									Approximate Chi Square Value (0.05)			49.32
436					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			46.67
437												
438						Assuming Gamma Distribution						
439					95% Approximate Gamma UCL (use when n>=50))	2.73			95% Adjusted Gamma UCL (use when n<50)			2.885
440												
441						Lognormal GOF Test						
442					Shapiro Wilk Test Statistic	0.727			Shapiro Wilk Lognormal GOF Test			
443					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
444					Lilliefors Test Statistic	0.38			Lilliefors Lognormal GOF Test			
445					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
446						Data Not Lognormal at 5% Significance Level						
447												
448						Lognormal Statistics						
449					Minimum of Logged Data	-0.74			Mean of logged Data			0.585
450					Maximum of Logged Data	1.43			SD of logged Data			0.543
451												
452						Assuming Lognormal Distribution						
453					95% H-UCL	3.145			90% Chebyshev (MVUE) UCL			3.124
454					95% Chebyshev (MVUE) UCL	3.611			97.5% Chebyshev (MVUE) UCL			4.288
455					99% Chebyshev (MVUE) UCL	5.617						
456												
457						Nonparametric Distribution Free UCL Statistics						
458						Data do not follow a Discernible Distribution (0.05)						
459												
460						Nonparametric Distribution Free UCLs						
461					95% CLT UCL	2.48			95% Jackknife UCL			2.535
462					95% Standard Bootstrap UCL	2.453			95% Bootstrap-t UCL			2.624
463					95% Hall's Bootstrap UCL	5.048			95% Percentile Bootstrap UCL			2.447
464					95% BCA Bootstrap UCL	2.515						
465					90% Chebyshev(Mean, Sd) UCL	2.872			95% Chebyshev(Mean, Sd) UCL			3.266
466					97.5% Chebyshev(Mean, Sd) UCL	3.811			99% Chebyshev(Mean, Sd) UCL			4.883
467												
468						Suggested UCL to Use						

	A	B	C	D	E	F	G	H	I	J	K	L
469					95% Chebyshev (Mean, Sd) UCL	3.266						
470												
471	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
472	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
473	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
474	For additional insight the user may want to consult a statistician.											
475												
476												
477	**Vanadium**											
478												
479	**General Statistics**											
480	Total Number of Observations					10	Number of Distinct Observations					9
481							Number of Missing Observations					0
482	Minimum					78	Mean					90.7
483	Maximum					110	Median					87.5
484	SD					12.83	Std. Error of Mean					4.058
485	Coefficient of Variation					0.141	Skewness					0.548
486												
487	**Normal GOF Test**											
488	Shapiro Wilk Test Statistic					0.853	**Shapiro Wilk GOF Test**					
489	5% Shapiro Wilk Critical Value					0.842	Data appear Normal at 5% Significance Level					
490	Lilliefors Test Statistic					0.198	**Lilliefors GOF Test**					
491	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
492	**Data appear Normal at 5% Significance Level**											
493												
494	**Assuming Normal Distribution**											
495	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
496	95% Student's-t UCL					98.14	95% Adjusted-CLT UCL (Chen-1995)					98.13
497							95% Modified-t UCL (Johnson-1978)					98.26
498												
499	**Gamma GOF Test**											
500	A-D Test Statistic					0.622	**Anderson-Darling Gamma GOF Test**					
501	5% A-D Critical Value					0.724	Detected data appear Gamma Distributed at 5% Significance Level					
502	K-S Test Statistic					0.212	**Kolmogrov-Smirnoff Gamma GOF Test**					
503	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
504	**Detected data appear Gamma Distributed at 5% Significance Level**											
505												
506	**Gamma Statistics**											
507	k hat (MLE)					57.26	k star (bias corrected MLE)					40.15
508	Theta hat (MLE)					1.584	Theta star (bias corrected MLE)					2.259
509	nu hat (MLE)					1145	nu star (bias corrected)					803
510	MLE Mean (bias corrected)					90.7	MLE Sd (bias corrected)					14.31
511							Approximate Chi Square Value (0.05)					738.3
512	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					727.4
513												
514	**Assuming Gamma Distribution**											
515	95% Approximate Gamma UCL (use when n>=50))					98.66	95% Adjusted Gamma UCL (use when n<50)					100.1
516												
517	**Lognormal GOF Test**											
518	Shapiro Wilk Test Statistic					0.861	**Shapiro Wilk Lognormal GOF Test**					
519	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
520	Lilliefors Test Statistic					0.2	**Lilliefors Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
521					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
522	Data appear Lognormal at 5% Significance Level											
523												
524	Lognormal Statistics											
525					Minimum of Logged Data	4.357				Mean of logged Data		4.499
526					Maximum of Logged Data	4.7				SD of logged Data		0.138
527												
528	Assuming Lognormal Distribution											
529					95% H-UCL	98.78				90% Chebyshev (MVUE) UCL		102.6
530					95% Chebyshev (MVUE) UCL	108				97.5% Chebyshev (MVUE) UCL		115.5
531					99% Chebyshev (MVUE) UCL	130.3						
532												
533	Nonparametric Distribution Free UCL Statistics											
534	Data appear to follow a Discernible Distribution at 5% Significance Level											
535												
536	Nonparametric Distribution Free UCLs											
537					95% CLT UCL	97.37				95% Jackknife UCL		98.14
538					95% Standard Bootstrap UCL	97.13				95% Bootstrap-t UCL		99.56
539					95% Hall's Bootstrap UCL	96.35				95% Percentile Bootstrap UCL		97.1
540					95% BCA Bootstrap UCL	97.3						
541					90% Chebyshev(Mean, Sd) UCL	102.9				95% Chebyshev(Mean, Sd) UCL		108.4
542					97.5% Chebyshev(Mean, Sd) UCL	116				99% Chebyshev(Mean, Sd) UCL		131.1
543												
544	Suggested UCL to Use											
545					95% Student's-t UCL	98.14						
546												
547	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
548	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
549	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
550	For additional insight the user may want to consult a statistician.											
551												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:25:56 PM								
5	From File			EPC_013Sub_EU05.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Aluminum											
12												
13	General Statistics											
14	Total Number of Observations					10	Number of Distinct Observations					5
15							Number of Missing Observations					0
16	Minimum					5100	Mean					7872
17	Maximum					14000	Median					7872
18	SD					2486	Std. Error of Mean					786
19	Coefficient of Variation					0.316	Skewness					1.676
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.782	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.3	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					9313	95% Adjusted-CLT UCL (Chen-1995)					9610
31							95% Modified-t UCL (Johnson-1978)					9382
32												
33	Gamma GOF Test											
34	A-D Test Statistic					0.812	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.725	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.263	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
38	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					12.98	k star (bias corrected MLE)					9.155
42	Theta hat (MLE)					606.3	Theta star (bias corrected MLE)					859.9
43	nu hat (MLE)					259.7	nu star (bias corrected)					183.1
44	MLE Mean (bias corrected)					7872	MLE Sd (bias corrected)					2602
45							Approximate Chi Square Value (0.05)					152.8
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					148
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50)					9433	95% Adjusted Gamma UCL (use when n<50)					9740
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.857	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.254	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	8.537	Mean of logged Data					8.932
60					Maximum of Logged Data	9.547	SD of logged Data					0.287
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	9521	90% Chebyshev (MVUE) UCL					10010
64					95% Chebyshev (MVUE) UCL	10986	97.5% Chebyshev (MVUE) UCL					12340
65					99% Chebyshev (MVUE) UCL	15000						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	9165	95% Jackknife UCL					9313
72					95% Standard Bootstrap UCL	9078	95% Bootstrap-t UCL					9828
73					95% Hall's Bootstrap UCL	15953	95% Percentile Bootstrap UCL					9239
74					95% BCA Bootstrap UCL	9516						
75					90% Chebyshev(Mean, Sd) UCL	10230	95% Chebyshev(Mean, Sd) UCL					11298
76					97.5% Chebyshev(Mean, Sd) UCL	12780	99% Chebyshev(Mean, Sd) UCL					15692
77												
78	**Suggested UCL to Use**											
79					95% Adjusted Gamma UCL	9740						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Cesium-137**											
88												
89	**General Statistics**											
90					Total Number of Observations	10	Number of Distinct Observations					6
91							Number of Missing Observations					0
92					Minimum	-0.0054	Mean					0.128
93					Maximum	0.562	Median					0.128
94					SD	0.163	Std. Error of Mean					0.0514
95					Coefficient of Variation	1.269	Skewness					2.443
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.668	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106				95% Student's-t UCL		0.222				95% Adjusted-CLT UCL (Chen-1995)		0.255
107										95% Modified-t UCL (Johnson-1978)		0.229
108	Gamma Statistics Not Available											
109	Lognormal Statistics Not Available											
110												
111	Nonparametric Distribution Free UCL Statistics											
112	Data do not follow a Discernible Distribution (0.05)											
113												
114	Nonparametric Distribution Free UCLs											
115				95% CLT UCL		0.213				95% Jackknife UCL		0.222
116				95% Standard Bootstrap UCL		0.21				95% Bootstrap-t UCL		0.311
117				95% Hall's Bootstrap UCL		0.564				95% Percentile Bootstrap UCL		0.224
118				95% BCA Bootstrap UCL		0.252						
119				90% Chebyshev(Mean, Sd) UCL		0.282				95% Chebyshev(Mean, Sd) UCL		0.352
120				97.5% Chebyshev(Mean, Sd) UCL		0.449				99% Chebyshev(Mean, Sd) UCL		0.64
121												
122	Suggested UCL to Use											
123				95% Chebyshev (Mean, Sd) UCL		0.352						
124												
125	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
126	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
127	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
128	For additional insight the user may want to consult a statistician.											
129												
130												
131	Chromium											
132												
133	General Statistics											
134				Total Number of Observations		10				Number of Distinct Observations		6
135										Number of Missing Observations		0
136				Minimum		8.26				Mean		27.46
137				Maximum		164				Median		12
138				SD		48.05				Std. Error of Mean		15.19
139				Coefficient of Variation		1.75				Skewness		3.145
140												
141	Normal GOF Test											
142				Shapiro Wilk Test Statistic		0.408	Shapiro Wilk GOF Test					
143				5% Shapiro Wilk Critical Value		0.842	Data Not Normal at 5% Significance Level					
144				Lilliefors Test Statistic		0.47	Lilliefors GOF Test					
145				5% Lilliefors Critical Value		0.28	Data Not Normal at 5% Significance Level					
146	Data Not Normal at 5% Significance Level											
147												
148	Assuming Normal Distribution											
149	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
150				95% Student's-t UCL		55.31				95% Adjusted-CLT UCL (Chen-1995)		68.59
151										95% Modified-t UCL (Johnson-1978)		57.83
152												
153	Gamma GOF Test											
154				A-D Test Statistic		2.568	Anderson-Darling Gamma GOF Test					
155				5% A-D Critical Value		0.748	Data Not Gamma Distributed at 5% Significance Level					
156				K-S Test Statistic		0.443	Kolmogrov-Smirnoff Gamma GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
157					5% K-S Critical Value	0.274	Data Not Gamma Distributed at 5% Significance Level					
158	**Data Not Gamma Distributed at 5% Significance Level**											
159												
160	**Gamma Statistics**											
161					k hat (MLE)	1.021				k star (bias corrected MLE)		0.782
162					Theta hat (MLE)	26.88				Theta star (bias corrected MLE)		35.13
163					nu hat (MLE)	20.43				nu star (bias corrected)		15.63
164					MLE Mean (bias corrected)	27.46				MLE Sd (bias corrected)		31.06
165										Approximate Chi Square Value (0.05)		7.703
166					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		6.758
167												
168	**Assuming Gamma Distribution**											
169				95% Approximate Gamma UCL (use when n>=50))		55.72				95% Adjusted Gamma UCL (use when n<50)		63.51
170												
171	**Lognormal GOF Test**											
172					Shapiro Wilk Test Statistic	0.555	**Shapiro Wilk Lognormal GOF Test**					
173					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
174					Lilliefors Test Statistic	0.411	**Lilliefors Lognormal GOF Test**					
175					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
176	**Data Not Lognormal at 5% Significance Level**											
177												
178	**Lognormal Statistics**											
179					Minimum of Logged Data	2.111				Mean of logged Data		2.749
180					Maximum of Logged Data	5.1				SD of logged Data		0.85
181												
182	**Assuming Lognormal Distribution**											
183					95% H-UCL	49.61				90% Chebyshev (MVUE) UCL		39.41
184					95% Chebyshev (MVUE) UCL	47.55				97.5% Chebyshev (MVUE) UCL		58.85
185					99% Chebyshev (MVUE) UCL	81.05						
186												
187	**Nonparametric Distribution Free UCL Statistics**											
188	**Data do not follow a Discernible Distribution (0.05)**											
189												
190	**Nonparametric Distribution Free UCLs**											
191					95% CLT UCL	52.45				95% Jackknife UCL		55.31
192					95% Standard Bootstrap UCL	51.29				95% Bootstrap-t UCL		660.6
193					95% Hall's Bootstrap UCL	684.1				95% Percentile Bootstrap UCL		57.66
194					95% BCA Bootstrap UCL	72.46						
195					90% Chebyshev(Mean, Sd) UCL	73.04				95% Chebyshev(Mean, Sd) UCL		93.69
196					97.5% Chebyshev(Mean, Sd) UCL	122.3				99% Chebyshev(Mean, Sd) UCL		178.6
197												
198	**Suggested UCL to Use**											
199					95% Chebyshev (Mean, Sd) UCL	93.69						
200												
201	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
202	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
203	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
204	For additional insight the user may want to consult a statistician.											
205												
206												
207	**Iron**											
208												

	A	B	C	D	E	F	G	H	I	J	K	L
209	General Statistics											
210	Total Number of Observations					10	Number of Distinct Observations					10
211							Number of Missing Observations					0
212	Minimum					17294	Mean					21780
213	Maximum					31295	Median					20930
214	SD					4173	Std. Error of Mean					1320
215	Coefficient of Variation					0.192	Skewness					1.346
216												
217	Normal GOF Test											
218	Shapiro Wilk Test Statistic					0.894	Shapiro Wilk GOF Test					
219	5% Shapiro Wilk Critical Value					0.842	Data appear Normal at 5% Significance Level					
220	Lilliefors Test Statistic					0.159	Lilliefors GOF Test					
221	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
222	Data appear Normal at 5% Significance Level											
223												
224	Assuming Normal Distribution											
225	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
226	95% Student's-t UCL					24199	95% Adjusted-CLT UCL (Chen-1995)					24551
227							95% Modified-t UCL (Johnson-1978)					24293
228												
229	Gamma GOF Test											
230	A-D Test Statistic					0.301	Anderson-Darling Gamma GOF Test					
231	5% A-D Critical Value					0.724	Detected data appear Gamma Distributed at 5% Significance Level					
232	K-S Test Statistic					0.143	Kolmogrov-Smirnoff Gamma GOF Test					
233	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
234	Detected data appear Gamma Distributed at 5% Significance Level											
235												
236	Gamma Statistics											
237	k hat (MLE)					33.41	k star (bias corrected MLE)					23.45
238	Theta hat (MLE)					652	Theta star (bias corrected MLE)					928.7
239	nu hat (MLE)					668.1	nu star (bias corrected)					469
240	MLE Mean (bias corrected)					21780	MLE Sd (bias corrected)					4498
241							Approximate Chi Square Value (0.05)					419.8
242	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					411.7
243												
244	Assuming Gamma Distribution											
245	95% Approximate Gamma UCL (use when n>=50))					24333	95% Adjusted Gamma UCL (use when n<50)					24812
246												
247	Lognormal GOF Test											
248	Shapiro Wilk Test Statistic					0.94	Shapiro Wilk Lognormal GOF Test					
249	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
250	Lilliefors Test Statistic					0.131	Lilliefors Lognormal GOF Test					
251	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
252	Data appear Lognormal at 5% Significance Level											
253												
254	Lognormal Statistics											
255	Minimum of Logged Data					9.758	Mean of logged Data					9.974
256	Maximum of Logged Data					10.35	SD of logged Data					0.179
257												
258	Assuming Lognormal Distribution											
259	95% H-UCL					24364	90% Chebyshev (MVUE) UCL					25471
260	95% Chebyshev (MVUE) UCL					27149	97.5% Chebyshev (MVUE) UCL					29478

	A	B	C	D	E	F	G	H	I	J	K	L
261					99% Chebyshev (MVUE) UCL	34054						
262												
263					Nonparametric Distribution Free UCL Statistics							
264					Data appear to follow a Discernible Distribution at 5% Significance Level							
265												
266					Nonparametric Distribution Free UCLs							
267					95% CLT UCL	23951				95% Jackknife UCL		24199
268					95% Standard Bootstrap UCL	23903				95% Bootstrap-t UCL		25373
269					95% Hall's Bootstrap UCL	27283				95% Percentile Bootstrap UCL		23798
270					95% BCA Bootstrap UCL	24428						
271					90% Chebyshev(Mean, Sd) UCL	25739				95% Chebyshev(Mean, Sd) UCL		27533
272					97.5% Chebyshev(Mean, Sd) UCL	30022				99% Chebyshev(Mean, Sd) UCL		34911
273												
274					Suggested UCL to Use							
275					95% Student's-t UCL	24199						
276												
277					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
278					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
279					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
280					For additional insight the user may want to consult a statistician.							
281												
282												
283	Manganese											
284												
285					General Statistics							
286					Total Number of Observations	10				Number of Distinct Observations		10
287										Number of Missing Observations		0
288					Minimum	248				Mean		642
289					Maximum	1843				Median		485
290					SD	459.6				Std. Error of Mean		145.3
291					Coefficient of Variation	0.716				Skewness		2.309
292												
293					Normal GOF Test							
294					Shapiro Wilk Test Statistic	0.734				Shapiro Wilk GOF Test		
295					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
296					Lilliefors Test Statistic	0.243				Lilliefors GOF Test		
297					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
298					Data appear Approximate Normal at 5% Significance Level							
299												
300					Assuming Normal Distribution							
301					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
302					95% Student's-t UCL	908.4				95% Adjusted-CLT UCL (Chen-1995)		994.4
303										95% Modified-t UCL (Johnson-1978)		926.1
304												
305					Gamma GOF Test							
306					A-D Test Statistic	0.491				Anderson-Darling Gamma GOF Test		
307					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
308					K-S Test Statistic	0.182				Kolmogrov-Smirnoff Gamma GOF Test		
309					5% K-S Critical Value	0.268				Detected data appear Gamma Distributed at 5% Significance Level		
310					Detected data appear Gamma Distributed at 5% Significance Level							
311												
312					Gamma Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
313					k hat (MLE)	3.221					k star (bias corrected MLE)	2.321
314					Theta hat (MLE)	199.3					Theta star (bias corrected MLE)	276.6
315					nu hat (MLE)	64.41					nu star (bias corrected)	46.42
316					MLE Mean (bias corrected)	642					MLE Sd (bias corrected)	421.4
317											Approximate Chi Square Value (0.05)	31.79
318					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	29.7
319												
320					**Assuming Gamma Distribution**							
321					95% Approximate Gamma UCL (use when n>=50))	937.5					95% Adjusted Gamma UCL (use when n<50)	1004
322												
323					**Lognormal GOF Test**							
324					Shapiro Wilk Test Statistic	0.942			**Shapiro Wilk Lognormal GOF Test**			
325					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
326					Lilliefors Test Statistic	0.147			**Lilliefors Lognormal GOF Test**			
327					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
328					**Data appear Lognormal at 5% Significance Level**							
329												
330					**Lognormal Statistics**							
331					Minimum of Logged Data	5.513					Mean of logged Data	6.301
332					Maximum of Logged Data	7.519					SD of logged Data	0.563
333												
334					**Assuming Lognormal Distribution**							
335					95% H-UCL	985.9					90% Chebyshev (MVUE) UCL	970.4
336					95% Chebyshev (MVUE) UCL	1126					97.5% Chebyshev (MVUE) UCL	1341
337					99% Chebyshev (MVUE) UCL	1764						
338												
339					**Nonparametric Distribution Free UCL Statistics**							
340					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
341												
342					**Nonparametric Distribution Free UCLs**							
343					95% CLT UCL	881					95% Jackknife UCL	908.4
344					95% Standard Bootstrap UCL	861.8					95% Bootstrap-t UCL	1223
345					95% Hall's Bootstrap UCL	1838					95% Percentile Bootstrap UCL	895.1
346					95% BCA Bootstrap UCL	989.2						
347					90% Chebyshev(Mean, Sd) UCL	1078					95% Chebyshev(Mean, Sd) UCL	1275
348					97.5% Chebyshev(Mean, Sd) UCL	1550					99% Chebyshev(Mean, Sd) UCL	2088
349												
350					**Suggested UCL to Use**							
351					95% Student's-t UCL	908.4						
352												
353					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
354					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
355					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
356					For additional insight the user may want to consult a statistician.							
357												
358												
359	**Neptunium-237**											
360												
361					**General Statistics**							
362					Total Number of Observations	10					Number of Distinct Observations	6
363											Number of Missing Observations	0
364					Minimum	0.00162					Mean	0.133

	A	B	C	D	E	F	G	H	I	J	K	L
365					Maximum	0.53					Median	0.133
366					SD	0.15					Std. Error of Mean	0.0473
367					Coefficient of Variation	1.129					Skewness	2.398
368												
369					Normal GOF Test							
370					Shapiro Wilk Test Statistic	0.678	Shapiro Wilk GOF Test					
371					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
372					Lilliefors Test Statistic	0.4	Lilliefors GOF Test					
373					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
374					Data Not Normal at 5% Significance Level							
375												
376					Assuming Normal Distribution							
377				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
378					95% Student's-t UCL	0.219					95% Adjusted-CLT UCL (Chen-1995)	0.249
379											95% Modified-t UCL (Johnson-1978)	0.225
380												
381					Gamma GOF Test							
382					A-D Test Statistic	0.818	Anderson-Darling Gamma GOF Test					
383					5% A-D Critical Value	0.757	Data Not Gamma Distributed at 5% Significance Level					
384					K-S Test Statistic	0.252	Kolmogrov-Smirnoff Gamma GOF Test					
385					5% K-S Critical Value	0.276	Detected data appear Gamma Distributed at 5% Significance Level					
386					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
387												
388					Gamma Statistics							
389					k hat (MLE)	0.744					k star (bias corrected MLE)	0.587
390					Theta hat (MLE)	0.178					Theta star (bias corrected MLE)	0.226
391					nu hat (MLE)	14.88					nu star (bias corrected)	11.75
392					MLE Mean (bias corrected)	0.133					MLE Sd (bias corrected)	0.173
393											Approximate Chi Square Value (0.05)	5.061
394					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	4.323
395												
396					Assuming Gamma Distribution							
397					95% Approximate Gamma UCL (use when n>=50)	0.308					95% Adjusted Gamma UCL (use when n<50)	0.36
398												
399					Lognormal GOF Test							
400					Shapiro Wilk Test Statistic	0.789	Shapiro Wilk Lognormal GOF Test					
401					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
402					Lilliefors Test Statistic	0.292	Lilliefors Lognormal GOF Test					
403					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
404					Data Not Lognormal at 5% Significance Level							
405												
406					Lognormal Statistics							
407					Minimum of Logged Data	-6.425					Mean of logged Data	-2.827
408					Maximum of Logged Data	-0.635					SD of logged Data	1.783
409												
410					Assuming Lognormal Distribution							
411					95% H-UCL	5.258					90% Chebyshev (MVUE) UCL	0.592
412					95% Chebyshev (MVUE) UCL	0.763					97.5% Chebyshev (MVUE) UCL	1.001
413					99% Chebyshev (MVUE) UCL	1.467						
414												
415					Nonparametric Distribution Free UCL Statistics							
416					Data appear to follow a Discernible Distribution at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
417												
418					Nonparametric Distribution Free UCLs							
419					95% CLT UCL	0.21				95% Jackknife UCL		0.219
420					95% Standard Bootstrap UCL	0.209				95% Bootstrap-t UCL		0.293
421					95% Hall's Bootstrap UCL	0.543				95% Percentile Bootstrap UCL		0.216
422					95% BCA Bootstrap UCL	0.246						
423					90% Chebyshev(Mean, Sd) UCL	0.274				95% Chebyshev(Mean, Sd) UCL		0.339
424					97.5% Chebyshev(Mean, Sd) UCL	0.428				99% Chebyshev(Mean, Sd) UCL		0.603
425												
426					Suggested UCL to Use							
427					95% Adjusted Gamma UCL	0.36						
428												
429					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
430					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
431					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
432					For additional insight the user may want to consult a statistician.							
433												
434												
435	PAH, Total											
436												
437					General Statistics							
438					Total Number of Observations	10				Number of Distinct Observations		5
439										Number of Missing Observations		0
440					Minimum	0.0663				Mean		0.375
441					Maximum	0.49				Median		0.375
442					SD	0.122				Std. Error of Mean		0.0385
443					Coefficient of Variation	0.325				Skewness		-1.93
444												
445					Normal GOF Test							
446					Shapiro Wilk Test Statistic	0.732				Shapiro Wilk GOF Test		
447					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
448					Lilliefors Test Statistic	0.311				Lilliefors GOF Test		
449					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
450					Data Not Normal at 5% Significance Level							
451												
452					Assuming Normal Distribution							
453					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
454					95% Student's-t UCL	0.445				95% Adjusted-CLT UCL (Chen-1995)		0.413
455										95% Modified-t UCL (Johnson-1978)		0.441
456												
457					Gamma GOF Test							
458					A-D Test Statistic	1.731				Anderson-Darling Gamma GOF Test		
459					5% A-D Critical Value	0.729				Data Not Gamma Distributed at 5% Significance Level		
460					K-S Test Statistic	0.392				Kolmogrov-Smirnoff Gamma GOF Test		
461					5% K-S Critical Value	0.267				Data Not Gamma Distributed at 5% Significance Level		
462					Data Not Gamma Distributed at 5% Significance Level							
463												
464					Gamma Statistics							
465					k hat (MLE)	5.041				k star (bias corrected MLE)		3.596
466					Theta hat (MLE)	0.0743				Theta star (bias corrected MLE)		0.104
467					nu hat (MLE)	100.8				nu star (bias corrected)		71.91
468					MLE Mean (bias corrected)	0.375				MLE Sd (bias corrected)		0.198

	A	B	C	D	E	F	G	H	I	J	K	L
469											Approximate Chi Square Value (0.05)	53.39
470					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	50.62
471												
472					Assuming Gamma Distribution							
473				95% Approximate Gamma UCL (use when n>=50))		0.505					95% Adjusted Gamma UCL (use when n<50)	0.532
474												
475					Lognormal GOF Test							
476					Shapiro Wilk Test Statistic	0.556			Shapiro Wilk Lognormal GOF Test			
477					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
478					Lilliefors Test Statistic	0.418			Lilliefors Lognormal GOF Test			
479					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
480					Data Not Lognormal at 5% Significance Level							
481												
482					Lognormal Statistics							
483					Minimum of Logged Data	-2.714			Mean of logged Data			-1.084
484					Maximum of Logged Data	-0.713			SD of logged Data			0.588
485												
486					Assuming Lognormal Distribution							
487					95% H-UCL	0.637			90% Chebyshev (MVUE) UCL			0.619
488					95% Chebyshev (MVUE) UCL	0.721			97.5% Chebyshev (MVUE) UCL			0.862
489					99% Chebyshev (MVUE) UCL	1.14						
490												
491					Nonparametric Distribution Free UCL Statistics							
492					Data do not follow a Discernible Distribution (0.05)							
493												
494					Nonparametric Distribution Free UCLs							
495					95% CLT UCL	0.438			95% Jackknife UCL			0.445
496					95% Standard Bootstrap UCL	0.435			95% Bootstrap-t UCL			0.429
497					95% Hall's Bootstrap UCL	0.421			95% Percentile Bootstrap UCL			0.428
498					95% BCA Bootstrap UCL	0.418						
499					90% Chebyshev(Mean, Sd) UCL	0.49			95% Chebyshev(Mean, Sd) UCL			0.543
500					97.5% Chebyshev(Mean, Sd) UCL	0.615			99% Chebyshev(Mean, Sd) UCL			0.758
501												
502					Suggested UCL to Use							
503					95% Chebyshev (Mean, Sd) UCL	0.543						
504												
505					Recommended UCL exceeds the maximum observation							
506												
507					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
508					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
509					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
510					For additional insight the user may want to consult a statistician.							
511												
512					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
513					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
514												
515												
516	PCB, Total											
517												
518					General Statistics							
519					Total Number of Observations	10			Number of Distinct Observations			6
520									Number of Missing Observations			0

	A	B	C	D	E	F	G	H	I	J	K	L
521					Minimum	0.1					Mean	2.733
522					Maximum	5					Median	3.126
523					SD	2.411					Std. Error of Mean	0.762
524					Coefficient of Variation	0.882					Skewness	-0.0574
525												
526					Normal GOF Test							
527					Shapiro Wilk Test Statistic	0.716	Shapiro Wilk GOF Test					
528					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
529					Lilliefors Test Statistic	0.326	Lilliefors GOF Test					
530					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
531					Data Not Normal at 5% Significance Level							
532												
533					Assuming Normal Distribution							
534				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
535					95% Student's-t UCL	4.13					95% Adjusted-CLT UCL (Chen-1995)	3.972
536											95% Modified-t UCL (Johnson-1978)	4.128
537												
538					Gamma GOF Test							
539					A-D Test Statistic	1.026	Anderson-Darling Gamma GOF Test					
540					5% A-D Critical Value	0.757	Data Not Gamma Distributed at 5% Significance Level					
541					K-S Test Statistic	0.33	Kolmogrov-Smirnoff Gamma GOF Test					
542					5% K-S Critical Value	0.276	Data Not Gamma Distributed at 5% Significance Level					
543					Data Not Gamma Distributed at 5% Significance Level							
544												
545					Gamma Statistics							
546					k hat (MLE)	0.752					k star (bias corrected MLE)	0.593
547					Theta hat (MLE)	3.636					Theta star (bias corrected MLE)	4.61
548					nu hat (MLE)	15.03					nu star (bias corrected)	11.86
549					MLE Mean (bias corrected)	2.733					MLE Sd (bias corrected)	3.55
550											Approximate Chi Square Value (0.05)	5.133
551					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	4.389
552												
553					Assuming Gamma Distribution							
554					95% Approximate Gamma UCL (use when n>=50))	6.313					95% Adjusted Gamma UCL (use when n<50)	7.383
555												
556					Lognormal GOF Test							
557					Shapiro Wilk Test Statistic	0.802	Shapiro Wilk Lognormal GOF Test					
558					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
559					Lilliefors Test Statistic	0.305	Lilliefors Lognormal GOF Test					
560					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
561					Data Not Lognormal at 5% Significance Level							
562												
563					Lognormal Statistics							
564					Minimum of Logged Data	-2.303					Mean of logged Data	0.209
565					Maximum of Logged Data	1.609					SD of logged Data	1.632
566												
567					Assuming Lognormal Distribution							
568					95% H-UCL	54.39					90% Chebyshev (MVUE) UCL	9.661
569					95% Chebyshev (MVUE) UCL	12.37					97.5% Chebyshev (MVUE) UCL	16.13
570					99% Chebyshev (MVUE) UCL	23.53						
571												
572					Nonparametric Distribution Free UCL Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
573	Data do not follow a Discernible Distribution (0.05)											
574												
575	Nonparametric Distribution Free UCLs											
576					95% CLT UCL	3.987				95% Jackknife UCL		4.13
577					95% Standard Bootstrap UCL	3.916				95% Bootstrap-t UCL		4.321
578					95% Hall's Bootstrap UCL	3.615				95% Percentile Bootstrap UCL		4.038
579					95% BCA Bootstrap UCL	4.038						
580					90% Chebyshev(Mean, Sd) UCL	5.02				95% Chebyshev(Mean, Sd) UCL		6.056
581					97.5% Chebyshev(Mean, Sd) UCL	7.494				99% Chebyshev(Mean, Sd) UCL		10.32
582												
583	Suggested UCL to Use											
584					99% Chebyshev (Mean, Sd) UCL	10.32						
585												
586	Recommended UCL exceeds the maximum observation											
587												
588	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
589	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
590	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
591	For additional insight the user may want to consult a statistician.											
592												
593	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
594	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
595												
596												
597	Technetium-99											
598												
599	General Statistics											
600					Total Number of Observations	10				Number of Distinct Observations		6
601										Number of Missing Observations		0
602					Minimum	-0.014				Mean		30.58
603					Maximum	150				Median		30.58
604					SD	44.51				Std. Error of Mean		14.08
605					Coefficient of Variation	1.456				Skewness		2.514
606												
607	Normal GOF Test											
608					Shapiro Wilk Test Statistic	0.631				Shapiro Wilk GOF Test		
609					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
610					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
611					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
612	Data Not Normal at 5% Significance Level											
613												
614	Assuming Normal Distribution											
615	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
616					95% Student's-t UCL	56.38				95% Adjusted-CLT UCL (Chen-1995)		65.69
617										95% Modified-t UCL (Johnson-1978)		58.24
618	Gamma Statistics Not Available											
619	Lognormal Statistics Not Available											
620												
621	Nonparametric Distribution Free UCL Statistics											
622	Data do not follow a Discernible Distribution (0.05)											
623												
624	Nonparametric Distribution Free UCLs											

625					95% CLT UCL	53.73					95% Jackknife UCL	56.38
626					95% Standard Bootstrap UCL	52.72					95% Bootstrap-t UCL	82.23
627					95% Hall's Bootstrap UCL	144.5					95% Percentile Bootstrap UCL	54.46
628					95% BCA Bootstrap UCL	72.26						
629					90% Chebyshev(Mean, Sd) UCL	72.8					95% Chebyshev(Mean, Sd) UCL	91.93
630					97.5% Chebyshev(Mean, Sd) UCL	118.5					99% Chebyshev(Mean, Sd) UCL	170.6
631												
632					**Suggested UCL to Use**							
633					95% Chebyshev (Mean, Sd) UCL	91.93						
634												
635					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
636					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
637					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
638					For additional insight the user may want to consult a statistician.							
639												
640												
641	**Uranium**											
642												
643					**General Statistics**							
644					Total Number of Observations	10					Number of Distinct Observations	4
645											Number of Missing Observations	0
646					Minimum	0.929					Mean	20.58
647					Maximum	130					Median	10
648					SD	38.57					Std. Error of Mean	12.2
649					Coefficient of Variation	1.874					Skewness	3.123
650												
651					**Normal GOF Test**							
652					Shapiro Wilk Test Statistic	0.429					**Shapiro Wilk GOF Test**	
653					5% Shapiro Wilk Critical Value	0.842					Data Not Normal at 5% Significance Level	
654					Lilliefors Test Statistic	0.508					**Lilliefors GOF Test**	
655					5% Lilliefors Critical Value	0.28					Data Not Normal at 5% Significance Level	
656					**Data Not Normal at 5% Significance Level**							
657												
658					**Assuming Normal Distribution**							
659					**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**	
660					95% Student's-t UCL	42.94					95% Adjusted-CLT UCL (Chen-1995)	53.52
661											95% Modified-t UCL (Johnson-1978)	44.95
662												
663					**Gamma GOF Test**							
664					A-D Test Statistic	1.906					**Anderson-Darling Gamma GOF Test**	
665					5% A-D Critical Value	0.756					Data Not Gamma Distributed at 5% Significance Level	
666					K-S Test Statistic	0.466					**Kolmogrov-Smirnoff Gamma GOF Test**	
667					5% K-S Critical Value	0.276					Data Not Gamma Distributed at 5% Significance Level	
668					**Data Not Gamma Distributed at 5% Significance Level**							
669												
670					**Gamma Statistics**							
671					k hat (MLE)	0.77					k star (bias corrected MLE)	0.606
672					Theta hat (MLE)	26.72					Theta star (bias corrected MLE)	33.97
673					nu hat (MLE)	15.41					nu star (bias corrected)	12.12
674					MLE Mean (bias corrected)	20.58					MLE Sd (bias corrected)	26.44
675											Approximate Chi Square Value (0.05)	5.305
676					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	4.546

	A	B	C	D	E	F	G	H	I	J	K	L
677												
678						Assuming Gamma Distribution						
679					95% Approximate Gamma UCL (use when n>=50))	47.02				95% Adjusted Gamma UCL (use when n<50)		54.86
680												
681						Lognormal GOF Test						
682					Shapiro Wilk Test Statistic	0.742			Shapiro Wilk Lognormal GOF Test			
683					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
684					Lilliefors Test Statistic	0.382			Lilliefors Lognormal GOF Test			
685					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
686						Data Not Lognormal at 5% Significance Level						
687												
688						Lognormal Statistics						
689					Minimum of Logged Data	-0.0736			Mean of logged Data			2.25
690					Maximum of Logged Data	4.868			SD of logged Data			1.188
691												
692						Assuming Lognormal Distribution						
693					95% H-UCL	76.95			90% Chebyshev (MVUE) UCL			37.96
694					95% Chebyshev (MVUE) UCL	47.31			97.5% Chebyshev (MVUE) UCL			60.27
695					99% Chebyshev (MVUE) UCL	85.75						
696												
697						Nonparametric Distribution Free UCL Statistics						
698						Data do not follow a Discernible Distribution (0.05)						
699												
700						Nonparametric Distribution Free UCLs						
701					95% CLT UCL	40.64			95% Jackknife UCL			42.94
702					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
703					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
704					95% BCA Bootstrap UCL	N/A						
705					90% Chebyshev(Mean, Sd) UCL	57.17			95% Chebyshev(Mean, Sd) UCL			73.75
706					97.5% Chebyshev(Mean, Sd) UCL	96.75			99% Chebyshev(Mean, Sd) UCL			141.9
707												
708						Suggested UCL to Use						
709					95% Chebyshev (Mean, Sd) UCL	73.75						
710												
711						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
712						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
713						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
714						For additional insight the user may want to consult a statistician.						
715												
716												
717	Uranium-234											
718												
719						General Statistics						
720					Total Number of Observations	10			Number of Distinct Observations			6
721									Number of Missing Observations			0
722					Minimum	0.5			Mean			8.028
723					Maximum	35.7			Median			8.028
724					SD	10.32			Std. Error of Mean			3.263
725					Coefficient of Variation	1.285			Skewness			2.51
726												
727						Normal GOF Test						
728					Shapiro Wilk Test Statistic	0.639			Shapiro Wilk GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
729					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
730					Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**					
731					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
732	**Data Not Normal at 5% Significance Level**											
733												
734	**Assuming Normal Distribution**											
735	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
736					95% Student's-t UCL	14.01	95% Adjusted-CLT UCL (Chen-1995)					16.16
737							95% Modified-t UCL (Johnson-1978)					14.44
738												
739	**Gamma GOF Test**											
740					A-D Test Statistic	0.716	**Anderson-Darling Gamma GOF Test**					
741					5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level					
742					K-S Test Statistic	0.258	**Kolmogrov-Smirnoff Gamma GOF Test**					
743					5% K-S Critical Value	0.275	Detected data appear Gamma Distributed at 5% Significance Level					
744	**Detected data appear Gamma Distributed at 5% Significance Level**											
745												
746	**Gamma Statistics**											
747					k hat (MLE)	0.863	k star (bias corrected MLE)					0.671
748					Theta hat (MLE)	9.303	Theta star (bias corrected MLE)					11.97
749					nu hat (MLE)	17.26	nu star (bias corrected)					13.41
750					MLE Mean (bias corrected)	8.028	MLE Sd (bias corrected)					9.803
751							Approximate Chi Square Value (0.05)					6.173
752					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					5.343
753												
754	**Assuming Gamma Distribution**											
755			95% Approximate Gamma UCL (use when n>=50)			17.45	95% Adjusted Gamma UCL (use when n<50)					20.16
756												
757	**Lognormal GOF Test**											
758					Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk Lognormal GOF Test**					
759					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
760					Lilliefors Test Statistic	0.297	**Lilliefors Lognormal GOF Test**					
761					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
762	**Data appear Approximate Lognormal at 5% Significance Level**											
763												
764	**Lognormal Statistics**											
765					Minimum of Logged Data	-0.693	Mean of logged Data					1.402
766					Maximum of Logged Data	3.575	SD of logged Data					1.319
767												
768	**Assuming Lognormal Distribution**											
769					95% H-UCL	51.42	90% Chebyshev (MVUE) UCL					19.68
770					95% Chebyshev (MVUE) UCL	24.76	97.5% Chebyshev (MVUE) UCL					31.81
771					99% Chebyshev (MVUE) UCL	45.66						
772												
773	**Nonparametric Distribution Free UCL Statistics**											
774	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
775												
776	**Nonparametric Distribution Free UCLs**											
777					95% CLT UCL	13.39	95% Jackknife UCL					14.01
778					95% Standard Bootstrap UCL	13.08	95% Bootstrap-t UCL					19.98
779					95% Hall's Bootstrap UCL	34.49	95% Percentile Bootstrap UCL					14.14
780					95% BCA Bootstrap UCL	16.95						

	A	B	C	D	E	F	G	H	I	J	K	L
781					90% Chebyshev(Mean, Sd) UCL	17.82					95% Chebyshev(Mean, Sd) UCL	22.25
782					97.5% Chebyshev(Mean, Sd) UCL	28.4					99% Chebyshev(Mean, Sd) UCL	40.49
783												
784					**Suggested UCL to Use**							
785					95% Adjusted Gamma UCL	20.16						
786												
787	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
788	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
789	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
790	For additional insight the user may want to consult a statistician.											
791												
792												
793	**Uranium-235**											
794												
795					**General Statistics**							
796					Total Number of Observations	10					Number of Distinct Observations	6
797											Number of Missing Observations	0
798					Minimum	0.00841					Mean	0.873
799					Maximum	4.12					Median	0.873
800					SD	1.21					Std. Error of Mean	0.383
801					Coefficient of Variation	1.386					Skewness	2.512
802												
803					**Normal GOF Test**							
804					Shapiro Wilk Test Statistic	0.636					**Shapiro Wilk GOF Test**	
805					5% Shapiro Wilk Critical Value	0.842					Data Not Normal at 5% Significance Level	
806					Lilliefors Test Statistic	0.4					**Lilliefors GOF Test**	
807					5% Lilliefors Critical Value	0.28					Data Not Normal at 5% Significance Level	
808					**Data Not Normal at 5% Significance Level**							
809												
810					**Assuming Normal Distribution**							
811					**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**	
812					95% Student's-t UCL	1.575					95% Adjusted-CLT UCL (Chen-1995)	1.828
813											95% Modified-t UCL (Johnson-1978)	1.626
814												
815					**Gamma GOF Test**							
816					A-D Test Statistic	0.653					**Anderson-Darling Gamma GOF Test**	
817					5% A-D Critical Value	0.77					Detected data appear Gamma Distributed at 5% Significance Level	
818					K-S Test Statistic	0.27					**Kolmogrov-Smirnoff Gamma GOF Test**	
819					5% K-S Critical Value	0.279					Detected data appear Gamma Distributed at 5% Significance Level	
820					**Detected data appear Gamma Distributed at 5% Significance Level**							
821												
822					**Gamma Statistics**							
823					k hat (MLE)	0.586					k star (bias corrected MLE)	0.477
824					Theta hat (MLE)	1.489					Theta star (bias corrected MLE)	1.83
825					nu hat (MLE)	11.73					nu star (bias corrected)	9.543
826					MLE Mean (bias corrected)	0.873					MLE Sd (bias corrected)	1.264
827											Approximate Chi Square Value (0.05)	3.658
828					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	3.053
829												
830					**Assuming Gamma Distribution**							
831					95% Approximate Gamma UCL (use when n>=50)	2.278					95% Adjusted Gamma UCL (use when n<50)	2.73
832												

	A	B	C	D	E	F	G	H	I	J	K	L
833						Lognormal GOF Test						
834					Shapiro Wilk Test Statistic	0.882	Shapiro Wilk Lognormal GOF Test					
835					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
836					Lilliefors Test Statistic	0.313	Lilliefors Lognormal GOF Test					
837					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
838					Data appear Approximate Lognormal at 5% Significance Level							
839												
840					Lognormal Statistics							
841					Minimum of Logged Data	-4.778	Mean of logged Data					-1.193
842					Maximum of Logged Data	1.416	SD of logged Data					1.885
843												
844					Assuming Lognormal Distribution							
845					95% H-UCL	44.6	90% Chebyshev (MVUE) UCL					3.584
846					95% Chebyshev (MVUE) UCL	4.639	97.5% Chebyshev (MVUE) UCL					6.103
847					99% Chebyshev (MVUE) UCL	8.979						
848												
849					Nonparametric Distribution Free UCL Statistics							
850					Data appear to follow a Discernible Distribution at 5% Significance Level							
851												
852					Nonparametric Distribution Free UCLs							
853					95% CLT UCL	1.503	95% Jackknife UCL					1.575
854					95% Standard Bootstrap UCL	1.467	95% Bootstrap-t UCL					2.276
855					95% Hall's Bootstrap UCL	3.974	95% Percentile Bootstrap UCL					1.523
856					95% BCA Bootstrap UCL	1.773						
857					90% Chebyshev(Mean, Sd) UCL	2.021	95% Chebyshev(Mean, Sd) UCL					2.542
858					97.5% Chebyshev(Mean, Sd) UCL	3.263	99% Chebyshev(Mean, Sd) UCL					4.682
859												
860					Suggested UCL to Use							
861					95% Adjusted Gamma UCL	2.73						
862												
863					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
864					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
865					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
866					For additional insight the user may want to consult a statistician.							
867												
868												
869	Uranium-238											
870												
871					General Statistics							
872					Total Number of Observations	10	Number of Distinct Observations					6
873							Number of Missing Observations					0
874					Minimum	0.687	Mean					13.99
875					Maximum	64.1	Median					13.99
876					SD	18.68	Std. Error of Mean					5.907
877					Coefficient of Variation	1.335	Skewness					2.512
878												
879					Normal GOF Test							
880					Shapiro Wilk Test Statistic	0.636	Shapiro Wilk GOF Test					
881					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
882					Lilliefors Test Statistic	0.4	Lilliefors GOF Test					
883					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
884					Data Not Normal at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
885												
886						Assuming Normal Distribution						
887				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
888					95% Student's-t UCL	24.82				95% Adjusted-CLT UCL (Chen-1995)		28.72
889										95% Modified-t UCL (Johnson-1978)		25.6
890												
891						Gamma GOF Test						
892					A-D Test Statistic	0.733			Anderson-Darling Gamma GOF Test			
893					5% A-D Critical Value	0.757			Detected data appear Gamma Distributed at 5% Significance Level			
894					K-S Test Statistic	0.251			Kolmogrov-Smirnoff Gamma GOF Test			
895					5% K-S Critical Value	0.276			Detected data appear Gamma Distributed at 5% Significance Level			
896						Detected data appear Gamma Distributed at 5% Significance Level						
897												
898						Gamma Statistics						
899					k hat (MLE)	0.754			k star (bias corrected MLE)			0.595
900					Theta hat (MLE)	18.55			Theta star (bias corrected MLE)			23.53
901					nu hat (MLE)	15.08			nu star (bias corrected)			11.89
902					MLE Mean (bias corrected)	13.99			MLE Sd (bias corrected)			18.14
903									Approximate Chi Square Value (0.05)			5.156
904					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			4.41
905												
906						Assuming Gamma Distribution						
907					95% Approximate Gamma UCL (use when n>=50)	32.27			95% Adjusted Gamma UCL (use when n<50)			37.73
908												
909						Lognormal GOF Test						
910					Shapiro Wilk Test Statistic	0.878			Shapiro Wilk Lognormal GOF Test			
911					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
912					Lilliefors Test Statistic	0.306			Lilliefors Lognormal GOF Test			
913					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
914						Data appear Approximate Lognormal at 5% Significance Level						
915												
916						Lognormal Statistics						
917					Minimum of Logged Data	-0.375			Mean of logged Data			1.845
918					Maximum of Logged Data	4.16			SD of logged Data			1.462
919												
920						Assuming Lognormal Distribution						
921					95% H-UCL	137.1			90% Chebyshev (MVUE) UCL			38.04
922					95% Chebyshev (MVUE) UCL	48.29			97.5% Chebyshev (MVUE) UCL			62.51
923					99% Chebyshev (MVUE) UCL	90.43						
924												
925						Nonparametric Distribution Free UCL Statistics						
926						Data appear to follow a Discernible Distribution at 5% Significance Level						
927												
928						Nonparametric Distribution Free UCLs						
929					95% CLT UCL	23.71			95% Jackknife UCL			24.82
930					95% Standard Bootstrap UCL	23.17			95% Bootstrap-t UCL			35.64
931					95% Hall's Bootstrap UCL	61.85			95% Percentile Bootstrap UCL			24.01
932					95% BCA Bootstrap UCL	27.88						
933					90% Chebyshev(Mean, Sd) UCL	31.71			95% Chebyshev(Mean, Sd) UCL			39.74
934					97.5% Chebyshev(Mean, Sd) UCL	50.88			99% Chebyshev(Mean, Sd) UCL			72.77
935												
936						Suggested UCL to Use						

	A	B	C	D	E	F	G	H	I	J	K	L
937					95% Adjusted Gamma UCL	37.73						
938												
939	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
940	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
941	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
942	For additional insight the user may want to consult a statistician.											
943												
944												
945	**Vanadium**											
946												
947	**General Statistics**											
948	Total Number of Observations					10	Number of Distinct Observations					9
949							Number of Missing Observations					0
950	Minimum					73	Mean					95
951	Maximum					138	Median					92.5
952	SD					18.11	Std. Error of Mean					5.727
953	Coefficient of Variation					0.191	Skewness					1.458
954												
955	**Normal GOF Test**											
956	Shapiro Wilk Test Statistic					0.875	**Shapiro Wilk GOF Test**					
957	5% Shapiro Wilk Critical Value					0.842	Data appear Normal at 5% Significance Level					
958	Lilliefors Test Statistic					0.191	**Lilliefors GOF Test**					
959	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
960	**Data appear Normal at 5% Significance Level**											
961												
962	**Assuming Normal Distribution**											
963	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
964	95% Student's-t UCL					105.5	95% Adjusted-CLT UCL (Chen-1995)					107.2
965							95% Modified-t UCL (Johnson-1978)					105.9
966												
967	**Gamma GOF Test**											
968	A-D Test Statistic					0.4	**Anderson-Darling Gamma GOF Test**					
969	5% A-D Critical Value					0.724	Detected data appear Gamma Distributed at 5% Significance Level					
970	K-S Test Statistic					0.16	**Kolmogrov-Smirnoff Gamma GOF Test**					
971	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
972	**Detected data appear Gamma Distributed at 5% Significance Level**											
973												
974	**Gamma Statistics**											
975	k hat (MLE)					33.86	k star (bias corrected MLE)					23.77
976	Theta hat (MLE)					2.806	Theta star (bias corrected MLE)					3.997
977	nu hat (MLE)					677.2	nu star (bias corrected)					475.4
978	MLE Mean (bias corrected)					95	MLE Sd (bias corrected)					19.49
979							Approximate Chi Square Value (0.05)					425.8
980	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					417.7
981												
982	**Assuming Gamma Distribution**											
983	95% Approximate Gamma UCL (use when n>=50))					106.1	95% Adjusted Gamma UCL (use when n<50)					108.1
984												
985	**Lognormal GOF Test**											
986	Shapiro Wilk Test Statistic					0.93	**Shapiro Wilk Lognormal GOF Test**					
987	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
988	Lilliefors Test Statistic					0.161	**Lilliefors Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
989					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
990	**Data appear Lognormal at 5% Significance Level**											
991												
992	**Lognormal Statistics**											
993					Minimum of Logged Data	4.29				Mean of logged Data		4.539
994					Maximum of Logged Data	4.927				SD of logged Data		0.178
995												
996	**Assuming Lognormal Distribution**											
997					95% H-UCL	106.2				90% Chebyshev (MVUE) UCL		111
998					95% Chebyshev (MVUE) UCL	118.3				97.5% Chebyshev (MVUE) UCL		128.4
999					99% Chebyshev (MVUE) UCL	148.2						
1000												
1001	**Nonparametric Distribution Free UCL Statistics**											
1002	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1003												
1004	**Nonparametric Distribution Free UCLs**											
1005					95% CLT UCL	104.4				95% Jackknife UCL		105.5
1006					95% Standard Bootstrap UCL	103.9				95% Bootstrap-t UCL		109.7
1007					95% Hall's Bootstrap UCL	156.7				95% Percentile Bootstrap UCL		104.6
1008					95% BCA Bootstrap UCL	107.8						
1009					90% Chebyshev(Mean, Sd) UCL	112.2				95% Chebyshev(Mean, Sd) UCL		120
1010					97.5% Chebyshev(Mean, Sd) UCL	130.8				99% Chebyshev(Mean, Sd) UCL		152
1011												
1012	**Suggested UCL to Use**											
1013					95% Student's-t UCL	105.5						
1014												
1015	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1016	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1017	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1018	For additional insight the user may want to consult a statistician.											
1019												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 8:45:03 PM								
5	From File			EPC_013Sub_EU06.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Cadmium**											
12												
13	**General Statistics**											
14	Total Number of Observations					10	Number of Distinct Observations					6
15							Number of Missing Observations					0
16	Minimum					0.85	Mean					2.482
17	Maximum					6.78	Median					2.241
18	SD					1.597	Std. Error of Mean					0.505
19	Coefficient of Variation					0.644	Skewness					2.515
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.666	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					3.408	95% Adjusted-CLT UCL (Chen-1995)					3.742
31							95% Modified-t UCL (Johnson-1978)					3.475
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.93	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.73	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.333	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.268	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					3.934	k star (bias corrected MLE)					2.82
42	Theta hat (MLE)					0.631	Theta star (bias corrected MLE)					0.88
43	nu hat (MLE)					78.68	nu star (bias corrected)					56.41
44	MLE Mean (bias corrected)					2.482	MLE Sd (bias corrected)					1.478
45							Approximate Chi Square Value (0.05)					40.15
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					37.77
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					3.487	95% Adjusted Gamma UCL (use when n<50)					3.706
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.858	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.299	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
56	**Data appear Approximate Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-0.163				Mean of logged Data		0.776
60					Maximum of Logged Data	1.914				SD of logged Data		0.515
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	3.649				90% Chebyshev (MVUE) UCL		3.666
64					95% Chebyshev (MVUE) UCL	4.218				97.5% Chebyshev (MVUE) UCL		4.985
65					99% Chebyshev (MVUE) UCL	6.49						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	3.312				95% Jackknife UCL		3.408
72					95% Standard Bootstrap UCL	3.263				95% Bootstrap-t UCL		4.435
73					95% Hall's Bootstrap UCL	7.068				95% Percentile Bootstrap UCL		3.371
74					95% BCA Bootstrap UCL	3.68						
75					90% Chebyshev(Mean, Sd) UCL	3.997				95% Chebyshev(Mean, Sd) UCL		4.683
76					97.5% Chebyshev(Mean, Sd) UCL	5.636				99% Chebyshev(Mean, Sd) UCL		7.507
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	4.683						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Cesium-137**											
88												
89	**General Statistics**											
90					Total Number of Observations	10				Number of Distinct Observations		8
91										Number of Missing Observations		0
92					Minimum	-0.0116				Mean		0.132
93					Maximum	0.331				Median		0.132
94					SD	0.12				Std. Error of Mean		0.0381
95					Coefficient of Variation	0.912				Skewness		0.675
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data appear Normal at 5% Significance Level					
102	**Data appear Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	0.202				95% Adjusted-CLT UCL (Chen-1995)		0.203
107										95% Modified-t UCL (Johnson-1978)		0.203
108	Gamma Statistics Not Available											
109	Lognormal Statistics Not Available											
110												
111	Nonparametric Distribution Free UCL Statistics											
112	Data appear to follow a Discernible Distribution at 5% Significance Level											
113												
114	Nonparametric Distribution Free UCLs											
115					95% CLT UCL	0.195				95% Jackknife UCL		0.202
116					95% Standard Bootstrap UCL	0.192				95% Bootstrap-t UCL		0.223
117					95% Hall's Bootstrap UCL	0.263				95% Percentile Bootstrap UCL		0.191
118					95% BCA Bootstrap UCL	0.196						
119					90% Chebyshev(Mean, Sd) UCL	0.246				95% Chebyshev(Mean, Sd) UCL		0.298
120					97.5% Chebyshev(Mean, Sd) UCL	0.37				99% Chebyshev(Mean, Sd) UCL		0.511
121												
122	Suggested UCL to Use											
123					95% Student's-t UCL	0.202						
124												
125	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
126	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
127	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
128	For additional insight the user may want to consult a statistician.											
129												
130												
131	Iron											
132												
133	General Statistics											
134					Total Number of Observations	10				Number of Distinct Observations		10
135										Number of Missing Observations		0
136					Minimum	17735				Mean		25568
137					Maximum	43337				Median		22634
138					SD	9171				Std. Error of Mean		2900
139					Coefficient of Variation	0.359				Skewness		1.365
140												
141	Normal GOF Test											
142					Shapiro Wilk Test Statistic	0.788	Shapiro Wilk GOF Test					
143					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
144					Lilliefors Test Statistic	0.272	Lilliefors GOF Test					
145					5% Lilliefors Critical Value	0.28	Data appear Normal at 5% Significance Level					
146	Data appear Approximate Normal at 5% Significance Level											
147												
148	Assuming Normal Distribution											
149	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
150					95% Student's-t UCL	30884				95% Adjusted-CLT UCL (Chen-1995)		31675
151										95% Modified-t UCL (Johnson-1978)		31092
152												
153	Gamma GOF Test											
154					A-D Test Statistic	0.742	Anderson-Darling Gamma GOF Test					
155					5% A-D Critical Value	0.725	Data Not Gamma Distributed at 5% Significance Level					
156					K-S Test Statistic	0.227	Kolmogrov-Smirnoff Gamma GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
157					5% K-S Critical Value	0.267	Detected data appear Gamma Distributed at 5% Significance Level					
158	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
159												
160	**Gamma Statistics**											
161					k hat (MLE)	10.27				k star (bias corrected MLE)		7.256
162					Theta hat (MLE)	2489				Theta star (bias corrected MLE)		3524
163					nu hat (MLE)	205.4				nu star (bias corrected)		145.1
164					MLE Mean (bias corrected)	25568				MLE Sd (bias corrected)		9492
165										Approximate Chi Square Value (0.05)		118.3
166					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		114.1
167												
168	**Assuming Gamma Distribution**											
169					95% Approximate Gamma UCL (use when n>=50))	31369				95% Adjusted Gamma UCL (use when n<50)		32527
170												
171	**Lognormal GOF Test**											
172					Shapiro Wilk Test Statistic	0.853	**Shapiro Wilk Lognormal GOF Test**					
173					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
174					Lilliefors Test Statistic	0.208	**Lilliefors Lognormal GOF Test**					
175					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
176	**Data appear Lognormal at 5% Significance Level**											
177												
178	**Lognormal Statistics**											
179					Minimum of Logged Data	9.783				Mean of logged Data		10.1
180					Maximum of Logged Data	10.68				SD of logged Data		0.319
181												
182	**Assuming Lognormal Distribution**											
183					95% H-UCL	31662				90% Chebyshev (MVUE) UCL		33238
184					95% Chebyshev (MVUE) UCL	36757				97.5% Chebyshev (MVUE) UCL		41641
185					99% Chebyshev (MVUE) UCL	51236						
186												
187	**Nonparametric Distribution Free UCL Statistics**											
188	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
189												
190	**Nonparametric Distribution Free UCLs**											
191					95% CLT UCL	30338				95% Jackknife UCL		30884
192					95% Standard Bootstrap UCL	30269				95% Bootstrap-t UCL		37561
193					95% Hall's Bootstrap UCL	62603				95% Percentile Bootstrap UCL		30284
194					95% BCA Bootstrap UCL	31470						
195					90% Chebyshev(Mean, Sd) UCL	34268				95% Chebyshev(Mean, Sd) UCL		38209
196					97.5% Chebyshev(Mean, Sd) UCL	43679				99% Chebyshev(Mean, Sd) UCL		54423
197												
198	**Suggested UCL to Use**											
199					95% Student's-t UCL	30884						
200												
201	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
202	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
203	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
204	For additional insight the user may want to consult a statistician.											
205												
206												
207	**Manganese**											
208												

	A	B	C	D	E	F	G	H	I	J	K	L
209	General Statistics											
210					Total Number of Observations	10				Number of Distinct Observations		10
211										Number of Missing Observations		0
212					Minimum	415				Mean		773.5
213					Maximum	1155				Median		709
214					SD	296.7				Std. Error of Mean		93.82
215					Coefficient of Variation	0.384				Skewness		0.227
216												
217	Normal GOF Test											
218					Shapiro Wilk Test Statistic	0.867			Shapiro Wilk GOF Test			
219					5% Shapiro Wilk Critical Value	0.842			Data appear Normal at 5% Significance Level			
220					Lilliefors Test Statistic	0.182			Lilliefors GOF Test			
221					5% Lilliefors Critical Value	0.28			Data appear Normal at 5% Significance Level			
222	Data appear Normal at 5% Significance Level											
223												
224	Assuming Normal Distribution											
225			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
226					95% Student's-t UCL	945.5				95% Adjusted-CLT UCL (Chen-1995)		935
227										95% Modified-t UCL (Johnson-1978)		946.6
228												
229	Gamma GOF Test											
230					A-D Test Statistic	0.535			Anderson-Darling Gamma GOF Test			
231					5% A-D Critical Value	0.727			Detected data appear Gamma Distributed at 5% Significance Level			
232					K-S Test Statistic	0.193			Kolmogrov-Smirnoff Gamma GOF Test			
233					5% K-S Critical Value	0.267			Detected data appear Gamma Distributed at 5% Significance Level			
234	Detected data appear Gamma Distributed at 5% Significance Level											
235												
236	Gamma Statistics											
237					k hat (MLE)	7.369				k star (bias corrected MLE)		5.225
238					Theta hat (MLE)	105				Theta star (bias corrected MLE)		148
239					nu hat (MLE)	147.4				nu star (bias corrected)		104.5
240					MLE Mean (bias corrected)	773.5				MLE Sd (bias corrected)		338.4
241										Approximate Chi Square Value (0.05)		81.91
242					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		78.44
243												
244	Assuming Gamma Distribution											
245					95% Approximate Gamma UCL (use when n>=50))	986.8				95% Adjusted Gamma UCL (use when n<50)		1030
246												
247	Lognormal GOF Test											
248					Shapiro Wilk Test Statistic	0.89			Shapiro Wilk Lognormal GOF Test			
249					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
250					Lilliefors Test Statistic	0.186			Lilliefors Lognormal GOF Test			
251					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
252	Data appear Lognormal at 5% Significance Level											
253												
254	Lognormal Statistics											
255					Minimum of Logged Data	6.028				Mean of logged Data		6.582
256					Maximum of Logged Data	7.052				SD of logged Data		0.397
257												
258	Assuming Lognormal Distribution											
259					95% H-UCL	1029				90% Chebyshev (MVUE) UCL		1069
260					95% Chebyshev (MVUE) UCL	1203				97.5% Chebyshev (MVUE) UCL		1388

	A	B	C	D	E	F	G	H	I	J	K	L
261					99% Chebyshev (MVUE) UCL	1753						
262												
263					Nonparametric Distribution Free UCL Statistics							
264					Data appear to follow a Discernible Distribution at 5% Significance Level							
265												
266					Nonparametric Distribution Free UCLs							
267					95% CLT UCL	927.8				95% Jackknife UCL		945.5
268					95% Standard Bootstrap UCL	921.2				95% Bootstrap-t UCL		964.8
269					95% Hall's Bootstrap UCL	900.9				95% Percentile Bootstrap UCL		916.4
270					95% BCA Bootstrap UCL	925.5						
271					90% Chebyshev(Mean, Sd) UCL	1055				95% Chebyshev(Mean, Sd) UCL		1182
272					97.5% Chebyshev(Mean, Sd) UCL	1359				99% Chebyshev(Mean, Sd) UCL		1707
273												
274					Suggested UCL to Use							
275					95% Student's-t UCL	945.5						
276												
277					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
278					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
279					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
280					For additional insight the user may want to consult a statistician.							
281												
282												
283	Neptunium-237											
284												
285					General Statistics							
286					Total Number of Observations	10				Number of Distinct Observations		8
287										Number of Missing Observations		0
288					Minimum	-0.016				Mean		0.169
289					Maximum	1.08				Median		0.0659
290					SD	0.33				Std. Error of Mean		0.104
291					Coefficient of Variation	1.952				Skewness		2.839
292												
293					Normal GOF Test							
294					Shapiro Wilk Test Statistic	0.573				Shapiro Wilk GOF Test		
295					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
296					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
297					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
298					Data Not Normal at 5% Significance Level							
299												
300					Assuming Normal Distribution							
301					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
302					95% Student's-t UCL	0.36				95% Adjusted-CLT UCL (Chen-1995)		0.44
303										95% Modified-t UCL (Johnson-1978)		0.375
304					Gamma Statistics Not Available							
305					Lognormal Statistics Not Available							
306												
307					Nonparametric Distribution Free UCL Statistics							
308					Data do not follow a Discernible Distribution (0.05)							
309												
310					Nonparametric Distribution Free UCLs							
311					95% CLT UCL	0.34				95% Jackknife UCL		0.36
312					95% Standard Bootstrap UCL	0.336				95% Bootstrap-t UCL		0.778

	A	B	C	D	E	F	G	H	I	J	K	L
313					95% Hall's Bootstrap UCL	0.971				95% Percentile Bootstrap UCL		0.369
314					95% BCA Bootstrap UCL	0.44						
315					90% Chebyshev(Mean, Sd) UCL	0.481				95% Chebyshev(Mean, Sd) UCL		0.623
316					97.5% Chebyshev(Mean, Sd) UCL	0.82				99% Chebyshev(Mean, Sd) UCL		1.206
317												
318					**Suggested UCL to Use**							
319					95% Chebyshev (Mean, Sd) UCL	0.623						
320												
321					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
322					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
323					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
324					For additional insight the user may want to consult a statistician.							
325												
326												
327	**PAH, Total**											
328												
329					**General Statistics**							
330					Total Number of Observations	10				Number of Distinct Observations		5
331										Number of Missing Observations		0
332					Minimum	0.46				Mean		0.668
333					Maximum	1.247				Median		0.668
334					SD	0.236				Std. Error of Mean		0.0746
335					Coefficient of Variation	0.353				Skewness		1.821
336												
337					**Normal GOF Test**							
338					Shapiro Wilk Test Statistic	0.779				**Shapiro Wilk GOF Test**		
339					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
340					Lilliefors Test Statistic	0.3				**Lilliefors GOF Test**		
341					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
342					**Data Not Normal at 5% Significance Level**							
343												
344					**Assuming Normal Distribution**							
345					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
346					95% Student's-t UCL	0.805				95% Adjusted-CLT UCL (Chen-1995)		0.837
347										95% Modified-t UCL (Johnson-1978)		0.812
348												
349					**Gamma GOF Test**							
350					A-D Test Statistic	0.726				**Anderson-Darling Gamma GOF Test**		
351					5% A-D Critical Value	0.725				Data Not Gamma Distributed at 5% Significance Level		
352					K-S Test Statistic	0.26				**Kolmogrov-Smirnoff Gamma GOF Test**		
353					5% K-S Critical Value	0.267				Detected data appear Gamma Distributed at 5% Significance Level		
354					**Detected data follow Appr. Gamma Distribution at 5% Significance Level**							
355												
356					**Gamma Statistics**							
357					k hat (MLE)	11.02				k star (bias corrected MLE)		7.782
358					Theta hat (MLE)	0.0606				Theta star (bias corrected MLE)		0.0859
359					nu hat (MLE)	220.4				nu star (bias corrected)		155.6
360					MLE Mean (bias corrected)	0.668				MLE Sd (bias corrected)		0.24
361										Approximate Chi Square Value (0.05)		127.8
362					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		123.4
363												
364					**Assuming Gamma Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
365				95% Approximate Gamma UCL (use when n>=50)		0.814			95% Adjusted Gamma UCL (use when n<50)			0.843
366												
367						Lognormal GOF Test						
368					Shapiro Wilk Test Statistic	0.858			Shapiro Wilk Lognormal GOF Test			
369					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
370					Lilliefors Test Statistic	0.24			Lilliefors Lognormal GOF Test			
371					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
372						Data appear Lognormal at 5% Significance Level						
373												
374						Lognormal Statistics						
375					Minimum of Logged Data	-0.777			Mean of logged Data			-0.449
376					Maximum of Logged Data	0.22			SD of logged Data			0.306
377												
378						Assuming Lognormal Distribution						
379					95% H-UCL	0.819			90% Chebyshev (MVUE) UCL			0.86
380					95% Chebyshev (MVUE) UCL	0.949			97.5% Chebyshev (MVUE) UCL			1.071
381					99% Chebyshev (MVUE) UCL	1.312						
382												
383						Nonparametric Distribution Free UCL Statistics						
384						Data appear to follow a Discernible Distribution at 5% Significance Level						
385												
386						Nonparametric Distribution Free UCLs						
387					95% CLT UCL	0.791			95% Jackknife UCL			0.805
388					95% Standard Bootstrap UCL	0.783			95% Bootstrap-t UCL			0.891
389					95% Hall's Bootstrap UCL	1.415			95% Percentile Bootstrap UCL			0.795
390					95% BCA Bootstrap UCL	0.837						
391					90% Chebyshev(Mean, Sd) UCL	0.892			95% Chebyshev(Mean, Sd) UCL			0.993
392					97.5% Chebyshev(Mean, Sd) UCL	1.134			99% Chebyshev(Mean, Sd) UCL			1.41
393												
394						Suggested UCL to Use						
395					95% Adjusted Gamma UCL	0.843						
396												
397						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
398						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
399						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
400						For additional insight the user may want to consult a statistician.						
401												
402												
403	PCB, Total											
404												
405						General Statistics						
406					Total Number of Observations	10			Number of Distinct Observations			5
407									Number of Missing Observations			0
408					Minimum	0.1			Mean			2.159
409					Maximum	5			Median			0.585
410					SD	2.453			Std. Error of Mean			0.776
411					Coefficient of Variation	1.136			Skewness			0.463
412												
413						Normal GOF Test						
414					Shapiro Wilk Test Statistic	0.683			Shapiro Wilk GOF Test			
415					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
416					Lilliefors Test Statistic	0.325			Lilliefors GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
417					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
418	Data Not Normal at 5% Significance Level											
419												
420	Assuming Normal Distribution											
421	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
422					95% Student's-t UCL	3.581				95% Adjusted-CLT UCL (Chen-1995)		3.556
423										95% Modified-t UCL (Johnson-1978)		3.6
424												
425	Gamma GOF Test											
426					A-D Test Statistic	1.103	Anderson-Darling Gamma GOF Test					
427					5% A-D Critical Value	0.773	Data Not Gamma Distributed at 5% Significance Level					
428					K-S Test Statistic	0.275	Kolmogrov-Smirnoff Gamma GOF Test					
429					5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level					
430	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
431												
432	Gamma Statistics											
433					k hat (MLE)	0.55				k star (bias corrected MLE)		0.451
434					Theta hat (MLE)	3.929				Theta star (bias corrected MLE)		4.783
435					nu hat (MLE)	10.99				nu star (bias corrected)		9.027
436					MLE Mean (bias corrected)	2.159				MLE Sd (bias corrected)		3.214
437										Approximate Chi Square Value (0.05)		3.343
438					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		2.77
439												
440	Assuming Gamma Distribution											
441					95% Approximate Gamma UCL (use when n>=50)	5.829				95% Adjusted Gamma UCL (use when n<50)		7.035
442												
443	Lognormal GOF Test											
444					Shapiro Wilk Test Statistic	0.779	Shapiro Wilk Lognormal GOF Test					
445					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
446					Lilliefors Test Statistic	0.261	Lilliefors Lognormal GOF Test					
447					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
448	Data appear Approximate Lognormal at 5% Significance Level											
449												
450	Lognormal Statistics											
451					Minimum of Logged Data	-2.303				Mean of logged Data		-0.37
452					Maximum of Logged Data	1.609				SD of logged Data		1.828
453												
454	Assuming Lognormal Distribution											
455					95% H-UCL	76.42				90% Chebyshev (MVUE) UCL		7.436
456					95% Chebyshev (MVUE) UCL	9.603				97.5% Chebyshev (MVUE) UCL		12.61
457					99% Chebyshev (MVUE) UCL	18.52						
458												
459	Nonparametric Distribution Free UCL Statistics											
460	Data appear to follow a Discernible Distribution at 5% Significance Level											
461												
462	Nonparametric Distribution Free UCLs											
463					95% CLT UCL	3.435				95% Jackknife UCL		3.581
464					95% Standard Bootstrap UCL	3.357				95% Bootstrap-t UCL		3.436
465					95% Hall's Bootstrap UCL	3.04				95% Percentile Bootstrap UCL		3.532
466					95% BCA Bootstrap UCL	3.57						
467					90% Chebyshev(Mean, Sd) UCL	4.486				95% Chebyshev(Mean, Sd) UCL		5.54
468					97.5% Chebyshev(Mean, Sd) UCL	7.003				99% Chebyshev(Mean, Sd) UCL		9.876

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470						**Suggested UCL to Use**						
471					95% Adjusted Gamma UCL	7.035						
472												
473						**Recommended UCL exceeds the maximum observation**						
474												
475						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
476						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
477						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
478						For additional insight the user may want to consult a statistician.						
479												
480												
481	**Technetium-99**											
482												
483						**General Statistics**						
484					Total Number of Observations	10			Number of Distinct Observations			8
485									Number of Missing Observations			0
486					Minimum	0			Mean			25.17
487					Maximum	142			Median			14.94
488					SD	42.49			Std. Error of Mean			13.44
489					Coefficient of Variation	1.688			Skewness			2.777
490												
491						**Normal GOF Test**						
492					Shapiro Wilk Test Statistic	0.59			**Shapiro Wilk GOF Test**			
493					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
494					Lilliefors Test Statistic	0.4			**Lilliefors GOF Test**			
495					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
496						**Data Not Normal at 5% Significance Level**						
497												
498						**Assuming Normal Distribution**						
499					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
500					95% Student's-t UCL	49.81			95% Adjusted-CLT UCL (Chen-1995)			59.88
501									95% Modified-t UCL (Johnson-1978)			51.77
502						**Gamma Statistics Not Available**						
503						**Lognormal Statistics Not Available**						
504												
505						**Nonparametric Distribution Free UCL Statistics**						
506						**Data do not follow a Discernible Distribution (0.05)**						
507												
508						**Nonparametric Distribution Free UCLs**						
509					95% CLT UCL	47.28			95% Jackknife UCL			49.81
510					95% Standard Bootstrap UCL	46.13			95% Bootstrap-t UCL			91.87
511					95% Hall's Bootstrap UCL	130.8			95% Percentile Bootstrap UCL			48.46
512					95% BCA Bootstrap UCL	64.05						
513					90% Chebyshev(Mean, Sd) UCL	65.49			95% Chebyshev(Mean, Sd) UCL			83.75
514					97.5% Chebyshev(Mean, Sd) UCL	109.1			99% Chebyshev(Mean, Sd) UCL			158.9
515												
516						**Suggested UCL to Use**						
517					95% Chebyshev (Mean, Sd) UCL	83.75						
518												
519						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
520						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						

	A	B	C	D	E	F	G	H	I	J	K	L
521	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
522	For additional insight the user may want to consult a statistician.											
523												
524												
525	**Uranium**											
526												
527	**General Statistics**											
528					Total Number of Observations	10			Number of Distinct Observations			5
529									Number of Missing Observations			0
530					Minimum	0.872			Mean			13.48
531					Maximum	60			Median			10
532					SD	16.85			Std. Error of Mean			5.328
533					Coefficient of Variation	1.25			Skewness			2.801
534												
535	**Normal GOF Test**											
536					Shapiro Wilk Test Statistic	0.563			**Shapiro Wilk GOF Test**			
537					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
538					Lilliefors Test Statistic	0.411			**Lilliefors GOF Test**			
539					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
540	**Data Not Normal at 5% Significance Level**											
541												
542	**Assuming Normal Distribution**											
543			**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**			
544					95% Student's-t UCL	23.24			95% Adjusted-CLT UCL (Chen-1995)			27.28
545									95% Modified-t UCL (Johnson-1978)			24.03
546												
547	**Gamma GOF Test**											
548					A-D Test Statistic	1.241			**Anderson-Darling Gamma GOF Test**			
549					5% A-D Critical Value	0.748			Data Not Gamma Distributed at 5% Significance Level			
550					K-S Test Statistic	0.324			**Kolmogrov-Smirnoff Gamma GOF Test**			
551					5% K-S Critical Value	0.274			Data Not Gamma Distributed at 5% Significance Level			
552	**Data Not Gamma Distributed at 5% Significance Level**											
553												
554	**Gamma Statistics**											
555					k hat (MLE)	0.996			k star (bias corrected MLE)			0.764
556					Theta hat (MLE)	13.53			Theta star (bias corrected MLE)			17.64
557					nu hat (MLE)	19.92			nu star (bias corrected)			15.27
558					MLE Mean (bias corrected)	13.48			MLE Sd (bias corrected)			15.42
559									Approximate Chi Square Value (0.05)			7.453
560					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			6.526
561												
562	**Assuming Gamma Distribution**											
563					95% Approximate Gamma UCL (use when n>=50))	27.62			95% Adjusted Gamma UCL (use when n<50)			31.54
564												
565	**Lognormal GOF Test**											
566					Shapiro Wilk Test Statistic	0.766			**Shapiro Wilk Lognormal GOF Test**			
567					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
568					Lilliefors Test Statistic	0.388			**Lilliefors Lognormal GOF Test**			
569					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
570	**Data Not Lognormal at 5% Significance Level**											
571												
572	**Lognormal Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
573					Minimum of Logged Data	-0.137				Mean of logged Data		2.021
574					Maximum of Logged Data	4.094				SD of logged Data		1.263
575												
576					Assuming Lognormal Distribution							
577					95% H-UCL	78.38				90% Chebyshev (MVUE) UCL		33.63
578					95% Chebyshev (MVUE) UCL	42.14				97.5% Chebyshev (MVUE) UCL		53.95
579					99% Chebyshev (MVUE) UCL	77.15						
580												
581					Nonparametric Distribution Free UCL Statistics							
582					Data do not follow a Discernible Distribution (0.05)							
583												
584					Nonparametric Distribution Free UCLs							
585					95% CLT UCL	22.24				95% Jackknife UCL		23.24
586					95% Standard Bootstrap UCL	21.55				95% Bootstrap-t UCL		38.95
587					95% Hall's Bootstrap UCL	68.28				95% Percentile Bootstrap UCL		23.17
588					95% BCA Bootstrap UCL	28.48						
589					90% Chebyshev(Mean, Sd) UCL	29.46				95% Chebyshev(Mean, Sd) UCL		36.7
590					97.5% Chebyshev(Mean, Sd) UCL	46.75				99% Chebyshev(Mean, Sd) UCL		66.49
591												
592					Suggested UCL to Use							
593					95% Chebyshev (Mean, Sd) UCL	36.7						
594												
595					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
596					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
597					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
598					For additional insight the user may want to consult a statistician.							
599												
600												
601	Uranium-234											
602												
603					General Statistics							
604					Total Number of Observations	10				Number of Distinct Observations		8
605										Number of Missing Observations		0
606					Minimum	0.442				Mean		5.366
607					Maximum	30.7				Median		2.29
608					SD	9.147				Std. Error of Mean		2.893
609					Coefficient of Variation	1.704				Skewness		2.859
610												
611					Normal GOF Test							
612					Shapiro Wilk Test Statistic	0.563				Shapiro Wilk GOF Test		
613					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
614					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
615					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
616					Data Not Normal at 5% Significance Level							
617												
618					Assuming Normal Distribution							
619					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
620					95% Student's-t UCL	10.67				95% Adjusted-CLT UCL (Chen-1995)		12.92
621										95% Modified-t UCL (Johnson-1978)		11.1
622												
623					Gamma GOF Test							
624					A-D Test Statistic	0.647				Anderson-Darling Gamma GOF Test		

	A	B	C	D	E	F	G	H	I	J	K	L
625					5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level					
626					K-S Test Statistic	0.24	**Kolmogrov-Smirnoff Gamma GOF Test**					
627					5% K-S Critical Value	0.278	Detected data appear Gamma Distributed at 5% Significance Level					
628	**Detected data appear Gamma Distributed at 5% Significance Level**											
629												
630	**Gamma Statistics**											
631					k hat (MLE)	0.668	k star (bias corrected MLE)					0.534
632					Theta hat (MLE)	8.037	Theta star (bias corrected MLE)					10.05
633					nu hat (MLE)	13.36	nu star (bias corrected)					10.68
634					MLE Mean (bias corrected)	5.366	MLE Sd (bias corrected)					7.343
635							Approximate Chi Square Value (0.05)					4.372
636					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					3.697
637												
638	**Assuming Gamma Distribution**											
639				95% Approximate Gamma UCL (use when n>=50)		13.11	95% Adjusted Gamma UCL (use when n<50)					15.51
640												
641	**Lognormal GOF Test**											
642					Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk Lognormal GOF Test**					
643					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
644					Lilliefors Test Statistic	0.161	**Lilliefors Lognormal GOF Test**					
645					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
646	**Data appear Lognormal at 5% Significance Level**											
647												
648	**Lognormal Statistics**											
649					Minimum of Logged Data	-0.816	Mean of logged Data					0.769
650					Maximum of Logged Data	3.424	SD of logged Data					1.392
651												
652	**Assuming Lognormal Distribution**											
653					95% H-UCL	35.63	90% Chebyshev (MVUE) UCL					11.65
654					95% Chebyshev (MVUE) UCL	14.73	97.5% Chebyshev (MVUE) UCL					19
655					99% Chebyshev (MVUE) UCL	27.38						
656												
657	**Nonparametric Distribution Free UCL Statistics**											
658	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
659												
660	**Nonparametric Distribution Free UCLs**											
661					95% CLT UCL	10.12	95% Jackknife UCL					10.67
662					95% Standard Bootstrap UCL	9.804	95% Bootstrap-t UCL					22.23
663					95% Hall's Bootstrap UCL	27.32	95% Percentile Bootstrap UCL					10.6
664					95% BCA Bootstrap UCL	13.06						
665					90% Chebyshev(Mean, Sd) UCL	14.04	95% Chebyshev(Mean, Sd) UCL					17.97
666					97.5% Chebyshev(Mean, Sd) UCL	23.43	99% Chebyshev(Mean, Sd) UCL					34.15
667												
668	**Suggested UCL to Use**											
669					95% Adjusted Gamma UCL	15.51						
670												
671	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
672	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
673	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
674	For additional insight the user may want to consult a statistician.											
675												
676												

	A	B	C	D	E	F	G	H	I	J	K	L
677	Uranium-235											
678												
679						General Statistics						
680					Total Number of Observations	10				Number of Distinct Observations		8
681										Number of Missing Observations		0
682					Minimum	0.00884				Mean		0.355
683					Maximum	2.11				Median		0.139
684					SD	0.633				Std. Error of Mean		0.2
685					Coefficient of Variation	1.782				Skewness		2.862
686												
687						Normal GOF Test						
688					Shapiro Wilk Test Statistic	0.564				Shapiro Wilk GOF Test		
689					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
690					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
691					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
692						Data Not Normal at 5% Significance Level						
693												
694						Assuming Normal Distribution						
695					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
696					95% Student's-t UCL	0.723				95% Adjusted-CLT UCL (Chen-1995)		0.879
697										95% Modified-t UCL (Johnson-1978)		0.753
698												
699						Gamma GOF Test						
700					A-D Test Statistic	0.459				Anderson-Darling Gamma GOF Test		
701					5% A-D Critical Value	0.773				Detected data appear Gamma Distributed at 5% Significance Level		
702					K-S Test Statistic	0.225				Kolmogrov-Smirnoff Gamma GOF Test		
703					5% K-S Critical Value	0.28				Detected data appear Gamma Distributed at 5% Significance Level		
704						Detected data appear Gamma Distributed at 5% Significance Level						
705												
706						Gamma Statistics						
707					k hat (MLE)	0.548				k star (bias corrected MLE)		0.45
708					Theta hat (MLE)	0.649				Theta star (bias corrected MLE)		0.79
709					nu hat (MLE)	10.96				nu star (bias corrected)		9.002
710					MLE Mean (bias corrected)	0.355				MLE Sd (bias corrected)		0.53
711										Approximate Chi Square Value (0.05)		3.328
712					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		2.757
713												
714						Assuming Gamma Distribution						
715					95% Approximate Gamma UCL (use when n>=50)	0.961				95% Adjusted Gamma UCL (use when n<50)		1.161
716												
717						Lognormal GOF Test						
718					Shapiro Wilk Test Statistic	0.96				Shapiro Wilk Lognormal GOF Test		
719					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
720					Lilliefors Test Statistic	0.151				Lilliefors Lognormal GOF Test		
721					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
722						Data appear Lognormal at 5% Significance Level						
723												
724						Lognormal Statistics						
725					Minimum of Logged Data	-4.728				Mean of logged Data		-2.178
726					Maximum of Logged Data	0.747				SD of logged Data		1.684
727												
728						Assuming Lognormal Distribution						

	A	B	C	D	E	F	G	H	I	J	K	L
729					95% H-UCL	6.316				90% Chebyshev (MVUE) UCL		0.965
730					95% Chebyshev (MVUE) UCL	1.238				97.5% Chebyshev (MVUE) UCL		1.618
731					99% Chebyshev (MVUE) UCL	2.365						
732												
733					Nonparametric Distribution Free UCL Statistics							
734					Data appear to follow a Discernible Distribution at 5% Significance Level							
735												
736					Nonparametric Distribution Free UCLs							
737					95% CLT UCL	0.685				95% Jackknife UCL		0.723
738					95% Standard Bootstrap UCL	0.677				95% Bootstrap-t UCL		1.491
739					95% Hall's Bootstrap UCL	1.872				95% Percentile Bootstrap UCL		0.733
740					95% BCA Bootstrap UCL	0.945						
741					90% Chebyshev(Mean, Sd) UCL	0.956				95% Chebyshev(Mean, Sd) UCL		1.229
742					97.5% Chebyshev(Mean, Sd) UCL	1.606				99% Chebyshev(Mean, Sd) UCL		2.348
743												
744					Suggested UCL to Use							
745					95% Adjusted Gamma UCL	1.161						
746												
747					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
748					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
749					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
750					For additional insight the user may want to consult a statistician.							
751												
752												
753	Uranium-238											
754												
755					General Statistics							
756					Total Number of Observations	10				Number of Distinct Observations		8
757										Number of Missing Observations		0
758					Minimum	0.44				Mean		11.4
759					Maximum	62.9				Median		5.8
760					SD	18.63				Std. Error of Mean		5.891
761					Coefficient of Variation	1.634				Skewness		2.838
762												
763					Normal GOF Test							
764					Shapiro Wilk Test Statistic	0.578				Shapiro Wilk GOF Test		
765					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
766					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
767					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
768					Data Not Normal at 5% Significance Level							
769												
770					Assuming Normal Distribution							
771					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
772					95% Student's-t UCL	22.2				95% Adjusted-CLT UCL (Chen-1995)		26.74
773										95% Modified-t UCL (Johnson-1978)		23.08
774												
775					Gamma GOF Test							
776					A-D Test Statistic	0.487				Anderson-Darling Gamma GOF Test		
777					5% A-D Critical Value	0.762				Detected data appear Gamma Distributed at 5% Significance Level		
778					K-S Test Statistic	0.242				Kolmogrov-Smirnoff Gamma GOF Test		
779					5% K-S Critical Value	0.277				Detected data appear Gamma Distributed at 5% Significance Level		
780					Detected data appear Gamma Distributed at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
781												
782						Gamma Statistics						
783					k hat (MLE)	0.684				k star (bias corrected MLE)		0.545
784					Theta hat (MLE)	16.67				Theta star (bias corrected MLE)		20.9
785					nu hat (MLE)	13.68				nu star (bias corrected)		10.91
786					MLE Mean (bias corrected)	11.4				MLE Sd (bias corrected)		15.43
787										Approximate Chi Square Value (0.05)		4.518
788					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		3.829
789												
790						Assuming Gamma Distribution						
791					95% Approximate Gamma UCL (use when n>=50)	27.53				95% Adjusted Gamma UCL (use when n<50)		32.48
792												
793						Lognormal GOF Test						
794					Shapiro Wilk Test Statistic	0.962				Shapiro Wilk Lognormal GOF Test		
795					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
796					Lilliefors Test Statistic	0.169				Lilliefors Lognormal GOF Test		
797					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
798						Data appear Lognormal at 5% Significance Level						
799												
800						Lognormal Statistics						
801					Minimum of Logged Data	-0.821				Mean of logged Data		1.547
802					Maximum of Logged Data	4.142				SD of logged Data		1.438
803												
804						Assuming Lognormal Distribution						
805					95% H-UCL	92.58				90% Chebyshev (MVUE) UCL		27.21
806					95% Chebyshev (MVUE) UCL	34.49				97.5% Chebyshev (MVUE) UCL		44.59
807					99% Chebyshev (MVUE) UCL	64.44						
808												
809						Nonparametric Distribution Free UCL Statistics						
810						Data appear to follow a Discernible Distribution at 5% Significance Level						
811												
812						Nonparametric Distribution Free UCLs						
813					95% CLT UCL	21.09				95% Jackknife UCL		22.2
814					95% Standard Bootstrap UCL	20.61				95% Bootstrap-t UCL		43.99
815					95% Hall's Bootstrap UCL	57.18				95% Percentile Bootstrap UCL		22.71
816					95% BCA Bootstrap UCL	27.43						
817					90% Chebyshev(Mean, Sd) UCL	29.07				95% Chebyshev(Mean, Sd) UCL		37.08
818					97.5% Chebyshev(Mean, Sd) UCL	48.19				99% Chebyshev(Mean, Sd) UCL		70.02
819												
820						Suggested UCL to Use						
821					95% Adjusted Gamma UCL	32.48						
822												
823						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
824						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
825						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
826						For additional insight the user may want to consult a statistician.						
827												
828												
829	Vanadium											
830												
831						General Statistics						
832					Total Number of Observations	10				Number of Distinct Observations		8

	A	B	C	D	E	F	G	H	I	J	K	L
833											Number of Missing Observations	0
834					Minimum	84					Mean	107.9
835					Maximum	158					Median	102
836					SD	20.73					Std. Error of Mean	6.557
837					Coefficient of Variation	0.192					Skewness	1.76
838												
839					Normal GOF Test							
840					Shapiro Wilk Test Statistic	0.827	Shapiro Wilk GOF Test					
841					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
842					Lilliefors Test Statistic	0.26	Lilliefors GOF Test					
843					5% Lilliefors Critical Value	0.28	Data appear Normal at 5% Significance Level					
844					Data appear Approximate Normal at 5% Significance Level							
845												
846					Assuming Normal Distribution							
847			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
848					95% Student's-t UCL	119.9					95% Adjusted-CLT UCL (Chen-1995)	122.6
849											95% Modified-t UCL (Johnson-1978)	120.5
850												
851					Gamma GOF Test							
852					A-D Test Statistic	0.628	Anderson-Darling Gamma GOF Test					
853					5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level					
854					K-S Test Statistic	0.232	Kolmogrov-Smirnoff Gamma GOF Test					
855					5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level					
856					Detected data appear Gamma Distributed at 5% Significance Level							
857												
858					Gamma Statistics							
859					k hat (MLE)	34.48					k star (bias corrected MLE)	24.2
860					Theta hat (MLE)	3.129					Theta star (bias corrected MLE)	4.458
861					nu hat (MLE)	689.6					nu star (bias corrected)	484.1
862					MLE Mean (bias corrected)	107.9					MLE Sd (bias corrected)	21.93
863											Approximate Chi Square Value (0.05)	434
864					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	425.8
865												
866					Assuming Gamma Distribution							
867					95% Approximate Gamma UCL (use when n>=50))	120.3					95% Adjusted Gamma UCL (use when n<50)	122.7
868												
869					Lognormal GOF Test							
870					Shapiro Wilk Test Statistic	0.889	Shapiro Wilk Lognormal GOF Test					
871					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
872					Lilliefors Test Statistic	0.223	Lilliefors Lognormal GOF Test					
873					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
874					Data appear Lognormal at 5% Significance Level							
875												
876					Lognormal Statistics							
877					Minimum of Logged Data	4.431					Mean of logged Data	4.667
878					Maximum of Logged Data	5.063					SD of logged Data	0.175
879												
880					Assuming Lognormal Distribution							
881					95% H-UCL	120.3					90% Chebyshev (MVUE) UCL	125.7
882					95% Chebyshev (MVUE) UCL	133.8					97.5% Chebyshev (MVUE) UCL	145
883					99% Chebyshev (MVUE) UCL	167.1						
884												

	A	B	C	D	E	F	G	H	I	J	K	L
885	Nonparametric Distribution Free UCL Statistics											
886	Data appear to follow a Discernible Distribution at 5% Significance Level											
887												
888	Nonparametric Distribution Free UCLs											
889					95% CLT UCL	118.7				95% Jackknife UCL		119.9
890					95% Standard Bootstrap UCL	118.3				95% Bootstrap-t UCL		131.5
891					95% Hall's Bootstrap UCL	183.8				95% Percentile Bootstrap UCL		118.7
892					95% BCA Bootstrap UCL	122.7						
893					90% Chebyshev(Mean, Sd) UCL	127.6				95% Chebyshev(Mean, Sd) UCL		136.5
894					97.5% Chebyshev(Mean, Sd) UCL	148.8				99% Chebyshev(Mean, Sd) UCL		173.1
895												
896	Suggested UCL to Use											
897					95% Student's-t UCL	119.9						
898												
899	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
900	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
901	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
902	For additional insight the user may want to consult a statistician.											
903												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:24:37 PM								
5	From File			EPC_013Sub_EU07.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	**General Statistics**											
14	Total Number of Observations					10	Number of Distinct Observations					10
15							Number of Missing Observations					0
16	Minimum					15858	Mean					23010
17	Maximum					39372	Median					21126
18	SD					6667	Std. Error of Mean					2108
19	Coefficient of Variation					0.29	Skewness					1.848
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.818	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.28	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					26875	95% Adjusted-CLT UCL (Chen-1995)					27794
31							95% Modified-t UCL (Johnson-1978)					27080
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.565	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.725	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.262	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					16.01	k star (bias corrected MLE)					11.28
42	Theta hat (MLE)					1437	Theta star (bias corrected MLE)					2041
43	nu hat (MLE)					320.3	nu star (bias corrected)					225.5
44	MLE Mean (bias corrected)					23010	MLE Sd (bias corrected)					6852
45							Approximate Chi Square Value (0.05)					191.8
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					186.4
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50)					27061	95% Adjusted Gamma UCL (use when n<50)					27847
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.908	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.245	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.671			Mean of logged Data			10.01
60					Maximum of Logged Data	10.58			SD of logged Data			0.254
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	27123			90% Chebyshev (MVUE) UCL			28516
64					95% Chebyshev (MVUE) UCL	31037			97.5% Chebyshev (MVUE) UCL			34536
65					99% Chebyshev (MVUE) UCL	41408						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	26478			95% Jackknife UCL			26875
72					95% Standard Bootstrap UCL	26258			95% Bootstrap-t UCL			30826
73					95% Hall's Bootstrap UCL	45110			95% Percentile Bootstrap UCL			26340
74					95% BCA Bootstrap UCL	28064						
75					90% Chebyshev(Mean, Sd) UCL	29335			95% Chebyshev(Mean, Sd) UCL			32199
76					97.5% Chebyshev(Mean, Sd) UCL	36176			99% Chebyshev(Mean, Sd) UCL			43986
77												
78	**Suggested UCL to Use**											
79					95% Adjusted Gamma UCL	27847						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**PCB, Total**											
88												
89	**General Statistics**											
90					Total Number of Observations	10			Number of Distinct Observations			4
91									Number of Missing Observations			0
92					Minimum	0.05			Mean			3.57
93					Maximum	5			Median			5
94					SD	2.306			Std. Error of Mean			0.729
95					Coefficient of Variation	0.646			Skewness			-1.047
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.611	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.432	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	4.907				95% Adjusted-CLT UCL (Chen-1995)		4.512
107										95% Modified-t UCL (Johnson-1978)		4.867
108												
109	Gamma GOF Test											
110					A-D Test Statistic	1.985	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.454	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.275	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	0.806				k star (bias corrected MLE)		0.631
118					Theta hat (MLE)	4.429				Theta star (bias corrected MLE)		5.659
119					nu hat (MLE)	16.12				nu star (bias corrected)		12.62
120					MLE Mean (bias corrected)	3.57				MLE Sd (bias corrected)		4.495
121										Approximate Chi Square Value (0.05)		5.637
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		4.85
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	7.991				95% Adjusted Gamma UCL (use when n<50)		9.287
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.649	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.422	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-2.996				Mean of logged Data		0.537
136					Maximum of Logged Data	1.609				SD of logged Data		1.822
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	183.8				90% Chebyshev (MVUE) UCL		18.23
140					95% Chebyshev (MVUE) UCL	23.54				97.5% Chebyshev (MVUE) UCL		30.91
141					99% Chebyshev (MVUE) UCL	45.39						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	4.77				95% Jackknife UCL		4.907
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	5.758				95% Chebyshev(Mean, Sd) UCL		6.749
152					97.5% Chebyshev(Mean, Sd) UCL	8.124				99% Chebyshev(Mean, Sd) UCL		10.83
153												
154	Suggested UCL to Use											
155					99% Chebyshev (Mean, Sd) UCL	10.83						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	**Recommended UCL exceeds the maximum observation**											
158												
159	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
160	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
161	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
162	For additional insight the user may want to consult a statistician.											
163												
164	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
165	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
166												
167												
168	**Silver**											
169												
170	**General Statistics**											
171					Total Number of Observations	10			Number of Distinct Observations			6
172									Number of Missing Observations			0
173					Minimum	0.033			Mean			50.85
174					Maximum	146			Median			50
175					SD	46.71			Std. Error of Mean			14.77
176					Coefficient of Variation	0.919			Skewness			0.936
177												
178	**Normal GOF Test**											
179					Shapiro Wilk Test Statistic	0.845			**Shapiro Wilk GOF Test**			
180					5% Shapiro Wilk Critical Value	0.842			Data appear Normal at 5% Significance Level			
181					Lilliefors Test Statistic	0.307			**Lilliefors GOF Test**			
182					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
183	**Data appear Approximate Normal at 5% Significance Level**											
184												
185	**Assuming Normal Distribution**											
186				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
187					95% Student's-t UCL	77.92			95% Adjusted-CLT UCL (Chen-1995)			79.82
188									95% Modified-t UCL (Johnson-1978)			78.65
189												
190	**Gamma GOF Test**											
191					A-D Test Statistic	0.951			**Anderson-Darling Gamma GOF Test**			
192					5% A-D Critical Value	0.775			Data Not Gamma Distributed at 5% Significance Level			
193					K-S Test Statistic	0.374			**Kolmogrov-Smirnoff Gamma GOF Test**			
194					5% K-S Critical Value	0.28			Data Not Gamma Distributed at 5% Significance Level			
195	**Data Not Gamma Distributed at 5% Significance Level**											
196												
197	**Gamma Statistics**											
198					k hat (MLE)	0.53			k star (bias corrected MLE)			0.438
199					Theta hat (MLE)	95.95			Theta star (bias corrected MLE)			116.2
200					nu hat (MLE)	10.6			nu star (bias corrected)			8.752
201					MLE Mean (bias corrected)	50.85			MLE Sd (bias corrected)			76.86
202									Approximate Chi Square Value (0.05)			3.178
203					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			2.623
204												
205	**Assuming Gamma Distribution**											
206					95% Approximate Gamma UCL (use when n>=50))	140			95% Adjusted Gamma UCL (use when n<50)			169.7
207												
208	**Lognormal GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
209					Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk Lognormal GOF Test**					
210					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
211					Lilliefors Test Statistic	0.374	**Lilliefors Lognormal GOF Test**					
212					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
213	**Data Not Lognormal at 5% Significance Level**											
214												
215	**Lognormal Statistics**											
216					Minimum of Logged Data	-3.411				Mean of logged Data		2.741
217					Maximum of Logged Data	4.984				SD of logged Data		2.605
218												
219	**Assuming Lognormal Distribution**											
220					95% H-UCL	181057				90% Chebyshev (MVUE) UCL		641.4
221					95% Chebyshev (MVUE) UCL	845.5				97.5% Chebyshev (MVUE) UCL		1129
222					99% Chebyshev (MVUE) UCL	1686						
223												
224	**Nonparametric Distribution Free UCL Statistics**											
225	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
226												
227	**Nonparametric Distribution Free UCLs**											
228					95% CLT UCL	75.14				95% Jackknife UCL		77.92
229					95% Standard Bootstrap UCL	73.5				95% Bootstrap-t UCL		88.58
230					95% Hall's Bootstrap UCL	127.1				95% Percentile Bootstrap UCL		74.83
231					95% BCA Bootstrap UCL	78.03						
232					90% Chebyshev(Mean, Sd) UCL	95.16				95% Chebyshev(Mean, Sd) UCL		115.2
233					97.5% Chebyshev(Mean, Sd) UCL	143.1				99% Chebyshev(Mean, Sd) UCL		197.8
234												
235	**Suggested UCL to Use**											
236					95% Student's-t UCL	77.92						
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
241	For additional insight the user may want to consult a statistician.											
242												
243												
244	**Uranium-238**											
245												
246	**General Statistics**											
247					Total Number of Observations	10				Number of Distinct Observations		4
248										Number of Missing Observations		0
249					Minimum	0.411				Mean		2.177
250					Maximum	4.82				Median		2.177
251					SD	1.099				Std. Error of Mean		0.348
252					Coefficient of Variation	0.505				Skewness		1.284
253												
254	**Normal GOF Test**											
255					Shapiro Wilk Test Statistic	0.731	**Shapiro Wilk GOF Test**					
256					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
257					Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**					
258					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
259	**Data Not Normal at 5% Significance Level**											
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	Assuming Normal Distribution											
262	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
263					95% Student's-t UCL	2.814			95% Adjusted-CLT UCL (Chen-1995)			2.9
264									95% Modified-t UCL (Johnson-1978)			2.838
265												
266	Gamma GOF Test											
267					A-D Test Statistic	1.427	Anderson-Darling Gamma GOF Test					
268					5% A-D Critical Value	0.73	Data Not Gamma Distributed at 5% Significance Level					
269					K-S Test Statistic	0.369	Kolmogrov-Smirnoff Gamma GOF Test					
270					5% K-S Critical Value	0.268	Data Not Gamma Distributed at 5% Significance Level					
271	Data Not Gamma Distributed at 5% Significance Level											
272												
273	Gamma Statistics											
274					k hat (MLE)	3.761			k star (bias corrected MLE)			2.7
275					Theta hat (MLE)	0.579			Theta star (bias corrected MLE)			0.806
276					nu hat (MLE)	75.22			nu star (bias corrected)			53.99
277					MLE Mean (bias corrected)	2.177			MLE Sd (bias corrected)			1.325
278									Approximate Chi Square Value (0.05)			38.11
279					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			35.8
280												
281	Assuming Gamma Distribution											
282				95% Approximate Gamma UCL (use when n>=50))		3.084			95% Adjusted Gamma UCL (use when n<50)			3.283
283												
284	Lognormal GOF Test											
285					Shapiro Wilk Test Statistic	0.719	Shapiro Wilk Lognormal GOF Test					
286					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
287					Lilliefors Test Statistic	0.388	Lilliefors Lognormal GOF Test					
288					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
289	Data Not Lognormal at 5% Significance Level											
290												
291	Lognormal Statistics											
292					Minimum of Logged Data	-0.889			Mean of logged Data			0.639
293					Maximum of Logged Data	1.573			SD of logged Data			0.622
294												
295	Assuming Lognormal Distribution											
296					95% H-UCL	3.785			90% Chebyshev (MVUE) UCL			3.612
297					95% Chebyshev (MVUE) UCL	4.229			97.5% Chebyshev (MVUE) UCL			5.085
298					99% Chebyshev (MVUE) UCL	6.767						
299												
300	Nonparametric Distribution Free UCL Statistics											
301	Data do not follow a Discernible Distribution (0.05)											
302												
303	Nonparametric Distribution Free UCLs											
304					95% CLT UCL	2.749			95% Jackknife UCL			2.814
305					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
306					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
307					95% BCA Bootstrap UCL	N/A						
308					90% Chebyshev(Mean, Sd) UCL	3.22			95% Chebyshev(Mean, Sd) UCL			3.692
309					97.5% Chebyshev(Mean, Sd) UCL	4.348			99% Chebyshev(Mean, Sd) UCL			5.635
310												
311	Suggested UCL to Use											
312					95% Chebyshev (Mean, Sd) UCL	3.692						

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												
319												
320	**Vanadium**											
321												
322	**General Statistics**											
323	Total Number of Observations					10	Number of Distinct Observations					9
324							Number of Missing Observations					0
325	Minimum					86	Mean					109
326	Maximum					145	Median					102
327	SD					21.67	Std. Error of Mean					6.852
328	Coefficient of Variation					0.199	Skewness					0.653
329												
330	**Normal GOF Test**											
331	Shapiro Wilk Test Statistic					0.871	**Shapiro Wilk GOF Test**					
332	5% Shapiro Wilk Critical Value					0.842	Data appear Normal at 5% Significance Level					
333	Lilliefors Test Statistic					0.256	**Lilliefors GOF Test**					
334	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
335	**Data appear Normal at 5% Significance Level**											
336												
337	**Assuming Normal Distribution**											
338	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
339	95% Student's-t UCL					121.6	95% Adjusted-CLT UCL (Chen-1995)					121.8
340							95% Modified-t UCL (Johnson-1978)					121.8
341												
342	**Gamma GOF Test**											
343	A-D Test Statistic					0.593	**Anderson-Darling Gamma GOF Test**					
344	5% A-D Critical Value					0.724	Detected data appear Gamma Distributed at 5% Significance Level					
345	K-S Test Statistic					0.265	**Kolmogrov-Smirnoff Gamma GOF Test**					
346	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
347	**Detected data appear Gamma Distributed at 5% Significance Level**											
348												
349	**Gamma Statistics**											
350	k hat (MLE)					29.47	k star (bias corrected MLE)					20.7
351	Theta hat (MLE)					3.698	Theta star (bias corrected MLE)					5.266
352	nu hat (MLE)					589.5	nu star (bias corrected)					414
353	MLE Mean (bias corrected)					109	MLE Sd (bias corrected)					23.96
354							Approximate Chi Square Value (0.05)					367.8
355	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					360.2
356												
357	**Assuming Gamma Distribution**											
358	95% Approximate Gamma UCL (use when n>=50))					122.7	95% Adjusted Gamma UCL (use when n<50)					125.3
359												
360	**Lognormal GOF Test**											
361	Shapiro Wilk Test Statistic					0.882	**Shapiro Wilk Lognormal GOF Test**					
362	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
363	Lilliefors Test Statistic					0.252	**Lilliefors Lognormal GOF Test**					
364	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
365	Data appear Lognormal at 5% Significance Level											
366												
367	Lognormal Statistics											
368					Minimum of Logged Data	4.454				Mean of logged Data		4.674
369					Maximum of Logged Data	4.977				SD of logged Data		0.193
370												
371	Assuming Lognormal Distribution											
372					95% H-UCL	123.1				90% Chebyshev (MVUE) UCL		128.9
373					95% Chebyshev (MVUE) UCL	138				97.5% Chebyshev (MVUE) UCL		150.5
374					99% Chebyshev (MVUE) UCL	175.2						
375												
376	Nonparametric Distribution Free UCL Statistics											
377	Data appear to follow a Discernible Distribution at 5% Significance Level											
378												
379	Nonparametric Distribution Free UCLs											
380					95% CLT UCL	120.3				95% Jackknife UCL		121.6
381					95% Standard Bootstrap UCL	119.7				95% Bootstrap-t UCL		124.3
382					95% Hall's Bootstrap UCL	121.5				95% Percentile Bootstrap UCL		121
383					95% BCA Bootstrap UCL	120.6						
384					90% Chebyshev(Mean, Sd) UCL	129.6				95% Chebyshev(Mean, Sd) UCL		138.9
385					97.5% Chebyshev(Mean, Sd) UCL	151.8				99% Chebyshev(Mean, Sd) UCL		177.2
386												
387	Suggested UCL to Use											
388					95% Student's-t UCL	121.6						
389												
390	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
391	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
392	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
393	For additional insight the user may want to consult a statistician.											
394												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:24:06 PM								
5	From File			EPC_013Sub_EU08.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	General Statistics											
14	Total Number of Observations					15	Number of Distinct Observations					15
15							Number of Missing Observations					0
16	Minimum					17679	Mean					22458
17	Maximum					31310	Median					21226
18	SD					3636	Std. Error of Mean					938.8
19	Coefficient of Variation					0.162	Skewness					1.043
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.929	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.881	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.166	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.229	Data appear Normal at 5% Significance Level					
26	Data appear Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					24112	95% Adjusted-CLT UCL (Chen-1995)					24273
31							95% Modified-t UCL (Johnson-1978)					24154
32												
33	Gamma GOF Test											
34	A-D Test Statistic					0.298	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.734	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.159	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.221	Detected data appear Gamma Distributed at 5% Significance Level					
38	Detected data appear Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					43.8	k star (bias corrected MLE)					35.08
42	Theta hat (MLE)					512.7	Theta star (bias corrected MLE)					640.1
43	nu hat (MLE)					1314	nu star (bias corrected)					1053
44	MLE Mean (bias corrected)					22458	MLE Sd (bias corrected)					3792
45							Approximate Chi Square Value (0.05)					978.2
46	Adjusted Level of Significance					0.0324	Adjusted Chi Square Value					969.4
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					24164	95% Adjusted Gamma UCL (use when n<50)					24384
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.963	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.148	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.78				Mean of logged Data		10.01
60					Maximum of Logged Data	10.35				SD of logged Data		0.154
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	24181				90% Chebyshev (MVUE) UCL		25144
64					95% Chebyshev (MVUE) UCL	26365				97.5% Chebyshev (MVUE) UCL		28058
65					99% Chebyshev (MVUE) UCL	31385						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	24002				95% Jackknife UCL		24112
72					95% Standard Bootstrap UCL	23940				95% Bootstrap-t UCL		24499
73					95% Hall's Bootstrap UCL	24787				95% Percentile Bootstrap UCL		23942
74					95% BCA Bootstrap UCL	24238						
75					90% Chebyshev(Mean, Sd) UCL	25275				95% Chebyshev(Mean, Sd) UCL		26550
76					97.5% Chebyshev(Mean, Sd) UCL	28321				99% Chebyshev(Mean, Sd) UCL		31799
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	24112						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Manganese**											
88												
89	**General Statistics**											
90					Total Number of Observations	15				Number of Distinct Observations		15
91										Number of Missing Observations		0
92					Minimum	205				Mean		910.1
93					Maximum	1927				Median		850
94					SD	463.1				Std. Error of Mean		119.6
95					Coefficient of Variation	0.509				Skewness		0.955
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.166	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level					
102	**Data appear Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	1121				95% Adjusted-CLT UCL (Chen-1995)		1138
107										95% Modified-t UCL (Johnson-1978)		1126
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.302	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.135	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.223	Detected data appear Gamma Distributed at 5% Significance Level					
114	**Detected data appear Gamma Distributed at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	4.067				k star (bias corrected MLE)		3.298
118					Theta hat (MLE)	223.8				Theta star (bias corrected MLE)		275.9
119					nu hat (MLE)	122				nu star (bias corrected)		98.94
120					MLE Mean (bias corrected)	910.1				MLE Sd (bias corrected)		501.1
121										Approximate Chi Square Value (0.05)		76.99
122					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		74.61
123												
124	**Assuming Gamma Distribution**											
125					95% Approximate Gamma UCL (use when n>=50))	1169				95% Adjusted Gamma UCL (use when n<50)		1207
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.166	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	5.323				Mean of logged Data		6.686
136					Maximum of Logged Data	7.564				SD of logged Data		0.551
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	1273				90% Chebyshev (MVUE) UCL		1328
140					95% Chebyshev (MVUE) UCL	1512				97.5% Chebyshev (MVUE) UCL		1768
141					99% Chebyshev (MVUE) UCL	2271						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	1107				95% Jackknife UCL		1121
148					95% Standard Bootstrap UCL	1100				95% Bootstrap-t UCL		1176
149					95% Hall's Bootstrap UCL	1215				95% Percentile Bootstrap UCL		1118
150					95% BCA Bootstrap UCL	1134						
151					90% Chebyshev(Mean, Sd) UCL	1269				95% Chebyshev(Mean, Sd) UCL		1431
152					97.5% Chebyshev(Mean, Sd) UCL	1657				99% Chebyshev(Mean, Sd) UCL		2100
153												
154	**Suggested UCL to Use**											
155					95% Student's-t UCL	1121						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	PAH, Total											
164												
165	General Statistics											
166	Total Number of Observations					15	Number of Distinct Observations					5
167							Number of Missing Observations					0
168	Minimum					0.0122	Mean					0.409
169	Maximum					0.5	Median					0.409
170	SD					0.116	Std. Error of Mean					0.03
171	Coefficient of Variation					0.284	Skewness					-3.142
172												
173	Normal GOF Test											
174	Shapiro Wilk Test Statistic					0.547	Shapiro Wilk GOF Test					
175	5% Shapiro Wilk Critical Value					0.881	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.433	Lilliefors GOF Test					
177	5% Lilliefors Critical Value					0.229	Data Not Normal at 5% Significance Level					
178	Data Not Normal at 5% Significance Level											
179												
180	Assuming Normal Distribution											
181	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
182	95% Student's-t UCL					0.462	95% Adjusted-CLT UCL (Chen-1995)					0.432
183							95% Modified-t UCL (Johnson-1978)					0.457
184												
185	Gamma GOF Test											
186	A-D Test Statistic					4.02	Anderson-Darling Gamma GOF Test					
187	5% A-D Critical Value					0.744	Data Not Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.51	Kolmogrov-Smirnoff Gamma GOF Test					
189	5% K-S Critical Value					0.223	Data Not Gamma Distributed at 5% Significance Level					
190	Data Not Gamma Distributed at 5% Significance Level											
191												
192	Gamma Statistics											
193	k hat (MLE)					3.011	k star (bias corrected MLE)					2.453
194	Theta hat (MLE)					0.136	Theta star (bias corrected MLE)					0.167
195	nu hat (MLE)					90.34	nu star (bias corrected)					73.6
196	MLE Mean (bias corrected)					0.409	MLE Sd (bias corrected)					0.261
197							Approximate Chi Square Value (0.05)					54.85
198	Adjusted Level of Significance					0.0324	Adjusted Chi Square Value					52.86
199												
200	Assuming Gamma Distribution											
201	95% Approximate Gamma UCL (use when n>=50))					0.548	95% Adjusted Gamma UCL (use when n<50)					0.569
202												
203	Lognormal GOF Test											
204	Shapiro Wilk Test Statistic					0.356	Shapiro Wilk Lognormal GOF Test					
205	5% Shapiro Wilk Critical Value					0.881	Data Not Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.508	Lilliefors Lognormal GOF Test					
207	5% Lilliefors Critical Value					0.229	Data Not Lognormal at 5% Significance Level					
208	Data Not Lognormal at 5% Significance Level											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-4.408				Mean of logged Data		-1.07
212					Maximum of Logged Data	-0.693				SD of logged Data		0.927
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	1.012				90% Chebyshev (MVUE) UCL		0.903
216					95% Chebyshev (MVUE) UCL	1.082				97.5% Chebyshev (MVUE) UCL		1.33
217					99% Chebyshev (MVUE) UCL	1.818						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data do not follow a Discernible Distribution (0.05)						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	0.458				95% Jackknife UCL		0.462
224					95% Standard Bootstrap UCL	0.457				95% Bootstrap-t UCL		0.444
225					95% Hall's Bootstrap UCL	0.443				95% Percentile Bootstrap UCL		0.447
226					95% BCA Bootstrap UCL	0.44						
227					90% Chebyshev(Mean, Sd) UCL	0.499				95% Chebyshev(Mean, Sd) UCL		0.539
228					97.5% Chebyshev(Mean, Sd) UCL	0.596				99% Chebyshev(Mean, Sd) UCL		0.707
229												
230						Suggested UCL to Use						
231					95% Chebyshev (Mean, Sd) UCL	0.539						
232												
233						Recommended UCL exceeds the maximum observation						
234												
235						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
236						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
237						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
238						For additional insight the user may want to consult a statistician.						
239												
240						Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
241						reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.						
242												
243												
244	Vanadium											
245												
246						General Statistics						
247					Total Number of Observations	15				Number of Distinct Observations		13
248										Number of Missing Observations		0
249					Minimum	78				Mean		94.47
250					Maximum	118				Median		96
251					SD	11.51				Std. Error of Mean		2.973
252					Coefficient of Variation	0.122				Skewness		0.516
253												
254						Normal GOF Test						
255					Shapiro Wilk Test Statistic	0.956				Shapiro Wilk GOF Test		
256					5% Shapiro Wilk Critical Value	0.881				Data appear Normal at 5% Significance Level		
257					Lilliefors Test Statistic	0.123				Lilliefors GOF Test		
258					5% Lilliefors Critical Value	0.229				Data appear Normal at 5% Significance Level		
259						Data appear Normal at 5% Significance Level						
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	Assuming Normal Distribution											
262	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
263					95% Student's-t UCL	99.7				95% Adjusted-CLT UCL (Chen-1995)		99.78
264										95% Modified-t UCL (Johnson-1978)		99.77
265												
266	Gamma GOF Test											
267					A-D Test Statistic	0.232	Anderson-Darling Gamma GOF Test					
268					5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level					
269					K-S Test Statistic	0.107	Kolmogrov-Smirnoff Gamma GOF Test					
270					5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level					
271	Detected data appear Gamma Distributed at 5% Significance Level											
272												
273	Gamma Statistics											
274					k hat (MLE)	73.78				k star (bias corrected MLE)		59.07
275					Theta hat (MLE)	1.28				Theta star (bias corrected MLE)		1.599
276					nu hat (MLE)	2214				nu star (bias corrected)		1772
277					MLE Mean (bias corrected)	94.47				MLE Sd (bias corrected)		12.29
278										Approximate Chi Square Value (0.05)		1675
279					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		1664
280												
281	Assuming Gamma Distribution											
282				95% Approximate Gamma UCL (use when n>=50))		99.92				95% Adjusted Gamma UCL (use when n<50)		100.6
283												
284	Lognormal GOF Test											
285					Shapiro Wilk Test Statistic	0.967	Shapiro Wilk Lognormal GOF Test					
286					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
287					Lilliefors Test Statistic	0.11	Lilliefors Lognormal GOF Test					
288					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
289	Data appear Lognormal at 5% Significance Level											
290												
291	Lognormal Statistics											
292					Minimum of Logged Data	4.357				Mean of logged Data		4.541
293					Maximum of Logged Data	4.771				SD of logged Data		0.12
294												
295	Assuming Lognormal Distribution											
296					95% H-UCL	100				90% Chebyshev (MVUE) UCL		103.3
297					95% Chebyshev (MVUE) UCL	107.3				97.5% Chebyshev (MVUE) UCL		112.8
298					99% Chebyshev (MVUE) UCL	123.7						
299												
300	Nonparametric Distribution Free UCL Statistics											
301	Data appear to follow a Discernible Distribution at 5% Significance Level											
302												
303	Nonparametric Distribution Free UCLs											
304					95% CLT UCL	99.36				95% Jackknife UCL		99.7
305					95% Standard Bootstrap UCL	99.13				95% Bootstrap-t UCL		100.1
306					95% Hall's Bootstrap UCL	100.5				95% Percentile Bootstrap UCL		99.27
307					95% BCA Bootstrap UCL	99.4						
308					90% Chebyshev(Mean, Sd) UCL	103.4				95% Chebyshev(Mean, Sd) UCL		107.4
309					97.5% Chebyshev(Mean, Sd) UCL	113				99% Chebyshev(Mean, Sd) UCL		124
310												
311	Suggested UCL to Use											
312					95% Student's-t UCL	99.7						

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:23:30 PM								
5	From File			EPC_013Sub_EU09.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Arsenic											
12												
13	General Statistics											
14	Total Number of Observations					12	Number of Distinct Observations					3
15							Number of Missing Observations					0
16	Minimum					0.875	Mean					9.156
17	Maximum					10	Median					10
18	SD					2.624	Std. Error of Mean					0.757
19	Coefficient of Variation					0.287	Skewness					-3.394
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.375	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.459	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					10.52	95% Adjusted-CLT UCL (Chen-1995)					9.609
31							95% Modified-t UCL (Johnson-1978)					10.39
32												
33	Gamma GOF Test											
34	A-D Test Statistic					3.887	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.735	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.469	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.246	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					4.203	k star (bias corrected MLE)					3.208
42	Theta hat (MLE)					2.178	Theta star (bias corrected MLE)					2.854
43	nu hat (MLE)					100.9	nu star (bias corrected)					76.99
44	MLE Mean (bias corrected)					9.156	MLE Sd (bias corrected)					5.112
45							Approximate Chi Square Value (0.05)					57.78
46	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					55.25
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					12.2	95% Adjusted Gamma UCL (use when n<50)					12.76
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.346	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.859		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.477		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.256		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	-0.134				Mean of logged Data		2.091
60					Maximum of Logged Data	2.303				SD of logged Data		0.701
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	17.24				90% Chebyshev (MVUE) UCL		16.49
64					95% Chebyshev (MVUE) UCL	19.38				97.5% Chebyshev (MVUE) UCL		23.4
65					99% Chebyshev (MVUE) UCL	31.29						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	10.4				95% Jackknife UCL		10.52
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	11.43				95% Chebyshev(Mean, Sd) UCL		12.46
76					97.5% Chebyshev(Mean, Sd) UCL	13.89				99% Chebyshev(Mean, Sd) UCL		16.69
77												
78					**Suggested UCL to Use**							
79					95% Chebyshev (Mean, Sd) UCL	12.46						
80												
81					**Recommended UCL exceeds the maximum observation**							
82												
83					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
84					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
85					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
86					For additional insight the user may want to consult a statistician.							
87												
88					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
89					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
90												
91												
92	**Cesium-137**											
93												
94					**General Statistics**							
95					Total Number of Observations	12				Number of Distinct Observations		5
96										Number of Missing Observations		0
97					Minimum	-0.00278				Mean		0.142
98					Maximum	0.393				Median		0.142
99					SD	0.0966				Std. Error of Mean		0.0279
100					Coefficient of Variation	0.679				Skewness		1.256
101												
102					**Normal GOF Test**							
103					Shapiro Wilk Test Statistic	0.713		**Shapiro Wilk GOF Test**				
104					5% Shapiro Wilk Critical Value	0.859		Data Not Normal at 5% Significance Level				

	A	B	C	D	E	F	G	H	I	J	K	L
105					Lilliefors Test Statistic	0.333	**Lilliefors GOF Test**					
106					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
107	**Data Not Normal at 5% Significance Level**											
108												
109	**Assuming Normal Distribution**											
110	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
111					95% Student's-t UCL	0.192	95% Adjusted-CLT UCL (Chen-1995)					0.199
112							95% Modified-t UCL (Johnson-1978)					0.194
113	**Gamma Statistics Not Available**											
114	**Lognormal Statistics Not Available**											
115												
116	**Nonparametric Distribution Free UCL Statistics**											
117	**Data do not follow a Discernible Distribution (0.05)**											
118												
119	**Nonparametric Distribution Free UCLs**											
120					95% CLT UCL	0.188	95% Jackknife UCL					0.192
121					95% Standard Bootstrap UCL	0.187	95% Bootstrap-t UCL					0.202
122					95% Hall's Bootstrap UCL	0.288	95% Percentile Bootstrap UCL					0.191
123					95% BCA Bootstrap UCL	0.197						
124					90% Chebyshev(Mean, Sd) UCL	0.226	95% Chebyshev(Mean, Sd) UCL					0.264
125					97.5% Chebyshev(Mean, Sd) UCL	0.316	99% Chebyshev(Mean, Sd) UCL					0.42
126												
127	**Suggested UCL to Use**											
128					95% Chebyshev (Mean, Sd) UCL	0.264						
129												
130	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
131	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
132	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
133	For additional insight the user may want to consult a statistician.											
134												
135												
136	**Neptunium-237**											
137												
138	**General Statistics**											
139					Total Number of Observations	12	Number of Distinct Observations					5
140							Number of Missing Observations					0
141					Minimum	-0.0157	Mean					0.223
142					Maximum	0.89	Median					0.223
143					SD	0.232	Std. Error of Mean					0.0671
144					Coefficient of Variation	1.043	Skewness					2.291
145												
146	**Normal GOF Test**											
147					Shapiro Wilk Test Statistic	0.644	**Shapiro Wilk GOF Test**					
148					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
149					Lilliefors Test Statistic	0.417	**Lilliefors GOF Test**					
150					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
151	**Data Not Normal at 5% Significance Level**											
152												
153	**Assuming Normal Distribution**											
154	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
155					95% Student's-t UCL	0.343	95% Adjusted-CLT UCL (Chen-1995)					0.381
156							95% Modified-t UCL (Johnson-1978)					0.351

	A	B	C	D	E	F	G	H	I	J	K	L
157	Gamma Statistics Not Available											
158	Lognormal Statistics Not Available											
159												
160	Nonparametric Distribution Free UCL Statistics											
161	Data do not follow a Discernible Distribution (0.05)											
162												
163	Nonparametric Distribution Free UCLs											
164					95% CLT UCL	0.333				95% Jackknife UCL		0.343
165					95% Standard Bootstrap UCL	0.331				95% Bootstrap-t UCL		0.41
166					95% Hall's Bootstrap UCL	0.845				95% Percentile Bootstrap UCL		0.335
167					95% BCA Bootstrap UCL	0.372						
168					90% Chebyshev(Mean, Sd) UCL	0.424				95% Chebyshev(Mean, Sd) UCL		0.515
169					97.5% Chebyshev(Mean, Sd) UCL	0.642				99% Chebyshev(Mean, Sd) UCL		0.89
170												
171	Suggested UCL to Use											
172					95% Chebyshev (Mean, Sd) UCL	0.515						
173												
174	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
175	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
176	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
177	For additional insight the user may want to consult a statistician.											
178												
179												
180	PAH, Total											
181												
182	General Statistics											
183					Total Number of Observations	12				Number of Distinct Observations		3
184										Number of Missing Observations		0
185					Minimum	0.0265				Mean		0.322
186					Maximum	0.47				Median		0.322
187					SD	0.109				Std. Error of Mean		0.0315
188					Coefficient of Variation	0.339				Skewness		-1.625
189												
190	Normal GOF Test											
191					Shapiro Wilk Test Statistic	0.65				Shapiro Wilk GOF Test		
192					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
193					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
194					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
195	Data Not Normal at 5% Significance Level											
196												
197	Assuming Normal Distribution											
198	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
199					95% Student's-t UCL	0.379				95% Adjusted-CLT UCL (Chen-1995)		0.358
200										95% Modified-t UCL (Johnson-1978)		0.376
201												
202	Gamma GOF Test											
203					A-D Test Statistic	2.755				Anderson-Darling Gamma GOF Test		
204					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
205					K-S Test Statistic	0.487				Kolmogrov-Smirnoff Gamma GOF Test		
206					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
207	Data Not Gamma Distributed at 5% Significance Level											
208												

	A	B	C	D	E	F	G	H	I	J	K	L
209						Gamma Statistics						
210					k hat (MLE)	3.601					k star (bias corrected MLE)	2.757
211					Theta hat (MLE)	0.0895					Theta star (bias corrected MLE)	0.117
212					nu hat (MLE)	86.43					nu star (bias corrected)	66.16
213					MLE Mean (bias corrected)	0.322					MLE Sd (bias corrected)	0.194
214											Approximate Chi Square Value (0.05)	48.44
215					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	46.13
216												
217						Assuming Gamma Distribution						
218					95% Approximate Gamma UCL (use when n>=50))	0.44					95% Adjusted Gamma UCL (use when n<50)	0.462
219												
220						Lognormal GOF Test						
221					Shapiro Wilk Test Statistic	0.461					Shapiro Wilk Lognormal GOF Test	
222					5% Shapiro Wilk Critical Value	0.859					Data Not Lognormal at 5% Significance Level	
223					Lilliefors Test Statistic	0.493					Lilliefors Lognormal GOF Test	
224					5% Lilliefors Critical Value	0.256					Data Not Lognormal at 5% Significance Level	
225						Data Not Lognormal at 5% Significance Level						
226												
227						Lognormal Statistics						
228					Minimum of Logged Data	-3.631					Mean of logged Data	-1.278
229					Maximum of Logged Data	-0.755					SD of logged Data	0.755
230												
231						Assuming Lognormal Distribution						
232					95% H-UCL	0.654					90% Chebyshev (MVUE) UCL	0.607
233					95% Chebyshev (MVUE) UCL	0.718					97.5% Chebyshev (MVUE) UCL	0.873
234					99% Chebyshev (MVUE) UCL	1.178						
235												
236						Nonparametric Distribution Free UCL Statistics						
237						Data do not follow a Discernible Distribution (0.05)						
238												
239						Nonparametric Distribution Free UCLs						
240					95% CLT UCL	0.374					95% Jackknife UCL	0.379
241					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
242					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
243					95% BCA Bootstrap UCL	N/A						
244					90% Chebyshev(Mean, Sd) UCL	0.417					95% Chebyshev(Mean, Sd) UCL	0.46
245					97.5% Chebyshev(Mean, Sd) UCL	0.519					99% Chebyshev(Mean, Sd) UCL	0.636
246												
247						Suggested UCL to Use						
248					95% Chebyshev (Mean, Sd) UCL	0.46						
249												
250						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
251						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
252						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
253						For additional insight the user may want to consult a statistician.						
254												
255						Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
256						reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.						
257												
258												
259	Uranium-238											
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	General Statistics											
262	Total Number of Observations					12	Number of Distinct Observations					5
263							Number of Missing Observations					0
264	Minimum					0.355	Mean					1.967
265	Maximum					6.08	Median					1.967
266	SD					1.438	Std. Error of Mean					0.415
267	Coefficient of Variation					0.731	Skewness					2.247
268												
269	Normal GOF Test											
270	Shapiro Wilk Test Statistic					0.657	**Shapiro Wilk GOF Test**					
271	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
272	Lilliefors Test Statistic					0.417	**Lilliefors GOF Test**					
273	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
274	**Data Not Normal at 5% Significance Level**											
275												
276	Assuming Normal Distribution											
277	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
278	95% Student's-t UCL					2.712	95% Adjusted-CLT UCL (Chen-1995)					2.937
279							95% Modified-t UCL (Johnson-1978)					2.757
280												
281	Gamma GOF Test											
282	A-D Test Statistic					1.434	**Anderson-Darling Gamma GOF Test**					
283	5% A-D Critical Value					0.741	Data Not Gamma Distributed at 5% Significance Level					
284	K-S Test Statistic					0.336	**Kolmogrov-Smirnoff Gamma GOF Test**					
285	5% K-S Critical Value					0.248	Data Not Gamma Distributed at 5% Significance Level					
286	**Data Not Gamma Distributed at 5% Significance Level**											
287												
288	Gamma Statistics											
289	k hat (MLE)					2.384	k star (bias corrected MLE)					1.843
290	Theta hat (MLE)					0.825	Theta star (bias corrected MLE)					1.067
291	nu hat (MLE)					57.2	nu star (bias corrected)					44.24
292	MLE Mean (bias corrected)					1.967	MLE Sd (bias corrected)					1.448
293							Approximate Chi Square Value (0.05)					29.98
294	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					28.2
295												
296	Assuming Gamma Distribution											
297	95% Approximate Gamma UCL (use when n>=50))					2.901	95% Adjusted Gamma UCL (use when n<50)					3.085
298												
299	Lognormal GOF Test											
300	Shapiro Wilk Test Statistic					0.794	**Shapiro Wilk Lognormal GOF Test**					
301	5% Shapiro Wilk Critical Value					0.859	Data Not Lognormal at 5% Significance Level					
302	Lilliefors Test Statistic					0.369	**Lilliefors Lognormal GOF Test**					
303	5% Lilliefors Critical Value					0.256	Data Not Lognormal at 5% Significance Level					
304	**Data Not Lognormal at 5% Significance Level**											
305												
306	Lognormal Statistics											
307	Minimum of Logged Data					-1.036	Mean of logged Data					0.452
308	Maximum of Logged Data					1.805	SD of logged Data					0.738
309												
310	Assuming Lognormal Distribution											
311	95% H-UCL					3.578	90% Chebyshev (MVUE) UCL					3.351
312	95% Chebyshev (MVUE) UCL					3.959	97.5% Chebyshev (MVUE) UCL					4.803

	A	B	C	D	E	F	G	H	I	J	K	L
313					99% Chebyshev (MVUE) UCL	6.46						
314												
315					Nonparametric Distribution Free UCL Statistics							
316					Data do not follow a Discernible Distribution (0.05)							
317												
318					Nonparametric Distribution Free UCLs							
319					95% CLT UCL	2.649				95% Jackknife UCL		2.712
320					95% Standard Bootstrap UCL	2.619				95% Bootstrap-t UCL		3.1
321					95% Hall's Bootstrap UCL	5.881				95% Percentile Bootstrap UCL		2.699
322					95% BCA Bootstrap UCL	2.995						
323					90% Chebyshev(Mean, Sd) UCL	3.211				95% Chebyshev(Mean, Sd) UCL		3.775
324					97.5% Chebyshev(Mean, Sd) UCL	4.558				99% Chebyshev(Mean, Sd) UCL		6.095
325												
326					Suggested UCL to Use							
327					95% Chebyshev (Mean, Sd) UCL	3.775						
328												
329					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
330					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
331					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
332					For additional insight the user may want to consult a statistician.							
333												
334												
335	Vanadium											
336												
337					General Statistics							
338					Total Number of Observations	12				Number of Distinct Observations		10
339										Number of Missing Observations		0
340					Minimum	80				Mean		103.9
341					Maximum	149				Median		89.5
342					SD	24.43				Std. Error of Mean		7.053
343					Coefficient of Variation	0.235				Skewness		0.942
344												
345					Normal GOF Test							
346					Shapiro Wilk Test Statistic	0.832				Shapiro Wilk GOF Test		
347					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
348					Lilliefors Test Statistic	0.285				Lilliefors GOF Test		
349					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
350					Data Not Normal at 5% Significance Level							
351												
352					Assuming Normal Distribution							
353					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
354					95% Student's-t UCL	116.6				95% Adjusted-CLT UCL (Chen-1995)		117.6
355										95% Modified-t UCL (Johnson-1978)		116.9
356												
357					Gamma GOF Test							
358					A-D Test Statistic	0.857				Anderson-Darling Gamma GOF Test		
359					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
360					K-S Test Statistic	0.285				Kolmogrov-Smirnoff Gamma GOF Test		
361					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
362					Data Not Gamma Distributed at 5% Significance Level							
363												
364					Gamma Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
365					k hat (MLE)	21.56				k star (bias corrected MLE)		16.23
366					Theta hat (MLE)	4.819				Theta star (bias corrected MLE)		6.403
367					nu hat (MLE)	517.5				nu star (bias corrected)		389.5
368					MLE Mean (bias corrected)	103.9				MLE Sd (bias corrected)		25.8
369										Approximate Chi Square Value (0.05)		344.7
370					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		338.3
371												
372					**Assuming Gamma Distribution**							
373					95% Approximate Gamma UCL (use when n>=50))	117.4				95% Adjusted Gamma UCL (use when n<50)		119.6
374												
375					**Lognormal GOF Test**							
376					Shapiro Wilk Test Statistic	0.855				**Shapiro Wilk Lognormal GOF Test**		
377					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
378					Lilliefors Test Statistic	0.273				**Lilliefors Lognormal GOF Test**		
379					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
380					**Data Not Lognormal at 5% Significance Level**							
381												
382					**Lognormal Statistics**							
383					Minimum of Logged Data	4.382				Mean of logged Data		4.62
384					Maximum of Logged Data	5.004				SD of logged Data		0.221
385												
386					**Assuming Lognormal Distribution**							
387					95% H-UCL	117.8				90% Chebyshev (MVUE) UCL		123.8
388					95% Chebyshev (MVUE) UCL	132.9				97.5% Chebyshev (MVUE) UCL		145.4
389					99% Chebyshev (MVUE) UCL	170.1						
390												
391					**Nonparametric Distribution Free UCL Statistics**							
392					**Data do not follow a Discernible Distribution (0.05)**							
393												
394					**Nonparametric Distribution Free UCLs**							
395					95% CLT UCL	115.5				95% Jackknife UCL		116.6
396					95% Standard Bootstrap UCL	115				95% Bootstrap-t UCL		120.2
397					95% Hall's Bootstrap UCL	117.5				95% Percentile Bootstrap UCL		115
398					95% BCA Bootstrap UCL	117.3						
399					90% Chebyshev(Mean, Sd) UCL	125.1				95% Chebyshev(Mean, Sd) UCL		134.7
400					97.5% Chebyshev(Mean, Sd) UCL	148				99% Chebyshev(Mean, Sd) UCL		174.1
401												
402					**Suggested UCL to Use**							
403					95% Student's-t UCL	116.6				or 95% Modified-t UCL		116.9
404												
405					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
406					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
407					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
408					For additional insight the user may want to consult a statistician.							
409												

UCL Statistics for Uncensored Full Data Sets			
User Selected Options			
Date/Time of Computation	10/29/2015 12:03		
From File	EPC_013Sub_i.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
Manganese			
General Statistics			
Total Number of Observations		11	Number of Distinct Observations	11
			Number of Missing Observations	0
Minimum		328	Mean	615.8
Maximum		1200	Median	601
SD		259.3	Std. Error of Mean	78.18
Coefficient of Variation		0.421	Skewness	1.088
Normal GOF Test				
Shapiro Wilk Test Statistic		0.907	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value		0.85	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic		0.15	Lilliefors GOF Test	
5% Lilliefors Critical Value		0.267	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level				
Assuming Normal Distribution				
95% Normal UCL			95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL		757.5	95% Adjusted-CLT UCL (Chen-1995)	771.8
			95% Modified-t UCL (Johnson-1978)	761.8
Gamma GOF Test				
A-D Test Statistic		0.257	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value		0.731	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic		0.139	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value		0.256	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level				
Gamma Statistics				
k hat (MLE)		6.835	k star (bias corrected MLE)	5.031
Theta hat (MLE)		90.1	Theta star (bias corrected MLE)	122.4
nu hat (MLE)		150.4	nu star (bias corrected)	110.7
MLE Mean (bias corrected)		615.8	MLE Sd (bias corrected)	274.5
			Approximate Chi Square Value (0.05)	87.4
Adjusted Level of Significance		0.0278	Adjusted Chi Square Value	84.03
Assuming Gamma Distribution				
95% Approximate Gamma UCL (use when n>=50))		779.9	95% Adjusted Gamma UCL (use when n<50)	811.1
Lognormal GOF Test				
Shapiro Wilk Test Statistic		0.962	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value		0.85	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic		0.117	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value		0.267	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	5.793	Mean of logged Data	6.348
Maximum of Logged Data	7.09	SD of logged Data	0.402
Assuming Lognormal Distribution			
95% H-UCL	804.2	90% Chebyshev (MVUE) UCL	841
95% Chebyshev (MVUE) UCL	943.6	97.5% Chebyshev (MVUE) UCL	1086
99% Chebyshev (MVUE) UCL	1366		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	744.4	95% Jackknife UCL	757.5
95% Standard Bootstrap UCL	739.3	95% Bootstrap-t UCL	803
95% Hall's Bootstrap UCL	809.8	95% Percentile Bootstrap UCL	744.3
95% BCA Bootstrap UCL	762.4		
90% Chebyshev(Mean, Sd) UCL	850.3	95% Chebyshev(Mean, Sd) UCL	956.6
97.5% Chebyshev(Mean, Sd) UCL	1104	99% Chebyshev(Mean, Sd) UCL	1394
Suggested UCL to Use			
95% Student's-t UCL	757.5		
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). However, simulations results will not cover all Real World data sets.			
For additional insight the user may want to consult a statistician.			
PCB, Total			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.05	Mean	3.714
Maximum	5	Median	5
SD	2.209	Std. Error of Mean	0.666
Coefficient of Variation	0.595	Skewness	-1.21
Normal GOF Test			
Shapiro Wilk Test Statistic	0.591	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.447	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	4.921	95% Adjusted-CLT UCL (Chen-1995)	4.55
		95% Modified-t UCL (Johnson-1978)	4.88
Gamma GOF Test			
A-D Test Statistic	2.344	Anderson-Darling Gamma GOF Test	

5% A-D Critical Value	0.756	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.468	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.263	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.893	k star (bias corrected MLE)	0.71
Theta hat (MLE)	4.16	Theta star (bias corrected MLE)	5.232
nu hat (MLE)	19.64	nu star (bias corrected)	15.62
MLE Mean (bias corrected)	3.714	MLE Sd (bias corrected)	4.408
		Approximate Chi Square Value (0.05)	7.692
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	6.804
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	7.539	95% Adjusted Gamma UCL (use when n<50)	8.523
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.614	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.435	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2.996	Mean of logged Data	0.656
Maximum of Logged Data	1.609	SD of logged Data	1.743
Assuming Lognormal Distribution			
95% H-UCL	109.5	90% Chebyshev (MVUE) UCL	18.17
95% Chebyshev (MVUE) UCL	23.34	97.5% Chebyshev (MVUE) UCL	30.51
99% Chebyshev (MVUE) UCL	44.6		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	4.809	95% Jackknife UCL	4.921
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		
90% Chebyshev(Mean, Sd) UCL	5.712	95% Chebyshev(Mean, Sd) UCL	6.617
97.5% Chebyshev(Mean, Sd) UCL	7.873	99% Chebyshev(Mean, Sd) UCL	10.34
Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	10.34		
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). However, simulations results will not cover all Real World data sets.			
For additional insight the user may want to consult a statistician.			
Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be			
reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.			

Silver											
General Statistics											
Total Number of Observations					11	Number of Distinct Observations					4
						Number of Missing Observations					0
Minimum					0.036	Mean					36.09
Maximum					50	Median					50
SD					22.24	Std. Error of Mean					6.705
Coefficient of Variation					0.616	Skewness					-1.152
Normal GOF Test											
Shapiro Wilk Test Statistic					0.625	Shapiro Wilk GOF Test					
5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
Lilliefors Test Statistic					0.37	Lilliefors GOF Test					
5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
Data Not Normal at 5% Significance Level											
Assuming Normal Distribution											
95% Normal UCL						95% UCLs (Adjusted for Skewness)					
95% Student's-t UCL					48.25	95% Adjusted-CLT UCL (Chen-1995)					44.63
						95% Modified-t UCL (Johnson-1978)					47.86
Gamma GOF Test											
A-D Test Statistic					2.203	Anderson-Darling Gamma GOF Test					
5% A-D Critical Value					0.768	Data Not Gamma Distributed at 5% Significance Level					
K-S Test Statistic					0.43	Kolmogrov-Smirnoff Gamma GOF Test					
5% K-S Critical Value					0.266	Data Not Gamma Distributed at 5% Significance Level					
Data Not Gamma Distributed at 5% Significance Level											
Gamma Statistics											
k hat (MLE)					0.68	k star (bias corrected MLE)					0.555
Theta hat (MLE)					53.09	Theta star (bias corrected MLE)					65.02
nu hat (MLE)					14.96	nu star (bias corrected)					12.21
MLE Mean (bias corrected)					36.09	MLE Sd (bias corrected)					48.45
						Approximate Chi Square Value (0.05)					5.367
Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					4.649
Assuming Gamma Distribution											
95% Approximate Gamma UCL (use when n>=50))					82.13	95% Adjusted Gamma UCL (use when n<50)					94.82
Lognormal GOF Test											
Shapiro Wilk Test Statistic					0.612	Shapiro Wilk Lognormal GOF Test					
5% Shapiro Wilk Critical Value					0.85	Data Not Lognormal at 5% Significance Level					
Lilliefors Test Statistic					0.401	Lilliefors Lognormal GOF Test					
5% Lilliefors Critical Value					0.267	Data Not Lognormal at 5% Significance Level					
Data Not Lognormal at 5% Significance Level											
Lognormal Statistics											
Minimum of Logged Data					-3.324	Mean of logged Data					2.694
Maximum of Logged Data					3.912	SD of logged Data					2.324
Assuming Lognormal Distribution											
95% H-UCL					16835	90% Chebyshev (MVUE) UCL					382.2

95% Chebyshev (MVUE) UCL	500.5	97.5% Chebyshev (MVUE) UCL	664.7
99% Chebyshev (MVUE) UCL	987.2		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	47.12	95% Jackknife UCL	48.25
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		
90% Chebyshev(Mean, Sd) UCL	56.21	95% Chebyshev(Mean, Sd) UCL	65.32
97.5% Chebyshev(Mean, Sd) UCL	77.97	99% Chebyshev(Mean, Sd) UCL	102.8
Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	102.8		
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). However, simulations results will not cover all Real World data sets.			
For additional insight the user may want to consult a statistician.			
Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be			
reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.			
Vanadium			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	85	Mean	104.5
Maximum	138	Median	101
SD	16.33	Std. Error of Mean	4.924
Coefficient of Variation	0.156	Skewness	0.866
Normal GOF Test			
Shapiro Wilk Test Statistic	0.923	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.222	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.267	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	113.5	95% Adjusted-CLT UCL (Chen-1995)	114
		95% Modified-t UCL (Johnson-1978)	113.7
Gamma GOF Test			
A-D Test Statistic	0.335	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.211	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	47.51	k star (bias corrected MLE)	34.62
Theta hat (MLE)	2.2	Theta star (bias corrected MLE)	3.02
nu hat (MLE)	1045	nu star (bias corrected)	761.5
MLE Mean (bias corrected)	104.5	MLE Sd (bias corrected)	17.77
		Approximate Chi Square Value (0.05)	698.5
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	688.7
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	114	95% Adjusted Gamma UCL (use when n<50)	115.6
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.945	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.199	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	4.443	Mean of logged Data	4.639
Maximum of Logged Data	4.927	SD of logged Data	0.151
Assuming Lognormal Distribution			
95% H-UCL	114.1	90% Chebyshev (MVUE) UCL	118.8
95% Chebyshev (MVUE) UCL	125.3	97.5% Chebyshev (MVUE) UCL	134.2
99% Chebyshev (MVUE) UCL	151.9		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	112.6	95% Jackknife UCL	113.5
95% Standard Bootstrap UCL	112.2	95% Bootstrap-t UCL	115.7
95% Hall's Bootstrap UCL	118.3	95% Percentile Bootstrap UCL	112.6
95% BCA Bootstrap UCL	113.3		
90% Chebyshev(Mean, Sd) UCL	119.3	95% Chebyshev(Mean, Sd) UCL	126
97.5% Chebyshev(Mean, Sd) UCL	135.3	99% Chebyshev(Mean, Sd) UCL	153.5
Suggested UCL to Use			
95% Student's-t UCL	113.5		
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). However, simulations results will not cover all Real World data sets.			
For additional insight the user may want to consult a statistician.			

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:22:17 PM								
5	From File			EPC_013Sub_EU12.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	**General Statistics**											
14	Total Number of Observations					11	Number of Distinct Observations					11
15							Number of Missing Observations					0
16	Minimum					14165	Mean					20604
17	Maximum					30409	Median					18769
18	SD					4399	Std. Error of Mean					1326
19	Coefficient of Variation					0.213	Skewness					1.01
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.928	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.207	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.267	Data appear Normal at 5% Significance Level					
26	**Data appear Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					23008	95% Adjusted-CLT UCL (Chen-1995)					23217
31							95% Modified-t UCL (Johnson-1978)					23075
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.321	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.729	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.201	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.255	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					25.82	k star (bias corrected MLE)					18.84
42	Theta hat (MLE)					798.1	Theta star (bias corrected MLE)					1094
43	nu hat (MLE)					567.9	nu star (bias corrected)					414.4
44	MLE Mean (bias corrected)					20604	MLE Sd (bias corrected)					4748
45							Approximate Chi Square Value (0.05)					368.2
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					361.1
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					23189	95% Adjusted Gamma UCL (use when n<50)					23645
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.965	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.559				Mean of logged Data		9.914
60					Maximum of Logged Data	10.32				SD of logged Data		0.205
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	23281				90% Chebyshev (MVUE) UCL		24423
64					95% Chebyshev (MVUE) UCL	26158				97.5% Chebyshev (MVUE) UCL		28565
65					99% Chebyshev (MVUE) UCL	33294						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	22786				95% Jackknife UCL		23008
72					95% Standard Bootstrap UCL	22641				95% Bootstrap-t UCL		23675
73					95% Hall's Bootstrap UCL	24466				95% Percentile Bootstrap UCL		22760
74					95% BCA Bootstrap UCL	23079						
75					90% Chebyshev(Mean, Sd) UCL	24583				95% Chebyshev(Mean, Sd) UCL		26385
76					97.5% Chebyshev(Mean, Sd) UCL	28887				99% Chebyshev(Mean, Sd) UCL		33801
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	23008						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Manganese**											
88												
89	**General Statistics**											
90					Total Number of Observations	11				Number of Distinct Observations		11
91										Number of Missing Observations		0
92					Minimum	231				Mean		762.9
93					Maximum	3114				Median		541
94					SD	825.5				Std. Error of Mean		248.9
95					Coefficient of Variation	1.082				Skewness		2.736
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.621	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.374	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	1214				95% Adjusted-CLT UCL (Chen-1995)		1392
107										95% Modified-t UCL (Johnson-1978)		1248
108												
109	Gamma GOF Test											
110					A-D Test Statistic	0.793	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.741	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.299	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.259	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	1.727				k star (bias corrected MLE)		1.316
118					Theta hat (MLE)	441.9				Theta star (bias corrected MLE)		579.6
119					nu hat (MLE)	37.98				nu star (bias corrected)		28.96
120					MLE Mean (bias corrected)	762.9				MLE Sd (bias corrected)		665
121										Approximate Chi Square Value (0.05)		17.68
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		16.25
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	1250				95% Adjusted Gamma UCL (use when n<50)		1359
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.901	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.238	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
132	Data appear Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	5.442				Mean of logged Data		6.32
136					Maximum of Logged Data	8.044				SD of logged Data		0.752
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	1353				90% Chebyshev (MVUE) UCL		1222
140					95% Chebyshev (MVUE) UCL	1451				97.5% Chebyshev (MVUE) UCL		1770
141					99% Chebyshev (MVUE) UCL	2396						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	1172				95% Jackknife UCL		1214
148					95% Standard Bootstrap UCL	1159				95% Bootstrap-t UCL		2375
149					95% Hall's Bootstrap UCL	3194				95% Percentile Bootstrap UCL		1203
150					95% BCA Bootstrap UCL	1484						
151					90% Chebyshev(Mean, Sd) UCL	1510				95% Chebyshev(Mean, Sd) UCL		1848
152					97.5% Chebyshev(Mean, Sd) UCL	2317				99% Chebyshev(Mean, Sd) UCL		3239
153												
154	Suggested UCL to Use											
155					95% H-UCL	1353						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
163	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
164	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
165	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
166												
167												
168	**PCB, Total**											
169												
170	**General Statistics**											
171					Total Number of Observations	11			Number of Distinct Observations			5
172									Number of Missing Observations			0
173					Minimum	0.05			Mean			2.851
174					Maximum	5			Median			5
175					SD	2.482			Std. Error of Mean			0.748
176					Coefficient of Variation	0.871			Skewness			-0.247
177												
178	**Normal GOF Test**											
179					Shapiro Wilk Test Statistic	0.682			**Shapiro Wilk GOF Test**			
180					5% Shapiro Wilk Critical Value	0.85			Data Not Normal at 5% Significance Level			
181					Lilliefors Test Statistic	0.352			**Lilliefors GOF Test**			
182					5% Lilliefors Critical Value	0.267			Data Not Normal at 5% Significance Level			
183	**Data Not Normal at 5% Significance Level**											
184												
185	**Assuming Normal Distribution**											
186	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
187					95% Student's-t UCL	4.207			95% Adjusted-CLT UCL (Chen-1995)			4.022
188									95% Modified-t UCL (Johnson-1978)			4.198
189												
190	**Gamma GOF Test**											
191					A-D Test Statistic	1.524			**Anderson-Darling Gamma GOF Test**			
192					5% A-D Critical Value	0.775			Data Not Gamma Distributed at 5% Significance Level			
193					K-S Test Statistic	0.36			**Kolmogrov-Smirnoff Gamma GOF Test**			
194					5% K-S Critical Value	0.268			Data Not Gamma Distributed at 5% Significance Level			
195	**Data Not Gamma Distributed at 5% Significance Level**											
196												
197	**Gamma Statistics**											
198					k hat (MLE)	0.588			k star (bias corrected MLE)			0.488
199					Theta hat (MLE)	4.85			Theta star (bias corrected MLE)			5.841
200					nu hat (MLE)	12.93			nu star (bias corrected)			10.74
201					MLE Mean (bias corrected)	2.851			MLE Sd (bias corrected)			4.081
202									Approximate Chi Square Value (0.05)			4.408
203					Adjusted Level of Significance	0.0278			Adjusted Chi Square Value			3.769
204												
205	**Assuming Gamma Distribution**											
206					95% Approximate Gamma UCL (use when n>=50))	6.945			95% Adjusted Gamma UCL (use when n<50)			8.121
207												
208	**Lognormal GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
209					Shapiro Wilk Test Statistic	0.738	**Shapiro Wilk Lognormal GOF Test**					
210					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
211					Lilliefors Test Statistic	0.337	**Lilliefors Lognormal GOF Test**					
212					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
213					**Data Not Lognormal at 5% Significance Level**							
214												
215					**Lognormal Statistics**							
216					Minimum of Logged Data	-2.996				Mean of logged Data		-0.00678
217					Maximum of Logged Data	1.609				SD of logged Data		1.99
218												
219					**Assuming Lognormal Distribution**							
220					95% H-UCL	182				90% Chebyshev (MVUE) UCL		14.22
221					95% Chebyshev (MVUE) UCL	18.45				97.5% Chebyshev (MVUE) UCL		24.31
222					99% Chebyshev (MVUE) UCL	35.83						
223												
224					**Nonparametric Distribution Free UCL Statistics**							
225					**Data do not follow a Discernible Distribution (0.05)**							
226												
227					**Nonparametric Distribution Free UCLs**							
228					95% CLT UCL	4.082				95% Jackknife UCL		4.207
229					95% Standard Bootstrap UCL	4.02				95% Bootstrap-t UCL		4.199
230					95% Hall's Bootstrap UCL	3.902				95% Percentile Bootstrap UCL		4.105
231					95% BCA Bootstrap UCL	4.105						
232					90% Chebyshev(Mean, Sd) UCL	5.096				95% Chebyshev(Mean, Sd) UCL		6.113
233					97.5% Chebyshev(Mean, Sd) UCL	7.525				99% Chebyshev(Mean, Sd) UCL		10.3
234												
235					**Suggested UCL to Use**							
236					99% Chebyshev (Mean, Sd) UCL	10.3						
237												
238					**Recommended UCL exceeds the maximum observation**							
239												
240					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
241					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
242					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
243					For additional insight the user may want to consult a statistician.							
244												
245					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
246					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
247												
248												
249	**Silver**											
250												
251					**General Statistics**							
252					Total Number of Observations	11				Number of Distinct Observations		6
253										Number of Missing Observations		0
254					Minimum	2.01				Mean		39.38
255					Maximum	124				Median		50
256					SD	36.52				Std. Error of Mean		11.01
257					Coefficient of Variation	0.927				Skewness		1.026
258												
259					**Normal GOF Test**							
260					Shapiro Wilk Test Statistic	0.775	**Shapiro Wilk GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
262					Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**					
263					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
264	**Data Not Normal at 5% Significance Level**											
265												
266	**Assuming Normal Distribution**											
267	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
268					95% Student's-t UCL	59.34	95% Adjusted-CLT UCL (Chen-1995)					61.13
269							95% Modified-t UCL (Johnson-1978)					59.91
270												
271	**Gamma GOF Test**											
272					A-D Test Statistic	1.431	**Anderson-Darling Gamma GOF Test**					
273					5% A-D Critical Value	0.763	Data Not Gamma Distributed at 5% Significance Level					
274					K-S Test Statistic	0.362	**Kolmogrov-Smirnoff Gamma GOF Test**					
275					5% K-S Critical Value	0.265	Data Not Gamma Distributed at 5% Significance Level					
276	**Data Not Gamma Distributed at 5% Significance Level**											
277												
278	**Gamma Statistics**											
279					k hat (MLE)	0.748	k star (bias corrected MLE)					0.604
280					Theta hat (MLE)	52.66	Theta star (bias corrected MLE)					65.15
281					nu hat (MLE)	16.45	nu star (bias corrected)					13.3
282					MLE Mean (bias corrected)	39.38	MLE Sd (bias corrected)					50.65
283							Approximate Chi Square Value (0.05)					6.093
284					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					5.319
285												
286	**Assuming Gamma Distribution**											
287					95% Approximate Gamma UCL (use when n>=50))	85.94	95% Adjusted Gamma UCL (use when n<50)					98.45
288												
289	**Lognormal GOF Test**											
290					Shapiro Wilk Test Statistic	0.733	**Shapiro Wilk Lognormal GOF Test**					
291					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
292					Lilliefors Test Statistic	0.373	**Lilliefors Lognormal GOF Test**					
293					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
294	**Data Not Lognormal at 5% Significance Level**											
295												
296	**Lognormal Statistics**											
297					Minimum of Logged Data	0.698	Mean of logged Data					2.872
298					Maximum of Logged Data	4.82	SD of logged Data					1.645
299												
300	**Assuming Lognormal Distribution**											
301					95% H-UCL	658.4	90% Chebyshev (MVUE) UCL					141.8
302					95% Chebyshev (MVUE) UCL	181.4	97.5% Chebyshev (MVUE) UCL					236.2
303					99% Chebyshev (MVUE) UCL	344						
304												
305	**Nonparametric Distribution Free UCL Statistics**											
306	**Data do not follow a Discernible Distribution (0.05)**											
307												
308	**Nonparametric Distribution Free UCLs**											
309					95% CLT UCL	57.49	95% Jackknife UCL					59.34
310					95% Standard Bootstrap UCL	56.55	95% Bootstrap-t UCL					61.97
311					95% Hall's Bootstrap UCL	68.8	95% Percentile Bootstrap UCL					57.2
312					95% BCA Bootstrap UCL	59.13						

	A	B	C	D	E	F	G	H	I	J	K	L
313					90% Chebyshev(Mean, Sd) UCL	72.42				95% Chebyshev(Mean, Sd) UCL		87.38
314					97.5% Chebyshev(Mean, Sd) UCL	108.1				99% Chebyshev(Mean, Sd) UCL		148.9
315												
316						**Suggested UCL to Use**						
317					99% Chebyshev (Mean, Sd) UCL	148.9						
318												
319						**Recommended UCL exceeds the maximum observation**						
320												
321					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
322					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
323					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
324					For additional insight the user may want to consult a statistician.							
325												
326												
327	**Vanadium**											
328												
329						**General Statistics**						
330					Total Number of Observations	11				Number of Distinct Observations		10
331										Number of Missing Observations		0
332					Minimum	71				Mean		103.1
333					Maximum	151				Median		106
334					SD	23.95				Std. Error of Mean		7.222
335					Coefficient of Variation	0.232				Skewness		0.364
336												
337						**Normal GOF Test**						
338					Shapiro Wilk Test Statistic	0.936				**Shapiro Wilk GOF Test**		
339					5% Shapiro Wilk Critical Value	0.85				Data appear Normal at 5% Significance Level		
340					Lilliefors Test Statistic	0.152				**Lilliefors GOF Test**		
341					5% Lilliefors Critical Value	0.267				Data appear Normal at 5% Significance Level		
342						**Data appear Normal at 5% Significance Level**						
343												
344						**Assuming Normal Distribution**						
345					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
346					95% Student's-t UCL	116.2				95% Adjusted-CLT UCL (Chen-1995)		115.8
347										95% Modified-t UCL (Johnson-1978)		116.3
348												
349						**Gamma GOF Test**						
350					A-D Test Statistic	0.369				**Anderson-Darling Gamma GOF Test**		
351					5% A-D Critical Value	0.729				Detected data appear Gamma Distributed at 5% Significance Level		
352					K-S Test Statistic	0.182				**Kolmogrov-Smirnoff Gamma GOF Test**		
353					5% K-S Critical Value	0.255				Detected data appear Gamma Distributed at 5% Significance Level		
354						**Detected data appear Gamma Distributed at 5% Significance Level**						
355												
356						**Gamma Statistics**						
357					k hat (MLE)	20.3				k star (bias corrected MLE)		14.82
358					Theta hat (MLE)	5.079				Theta star (bias corrected MLE)		6.955
359					nu hat (MLE)	446.6				nu star (bias corrected)		326.1
360					MLE Mean (bias corrected)	103.1				MLE Sd (bias corrected)		26.78
361										Approximate Chi Square Value (0.05)		285.3
362					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		279
363												
364						**Assuming Gamma Distribution**						

	A	B	C	D	E	F	G	H	I	J	K	L
365	95% Approximate Gamma UCL (use when n>=50))					117.8	95% Adjusted Gamma UCL (use when n<50)					120.5
366												
367	**Lognormal GOF Test**											
368	Shapiro Wilk Test Statistic					0.935	**Shapiro Wilk Lognormal GOF Test**					
369	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
370	Lilliefors Test Statistic					0.193	**Lilliefors Lognormal GOF Test**					
371	5% Lilliefors Critical Value					0.267	Data appear Lognormal at 5% Significance Level					
372	**Data appear Lognormal at 5% Significance Level**											
373												
374	**Lognormal Statistics**											
375	Minimum of Logged Data					4.263	Mean of logged Data					4.611
376	Maximum of Logged Data					5.017	SD of logged Data					0.235
377												
378	**Assuming Lognormal Distribution**											
379	95% H-UCL					119	90% Chebyshev (MVUE) UCL					125.2
380	95% Chebyshev (MVUE) UCL					135.2	97.5% Chebyshev (MVUE) UCL					149
381	99% Chebyshev (MVUE) UCL					176.2						
382												
383	**Nonparametric Distribution Free UCL Statistics**											
384	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
385												
386	**Nonparametric Distribution Free UCLs**											
387	95% CLT UCL					115	95% Jackknife UCL					116.2
388	95% Standard Bootstrap UCL					114.3	95% Bootstrap-t UCL					117.3
389	95% Hall's Bootstrap UCL					116.6	95% Percentile Bootstrap UCL					114.5
390	95% BCA Bootstrap UCL					115						
391	90% Chebyshev(Mean, Sd) UCL					124.8	95% Chebyshev(Mean, Sd) UCL					134.6
392	97.5% Chebyshev(Mean, Sd) UCL					148.2	99% Chebyshev(Mean, Sd) UCL					174.9
393												
394	**Suggested UCL to Use**											
395	95% Student's-t UCL					116.2						
396												
397	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
398	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
399	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
400	For additional insight the user may want to consult a statistician.											
401												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:21:45 PM								
5	From File			EPC_013Sub_EU13.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	General Statistics											
14	Total Number of Observations					11	Number of Distinct Observations					11
15							Number of Missing Observations					0
16	Minimum					14554	Mean					23190
17	Maximum					47830	Median					18471
18	SD					10514	Std. Error of Mean					3170
19	Coefficient of Variation					0.453	Skewness					1.623
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.743	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.348	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					28936	95% Adjusted-CLT UCL (Chen-1995)					30063
31							95% Modified-t UCL (Johnson-1978)					29195
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.177	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.328	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.256	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					6.877	k star (bias corrected MLE)					5.062
42	Theta hat (MLE)					3372	Theta star (bias corrected MLE)					4581
43	nu hat (MLE)					151.3	nu star (bias corrected)					111.4
44	MLE Mean (bias corrected)					23190	MLE Sd (bias corrected)					10307
45							Approximate Chi Square Value (0.05)					88.01
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					84.63
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					29346	95% Adjusted Gamma UCL (use when n<50)					30518
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.81	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value					0.85	Data Not Lognormal at 5% Significance Level					

54					Lilliefors Test Statistic	0.306			**Lilliefors Lognormal GOF Test**			
55					5% Lilliefors Critical Value	0.267			Data Not Lognormal at 5% Significance Level			
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	9.586			Mean of logged Data			9.977
60					Maximum of Logged Data	10.78			SD of logged Data			0.382
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	29614			90% Chebyshev (MVUE) UCL			31051
64					95% Chebyshev (MVUE) UCL	34699			97.5% Chebyshev (MVUE) UCL			39763
65					99% Chebyshev (MVUE) UCL	49710						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	28405			95% Jackknife UCL			28936
72					95% Standard Bootstrap UCL	28082			95% Bootstrap-t UCL			32212
73					95% Hall's Bootstrap UCL	28038			95% Percentile Bootstrap UCL			28601
74					95% BCA Bootstrap UCL	30003						
75					90% Chebyshev(Mean, Sd) UCL	32701			95% Chebyshev(Mean, Sd) UCL			37009
76					97.5% Chebyshev(Mean, Sd) UCL	42988			99% Chebyshev(Mean, Sd) UCL			54733
77												
78					**Suggested UCL to Use**							
79					95% Student's-t UCL	28936			or 95% Modified-t UCL			29195
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	**Manganese**											
88												
89					**General Statistics**							
90					Total Number of Observations	11			Number of Distinct Observations			11
91									Number of Missing Observations			0
92					Minimum	119			Mean			466.6
93					Maximum	1951			Median			348
94					SD	502.3			Std. Error of Mean			151.5
95					Coefficient of Variation	1.077			Skewness			3.073
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.541			**Shapiro Wilk GOF Test**			
99					5% Shapiro Wilk Critical Value	0.85			Data Not Normal at 5% Significance Level			
100					Lilliefors Test Statistic	0.427			**Lilliefors GOF Test**			
101					5% Lilliefors Critical Value	0.267			Data Not Normal at 5% Significance Level			
102					**Data Not Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							
105					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
106					95% Student's-t UCL	741.2			95% Adjusted-CLT UCL (Chen-1995)			865.7

	A	B	C	D	E	F	G	H	I	J	K	L
107							95% Modified-t UCL (Johnson-1978)					764.6
108												
109	Gamma GOF Test											
110	A-D Test Statistic					1.156	Anderson-Darling Gamma GOF Test					
111	5% A-D Critical Value					0.739	Data Not Gamma Distributed at 5% Significance Level					
112	K-S Test Statistic					0.341	Kolmogrov-Smirnoff Gamma GOF Test					
113	5% K-S Critical Value					0.259	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117	k hat (MLE)					1.956	k star (bias corrected MLE)					1.483
118	Theta hat (MLE)					238.6	Theta star (bias corrected MLE)					314.6
119	nu hat (MLE)					43.03	nu star (bias corrected)					32.63
120	MLE Mean (bias corrected)					466.6	MLE Sd (bias corrected)					383.2
121							Approximate Chi Square Value (0.05)					20.57
122	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					19.02
123												
124	Assuming Gamma Distribution											
125	95% Approximate Gamma UCL (use when n>=50))					740.2	95% Adjusted Gamma UCL (use when n<50)					800.4
126												
127	Lognormal GOF Test											
128	Shapiro Wilk Test Statistic					0.859	Shapiro Wilk Lognormal GOF Test					
129	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
130	Lilliefors Test Statistic					0.28	Lilliefors Lognormal GOF Test					
131	5% Lilliefors Critical Value					0.267	Data Not Lognormal at 5% Significance Level					
132	Data appear Approximate Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135	Minimum of Logged Data					4.779	Mean of logged Data					5.869
136	Maximum of Logged Data					7.576	SD of logged Data					0.687
137												
138	Assuming Lognormal Distribution											
139	95% H-UCL					761.8	90% Chebyshev (MVUE) UCL					717.9
140	95% Chebyshev (MVUE) UCL					845.2	97.5% Chebyshev (MVUE) UCL					1022
141	99% Chebyshev (MVUE) UCL					1369						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147	95% CLT UCL					715.8	95% Jackknife UCL					741.2
148	95% Standard Bootstrap UCL					703.5	95% Bootstrap-t UCL					1426
149	95% Hall's Bootstrap UCL					1875	95% Percentile Bootstrap UCL					743.4
150	95% BCA Bootstrap UCL					915.7						
151	90% Chebyshev(Mean, Sd) UCL					921	95% Chebyshev(Mean, Sd) UCL					1127
152	97.5% Chebyshev(Mean, Sd) UCL					1413	99% Chebyshev(Mean, Sd) UCL					1974
153												
154	Suggested UCL to Use											
155	95% Chebyshev (Mean, Sd) UCL					1127						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											

	A	B	C	D	E	F	G	H	I	J	K	L
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Molybdenum**											
164												
165	**General Statistics**											
166	Total Number of Observations					11	Number of Distinct Observations					6
167							Number of Missing Observations					0
168	Minimum					0.31	Mean					8.719
169	Maximum					43	Median					3
170	SD					14.06	Std. Error of Mean					4.24
171	Coefficient of Variation					1.613	Skewness					2.096
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.559	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.476	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					16.4	95% Adjusted-CLT UCL (Chen-1995)					18.56
183							95% Modified-t UCL (Johnson-1978)					16.85
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					1.804	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.767	Data Not Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.448	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.266	Data Not Gamma Distributed at 5% Significance Level					
190	**Data Not Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					0.695	k star (bias corrected MLE)					0.566
194	Theta hat (MLE)					12.54	Theta star (bias corrected MLE)					15.4
195	nu hat (MLE)					15.29	nu star (bias corrected)					12.45
196	MLE Mean (bias corrected)					8.719	MLE Sd (bias corrected)					11.59
197							Approximate Chi Square Value (0.05)					5.528
198	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					4.797
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					19.64	95% Adjusted Gamma UCL (use when n<50)					22.64
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.784	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.85	Data Not Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.378	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.267	Data Not Lognormal at 5% Significance Level					
208	**Data Not Lognormal at 5% Significance Level**											
209												
210	**Lognormal Statistics**											
211	Minimum of Logged Data					-1.171	Mean of logged Data					1.295
212	Maximum of Logged Data					3.761	SD of logged Data					1.314

213											
214	**Assuming Lognormal Distribution**										
215					95% H-UCL	39.17			90% Chebyshev (MVUE) UCL		17.42
216					95% Chebyshev (MVUE) UCL	21.85			97.5% Chebyshev (MVUE) UCL		28
217					99% Chebyshev (MVUE) UCL	40.06					
218											
219	**Nonparametric Distribution Free UCL Statistics**										
220	**Data do not follow a Discernible Distribution (0.05)**										
221											
222	**Nonparametric Distribution Free UCLs**										
223					95% CLT UCL	15.69			95% Jackknife UCL		16.4
224					95% Standard Bootstrap UCL	15.44			95% Bootstrap-t UCL		114.7
225					95% Hall's Bootstrap UCL	165.7			95% Percentile Bootstrap UCL		16.22
226					95% BCA Bootstrap UCL	17.66					
227					90% Chebyshev(Mean, Sd) UCL	21.44			95% Chebyshev(Mean, Sd) UCL		27.2
228					97.5% Chebyshev(Mean, Sd) UCL	35.2			99% Chebyshev(Mean, Sd) UCL		50.91
229											
230	**Suggested UCL to Use**										
231					95% Chebyshev (Mean, Sd) UCL	27.2					
232											
233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
234	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)										
235	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.										
236	For additional insight the user may want to consult a statistician.										
237											
238											
239	**Vanadium**										
240											
241	**General Statistics**										
242					Total Number of Observations	11			Number of Distinct Observations		11
243									Number of Missing Observations		0
244					Minimum	70			Mean		105.6
245					Maximum	145			Median		108
246					SD	23.56			Std. Error of Mean		7.105
247					Coefficient of Variation	0.223			Skewness		0.229
248											
249	**Normal GOF Test**										
250					Shapiro Wilk Test Statistic	0.967			**Shapiro Wilk GOF Test**		
251					5% Shapiro Wilk Critical Value	0.85			Data appear Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.133			**Lilliefors GOF Test**		
253					5% Lilliefors Critical Value	0.267			Data appear Normal at 5% Significance Level		
254	**Data appear Normal at 5% Significance Level**										
255											
256	**Assuming Normal Distribution**										
257					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**		
258					95% Student's-t UCL	118.5			95% Adjusted-CLT UCL (Chen-1995)		117.8
259									95% Modified-t UCL (Johnson-1978)		118.6
260											

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Gamma GOF Test**											
262					A-D Test Statistic	0.186	**Anderson-Darling Gamma GOF Test**					
263					5% A-D Critical Value	0.729	Detected data appear Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.115	**Kolmogrov-Smirnoff Gamma GOF Test**					
265					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
266	**Detected data appear Gamma Distributed at 5% Significance Level**											
267												
268	**Gamma Statistics**											
269					k hat (MLE)	21.83	k star (bias corrected MLE)					15.93
270					Theta hat (MLE)	4.84	Theta star (bias corrected MLE)					6.629
271					nu hat (MLE)	480.2	nu star (bias corrected)					350.6
272					MLE Mean (bias corrected)	105.6	MLE Sd (bias corrected)					26.46
273							Approximate Chi Square Value (0.05)					308.2
274					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					301.7
275												
276	**Assuming Gamma Distribution**											
277					95% Approximate Gamma UCL (use when n>=50))	120.2	95% Adjusted Gamma UCL (use when n<50)					122.7
278												
279	**Lognormal GOF Test**											
280					Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk Lognormal GOF Test**					
281					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.124	**Lilliefors Lognormal GOF Test**					
283					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
284	**Data appear Lognormal at 5% Significance Level**											
285												
286	**Lognormal Statistics**											
287					Minimum of Logged Data	4.248	Mean of logged Data					4.637
288					Maximum of Logged Data	4.977	SD of logged Data					0.227
289												
290	**Assuming Lognormal Distribution**											
291					95% H-UCL	121.2	90% Chebyshev (MVUE) UCL					127.5
292					95% Chebyshev (MVUE) UCL	137.3	97.5% Chebyshev (MVUE) UCL					151.1
293					99% Chebyshev (MVUE) UCL	178						
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
297												
298	**Nonparametric Distribution Free UCLs**											
299					95% CLT UCL	117.3	95% Jackknife UCL					118.5
300					95% Standard Bootstrap UCL	116.8	95% Bootstrap-t UCL					119.4
301					95% Hall's Bootstrap UCL	120.7	95% Percentile Bootstrap UCL					117.1
302					95% BCA Bootstrap UCL	117.1						
303					90% Chebyshev(Mean, Sd) UCL	127	95% Chebyshev(Mean, Sd) UCL					136.6
304					97.5% Chebyshev(Mean, Sd) UCL	150	99% Chebyshev(Mean, Sd) UCL					176.3
305												
306	**Suggested UCL to Use**											
307					95% Student's-t UCL	118.5						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											
313												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:20:49 PM								
5	From File			EPC_013Sub_EU14.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Manganese**											
12												
13	**General Statistics**											
14	Total Number of Observations					11	Number of Distinct Observations					11
15							Number of Missing Observations					0
16	Minimum					196	Mean					458.9
17	Maximum					835	Median					495
18	SD					177.1	Std. Error of Mean					53.4
19	Coefficient of Variation					0.386	Skewness					0.624
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.955	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.138	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.267	Data appear Normal at 5% Significance Level					
26	**Data appear Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					555.7	95% Adjusted-CLT UCL (Chen-1995)					557.5
31							95% Modified-t UCL (Johnson-1978)					557.4
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.238	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.731	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.175	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.256	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					7.197	k star (bias corrected MLE)					5.294
42	Theta hat (MLE)					63.77	Theta star (bias corrected MLE)					86.68
43	nu hat (MLE)					158.3	nu star (bias corrected)					116.5
44	MLE Mean (bias corrected)					458.9	MLE Sd (bias corrected)					199.4
45							Approximate Chi Square Value (0.05)					92.56
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					89.09
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					577.5	95% Adjusted Gamma UCL (use when n<50)					600
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.968	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.187	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	5.278	Mean of logged Data					6.058
60					Maximum of Logged Data	6.727	SD of logged Data					0.405
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	604.3	90% Chebyshev (MVUE) UCL					631.6
64					95% Chebyshev (MVUE) UCL	709.2	97.5% Chebyshev (MVUE) UCL					816.9
65					99% Chebyshev (MVUE) UCL	1028						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	546.7	95% Jackknife UCL					555.7
72					95% Standard Bootstrap UCL	543.7	95% Bootstrap-t UCL					564.4
73					95% Hall's Bootstrap UCL	585.8	95% Percentile Bootstrap UCL					545.9
74					95% BCA Bootstrap UCL	557.4						
75					90% Chebyshev(Mean, Sd) UCL	619.1	95% Chebyshev(Mean, Sd) UCL					691.7
76					97.5% Chebyshev(Mean, Sd) UCL	792.4	99% Chebyshev(Mean, Sd) UCL					990.2
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	555.7						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**PAH, Total**											
88												
89	**General Statistics**											
90					Total Number of Observations	11	Number of Distinct Observations					4
91							Number of Missing Observations					0
92					Minimum	0.0327	Mean					0.376
93					Maximum	0.5	Median					0.376
94					SD	0.125	Std. Error of Mean					0.0378
95					Coefficient of Variation	0.334	Skewness					-2.206
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.668	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.409	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	0.444				95% Adjusted-CLT UCL (Chen-1995)		0.411
107										95% Modified-t UCL (Johnson-1978)		0.44
108												
109	Gamma GOF Test											
110					A-D Test Statistic	2.405	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.733	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.48	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.257	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	3.5				k star (bias corrected MLE)		2.606
118					Theta hat (MLE)	0.107				Theta star (bias corrected MLE)		0.144
119					nu hat (MLE)	77				nu star (bias corrected)		57.34
120					MLE Mean (bias corrected)	0.376				MLE Sd (bias corrected)		0.233
121										Approximate Chi Square Value (0.05)		40.93
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		38.68
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	0.526				95% Adjusted Gamma UCL (use when n<50)		0.557
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.472	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.486	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-3.42				Mean of logged Data		-1.129
136					Maximum of Logged Data	-0.693				SD of logged Data		0.77
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	0.815				90% Chebyshev (MVUE) UCL		0.727
140					95% Chebyshev (MVUE) UCL	0.865				97.5% Chebyshev (MVUE) UCL		1.057
141					99% Chebyshev (MVUE) UCL	1.435						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	0.438				95% Jackknife UCL		0.444
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	0.489				95% Chebyshev(Mean, Sd) UCL		0.541
152					97.5% Chebyshev(Mean, Sd) UCL	0.612				99% Chebyshev(Mean, Sd) UCL		0.752
153												
154	Suggested UCL to Use											
155					95% Chebyshev (Mean, Sd) UCL	0.541						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	**Recommended UCL exceeds the maximum observation**											
158												
159	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
160	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
161	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
162	For additional insight the user may want to consult a statistician.											
163												
164	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
165	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
166												
167												
168	**PCB, Total**											
169												
170	**General Statistics**											
171	Total Number of Observations					11	Number of Distinct Observations					4
172							Number of Missing Observations					0
173	Minimum					0.1	Mean					3.235
174	Maximum					5	Median					5
175	SD					2.45	Std. Error of Mean					0.739
176	Coefficient of Variation					0.757	Skewness					-0.661
177												
178	**Normal GOF Test**											
179	Shapiro Wilk Test Statistic					0.629	**Shapiro Wilk GOF Test**					
180	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
181	Lilliefors Test Statistic					0.401	**Lilliefors GOF Test**					
182	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
183	**Data Not Normal at 5% Significance Level**											
184												
185	**Assuming Normal Distribution**											
186	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
187	95% Student's-t UCL					4.573	95% Adjusted-CLT UCL (Chen-1995)					4.292
188							95% Modified-t UCL (Johnson-1978)					4.549
189												
190	**Gamma GOF Test**											
191	A-D Test Statistic					2.079	**Anderson-Darling Gamma GOF Test**					
192	5% A-D Critical Value					0.766	Data Not Gamma Distributed at 5% Significance Level					
193	K-S Test Statistic					0.42	**Kolmogrov-Smirnoff Gamma GOF Test**					
194	5% K-S Critical Value					0.266	Data Not Gamma Distributed at 5% Significance Level					
195	**Data Not Gamma Distributed at 5% Significance Level**											
196												
197	**Gamma Statistics**											
198	k hat (MLE)					0.697	k star (bias corrected MLE)					0.567
199	Theta hat (MLE)					4.641	Theta star (bias corrected MLE)					5.7
200	nu hat (MLE)					15.33	nu star (bias corrected)					12.48
201	MLE Mean (bias corrected)					3.235	MLE Sd (bias corrected)					4.294
202							Approximate Chi Square Value (0.05)					5.548
203	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					4.815
204												
205	**Assuming Gamma Distribution**											
206	95% Approximate Gamma UCL (use when n>=50))					7.279	95% Adjusted Gamma UCL (use when n<50)					8.386
207												
208	**Lognormal GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
209					Shapiro Wilk Test Statistic	0.661	**Shapiro Wilk Lognormal GOF Test**					
210					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
211					Lilliefors Test Statistic	0.4	**Lilliefors Lognormal GOF Test**					
212					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
213	**Data Not Lognormal at 5% Significance Level**											
214												
215	**Lognormal Statistics**											
216					Minimum of Logged Data	-2.303				Mean of logged Data		0.306
217					Maximum of Logged Data	1.609				SD of logged Data		1.817
218												
219	**Assuming Lognormal Distribution**											
220					95% H-UCL	107.8				90% Chebyshev (MVUE) UCL		14.48
221					95% Chebyshev (MVUE) UCL	18.66				97.5% Chebyshev (MVUE) UCL		24.46
222					99% Chebyshev (MVUE) UCL	35.85						
223												
224	**Nonparametric Distribution Free UCL Statistics**											
225	**Data do not follow a Discernible Distribution (0.05)**											
226												
227	**Nonparametric Distribution Free UCLs**											
228					95% CLT UCL	4.449				95% Jackknife UCL		4.573
229					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
230					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
231					95% BCA Bootstrap UCL	N/A						
232					90% Chebyshev(Mean, Sd) UCL	5.45				95% Chebyshev(Mean, Sd) UCL		6.454
233					97.5% Chebyshev(Mean, Sd) UCL	7.847				99% Chebyshev(Mean, Sd) UCL		10.58
234												
235	**Suggested UCL to Use**											
236					99% Chebyshev (Mean, Sd) UCL	10.58						
237												
238	**Recommended UCL exceeds the maximum observation**											
239												
240	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
241	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
242	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
243	For additional insight the user may want to consult a statistician.											
244												
245	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
246	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
247												
248												
249	**Uranium-238**											
250												
251	**General Statistics**											
252					Total Number of Observations	11				Number of Distinct Observations		5
253										Number of Missing Observations		0
254					Minimum	0.274				Mean		2.079
255					Maximum	5.55				Median		2.079
256					SD	1.344				Std. Error of Mean		0.405
257					Coefficient of Variation	0.646				Skewness		1.582
258												
259	**Normal GOF Test**											
260					Shapiro Wilk Test Statistic	0.681	**Shapiro Wilk GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
262					Lilliefors Test Statistic	0.409	**Lilliefors GOF Test**					
263					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
264	**Data Not Normal at 5% Significance Level**											
265												
266	**Assuming Normal Distribution**											
267	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
268					95% Student's-t UCL	2.813	95% Adjusted-CLT UCL (Chen-1995)					2.952
269							95% Modified-t UCL (Johnson-1978)					2.845
270												
271	**Gamma GOF Test**											
272					A-D Test Statistic	1.758	**Anderson-Darling Gamma GOF Test**					
273					5% A-D Critical Value	0.738	Data Not Gamma Distributed at 5% Significance Level					
274					K-S Test Statistic	0.405	**Kolmogrov-Smirnoff Gamma GOF Test**					
275					5% K-S Critical Value	0.258	Data Not Gamma Distributed at 5% Significance Level					
276	**Data Not Gamma Distributed at 5% Significance Level**											
277												
278	**Gamma Statistics**											
279					k hat (MLE)	2.233	k star (bias corrected MLE)					1.685
280					Theta hat (MLE)	0.931	Theta star (bias corrected MLE)					1.234
281					nu hat (MLE)	49.12	nu star (bias corrected)					37.06
282					MLE Mean (bias corrected)	2.079	MLE Sd (bias corrected)					1.602
283							Approximate Chi Square Value (0.05)					24.12
284					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					22.43
285												
286	**Assuming Gamma Distribution**											
287					95% Approximate Gamma UCL (use when n>=50))	3.194	95% Adjusted Gamma UCL (use when n<50)					3.434
288												
289	**Lognormal GOF Test**											
290					Shapiro Wilk Test Statistic	0.703	**Shapiro Wilk Lognormal GOF Test**					
291					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
292					Lilliefors Test Statistic	0.429	**Lilliefors Lognormal GOF Test**					
293					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
294	**Data Not Lognormal at 5% Significance Level**											
295												
296	**Lognormal Statistics**											
297					Minimum of Logged Data	-1.295	Mean of logged Data					0.492
298					Maximum of Logged Data	1.714	SD of logged Data					0.835
299												
300	**Assuming Lognormal Distribution**											
301					95% H-UCL	4.721	90% Chebyshev (MVUE) UCL					3.991
302					95% Chebyshev (MVUE) UCL	4.79	97.5% Chebyshev (MVUE) UCL					5.898
303					99% Chebyshev (MVUE) UCL	8.076						
304												
305	**Nonparametric Distribution Free UCL Statistics**											
306	**Data do not follow a Discernible Distribution (0.05)**											
307												
308	**Nonparametric Distribution Free UCLs**											
309					95% CLT UCL	2.745	95% Jackknife UCL					2.813
310					95% Standard Bootstrap UCL	2.718	95% Bootstrap-t UCL					3.046
311					95% Hall's Bootstrap UCL	6.191	95% Percentile Bootstrap UCL					2.711
312					95% BCA Bootstrap UCL	2.873						

	A	B	C	D	E	F	G	H	I	J	K	L
313					90% Chebyshev(Mean, Sd) UCL	3.294				95% Chebyshev(Mean, Sd) UCL		3.845
314					97.5% Chebyshev(Mean, Sd) UCL	4.609				99% Chebyshev(Mean, Sd) UCL		6.11
315												
316					**Suggested UCL to Use**							
317					95% Chebyshev (Mean, Sd) UCL	3.845						
318												
319					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
320					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
321					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
322					For additional insight the user may want to consult a statistician.							
323												
324												
325	**Vanadium**											
326												
327					**General Statistics**							
328					Total Number of Observations	11				Number of Distinct Observations		11
329										Number of Missing Observations		0
330					Minimum	75				Mean		108.7
331					Maximum	158				Median		105
332					SD	24.99				Std. Error of Mean		7.534
333					Coefficient of Variation	0.23				Skewness		0.551
334												
335					**Normal GOF Test**							
336					Shapiro Wilk Test Statistic	0.958				**Shapiro Wilk GOF Test**		
337					5% Shapiro Wilk Critical Value	0.85				Data appear Normal at 5% Significance Level		
338					Lilliefors Test Statistic	0.144				**Lilliefors GOF Test**		
339					5% Lilliefors Critical Value	0.267				Data appear Normal at 5% Significance Level		
340					**Data appear Normal at 5% Significance Level**							
341												
342					**Assuming Normal Distribution**							
343					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
344					95% Student's-t UCL	122.4				95% Adjusted-CLT UCL (Chen-1995)		122.5
345										95% Modified-t UCL (Johnson-1978)		122.6
346												
347					**Gamma GOF Test**							
348					A-D Test Statistic	0.193				**Anderson-Darling Gamma GOF Test**		
349					5% A-D Critical Value	0.729				Detected data appear Gamma Distributed at 5% Significance Level		
350					K-S Test Statistic	0.115				**Kolmogrov-Smirnoff Gamma GOF Test**		
351					5% K-S Critical Value	0.255				Detected data appear Gamma Distributed at 5% Significance Level		
352					**Detected data appear Gamma Distributed at 5% Significance Level**							
353												
354					**Gamma Statistics**							
355					k hat (MLE)	21.25				k star (bias corrected MLE)		15.51
356					Theta hat (MLE)	5.117				Theta star (bias corrected MLE)		7.008
357					nu hat (MLE)	467.5				nu star (bias corrected)		341.3
358					MLE Mean (bias corrected)	108.7				MLE Sd (bias corrected)		27.6
359										Approximate Chi Square Value (0.05)		299.5
360					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		293.1
361												
362					**Assuming Gamma Distribution**							
363					95% Approximate Gamma UCL (use when n>=50))	123.9				95% Adjusted Gamma UCL (use when n<50)		126.6
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365	**Lognormal GOF Test**											
366					Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**					
367					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
368					Lilliefors Test Statistic	0.114	**Lilliefors Lognormal GOF Test**					
369					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
370	**Data appear Lognormal at 5% Significance Level**											
371												
372	**Lognormal Statistics**											
373					Minimum of Logged Data	4.317				Mean of logged Data		4.665
374					Maximum of Logged Data	5.063				SD of logged Data		0.228
375												
376	**Assuming Lognormal Distribution**											
377					95% H-UCL	124.9				90% Chebyshev (MVUE) UCL		131.3
378					95% Chebyshev (MVUE) UCL	141.5				97.5% Chebyshev (MVUE) UCL		155.7
379					99% Chebyshev (MVUE) UCL	183.6						
380												
381	**Nonparametric Distribution Free UCL Statistics**											
382	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
383												
384	**Nonparametric Distribution Free UCLs**											
385					95% CLT UCL	121.1				95% Jackknife UCL		122.4
386					95% Standard Bootstrap UCL	121.1				95% Bootstrap-t UCL		124.2
387					95% Hall's Bootstrap UCL	127.3				95% Percentile Bootstrap UCL		120.8
388					95% BCA Bootstrap UCL	121.7						
389					90% Chebyshev(Mean, Sd) UCL	131.3				95% Chebyshev(Mean, Sd) UCL		141.6
390					97.5% Chebyshev(Mean, Sd) UCL	155.8				99% Chebyshev(Mean, Sd) UCL		183.7
391												
392	**Suggested UCL to Use**											
393					95% Student's-t UCL	122.4						
394												
395	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
396	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
397	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
398	For additional insight the user may want to consult a statistician.											
399												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			10/29/2015 11:45								
5	From File			EPC_013Surf.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Vanadium**											
12												
13	**General Statistics**											
14	Total Number of Observations					15	Number of Distinct Observations					12
15							Number of Missing Observations					0
16	Minimum					72	Mean					87.47
17	Maximum					103	Median					85
18	SD					10.66	Std. Error of Mean					2.751
19	Coefficient of Variation					0.122	Skewness					0.192
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.917	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.881	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.155	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.229	Data appear Normal at 5% Significance Level					
26	**Data appear Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					92.31	95% Adjusted-CLT UCL (Chen-1995)					92.14
31							95% Modified-t UCL (Johnson-1978)					92.34
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.497	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.734	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.158	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.221	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					72.5	k star (bias corrected MLE)					58.05
42	Theta hat (MLE)					1.206	Theta star (bias corrected MLE)					1.507
43	nu hat (MLE)					2175	nu star (bias corrected)					1741
44	MLE Mean (bias corrected)					87.47	MLE Sd (bias corrected)					11.48
45							Approximate Chi Square Value (0.05)					1645
46	Adjusted Level of Significance					0.0324	Adjusted Chi Square Value					1634
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					92.57	95% Adjusted Gamma UCL (use when n<50)					93.22
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.924	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53	5% Shapiro Wilk Critical Value					0.881	Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.151	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.229	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					4.277	Mean of logged Data					4.464
60	Maximum of Logged Data					4.635	SD of logged Data					0.122
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					92.67	90% Chebyshev (MVUE) UCL					95.72
64	95% Chebyshev (MVUE) UCL					99.47	97.5% Chebyshev (MVUE) UCL					104.7
65	99% Chebyshev (MVUE) UCL					114.9						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					91.99	95% Jackknife UCL					92.31
72	95% Standard Bootstrap UCL					91.75	95% Bootstrap-t UCL					92.74
73	95% Hall's Bootstrap UCL					91.91	95% Percentile Bootstrap UCL					91.53
74	95% BCA Bootstrap UCL					92						
75	90% Chebyshev(Mean, Sd) UCL					95.72	95% Chebyshev(Mean, Sd) UCL					99.46
76	97.5% Chebyshev(Mean, Sd) UCL					104.6	99% Chebyshev(Mean, Sd) UCL					114.8
77												
78	**Suggested UCL to Use**											
79	95% Student's-t UCL					92.31						
80												
81	**Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.**											
82	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											

UCL Statistics for Uncensored Full Data Sets			
User Selected Options			
Date/Time of Computation	10/29/2015 11:45		
From File	EPC_013Surf.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
Vanadium			
General Statistics			
Total Number of Observations	15	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	72	Mean	87.47
Maximum	103	Median	85
SD	10.66	Std. Error of Mean	2.751
Coefficient of Variation	0.122	Skewness	0.192
Normal GOF Test			
Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.155	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	92.31	95% Adjusted-CLT UCL (Chen-1995)	92.14
		95% Modified-t UCL (Johnson-1978)	92.34
Gamma GOF Test			
A-D Test Statistic	0.497	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.158	**Kolmogrov-Smirnoff Gamma GOF Test**	
5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	72.5	k star (bias corrected MLE)	58.05
Theta hat (MLE)	1.206	Theta star (bias corrected MLE)	1.507
nu hat (MLE)	2175	nu star (bias corrected)	1741
MLE Mean (bias corrected)	87.47	MLE Sd (bias corrected)	11.48
		Approximate Chi Square Value (0.05)	1645
Adjusted Level of Significance	0.0324	Adjusted Chi Square Value	1634
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	92.57	95% Adjusted Gamma UCL (use when n<50)	93.22
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.151	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	4.277	Mean of logged Data	4.464
Maximum of Logged Data	4.635	SD of logged Data	0.122
Assuming Lognormal Distribution			
95% H-UCL	92.67	90% Chebyshev (MVUE) UCL	95.72

95% Chebyshev (MVUE) UCL				99.47	97.5% Chebyshev (MVUE) UCL					104.7
99% Chebyshev (MVUE) UCL				114.9						
Nonparametric Distribution Free UCL Statistics										
Data appear to follow a Discernible Distribution at 5% Significance Level										
Nonparametric Distribution Free UCLs										
95% CLT UCL				91.99	95% Jackknife UCL					92.31
95% Standard Bootstrap UCL				91.75	95% Bootstrap-t UCL					92.74
95% Hall's Bootstrap UCL				91.91	95% Percentile Bootstrap UCL					91.53
95% BCA Bootstrap UCL				92						
90% Chebyshev(Mean, Sd) UCL				95.72	95% Chebyshev(Mean, Sd) UCL					99.46
97.5% Chebyshev(Mean, Sd) UCL				104.6	99% Chebyshev(Mean, Sd) UCL					114.8
Suggested UCL to Use										
95% Student's-t UCL				92.31						
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). However, simulations results will not cover all Real World data sets.										
For additional insight the user may want to consult a statistician.										

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:19:05 PM								
5	From File			EPC_013Surf_EU02.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	General Statistics											
14	Total Number of Observations					12	Number of Distinct Observations					12
15							Number of Missing Observations					0
16	Minimum					17903	Mean					22708
17	Maximum					30751	Median					21530
18	SD					3931	Std. Error of Mean					1135
19	Coefficient of Variation					0.173	Skewness					1.559
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.75	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.307	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					24745	95% Adjusted-CLT UCL (Chen-1995)					25120
31							95% Modified-t UCL (Johnson-1978)					24831
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.314	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.73	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.293	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.245	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					41.05	k star (bias corrected MLE)					30.85
42	Theta hat (MLE)					553.1	Theta star (bias corrected MLE)					736.2
43	nu hat (MLE)					985.3	nu star (bias corrected)					740.3
44	MLE Mean (bias corrected)					22708	MLE Sd (bias corrected)					4089
45							Approximate Chi Square Value (0.05)					678.2
46	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					669.1
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					24788	95% Adjusted Gamma UCL (use when n<50)					25125
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.8	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.859		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.283		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.256		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	9.793				Mean of logged Data		10.02
60					Maximum of Logged Data	10.33				SD of logged Data		0.159
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	24777				90% Chebyshev (MVUE) UCL		25822
64					95% Chebyshev (MVUE) UCL	27239				97.5% Chebyshev (MVUE) UCL		29207
65					99% Chebyshev (MVUE) UCL	33071						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	24574				95% Jackknife UCL		24745
72					95% Standard Bootstrap UCL	24487				95% Bootstrap-t UCL		27850
73					95% Hall's Bootstrap UCL	39197				95% Percentile Bootstrap UCL		24585
74					95% BCA Bootstrap UCL	25078						
75					90% Chebyshev(Mean, Sd) UCL	26112				95% Chebyshev(Mean, Sd) UCL		27654
76					97.5% Chebyshev(Mean, Sd) UCL	29794				99% Chebyshev(Mean, Sd) UCL		33997
77												
78					**Suggested UCL to Use**							
79					95% Student's-t UCL	24745				or 95% Modified-t UCL		24831
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	**Manganese**											
88												
89					**General Statistics**							
90					Total Number of Observations	12				Number of Distinct Observations		12
91										Number of Missing Observations		0
92					Minimum	456				Mean		928.7
93					Maximum	2156				Median		709
94					SD	569.1				Std. Error of Mean		164.3
95					Coefficient of Variation	0.613				Skewness		1.824
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.678		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.859		Data Not Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.332		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.256		Data Not Normal at 5% Significance Level				
102					**Data Not Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	1224				95% Adjusted-CLT UCL (Chen-1995)		1291
107										95% Modified-t UCL (Johnson-1978)		1238
108												
109	Gamma GOF Test											
110					A-D Test Statistic	1.297	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.266	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.246	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	4.154				k star (bias corrected MLE)		3.171
118					Theta hat (MLE)	223.5				Theta star (bias corrected MLE)		292.8
119					nu hat (MLE)	99.71				nu star (bias corrected)		76.11
120					MLE Mean (bias corrected)	928.7				MLE Sd (bias corrected)		521.5
121										Approximate Chi Square Value (0.05)		57.02
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		54.5
123												
124	Assuming Gamma Distribution											
125				95% Approximate Gamma UCL (use when n>=50))		1240				95% Adjusted Gamma UCL (use when n<50)		1297
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.815	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.229	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
132	Data appear Approximate Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	6.122				Mean of logged Data		6.709
136					Maximum of Logged Data	7.676				SD of logged Data		0.482
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	1253				90% Chebyshev (MVUE) UCL		1300
140					95% Chebyshev (MVUE) UCL	1476				97.5% Chebyshev (MVUE) UCL		1721
141					99% Chebyshev (MVUE) UCL	2201						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	1199				95% Jackknife UCL		1224
148					95% Standard Bootstrap UCL	1183				95% Bootstrap-t UCL		1936
149					95% Hall's Bootstrap UCL	2940				95% Percentile Bootstrap UCL		1191
150					95% BCA Bootstrap UCL	1298						
151					90% Chebyshev(Mean, Sd) UCL	1422				95% Chebyshev(Mean, Sd) UCL		1645
152					97.5% Chebyshev(Mean, Sd) UCL	1955				99% Chebyshev(Mean, Sd) UCL		2563
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	1224				or 95% Modified-t UCL		1238
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Uranium-238**											
164												
165	**General Statistics**											
166					Total Number of Observations	12			Number of Distinct Observations			1
167									Number of Missing Observations			0
168					Minimum	1.4			Mean			1.4
169					Maximum	1.4			Median			1.4
170												
171	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
172	**ProUCL (or any other software) should not be used on such a data set!**											
173	**The data set for variable Uranium-238 was not processed!**											
174												
175	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
176	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
177												
178												
179												
180	**Vanadium**											
181												
182	**General Statistics**											
183					Total Number of Observations	12			Number of Distinct Observations			10
184									Number of Missing Observations			0
185					Minimum	71			Mean			87.83
186					Maximum	108			Median			88
187					SD	11.58			Std. Error of Mean			3.344
188					Coefficient of Variation	0.132			Skewness			0.169
189												
190	**Normal GOF Test**											
191					Shapiro Wilk Test Statistic	0.938			**Shapiro Wilk GOF Test**			
192					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
193					Lilliefors Test Statistic	0.172			**Lilliefors GOF Test**			
194					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
195	**Data appear Normal at 5% Significance Level**											
196												
197	**Assuming Normal Distribution**											
198					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
199					95% Student's-t UCL	93.84			95% Adjusted-CLT UCL (Chen-1995)			93.51
200									95% Modified-t UCL (Johnson-1978)			93.87
201												
202	**Gamma GOF Test**											
203					A-D Test Statistic	0.434			**Anderson-Darling Gamma GOF Test**			
204					5% A-D Critical Value	0.73			Detected data appear Gamma Distributed at 5% Significance Level			
205					K-S Test Statistic	0.191			**Kolmogrov-Smirnoff Gamma GOF Test**			
206					5% K-S Critical Value	0.245			Detected data appear Gamma Distributed at 5% Significance Level			
207	**Detected data appear Gamma Distributed at 5% Significance Level**											
208												

	A	B	C	D	E	F	G	H	I	J	K	L
209	Gamma Statistics											
210					k hat (MLE)	62.8	k star (bias corrected MLE)					47.16
211					Theta hat (MLE)	1.399	Theta star (bias corrected MLE)					1.863
212					nu hat (MLE)	1507	nu star (bias corrected)					1132
213					MLE Mean (bias corrected)	87.83	MLE Sd (bias corrected)					12.79
214							Approximate Chi Square Value (0.05)					1055
215					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					1043
216												
217	Assuming Gamma Distribution											
218				95% Approximate Gamma UCL (use when n>=50))		94.25	95% Adjusted Gamma UCL (use when n<50)					95.28
219												
220	Lognormal GOF Test											
221					Shapiro Wilk Test Statistic	0.939	Shapiro Wilk Lognormal GOF Test					
222					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
223					Lilliefors Test Statistic	0.189	Lilliefors Lognormal GOF Test					
224					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
225	Data appear Lognormal at 5% Significance Level											
226												
227	Lognormal Statistics											
228					Minimum of Logged Data	4.263	Mean of logged Data					4.467
229					Maximum of Logged Data	4.682	SD of logged Data					0.132
230												
231	Assuming Lognormal Distribution											
232					95% H-UCL	94.41	90% Chebyshev (MVUE) UCL					97.9
233					95% Chebyshev (MVUE) UCL	102.5	97.5% Chebyshev (MVUE) UCL					108.8
234					99% Chebyshev (MVUE) UCL	121.2						
235												
236	Nonparametric Distribution Free UCL Statistics											
237	Data appear to follow a Discernible Distribution at 5% Significance Level											
238												
239	Nonparametric Distribution Free UCLs											
240					95% CLT UCL	93.33	95% Jackknife UCL					93.84
241					95% Standard Bootstrap UCL	92.97	95% Bootstrap-t UCL					94.16
242					95% Hall's Bootstrap UCL	93.14	95% Percentile Bootstrap UCL					93.08
243					95% BCA Bootstrap UCL	93						
244					90% Chebyshev(Mean, Sd) UCL	97.86	95% Chebyshev(Mean, Sd) UCL					102.4
245					97.5% Chebyshev(Mean, Sd) UCL	108.7	99% Chebyshev(Mean, Sd) UCL					121.1
246												
247	Suggested UCL to Use											
248					95% Student's-t UCL	93.84						
249												
250	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
251	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
252	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
253	For additional insight the user may want to consult a statistician.											
254												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:18:26 PM								
5	From File			EPC_013Surf_EU03.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Iron**											
12												
13	**General Statistics**											
14	Total Number of Observations					11	Number of Distinct Observations					11
15							Number of Missing Observations					0
16	Minimum					15990	Mean					21906
17	Maximum					41021	Median					20547
18	SD					6865	Std. Error of Mean					2070
19	Coefficient of Variation					0.313	Skewness					2.47
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.712	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.282	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					25657	95% Adjusted-CLT UCL (Chen-1995)					26957
31							95% Modified-t UCL (Johnson-1978)					25914
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.846	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.729	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.241	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.255	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					14.9	k star (bias corrected MLE)					10.89
42	Theta hat (MLE)					1470	Theta star (bias corrected MLE)					2011
43	nu hat (MLE)					327.7	nu star (bias corrected)					239.7
44	MLE Mean (bias corrected)					21906	MLE Sd (bias corrected)					6637
45							Approximate Chi Square Value (0.05)					204.8
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					199.6
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50)					25631	95% Adjusted Gamma UCL (use when n<50)					26306
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.832	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.223	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
56	**Data appear Approximate Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.68				Mean of logged Data		9.961
60					Maximum of Logged Data	10.62				SD of logged Data		0.256
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	25545				90% Chebyshev (MVUE) UCL		26906
64					95% Chebyshev (MVUE) UCL	29212				97.5% Chebyshev (MVUE) UCL		32413
65					99% Chebyshev (MVUE) UCL	38700						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	25310				95% Jackknife UCL		25657
72					95% Standard Bootstrap UCL	25229				95% Bootstrap-t UCL		29884
73					95% Hall's Bootstrap UCL	41444				95% Percentile Bootstrap UCL		25647
74					95% BCA Bootstrap UCL	26941						
75					90% Chebyshev(Mean, Sd) UCL	28115				95% Chebyshev(Mean, Sd) UCL		30927
76					97.5% Chebyshev(Mean, Sd) UCL	34831				99% Chebyshev(Mean, Sd) UCL		42499
77												
78	**Suggested UCL to Use**											
79					95% Adjusted Gamma UCL	26306						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Manganese**											
88												
89	**General Statistics**											
90					Total Number of Observations	11				Number of Distinct Observations		11
91										Number of Missing Observations		0
92					Minimum	306				Mean		718.9
93					Maximum	2248				Median		601
94					SD	541.9				Std. Error of Mean		163.4
95					Coefficient of Variation	0.754				Skewness		2.597
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.678	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.309	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	1015				95% Adjusted-CLT UCL (Chen-1995)		1124
107										95% Modified-t UCL (Johnson-1978)		1036
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.622	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.215	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.257	Detected data appear Gamma Distributed at 5% Significance Level					
114	**Detected data appear Gamma Distributed at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	3.11				k star (bias corrected MLE)		2.322
118					Theta hat (MLE)	231.2				Theta star (bias corrected MLE)		309.6
119					nu hat (MLE)	68.41				nu star (bias corrected)		51.09
120					MLE Mean (bias corrected)	718.9				MLE Sd (bias corrected)		471.8
121										Approximate Chi Square Value (0.05)		35.67
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		33.58
123												
124	**Assuming Gamma Distribution**											
125				95% Approximate Gamma UCL (use when n>=50)		1030				95% Adjusted Gamma UCL (use when n<50)		1094
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	5.724				Mean of logged Data		6.408
136					Maximum of Logged Data	7.718				SD of logged Data		0.562
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	1062				90% Chebyshev (MVUE) UCL		1064
140					95% Chebyshev (MVUE) UCL	1229				97.5% Chebyshev (MVUE) UCL		1459
141					99% Chebyshev (MVUE) UCL	1909						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	987.7				95% Jackknife UCL		1015
148					95% Standard Bootstrap UCL	981				95% Bootstrap-t UCL		1365
149					95% Hall's Bootstrap UCL	2082				95% Percentile Bootstrap UCL		1017
150					95% BCA Bootstrap UCL	1153						
151					90% Chebyshev(Mean, Sd) UCL	1209				95% Chebyshev(Mean, Sd) UCL		1431
152					97.5% Chebyshev(Mean, Sd) UCL	1739				99% Chebyshev(Mean, Sd) UCL		2345
153												
154	**Suggested UCL to Use**											
155					95% Adjusted Gamma UCL	1094						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Molybdenum**											
164												
165	**General Statistics**											
166	Total Number of Observations					11	Number of Distinct Observations					3
167							Number of Missing Observations					0
168	Minimum					0.33	Mean					6.303
169	Maximum					42	Median					3
170	SD					11.87	Std. Error of Mean					3.578
171	Coefficient of Variation					1.883	Skewness					3.288
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.387	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.519	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					12.79	95% Adjusted-CLT UCL (Chen-1995)					15.98
183							95% Modified-t UCL (Johnson-1978)					13.38
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					2.693	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.759	Data Not Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.497	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.264	Data Not Gamma Distributed at 5% Significance Level					
190	**Data Not Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					0.839	k star (bias corrected MLE)					0.671
194	Theta hat (MLE)					7.513	Theta star (bias corrected MLE)					9.397
195	nu hat (MLE)					18.46	nu star (bias corrected)					14.76
196	MLE Mean (bias corrected)					6.303	MLE Sd (bias corrected)					7.696
197							Approximate Chi Square Value (0.05)					7.092
198	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					6.245
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					13.11	95% Adjusted Gamma UCL (use when n<50)					14.89
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.623	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.85	Data Not Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.423	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.267	Data Not Lognormal at 5% Significance Level					
208	**Data Not Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-1.109				Mean of logged Data		1.138
212					Maximum of Logged Data	3.738				SD of logged Data		1.087
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	16.74				90% Chebyshev (MVUE) UCL		10.69
216					95% Chebyshev (MVUE) UCL	13.17				97.5% Chebyshev (MVUE) UCL		16.61
217					99% Chebyshev (MVUE) UCL	23.37						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data do not follow a Discernible Distribution (0.05)						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	12.19				95% Jackknife UCL		12.79
224					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
225					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
226					95% BCA Bootstrap UCL	N/A						
227					90% Chebyshev(Mean, Sd) UCL	17.04				95% Chebyshev(Mean, Sd) UCL		21.9
228					97.5% Chebyshev(Mean, Sd) UCL	28.65				99% Chebyshev(Mean, Sd) UCL		41.9
229												
230						Suggested UCL to Use						
231					95% Chebyshev (Mean, Sd) UCL	21.9						
232												
233					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
234					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
235					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
236					For additional insight the user may want to consult a statistician.							
237												
238												
239	PAH, Total											
240												
241						General Statistics						
242					Total Number of Observations	11				Number of Distinct Observations		1
243										Number of Missing Observations		0
244					Minimum	0.0215				Mean		0.0215
245					Maximum	0.0215				Median		0.0215
246												
247						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
248						ProUCL (or any other software) should not be used on such a data set!						
249						The data set for variable PAH, Total was not processed!						
250												
251						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
252						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
253												
254												
255												
256	Vanadium											
257												
258						General Statistics						
259					Total Number of Observations	11				Number of Distinct Observations		9
260										Number of Missing Observations		0

	A	B	C	D	E	F	G	H	I	J	K	L
261					Minimum	72					Mean	91.09
262					Maximum	116					Median	92
263					SD	14.07					Std. Error of Mean	4.241
264					Coefficient of Variation	0.154					Skewness	0.434
265												
266					Normal GOF Test							
267					Shapiro Wilk Test Statistic	0.94	Shapiro Wilk GOF Test					
268					5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level					
269					Lilliefors Test Statistic	0.169	Lilliefors GOF Test					
270					5% Lilliefors Critical Value	0.267	Data appear Normal at 5% Significance Level					
271					Data appear Normal at 5% Significance Level							
272												
273					Assuming Normal Distribution							
274			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
275					95% Student's-t UCL	98.78					95% Adjusted-CLT UCL (Chen-1995)	98.66
276											95% Modified-t UCL (Johnson-1978)	98.87
277												
278					Gamma GOF Test							
279					A-D Test Statistic	0.331	Anderson-Darling Gamma GOF Test					
280					5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level					
281					K-S Test Statistic	0.181	Kolmogrov-Smirnoff Gamma GOF Test					
282					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
283					Detected data appear Gamma Distributed at 5% Significance Level							
284												
285					Gamma Statistics							
286					k hat (MLE)	47.06					k star (bias corrected MLE)	34.29
287					Theta hat (MLE)	1.936					Theta star (bias corrected MLE)	2.657
288					nu hat (MLE)	1035					nu star (bias corrected)	754.3
289					MLE Mean (bias corrected)	91.09					MLE Sd (bias corrected)	15.56
290											Approximate Chi Square Value (0.05)	691.6
291					Adjusted Level of Significance	0.0278					Adjusted Chi Square Value	681.8
292												
293					Assuming Gamma Distribution							
294					95% Approximate Gamma UCL (use when n>=50))	99.35					95% Adjusted Gamma UCL (use when n<50)	100.8
295												
296					Lognormal GOF Test							
297					Shapiro Wilk Test Statistic	0.949	Shapiro Wilk Lognormal GOF Test					
298					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
299					Lilliefors Test Statistic	0.17	Lilliefors Lognormal GOF Test					
300					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
301					Data appear Lognormal at 5% Significance Level							
302												
303					Lognormal Statistics							
304					Minimum of Logged Data	4.277					Mean of logged Data	4.501
305					Maximum of Logged Data	4.754					SD of logged Data	0.153
306												
307					Assuming Lognormal Distribution							
308					95% H-UCL	99.57					90% Chebyshev (MVUE) UCL	103.7
309					95% Chebyshev (MVUE) UCL	109.4					97.5% Chebyshev (MVUE) UCL	117.3
310					99% Chebyshev (MVUE) UCL	132.9						
311												
312					Nonparametric Distribution Free UCL Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
313	Data appear to follow a Discernible Distribution at 5% Significance Level											
314												
315	Nonparametric Distribution Free UCLs											
316					95% CLT UCL	98.07				95% Jackknife UCL		98.78
317					95% Standard Bootstrap UCL	97.73				95% Bootstrap-t UCL		99.35
318					95% Hall's Bootstrap UCL	98.75				95% Percentile Bootstrap UCL		97.64
319					95% BCA Bootstrap UCL	98.27						
320					90% Chebyshev(Mean, Sd) UCL	103.8				95% Chebyshev(Mean, Sd) UCL		109.6
321					97.5% Chebyshev(Mean, Sd) UCL	117.6				99% Chebyshev(Mean, Sd) UCL		133.3
322												
323	Suggested UCL to Use											
324					95% Student's-t UCL	98.78						
325												
326	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
327	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
328	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
329	For additional insight the user may want to consult a statistician.											
330												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:17:47 PM								
5	From File			EPC_013Surf_EU04.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	General Statistics											
14	Total Number of Observations					10	Number of Distinct Observations					10
15							Number of Missing Observations					0
16	Minimum					17066	Mean					23601
17	Maximum					36780	Median					20377
18	SD					6701	Std. Error of Mean					2119
19	Coefficient of Variation					0.284	Skewness					0.891
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.862	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.842	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.281	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	Data appear Approximate Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					27485	95% Adjusted-CLT UCL (Chen-1995)					27724
31							95% Modified-t UCL (Johnson-1978)					27585
32												
33	Gamma GOF Test											
34	A-D Test Statistic					0.62	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.725	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.275	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.266	Data Not Gamma Distributed at 5% Significance Level					
38	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					14.99	k star (bias corrected MLE)					10.56
42	Theta hat (MLE)					1574	Theta star (bias corrected MLE)					2235
43	nu hat (MLE)					299.8	nu star (bias corrected)					211.2
44	MLE Mean (bias corrected)					23601	MLE Sd (bias corrected)					7263
45							Approximate Chi Square Value (0.05)					178.6
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					173.3
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					27913	95% Adjusted Gamma UCL (use when n<50)					28753
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.885	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.258	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.745				Mean of logged Data		10.04
60					Maximum of Logged Data	10.51				SD of logged Data		0.269
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	28166				90% Chebyshev (MVUE) UCL		29618
64					95% Chebyshev (MVUE) UCL	32358				97.5% Chebyshev (MVUE) UCL		36160
65					99% Chebyshev (MVUE) UCL	43629						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	27086				95% Jackknife UCL		27485
72					95% Standard Bootstrap UCL	26967				95% Bootstrap-t UCL		28330
73					95% Hall's Bootstrap UCL	27057				95% Percentile Bootstrap UCL		27026
74					95% BCA Bootstrap UCL	27220						
75					90% Chebyshev(Mean, Sd) UCL	29958				95% Chebyshev(Mean, Sd) UCL		32838
76					97.5% Chebyshev(Mean, Sd) UCL	36834				99% Chebyshev(Mean, Sd) UCL		44685
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	27485						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**PAH, Total**											
88												
89	**General Statistics**											
90					Total Number of Observations	10				Number of Distinct Observations		3
91										Number of Missing Observations		0
92					Minimum	0.0511				Mean		0.271
93					Maximum	0.49				Median		0.271
94					SD	0.103				Std. Error of Mean		0.0327
95					Coefficient of Variation	0.382				Skewness		-4.35E-16
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.659	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	0.331				95% Adjusted-CLT UCL (Chen-1995)		0.324
107										95% Modified-t UCL (Johnson-1978)		0.331
108												
109	Gamma GOF Test											
110					A-D Test Statistic	2.181	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.729	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.461	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.267	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	4.821				k star (bias corrected MLE)		3.442
118					Theta hat (MLE)	0.0561				Theta star (bias corrected MLE)		0.0786
119					nu hat (MLE)	96.43				nu star (bias corrected)		68.83
120					MLE Mean (bias corrected)	0.271				MLE Sd (bias corrected)		0.146
121										Approximate Chi Square Value (0.05)		50.74
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		48.05
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	0.367				95% Adjusted Gamma UCL (use when n<50)		0.388
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.558	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.474	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-2.974				Mean of logged Data		-1.415
136					Maximum of Logged Data	-0.713				SD of logged Data		0.579
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	0.451				90% Chebyshev (MVUE) UCL		0.44
140					95% Chebyshev (MVUE) UCL	0.512				97.5% Chebyshev (MVUE) UCL		0.612
141					99% Chebyshev (MVUE) UCL	0.807						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	0.324				95% Jackknife UCL		0.331
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	0.369				95% Chebyshev(Mean, Sd) UCL		0.413
152					97.5% Chebyshev(Mean, Sd) UCL	0.475				99% Chebyshev(Mean, Sd) UCL		0.596
153												
154	Suggested UCL to Use											
155					95% Chebyshev (Mean, Sd) UCL	0.413						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
163	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
164												
165												
166	**PCB, Total**											
167												
168	**General Statistics**											
169	Total Number of Observations					10	Number of Distinct Observations					2
170							Number of Missing Observations					0
171	Minimum					0.1	Mean					4.02
172	Maximum					5	Median					5
173	SD					2.066	Std. Error of Mean					0.653
174	Coefficient of Variation					0.514	Skewness					-1.779
175												
176	**Normal GOF Test**											
177	Shapiro Wilk Test Statistic					0.51	**Shapiro Wilk GOF Test**					
178	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
179	Lilliefors Test Statistic					0.482	**Lilliefors GOF Test**					
180	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
181	**Data Not Normal at 5% Significance Level**											
182												
183	**Assuming Normal Distribution**											
184	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
185	95% Student's-t UCL					5.218	95% Adjusted-CLT UCL (Chen-1995)					4.702
186							95% Modified-t UCL (Johnson-1978)					5.156
187												
188	**Gamma GOF Test**											
189	A-D Test Statistic					2.814	**Anderson-Darling Gamma GOF Test**					
190	5% A-D Critical Value					0.748	Data Not Gamma Distributed at 5% Significance Level					
191	K-S Test Statistic					0.511	**Kolmogrov-Smirnoff Gamma GOF Test**					
192	5% K-S Critical Value					0.274	Data Not Gamma Distributed at 5% Significance Level					
193	**Data Not Gamma Distributed at 5% Significance Level**											
194												
195	**Gamma Statistics**											
196	k hat (MLE)					1.021	k star (bias corrected MLE)					0.781
197	Theta hat (MLE)					3.939	Theta star (bias corrected MLE)					5.147
198	nu hat (MLE)					20.41	nu star (bias corrected)					15.62
199	MLE Mean (bias corrected)					4.02	MLE Sd (bias corrected)					4.549
200							Approximate Chi Square Value (0.05)					7.696
201	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					6.751
202												
203	**Assuming Gamma Distribution**											
204	95% Approximate Gamma UCL (use when n>=50))					8.16	95% Adjusted Gamma UCL (use when n<50)					9.302
205												
206	**Lognormal GOF Test**											
207	Shapiro Wilk Test Statistic					0.51	**Shapiro Wilk Lognormal GOF Test**					
208	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.482	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	-2.303				Mean of logged Data		0.827
215					Maximum of Logged Data	1.609				SD of logged Data		1.649
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	109.1				90% Chebyshev (MVUE) UCL		18.43
219					95% Chebyshev (MVUE) UCL	23.62				97.5% Chebyshev (MVUE) UCL		30.83
220					99% Chebyshev (MVUE) UCL	44.98						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	5.095				95% Jackknife UCL		N/A
227					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
228					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
229					95% BCA Bootstrap UCL	N/A						
230					90% Chebyshev(Mean, Sd) UCL	5.98				95% Chebyshev(Mean, Sd) UCL		6.868
231					97.5% Chebyshev(Mean, Sd) UCL	8.1				99% Chebyshev(Mean, Sd) UCL		10.52
232												
233	**Suggested UCL to Use**											
234					99% Chebyshev (Mean, Sd) UCL	10.52						
235												
236	**Recommended UCL exceeds the maximum observation**											
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
241	For additional insight the user may want to consult a statistician.											
242												
243	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
244	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
245												
246												
247	**Uranium-238**											
248												
249	**General Statistics**											
250					Total Number of Observations	10				Number of Distinct Observations		3
251										Number of Missing Observations		0
252					Minimum	1.32				Mean		1.68
253					Maximum	2.04				Median		1.68
254					SD	0.17				Std. Error of Mean		0.0537
255					Coefficient of Variation	0.101				Skewness		-2.37E-15
256												
257	**Normal GOF Test**											
258					Shapiro Wilk Test Statistic	0.659	**Shapiro Wilk GOF Test**					
259					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
260					Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
262	**Data Not Normal at 5% Significance Level**											
263												
264	**Assuming Normal Distribution**											
265	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
266					95% Student's-t UCL	1.778				95% Adjusted-CLT UCL (Chen-1995)		1.768
267										95% Modified-t UCL (Johnson-1978)		1.778
268												
269	**Gamma GOF Test**											
270					A-D Test Statistic	2.02	**Anderson-Darling Gamma GOF Test**					
271					5% A-D Critical Value	0.724	Data Not Gamma Distributed at 5% Significance Level					
272					K-S Test Statistic	0.413	**Kolmogrov-Smirnoff Gamma GOF Test**					
273					5% K-S Critical Value	0.266	Data Not Gamma Distributed at 5% Significance Level					
274	**Data Not Gamma Distributed at 5% Significance Level**											
275												
276	**Gamma Statistics**											
277					k hat (MLE)	106.5				k star (bias corrected MLE)		74.64
278					Theta hat (MLE)	0.0158				Theta star (bias corrected MLE)		0.0225
279					nu hat (MLE)	2131				nu star (bias corrected)		1493
280					MLE Mean (bias corrected)	1.68				MLE Sd (bias corrected)		0.194
281										Approximate Chi Square Value (0.05)		1404
282					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		1389
283												
284	**Assuming Gamma Distribution**											
285					95% Approximate Gamma UCL (use when n>=50))	1.786				95% Adjusted Gamma UCL (use when n<50)		1.805
286												
287	**Lognormal GOF Test**											
288					Shapiro Wilk Test Statistic	0.653	**Shapiro Wilk Lognormal GOF Test**					
289					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
290					Lilliefors Test Statistic	0.418	**Lilliefors Lognormal GOF Test**					
291					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
292	**Data Not Lognormal at 5% Significance Level**											
293												
294	**Lognormal Statistics**											
295					Minimum of Logged Data	0.278				Mean of logged Data		0.514
296					Maximum of Logged Data	0.713				SD of logged Data		0.103
297												
298	**Assuming Lognormal Distribution**											
299					95% H-UCL	1.789				90% Chebyshev (MVUE) UCL		1.845
300					95% Chebyshev (MVUE) UCL	1.919				97.5% Chebyshev (MVUE) UCL		2.022
301					99% Chebyshev (MVUE) UCL	2.226						
302												
303	**Nonparametric Distribution Free UCL Statistics**											
304	**Data do not follow a Discernible Distribution (0.05)**											
305												
306	**Nonparametric Distribution Free UCLs**											
307					95% CLT UCL	1.768				95% Jackknife UCL		1.778
308					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
309					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
310					95% BCA Bootstrap UCL	N/A						
311					90% Chebyshev(Mean, Sd) UCL	1.841				95% Chebyshev(Mean, Sd) UCL		1.914
312					97.5% Chebyshev(Mean, Sd) UCL	2.015				99% Chebyshev(Mean, Sd) UCL		2.214

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314						**Suggested UCL to Use**						
315					95% Student's-t UCL	1.778					or 95% Modified-t UCL	1.778
316												
317					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
318					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
319					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
320					For additional insight the user may want to consult a statistician.							
321												
322					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
323					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
324												
325												
326	**Vanadium**											
327												
328						**General Statistics**						
329					Total Number of Observations	10					Number of Distinct Observations	9
330											Number of Missing Observations	0
331					Minimum	78					Mean	90.7
332					Maximum	110					Median	87.5
333					SD	12.83					Std. Error of Mean	4.058
334					Coefficient of Variation	0.141					Skewness	0.548
335												
336						**Normal GOF Test**						
337					Shapiro Wilk Test Statistic	0.853					**Shapiro Wilk GOF Test**	
338					5% Shapiro Wilk Critical Value	0.842					Data appear Normal at 5% Significance Level	
339					Lilliefors Test Statistic	0.198					**Lilliefors GOF Test**	
340					5% Lilliefors Critical Value	0.28					Data appear Normal at 5% Significance Level	
341						**Data appear Normal at 5% Significance Level**						
342												
343						**Assuming Normal Distribution**						
344					**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**	
345					95% Student's-t UCL	98.14					95% Adjusted-CLT UCL (Chen-1995)	98.13
346											95% Modified-t UCL (Johnson-1978)	98.26
347												
348						**Gamma GOF Test**						
349					A-D Test Statistic	0.622					**Anderson-Darling Gamma GOF Test**	
350					5% A-D Critical Value	0.724					Detected data appear Gamma Distributed at 5% Significance Level	
351					K-S Test Statistic	0.212					**Kolmogrov-Smirnoff Gamma GOF Test**	
352					5% K-S Critical Value	0.266					Detected data appear Gamma Distributed at 5% Significance Level	
353						**Detected data appear Gamma Distributed at 5% Significance Level**						
354												
355						**Gamma Statistics**						
356					k hat (MLE)	57.26					k star (bias corrected MLE)	40.15
357					Theta hat (MLE)	1.584					Theta star (bias corrected MLE)	2.259
358					nu hat (MLE)	1145					nu star (bias corrected)	803
359					MLE Mean (bias corrected)	90.7					MLE Sd (bias corrected)	14.31
360											Approximate Chi Square Value (0.05)	738.3
361					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	727.4
362												
363						**Assuming Gamma Distribution**						
364					95% Approximate Gamma UCL (use when n>=50))	98.66					95% Adjusted Gamma UCL (use when n<50)	100.1

	A	B	C	D	E	F	G	H	I	J	K	L
365												
366						Lognormal GOF Test						
367					Shapiro Wilk Test Statistic	0.861	Shapiro Wilk Lognormal GOF Test					
368					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
369					Lilliefors Test Statistic	0.2	Lilliefors Lognormal GOF Test					
370					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
371					Data appear Lognormal at 5% Significance Level							
372												
373					Lognormal Statistics							
374					Minimum of Logged Data	4.357	Mean of logged Data					4.499
375					Maximum of Logged Data	4.7	SD of logged Data					0.138
376												
377					Assuming Lognormal Distribution							
378					95% H-UCL	98.78	90% Chebyshev (MVUE) UCL					102.6
379					95% Chebyshev (MVUE) UCL	108	97.5% Chebyshev (MVUE) UCL					115.5
380					99% Chebyshev (MVUE) UCL	130.3						
381												
382					Nonparametric Distribution Free UCL Statistics							
383					Data appear to follow a Discernible Distribution at 5% Significance Level							
384												
385					Nonparametric Distribution Free UCLs							
386					95% CLT UCL	97.37	95% Jackknife UCL					98.14
387					95% Standard Bootstrap UCL	96.83	95% Bootstrap-t UCL					99.89
388					95% Hall's Bootstrap UCL	96.47	95% Percentile Bootstrap UCL					97.3
389					95% BCA Bootstrap UCL	97.2						
390					90% Chebyshev(Mean, Sd) UCL	102.9	95% Chebyshev(Mean, Sd) UCL					108.4
391					97.5% Chebyshev(Mean, Sd) UCL	116	99% Chebyshev(Mean, Sd) UCL					131.1
392												
393					Suggested UCL to Use							
394					95% Student's-t UCL	98.14						
395												
396					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
397					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
398					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
399					For additional insight the user may want to consult a statistician.							
400												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:16:20 PM								
5	From File			EPC_013Surf_EU05.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Aluminum											
12												
13	General Statistics											
14	Total Number of Observations					10	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					5100	Mean					8520
17	Maximum					14000	Median					8520
18	SD					2260	Std. Error of Mean					714.7
19	Coefficient of Variation					0.265	Skewness					1.394
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.728	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.4	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					9830	95% Adjusted-CLT UCL (Chen-1995)					10032
31							95% Modified-t UCL (Johnson-1978)					9883
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.376	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.725	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.368	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.266	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					17.21	k star (bias corrected MLE)					12.11
42	Theta hat (MLE)					495	Theta star (bias corrected MLE)					703.3
43	nu hat (MLE)					344.2	nu star (bias corrected)					242.3
44	MLE Mean (bias corrected)					8520	MLE Sd (bias corrected)					2448
45							Approximate Chi Square Value (0.05)					207.3
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					201.6
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					9960	95% Adjusted Gamma UCL (use when n<50)					10239
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.778	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.354		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.28		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	8.537				Mean of logged Data		9.021
60					Maximum of Logged Data	9.547				SD of logged Data		0.253
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	10057				90% Chebyshev (MVUE) UCL		10573
64					95% Chebyshev (MVUE) UCL	11505				97.5% Chebyshev (MVUE) UCL		12799
65					99% Chebyshev (MVUE) UCL	15340						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	9696				95% Jackknife UCL		9830
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	10664				95% Chebyshev(Mean, Sd) UCL		11635
76					97.5% Chebyshev(Mean, Sd) UCL	12983				99% Chebyshev(Mean, Sd) UCL		15631
77												
78					**Suggested UCL to Use**							
79					95% Student's-t UCL	9830				or 95% Modified-t UCL		9883
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	**Chromium**											
88												
89					**General Statistics**							
90					Total Number of Observations	10				Number of Distinct Observations		4
91										Number of Missing Observations		0
92					Minimum	8.26				Mean		12.23
93					Maximum	19				Median		12
94					SD	2.656				Std. Error of Mean		0.84
95					Coefficient of Variation	0.217				Skewness		1.828
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.664		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.842		Data Not Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.434		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.28		Data Not Normal at 5% Significance Level				
102					**Data Not Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	13.77				95% Adjusted-CLT UCL (Chen-1995)		14.13
107										95% Modified-t UCL (Johnson-1978)		13.85
108												
109	Gamma GOF Test											
110					A-D Test Statistic	1.67	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.725	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.413	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.266	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	26.83				k star (bias corrected MLE)		18.84
118					Theta hat (MLE)	0.456				Theta star (bias corrected MLE)		0.649
119					nu hat (MLE)	536.5				nu star (bias corrected)		376.9
120					MLE Mean (bias corrected)	12.23				MLE Sd (bias corrected)		2.816
121										Approximate Chi Square Value (0.05)		332.9
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		325.7
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	13.84				95% Adjusted Gamma UCL (use when n<50)		14.15
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.717	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.4	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	2.111				Mean of logged Data		2.485
136					Maximum of Logged Data	2.944				SD of logged Data		0.2
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	13.87				90% Chebyshev (MVUE) UCL		14.53
140					95% Chebyshev (MVUE) UCL	15.59				97.5% Chebyshev (MVUE) UCL		17.04
141					99% Chebyshev (MVUE) UCL	19.91						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	13.61				95% Jackknife UCL		13.77
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	14.75				95% Chebyshev(Mean, Sd) UCL		15.89
152					97.5% Chebyshev(Mean, Sd) UCL	17.47				99% Chebyshev(Mean, Sd) UCL		20.58
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	13.77				or 95% Modified-t UCL		13.85
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	Iron											
164												
165	General Statistics											
166	Total Number of Observations					10	Number of Distinct Observations					10
167							Number of Missing Observations					0
168	Minimum					17294	Mean					21780
169	Maximum					31295	Median					20930
170	SD					4173	Std. Error of Mean					1320
171	Coefficient of Variation					0.192	Skewness					1.346
172												
173	Normal GOF Test											
174	Shapiro Wilk Test Statistic					0.894	Shapiro Wilk GOF Test					
175	5% Shapiro Wilk Critical Value					0.842	Data appear Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.159	Lilliefors GOF Test					
177	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
178	Data appear Normal at 5% Significance Level											
179												
180	Assuming Normal Distribution											
181	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
182	95% Student's-t UCL					24199	95% Adjusted-CLT UCL (Chen-1995)					24551
183							95% Modified-t UCL (Johnson-1978)					24293
184												
185	Gamma GOF Test											
186	A-D Test Statistic					0.301	Anderson-Darling Gamma GOF Test					
187	5% A-D Critical Value					0.724	Detected data appear Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.143	Kolmogrov-Smirnoff Gamma GOF Test					
189	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
190	Detected data appear Gamma Distributed at 5% Significance Level											
191												
192	Gamma Statistics											
193	k hat (MLE)					33.41	k star (bias corrected MLE)					23.45
194	Theta hat (MLE)					652	Theta star (bias corrected MLE)					928.7
195	nu hat (MLE)					668.1	nu star (bias corrected)					469
196	MLE Mean (bias corrected)					21780	MLE Sd (bias corrected)					4498
197							Approximate Chi Square Value (0.05)					419.8
198	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					411.7
199												
200	Assuming Gamma Distribution											
201	95% Approximate Gamma UCL (use when n>=50))					24333	95% Adjusted Gamma UCL (use when n<50)					24812
202												
203	Lognormal GOF Test											
204	Shapiro Wilk Test Statistic					0.94	Shapiro Wilk Lognormal GOF Test					
205	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.131	Lilliefors Lognormal GOF Test					
207	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
208	Data appear Lognormal at 5% Significance Level											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	9.758				Mean of logged Data		9.974
212					Maximum of Logged Data	10.35				SD of logged Data		0.179
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	24364				90% Chebyshev (MVUE) UCL		25471
216					95% Chebyshev (MVUE) UCL	27149				97.5% Chebyshev (MVUE) UCL		29478
217					99% Chebyshev (MVUE) UCL	34054						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	23951				95% Jackknife UCL		24199
224					95% Standard Bootstrap UCL	23811				95% Bootstrap-t UCL		25091
225					95% Hall's Bootstrap UCL	28217				95% Percentile Bootstrap UCL		23859
226					95% BCA Bootstrap UCL	24516						
227					90% Chebyshev(Mean, Sd) UCL	25739				95% Chebyshev(Mean, Sd) UCL		27533
228					97.5% Chebyshev(Mean, Sd) UCL	30022				99% Chebyshev(Mean, Sd) UCL		34911
229												
230						Suggested UCL to Use						
231					95% Student's-t UCL	24199						
232												
233						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
234						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
235						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
236						For additional insight the user may want to consult a statistician.						
237												
238												
239	Manganese											
240												
241						General Statistics						
242					Total Number of Observations	10				Number of Distinct Observations		10
243										Number of Missing Observations		0
244					Minimum	248				Mean		642
245					Maximum	1843				Median		485
246					SD	459.6				Std. Error of Mean		145.3
247					Coefficient of Variation	0.716				Skewness		2.309
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.734				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.243				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
254						Data appear Approximate Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	908.4				95% Adjusted-CLT UCL (Chen-1995)		994.4
259										95% Modified-t UCL (Johnson-1978)		926.1
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	Gamma GOF Test											
262					A-D Test Statistic	0.491	Anderson-Darling Gamma GOF Test					
263					5% A-D Critical Value	0.732	Detected data appear Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.182	Kolmogrov-Smirnoff Gamma GOF Test					
265					5% K-S Critical Value	0.268	Detected data appear Gamma Distributed at 5% Significance Level					
266	Detected data appear Gamma Distributed at 5% Significance Level											
267												
268	Gamma Statistics											
269					k hat (MLE)	3.221			k star (bias corrected MLE)			2.321
270					Theta hat (MLE)	199.3			Theta star (bias corrected MLE)			276.6
271					nu hat (MLE)	64.41			nu star (bias corrected)			46.42
272					MLE Mean (bias corrected)	642			MLE Sd (bias corrected)			421.4
273									Approximate Chi Square Value (0.05)			31.79
274					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			29.7
275												
276	Assuming Gamma Distribution											
277					95% Approximate Gamma UCL (use when n>=50))	937.5			95% Adjusted Gamma UCL (use when n<50)			1004
278												
279	Lognormal GOF Test											
280					Shapiro Wilk Test Statistic	0.942	Shapiro Wilk Lognormal GOF Test					
281					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.147	Lilliefors Lognormal GOF Test					
283					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
284	Data appear Lognormal at 5% Significance Level											
285												
286	Lognormal Statistics											
287					Minimum of Logged Data	5.513			Mean of logged Data			6.301
288					Maximum of Logged Data	7.519			SD of logged Data			0.563
289												
290	Assuming Lognormal Distribution											
291					95% H-UCL	985.9			90% Chebyshev (MVUE) UCL			970.4
292					95% Chebyshev (MVUE) UCL	1126			97.5% Chebyshev (MVUE) UCL			1341
293					99% Chebyshev (MVUE) UCL	1764						
294												
295	Nonparametric Distribution Free UCL Statistics											
296	Data appear to follow a Discernible Distribution at 5% Significance Level											
297												
298	Nonparametric Distribution Free UCLs											
299					95% CLT UCL	881			95% Jackknife UCL			908.4
300					95% Standard Bootstrap UCL	869.9			95% Bootstrap-t UCL			1199
301					95% Hall's Bootstrap UCL	1832			95% Percentile Bootstrap UCL			889.5
302					95% BCA Bootstrap UCL	1003						
303					90% Chebyshev(Mean, Sd) UCL	1078			95% Chebyshev(Mean, Sd) UCL			1275
304					97.5% Chebyshev(Mean, Sd) UCL	1550			99% Chebyshev(Mean, Sd) UCL			2088
305												
306	Suggested UCL to Use											
307					95% Student's-t UCL	908.4						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314												
315	Neptunium-237											
316												
317						General Statistics						
318					Total Number of Observations	10				Number of Distinct Observations		4
319										Number of Missing Observations		0
320					Minimum	0.00377				Mean		0.201
321					Maximum	0.53				Median		0.201
322					SD	0.135				Std. Error of Mean		0.0427
323					Coefficient of Variation	0.671				Skewness		1.439
324												
325						Normal GOF Test						
326					Shapiro Wilk Test Statistic	0.725				Shapiro Wilk GOF Test		
327					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
328					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
329					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
330						Data Not Normal at 5% Significance Level						
331												
332						Assuming Normal Distribution						
333					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
334					95% Student's-t UCL	0.28				95% Adjusted-CLT UCL (Chen-1995)		0.292
335										95% Modified-t UCL (Johnson-1978)		0.283
336												
337						Gamma GOF Test						
338					A-D Test Statistic	1.564				Anderson-Darling Gamma GOF Test		
339					5% A-D Critical Value	0.742				Data Not Gamma Distributed at 5% Significance Level		
340					K-S Test Statistic	0.413				Kolmogrov-Smirnoff Gamma GOF Test		
341					5% K-S Critical Value	0.272				Data Not Gamma Distributed at 5% Significance Level		
342						Data Not Gamma Distributed at 5% Significance Level						
343												
344						Gamma Statistics						
345					k hat (MLE)	1.373				k star (bias corrected MLE)		1.028
346					Theta hat (MLE)	0.147				Theta star (bias corrected MLE)		0.196
347					nu hat (MLE)	27.47				nu star (bias corrected)		20.56
348					MLE Mean (bias corrected)	0.201				MLE Sd (bias corrected)		0.199
349										Approximate Chi Square Value (0.05)		11.26
350					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		10.09
351												
352						Assuming Gamma Distribution						
353					95% Approximate Gamma UCL (use when n>=50))	0.367				95% Adjusted Gamma UCL (use when n<50)		0.41
354												
355						Lognormal GOF Test						
356					Shapiro Wilk Test Statistic	0.626				Shapiro Wilk Lognormal GOF Test		
357					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
358					Lilliefors Test Statistic	0.419				Lilliefors Lognormal GOF Test		
359					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
360						Data Not Lognormal at 5% Significance Level						
361												
362						Lognormal Statistics						
363					Minimum of Logged Data	-5.581				Mean of logged Data		-2.009
364					Maximum of Logged Data	-0.635				SD of logged Data		1.342

	A	B	C	D	E	F	G	H	I	J	K	L
365												
366					Assuming Lognormal Distribution							
367					95% H-UCL	1.845			90% Chebyshev (MVUE) UCL			0.672
368					95% Chebyshev (MVUE) UCL	0.847			97.5% Chebyshev (MVUE) UCL			1.09
369					99% Chebyshev (MVUE) UCL	1.567						
370												
371					Nonparametric Distribution Free UCL Statistics							
372					Data do not follow a Discernible Distribution (0.05)							
373												
374					Nonparametric Distribution Free UCLs							
375					95% CLT UCL	0.272			95% Jackknife UCL			0.28
376					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
377					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
378					95% BCA Bootstrap UCL	N/A						
379					90% Chebyshev(Mean, Sd) UCL	0.329			95% Chebyshev(Mean, Sd) UCL			0.388
380					97.5% Chebyshev(Mean, Sd) UCL	0.468			99% Chebyshev(Mean, Sd) UCL			0.626
381												
382					Suggested UCL to Use							
383					95% Chebyshev (Mean, Sd) UCL	0.388						
384												
385					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
386					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
387					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
388					For additional insight the user may want to consult a statistician.							
389												
390												
391	PAH, Total											
392												
393					General Statistics							
394					Total Number of Observations	10			Number of Distinct Observations			4
395									Number of Missing Observations			0
396					Minimum	0.0663			Mean			0.301
397					Maximum	0.49			Median			0.301
398					SD	0.102			Std. Error of Mean			0.0321
399					Coefficient of Variation	0.337			Skewness			-0.811
400												
401					Normal GOF Test							
402					Shapiro Wilk Test Statistic	0.718			Shapiro Wilk GOF Test			
403					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
404					Lilliefors Test Statistic	0.4			Lilliefors GOF Test			
405					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
406					Data Not Normal at 5% Significance Level							
407												
408					Assuming Normal Distribution							
409					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
410					95% Student's-t UCL	0.36			95% Adjusted-CLT UCL (Chen-1995)			0.345
411									95% Modified-t UCL (Johnson-1978)			0.359
412												
413					Gamma GOF Test							
414					A-D Test Statistic	1.935			Anderson-Darling Gamma GOF Test			
415					5% A-D Critical Value	0.729			Data Not Gamma Distributed at 5% Significance Level			
416					K-S Test Statistic	0.455			Kolmogrov-Smirnoff Gamma GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
417					5% K-S Critical Value	0.267	Data Not Gamma Distributed at 5% Significance Level					
418	**Data Not Gamma Distributed at 5% Significance Level**											
419												
420	**Gamma Statistics**											
421					k hat (MLE)	5.811				k star (bias corrected MLE)		4.135
422					Theta hat (MLE)	0.0518				Theta star (bias corrected MLE)		0.0728
423					nu hat (MLE)	116.2				nu star (bias corrected)		82.69
424					MLE Mean (bias corrected)	0.301				MLE Sd (bias corrected)		0.148
425										Approximate Chi Square Value (0.05)		62.74
426					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		59.72
427												
428	**Assuming Gamma Distribution**											
429			95% Approximate Gamma UCL (use when n>=50))			0.397				95% Adjusted Gamma UCL (use when n<50)		0.417
430												
431	**Lognormal GOF Test**											
432					Shapiro Wilk Test Statistic	0.578	**Shapiro Wilk Lognormal GOF Test**					
433					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
434					Lilliefors Test Statistic	0.467	**Lilliefors Lognormal GOF Test**					
435					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
436	**Data Not Lognormal at 5% Significance Level**											
437												
438	**Lognormal Statistics**											
439					Minimum of Logged Data	-2.714				Mean of logged Data		-1.289
440					Maximum of Logged Data	-0.713				SD of logged Data		0.524
441												
442	**Assuming Lognormal Distribution**											
443					95% H-UCL	0.469				90% Chebyshev (MVUE) UCL		0.469
444					95% Chebyshev (MVUE) UCL	0.541				97.5% Chebyshev (MVUE) UCL		0.64
445					99% Chebyshev (MVUE) UCL	0.835						
446												
447	**Nonparametric Distribution Free UCL Statistics**											
448	**Data do not follow a Discernible Distribution (0.05)**											
449												
450	**Nonparametric Distribution Free UCLs**											
451					95% CLT UCL	0.354				95% Jackknife UCL		0.36
452					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
453					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
454					95% BCA Bootstrap UCL	N/A						
455					90% Chebyshev(Mean, Sd) UCL	0.398				95% Chebyshev(Mean, Sd) UCL		0.441
456					97.5% Chebyshev(Mean, Sd) UCL	0.502				99% Chebyshev(Mean, Sd) UCL		0.621
457												
458	**Suggested UCL to Use**											
459					95% Chebyshev (Mean, Sd) UCL	0.441						
460												
461	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
462	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
463	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
464	For additional insight the user may want to consult a statistician.											
465												
466	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
467	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470	PCB, Total											
471												
472						General Statistics						
473					Total Number of Observations	10				Number of Distinct Observations		4
474										Number of Missing Observations		0
475					Minimum	0.1				Mean		3.663
476					Maximum	5				Median		5
477					SD	2.172				Std. Error of Mean		0.687
478					Coefficient of Variation	0.593				Skewness		-1.101
479												
480						Normal GOF Test						
481					Shapiro Wilk Test Statistic	0.629				Shapiro Wilk GOF Test		
482					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
483					Lilliefors Test Statistic	0.431				Lilliefors GOF Test		
484					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
485						Data Not Normal at 5% Significance Level						
486												
487						Assuming Normal Distribution						
488					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
489					95% Student's-t UCL	4.922				95% Adjusted-CLT UCL (Chen-1995)		4.537
490										95% Modified-t UCL (Johnson-1978)		4.882
491												
492						Gamma GOF Test						
493					A-D Test Statistic	1.892				Anderson-Darling Gamma GOF Test		
494					5% A-D Critical Value	0.746				Data Not Gamma Distributed at 5% Significance Level		
495					K-S Test Statistic	0.445				Kolmogrov-Smirnoff Gamma GOF Test		
496					5% K-S Critical Value	0.273				Data Not Gamma Distributed at 5% Significance Level		
497						Data Not Gamma Distributed at 5% Significance Level						
498												
499						Gamma Statistics						
500					k hat (MLE)	1.124				k star (bias corrected MLE)		0.853
501					Theta hat (MLE)	3.259				Theta star (bias corrected MLE)		4.293
502					nu hat (MLE)	22.48				nu star (bias corrected)		17.07
503					MLE Mean (bias corrected)	3.663				MLE Sd (bias corrected)		3.965
504										Approximate Chi Square Value (0.05)		8.72
505					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		7.705
506												
507						Assuming Gamma Distribution						
508					95% Approximate Gamma UCL (use when n>=50))	7.169				95% Adjusted Gamma UCL (use when n<50)		8.114
509												
510						Lognormal GOF Test						
511					Shapiro Wilk Test Statistic	0.647				Shapiro Wilk Lognormal GOF Test		
512					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
513					Lilliefors Test Statistic	0.414				Lilliefors Lognormal GOF Test		
514					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
515						Data Not Lognormal at 5% Significance Level						
516												
517						Lognormal Statistics						
518					Minimum of Logged Data	-2.303				Mean of logged Data		0.791
519					Maximum of Logged Data	1.609				SD of logged Data		1.447
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521					Assuming Lognormal Distribution							
522					95% H-UCL	45.04				90% Chebyshev (MVUE) UCL		12.96
523					95% Chebyshev (MVUE) UCL	16.43				97.5% Chebyshev (MVUE) UCL		21.26
524					99% Chebyshev (MVUE) UCL	30.73						
525												
526					Nonparametric Distribution Free UCL Statistics							
527					Data do not follow a Discernible Distribution (0.05)							
528												
529					Nonparametric Distribution Free UCLs							
530					95% CLT UCL	4.793				95% Jackknife UCL		4.922
531					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
532					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
533					95% BCA Bootstrap UCL	N/A						
534					90% Chebyshev(Mean, Sd) UCL	5.724				95% Chebyshev(Mean, Sd) UCL		6.657
535					97.5% Chebyshev(Mean, Sd) UCL	7.953				99% Chebyshev(Mean, Sd) UCL		10.5
536												
537					Suggested UCL to Use							
538					95% Chebyshev (Mean, Sd) UCL	6.657						
539												
540					Recommended UCL exceeds the maximum observation							
541												
542					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
543					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
544					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
545					For additional insight the user may want to consult a statistician.							
546												
547					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
548					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
549												
550												
551	Technetium-99											
552												
553					General Statistics							
554					Total Number of Observations	10				Number of Distinct Observations		4
555										Number of Missing Observations		0
556					Minimum	0				Mean		50.88
557					Maximum	150				Median		50.88
558					SD	40.47				Std. Error of Mean		12.8
559					Coefficient of Variation	0.795				Skewness		1.529
560												
561					Normal GOF Test							
562					Shapiro Wilk Test Statistic	0.705				Shapiro Wilk GOF Test		
563					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
564					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
565					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
566					Data Not Normal at 5% Significance Level							
567												
568					Assuming Normal Distribution							
569					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
570					95% Student's-t UCL	74.34				95% Adjusted-CLT UCL (Chen-1995)		78.54
571										95% Modified-t UCL (Johnson-1978)		75.37
572					Gamma Statistics Not Available							

	A	B	C	D	E	F	G	H	I	J	K	L
573	Lognormal Statistics Not Available											
574												
575	Nonparametric Distribution Free UCL Statistics											
576	Data do not follow a Discernible Distribution (0.05)											
577												
578	Nonparametric Distribution Free UCLs											
579					95% CLT UCL	71.93			95% Jackknife UCL			74.34
580					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
581					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
582					95% BCA Bootstrap UCL	N/A						
583					90% Chebyshev(Mean, Sd) UCL	89.27			95% Chebyshev(Mean, Sd) UCL			106.7
584					97.5% Chebyshev(Mean, Sd) UCL	130.8			99% Chebyshev(Mean, Sd) UCL			178.2
585												
586	Suggested UCL to Use											
587					95% Chebyshev (Mean, Sd) UCL	106.7						
588												
589	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
590	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
591	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
592	For additional insight the user may want to consult a statistician.											
593												
594												
595	Uranium											
596												
597	General Statistics											
598					Total Number of Observations	10			Number of Distinct Observations			3
599									Number of Missing Observations			0
600					Minimum	4.9			Mean			21.49
601					Maximum	130			Median			10
602					SD	38.16			Std. Error of Mean			12.07
603					Coefficient of Variation	1.776			Skewness			3.152
604												
605	Normal GOF Test											
606					Shapiro Wilk Test Statistic	0.393			Shapiro Wilk GOF Test			
607					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
608					Lilliefors Test Statistic	0.518			Lilliefors GOF Test			
609					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
610	Data Not Normal at 5% Significance Level											
611												
612	Assuming Normal Distribution											
613					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
614					95% Student's-t UCL	43.61			95% Adjusted-CLT UCL (Chen-1995)			54.19
615									95% Modified-t UCL (Johnson-1978)			45.62
616												
617	Gamma GOF Test											
618					A-D Test Statistic	2.827			Anderson-Darling Gamma GOF Test			
619					5% A-D Critical Value	0.748			Data Not Gamma Distributed at 5% Significance Level			
620					K-S Test Statistic	0.527			Kolmogrov-Smirnoff Gamma GOF Test			
621					5% K-S Critical Value	0.274			Data Not Gamma Distributed at 5% Significance Level			
622	Data Not Gamma Distributed at 5% Significance Level											
623												
624	Gamma Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
625					k hat (MLE)	0.996				k star (bias corrected MLE)		0.764
626					Theta hat (MLE)	21.58				Theta star (bias corrected MLE)		28.13
627					nu hat (MLE)	19.92				nu star (bias corrected)		15.28
628					MLE Mean (bias corrected)	21.49				MLE Sd (bias corrected)		24.59
629										Approximate Chi Square Value (0.05)		7.454
630					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		6.527
631												
632					Assuming Gamma Distribution							
633				95% Approximate Gamma UCL (use when n>=50))		44.04				95% Adjusted Gamma UCL (use when n<50)		50.3
634												
635					Lognormal GOF Test							
636					Shapiro Wilk Test Statistic	0.525				Shapiro Wilk Lognormal GOF Test		
637					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
638					Lilliefors Test Statistic	0.485				Lilliefors Lognormal GOF Test		
639					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
640					Data Not Lognormal at 5% Significance Level							
641												
642					Lognormal Statistics							
643					Minimum of Logged Data	1.589				Mean of logged Data		2.488
644					Maximum of Logged Data	4.868				SD of logged Data		0.866
645												
646					Assuming Lognormal Distribution							
647					95% H-UCL	39.66				90% Chebyshev (MVUE) UCL		30.98
648					95% Chebyshev (MVUE) UCL	37.45				97.5% Chebyshev (MVUE) UCL		46.43
649					99% Chebyshev (MVUE) UCL	64.07						
650												
651					Nonparametric Distribution Free UCL Statistics							
652					Data do not follow a Discernible Distribution (0.05)							
653												
654					Nonparametric Distribution Free UCLs							
655					95% CLT UCL	41.34				95% Jackknife UCL		43.61
656					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
657					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
658					95% BCA Bootstrap UCL	N/A						
659					90% Chebyshev(Mean, Sd) UCL	57.69				95% Chebyshev(Mean, Sd) UCL		74.09
660					97.5% Chebyshev(Mean, Sd) UCL	96.85				99% Chebyshev(Mean, Sd) UCL		141.6
661												
662					Suggested UCL to Use							
663					95% Chebyshev (Mean, Sd) UCL	74.09						
664												
665					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
666					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
667					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
668					For additional insight the user may want to consult a statistician.							
669												
670												
671	Uranium-234											
672												
673					General Statistics							
674					Total Number of Observations	10				Number of Distinct Observations		4
675										Number of Missing Observations		0
676					Minimum	1.16				Mean		12.88

	A	B	C	D	E	F	G	H	I	J	K	L
677					Maximum	35.7					Median	12.88
678					SD	9.316					Std. Error of Mean	2.946
679					Coefficient of Variation	0.723					Skewness	1.529
680												
681					Normal GOF Test							
682					Shapiro Wilk Test Statistic	0.705	Shapiro Wilk GOF Test					
683					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
684					Lilliefors Test Statistic	0.4	Lilliefors GOF Test					
685					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
686					Data Not Normal at 5% Significance Level							
687												
688					Assuming Normal Distribution							
689			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
690					95% Student's-t UCL	18.28	95% Adjusted-CLT UCL (Chen-1995)					19.25
691							95% Modified-t UCL (Johnson-1978)					18.52
692												
693					Gamma GOF Test							
694					A-D Test Statistic	1.509	Anderson-Darling Gamma GOF Test					
695					5% A-D Critical Value	0.738	Data Not Gamma Distributed at 5% Significance Level					
696					K-S Test Statistic	0.404	Kolmogrov-Smirnoff Gamma GOF Test					
697					5% K-S Critical Value	0.271	Data Not Gamma Distributed at 5% Significance Level					
698					Data Not Gamma Distributed at 5% Significance Level							
699												
700					Gamma Statistics							
701					k hat (MLE)	1.634	k star (bias corrected MLE)					1.21
702					Theta hat (MLE)	7.885	Theta star (bias corrected MLE)					10.64
703					nu hat (MLE)	32.68	nu star (bias corrected)					24.21
704					MLE Mean (bias corrected)	12.88	MLE Sd (bias corrected)					11.71
705							Approximate Chi Square Value (0.05)					14.01
706					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					12.68
707												
708					Assuming Gamma Distribution							
709					95% Approximate Gamma UCL (use when n>=50))	22.27	95% Adjusted Gamma UCL (use when n<50)					24.6
710												
711					Lognormal GOF Test							
712					Shapiro Wilk Test Statistic	0.713	Shapiro Wilk Lognormal GOF Test					
713					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
714					Lilliefors Test Statistic	0.428	Lilliefors Lognormal GOF Test					
715					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
716					Data Not Lognormal at 5% Significance Level							
717												
718					Lognormal Statistics							
719					Minimum of Logged Data	0.148	Mean of logged Data					2.22
720					Maximum of Logged Data	3.575	SD of logged Data					1.033
721												
722					Assuming Lognormal Distribution							
723					95% H-UCL	46.74	90% Chebyshev (MVUE) UCL					29.61
724					95% Chebyshev (MVUE) UCL	36.41	97.5% Chebyshev (MVUE) UCL					45.85
725					99% Chebyshev (MVUE) UCL	64.39						
726												
727					Nonparametric Distribution Free UCL Statistics							
728					Data do not follow a Discernible Distribution (0.05)							

	A	B	C	D	E	F	G	H	I	J	K	L
729												
730					Nonparametric Distribution Free UCLs							
731					95% CLT UCL	17.73				95% Jackknife UCL		18.28
732				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
733				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
734				95% BCA Bootstrap UCL		N/A						
735				90% Chebyshev(Mean, Sd) UCL		21.72				95% Chebyshev(Mean, Sd) UCL		25.72
736				97.5% Chebyshev(Mean, Sd) UCL		31.28				99% Chebyshev(Mean, Sd) UCL		42.2
737												
738					Suggested UCL to Use							
739				95% Chebyshev (Mean, Sd) UCL		25.72						
740												
741					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
742					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
743					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
744					For additional insight the user may want to consult a statistician.							
745												
746												
747	Uranium-235											
748												
749					General Statistics							
750				Total Number of Observations		10				Number of Distinct Observations		4
751										Number of Missing Observations		0
752				Minimum		0.0572				Mean		1.436
753				Maximum		4.12				Median		1.436
754				SD		1.096				Std. Error of Mean		0.347
755				Coefficient of Variation		0.763				Skewness		1.529
756												
757					Normal GOF Test							
758				Shapiro Wilk Test Statistic		0.705				Shapiro Wilk GOF Test		
759				5% Shapiro Wilk Critical Value		0.842				Data Not Normal at 5% Significance Level		
760				Lilliefors Test Statistic		0.4				Lilliefors GOF Test		
761				5% Lilliefors Critical Value		0.28				Data Not Normal at 5% Significance Level		
762					Data Not Normal at 5% Significance Level							
763												
764					Assuming Normal Distribution							
765				95% Normal UCL						95% UCLs (Adjusted for Skewness)		
766				95% Student's-t UCL		2.071				95% Adjusted-CLT UCL (Chen-1995)		2.185
767										95% Modified-t UCL (Johnson-1978)		2.099
768												
769					Gamma GOF Test							
770				A-D Test Statistic		1.56				Anderson-Darling Gamma GOF Test		
771				5% A-D Critical Value		0.744				Data Not Gamma Distributed at 5% Significance Level		
772				K-S Test Statistic		0.419				Kolmogrov-Smirnoff Gamma GOF Test		
773				5% K-S Critical Value		0.273				Data Not Gamma Distributed at 5% Significance Level		
774					Data Not Gamma Distributed at 5% Significance Level							
775												
776					Gamma Statistics							
777				k hat (MLE)		1.234				k star (bias corrected MLE)		0.93
778				Theta hat (MLE)		1.164				Theta star (bias corrected MLE)		1.543
779				nu hat (MLE)		24.68				nu star (bias corrected)		18.61
780				MLE Mean (bias corrected)		1.436				MLE Sd (bias corrected)		1.488

	A	B	C	D	E	F	G	H	I	J	K	L
781											Approximate Chi Square Value (0.05)	9.832
782					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	8.744
783												
784					Assuming Gamma Distribution							
785				95% Approximate Gamma UCL (use when n>=50))		2.717					95% Adjusted Gamma UCL (use when n<50)	3.055
786												
787					Lognormal GOF Test							
788					Shapiro Wilk Test Statistic	0.694			Shapiro Wilk Lognormal GOF Test			
789					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
790					Lilliefors Test Statistic	0.438			Lilliefors Lognormal GOF Test			
791					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
792					Data Not Lognormal at 5% Significance Level							
793												
794					Lognormal Statistics							
795					Minimum of Logged Data	-2.861					Mean of logged Data	-0.0954
796					Maximum of Logged Data	1.416					SD of logged Data	1.299
797												
798					Assuming Lognormal Distribution							
799					95% H-UCL	10.7					90% Chebyshev (MVUE) UCL	4.272
800					95% Chebyshev (MVUE) UCL	5.366					97.5% Chebyshev (MVUE) UCL	6.885
801					99% Chebyshev (MVUE) UCL	9.87						
802												
803					Nonparametric Distribution Free UCL Statistics							
804					Data do not follow a Discernible Distribution (0.05)							
805												
806					Nonparametric Distribution Free UCLs							
807					95% CLT UCL	2.006					95% Jackknife UCL	2.071
808					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
809					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
810					95% BCA Bootstrap UCL	N/A						
811					90% Chebyshev(Mean, Sd) UCL	2.475					95% Chebyshev(Mean, Sd) UCL	2.946
812					97.5% Chebyshev(Mean, Sd) UCL	3.6					99% Chebyshev(Mean, Sd) UCL	4.884
813												
814					Suggested UCL to Use							
815					95% Chebyshev (Mean, Sd) UCL	2.946						
816												
817					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
818					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
819					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
820					For additional insight the user may want to consult a statistician.							
821												
822												
823	Uranium-238											
824												
825					General Statistics							
826					Total Number of Observations	10					Number of Distinct Observations	4
827											Number of Missing Observations	0
828					Minimum	1.17					Mean	22.59
829					Maximum	64.1					Median	22.59
830					SD	16.95					Std. Error of Mean	5.359
831					Coefficient of Variation	0.75					Skewness	1.529
832												

	A	B	C	D	E	F	G	H	I	J	K	L
833						Normal GOF Test						
834					Shapiro Wilk Test Statistic	0.706	Shapiro Wilk GOF Test					
835					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
836					Lilliefors Test Statistic	0.4	Lilliefors GOF Test					
837					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
838					Data Not Normal at 5% Significance Level							
839												
840					Assuming Normal Distribution							
841			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
842					95% Student's-t UCL	32.42				95% Adjusted-CLT UCL (Chen-1995)		34.18
843										95% Modified-t UCL (Johnson-1978)		32.85
844												
845					Gamma GOF Test							
846					A-D Test Statistic	1.531	Anderson-Darling Gamma GOF Test					
847					5% A-D Critical Value	0.742	Data Not Gamma Distributed at 5% Significance Level					
848					K-S Test Statistic	0.414	Kolmogrov-Smirnoff Gamma GOF Test					
849					5% K-S Critical Value	0.272	Data Not Gamma Distributed at 5% Significance Level					
850					Data Not Gamma Distributed at 5% Significance Level							
851												
852					Gamma Statistics							
853					k hat (MLE)	1.358				k star (bias corrected MLE)		1.017
854					Theta hat (MLE)	16.64				Theta star (bias corrected MLE)		22.22
855					nu hat (MLE)	27.15				nu star (bias corrected)		20.34
856					MLE Mean (bias corrected)	22.59				MLE Sd (bias corrected)		22.4
857										Approximate Chi Square Value (0.05)		11.1
858					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		9.935
859												
860					Assuming Gamma Distribution							
861					95% Approximate Gamma UCL (use when n>=50))	41.39				95% Adjusted Gamma UCL (use when n<50)		46.25
862												
863					Lognormal GOF Test							
864					Shapiro Wilk Test Statistic	0.703	Shapiro Wilk Lognormal GOF Test					
865					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
866					Lilliefors Test Statistic	0.434	Lilliefors Lognormal GOF Test					
867					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
868					Data Not Lognormal at 5% Significance Level							
869												
870					Lognormal Statistics							
871					Minimum of Logged Data	0.157				Mean of logged Data		2.706
872					Maximum of Logged Data	4.16				SD of logged Data		1.201
873												
874					Assuming Lognormal Distribution							
875					95% H-UCL	126.7				90% Chebyshev (MVUE) UCL		61.03
876					95% Chebyshev (MVUE) UCL	76.13				97.5% Chebyshev (MVUE) UCL		97.09
877					99% Chebyshev (MVUE) UCL	138.2						
878												
879					Nonparametric Distribution Free UCL Statistics							
880					Data do not follow a Discernible Distribution (0.05)							
881												
882					Nonparametric Distribution Free UCLs							
883					95% CLT UCL	31.41				95% Jackknife UCL		32.42
884					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A

	A	B	C	D	E	F	G	H	I	J	K	L
885					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
886					95% BCA Bootstrap UCL	N/A						
887					90% Chebyshev(Mean, Sd) UCL	38.67				95% Chebyshev(Mean, Sd) UCL		45.95
888					97.5% Chebyshev(Mean, Sd) UCL	56.06				99% Chebyshev(Mean, Sd) UCL		75.92
889												
890					**Suggested UCL to Use**							
891					95% Chebyshev (Mean, Sd) UCL	45.95						
892												
893					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
894					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
895					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
896					For additional insight the user may want to consult a statistician.							
897												
898												
899	**Vanadium**											
900												
901					**General Statistics**							
902					Total Number of Observations	10				Number of Distinct Observations		9
903										Number of Missing Observations		0
904					Minimum	73				Mean		95
905					Maximum	138				Median		92.5
906					SD	18.11				Std. Error of Mean		5.727
907					Coefficient of Variation	0.191				Skewness		1.458
908												
909					**Normal GOF Test**							
910					Shapiro Wilk Test Statistic	0.875				**Shapiro Wilk GOF Test**		
911					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
912					Lilliefors Test Statistic	0.191				**Lilliefors GOF Test**		
913					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
914					**Data appear Normal at 5% Significance Level**							
915												
916					**Assuming Normal Distribution**							
917					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
918					95% Student's-t UCL	105.5				95% Adjusted-CLT UCL (Chen-1995)		107.2
919										95% Modified-t UCL (Johnson-1978)		105.9
920												
921					**Gamma GOF Test**							
922					A-D Test Statistic	0.4				**Anderson-Darling Gamma GOF Test**		
923					5% A-D Critical Value	0.724				Detected data appear Gamma Distributed at 5% Significance Level		
924					K-S Test Statistic	0.16				**Kolmogrov-Smirnoff Gamma GOF Test**		
925					5% K-S Critical Value	0.266				Detected data appear Gamma Distributed at 5% Significance Level		
926					**Detected data appear Gamma Distributed at 5% Significance Level**							
927												
928					**Gamma Statistics**							
929					k hat (MLE)	33.86				k star (bias corrected MLE)		23.77
930					Theta hat (MLE)	2.806				Theta star (bias corrected MLE)		3.997
931					nu hat (MLE)	677.2				nu star (bias corrected)		475.4
932					MLE Mean (bias corrected)	95				MLE Sd (bias corrected)		19.49
933										Approximate Chi Square Value (0.05)		425.8
934					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		417.7
935												
936					**Assuming Gamma Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
937	95% Approximate Gamma UCL (use when n>=50))					106.1	95% Adjusted Gamma UCL (use when n<50)					108.1
938												
939	**Lognormal GOF Test**											
940	Shapiro Wilk Test Statistic					0.93	**Shapiro Wilk Lognormal GOF Test**					
941	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
942	Lilliefors Test Statistic					0.161	**Lilliefors Lognormal GOF Test**					
943	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
944	**Data appear Lognormal at 5% Significance Level**											
945												
946	**Lognormal Statistics**											
947	Minimum of Logged Data					4.29	Mean of logged Data					4.539
948	Maximum of Logged Data					4.927	SD of logged Data					0.178
949												
950	**Assuming Lognormal Distribution**											
951	95% H-UCL					106.2	90% Chebyshev (MVUE) UCL					111
952	95% Chebyshev (MVUE) UCL					118.3	97.5% Chebyshev (MVUE) UCL					128.4
953	99% Chebyshev (MVUE) UCL					148.2						
954												
955	**Nonparametric Distribution Free UCL Statistics**											
956	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
957												
958	**Nonparametric Distribution Free UCLs**											
959	95% CLT UCL					104.4	95% Jackknife UCL					105.5
960	95% Standard Bootstrap UCL					103.7	95% Bootstrap-t UCL					109.7
961	95% Hall's Bootstrap UCL					154.2	95% Percentile Bootstrap UCL					104.5
962	95% BCA Bootstrap UCL					106.7						
963	90% Chebyshev(Mean, Sd) UCL					112.2	95% Chebyshev(Mean, Sd) UCL					120
964	97.5% Chebyshev(Mean, Sd) UCL					130.8	99% Chebyshev(Mean, Sd) UCL					152
965												
966	**Suggested UCL to Use**											
967	95% Student's-t UCL					105.5						
968												
969	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
970	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
971	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
972	For additional insight the user may want to consult a statistician.											
973												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 8:42:40 PM								
5	From File			EPC_013Surf_EU06.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Iron**											
12												
13	**General Statistics**											
14	Total Number of Observations					10	Number of Distinct Observations					10
15							Number of Missing Observations					0
16	Minimum					17735	Mean					25568
17	Maximum					43337	Median					22634
18	SD					9171	Std. Error of Mean					2900
19	Coefficient of Variation					0.359	Skewness					1.365
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.788	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.272	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
26	**Data appear Approximate Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					30884	95% Adjusted-CLT UCL (Chen-1995)					31675
31							95% Modified-t UCL (Johnson-1978)					31092
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.742	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.725	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.227	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.267	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					10.27	k star (bias corrected MLE)					7.256
42	Theta hat (MLE)					2489	Theta star (bias corrected MLE)					3524
43	nu hat (MLE)					205.4	nu star (bias corrected)					145.1
44	MLE Mean (bias corrected)					25568	MLE Sd (bias corrected)					9492
45							Approximate Chi Square Value (0.05)					118.3
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					114.1
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					31369	95% Adjusted Gamma UCL (use when n<50)					32527
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.853	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.208	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.783				Mean of logged Data		10.1
60					Maximum of Logged Data	10.68				SD of logged Data		0.319
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	31662				90% Chebyshev (MVUE) UCL		33238
64					95% Chebyshev (MVUE) UCL	36757				97.5% Chebyshev (MVUE) UCL		41641
65					99% Chebyshev (MVUE) UCL	51236						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	30338				95% Jackknife UCL		30884
72					95% Standard Bootstrap UCL	30201				95% Bootstrap-t UCL		38103
73					95% Hall's Bootstrap UCL	63111				95% Percentile Bootstrap UCL		30463
74					95% BCA Bootstrap UCL	31176						
75					90% Chebyshev(Mean, Sd) UCL	34268				95% Chebyshev(Mean, Sd) UCL		38209
76					97.5% Chebyshev(Mean, Sd) UCL	43679				99% Chebyshev(Mean, Sd) UCL		54423
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	30884						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Neptunium-237**											
88												
89	**General Statistics**											
90					Total Number of Observations	10				Number of Distinct Observations		5
91										Number of Missing Observations		0
92					Minimum	8.2000E-4				Mean		0.281
93					Maximum	1.08				Median		0.281
94					SD	0.308				Std. Error of Mean		0.0973
95					Coefficient of Variation	1.094				Skewness		2.159
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.682	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	0.459				95% Adjusted-CLT UCL (Chen-1995)		0.512
107										95% Modified-t UCL (Johnson-1978)		0.471
108												
109	Gamma GOF Test											
110					A-D Test Statistic	1.043	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.369	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.279	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	0.593				k star (bias corrected MLE)		0.482
118					Theta hat (MLE)	0.474				Theta star (bias corrected MLE)		0.584
119					nu hat (MLE)	11.86				nu star (bias corrected)		9.636
120					MLE Mean (bias corrected)	0.281				MLE Sd (bias corrected)		0.405
121										Approximate Chi Square Value (0.05)		3.716
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		3.104
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	0.729				95% Adjusted Gamma UCL (use when n<50)		0.873
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.767	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.38	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-7.106				Mean of logged Data		-2.312
136					Maximum of Logged Data	0.077				SD of logged Data		2.226
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	97.29				90% Chebyshev (MVUE) UCL		2.09
140					95% Chebyshev (MVUE) UCL	2.734				97.5% Chebyshev (MVUE) UCL		3.627
141					99% Chebyshev (MVUE) UCL	5.382						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	0.441				95% Jackknife UCL		0.459
148					95% Standard Bootstrap UCL	0.434				95% Bootstrap-t UCL		0.572
149					95% Hall's Bootstrap UCL	1.154				95% Percentile Bootstrap UCL		0.441
150					95% BCA Bootstrap UCL	0.493						
151					90% Chebyshev(Mean, Sd) UCL	0.573				95% Chebyshev(Mean, Sd) UCL		0.705
152					97.5% Chebyshev(Mean, Sd) UCL	0.889				99% Chebyshev(Mean, Sd) UCL		1.249
153												
154	Suggested UCL to Use											
155					99% Chebyshev (Mean, Sd) UCL	1.249						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	**Recommended UCL exceeds the maximum observation**											
158												
159	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
160	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
161	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
162	For additional insight the user may want to consult a statistician.											
163												
164												
165	**PAH, Total**											
166												
167	**General Statistics**											
168	Total Number of Observations					10	Number of Distinct Observations					4
169							Number of Missing Observations					0
170	Minimum					0.46	Mean					0.594
171	Maximum					0.833	Median					0.594
172	SD					0.0977	Std. Error of Mean					0.0309
173	Coefficient of Variation					0.164	Skewness					1.495
174												
175	**Normal GOF Test**											
176	Shapiro Wilk Test Statistic					0.718	**Shapiro Wilk GOF Test**					
177	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
178	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
179	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
180	**Data Not Normal at 5% Significance Level**											
181												
182	**Assuming Normal Distribution**											
183	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
184	95% Student's-t UCL					0.651	95% Adjusted-CLT UCL (Chen-1995)					0.661
185							95% Modified-t UCL (Johnson-1978)					0.653
186												
187	**Gamma GOF Test**											
188	A-D Test Statistic					1.421	**Anderson-Darling Gamma GOF Test**					
189	5% A-D Critical Value					0.724	Data Not Gamma Distributed at 5% Significance Level					
190	K-S Test Statistic					0.38	**Kolmogrov-Smirnoff Gamma GOF Test**					
191	5% K-S Critical Value					0.266	Data Not Gamma Distributed at 5% Significance Level					
192	**Data Not Gamma Distributed at 5% Significance Level**											
193												
194	**Gamma Statistics**											
195	k hat (MLE)					44.91	k star (bias corrected MLE)					31.51
196	Theta hat (MLE)					0.0132	Theta star (bias corrected MLE)					0.0189
197	nu hat (MLE)					898.3	nu star (bias corrected)					630.1
198	MLE Mean (bias corrected)					0.594	MLE Sd (bias corrected)					0.106
199							Approximate Chi Square Value (0.05)					572.9
200	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					563.4
201												
202	**Assuming Gamma Distribution**											
203	95% Approximate Gamma UCL (use when n>=50))					0.654	95% Adjusted Gamma UCL (use when n<50)					0.665
204												
205	**Lognormal GOF Test**											
206	Shapiro Wilk Test Statistic					0.758	**Shapiro Wilk Lognormal GOF Test**					
207	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
208	Lilliefors Test Statistic					0.371	**Lilliefors Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
209					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
210	Data Not Lognormal at 5% Significance Level											
211												
212	Lognormal Statistics											
213					Minimum of Logged Data	-0.777				Mean of logged Data		-0.531
214					Maximum of Logged Data	-0.183				SD of logged Data		0.155
215												
216	Assuming Lognormal Distribution											
217					95% H-UCL	0.654				90% Chebyshev (MVUE) UCL		0.682
218					95% Chebyshev (MVUE) UCL	0.721				97.5% Chebyshev (MVUE) UCL		0.776
219					99% Chebyshev (MVUE) UCL	0.884						
220												
221	Nonparametric Distribution Free UCL Statistics											
222	Data do not follow a Discernible Distribution (0.05)											
223												
224	Nonparametric Distribution Free UCLs											
225					95% CLT UCL	0.645				95% Jackknife UCL		0.651
226					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
227					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
228					95% BCA Bootstrap UCL	N/A						
229					90% Chebyshev(Mean, Sd) UCL	0.687				95% Chebyshev(Mean, Sd) UCL		0.729
230					97.5% Chebyshev(Mean, Sd) UCL	0.787				99% Chebyshev(Mean, Sd) UCL		0.902
231												
232	Suggested UCL to Use											
233					95% Student's-t UCL	0.651				or 95% Modified-t UCL		0.653
234												
235	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
236	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
237	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
238	For additional insight the user may want to consult a statistician.											
239												
240												
241	PCB, Total											
242												
243	General Statistics											
244					Total Number of Observations	10				Number of Distinct Observations		3
245										Number of Missing Observations		0
246					Minimum	0.1				Mean		3.589
247					Maximum	5				Median		5
248					SD	2.278				Std. Error of Mean		0.72
249					Coefficient of Variation	0.635				Skewness		-1.054
250												
251	Normal GOF Test											
252					Shapiro Wilk Test Statistic	0.612	Shapiro Wilk GOF Test					
253					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
254					Lilliefors Test Statistic	0.432	Lilliefors GOF Test					
255					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
256	Data Not Normal at 5% Significance Level											
257												
258	Assuming Normal Distribution											
259	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
260					95% Student's-t UCL	4.909				95% Adjusted-CLT UCL (Chen-1995)		4.517

	A	B	C	D	E	F	G	H	I	J	K	L
261										95% Modified-t UCL (Johnson-1978)		4.869
262												
263						Gamma GOF Test						
264					A-D Test Statistic	2.018			Anderson-Darling Gamma GOF Test			
265					5% A-D Critical Value	0.752			Data Not Gamma Distributed at 5% Significance Level			
266					K-S Test Statistic	0.452			Kolmogrov-Smirnoff Gamma GOF Test			
267					5% K-S Critical Value	0.275			Data Not Gamma Distributed at 5% Significance Level			
268						Data Not Gamma Distributed at 5% Significance Level						
269												
270						Gamma Statistics						
271					k hat (MLE)	0.901			k star (bias corrected MLE)			0.697
272					Theta hat (MLE)	3.984			Theta star (bias corrected MLE)			5.147
273					nu hat (MLE)	18.02			nu star (bias corrected)			13.95
274					MLE Mean (bias corrected)	3.589			MLE Sd (bias corrected)			4.298
275									Approximate Chi Square Value (0.05)			6.534
276					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			5.676
277												
278						Assuming Gamma Distribution						
279					95% Approximate Gamma UCL (use when n>=50))	7.66			95% Adjusted Gamma UCL (use when n<50)			8.818
280												
281						Lognormal GOF Test						
282					Shapiro Wilk Test Statistic	0.628			Shapiro Wilk Lognormal GOF Test			
283					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
284					Lilliefors Test Statistic	0.422			Lilliefors Lognormal GOF Test			
285					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
286						Data Not Lognormal at 5% Significance Level						
287												
288						Lognormal Statistics						
289					Minimum of Logged Data	-2.303			Mean of logged Data			0.629
290					Maximum of Logged Data	1.609			SD of logged Data			1.664
291												
292						Assuming Lognormal Distribution						
293					95% H-UCL	95.51			90% Chebyshev (MVUE) UCL			15.47
294					95% Chebyshev (MVUE) UCL	19.84			97.5% Chebyshev (MVUE) UCL			25.91
295					99% Chebyshev (MVUE) UCL	37.83						
296												
297						Nonparametric Distribution Free UCL Statistics						
298						Data do not follow a Discernible Distribution (0.05)						
299												
300						Nonparametric Distribution Free UCLs						
301					95% CLT UCL	4.774			95% Jackknife UCL			4.909
302					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
303					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
304					95% BCA Bootstrap UCL	N/A						
305					90% Chebyshev(Mean, Sd) UCL	5.75			95% Chebyshev(Mean, Sd) UCL			6.728
306					97.5% Chebyshev(Mean, Sd) UCL	8.087			99% Chebyshev(Mean, Sd) UCL			10.76
307												
308						Suggested UCL to Use						
309					99% Chebyshev (Mean, Sd) UCL	10.76						
310												
311						Recommended UCL exceeds the maximum observation						
312												

	A	B	C	D	E	F	G	H	I	J	K	L
313	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
314	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
315	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
316	For additional insight the user may want to consult a statistician.											
317												
318	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
319	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
320												
321												
322	**Technetium-99**											
323												
324	**General Statistics**											
325	Total Number of Observations					10	Number of Distinct Observations					4
326							Number of Missing Observations					0
327	Minimum					0	Mean					40.7
328	Maximum					142	Median					40.7
329	SD					39.4	Std. Error of Mean					12.46
330	Coefficient of Variation					0.968	Skewness					2.037
331												
332	**Normal GOF Test**											
333	Shapiro Wilk Test Statistic					0.704	**Shapiro Wilk GOF Test**					
334	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
335	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
336	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
337	**Data Not Normal at 5% Significance Level**											
338												
339	**Assuming Normal Distribution**											
340	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
341	95% Student's-t UCL					63.54	95% Adjusted-CLT UCL (Chen-1995)					69.77
342							95% Modified-t UCL (Johnson-1978)					64.88
343	**Gamma Statistics Not Available**											
344	**Lognormal Statistics Not Available**											
345												
346	**Nonparametric Distribution Free UCL Statistics**											
347	**Data do not follow a Discernible Distribution (0.05)**											
348												
349	**Nonparametric Distribution Free UCLs**											
350	95% CLT UCL					61.19	95% Jackknife UCL					63.54
351	95% Standard Bootstrap UCL					N/A	95% Bootstrap-t UCL					N/A
352	95% Hall's Bootstrap UCL					N/A	95% Percentile Bootstrap UCL					N/A
353	95% BCA Bootstrap UCL					N/A						
354	90% Chebyshev(Mean, Sd) UCL					78.08	95% Chebyshev(Mean, Sd) UCL					95.01
355	97.5% Chebyshev(Mean, Sd) UCL					118.5	99% Chebyshev(Mean, Sd) UCL					164.7
356												
357	**Suggested UCL to Use**											
358	95% Chebyshev (Mean, Sd) UCL					95.01						
359												
360	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
361	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
362	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
363	For additional insight the user may want to consult a statistician.											
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365												
366	Uranium											
367												
368						General Statistics						
369					Total Number of Observations	10				Number of Distinct Observations		3
370										Number of Missing Observations		0
371					Minimum	10				Mean		15.3
372					Maximum	60				Median		10
373					SD	15.73				Std. Error of Mean		4.976
374					Coefficient of Variation	1.028				Skewness		3.142
375												
376						Normal GOF Test						
377					Shapiro Wilk Test Statistic	0.395				Shapiro Wilk GOF Test		
378					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
379					Lilliefors Test Statistic	0.458				Lilliefors GOF Test		
380					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
381						Data Not Normal at 5% Significance Level						
382												
383						Assuming Normal Distribution						
384					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
385					95% Student's-t UCL	24.42				95% Adjusted-CLT UCL (Chen-1995)		28.77
386										95% Modified-t UCL (Johnson-1978)		25.24
387												
388						Gamma GOF Test						
389					A-D Test Statistic	2.931				Anderson-Darling Gamma GOF Test		
390					5% A-D Critical Value	0.734				Data Not Gamma Distributed at 5% Significance Level		
391					K-S Test Statistic	0.454				Kolmogrov-Smirnoff Gamma GOF Test		
392					5% K-S Critical Value	0.269				Data Not Gamma Distributed at 5% Significance Level		
393						Data Not Gamma Distributed at 5% Significance Level						
394												
395						Gamma Statistics						
396					k hat (MLE)	2.428				k star (bias corrected MLE)		1.766
397					Theta hat (MLE)	6.302				Theta star (bias corrected MLE)		8.663
398					nu hat (MLE)	48.56				nu star (bias corrected)		35.32
399					MLE Mean (bias corrected)	15.3				MLE Sd (bias corrected)		11.51
400										Approximate Chi Square Value (0.05)		22.72
401					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		20.98
402												
403						Assuming Gamma Distribution						
404					95% Approximate Gamma UCL (use when n>=50))	23.78				95% Adjusted Gamma UCL (use when n<50)		25.76
405												
406						Lognormal GOF Test						
407					Shapiro Wilk Test Statistic	0.435				Shapiro Wilk Lognormal GOF Test		
408					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
409					Lilliefors Test Statistic	0.442				Lilliefors Lognormal GOF Test		
410					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
411						Data Not Lognormal at 5% Significance Level						
412												
413						Lognormal Statistics						
414					Minimum of Logged Data	2.303				Mean of logged Data		2.508
415					Maximum of Logged Data	4.094				SD of logged Data		0.563
416												

	A	B	C	D	E	F	G	H	I	J	K	L
417						Assuming Lognormal Distribution						
418					95% H-UCL	22.22				90% Chebyshev (MVUE) UCL		21.87
419					95% Chebyshev (MVUE) UCL	25.36				97.5% Chebyshev (MVUE) UCL		30.22
420					99% Chebyshev (MVUE) UCL	39.76						
421												
422						Nonparametric Distribution Free UCL Statistics						
423						Data do not follow a Discernible Distribution (0.05)						
424												
425						Nonparametric Distribution Free UCLs						
426					95% CLT UCL	23.48				95% Jackknife UCL		24.42
427					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
428					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
429					95% BCA Bootstrap UCL	N/A						
430					90% Chebyshev(Mean, Sd) UCL	30.23				95% Chebyshev(Mean, Sd) UCL		36.99
431					97.5% Chebyshev(Mean, Sd) UCL	46.37				99% Chebyshev(Mean, Sd) UCL		64.81
432												
433						Suggested UCL to Use						
434					95% Chebyshev (Mean, Sd) UCL	36.99						
435												
436					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
437					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
438					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
439					For additional insight the user may want to consult a statistician.							
440												
441												
442	Uranium-234											
443												
444						General Statistics						
445					Total Number of Observations	10				Number of Distinct Observations		5
446										Number of Missing Observations		0
447					Minimum	0.478				Mean		8.614
448					Maximum	30.7				Median		8.614
449					SD	8.519				Std. Error of Mean		2.694
450					Coefficient of Variation	0.989				Skewness		2.139
451												
452						Normal GOF Test						
453					Shapiro Wilk Test Statistic	0.691				Shapiro Wilk GOF Test		
454					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
455					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
456					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
457						Data Not Normal at 5% Significance Level						
458												
459						Assuming Normal Distribution						
460					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
461					95% Student's-t UCL	13.55				95% Adjusted-CLT UCL (Chen-1995)		14.99
462										95% Modified-t UCL (Johnson-1978)		13.86
463												
464						Gamma GOF Test						
465					A-D Test Statistic	0.964				Anderson-Darling Gamma GOF Test		
466					5% A-D Critical Value	0.747				Data Not Gamma Distributed at 5% Significance Level		
467					K-S Test Statistic	0.328				Kolmogrov-Smirnoff Gamma GOF Test		
468					5% K-S Critical Value	0.273				Data Not Gamma Distributed at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
469	Data Not Gamma Distributed at 5% Significance Level											
470												
471	Gamma Statistics											
472					k hat (MLE)	1.07				k star (bias corrected MLE)		0.816
473					Theta hat (MLE)	8.048				Theta star (bias corrected MLE)		10.56
474					nu hat (MLE)	21.41				nu star (bias corrected)		16.32
475					MLE Mean (bias corrected)	8.614				MLE Sd (bias corrected)		9.536
476										Approximate Chi Square Value (0.05)		8.187
477					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		7.208
478												
479	Assuming Gamma Distribution											
480				95% Approximate Gamma UCL (use when n>=50))		17.17				95% Adjusted Gamma UCL (use when n<50)		19.5
481												
482	Lognormal GOF Test											
483					Shapiro Wilk Test Statistic	0.809				Shapiro Wilk Lognormal GOF Test		
484					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
485					Lilliefors Test Statistic	0.361				Lilliefors Lognormal GOF Test		
486					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
487	Data Not Lognormal at 5% Significance Level											
488												
489	Lognormal Statistics											
490					Minimum of Logged Data	-0.738				Mean of logged Data		1.618
491					Maximum of Logged Data	3.424				SD of logged Data		1.289
492												
493	Assuming Lognormal Distribution											
494					95% H-UCL	57.36				90% Chebyshev (MVUE) UCL		23.37
495					95% Chebyshev (MVUE) UCL	29.33				97.5% Chebyshev (MVUE) UCL		37.61
496					99% Chebyshev (MVUE) UCL	53.88						
497												
498	Nonparametric Distribution Free UCL Statistics											
499	Data do not follow a Discernible Distribution (0.05)											
500												
501	Nonparametric Distribution Free UCLs											
502					95% CLT UCL	13.04				95% Jackknife UCL		13.55
503					95% Standard Bootstrap UCL	12.88				95% Bootstrap-t UCL		16.6
504					95% Hall's Bootstrap UCL	33.01				95% Percentile Bootstrap UCL		13.63
505					95% BCA Bootstrap UCL	14.45						
506					90% Chebyshev(Mean, Sd) UCL	16.7				95% Chebyshev(Mean, Sd) UCL		20.36
507					97.5% Chebyshev(Mean, Sd) UCL	25.44				99% Chebyshev(Mean, Sd) UCL		35.42
508												
509	Suggested UCL to Use											
510					95% Chebyshev (Mean, Sd) UCL	20.36						
511												
512	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
513	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
514	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
515	For additional insight the user may want to consult a statistician.											
516												
517												
518	Uranium-235											
519												
520	General Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
521					Total Number of Observations	10				Number of Distinct Observations		5
522										Number of Missing Observations		0
523					Minimum	0.0372					Mean	0.588
524					Maximum	2.11					Median	0.588
525					SD	0.587					Std. Error of Mean	0.186
526					Coefficient of Variation	0.998					Skewness	2.143
527												
528					Normal GOF Test							
529					Shapiro Wilk Test Statistic	0.688			Shapiro Wilk GOF Test			
530					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
531					Lilliefors Test Statistic	0.4			Lilliefors GOF Test			
532					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
533					Data Not Normal at 5% Significance Level							
534												
535					Assuming Normal Distribution							
536			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
537					95% Student's-t UCL	0.928			95% Adjusted-CLT UCL (Chen-1995)			1.028
538									95% Modified-t UCL (Johnson-1978)			0.949
539												
540					Gamma GOF Test							
541					A-D Test Statistic	0.99			Anderson-Darling Gamma GOF Test			
542					5% A-D Critical Value	0.747			Data Not Gamma Distributed at 5% Significance Level			
543					K-S Test Statistic	0.329			Kolmogrov-Smirnoff Gamma GOF Test			
544					5% K-S Critical Value	0.273			Data Not Gamma Distributed at 5% Significance Level			
545					Data Not Gamma Distributed at 5% Significance Level							
546												
547					Gamma Statistics							
548					k hat (MLE)	1.054			k star (bias corrected MLE)			0.805
549					Theta hat (MLE)	0.558			Theta star (bias corrected MLE)			0.731
550					nu hat (MLE)	21.09			nu star (bias corrected)			16.09
551					MLE Mean (bias corrected)	0.588			MLE Sd (bias corrected)			0.655
552									Approximate Chi Square Value (0.05)			8.028
553					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			7.06
554												
555					Assuming Gamma Distribution							
556					95% Approximate Gamma UCL (use when n>=50))	1.178			95% Adjusted Gamma UCL (use when n<50)			1.34
557												
558					Lognormal GOF Test							
559					Shapiro Wilk Test Statistic	0.798			Shapiro Wilk Lognormal GOF Test			
560					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
561					Lilliefors Test Statistic	0.363			Lilliefors Lognormal GOF Test			
562					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
563					Data Not Lognormal at 5% Significance Level							
564												
565					Lognormal Statistics							
566					Minimum of Logged Data	-3.291			Mean of logged Data			-1.075
567					Maximum of Logged Data	0.747			SD of logged Data			1.296
568												
569					Assuming Lognormal Distribution							
570					95% H-UCL	3.977			90% Chebyshev (MVUE) UCL			1.597
571					95% Chebyshev (MVUE) UCL	2.006			97.5% Chebyshev (MVUE) UCL			2.573
572					99% Chebyshev (MVUE) UCL	3.688						

	A	B	C	D	E	F	G	H	I	J	K	L
573												
574						Nonparametric Distribution Free UCL Statistics						
575						Data do not follow a Discernible Distribution (0.05)						
576												
577						Nonparametric Distribution Free UCLs						
578					95% CLT UCL	0.893				95% Jackknife UCL		0.928
579					95% Standard Bootstrap UCL	0.884				95% Bootstrap-t UCL		1.137
580					95% Hall's Bootstrap UCL	2.265				95% Percentile Bootstrap UCL		0.905
581					95% BCA Bootstrap UCL	1.044						
582					90% Chebyshev(Mean, Sd) UCL	1.145				95% Chebyshev(Mean, Sd) UCL		1.397
583					97.5% Chebyshev(Mean, Sd) UCL	1.747				99% Chebyshev(Mean, Sd) UCL		2.434
584												
585						Suggested UCL to Use						
586					95% Chebyshev (Mean, Sd) UCL	1.397						
587												
588					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
589					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
590					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
591					For additional insight the user may want to consult a statistician.							
592												
593												
594	Uranium-238											
595												
596						General Statistics						
597					Total Number of Observations	10				Number of Distinct Observations		5
598										Number of Missing Observations		0
599					Minimum	1.31				Mean		17.68
600					Maximum	62.9				Median		17.68
601					SD	17.44				Std. Error of Mean		5.514
602					Coefficient of Variation	0.986				Skewness		2.142
603												
604						Normal GOF Test						
605					Shapiro Wilk Test Statistic	0.688				Shapiro Wilk GOF Test		
606					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
607					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
608					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
609						Data Not Normal at 5% Significance Level						
610												
611						Assuming Normal Distribution						
612					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
613					95% Student's-t UCL	27.79				95% Adjusted-CLT UCL (Chen-1995)		30.74
614										95% Modified-t UCL (Johnson-1978)		28.41
615												
616						Gamma GOF Test						
617					A-D Test Statistic	0.993				Anderson-Darling Gamma GOF Test		
618					5% A-D Critical Value	0.746				Data Not Gamma Distributed at 5% Significance Level		
619					K-S Test Statistic	0.326				Kolmogrov-Smirnoff Gamma GOF Test		
620					5% K-S Critical Value	0.273				Data Not Gamma Distributed at 5% Significance Level		
621						Data Not Gamma Distributed at 5% Significance Level						
622												
623						Gamma Statistics						
624					k hat (MLE)	1.107				k star (bias corrected MLE)		0.841

	A	B	C	D	E	F	G	H	I	J	K	L
625					Theta hat (MLE)	15.97				Theta star (bias corrected MLE)		21.01
626					nu hat (MLE)	22.14				nu star (bias corrected)		16.83
627					MLE Mean (bias corrected)	17.68				MLE Sd (bias corrected)		19.27
628										Approximate Chi Square Value (0.05)		8.55
629					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		7.546
630												
631					**Assuming Gamma Distribution**							
632				95% Approximate Gamma UCL (use when n>=50))		34.79				95% Adjusted Gamma UCL (use when n<50)		39.42
633												
634					**Lognormal GOF Test**							
635					Shapiro Wilk Test Statistic	0.798				**Shapiro Wilk Lognormal GOF Test**		
636					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
637					Lilliefors Test Statistic	0.361				**Lilliefors Lognormal GOF Test**		
638					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
639					**Data Not Lognormal at 5% Significance Level**							
640												
641					**Lognormal Statistics**							
642					Minimum of Logged Data	0.27				Mean of logged Data		2.357
643					Maximum of Logged Data	4.142				SD of logged Data		1.246
644												
645					**Assuming Lognormal Distribution**							
646					95% H-UCL	103.5				90% Chebyshev (MVUE) UCL		45.89
647					95% Chebyshev (MVUE) UCL	57.44				97.5% Chebyshev (MVUE) UCL		73.46
648					99% Chebyshev (MVUE) UCL	104.9						
649												
650					**Nonparametric Distribution Free UCL Statistics**							
651					**Data do not follow a Discernible Distribution (0.05)**							
652												
653					**Nonparametric Distribution Free UCLs**							
654					95% CLT UCL	26.75				95% Jackknife UCL		27.79
655					95% Standard Bootstrap UCL	26.13				95% Bootstrap-t UCL		34
656					95% Hall's Bootstrap UCL	67.54				95% Percentile Bootstrap UCL		26.72
657					95% BCA Bootstrap UCL	30.86						
658					90% Chebyshev(Mean, Sd) UCL	34.22				95% Chebyshev(Mean, Sd) UCL		41.71
659					97.5% Chebyshev(Mean, Sd) UCL	52.11				99% Chebyshev(Mean, Sd) UCL		72.54
660												
661					**Suggested UCL to Use**							
662					95% Chebyshev (Mean, Sd) UCL	41.71						
663												
664					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
665					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
666					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
667					For additional insight the user may want to consult a statistician.							
668												
669												
670	**Vanadium**											
671												
672					**General Statistics**							
673					Total Number of Observations	10				Number of Distinct Observations		8
674										Number of Missing Observations		0
675					Minimum	84				Mean		107.9
676					Maximum	158				Median		102

	A	B	C	D	E	F	G	H	I	J	K	L
677					SD	20.73					Std. Error of Mean	6.557
678					Coefficient of Variation	0.192					Skewness	1.76
679												
680					Normal GOF Test							
681					Shapiro Wilk Test Statistic	0.827	Shapiro Wilk GOF Test					
682					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
683					Lilliefors Test Statistic	0.26	Lilliefors GOF Test					
684					5% Lilliefors Critical Value	0.28	Data appear Normal at 5% Significance Level					
685					Data appear Approximate Normal at 5% Significance Level							
686												
687					Assuming Normal Distribution							
688				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
689					95% Student's-t UCL	119.9					95% Adjusted-CLT UCL (Chen-1995)	122.6
690											95% Modified-t UCL (Johnson-1978)	120.5
691												
692					Gamma GOF Test							
693					A-D Test Statistic	0.628	Anderson-Darling Gamma GOF Test					
694					5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level					
695					K-S Test Statistic	0.232	Kolmogrov-Smirnoff Gamma GOF Test					
696					5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level					
697					Detected data appear Gamma Distributed at 5% Significance Level							
698												
699					Gamma Statistics							
700					k hat (MLE)	34.48					k star (bias corrected MLE)	24.2
701					Theta hat (MLE)	3.129					Theta star (bias corrected MLE)	4.458
702					nu hat (MLE)	689.6					nu star (bias corrected)	484.1
703					MLE Mean (bias corrected)	107.9					MLE Sd (bias corrected)	21.93
704											Approximate Chi Square Value (0.05)	434
705					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	425.8
706												
707					Assuming Gamma Distribution							
708					95% Approximate Gamma UCL (use when n>=50))	120.3					95% Adjusted Gamma UCL (use when n<50)	122.7
709												
710					Lognormal GOF Test							
711					Shapiro Wilk Test Statistic	0.889	Shapiro Wilk Lognormal GOF Test					
712					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
713					Lilliefors Test Statistic	0.223	Lilliefors Lognormal GOF Test					
714					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
715					Data appear Lognormal at 5% Significance Level							
716												
717					Lognormal Statistics							
718					Minimum of Logged Data	4.431					Mean of logged Data	4.667
719					Maximum of Logged Data	5.063					SD of logged Data	0.175
720												
721					Assuming Lognormal Distribution							
722					95% H-UCL	120.3					90% Chebyshev (MVUE) UCL	125.7
723					95% Chebyshev (MVUE) UCL	133.8					97.5% Chebyshev (MVUE) UCL	145
724					99% Chebyshev (MVUE) UCL	167.1						
725												
726					Nonparametric Distribution Free UCL Statistics							
727					Data appear to follow a Discernible Distribution at 5% Significance Level							
728												

	A	B	C	D	E	F	G	H	I	J	K	L
729	**Nonparametric Distribution Free UCLs**											
730					95% CLT UCL	118.7				95% Jackknife UCL		119.9
731					95% Standard Bootstrap UCL	118.2				95% Bootstrap-t UCL		131.4
732					95% Hall's Bootstrap UCL	184.3				95% Percentile Bootstrap UCL		118.7
733					95% BCA Bootstrap UCL	123.1						
734					90% Chebyshev(Mean, Sd) UCL	127.6				95% Chebyshev(Mean, Sd) UCL		136.5
735					97.5% Chebyshev(Mean, Sd) UCL	148.8				99% Chebyshev(Mean, Sd) UCL		173.1
736												
737	**Suggested UCL to Use**											
738					95% Student's-t UCL	119.9						
739												
740	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
741	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
742	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
743	For additional insight the user may want to consult a statistician.											
744												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:15:11 PM								
5	From File			EPC_013Surf_7.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	**General Statistics**											
14	Total Number of Observations					10	Number of Distinct Observations					10
15							Number of Missing Observations					0
16	Minimum					15858	Mean					23010
17	Maximum					39372	Median					21126
18	SD					6667	Std. Error of Mean					2108
19	Coefficient of Variation					0.29	Skewness					1.848
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.818	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.28	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					26875	95% Adjusted-CLT UCL (Chen-1995)					27794
31							95% Modified-t UCL (Johnson-1978)					27080
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.565	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.725	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.262	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					16.01	k star (bias corrected MLE)					11.28
42	Theta hat (MLE)					1437	Theta star (bias corrected MLE)					2041
43	nu hat (MLE)					320.3	nu star (bias corrected)					225.5
44	MLE Mean (bias corrected)					23010	MLE Sd (bias corrected)					6852
45							Approximate Chi Square Value (0.05)					191.8
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					186.4
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50)					27061	95% Adjusted Gamma UCL (use when n<50)					27847
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.908	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.245	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.671				Mean of logged Data		10.01
60					Maximum of Logged Data	10.58				SD of logged Data		0.254
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	27123				90% Chebyshev (MVUE) UCL		28516
64					95% Chebyshev (MVUE) UCL	31037				97.5% Chebyshev (MVUE) UCL		34536
65					99% Chebyshev (MVUE) UCL	41408						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	26478				95% Jackknife UCL		26875
72					95% Standard Bootstrap UCL	26333				95% Bootstrap-t UCL		30503
73					95% Hall's Bootstrap UCL	45082				95% Percentile Bootstrap UCL		26680
74					95% BCA Bootstrap UCL	27604						
75					90% Chebyshev(Mean, Sd) UCL	29335				95% Chebyshev(Mean, Sd) UCL		32199
76					97.5% Chebyshev(Mean, Sd) UCL	36176				99% Chebyshev(Mean, Sd) UCL		43986
77												
78	**Suggested UCL to Use**											
79					95% Adjusted Gamma UCL	27847						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Silver**											
88												
89	**General Statistics**											
90					Total Number of Observations	10				Number of Distinct Observations		4
91										Number of Missing Observations		0
92					Minimum	0.033				Mean		60.4
93					Maximum	146				Median		50
94					SD	39.43				Std. Error of Mean		12.47
95					Coefficient of Variation	0.653				Skewness		1.149
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.756	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.404	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	83.26				95% Adjusted-CLT UCL (Chen-1995)		85.75
107										95% Modified-t UCL (Johnson-1978)		84.02
108												
109	Gamma GOF Test											
110					A-D Test Statistic	2.055	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.486	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.275	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	0.804				k star (bias corrected MLE)		0.63
118					Theta hat (MLE)	75.08				Theta star (bias corrected MLE)		95.91
119					nu hat (MLE)	16.09				nu star (bias corrected)		12.6
120					MLE Mean (bias corrected)	60.4				MLE Sd (bias corrected)		76.11
121										Approximate Chi Square Value (0.05)		5.622
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		4.837
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	135.3				95% Adjusted Gamma UCL (use when n<50)		157.3
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.491	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.49	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-3.411				Mean of logged Data		3.364
136					Maximum of Logged Data	4.984				SD of logged Data		2.412
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	91306				90% Chebyshev (MVUE) UCL		846.1
140					95% Chebyshev (MVUE) UCL	1111				97.5% Chebyshev (MVUE) UCL		1480
141					99% Chebyshev (MVUE) UCL	2203						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	80.91				95% Jackknife UCL		83.26
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	97.81				95% Chebyshev(Mean, Sd) UCL		114.8
152					97.5% Chebyshev(Mean, Sd) UCL	138.3				99% Chebyshev(Mean, Sd) UCL		184.5
153												
154	Suggested UCL to Use											
155					99% Chebyshev (Mean, Sd) UCL	184.5						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Recommended UCL exceeds the maximum observation											
158												
159	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
160	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
161	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
162	For additional insight the user may want to consult a statistician.											
163												
164												
165	Uranium-238											
166												
167	General Statistics											
168					Total Number of Observations	10	Number of Distinct Observations				1	
169							Number of Missing Observations				0	
170					Minimum	1.3	Mean				1.3	
171					Maximum	1.3	Median				1.3	
172												
173	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
174	ProUCL (or any other software) should not be used on such a data set!											
175	The data set for variable Uranium-238 was not processed!											
176												
177	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
178	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
179												
180												
181												
182	Vanadium											
183												
184	General Statistics											
185					Total Number of Observations	10	Number of Distinct Observations				9	
186							Number of Missing Observations				0	
187					Minimum	86	Mean				109	
188					Maximum	145	Median				102	
189					SD	21.67	Std. Error of Mean				6.852	
190					Coefficient of Variation	0.199	Skewness				0.653	
191												
192	Normal GOF Test											
193					Shapiro Wilk Test Statistic	0.871	Shapiro Wilk GOF Test					
194					5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level					
195					Lilliefors Test Statistic	0.256	Lilliefors GOF Test					
196					5% Lilliefors Critical Value	0.28	Data appear Normal at 5% Significance Level					
197	Data appear Normal at 5% Significance Level											
198												
199	Assuming Normal Distribution											
200	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
201					95% Student's-t UCL	121.6	95% Adjusted-CLT UCL (Chen-1995)				121.8	
202							95% Modified-t UCL (Johnson-1978)				121.8	
203												
204	Gamma GOF Test											
205					A-D Test Statistic	0.593	Anderson-Darling Gamma GOF Test					
206					5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level					
207					K-S Test Statistic	0.265	Kolmogrov-Smirnoff Gamma GOF Test					
208					5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
209	Detected data appear Gamma Distributed at 5% Significance Level											
210												
211	Gamma Statistics											
212					k hat (MLE)	29.47				k star (bias corrected MLE)		20.7
213					Theta hat (MLE)	3.698				Theta star (bias corrected MLE)		5.266
214					nu hat (MLE)	589.5				nu star (bias corrected)		414
215					MLE Mean (bias corrected)	109				MLE Sd (bias corrected)		23.96
216										Approximate Chi Square Value (0.05)		367.8
217					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		360.2
218												
219	Assuming Gamma Distribution											
220					95% Approximate Gamma UCL (use when n>=50))	122.7				95% Adjusted Gamma UCL (use when n<50)		125.3
221												
222	Lognormal GOF Test											
223					Shapiro Wilk Test Statistic	0.882				Shapiro Wilk Lognormal GOF Test		
224					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
225					Lilliefors Test Statistic	0.252				Lilliefors Lognormal GOF Test		
226					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
227	Data appear Lognormal at 5% Significance Level											
228												
229	Lognormal Statistics											
230					Minimum of Logged Data	4.454				Mean of logged Data		4.674
231					Maximum of Logged Data	4.977				SD of logged Data		0.193
232												
233	Assuming Lognormal Distribution											
234					95% H-UCL	123.1				90% Chebyshev (MVUE) UCL		128.9
235					95% Chebyshev (MVUE) UCL	138				97.5% Chebyshev (MVUE) UCL		150.5
236					99% Chebyshev (MVUE) UCL	175.2						
237												
238	Nonparametric Distribution Free UCL Statistics											
239	Data appear to follow a Discernible Distribution at 5% Significance Level											
240												
241	Nonparametric Distribution Free UCLs											
242					95% CLT UCL	120.3				95% Jackknife UCL		121.6
243					95% Standard Bootstrap UCL	119.8				95% Bootstrap-t UCL		125
244					95% Hall's Bootstrap UCL	120.7				95% Percentile Bootstrap UCL		120.2
245					95% BCA Bootstrap UCL	121.1						
246					90% Chebyshev(Mean, Sd) UCL	129.6				95% Chebyshev(Mean, Sd) UCL		138.9
247					97.5% Chebyshev(Mean, Sd) UCL	151.8				99% Chebyshev(Mean, Sd) UCL		177.2
248												
249	Suggested UCL to Use											
250					95% Student's-t UCL	121.6						
251												
252	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
253	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
254	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
255	For additional insight the user may want to consult a statistician.											
256												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:14:34 PM								
5	From File			EPC_013Surf_8.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	General Statistics											
14	Total Number of Observations					15	Number of Distinct Observations					15
15							Number of Missing Observations					0
16	Minimum					17679	Mean					22458
17	Maximum					31310	Median					21226
18	SD					3636	Std. Error of Mean					938.8
19	Coefficient of Variation					0.162	Skewness					1.043
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.929	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.881	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.166	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.229	Data appear Normal at 5% Significance Level					
26	Data appear Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					24112	95% Adjusted-CLT UCL (Chen-1995)					24273
31							95% Modified-t UCL (Johnson-1978)					24154
32												
33	Gamma GOF Test											
34	A-D Test Statistic					0.298	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.734	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.159	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.221	Detected data appear Gamma Distributed at 5% Significance Level					
38	Detected data appear Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					43.8	k star (bias corrected MLE)					35.08
42	Theta hat (MLE)					512.7	Theta star (bias corrected MLE)					640.1
43	nu hat (MLE)					1314	nu star (bias corrected)					1053
44	MLE Mean (bias corrected)					22458	MLE Sd (bias corrected)					3792
45							Approximate Chi Square Value (0.05)					978.2
46	Adjusted Level of Significance					0.0324	Adjusted Chi Square Value					969.4
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					24164	95% Adjusted Gamma UCL (use when n<50)					24384
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.963	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.148	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.78				Mean of logged Data		10.01
60					Maximum of Logged Data	10.35				SD of logged Data		0.154
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	24181				90% Chebyshev (MVUE) UCL		25144
64					95% Chebyshev (MVUE) UCL	26365				97.5% Chebyshev (MVUE) UCL		28058
65					99% Chebyshev (MVUE) UCL	31385						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	24002				95% Jackknife UCL		24112
72					95% Standard Bootstrap UCL	23953				95% Bootstrap-t UCL		24618
73					95% Hall's Bootstrap UCL	24684				95% Percentile Bootstrap UCL		23930
74					95% BCA Bootstrap UCL	24230						
75					90% Chebyshev(Mean, Sd) UCL	25275				95% Chebyshev(Mean, Sd) UCL		26550
76					97.5% Chebyshev(Mean, Sd) UCL	28321				99% Chebyshev(Mean, Sd) UCL		31799
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	24112						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Manganese**											
88												
89	**General Statistics**											
90					Total Number of Observations	15				Number of Distinct Observations		15
91										Number of Missing Observations		0
92					Minimum	205				Mean		910.1
93					Maximum	1927				Median		850
94					SD	463.1				Std. Error of Mean		119.6
95					Coefficient of Variation	0.509				Skewness		0.955
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.166	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level					
102	**Data appear Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	1121				95% Adjusted-CLT UCL (Chen-1995)		1138
107										95% Modified-t UCL (Johnson-1978)		1126
108												
109	Gamma GOF Test											
110					A-D Test Statistic	0.302	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.135	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.223	Detected data appear Gamma Distributed at 5% Significance Level					
114	Detected data appear Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	4.067				k star (bias corrected MLE)		3.298
118					Theta hat (MLE)	223.8				Theta star (bias corrected MLE)		275.9
119					nu hat (MLE)	122				nu star (bias corrected)		98.94
120					MLE Mean (bias corrected)	910.1				MLE Sd (bias corrected)		501.1
121										Approximate Chi Square Value (0.05)		76.99
122					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		74.61
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	1169				95% Adjusted Gamma UCL (use when n<50)		1207
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.941	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.166	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
132	Data appear Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	5.323				Mean of logged Data		6.686
136					Maximum of Logged Data	7.564				SD of logged Data		0.551
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	1273				90% Chebyshev (MVUE) UCL		1328
140					95% Chebyshev (MVUE) UCL	1512				97.5% Chebyshev (MVUE) UCL		1768
141					99% Chebyshev (MVUE) UCL	2271						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	1107				95% Jackknife UCL		1121
148					95% Standard Bootstrap UCL	1096				95% Bootstrap-t UCL		1197
149					95% Hall's Bootstrap UCL	1265				95% Percentile Bootstrap UCL		1107
150					95% BCA Bootstrap UCL	1143						
151					90% Chebyshev(Mean, Sd) UCL	1269				95% Chebyshev(Mean, Sd) UCL		1431
152					97.5% Chebyshev(Mean, Sd) UCL	1657				99% Chebyshev(Mean, Sd) UCL		2100
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	1121						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**PAH, Total**											
164												
165	**General Statistics**											
166	Total Number of Observations					15	Number of Distinct Observations					1
167							Number of Missing Observations					0
168	Minimum					0.0122	Mean					0.0122
169	Maximum					0.0122	Median					0.0122
170												
171	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
172	**ProUCL (or any other software) should not be used on such a data set!**											
173	**The data set for variable PAH, Total was not processed!**											
174												
175	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
176	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
177												
178												
179												
180	**Vanadium**											
181												
182	**General Statistics**											
183	Total Number of Observations					15	Number of Distinct Observations					13
184							Number of Missing Observations					0
185	Minimum					78	Mean					94.47
186	Maximum					118	Median					96
187	SD					11.51	Std. Error of Mean					2.973
188	Coefficient of Variation					0.122	Skewness					0.516
189												
190	**Normal GOF Test**											
191	Shapiro Wilk Test Statistic					0.956	**Shapiro Wilk GOF Test**					
192	5% Shapiro Wilk Critical Value					0.881	Data appear Normal at 5% Significance Level					
193	Lilliefors Test Statistic					0.123	**Lilliefors GOF Test**					
194	5% Lilliefors Critical Value					0.229	Data appear Normal at 5% Significance Level					
195	**Data appear Normal at 5% Significance Level**											
196												
197	**Assuming Normal Distribution**											
198	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
199	95% Student's-t UCL					99.7	95% Adjusted-CLT UCL (Chen-1995)					99.78
200							95% Modified-t UCL (Johnson-1978)					99.77
201												
202	**Gamma GOF Test**											
203	A-D Test Statistic					0.232	**Anderson-Darling Gamma GOF Test**					
204	5% A-D Critical Value					0.734	Detected data appear Gamma Distributed at 5% Significance Level					
205	K-S Test Statistic					0.107	**Kolmogrov-Smirnoff Gamma GOF Test**					
206	5% K-S Critical Value					0.221	Detected data appear Gamma Distributed at 5% Significance Level					
207	**Detected data appear Gamma Distributed at 5% Significance Level**											
208												

	A	B	C	D	E	F	G	H	I	J	K	L
209	Gamma Statistics											
210					k hat (MLE)	73.78	k star (bias corrected MLE)					59.07
211					Theta hat (MLE)	1.28	Theta star (bias corrected MLE)					1.599
212					nu hat (MLE)	2214	nu star (bias corrected)					1772
213					MLE Mean (bias corrected)	94.47	MLE Sd (bias corrected)					12.29
214							Approximate Chi Square Value (0.05)					1675
215					Adjusted Level of Significance	0.0324	Adjusted Chi Square Value					1664
216												
217	Assuming Gamma Distribution											
218					95% Approximate Gamma UCL (use when n>=50))	99.92	95% Adjusted Gamma UCL (use when n<50)					100.6
219												
220	Lognormal GOF Test											
221					Shapiro Wilk Test Statistic	0.967	Shapiro Wilk Lognormal GOF Test					
222					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
223					Lilliefors Test Statistic	0.11	Lilliefors Lognormal GOF Test					
224					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
225	Data appear Lognormal at 5% Significance Level											
226												
227	Lognormal Statistics											
228					Minimum of Logged Data	4.357	Mean of logged Data					4.541
229					Maximum of Logged Data	4.771	SD of logged Data					0.12
230												
231	Assuming Lognormal Distribution											
232					95% H-UCL	100	90% Chebyshev (MVUE) UCL					103.3
233					95% Chebyshev (MVUE) UCL	107.3	97.5% Chebyshev (MVUE) UCL					112.8
234					99% Chebyshev (MVUE) UCL	123.7						
235												
236	Nonparametric Distribution Free UCL Statistics											
237	Data appear to follow a Discernible Distribution at 5% Significance Level											
238												
239	Nonparametric Distribution Free UCLs											
240					95% CLT UCL	99.36	95% Jackknife UCL					99.7
241					95% Standard Bootstrap UCL	99.12	95% Bootstrap-t UCL					100.3
242					95% Hall's Bootstrap UCL	100	95% Percentile Bootstrap UCL					99.33
243					95% BCA Bootstrap UCL	99.2						
244					90% Chebyshev(Mean, Sd) UCL	103.4	95% Chebyshev(Mean, Sd) UCL					107.4
245					97.5% Chebyshev(Mean, Sd) UCL	113	99% Chebyshev(Mean, Sd) UCL					124
246												
247	Suggested UCL to Use											
248					95% Student's-t UCL	99.7						
249												
250	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
251	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
252	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
253	For additional insight the user may want to consult a statistician.											
254												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:13:39 PM								
5	From File			EPC_013Surf_9.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Chromium											
12												
13	General Statistics											
14	Total Number of Observations					12	Number of Distinct Observations					2
15							Number of Missing Observations					0
16	Minimum					12	Mean					12.83
17	Maximum					22	Median					12
18	SD					2.887	Std. Error of Mean					0.833
19	Coefficient of Variation					0.225	Skewness					3.464
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.327	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.53	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					14.33	95% Adjusted-CLT UCL (Chen-1995)					15.09
31							95% Modified-t UCL (Johnson-1978)					14.47
32												
33	Gamma GOF Test											
34	A-D Test Statistic					4.09	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.536	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.245	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					30.24	k star (bias corrected MLE)					22.73
42	Theta hat (MLE)					0.424	Theta star (bias corrected MLE)					0.565
43	nu hat (MLE)					725.7	nu star (bias corrected)					545.6
44	MLE Mean (bias corrected)					12.83	MLE Sd (bias corrected)					2.692
45							Approximate Chi Square Value (0.05)					492.4
46	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					484.7
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					14.22	95% Adjusted Gamma UCL (use when n<50)					14.45
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.327	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.859		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.53		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.256		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	2.485				Mean of logged Data		2.535
60					Maximum of Logged Data	3.091				SD of logged Data		0.175
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	14.11				90% Chebyshev (MVUE) UCL		14.75
64					95% Chebyshev (MVUE) UCL	15.63				97.5% Chebyshev (MVUE) UCL		16.85
65					99% Chebyshev (MVUE) UCL	19.25						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	14.2				95% Jackknife UCL		N/A
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	15.33				95% Chebyshev(Mean, Sd) UCL		16.47
76					97.5% Chebyshev(Mean, Sd) UCL	18.04				99% Chebyshev(Mean, Sd) UCL		21.12
77												
78					**Suggested UCL to Use**							
79					95% Student's-t UCL	14.33				or 95% Modified-t UCL		14.47
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	**Neptunium-237**											
88												
89					**General Statistics**							
90					Total Number of Observations	12				Number of Distinct Observations		3
91										Number of Missing Observations		0
92					Minimum	0.0174				Mean		0.454
93					Maximum	0.89				Median		0.454
94					SD	0.186				Std. Error of Mean		0.0537
95					Coefficient of Variation	0.41				Skewness		0
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.6		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.859		Data Not Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.417		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.256		Data Not Normal at 5% Significance Level				
102					**Data Not Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	0.55				95% Adjusted-CLT UCL (Chen-1995)		0.542
107										95% Modified-t UCL (Johnson-1978)		0.55
108												
109	Gamma GOF Test											
110					A-D Test Statistic	3.116	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.74	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.501	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.248	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	2.473				k star (bias corrected MLE)		1.91
118					Theta hat (MLE)	0.183				Theta star (bias corrected MLE)		0.237
119					nu hat (MLE)	59.35				nu star (bias corrected)		45.85
120					MLE Mean (bias corrected)	0.454				MLE Sd (bias corrected)		0.328
121										Approximate Chi Square Value (0.05)		31.31
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		29.49
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	0.664				95% Adjusted Gamma UCL (use when n<50)		0.705
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.441	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.504	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-4.051				Mean of logged Data		-1.006
136					Maximum of Logged Data	-0.117				SD of logged Data		0.978
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	1.379				90% Chebyshev (MVUE) UCL		1.065
140					95% Chebyshev (MVUE) UCL	1.295				97.5% Chebyshev (MVUE) UCL		1.613
141					99% Chebyshev (MVUE) UCL	2.238						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	0.542				95% Jackknife UCL		0.55
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	0.615				95% Chebyshev(Mean, Sd) UCL		0.688
152					97.5% Chebyshev(Mean, Sd) UCL	0.789				99% Chebyshev(Mean, Sd) UCL		0.988
153												
154	Suggested UCL to Use											
155					95% Chebyshev (Mean, Sd) UCL	0.688						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**PAH, Total**											
164												
165	**General Statistics**											
166	Total Number of Observations					12	Number of Distinct Observations				1	
167							Number of Missing Observations				0	
168	Minimum					0.0265	Mean				0.0265	
169	Maximum					0.0265	Median				0.0265	
170												
171	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
172	**ProUCL (or any other software) should not be used on such a data set!**											
173	**The data set for variable PAH, Total was not processed!**											
174												
175	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
176	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
177												
178												
179												
180	**Uranium-238**											
181												
182	**General Statistics**											
183	Total Number of Observations					12	Number of Distinct Observations				3	
184							Number of Missing Observations				0	
185	Minimum					0.92	Mean				3.5	
186	Maximum					6.08	Median				3.5	
187	SD					1.1	Std. Error of Mean				0.318	
188	Coefficient of Variation					0.314	Skewness				0	
189												
190	**Normal GOF Test**											
191	Shapiro Wilk Test Statistic					0.6	**Shapiro Wilk GOF Test**					
192	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
193	Lilliefors Test Statistic					0.417	**Lilliefors GOF Test**					
194	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
195	**Data Not Normal at 5% Significance Level**											
196												
197	**Assuming Normal Distribution**											
198	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
199	95% Student's-t UCL					4.07	95% Adjusted-CLT UCL (Chen-1995)				4.022	
200							95% Modified-t UCL (Johnson-1978)				4.07	
201												
202	**Gamma GOF Test**											
203	A-D Test Statistic					2.837	**Anderson-Darling Gamma GOF Test**					
204	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
205	K-S Test Statistic					0.464	**Kolmogrov-Smirnoff Gamma GOF Test**					
206	5% K-S Critical Value					0.246	Data Not Gamma Distributed at 5% Significance Level					
207	**Data Not Gamma Distributed at 5% Significance Level**											
208												

	A	B	C	D	E	F	G	H	I	J	K	L
209	Gamma Statistics											
210					k hat (MLE)	7.817	k star (bias corrected MLE)					5.918
211					Theta hat (MLE)	0.448	Theta star (bias corrected MLE)					0.591
212					nu hat (MLE)	187.6	nu star (bias corrected)					142
213					MLE Mean (bias corrected)	3.5	MLE Sd (bias corrected)					1.439
214							Approximate Chi Square Value (0.05)					115.5
215					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					111.8
216												
217	Assuming Gamma Distribution											
218				95% Approximate Gamma UCL (use when n>=50))		4.304	95% Adjusted Gamma UCL (use when n<50)					4.445
219												
220	Lognormal GOF Test											
221					Shapiro Wilk Test Statistic	0.524	Shapiro Wilk Lognormal GOF Test					
222					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
223					Lilliefors Test Statistic	0.477	Lilliefors Lognormal GOF Test					
224					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
225	Data Not Lognormal at 5% Significance Level											
226												
227	Lognormal Statistics											
228					Minimum of Logged Data	-0.0834	Mean of logged Data					1.187
229					Maximum of Logged Data	1.805	SD of logged Data					0.431
230												
231	Assuming Lognormal Distribution											
232					95% H-UCL	4.7	90% Chebyshev (MVUE) UCL					4.922
233					95% Chebyshev (MVUE) UCL	5.535	97.5% Chebyshev (MVUE) UCL					6.386
234					99% Chebyshev (MVUE) UCL	8.059						
235												
236	Nonparametric Distribution Free UCL Statistics											
237	Data do not follow a Discernible Distribution (0.05)											
238												
239	Nonparametric Distribution Free UCLs											
240					95% CLT UCL	4.022	95% Jackknife UCL					4.07
241					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
242					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
243					95% BCA Bootstrap UCL	N/A						
244					90% Chebyshev(Mean, Sd) UCL	4.453	95% Chebyshev(Mean, Sd) UCL					4.884
245					97.5% Chebyshev(Mean, Sd) UCL	5.483	99% Chebyshev(Mean, Sd) UCL					6.66
246												
247	Suggested UCL to Use											
248					95% Student's-t UCL	4.07	or 95% Modified-t UCL					4.07
249												
250	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
251	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
252	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
253	For additional insight the user may want to consult a statistician.											
254												
255												
256	Vanadium											
257												
258	General Statistics											
259					Total Number of Observations	12	Number of Distinct Observations					10
260							Number of Missing Observations					0

	A	B	C	D	E	F	G	H	I	J	K	L
261					Minimum	80					Mean	103.9
262					Maximum	149					Median	89.5
263					SD	24.43					Std. Error of Mean	7.053
264					Coefficient of Variation	0.235					Skewness	0.942
265												
266					Normal GOF Test							
267					Shapiro Wilk Test Statistic	0.832	Shapiro Wilk GOF Test					
268					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
269					Lilliefors Test Statistic	0.285	Lilliefors GOF Test					
270					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
271					Data Not Normal at 5% Significance Level							
272												
273					Assuming Normal Distribution							
274			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
275					95% Student's-t UCL	116.6					95% Adjusted-CLT UCL (Chen-1995)	117.6
276											95% Modified-t UCL (Johnson-1978)	116.9
277												
278					Gamma GOF Test							
279					A-D Test Statistic	0.857	Anderson-Darling Gamma GOF Test					
280					5% A-D Critical Value	0.732	Data Not Gamma Distributed at 5% Significance Level					
281					K-S Test Statistic	0.285	Kolmogrov-Smirnoff Gamma GOF Test					
282					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
283					Data Not Gamma Distributed at 5% Significance Level							
284												
285					Gamma Statistics							
286					k hat (MLE)	21.56					k star (bias corrected MLE)	16.23
287					Theta hat (MLE)	4.819					Theta star (bias corrected MLE)	6.403
288					nu hat (MLE)	517.5					nu star (bias corrected)	389.5
289					MLE Mean (bias corrected)	103.9					MLE Sd (bias corrected)	25.8
290											Approximate Chi Square Value (0.05)	344.7
291					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	338.3
292												
293					Assuming Gamma Distribution							
294					95% Approximate Gamma UCL (use when n>=50))	117.4					95% Adjusted Gamma UCL (use when n<50)	119.6
295												
296					Lognormal GOF Test							
297					Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Lognormal GOF Test					
298					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
299					Lilliefors Test Statistic	0.273	Lilliefors Lognormal GOF Test					
300					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
301					Data Not Lognormal at 5% Significance Level							
302												
303					Lognormal Statistics							
304					Minimum of Logged Data	4.382					Mean of logged Data	4.62
305					Maximum of Logged Data	5.004					SD of logged Data	0.221
306												
307					Assuming Lognormal Distribution							
308					95% H-UCL	117.8					90% Chebyshev (MVUE) UCL	123.8
309					95% Chebyshev (MVUE) UCL	132.9					97.5% Chebyshev (MVUE) UCL	145.4
310					99% Chebyshev (MVUE) UCL	170.1						
311												
312					Nonparametric Distribution Free UCL Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
313	Data do not follow a Discernible Distribution (0.05)											
314												
315	Nonparametric Distribution Free UCLs											
316					95% CLT UCL	115.5				95% Jackknife UCL		116.6
317					95% Standard Bootstrap UCL	115.3				95% Bootstrap-t UCL		118.9
318					95% Hall's Bootstrap UCL	117.9				95% Percentile Bootstrap UCL		115.9
319					95% BCA Bootstrap UCL	116.3						
320					90% Chebyshev(Mean, Sd) UCL	125.1				95% Chebyshev(Mean, Sd) UCL		134.7
321					97.5% Chebyshev(Mean, Sd) UCL	148				99% Chebyshev(Mean, Sd) UCL		174.1
322												
323	Suggested UCL to Use											
324					95% Student's-t UCL	116.6				or 95% Modified-t UCL		116.9
325												
326	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
327	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
328	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
329	For additional insight the user may want to consult a statistician.											
330												

UCL Statistics for Uncensored Full Data Sets			
User Selected Options			
Date/Time of Computation	10/29/2015 11:41		
From File	EPC_013Surf_i.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
PCB, Total			
General Statistics			
Total Number of Observations		11	Number of Distinct Observations	4
			Number of Missing Observations	0
Minimum		0.05	Mean	3.714
Maximum		5	Median	5
SD		2.209	Std. Error of Mean	0.666
Coefficient of Variation		0.595	Skewness	-1.21
Normal GOF Test				
Shapiro Wilk Test Statistic		0.591	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value		0.85	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic		0.447	Lilliefors GOF Test	
5% Lilliefors Critical Value		0.267	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level				
Assuming Normal Distribution				
95% Normal UCL			95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL		4.921	95% Adjusted-CLT UCL (Chen-1995)	4.55
			95% Modified-t UCL (Johnson-1978)	4.88
Gamma GOF Test				
A-D Test Statistic		2.344	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value		0.756	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic		0.468	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value		0.263	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level				
Gamma Statistics				
k hat (MLE)		0.893	k star (bias corrected MLE)	0.71
Theta hat (MLE)		4.16	Theta star (bias corrected MLE)	5.232
nu hat (MLE)		19.64	nu star (bias corrected)	15.62
MLE Mean (bias corrected)		3.714	MLE Sd (bias corrected)	4.408
			Approximate Chi Square Value (0.05)	7.692
Adjusted Level of Significance		0.0278	Adjusted Chi Square Value	6.804
Assuming Gamma Distribution				
95% Approximate Gamma UCL (use when n>=50))		7.539	95% Adjusted Gamma UCL (use when n<50)	8.523
Lognormal GOF Test				
Shapiro Wilk Test Statistic		0.614	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value		0.85	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic		0.435	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value		0.267	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2.996	Mean of logged Data	0.656
Maximum of Logged Data	1.609	SD of logged Data	1.743
Assuming Lognormal Distribution			
95% H-UCL	109.5	90% Chebyshev (MVUE) UCL	18.17
95% Chebyshev (MVUE) UCL	23.34	97.5% Chebyshev (MVUE) UCL	30.51
99% Chebyshev (MVUE) UCL	44.6		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	4.809	95% Jackknife UCL	4.921
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		
90% Chebyshev(Mean, Sd) UCL	5.712	95% Chebyshev(Mean, Sd) UCL	6.617
97.5% Chebyshev(Mean, Sd) UCL	7.873	99% Chebyshev(Mean, Sd) UCL	10.34
Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	10.34		
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). However, simulations results will not cover all Real World data sets.			
For additional insight the user may want to consult a statistician.			
Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be			
reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.			
Silver			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.036	Mean	36.09
Maximum	50	Median	50
SD	22.24	Std. Error of Mean	6.705
Coefficient of Variation	0.616	Skewness	-1.152
Normal GOF Test			
Shapiro Wilk Test Statistic	0.625	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.37	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	

95% Student's-t UCL	48.25	95% Adjusted-CLT UCL (Chen-1995)	44.63
		95% Modified-t UCL (Johnson-1978)	47.86
Gamma GOF Test			
A-D Test Statistic	2.203	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.768	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.43	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.266	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.68	k star (bias corrected MLE)	0.555
Theta hat (MLE)	53.09	Theta star (bias corrected MLE)	65.02
nu hat (MLE)	14.96	nu star (bias corrected)	12.21
MLE Mean (bias corrected)	36.09	MLE Sd (bias corrected)	48.45
		Approximate Chi Square Value (0.05)	5.367
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	4.649
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	82.13	95% Adjusted Gamma UCL (use when n<50)	94.82
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.612	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.401	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-3.324	Mean of logged Data	2.694
Maximum of Logged Data	3.912	SD of logged Data	2.324
Assuming Lognormal Distribution			
95% H-UCL	16835	90% Chebyshev (MVUE) UCL	382.2
95% Chebyshev (MVUE) UCL	500.5	97.5% Chebyshev (MVUE) UCL	664.7
99% Chebyshev (MVUE) UCL	987.2		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	47.12	95% Jackknife UCL	48.25
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		
90% Chebyshev(Mean, Sd) UCL	56.21	95% Chebyshev(Mean, Sd) UCL	65.32
97.5% Chebyshev(Mean, Sd) UCL	77.97	99% Chebyshev(Mean, Sd) UCL	102.8
Suggested UCL to Use			
99% Chebyshev (Mean, Sd) UCL	102.8		
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). However, simulations results will not cover all Real World data sets.											
For additional insight the user may want to consult a statistician.											
Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
Vanadium											
General Statistics											
Total Number of Observations					11	Number of Distinct Observations					10
						Number of Missing Observations					0
Minimum					85	Mean					104.5
Maximum					138	Median					101
SD					16.33	Std. Error of Mean					4.924
Coefficient of Variation					0.156	Skewness					0.866
Normal GOF Test											
Shapiro Wilk Test Statistic					0.923	Shapiro Wilk GOF Test					
5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
Lilliefors Test Statistic					0.222	Lilliefors GOF Test					
5% Lilliefors Critical Value					0.267	Data appear Normal at 5% Significance Level					
Data appear Normal at 5% Significance Level											
Assuming Normal Distribution											
95% Normal UCL						95% UCLs (Adjusted for Skewness)					
95% Student's-t UCL					113.5	95% Adjusted-CLT UCL (Chen-1995)					114
						95% Modified-t UCL (Johnson-1978)					113.7
Gamma GOF Test											
A-D Test Statistic					0.335	Anderson-Darling Gamma GOF Test					
5% A-D Critical Value					0.728	Detected data appear Gamma Distributed at 5% Significance Level					
K-S Test Statistic					0.211	Kolmogrov-Smirnoff Gamma GOF Test					
5% K-S Critical Value					0.255	Detected data appear Gamma Distributed at 5% Significance Level					
Detected data appear Gamma Distributed at 5% Significance Level											
Gamma Statistics											
k hat (MLE)					47.51	k star (bias corrected MLE)					34.62
Theta hat (MLE)					2.2	Theta star (bias corrected MLE)					3.02
nu hat (MLE)					1045	nu star (bias corrected)					761.5
MLE Mean (bias corrected)					104.5	MLE Sd (bias corrected)					17.77
						Approximate Chi Square Value (0.05)					698.5
Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					688.7
Assuming Gamma Distribution											
95% Approximate Gamma UCL (use when n>=50))					114	95% Adjusted Gamma UCL (use when n<50)					115.6
Lognormal GOF Test											
Shapiro Wilk Test Statistic					0.945	Shapiro Wilk Lognormal GOF Test					
5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
Lilliefors Test Statistic					0.199	Lilliefors Lognormal GOF Test					
5% Lilliefors Critical Value					0.267	Data appear Lognormal at 5% Significance Level					
Data appear Lognormal at 5% Significance Level											
Lognormal Statistics											

Minimum of Logged Data				4.443	Mean of logged Data					4.639
Maximum of Logged Data				4.927	SD of logged Data					0.151
Assuming Lognormal Distribution										
95% H-UCL				114.1	90% Chebyshev (MVUE) UCL					118.8
95% Chebyshev (MVUE) UCL				125.3	97.5% Chebyshev (MVUE) UCL					134.2
99% Chebyshev (MVUE) UCL				151.9						
Nonparametric Distribution Free UCL Statistics										
Data appear to follow a Discernible Distribution at 5% Significance Level										
Nonparametric Distribution Free UCLs										
95% CLT UCL				112.6	95% Jackknife UCL					113.5
95% Standard Bootstrap UCL				112	95% Bootstrap-t UCL					116
95% Hall's Bootstrap UCL				117.9	95% Percentile Bootstrap UCL					112.7
95% BCA Bootstrap UCL				112.9						
90% Chebyshev(Mean, Sd) UCL				119.3	95% Chebyshev(Mean, Sd) UCL					126
97.5% Chebyshev(Mean, Sd) UCL				135.3	99% Chebyshev(Mean, Sd) UCL					153.5
Suggested UCL to Use										
95% Student's-t UCL				113.5						
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). However, simulations results will not cover all Real World data sets.										
For additional insight the user may want to consult a statistician.										

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:12:21 PM								
5	From File			EPC_013Surf_EU12.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	**General Statistics**											
14	Total Number of Observations					11	Number of Distinct Observations					11
15							Number of Missing Observations					0
16	Minimum					14165	Mean					20604
17	Maximum					30409	Median					18769
18	SD					4399	Std. Error of Mean					1326
19	Coefficient of Variation					0.213	Skewness					1.01
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.928	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.207	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.267	Data appear Normal at 5% Significance Level					
26	**Data appear Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					23008	95% Adjusted-CLT UCL (Chen-1995)					23217
31							95% Modified-t UCL (Johnson-1978)					23075
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.321	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.729	Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.201	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.255	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					25.82	k star (bias corrected MLE)					18.84
42	Theta hat (MLE)					798.1	Theta star (bias corrected MLE)					1094
43	nu hat (MLE)					567.9	nu star (bias corrected)					414.4
44	MLE Mean (bias corrected)					20604	MLE Sd (bias corrected)					4748
45							Approximate Chi Square Value (0.05)					368.2
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					361.1
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					23189	95% Adjusted Gamma UCL (use when n<50)					23645
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.965	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.559	Mean of logged Data					9.914
60					Maximum of Logged Data	10.32	SD of logged Data					0.205
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	23281	90% Chebyshev (MVUE) UCL					24423
64					95% Chebyshev (MVUE) UCL	26158	97.5% Chebyshev (MVUE) UCL					28565
65					99% Chebyshev (MVUE) UCL	33294						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	22786	95% Jackknife UCL					23008
72					95% Standard Bootstrap UCL	22677	95% Bootstrap-t UCL					23802
73					95% Hall's Bootstrap UCL	24278	95% Percentile Bootstrap UCL					22815
74					95% BCA Bootstrap UCL	23024						
75					90% Chebyshev(Mean, Sd) UCL	24583	95% Chebyshev(Mean, Sd) UCL					26385
76					97.5% Chebyshev(Mean, Sd) UCL	28887	99% Chebyshev(Mean, Sd) UCL					33801
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	23008						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Manganese**											
88												
89	**General Statistics**											
90					Total Number of Observations	11	Number of Distinct Observations					11
91							Number of Missing Observations					0
92					Minimum	231	Mean					762.9
93					Maximum	3114	Median					541
94					SD	825.5	Std. Error of Mean					248.9
95					Coefficient of Variation	1.082	Skewness					2.736
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.621	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.374	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	1214				95% Adjusted-CLT UCL (Chen-1995)		1392
107										95% Modified-t UCL (Johnson-1978)		1248
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.793	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.741	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.299	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.259	Data Not Gamma Distributed at 5% Significance Level					
114	**Data Not Gamma Distributed at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	1.727				k star (bias corrected MLE)		1.316
118					Theta hat (MLE)	441.9				Theta star (bias corrected MLE)		579.6
119					nu hat (MLE)	37.98				nu star (bias corrected)		28.96
120					MLE Mean (bias corrected)	762.9				MLE Sd (bias corrected)		665
121										Approximate Chi Square Value (0.05)		17.68
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		16.25
123												
124	**Assuming Gamma Distribution**											
125					95% Approximate Gamma UCL (use when n>=50))	1250				95% Adjusted Gamma UCL (use when n<50)		1359
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.238	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	5.442				Mean of logged Data		6.32
136					Maximum of Logged Data	8.044				SD of logged Data		0.752
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	1353				90% Chebyshev (MVUE) UCL		1222
140					95% Chebyshev (MVUE) UCL	1451				97.5% Chebyshev (MVUE) UCL		1770
141					99% Chebyshev (MVUE) UCL	2396						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	1172				95% Jackknife UCL		1214
148					95% Standard Bootstrap UCL	1152				95% Bootstrap-t UCL		2388
149					95% Hall's Bootstrap UCL	3224				95% Percentile Bootstrap UCL		1221
150					95% BCA Bootstrap UCL	1367						
151					90% Chebyshev(Mean, Sd) UCL	1510				95% Chebyshev(Mean, Sd) UCL		1848
152					97.5% Chebyshev(Mean, Sd) UCL	2317				99% Chebyshev(Mean, Sd) UCL		3239
153												
154	**Suggested UCL to Use**											
155					95% H-UCL	1353						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
163	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
164	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
165	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
166												
167												
168	**Silver**											
169												
170	**General Statistics**											
171					Total Number of Observations	11			Number of Distinct Observations		3	
172									Number of Missing Observations		0	
173					Minimum	2.5			Mean		52.41	
174					Maximum	124			Median		50	
175					SD	27.69			Std. Error of Mean		8.349	
176					Coefficient of Variation	0.528			Skewness		1.396	
177												
178	**Normal GOF Test**											
179					Shapiro Wilk Test Statistic	0.604			**Shapiro Wilk GOF Test**			
180					5% Shapiro Wilk Critical Value	0.85			Data Not Normal at 5% Significance Level			
181					Lilliefors Test Statistic	0.444			**Lilliefors GOF Test**			
182					5% Lilliefors Critical Value	0.267			Data Not Normal at 5% Significance Level			
183	**Data Not Normal at 5% Significance Level**											
184												
185	**Assuming Normal Distribution**											
186	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
187					95% Student's-t UCL	67.54			95% Adjusted-CLT UCL (Chen-1995)		69.9	
188									95% Modified-t UCL (Johnson-1978)		68.13	
189												
190	**Gamma GOF Test**											
191					A-D Test Statistic	2.538			**Anderson-Darling Gamma GOF Test**			
192					5% A-D Critical Value	0.737			Data Not Gamma Distributed at 5% Significance Level			
193					K-S Test Statistic	0.47			**Kolmogrov-Smirnoff Gamma GOF Test**			
194					5% K-S Critical Value	0.258			Data Not Gamma Distributed at 5% Significance Level			
195	**Data Not Gamma Distributed at 5% Significance Level**											
196												
197	**Gamma Statistics**											
198					k hat (MLE)	2.264			k star (bias corrected MLE)		1.707	
199					Theta hat (MLE)	23.15			Theta star (bias corrected MLE)		30.7	
200					nu hat (MLE)	49.81			nu star (bias corrected)		37.56	
201					MLE Mean (bias corrected)	52.41			MLE Sd (bias corrected)		40.11	
202									Approximate Chi Square Value (0.05)		24.52	
203					Adjusted Level of Significance	0.0278			Adjusted Chi Square Value		22.82	
204												
205	**Assuming Gamma Distribution**											
206					95% Approximate Gamma UCL (use when n>=50))	80.26			95% Adjusted Gamma UCL (use when n<50)		86.25	
207												
208	**Lognormal GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
209					Shapiro Wilk Test Statistic	0.508	**Shapiro Wilk Lognormal GOF Test**					
210					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
211					Lilliefors Test Statistic	0.487	**Lilliefors Lognormal GOF Test**					
212					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
213	**Data Not Lognormal at 5% Significance Level**											
214												
215	**Lognormal Statistics**											
216					Minimum of Logged Data	0.916	Mean of logged Data					3.722
217					Maximum of Logged Data	4.82	SD of logged Data					0.97
218												
219	**Assuming Lognormal Distribution**											
220					95% H-UCL	163	90% Chebyshev (MVUE) UCL					120.5
221					95% Chebyshev (MVUE) UCL	146.8	97.5% Chebyshev (MVUE) UCL					183.3
222					99% Chebyshev (MVUE) UCL	254.9						
223												
224	**Nonparametric Distribution Free UCL Statistics**											
225	**Data do not follow a Discernible Distribution (0.05)**											
226												
227	**Nonparametric Distribution Free UCLs**											
228					95% CLT UCL	66.14	95% Jackknife UCL					67.54
229					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
230					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
231					95% BCA Bootstrap UCL	N/A						
232					90% Chebyshev(Mean, Sd) UCL	77.46	95% Chebyshev(Mean, Sd) UCL					88.8
233					97.5% Chebyshev(Mean, Sd) UCL	104.6	99% Chebyshev(Mean, Sd) UCL					135.5
234												
235	**Suggested UCL to Use**											
236					95% Chebyshev (Mean, Sd) UCL	88.8						
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
241	For additional insight the user may want to consult a statistician.											
242												
243												
244	**Vanadium**											
245												
246	**General Statistics**											
247					Total Number of Observations	11	Number of Distinct Observations					10
248							Number of Missing Observations					0
249					Minimum	71	Mean					103.1
250					Maximum	151	Median					106
251					SD	23.95	Std. Error of Mean					7.222
252					Coefficient of Variation	0.232	Skewness					0.364
253												
254	**Normal GOF Test**											
255					Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**					
256					5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level					
257					Lilliefors Test Statistic	0.152	**Lilliefors GOF Test**					
258					5% Lilliefors Critical Value	0.267	Data appear Normal at 5% Significance Level					
259	**Data appear Normal at 5% Significance Level**											
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Assuming Normal Distribution**											
262	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
263					95% Student's-t UCL	116.2				95% Adjusted-CLT UCL (Chen-1995)		115.8
264										95% Modified-t UCL (Johnson-1978)		116.3
265												
266	**Gamma GOF Test**											
267					A-D Test Statistic	0.369	**Anderson-Darling Gamma GOF Test**					
268					5% A-D Critical Value	0.729	Detected data appear Gamma Distributed at 5% Significance Level					
269					K-S Test Statistic	0.182	**Kolmogrov-Smirnoff Gamma GOF Test**					
270					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
271	**Detected data appear Gamma Distributed at 5% Significance Level**											
272												
273	**Gamma Statistics**											
274					k hat (MLE)	20.3				k star (bias corrected MLE)		14.82
275					Theta hat (MLE)	5.079				Theta star (bias corrected MLE)		6.955
276					nu hat (MLE)	446.6				nu star (bias corrected)		326.1
277					MLE Mean (bias corrected)	103.1				MLE Sd (bias corrected)		26.78
278										Approximate Chi Square Value (0.05)		285.3
279					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		279
280												
281	**Assuming Gamma Distribution**											
282				95% Approximate Gamma UCL (use when n>=50))		117.8				95% Adjusted Gamma UCL (use when n<50)		120.5
283												
284	**Lognormal GOF Test**											
285					Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk Lognormal GOF Test**					
286					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
287					Lilliefors Test Statistic	0.193	**Lilliefors Lognormal GOF Test**					
288					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
289	**Data appear Lognormal at 5% Significance Level**											
290												
291	**Lognormal Statistics**											
292					Minimum of Logged Data	4.263				Mean of logged Data		4.611
293					Maximum of Logged Data	5.017				SD of logged Data		0.235
294												
295	**Assuming Lognormal Distribution**											
296					95% H-UCL	119				90% Chebyshev (MVUE) UCL		125.2
297					95% Chebyshev (MVUE) UCL	135.2				97.5% Chebyshev (MVUE) UCL		149
298					99% Chebyshev (MVUE) UCL	176.2						
299												
300	**Nonparametric Distribution Free UCL Statistics**											
301	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
302												
303	**Nonparametric Distribution Free UCLs**											
304					95% CLT UCL	115				95% Jackknife UCL		116.2
305					95% Standard Bootstrap UCL	114.3				95% Bootstrap-t UCL		116.6
306					95% Hall's Bootstrap UCL	117.5				95% Percentile Bootstrap UCL		114.2
307					95% BCA Bootstrap UCL	115.4						
308					90% Chebyshev(Mean, Sd) UCL	124.8				95% Chebyshev(Mean, Sd) UCL		134.6
309					97.5% Chebyshev(Mean, Sd) UCL	148.2				99% Chebyshev(Mean, Sd) UCL		174.9
310												
311	**Suggested UCL to Use**											
312					95% Student's-t UCL	116.2						

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:11:42 PM								
5	From File			EPC_013Surf_EU13.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Iron											
12												
13	General Statistics											
14	Total Number of Observations					11	Number of Distinct Observations					11
15							Number of Missing Observations					0
16	Minimum					14554	Mean					23190
17	Maximum					47830	Median					18471
18	SD					10514	Std. Error of Mean					3170
19	Coefficient of Variation					0.453	Skewness					1.623
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.743	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.348	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					28936	95% Adjusted-CLT UCL (Chen-1995)					30063
31							95% Modified-t UCL (Johnson-1978)					29195
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.177	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.328	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.256	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					6.877	k star (bias corrected MLE)					5.062
42	Theta hat (MLE)					3372	Theta star (bias corrected MLE)					4581
43	nu hat (MLE)					151.3	nu star (bias corrected)					111.4
44	MLE Mean (bias corrected)					23190	MLE Sd (bias corrected)					10307
45							Approximate Chi Square Value (0.05)					88.01
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					84.63
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					29346	95% Adjusted Gamma UCL (use when n<50)					30518
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.81	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value					0.85	Data Not Lognormal at 5% Significance Level					

54					Lilliefors Test Statistic	0.306	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.586	Mean of logged Data					9.977
60					Maximum of Logged Data	10.78	SD of logged Data					0.382
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	29614	90% Chebyshev (MVUE) UCL					31051
64					95% Chebyshev (MVUE) UCL	34699	97.5% Chebyshev (MVUE) UCL					39763
65					99% Chebyshev (MVUE) UCL	49710						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	28405	95% Jackknife UCL					28936
72					95% Standard Bootstrap UCL	28189	95% Bootstrap-t UCL					32410
73					95% Hall's Bootstrap UCL	28123	95% Percentile Bootstrap UCL					28337
74					95% BCA Bootstrap UCL	29075						
75					90% Chebyshev(Mean, Sd) UCL	32701	95% Chebyshev(Mean, Sd) UCL					37009
76					97.5% Chebyshev(Mean, Sd) UCL	42988	99% Chebyshev(Mean, Sd) UCL					54733
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	28936	or 95% Modified-t UCL					29195
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Manganese**											
88												
89	**General Statistics**											
90					Total Number of Observations	11	Number of Distinct Observations					11
91							Number of Missing Observations					0
92					Minimum	119	Mean					466.6
93					Maximum	1951	Median					348
94					SD	502.3	Std. Error of Mean					151.5
95					Coefficient of Variation	1.077	Skewness					3.073
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.541	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.427	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	741.2	95% Adjusted-CLT UCL (Chen-1995)					865.7

	A	B	C	D	E	F	G	H	I	J	K	L
107										95% Modified-t UCL (Johnson-1978)		764.6
108												
109						Gamma GOF Test						
110					A-D Test Statistic	1.156	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.739	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.341	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.259	Data Not Gamma Distributed at 5% Significance Level					
114					Data Not Gamma Distributed at 5% Significance Level							
115												
116						Gamma Statistics						
117					k hat (MLE)	1.956				k star (bias corrected MLE)		1.483
118					Theta hat (MLE)	238.6				Theta star (bias corrected MLE)		314.6
119					nu hat (MLE)	43.03				nu star (bias corrected)		32.63
120					MLE Mean (bias corrected)	466.6				MLE Sd (bias corrected)		383.2
121										Approximate Chi Square Value (0.05)		20.57
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		19.02
123												
124						Assuming Gamma Distribution						
125					95% Approximate Gamma UCL (use when n>=50))	740.2				95% Adjusted Gamma UCL (use when n<50)		800.4
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.859	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.28	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
132						Data appear Approximate Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	4.779				Mean of logged Data		5.869
136					Maximum of Logged Data	7.576				SD of logged Data		0.687
137												
138						Assuming Lognormal Distribution						
139					95% H-UCL	761.8				90% Chebyshev (MVUE) UCL		717.9
140					95% Chebyshev (MVUE) UCL	845.2				97.5% Chebyshev (MVUE) UCL		1022
141					99% Chebyshev (MVUE) UCL	1369						
142												
143						Nonparametric Distribution Free UCL Statistics						
144						Data appear to follow a Discernible Distribution at 5% Significance Level						
145												
146						Nonparametric Distribution Free UCLs						
147					95% CLT UCL	715.8				95% Jackknife UCL		741.2
148					95% Standard Bootstrap UCL	697.8				95% Bootstrap-t UCL		1435
149					95% Hall's Bootstrap UCL	1878				95% Percentile Bootstrap UCL		752.7
150					95% BCA Bootstrap UCL	831						
151					90% Chebyshev(Mean, Sd) UCL	921				95% Chebyshev(Mean, Sd) UCL		1127
152					97.5% Chebyshev(Mean, Sd) UCL	1413				99% Chebyshev(Mean, Sd) UCL		1974
153												
154						Suggested UCL to Use						
155					95% Chebyshev (Mean, Sd) UCL	1127						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											

	A	B	C	D	E	F	G	H	I	J	K	L
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Molybdenum**											
164												
165	**General Statistics**											
166	Total Number of Observations					11	Number of Distinct Observations					4
167							Number of Missing Observations					0
168	Minimum					0.31	Mean					8.846
169	Maximum					43	Median					3
170	SD					14	Std. Error of Mean					4.221
171	Coefficient of Variation					1.583	Skewness					2.097
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.551	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.48	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					16.5	95% Adjusted-CLT UCL (Chen-1995)					18.64
183							95% Modified-t UCL (Johnson-1978)					16.94
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					2.03	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.765	Data Not Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.459	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.265	Data Not Gamma Distributed at 5% Significance Level					
190	**Data Not Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					0.72	k star (bias corrected MLE)					0.584
194	Theta hat (MLE)					12.29	Theta star (bias corrected MLE)					15.15
195	nu hat (MLE)					15.84	nu star (bias corrected)					12.85
196	MLE Mean (bias corrected)					8.846	MLE Sd (bias corrected)					11.58
197							Approximate Chi Square Value (0.05)					5.792
198	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					5.04
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					19.63	95% Adjusted Gamma UCL (use when n<50)					22.55
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.736	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.85	Data Not Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.393	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.267	Data Not Lognormal at 5% Significance Level					
208	**Data Not Lognormal at 5% Significance Level**											
209												
210	**Lognormal Statistics**											
211	Minimum of Logged Data					-1.171	Mean of logged Data					1.344
212	Maximum of Logged Data					3.761	SD of logged Data					1.299

	A	B	C	D	E	F	G	H	I	J	K	L
213												
214					Assuming Lognormal Distribution							
215					95% H-UCL	39.18			90% Chebyshev (MVUE) UCL			17.89
216					95% Chebyshev (MVUE) UCL	22.42			97.5% Chebyshev (MVUE) UCL			28.69
217					99% Chebyshev (MVUE) UCL	41.02						
218												
219					Nonparametric Distribution Free UCL Statistics							
220					Data do not follow a Discernible Distribution (0.05)							
221												
222					Nonparametric Distribution Free UCLs							
223					95% CLT UCL	15.79			95% Jackknife UCL			16.5
224					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
225					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
226					95% BCA Bootstrap UCL	N/A						
227					90% Chebyshev(Mean, Sd) UCL	21.51			95% Chebyshev(Mean, Sd) UCL			27.25
228					97.5% Chebyshev(Mean, Sd) UCL	35.21			99% Chebyshev(Mean, Sd) UCL			50.85
229												
230					Suggested UCL to Use							
231					95% Chebyshev (Mean, Sd) UCL	27.25						
232												
233					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
234					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
235					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
236					For additional insight the user may want to consult a statistician.							
237												
238												
239	Vanadium											
240												
241					General Statistics							
242					Total Number of Observations	11			Number of Distinct Observations			11
243									Number of Missing Observations			0
244					Minimum	70			Mean			105.6
245					Maximum	145			Median			108
246					SD	23.56			Std. Error of Mean			7.105
247					Coefficient of Variation	0.223			Skewness			0.229
248												
249					Normal GOF Test							
250					Shapiro Wilk Test Statistic	0.967			Shapiro Wilk GOF Test			
251					5% Shapiro Wilk Critical Value	0.85			Data appear Normal at 5% Significance Level			
252					Lilliefors Test Statistic	0.133			Lilliefors GOF Test			
253					5% Lilliefors Critical Value	0.267			Data appear Normal at 5% Significance Level			
254					Data appear Normal at 5% Significance Level							
255												
256					Assuming Normal Distribution							
257					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
258					95% Student's-t UCL	118.5			95% Adjusted-CLT UCL (Chen-1995)			117.8
259									95% Modified-t UCL (Johnson-1978)			118.6
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Gamma GOF Test**											
262					A-D Test Statistic	0.186	**Anderson-Darling Gamma GOF Test**					
263					5% A-D Critical Value	0.729	Detected data appear Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.115	**Kolmogrov-Smirnoff Gamma GOF Test**					
265					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
266	**Detected data appear Gamma Distributed at 5% Significance Level**											
267												
268	**Gamma Statistics**											
269					k hat (MLE)	21.83	k star (bias corrected MLE)					15.93
270					Theta hat (MLE)	4.84	Theta star (bias corrected MLE)					6.629
271					nu hat (MLE)	480.2	nu star (bias corrected)					350.6
272					MLE Mean (bias corrected)	105.6	MLE Sd (bias corrected)					26.46
273							Approximate Chi Square Value (0.05)					308.2
274					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					301.7
275												
276	**Assuming Gamma Distribution**											
277					95% Approximate Gamma UCL (use when n>=50))	120.2	95% Adjusted Gamma UCL (use when n<50)					122.7
278												
279	**Lognormal GOF Test**											
280					Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk Lognormal GOF Test**					
281					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.124	**Lilliefors Lognormal GOF Test**					
283					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
284	**Data appear Lognormal at 5% Significance Level**											
285												
286	**Lognormal Statistics**											
287					Minimum of Logged Data	4.248	Mean of logged Data					4.637
288					Maximum of Logged Data	4.977	SD of logged Data					0.227
289												
290	**Assuming Lognormal Distribution**											
291					95% H-UCL	121.2	90% Chebyshev (MVUE) UCL					127.5
292					95% Chebyshev (MVUE) UCL	137.3	97.5% Chebyshev (MVUE) UCL					151.1
293					99% Chebyshev (MVUE) UCL	178						
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
297												
298	**Nonparametric Distribution Free UCLs**											
299					95% CLT UCL	117.3	95% Jackknife UCL					118.5
300					95% Standard Bootstrap UCL	116.7	95% Bootstrap-t UCL					119.8
301					95% Hall's Bootstrap UCL	119	95% Percentile Bootstrap UCL					117.4
302					95% BCA Bootstrap UCL	117.1						
303					90% Chebyshev(Mean, Sd) UCL	127	95% Chebyshev(Mean, Sd) UCL					136.6
304					97.5% Chebyshev(Mean, Sd) UCL	150	99% Chebyshev(Mean, Sd) UCL					176.3
305												
306	**Suggested UCL to Use**											
307					95% Student's-t UCL	118.5						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											
313												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 7:05:51 PM								
5	From File			EPC_013Surf_EU14.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	PAH, Total											
12												
13	General Statistics											
14	Total Number of Observations					11	Number of Distinct Observations					1
15							Number of Missing Observations					0
16	Minimum					0.0327	Mean					0.0327
17	Maximum					0.0327	Median					0.0327
18												
19	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
20	ProUCL (or any other software) should not be used on such a data set!											
21	The data set for variable PAH, Total was not processed!											
22												
23	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
24	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
25												
26												
27												
28	PCB, Total											
29												
30	General Statistics											
31	Total Number of Observations					11	Number of Distinct Observations					2
32							Number of Missing Observations					0
33	Minimum					0.22	Mean					4.565
34	Maximum					5	Median					5
35	SD					1.441	Std. Error of Mean					0.435
36	Coefficient of Variation					0.316	Skewness					-3.317
37												
38	Normal GOF Test											
39	Shapiro Wilk Test Statistic					0.345	Shapiro Wilk GOF Test					
40	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
41	Lilliefors Test Statistic					0.528	Lilliefors GOF Test					
42	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
43	Data Not Normal at 5% Significance Level											
44												
45	Assuming Normal Distribution											
46	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
47	95% Student's-t UCL					5.353	95% Adjusted-CLT UCL (Chen-1995)					4.816
48							95% Modified-t UCL (Johnson-1978)					5.281
49												
50	Gamma GOF Test											
51	A-D Test Statistic					3.793	Anderson-Darling Gamma GOF Test					
52	5% A-D Critical Value					0.735	Data Not Gamma Distributed at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
53					K-S Test Statistic	0.547	**Kolmogrov-Smirnoff Gamma GOF Test**					
54					5% K-S Critical Value	0.257	Data Not Gamma Distributed at 5% Significance Level					
55	**Data Not Gamma Distributed at 5% Significance Level**											
56												
57	**Gamma Statistics**											
58					k hat (MLE)	2.745				k star (bias corrected MLE)		2.057
59					Theta hat (MLE)	1.663				Theta star (bias corrected MLE)		2.219
60					nu hat (MLE)	60.4				nu star (bias corrected)		45.26
61					MLE Mean (bias corrected)	4.565				MLE Sd (bias corrected)		3.183
62										Approximate Chi Square Value (0.05)		30.83
63					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		28.9
64												
65	**Assuming Gamma Distribution**											
66					95% Approximate Gamma UCL (use when n>=50))	6.703				95% Adjusted Gamma UCL (use when n<50)		7.151
67												
68	**Lognormal GOF Test**											
69					Shapiro Wilk Test Statistic	0.345	**Shapiro Wilk Lognormal GOF Test**					
70					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
71					Lilliefors Test Statistic	0.528	**Lilliefors Lognormal GOF Test**					
72					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
73	**Data Not Lognormal at 5% Significance Level**											
74												
75	**Lognormal Statistics**											
76					Minimum of Logged Data	-1.514				Mean of logged Data		1.325
77					Maximum of Logged Data	1.609				SD of logged Data		0.942
78												
79	**Assuming Lognormal Distribution**											
80					95% H-UCL	13.86				90% Chebyshev (MVUE) UCL		10.56
81					95% Chebyshev (MVUE) UCL	12.83				97.5% Chebyshev (MVUE) UCL		15.98
82					99% Chebyshev (MVUE) UCL	22.15						
83												
84	**Nonparametric Distribution Free UCL Statistics**											
85	**Data do not follow a Discernible Distribution (0.05)**											
86												
87	**Nonparametric Distribution Free UCLs**											
88					95% CLT UCL	5.28				95% Jackknife UCL		N/A
89					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
90					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
91					95% BCA Bootstrap UCL	N/A						
92					90% Chebyshev(Mean, Sd) UCL	5.869				95% Chebyshev(Mean, Sd) UCL		6.46
93					97.5% Chebyshev(Mean, Sd) UCL	7.279				99% Chebyshev(Mean, Sd) UCL		8.889
94												
95	**Suggested UCL to Use**											
96					95% Chebyshev (Mean, Sd) UCL	6.46						
97												
98	**Recommended UCL exceeds the maximum observation**											
99												
100	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
101	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
102	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
103	For additional insight the user may want to consult a statistician.											
104												

	A	B	C	D	E	F	G	H	I	J	K	L
105	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
106	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
107												
108												
109	Uranium-238											
110												
111	General Statistics											
112	Total Number of Observations					11	Number of Distinct Observations					1
113							Number of Missing Observations					0
114	Minimum					2.07	Mean					2.07
115	Maximum					2.07	Median					2.07
116												
117	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
118	ProUCL (or any other software) should not be used on such a data set!											
119	The data set for variable Uranium-238 was not processed!											
120												
121	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
122	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
123												
124												
125												
126	Vanadium											
127												
128	General Statistics											
129	Total Number of Observations					11	Number of Distinct Observations					11
130							Number of Missing Observations					0
131	Minimum					75	Mean					108.7
132	Maximum					158	Median					105
133	SD					24.99	Std. Error of Mean					7.534
134	Coefficient of Variation					0.23	Skewness					0.551
135												
136	Normal GOF Test											
137	Shapiro Wilk Test Statistic					0.958	Shapiro Wilk GOF Test					
138	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
139	Lilliefors Test Statistic					0.144	Lilliefors GOF Test					
140	5% Lilliefors Critical Value					0.267	Data appear Normal at 5% Significance Level					
141	Data appear Normal at 5% Significance Level											
142												
143	Assuming Normal Distribution											
144	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
145	95% Student's-t UCL					122.4	95% Adjusted-CLT UCL (Chen-1995)					122.5
146							95% Modified-t UCL (Johnson-1978)					122.6
147												
148	Gamma GOF Test											
149	A-D Test Statistic					0.193	Anderson-Darling Gamma GOF Test					
150	5% A-D Critical Value					0.729	Detected data appear Gamma Distributed at 5% Significance Level					
151	K-S Test Statistic					0.115	Kolmogrov-Smirnoff Gamma GOF Test					
152	5% K-S Critical Value					0.255	Detected data appear Gamma Distributed at 5% Significance Level					
153	Detected data appear Gamma Distributed at 5% Significance Level											
154												
155	Gamma Statistics											
156	k hat (MLE)					21.25	k star (bias corrected MLE)					15.51

	A	B	C	D	E	F	G	H	I	J	K	L
157					Theta hat (MLE)	5.117				Theta star (bias corrected MLE)		7.008
158					nu hat (MLE)	467.5				nu star (bias corrected)		341.3
159					MLE Mean (bias corrected)	108.7				MLE Sd (bias corrected)		27.6
160										Approximate Chi Square Value (0.05)		299.5
161					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		293.1
162												
163					**Assuming Gamma Distribution**							
164					95% Approximate Gamma UCL (use when n>=50))	123.9				95% Adjusted Gamma UCL (use when n<50)		126.6
165												
166					**Lognormal GOF Test**							
167					Shapiro Wilk Test Statistic	0.968				**Shapiro Wilk Lognormal GOF Test**		
168					5% Shapiro Wilk Critical Value	0.85				Data appear Lognormal at 5% Significance Level		
169					Lilliefors Test Statistic	0.114				**Lilliefors Lognormal GOF Test**		
170					5% Lilliefors Critical Value	0.267				Data appear Lognormal at 5% Significance Level		
171					**Data appear Lognormal at 5% Significance Level**							
172												
173					**Lognormal Statistics**							
174					Minimum of Logged Data	4.317				Mean of logged Data		4.665
175					Maximum of Logged Data	5.063				SD of logged Data		0.228
176												
177					**Assuming Lognormal Distribution**							
178					95% H-UCL	124.9				90% Chebyshev (MVUE) UCL		131.3
179					95% Chebyshev (MVUE) UCL	141.5				97.5% Chebyshev (MVUE) UCL		155.7
180					99% Chebyshev (MVUE) UCL	183.6						
181												
182					**Nonparametric Distribution Free UCL Statistics**							
183					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
184												
185					**Nonparametric Distribution Free UCLs**							
186					95% CLT UCL	121.1				95% Jackknife UCL		122.4
187					95% Standard Bootstrap UCL	120.7				95% Bootstrap-t UCL		124.8
188					95% Hall's Bootstrap UCL	127.1				95% Percentile Bootstrap UCL		120.8
189					95% BCA Bootstrap UCL	121.9						
190					90% Chebyshev(Mean, Sd) UCL	131.3				95% Chebyshev(Mean, Sd) UCL		141.6
191					97.5% Chebyshev(Mean, Sd) UCL	155.8				99% Chebyshev(Mean, Sd) UCL		183.7
192												
193					**Suggested UCL to Use**							
194					95% Student's-t UCL	122.4						
195												
196					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
197					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
198					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
199					For additional insight the user may want to consult a statistician.							
200												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 1:49:25 PM								
5	From File			EPC_015Sub_EU01.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	30				Mean		92.16
17					Maximum	135				Median		99.66
18					SD	30.92				Std. Error of Mean		8.927
19					Coefficient of Variation	0.336				Skewness		-0.912
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.918				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.172				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	108.2				95% Adjusted-CLT UCL (Chen-1995)		104.3
31										95% Modified-t UCL (Johnson-1978)		107.8
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.847				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.232				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	6.843				k star (bias corrected MLE)		5.188
42					Theta hat (MLE)	13.47				Theta star (bias corrected MLE)		17.76
43					nu hat (MLE)	164.2				nu star (bias corrected)		124.5
44					MLE Mean (bias corrected)	92.16				MLE Sd (bias corrected)		40.46
45										Approximate Chi Square Value (0.05)		99.74
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		96.36
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	115.1				95% Adjusted Gamma UCL (use when n<50)		119.1
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.802				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.266				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	3.401				Mean of logged Data		4.449
60					Maximum of Logged Data	4.905				SD of logged Data		0.447
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	125.1				90% Chebyshev (MVUE) UCL		130.7
64					95% Chebyshev (MVUE) UCL	147.4				97.5% Chebyshev (MVUE) UCL		170.7
65					99% Chebyshev (MVUE) UCL	216.4						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	106.8				95% Jackknife UCL		108.2
72					95% Standard Bootstrap UCL	106.2				95% Bootstrap-t UCL		105.8
73					95% Hall's Bootstrap UCL	104.6				95% Percentile Bootstrap UCL		106.1
74					95% BCA Bootstrap UCL	104.6						
75					90% Chebyshev(Mean, Sd) UCL	118.9				95% Chebyshev(Mean, Sd) UCL		131.1
76					97.5% Chebyshev(Mean, Sd) UCL	147.9				99% Chebyshev(Mean, Sd) UCL		181
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	108.2						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												

	A	B	C	D	E	F	G	H	I	J	K	L
90	Arsenic											
91												
92						General Statistics						
93					Total Number of Observations	12				Number of Distinct Observations		11
94										Number of Missing Observations		0
95					Minimum	7.35				Mean		11.48
96					Maximum	20.04				Median		11
97					SD	3.246				Std. Error of Mean		0.937
98					Coefficient of Variation	0.283				Skewness		1.598
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.839				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.204				Lilliefors GOF Test		
104					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
105						Data appear Approximate Normal at 5% Significance Level						
106												
107						Assuming Normal Distribution						
108					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
109					95% Student's-t UCL	13.16				95% Adjusted-CLT UCL (Chen-1995)		13.48
110										95% Modified-t UCL (Johnson-1978)		13.23
111												
112						Gamma GOF Test						
113					A-D Test Statistic	0.565				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.167				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
117						Detected data appear Gamma Distributed at 5% Significance Level						
118												
119						Gamma Statistics						
120					k hat (MLE)	15.57				k star (bias corrected MLE)		11.73
121					Theta hat (MLE)	0.737				Theta star (bias corrected MLE)		0.978
122					nu hat (MLE)	373.7				nu star (bias corrected)		281.6
123					MLE Mean (bias corrected)	11.48				MLE Sd (bias corrected)		3.35
124										Approximate Chi Square Value (0.05)		243.7
125					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		238.4
126												
127						Assuming Gamma Distribution						
128					95% Approximate Gamma UCL (use when n>=50))	13.26				95% Adjusted Gamma UCL (use when n<50)		13.56
129												
130						Lognormal GOF Test						
131					Shapiro Wilk Test Statistic	0.913				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.184				Lilliefors Lognormal GOF Test		
134					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
135						Data appear Lognormal at 5% Significance Level						
136												
137						Lognormal Statistics						
138					Minimum of Logged Data	1.995				Mean of logged Data		2.408
139					Maximum of Logged Data	2.998				SD of logged Data		0.261
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141	Assuming Lognormal Distribution											
142					95% H-UCL	13.34				90% Chebyshev (MVUE) UCL		14.07
143					95% Chebyshev (MVUE) UCL	15.25				97.5% Chebyshev (MVUE) UCL		16.88
144					99% Chebyshev (MVUE) UCL	20.1						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data appear to follow a Discernible Distribution at 5% Significance Level											
148												
149	Nonparametric Distribution Free UCLs											
150					95% CLT UCL	13.02				95% Jackknife UCL		13.16
151					95% Standard Bootstrap UCL	12.92				95% Bootstrap-t UCL		13.77
152					95% Hall's Bootstrap UCL	21.83				95% Percentile Bootstrap UCL		13.03
153					95% BCA Bootstrap UCL	13.45						
154					90% Chebyshev(Mean, Sd) UCL	14.29				95% Chebyshev(Mean, Sd) UCL		15.56
155					97.5% Chebyshev(Mean, Sd) UCL	17.33				99% Chebyshev(Mean, Sd) UCL		20.8
156												
157	Suggested UCL to Use											
158					95% Student's-t UCL	13.16						
159												
160	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
161	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
162	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
163	For additional insight the user may want to consult a statistician.											
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Cadmium											
167												
168						General Statistics						
169					Total Number of Observations	12				Number of Distinct Observations		9
170										Number of Missing Observations		0
171					Minimum	0.11				Mean		8.083
172					Maximum	16.74				Median		12
173					SD	6.64				Std. Error of Mean		1.917
174					Coefficient of Variation	0.821				Skewness		-0.248
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.802				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.306				Lilliefors GOF Test		
180					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
181						Data Not Normal at 5% Significance Level						
182												
183						Assuming Normal Distribution						
184					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
185					95% Student's-t UCL	11.53				95% Adjusted-CLT UCL (Chen-1995)		11.09
186										95% Modified-t UCL (Johnson-1978)		11.5
187												
188						Gamma GOF Test						
189					A-D Test Statistic	1.268				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.774				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.356				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.257				Data Not Gamma Distributed at 5% Significance Level		
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	0.639				k star (bias corrected MLE)		0.535
197					Theta hat (MLE)	12.65				Theta star (bias corrected MLE)		15.11
198					nu hat (MLE)	15.34				nu star (bias corrected)		12.84
199					MLE Mean (bias corrected)	8.083				MLE Sd (bias corrected)		11.05
200										Approximate Chi Square Value (0.05)		5.782
201					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.078
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	17.94				95% Adjusted Gamma UCL (use when n<50)		20.43
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.775				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.339				Lilliefors Lognormal GOF Test		
210					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
211						Data Not Lognormal at 5% Significance Level						
212												
213						Lognormal Statistics						
214					Minimum of Logged Data	-2.207				Mean of logged Data		1.132
215					Maximum of Logged Data	2.818				SD of logged Data		1.954
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217					Assuming Lognormal Distribution							
218					95% H-UCL	366.6				90% Chebyshev (MVUE) UCL		42.17
219				95% Chebyshev (MVUE) UCL		54.54				97.5% Chebyshev (MVUE) UCL		71.7
220				99% Chebyshev (MVUE) UCL		105.4						
221												
222					Nonparametric Distribution Free UCL Statistics							
223					Data do not follow a Discernible Distribution (0.05)							
224												
225					Nonparametric Distribution Free UCLs							
226					95% CLT UCL	11.24				95% Jackknife UCL		11.53
227				95% Standard Bootstrap UCL		11.13				95% Bootstrap-t UCL		11.29
228				95% Hall's Bootstrap UCL		10.71				95% Percentile Bootstrap UCL		11.04
229				95% BCA Bootstrap UCL		11.08						
230				90% Chebyshev(Mean, Sd) UCL		13.83				95% Chebyshev(Mean, Sd) UCL		16.44
231				97.5% Chebyshev(Mean, Sd) UCL		20.05				99% Chebyshev(Mean, Sd) UCL		27.16
232												
233					Suggested UCL to Use							
234				99% Chebyshev (Mean, Sd) UCL		27.16						
235												
236					Recommended UCL exceeds the maximum observation							
237												
238					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
239					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
240					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
241					For additional insight the user may want to consult a statistician.							
242												
243					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
244					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
245												
246												

	A	B	C	D	E	F	G	H	I	J	K	L
247	Chromium											
248												
249					General Statistics							
250					Total Number of Observations	12			Number of Distinct Observations			8
251									Number of Missing Observations			0
252					Minimum	9.26			Mean			57.74
253					Maximum	85			Median			52.48
254					SD	26.5			Std. Error of Mean			7.651
255					Coefficient of Variation	0.459			Skewness			-0.275
256												
257					Normal GOF Test							
258					Shapiro Wilk Test Statistic	0.856			Shapiro Wilk GOF Test			
259					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
260					Lilliefors Test Statistic	0.265			Lilliefors GOF Test			
261					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
262					Data Not Normal at 5% Significance Level							
263												
264					Assuming Normal Distribution							
265					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
266					95% Student's-t UCL	71.48			95% Adjusted-CLT UCL (Chen-1995)			69.68
267									95% Modified-t UCL (Johnson-1978)			71.38
268												
269					Gamma GOF Test							
270					A-D Test Statistic	0.745			Anderson-Darling Gamma GOF Test			
271					5% A-D Critical Value	0.737			Data Not Gamma Distributed at 5% Significance Level			
272					K-S Test Statistic	0.247			Kolmogrov-Smirnoff Gamma GOF Test			
273					5% K-S Critical Value	0.247			Detected data appear Gamma Distributed at 5% Significance Level			
274					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
275												
276					Gamma Statistics							
277					k hat (MLE)	3.586			k star (bias corrected MLE)			2.745
278					Theta hat (MLE)	16.1			Theta star (bias corrected MLE)			21.03
279					nu hat (MLE)	86.07			nu star (bias corrected)			65.88
280					MLE Mean (bias corrected)	57.74			MLE Sd (bias corrected)			34.85
281									Approximate Chi Square Value (0.05)			48.21
282					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			45.91
283												
284					Assuming Gamma Distribution							
285					95% Approximate Gamma UCL (use when n>=50)	78.92			95% Adjusted Gamma UCL (use when n<50)			82.87
286												
287					Lognormal GOF Test							
288					Shapiro Wilk Test Statistic	0.793			Shapiro Wilk Lognormal GOF Test			
289					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
290					Lilliefors Test Statistic	0.211			Lilliefors Lognormal GOF Test			
291					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
292					Data appear Approximate Lognormal at 5% Significance Level							
293												
294					Lognormal Statistics							
295					Minimum of Logged Data	2.226			Mean of logged Data			3.91
296					Maximum of Logged Data	4.443			SD of logged Data			0.648
297												

	A	B	C	D	E	F	G	H	I	J	K	L
298	**Assuming Lognormal Distribution**											
299					95% H-UCL	97.14				90% Chebyshev (MVUE) UCL		95.39
300					95% Chebyshev (MVUE) UCL	111.3				97.5% Chebyshev (MVUE) UCL		133.3
301					99% Chebyshev (MVUE) UCL	176.6						
302												
303	**Nonparametric Distribution Free UCL Statistics**											
304	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
305												
306	**Nonparametric Distribution Free UCLs**											
307					95% CLT UCL	70.33				95% Jackknife UCL		71.48
308					95% Standard Bootstrap UCL	69.9				95% Bootstrap-t UCL		71.5
309					95% Hall's Bootstrap UCL	69.5				95% Percentile Bootstrap UCL		69.16
310					95% BCA Bootstrap UCL	69.68						
311					90% Chebyshev(Mean, Sd) UCL	80.69				95% Chebyshev(Mean, Sd) UCL		91.09
312					97.5% Chebyshev(Mean, Sd) UCL	105.5				99% Chebyshev(Mean, Sd) UCL		133.9
313												
314	**Suggested UCL to Use**											
315					95% Adjusted Gamma UCL	82.87						
316												
317	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
318	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
319	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
320	For additional insight the user may want to consult a statistician.											
321												
322	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
323	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
324												
325												

	A	B	C	D	E	F	G	H	I	J	K	L
326	Iron											
327												
328						General Statistics						
329					Total Number of Observations	12				Number of Distinct Observations		12
330										Number of Missing Observations		0
331					Minimum	19309				Mean		26667
332					Maximum	37400				Median		26235
333					SD	5876				Std. Error of Mean		1696
334					Coefficient of Variation	0.22				Skewness		0.826
335												
336						Normal GOF Test						
337					Shapiro Wilk Test Statistic	0.904				Shapiro Wilk GOF Test		
338					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
339					Lilliefors Test Statistic	0.154				Lilliefors GOF Test		
340					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
341						Data appear Normal at 5% Significance Level						
342												
343						Assuming Normal Distribution						
344					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
345					95% Student's-t UCL	29714				95% Adjusted-CLT UCL (Chen-1995)		29890
346										95% Modified-t UCL (Johnson-1978)		29781
347												
348						Gamma GOF Test						
349					A-D Test Statistic	0.367				Anderson-Darling Gamma GOF Test		
350					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
351					K-S Test Statistic	0.159				Kolmogrov-Smirnoff Gamma GOF Test		
352					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
353						Detected data appear Gamma Distributed at 5% Significance Level						
354												
355						Gamma Statistics						
356					k hat (MLE)	23.93				k star (bias corrected MLE)		18
357					Theta hat (MLE)	1114				Theta star (bias corrected MLE)		1481
358					nu hat (MLE)	574.3				nu star (bias corrected)		432
359					MLE Mean (bias corrected)	26667				MLE Sd (bias corrected)		6285
360										Approximate Chi Square Value (0.05)		384.8
361					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		378
362												
363						Assuming Gamma Distribution						
364					95% Approximate Gamma UCL (use when n>=50))	29937				95% Adjusted Gamma UCL (use when n<50)		30476
365												
366						Lognormal GOF Test						
367					Shapiro Wilk Test Statistic	0.939				Shapiro Wilk Lognormal GOF Test		
368					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
369					Lilliefors Test Statistic	0.147				Lilliefors Lognormal GOF Test		
370					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
371						Data appear Lognormal at 5% Significance Level						
372												
373						Lognormal Statistics						
374					Minimum of Logged Data	9.868				Mean of logged Data		10.17
375					Maximum of Logged Data	10.53				SD of logged Data		0.212
376												

	A	B	C	D	E	F	G	H	I	J	K	L
377	**Assuming Lognormal Distribution**											
378					95% H-UCL	30053				90% Chebyshev (MVUE) UCL		31560
379					95% Chebyshev (MVUE) UCL	33783				97.5% Chebyshev (MVUE) UCL		36869
380					99% Chebyshev (MVUE) UCL	42929						
381												
382	**Nonparametric Distribution Free UCL Statistics**											
383	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
384												
385	**Nonparametric Distribution Free UCLs**											
386					95% CLT UCL	29457				95% Jackknife UCL		29714
387					95% Standard Bootstrap UCL	29381				95% Bootstrap-t UCL		30638
388					95% Hall's Bootstrap UCL	31169				95% Percentile Bootstrap UCL		29449
389					95% BCA Bootstrap UCL	30038						
390					90% Chebyshev(Mean, Sd) UCL	31756				95% Chebyshev(Mean, Sd) UCL		34061
391					97.5% Chebyshev(Mean, Sd) UCL	37261				99% Chebyshev(Mean, Sd) UCL		43545
392												
393	**Suggested UCL to Use**											
394					95% Student's-t UCL	29714						
395												
396	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
397	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
398	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
399	For additional insight the user may want to consult a statistician.											
400												
401												

	A	B	C	D	E	F	G	H	I	J	K	L
402	Manganese											
403												
404					General Statistics							
405					Total Number of Observations	12				Number of Distinct Observations		12
406										Number of Missing Observations		0
407					Minimum	199.3				Mean		492.1
408					Maximum	832.7				Median		439.9
409					SD	210.7				Std. Error of Mean		60.82
410					Coefficient of Variation	0.428				Skewness		0.38
411												
412					Normal GOF Test							
413					Shapiro Wilk Test Statistic	0.922				Shapiro Wilk GOF Test		
414					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
415					Lilliefors Test Statistic	0.177				Lilliefors GOF Test		
416					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
417					Data appear Normal at 5% Significance Level							
418												
419					Assuming Normal Distribution							
420					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
421					95% Student's-t UCL	601.3				95% Adjusted-CLT UCL (Chen-1995)		599.2
422										95% Modified-t UCL (Johnson-1978)		602.4
423												
424					Gamma GOF Test							
425					A-D Test Statistic	0.357				Anderson-Darling Gamma GOF Test		
426					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
427					K-S Test Statistic	0.167				Kolmogrov-Smirnoff Gamma GOF Test		
428					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
429					Detected data appear Gamma Distributed at 5% Significance Level							
430												
431					Gamma Statistics							
432					k hat (MLE)	5.79				k star (bias corrected MLE)		4.398
433					Theta hat (MLE)	84.99				Theta star (bias corrected MLE)		111.9
434					nu hat (MLE)	139				nu star (bias corrected)		105.6
435					MLE Mean (bias corrected)	492.1				MLE Sd (bias corrected)		234.6
436										Approximate Chi Square Value (0.05)		82.84
437					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		79.78
438												
439					Assuming Gamma Distribution							
440					95% Approximate Gamma UCL (use when n>=50))	627				95% Adjusted Gamma UCL (use when n<50)		651.1
441												
442					Lognormal GOF Test							
443					Shapiro Wilk Test Statistic	0.945				Shapiro Wilk Lognormal GOF Test		
444					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
445					Lilliefors Test Statistic	0.145				Lilliefors Lognormal GOF Test		
446					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
447					Data appear Lognormal at 5% Significance Level							
448												
449					Lognormal Statistics							
450					Minimum of Logged Data	5.295				Mean of logged Data		6.11
451					Maximum of Logged Data	6.725				SD of logged Data		0.449
452												

	A	B	C	D	E	F	G	H	I	J	K	L
453	**Assuming Lognormal Distribution**											
454					95% H-UCL	659.6				90% Chebyshev (MVUE) UCL		688.8
455					95% Chebyshev (MVUE) UCL	777.4				97.5% Chebyshev (MVUE) UCL		900.2
456					99% Chebyshev (MVUE) UCL	1142						
457												
458	**Nonparametric Distribution Free UCL Statistics**											
459	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
460												
461	**Nonparametric Distribution Free UCLs**											
462					95% CLT UCL	592.1				95% Jackknife UCL		601.3
463					95% Standard Bootstrap UCL	588.2				95% Bootstrap-t UCL		617.7
464					95% Hall's Bootstrap UCL	584.8				95% Percentile Bootstrap UCL		591.8
465					95% BCA Bootstrap UCL	593.2						
466					90% Chebyshev(Mean, Sd) UCL	674.5				95% Chebyshev(Mean, Sd) UCL		757.2
467					97.5% Chebyshev(Mean, Sd) UCL	871.9				99% Chebyshev(Mean, Sd) UCL		1097
468												
469	**Suggested UCL to Use**											
470					95% Student's-t UCL	601.3						
471												
472	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
473	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
474	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
475	For additional insight the user may want to consult a statistician.											
476												
477												

	A	B	C	D	E	F	G	H	I	J	K	L
478	Nickel											
479												
480					General Statistics							
481					Total Number of Observations	12				Number of Distinct Observations		10
482										Number of Missing Observations		0
483					Minimum	60.51				Mean		103.2
484					Maximum	260.5				Median		83.77
485					SD	56.68				Std. Error of Mean		16.36
486					Coefficient of Variation	0.549				Skewness		2.242
487												
488					Normal GOF Test							
489					Shapiro Wilk Test Statistic	0.728				Shapiro Wilk GOF Test		
490					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
491					Lilliefors Test Statistic	0.262				Lilliefors GOF Test		
492					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
493					Data Not Normal at 5% Significance Level							
494												
495					Assuming Normal Distribution							
496					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
497					95% Student's-t UCL	132.6				95% Adjusted-CLT UCL (Chen-1995)		141.4
498										95% Modified-t UCL (Johnson-1978)		134.3
499												
500					Gamma GOF Test							
501					A-D Test Statistic	0.784				Anderson-Darling Gamma GOF Test		
502					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
503					K-S Test Statistic	0.234				Kolmogrov-Smirnoff Gamma GOF Test		
504					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
505					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
506												
507					Gamma Statistics							
508					k hat (MLE)	5.228				k star (bias corrected MLE)		3.976
509					Theta hat (MLE)	19.74				Theta star (bias corrected MLE)		25.95
510					nu hat (MLE)	125.5				nu star (bias corrected)		95.43
511					MLE Mean (bias corrected)	103.2				MLE Sd (bias corrected)		51.75
512										Approximate Chi Square Value (0.05)		73.9
513					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		71.01
514												
515					Assuming Gamma Distribution							
516					95% Approximate Gamma UCL (use when n>=50)	133.3				95% Adjusted Gamma UCL (use when n<50)		138.7
517												
518					Lognormal GOF Test							
519					Shapiro Wilk Test Statistic	0.868				Shapiro Wilk Lognormal GOF Test		
520					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
521					Lilliefors Test Statistic	0.207				Lilliefors Lognormal GOF Test		
522					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
523					Data appear Lognormal at 5% Significance Level							
524												
525					Lognormal Statistics							
526					Minimum of Logged Data	4.103				Mean of logged Data		4.538
527					Maximum of Logged Data	5.563				SD of logged Data		0.43
528												

	A	B	C	D	E	F	G	H	I	J	K	L
529					Assuming Lognormal Distribution							
530					95% H-UCL	133.9				90% Chebyshev (MVUE) UCL		140.3
531					95% Chebyshev (MVUE) UCL	157.7				97.5% Chebyshev (MVUE) UCL		182
532					99% Chebyshev (MVUE) UCL	229.6						
533												
534					Nonparametric Distribution Free UCL Statistics							
535					Data appear to follow a Discernible Distribution at 5% Significance Level							
536												
537					Nonparametric Distribution Free UCLs							
538					95% CLT UCL	130.1				95% Jackknife UCL		132.6
539					95% Standard Bootstrap UCL	129				95% Bootstrap-t UCL		168
540					95% Hall's Bootstrap UCL	245.2				95% Percentile Bootstrap UCL		132.3
541					95% BCA Bootstrap UCL	141						
542					90% Chebyshev(Mean, Sd) UCL	152.3				95% Chebyshev(Mean, Sd) UCL		174.5
543					97.5% Chebyshev(Mean, Sd) UCL	205.4				99% Chebyshev(Mean, Sd) UCL		266
544												
545					Suggested UCL to Use							
546					95% Adjusted Gamma UCL	138.7						
547												
548					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
549					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
550					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
551					For additional insight the user may want to consult a statistician.							
552												
553												

	A	B	C	D	E	F	G	H	I	J	K	L
554	PAH, Total											
555												
556						General Statistics						
557					Total Number of Observations	12				Number of Distinct Observations		5
558										Number of Missing Observations		0
559					Minimum	0.0078				Mean		0.678
560					Maximum	1.714				Median		0.678
561					SD	0.38				Std. Error of Mean		0.11
562					Coefficient of Variation	0.561				Skewness		1.587
563												
564						Normal GOF Test						
565					Shapiro Wilk Test Statistic	0.678				Shapiro Wilk GOF Test		
566					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
567					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
568					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
569						Data Not Normal at 5% Significance Level						
570												
571						Assuming Normal Distribution						
572					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
573					95% Student's-t UCL	0.875				95% Adjusted-CLT UCL (Chen-1995)		0.912
574										95% Modified-t UCL (Johnson-1978)		0.884
575												
576						Gamma GOF Test						
577					A-D Test Statistic	2.357				Anderson-Darling Gamma GOF Test		
578					5% A-D Critical Value	0.745				Data Not Gamma Distributed at 5% Significance Level		
579					K-S Test Statistic	0.371				Kolmogrov-Smirnoff Gamma GOF Test		
580					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
581						Data Not Gamma Distributed at 5% Significance Level						
582												
583						Gamma Statistics						
584					k hat (MLE)	1.586				k star (bias corrected MLE)		1.245
585					Theta hat (MLE)	0.428				Theta star (bias corrected MLE)		0.545
586					nu hat (MLE)	38.07				nu star (bias corrected)		29.88
587					MLE Mean (bias corrected)	0.678				MLE Sd (bias corrected)		0.608
588										Approximate Chi Square Value (0.05)		18.4
589					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		17.04
590												
591						Assuming Gamma Distribution						
592					95% Approximate Gamma UCL (use when n>=50))	1.101				95% Adjusted Gamma UCL (use when n<50)		1.189
593												
594						Lognormal GOF Test						
595					Shapiro Wilk Test Statistic	0.502				Shapiro Wilk Lognormal GOF Test		
596					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
597					Lilliefors Test Statistic	0.423				Lilliefors Lognormal GOF Test		
598					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
599						Data Not Lognormal at 5% Significance Level						
600												
601						Lognormal Statistics						
602					Minimum of Logged Data	-4.854				Mean of logged Data		-0.736
603					Maximum of Logged Data	0.539				SD of logged Data		1.333
604												

	A	B	C	D	E	F	G	H	I	J	K	L
605					Assuming Lognormal Distribution							
606					95% H-UCL	4.861				90% Chebyshev (MVUE) UCL		2.337
607				95% Chebyshev (MVUE) UCL		2.927				97.5% Chebyshev (MVUE) UCL		3.746
608				99% Chebyshev (MVUE) UCL		5.355						
609												
610					Nonparametric Distribution Free UCL Statistics							
611					Data do not follow a Discernible Distribution (0.05)							
612												
613					Nonparametric Distribution Free UCLs							
614					95% CLT UCL	0.859				95% Jackknife UCL		0.875
615				95% Standard Bootstrap UCL		0.856				95% Bootstrap-t UCL		0.935
616				95% Hall's Bootstrap UCL		1.945				95% Percentile Bootstrap UCL		0.866
617				95% BCA Bootstrap UCL		0.907						
618				90% Chebyshev(Mean, Sd) UCL		1.007				95% Chebyshev(Mean, Sd) UCL		1.156
619				97.5% Chebyshev(Mean, Sd) UCL		1.363				99% Chebyshev(Mean, Sd) UCL		1.77
620												
621					Suggested UCL to Use							
622				95% Chebyshev (Mean, Sd) UCL		1.156						
623												
624	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
625	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
626	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
627	For additional insight the user may want to consult a statistician.											
628												
629												

	A	B	C	D	E	F	G	H	I	J	K	L
630	Technetium-99											
631												
632						General Statistics						
633					Total Number of Observations	12				Number of Distinct Observations		5
634										Number of Missing Observations		0
635					Minimum	-0.02				Mean		46.52
636					Maximum	183				Median		46.52
637					SD	47.52				Std. Error of Mean		13.72
638					Coefficient of Variation	1.022				Skewness		2.297
639												
640						Normal GOF Test						
641					Shapiro Wilk Test Statistic	0.636				Shapiro Wilk GOF Test		
642					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
643					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
644					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
645						Data Not Normal at 5% Significance Level						
646												
647						Assuming Normal Distribution						
648					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
649					95% Student's-t UCL	71.15				95% Adjusted-CLT UCL (Chen-1995)		78.8
650										95% Modified-t UCL (Johnson-1978)		72.67
651						Gamma Statistics Not Available						
652						Lognormal Statistics Not Available						
653												
654						Nonparametric Distribution Free UCL Statistics						
655						Data do not follow a Discernible Distribution (0.05)						
656												
657						Nonparametric Distribution Free UCLs						
658					95% CLT UCL	69.08				95% Jackknife UCL		71.15
659					95% Standard Bootstrap UCL	68.44				95% Bootstrap-t UCL		84.96
660					95% Hall's Bootstrap UCL	173.5				95% Percentile Bootstrap UCL		69.26
661					95% BCA Bootstrap UCL	80.52						
662					90% Chebyshev(Mean, Sd) UCL	87.67				95% Chebyshev(Mean, Sd) UCL		106.3
663					97.5% Chebyshev(Mean, Sd) UCL	132.2				99% Chebyshev(Mean, Sd) UCL		183
664												
665						Suggested UCL to Use						
666					95% Chebyshev (Mean, Sd) UCL	106.3						
667												
668	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
669	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
670	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
671	For additional insight the user may want to consult a statistician.											
672												
673												

	A	B	C	D	E	F	G	H	I	J	K	L
674	Thallium											
675												
676					General Statistics							
677					Total Number of Observations	12				Number of Distinct Observations		6
678										Number of Missing Observations		0
679					Minimum	0.24				Mean		6.652
680					Maximum	16.5				Median		6.652
681					SD	5.124				Std. Error of Mean		1.479
682					Coefficient of Variation	0.77				Skewness		0.737
683												
684					Normal GOF Test							
685					Shapiro Wilk Test Statistic	0.807				Shapiro Wilk GOF Test		
686					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
687					Lilliefors Test Statistic	0.333				Lilliefors GOF Test		
688					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
689					Data Not Normal at 5% Significance Level							
690												
691					Assuming Normal Distribution							
692					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
693					95% Student's-t UCL	9.309				95% Adjusted-CLT UCL (Chen-1995)		9.421
694										95% Modified-t UCL (Johnson-1978)		9.361
695												
696					Gamma GOF Test							
697					A-D Test Statistic	1.347				Anderson-Darling Gamma GOF Test		
698					5% A-D Critical Value	0.756				Data Not Gamma Distributed at 5% Significance Level		
699					K-S Test Statistic	0.379				Kolmogrov-Smirnoff Gamma GOF Test		
700					5% K-S Critical Value	0.252				Data Not Gamma Distributed at 5% Significance Level		
701					Data Not Gamma Distributed at 5% Significance Level							
702												
703					Gamma Statistics							
704					k hat (MLE)	1.054				k star (bias corrected MLE)		0.846
705					Theta hat (MLE)	6.311				Theta star (bias corrected MLE)		7.862
706					nu hat (MLE)	25.3				nu star (bias corrected)		20.31
707					MLE Mean (bias corrected)	6.652				MLE Sd (bias corrected)		7.232
708										Approximate Chi Square Value (0.05)		11.08
709					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		10.05
710												
711					Assuming Gamma Distribution							
712					95% Approximate Gamma UCL (use when n>=50))	12.19				95% Adjusted Gamma UCL (use when n<50)		13.44
713												
714					Lognormal GOF Test							
715					Shapiro Wilk Test Statistic	0.754				Shapiro Wilk Lognormal GOF Test		
716					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
717					Lilliefors Test Statistic	0.402				Lilliefors Lognormal GOF Test		
718					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
719					Data Not Lognormal at 5% Significance Level							
720												
721					Lognormal Statistics							
722					Minimum of Logged Data	-1.427				Mean of logged Data		1.351
723					Maximum of Logged Data	2.803				SD of logged Data		1.392
724												

	A	B	C	D	E	F	G	H	I	J	K	L
725	Assuming Lognormal Distribution											
726					95% H-UCL	47.52				90% Chebyshev (MVUE) UCL		20.62
727					95% Chebyshev (MVUE) UCL	25.94				97.5% Chebyshev (MVUE) UCL		33.31
728					99% Chebyshev (MVUE) UCL	47.79						
729												
730	Nonparametric Distribution Free UCL Statistics											
731	Data do not follow a Discernible Distribution (0.05)											
732												
733	Nonparametric Distribution Free UCLs											
734					95% CLT UCL	9.085				95% Jackknife UCL		9.309
735					95% Standard Bootstrap UCL	8.934				95% Bootstrap-t UCL		10.12
736					95% Hall's Bootstrap UCL	12.3				95% Percentile Bootstrap UCL		9.022
737					95% BCA Bootstrap UCL	9.195						
738					90% Chebyshev(Mean, Sd) UCL	11.09				95% Chebyshev(Mean, Sd) UCL		13.1
739					97.5% Chebyshev(Mean, Sd) UCL	15.89				99% Chebyshev(Mean, Sd) UCL		21.37
740												
741	Suggested UCL to Use											
742					95% Chebyshev (Mean, Sd) UCL	13.1						
743												
744	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
745	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
746	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
747	For additional insight the user may want to consult a statistician.											
748												
749												

	A	B	C	D	E	F	G	H	I	J	K	L
750	Uranium											
751												
752					General Statistics							
753					Total Number of Observations	12				Number of Distinct Observations		10
754										Number of Missing Observations		0
755					Minimum	6.9				Mean		21.3
756					Maximum	45.33				Median		19.31
757					SD	13.64				Std. Error of Mean		3.937
758					Coefficient of Variation	0.64				Skewness		0.863
759												
760					Normal GOF Test							
761					Shapiro Wilk Test Statistic	0.847				Shapiro Wilk GOF Test		
762					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
763					Lilliefors Test Statistic	0.288				Lilliefors GOF Test		
764					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
765					Data Not Normal at 5% Significance Level							
766												
767					Assuming Normal Distribution							
768					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
769					95% Student's-t UCL	28.38				95% Adjusted-CLT UCL (Chen-1995)		28.83
770										95% Modified-t UCL (Johnson-1978)		28.54
771												
772					Gamma GOF Test							
773					A-D Test Statistic	0.499				Anderson-Darling Gamma GOF Test		
774					5% A-D Critical Value	0.74				Detected data appear Gamma Distributed at 5% Significance Level		
775					K-S Test Statistic	0.211				Kolmogrov-Smirnoff Gamma GOF Test		
776					5% K-S Critical Value	0.248				Detected data appear Gamma Distributed at 5% Significance Level		
777					Detected data appear Gamma Distributed at 5% Significance Level							
778												
779					Gamma Statistics							
780					k hat (MLE)	2.771				k star (bias corrected MLE)		2.134
781					Theta hat (MLE)	7.688				Theta star (bias corrected MLE)		9.984
782					nu hat (MLE)	66.5				nu star (bias corrected)		51.21
783					MLE Mean (bias corrected)	21.3				MLE Sd (bias corrected)		14.58
784										Approximate Chi Square Value (0.05)		35.78
785					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		33.82
786												
787					Assuming Gamma Distribution							
788					95% Approximate Gamma UCL (use when n>=50)	30.5				95% Adjusted Gamma UCL (use when n<50)		32.26
789												
790					Lognormal GOF Test							
791					Shapiro Wilk Test Statistic	0.915				Shapiro Wilk Lognormal GOF Test		
792					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
793					Lilliefors Test Statistic	0.173				Lilliefors Lognormal GOF Test		
794					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
795					Data appear Lognormal at 5% Significance Level							
796												
797					Lognormal Statistics							
798					Minimum of Logged Data	1.932				Mean of logged Data		2.868
799					Maximum of Logged Data	3.814				SD of logged Data		0.656
800												

	A	B	C	D	E	F	G	H	I	J	K	L
801					Assuming Lognormal Distribution							
802					95% H-UCL	34.7				90% Chebyshev (MVUE) UCL		33.95
803					95% Chebyshev (MVUE) UCL	39.65				97.5% Chebyshev (MVUE) UCL		47.57
804					99% Chebyshev (MVUE) UCL	63.11						
805												
806					Nonparametric Distribution Free UCL Statistics							
807					Data appear to follow a Discernible Distribution at 5% Significance Level							
808												
809					Nonparametric Distribution Free UCLs							
810					95% CLT UCL	27.78				95% Jackknife UCL		28.38
811					95% Standard Bootstrap UCL	27.38				95% Bootstrap-t UCL		30.04
812					95% Hall's Bootstrap UCL	27.87				95% Percentile Bootstrap UCL		27.65
813					95% BCA Bootstrap UCL	28.81						
814					90% Chebyshev(Mean, Sd) UCL	33.12				95% Chebyshev(Mean, Sd) UCL		38.47
815					97.5% Chebyshev(Mean, Sd) UCL	45.89				99% Chebyshev(Mean, Sd) UCL		60.48
816												
817					Suggested UCL to Use							
818					95% Adjusted Gamma UCL	32.26						
819												
820					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
821					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
822					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
823					For additional insight the user may want to consult a statistician.							
824												
825												

	A	B	C	D	E	F	G	H	I	J	K	L
826	Uranium-238											
827												
828						General Statistics						
829					Total Number of Observations	12				Number of Distinct Observations		5
830										Number of Missing Observations		0
831					Minimum	0.711				Mean		1.147
832					Maximum	1.85				Median		1.147
833					SD	0.285				Std. Error of Mean		0.0823
834					Coefficient of Variation	0.249				Skewness		0.89
835												
836						Normal GOF Test						
837					Shapiro Wilk Test Statistic	0.752				Shapiro Wilk GOF Test		
838					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
839					Lilliefors Test Statistic	0.333				Lilliefors GOF Test		
840					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
841						Data Not Normal at 5% Significance Level						
842												
843						Assuming Normal Distribution						
844					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
845					95% Student's-t UCL	1.295				95% Adjusted-CLT UCL (Chen-1995)		1.305
846										95% Modified-t UCL (Johnson-1978)		1.299
847												
848						Gamma GOF Test						
849					A-D Test Statistic	1.604				Anderson-Darling Gamma GOF Test		
850					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
851					K-S Test Statistic	0.365				Kolmogrov-Smirnoff Gamma GOF Test		
852					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
853						Data Not Gamma Distributed at 5% Significance Level						
854												
855						Gamma Statistics						
856					k hat (MLE)	17.99				k star (bias corrected MLE)		13.55
857					Theta hat (MLE)	0.0638				Theta star (bias corrected MLE)		0.0847
858					nu hat (MLE)	431.7				nu star (bias corrected)		325.1
859					MLE Mean (bias corrected)	1.147				MLE Sd (bias corrected)		0.312
860										Approximate Chi Square Value (0.05)		284.4
861					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		278.5
862												
863						Assuming Gamma Distribution						
864					95% Approximate Gamma UCL (use when n>=50))	1.312				95% Adjusted Gamma UCL (use when n<50)		1.339
865												
866						Lognormal GOF Test						
867					Shapiro Wilk Test Statistic	0.764				Shapiro Wilk Lognormal GOF Test		
868					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
869					Lilliefors Test Statistic	0.378				Lilliefors Lognormal GOF Test		
870					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
871						Data Not Lognormal at 5% Significance Level						
872												
873						Lognormal Statistics						
874					Minimum of Logged Data	-0.341				Mean of logged Data		0.109
875					Maximum of Logged Data	0.615				SD of logged Data		0.25
876												

	A	B	C	D	E	F	G	H	I	J	K	L
877					Assuming Lognormal Distribution							
878					95% H-UCL	1.326				90% Chebyshev (MVUE) UCL		1.397
879					95% Chebyshev (MVUE) UCL	1.51				97.5% Chebyshev (MVUE) UCL		1.667
880					99% Chebyshev (MVUE) UCL	1.976						
881												
882					Nonparametric Distribution Free UCL Statistics							
883					Data do not follow a Discernible Distribution (0.05)							
884												
885					Nonparametric Distribution Free UCLs							
886					95% CLT UCL	1.283				95% Jackknife UCL		1.295
887					95% Standard Bootstrap UCL	1.278				95% Bootstrap-t UCL		1.305
888					95% Hall's Bootstrap UCL	1.431				95% Percentile Bootstrap UCL		1.287
889					95% BCA Bootstrap UCL	1.301						
890					90% Chebyshev(Mean, Sd) UCL	1.394				95% Chebyshev(Mean, Sd) UCL		1.506
891					97.5% Chebyshev(Mean, Sd) UCL	1.661				99% Chebyshev(Mean, Sd) UCL		1.967
892												
893					Suggested UCL to Use							
894					95% Student's-t UCL	1.295				or 95% Modified-t UCL		1.299
895												
896	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
897	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
898	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
899	For additional insight the user may want to consult a statistician.											
900												
901												

	A	B	C	D	E	F	G	H	I	J	K	L
902	Vanadium											
903												
904						General Statistics						
905					Total Number of Observations	12				Number of Distinct Observations		7
906										Number of Missing Observations		0
907					Minimum	11.6				Mean		51.82
908					Maximum	83.44				Median		70
909					SD	25.59				Std. Error of Mean		7.388
910					Coefficient of Variation	0.494				Skewness		-0.438
911												
912						Normal GOF Test						
913					Shapiro Wilk Test Statistic	0.804				Shapiro Wilk GOF Test		
914					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
915					Lilliefors Test Statistic	0.345				Lilliefors GOF Test		
916					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
917						Data Not Normal at 5% Significance Level						
918												
919						Assuming Normal Distribution						
920					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
921					95% Student's-t UCL	65.09				95% Adjusted-CLT UCL (Chen-1995)		62.97
922										95% Modified-t UCL (Johnson-1978)		64.93
923												
924						Gamma GOF Test						
925					A-D Test Statistic	1.248				Anderson-Darling Gamma GOF Test		
926					5% A-D Critical Value	0.738				Data Not Gamma Distributed at 5% Significance Level		
927					K-S Test Statistic	0.357				Kolmogrov-Smirnoff Gamma GOF Test		
928					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
929						Data Not Gamma Distributed at 5% Significance Level						
930												
931						Gamma Statistics						
932					k hat (MLE)	3.257				k star (bias corrected MLE)		2.499
933					Theta hat (MLE)	15.91				Theta star (bias corrected MLE)		20.74
934					nu hat (MLE)	78.18				nu star (bias corrected)		59.97
935					MLE Mean (bias corrected)	51.82				MLE Sd (bias corrected)		32.78
936										Approximate Chi Square Value (0.05)		43.16
937					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		40.99
938												
939						Assuming Gamma Distribution						
940					95% Approximate Gamma UCL (use when n>=50))	72				95% Adjusted Gamma UCL (use when n<50)		75.81
941												
942						Lognormal GOF Test						
943					Shapiro Wilk Test Statistic	0.802				Shapiro Wilk Lognormal GOF Test		
944					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
945					Lilliefors Test Statistic	0.344				Lilliefors Lognormal GOF Test		
946					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
947						Data Not Lognormal at 5% Significance Level						
948												
949						Lognormal Statistics						
950					Minimum of Logged Data	2.451				Mean of logged Data		3.786
951					Maximum of Logged Data	4.424				SD of logged Data		0.653
952												

	A	B	C	D	E	F	G	H	I	J	K	L
953					Assuming Lognormal Distribution							
954					95% H-UCL	86.61				90% Chebyshev (MVUE) UCL		84.84
955				95% Chebyshev (MVUE) UCL		99.05				97.5% Chebyshev (MVUE) UCL		118.8
956				99% Chebyshev (MVUE) UCL		157.5						
957												
958					Nonparametric Distribution Free UCL Statistics							
959					Data do not follow a Discernible Distribution (0.05)							
960												
961					Nonparametric Distribution Free UCLs							
962					95% CLT UCL	63.97				95% Jackknife UCL		65.09
963				95% Standard Bootstrap UCL		63.7				95% Bootstrap-t UCL		64.68
964				95% Hall's Bootstrap UCL		62.01				95% Percentile Bootstrap UCL		63.45
965				95% BCA Bootstrap UCL		62.38						
966				90% Chebyshev(Mean, Sd) UCL		73.99				95% Chebyshev(Mean, Sd) UCL		84.03
967				97.5% Chebyshev(Mean, Sd) UCL		97.96				99% Chebyshev(Mean, Sd) UCL		125.3
968												
969					Suggested UCL to Use							
970				95% Chebyshev (Mean, Sd) UCL		84.03						
971												
972					Recommended UCL exceeds the maximum observation							
973												
974					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
975					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
976					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
977					For additional insight the user may want to consult a statistician.							
978												
979					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
980					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
981												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/3/2015 7:40:25 AM								
5	From File			EPC_015SubEU03R1.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Antimony**											
12												
13	**General Statistics**											
14	Total Number of Observations					12	Number of Distinct Observations					12
15							Number of Missing Observations					0
16	Minimum					63.94	Mean					96.05
17	Maximum					168.7	Median					78.22
18	SD					36.46	Std. Error of Mean					10.53
19	Coefficient of Variation					0.38	Skewness					1.189
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.819	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.25	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.256	Data appear Normal at 5% Significance Level					
26	**Data appear Approximate Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					115	95% Adjusted-CLT UCL (Chen-1995)					117.2
31							95% Modified-t UCL (Johnson-1978)					115.6
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.74	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.239	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.246	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					8.85	k star (bias corrected MLE)					6.693
42	Theta hat (MLE)					10.85	Theta star (bias corrected MLE)					14.35
43	nu hat (MLE)					212.4	nu star (bias corrected)					160.6
44	MLE Mean (bias corrected)					96.05	MLE Sd (bias corrected)					37.13
45							Approximate Chi Square Value (0.05)					132.3
46	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					128.4
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					116.6	95% Adjusted Gamma UCL (use when n<50)					120.1
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.871	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.221	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	4.158	Mean of logged Data					4.507
60					Maximum of Logged Data	5.128	SD of logged Data					0.343
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	117.8	90% Chebyshev (MVUE) UCL					124.4
64					95% Chebyshev (MVUE) UCL	137.4	97.5% Chebyshev (MVUE) UCL					155.4
65					99% Chebyshev (MVUE) UCL	190.9						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	113.4	95% Jackknife UCL					115
72					95% Standard Bootstrap UCL	112.4	95% Bootstrap-t UCL					124.7
73					95% Hall's Bootstrap UCL	121.2	95% Percentile Bootstrap UCL					114
74					95% BCA Bootstrap UCL	115.7						
75					90% Chebyshev(Mean, Sd) UCL	127.6	95% Chebyshev(Mean, Sd) UCL					141.9
76					97.5% Chebyshev(Mean, Sd) UCL	161.8	99% Chebyshev(Mean, Sd) UCL					200.8
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	115						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Arsenic**											
88												
89	**General Statistics**											
90					Total Number of Observations	12	Number of Distinct Observations					12
91							Number of Missing Observations					0
92					Minimum	5.98	Mean					21.67
93					Maximum	111.4	Median					14.45
94					SD	28.82	Std. Error of Mean					8.318
95					Coefficient of Variation	1.33	Skewness					3.223
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.511	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.415	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	36.61				95% Adjusted-CLT UCL (Chen-1995)		43.62
107										95% Modified-t UCL (Johnson-1978)		37.9
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	1.146	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.303	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.25	Data Not Gamma Distributed at 5% Significance Level					
114	**Data Not Gamma Distributed at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	1.435				k star (bias corrected MLE)		1.132
118					Theta hat (MLE)	15.09				Theta star (bias corrected MLE)		19.14
119					nu hat (MLE)	34.45				nu star (bias corrected)		27.17
120					MLE Mean (bias corrected)	21.67				MLE Sd (bias corrected)		20.36
121										Approximate Chi Square Value (0.05)		16.28
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		15.01
123												
124	**Assuming Gamma Distribution**											
125					95% Approximate Gamma UCL (use when n>=50))	36.15				95% Adjusted Gamma UCL (use when n<50)		39.22
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.859	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.225	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	1.788				Mean of logged Data		2.689
136					Maximum of Logged Data	4.713				SD of logged Data		0.784
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	36.51				90% Chebyshev (MVUE) UCL		33.21
140					95% Chebyshev (MVUE) UCL	39.47				97.5% Chebyshev (MVUE) UCL		48.17
141					99% Chebyshev (MVUE) UCL	65.24						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	35.35				95% Jackknife UCL		36.61
148					95% Standard Bootstrap UCL	34.61				95% Bootstrap-t UCL		75.2
149					95% Hall's Bootstrap UCL	90.69				95% Percentile Bootstrap UCL		37.96
150					95% BCA Bootstrap UCL	45.94						
151					90% Chebyshev(Mean, Sd) UCL	46.62				95% Chebyshev(Mean, Sd) UCL		57.93
152					97.5% Chebyshev(Mean, Sd) UCL	73.62				99% Chebyshev(Mean, Sd) UCL		104.4
153												
154	**Suggested UCL to Use**											
155					95% H-UCL	36.51						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
163	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
164	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
165	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
166												
167												
168	**Cadmium**											
169												
170	**General Statistics**											
171	Total Number of Observations					12	Number of Distinct Observations					8
172							Number of Missing Observations					0
173	Minimum					1.62	Mean					10.93
174	Maximum					22.12	Median					12
175	SD					6.367	Std. Error of Mean					1.838
176	Coefficient of Variation					0.583	Skewness					-0.248
177												
178	**Normal GOF Test**											
179	Shapiro Wilk Test Statistic					0.855	**Shapiro Wilk GOF Test**					
180	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
181	Lilliefors Test Statistic					0.311	**Lilliefors GOF Test**					
182	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
183	**Data Not Normal at 5% Significance Level**											
184												
185	**Assuming Normal Distribution**											
186	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
187	95% Student's-t UCL					14.23	95% Adjusted-CLT UCL (Chen-1995)					13.81
188							95% Modified-t UCL (Johnson-1978)					14.21
189												
190	**Gamma GOF Test**											
191	A-D Test Statistic					1.538	**Anderson-Darling Gamma GOF Test**					
192	5% A-D Critical Value					0.743	Data Not Gamma Distributed at 5% Significance Level					
193	K-S Test Statistic					0.392	**Kolmogrov-Smirnoff Gamma GOF Test**					
194	5% K-S Critical Value					0.249	Data Not Gamma Distributed at 5% Significance Level					
195	**Data Not Gamma Distributed at 5% Significance Level**											
196												
197	**Gamma Statistics**											
198	k hat (MLE)					1.826	k star (bias corrected MLE)					1.425
199	Theta hat (MLE)					5.985	Theta star (bias corrected MLE)					7.669
200	nu hat (MLE)					43.83	nu star (bias corrected)					34.21
201	MLE Mean (bias corrected)					10.93	MLE Sd (bias corrected)					9.155
202							Approximate Chi Square Value (0.05)					21.83
203	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					20.33
204												
205	**Assuming Gamma Distribution**											
206	95% Approximate Gamma UCL (use when n>=50))					17.13	95% Adjusted Gamma UCL (use when n<50)					18.39
207												
208	**Lognormal GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
209					Shapiro Wilk Test Statistic	0.717	**Shapiro Wilk Lognormal GOF Test**					
210					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
211					Lilliefors Test Statistic	0.405	**Lilliefors Lognormal GOF Test**					
212					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
213	**Data Not Lognormal at 5% Significance Level**											
214												
215	**Lognormal Statistics**											
216					Minimum of Logged Data	0.482	Mean of logged Data					2.093
217					Maximum of Logged Data	3.096	SD of logged Data					0.963
218												
219	**Assuming Lognormal Distribution**											
220					95% H-UCL	29.48	90% Chebyshev (MVUE) UCL					23.14
221					95% Chebyshev (MVUE) UCL	28.07	97.5% Chebyshev (MVUE) UCL					34.92
222					99% Chebyshev (MVUE) UCL	48.36						
223												
224	**Nonparametric Distribution Free UCL Statistics**											
225	**Data do not follow a Discernible Distribution (0.05)**											
226												
227	**Nonparametric Distribution Free UCLs**											
228					95% CLT UCL	13.95	95% Jackknife UCL					14.23
229					95% Standard Bootstrap UCL	13.83	95% Bootstrap-t UCL					14.15
230					95% Hall's Bootstrap UCL	13.83	95% Percentile Bootstrap UCL					13.81
231					95% BCA Bootstrap UCL	13.68						
232					90% Chebyshev(Mean, Sd) UCL	16.44	95% Chebyshev(Mean, Sd) UCL					18.94
233					97.5% Chebyshev(Mean, Sd) UCL	22.41	99% Chebyshev(Mean, Sd) UCL					29.22
234												
235	**Suggested UCL to Use**											
236					95% Chebyshev (Mean, Sd) UCL	18.94						
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
241	For additional insight the user may want to consult a statistician.											
242												
243	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
244	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
245												
246												
247	**Chromium**											
248												
249	**General Statistics**											
250					Total Number of Observations	12	Number of Distinct Observations					11
251							Number of Missing Observations					0
252					Minimum	29.5	Mean					66.79
253					Maximum	119.1	Median					58.45
254					SD	28	Std. Error of Mean					8.082
255					Coefficient of Variation	0.419	Skewness					0.796
256												
257	**Normal GOF Test**											
258					Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**					
259					5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level					
260					Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					5% Lilliefors Critical Value	0.256	Data appear Normal at 5% Significance Level					
262	**Data appear Normal at 5% Significance Level**											
263												
264	**Assuming Normal Distribution**											
265	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
266					95% Student's-t UCL	81.3				95% Adjusted-CLT UCL (Chen-1995)		82.07
267										95% Modified-t UCL (Johnson-1978)		81.61
268												
269	**Gamma GOF Test**											
270					A-D Test Statistic	0.303	**Anderson-Darling Gamma GOF Test**					
271					5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level					
272					K-S Test Statistic	0.155	**Kolmogrov-Smirnoff Gamma GOF Test**					
273					5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level					
274	**Detected data appear Gamma Distributed at 5% Significance Level**											
275												
276	**Gamma Statistics**											
277					k hat (MLE)	6.546				k star (bias corrected MLE)		4.965
278					Theta hat (MLE)	10.2				Theta star (bias corrected MLE)		13.45
279					nu hat (MLE)	157.1				nu star (bias corrected)		119.2
280					MLE Mean (bias corrected)	66.79				MLE Sd (bias corrected)		29.97
281										Approximate Chi Square Value (0.05)		94.95
282					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		91.65
283												
284	**Assuming Gamma Distribution**											
285					95% Approximate Gamma UCL (use when n>=50))	83.81				95% Adjusted Gamma UCL (use when n<50)		86.82
286												
287	**Lognormal GOF Test**											
288					Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**					
289					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
290					Lilliefors Test Statistic	0.129	**Lilliefors Lognormal GOF Test**					
291					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
292	**Data appear Lognormal at 5% Significance Level**											
293												
294	**Lognormal Statistics**											
295					Minimum of Logged Data	3.384				Mean of logged Data		4.123
296					Maximum of Logged Data	4.78				SD of logged Data		0.414
297												
298	**Assuming Lognormal Distribution**											
299					95% H-UCL	86.77				90% Chebyshev (MVUE) UCL		91.08
300					95% Chebyshev (MVUE) UCL	102.1				97.5% Chebyshev (MVUE) UCL		117.4
301					99% Chebyshev (MVUE) UCL	147.4						
302												
303	**Nonparametric Distribution Free UCL Statistics**											
304	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
305												
306	**Nonparametric Distribution Free UCLs**											
307					95% CLT UCL	80.08				95% Jackknife UCL		81.3
308					95% Standard Bootstrap UCL	79.41				95% Bootstrap-t UCL		85.2
309					95% Hall's Bootstrap UCL	83.73				95% Percentile Bootstrap UCL		80.48
310					95% BCA Bootstrap UCL	80.89						
311					90% Chebyshev(Mean, Sd) UCL	91.03				95% Chebyshev(Mean, Sd) UCL		102
312					97.5% Chebyshev(Mean, Sd) UCL	117.3				99% Chebyshev(Mean, Sd) UCL		147.2

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314						**Suggested UCL to Use**						
315					95% Student's-t UCL	81.3						
316												
317					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
318					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
319					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
320					For additional insight the user may want to consult a statistician.							
321												
322												
323	**Cobalt**											
324												
325						**General Statistics**						
326					Total Number of Observations	12			Number of Distinct Observations			3
327									Number of Missing Observations			0
328					Minimum	7.4			Mean			20.75
329					Maximum	34.1			Median			20.75
330					SD	5.692			Std. Error of Mean			1.643
331					Coefficient of Variation	0.274			Skewness			8.068E-16
332												
333						**Normal GOF Test**						
334					Shapiro Wilk Test Statistic	0.6			**Shapiro Wilk GOF Test**			
335					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
336					Lilliefors Test Statistic	0.417			**Lilliefors GOF Test**			
337					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
338						**Data Not Normal at 5% Significance Level**						
339												
340						**Assuming Normal Distribution**						
341					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
342					95% Student's-t UCL	23.7			95% Adjusted-CLT UCL (Chen-1995)			23.45
343									95% Modified-t UCL (Johnson-1978)			23.7
344												
345						**Gamma GOF Test**						
346					A-D Test Statistic	2.797			**Anderson-Darling Gamma GOF Test**			
347					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
348					K-S Test Statistic	0.456			**Kolmogrov-Smirnoff Gamma GOF Test**			
349					5% K-S Critical Value	0.245			Data Not Gamma Distributed at 5% Significance Level			
350						**Data Not Gamma Distributed at 5% Significance Level**						
351												
352						**Gamma Statistics**						
353					k hat (MLE)	11.39			k star (bias corrected MLE)			8.601
354					Theta hat (MLE)	1.821			Theta star (bias corrected MLE)			2.413
355					nu hat (MLE)	273.4			nu star (bias corrected)			206.4
356					MLE Mean (bias corrected)	20.75			MLE Sd (bias corrected)			7.075
357									Approximate Chi Square Value (0.05)			174.2
358					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			169.7
359												
360						**Assuming Gamma Distribution**						
361					95% Approximate Gamma UCL (use when n>=50))	24.59			95% Adjusted Gamma UCL (use when n<50)			25.25
362												
363						**Lognormal GOF Test**						
364					Shapiro Wilk Test Statistic	0.544			**Shapiro Wilk Lognormal GOF Test**			

	A	B	C	D	E	F	G	H	I	J	K	L
365					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
366					Lilliefors Test Statistic	0.468	**Lilliefors Lognormal GOF Test**					
367					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
368	**Data Not Lognormal at 5% Significance Level**											
369												
370	**Lognormal Statistics**											
371					Minimum of Logged Data	2.001	Mean of logged Data					2.988
372					Maximum of Logged Data	3.529	SD of logged Data					0.342
373												
374	**Assuming Lognormal Distribution**											
375					95% H-UCL	25.77	90% Chebyshev (MVUE) UCL					27.21
376					95% Chebyshev (MVUE) UCL	30.05	97.5% Chebyshev (MVUE) UCL					33.99
377					99% Chebyshev (MVUE) UCL	41.74						
378												
379	**Nonparametric Distribution Free UCL Statistics**											
380	**Data do not follow a Discernible Distribution (0.05)**											
381												
382	**Nonparametric Distribution Free UCLs**											
383					95% CLT UCL	23.45	95% Jackknife UCL					23.7
384					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
385					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
386					95% BCA Bootstrap UCL	N/A						
387					90% Chebyshev(Mean, Sd) UCL	25.68	95% Chebyshev(Mean, Sd) UCL					27.91
388					97.5% Chebyshev(Mean, Sd) UCL	31.01	99% Chebyshev(Mean, Sd) UCL					37.1
389												
390	**Suggested UCL to Use**											
391					95% Student's-t UCL	23.7	or 95% Modified-t UCL					23.7
392												
393	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
394	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
395	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
396	For additional insight the user may want to consult a statistician.											
397												
398												
399	**Copper**											
400												
401	**General Statistics**											
402					Total Number of Observations	12	Number of Distinct Observations					12
403							Number of Missing Observations					0
404					Minimum	22.56	Mean					604.1
405					Maximum	4360	Median					288.2
406					SD	1199	Std. Error of Mean					346.2
407					Coefficient of Variation	1.985	Skewness					3.298
408												
409	**Normal GOF Test**											
410					Shapiro Wilk Test Statistic	0.477	**Shapiro Wilk GOF Test**					
411					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
412					Lilliefors Test Statistic	0.438	**Lilliefors GOF Test**					
413					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
414	**Data Not Normal at 5% Significance Level**											
415												
416	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
417	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
418					95% Student's-t UCL	1226				95% Adjusted-CLT UCL (Chen-1995)		1526
419										95% Modified-t UCL (Johnson-1978)		1281
420												
421	Gamma GOF Test											
422					A-D Test Statistic	0.733	Anderson-Darling Gamma GOF Test					
423					5% A-D Critical Value	0.778	Detected data appear Gamma Distributed at 5% Significance Level					
424					K-S Test Statistic	0.276	Kolmogrov-Smirnoff Gamma GOF Test					
425					5% K-S Critical Value	0.257	Data Not Gamma Distributed at 5% Significance Level					
426	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
427												
428	Gamma Statistics											
429					k hat (MLE)	0.586				k star (bias corrected MLE)		0.495
430					Theta hat (MLE)	1031				Theta star (bias corrected MLE)		1221
431					nu hat (MLE)	14.06				nu star (bias corrected)		11.88
432					MLE Mean (bias corrected)	604.1				MLE Sd (bias corrected)		858.8
433										Approximate Chi Square Value (0.05)		5.145
434					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		4.487
435												
436	Assuming Gamma Distribution											
437				95% Approximate Gamma UCL (use when n>=50)		1394				95% Adjusted Gamma UCL (use when n<50)		1599
438												
439	Lognormal GOF Test											
440					Shapiro Wilk Test Statistic	0.932	Shapiro Wilk Lognormal GOF Test					
441					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
442					Lilliefors Test Statistic	0.183	Lilliefors Lognormal GOF Test					
443					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
444	Data appear Lognormal at 5% Significance Level											
445												
446	Lognormal Statistics											
447					Minimum of Logged Data	3.116				Mean of logged Data		5.345
448					Maximum of Logged Data	8.38				SD of logged Data		1.515
449												
450	Assuming Lognormal Distribution											
451					95% H-UCL	3975				90% Chebyshev (MVUE) UCL		1361
452					95% Chebyshev (MVUE) UCL	1725				97.5% Chebyshev (MVUE) UCL		2230
453					99% Chebyshev (MVUE) UCL	3221						
454												
455	Nonparametric Distribution Free UCL Statistics											
456	Data appear to follow a Discernible Distribution at 5% Significance Level											
457												
458	Nonparametric Distribution Free UCLs											
459					95% CLT UCL	1173				95% Jackknife UCL		1226
460					95% Standard Bootstrap UCL	1156				95% Bootstrap-t UCL		3277
461					95% Hall's Bootstrap UCL	3563				95% Percentile Bootstrap UCL		1284
462					95% BCA Bootstrap UCL	1632						
463					90% Chebyshev(Mean, Sd) UCL	1643				95% Chebyshev(Mean, Sd) UCL		2113
464					97.5% Chebyshev(Mean, Sd) UCL	2766				99% Chebyshev(Mean, Sd) UCL		4048
465												
466	Suggested UCL to Use											
467					95% Adjusted Gamma UCL	1599						
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
470	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
471	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
472	For additional insight the user may want to consult a statistician.											
473												
474												
475	Iron											
476												
477	General Statistics											
478	Total Number of Observations					12	Number of Distinct Observations					12
479							Number of Missing Observations					0
480	Minimum					13418	Mean					40236
481	Maximum					171000	Median					25719
482	SD					43668	Std. Error of Mean					12606
483	Coefficient of Variation					1.085	Skewness					2.873
484												
485	Normal GOF Test											
486	Shapiro Wilk Test Statistic					0.58	Shapiro Wilk GOF Test					
487	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
488	Lilliefors Test Statistic					0.361	Lilliefors GOF Test					
489	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
490	Data Not Normal at 5% Significance Level											
491												
492	Assuming Normal Distribution											
493	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
494	95% Student's-t UCL					62875	95% Adjusted-CLT UCL (Chen-1995)					72143
495							95% Modified-t UCL (Johnson-1978)					64618
496												
497	Gamma GOF Test											
498	A-D Test Statistic					1.265	Anderson-Darling Gamma GOF Test					
499	5% A-D Critical Value					0.743	Data Not Gamma Distributed at 5% Significance Level					
500	K-S Test Statistic					0.336	Kolmogrov-Smirnoff Gamma GOF Test					
501	5% K-S Critical Value					0.249	Data Not Gamma Distributed at 5% Significance Level					
502	Data Not Gamma Distributed at 5% Significance Level											
503												
504	Gamma Statistics											
505	k hat (MLE)					1.858	k star (bias corrected MLE)					1.449
506	Theta hat (MLE)					21658	Theta star (bias corrected MLE)					27770
507	nu hat (MLE)					44.59	nu star (bias corrected)					34.77
508	MLE Mean (bias corrected)					40236	MLE Sd (bias corrected)					33427
509							Approximate Chi Square Value (0.05)					22.28
510	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					20.77
511												
512	Assuming Gamma Distribution											
513	95% Approximate Gamma UCL (use when n>=50))					62789	95% Adjusted Gamma UCL (use when n<50)					67370
514												
515	Lognormal GOF Test											
516	Shapiro Wilk Test Statistic					0.842	Shapiro Wilk Lognormal GOF Test					
517	5% Shapiro Wilk Critical Value					0.859	Data Not Lognormal at 5% Significance Level					
518	Lilliefors Test Statistic					0.292	Lilliefors Lognormal GOF Test					
519	5% Lilliefors Critical Value					0.256	Data Not Lognormal at 5% Significance Level					
520	Data Not Lognormal at 5% Significance Level											

521												
522	**Lognormal Statistics**											
523					Minimum of Logged Data	9.504				Mean of logged Data		10.31
524					Maximum of Logged Data	12.05				SD of logged Data		0.694
525												
526	**Assuming Lognormal Distribution**											
527					95% H-UCL	63159				90% Chebyshev (MVUE) UCL		60638
528					95% Chebyshev (MVUE) UCL	71209				97.5% Chebyshev (MVUE) UCL		85880
529					99% Chebyshev (MVUE) UCL	114699						
530												
531	**Nonparametric Distribution Free UCL Statistics**											
532	**Data do not follow a Discernible Distribution (0.05)**											
533												
534	**Nonparametric Distribution Free UCLs**											
535					95% CLT UCL	60971				95% Jackknife UCL		62875
536					95% Standard Bootstrap UCL	60409				95% Bootstrap-t UCL		131384
537					95% Hall's Bootstrap UCL	140758				95% Percentile Bootstrap UCL		63868
538					95% BCA Bootstrap UCL	75017						
539					90% Chebyshev(Mean, Sd) UCL	78054				95% Chebyshev(Mean, Sd) UCL		95184
540					97.5% Chebyshev(Mean, Sd) UCL	118960				99% Chebyshev(Mean, Sd) UCL		165664
541												
542	**Suggested UCL to Use**											
543					95% Chebyshev (Mean, Sd) UCL	95184						
544												
545	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
546	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
547	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
548	For additional insight the user may want to consult a statistician.											
549												
550												
551	**Lead**											
552												
553	**General Statistics**											
554					Total Number of Observations	12				Number of Distinct Observations		12
555										Number of Missing Observations		0
556					Minimum	18.83				Mean		329.4
557					Maximum	1799				Median		140.6
558					SD	511.7				Std. Error of Mean		147.7
559					Coefficient of Variation	1.553				Skewness		2.583
560												
561	**Normal GOF Test**											
562					Shapiro Wilk Test Statistic	0.623				**Shapiro Wilk GOF Test**		
563					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
564					Lilliefors Test Statistic	0.353				**Lilliefors GOF Test**		
565					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
566	**Data Not Normal at 5% Significance Level**											
567												
568	**Assuming Normal Distribution**											
569					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
570					95% Student's-t UCL	594.7				95% Adjusted-CLT UCL (Chen-1995)		690.1
571										95% Modified-t UCL (Johnson-1978)		613
572												

	A	B	C	D	E	F	G	H	I	J	K	L
573	**Gamma GOF Test**											
574					A-D Test Statistic	0.523	**Anderson-Darling Gamma GOF Test**					
575					5% A-D Critical Value	0.767	Detected data appear Gamma Distributed at 5% Significance Level					
576					K-S Test Statistic	0.204	**Kolmogrov-Smirnoff Gamma GOF Test**					
577					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
578	**Detected data appear Gamma Distributed at 5% Significance Level**											
579												
580	**Gamma Statistics**											
581					k hat (MLE)	0.726			k star (bias corrected MLE)			0.6
582					Theta hat (MLE)	453.5			Theta star (bias corrected MLE)			548.7
583					nu hat (MLE)	17.43			nu star (bias corrected)			14.41
584					MLE Mean (bias corrected)	329.4			MLE Sd (bias corrected)			425.2
585									Approximate Chi Square Value (0.05)			6.851
586					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			6.073
587												
588	**Assuming Gamma Distribution**											
589					95% Approximate Gamma UCL (use when n>=50)	692.7			95% Adjusted Gamma UCL (use when n<50)			781.5
590												
591	**Lognormal GOF Test**											
592					Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**					
593					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
594					Lilliefors Test Statistic	0.123	**Lilliefors Lognormal GOF Test**					
595					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
596	**Data appear Lognormal at 5% Significance Level**											
597												
598	**Lognormal Statistics**											
599					Minimum of Logged Data	2.935			Mean of logged Data			4.97
600					Maximum of Logged Data	7.495			SD of logged Data			1.349
601												
602	**Assuming Lognormal Distribution**											
603					95% H-UCL	1536			90% Chebyshev (MVUE) UCL			719.3
604					95% Chebyshev (MVUE) UCL	901.8			97.5% Chebyshev (MVUE) UCL			1155
605					99% Chebyshev (MVUE) UCL	1653						
606												
607	**Nonparametric Distribution Free UCL Statistics**											
608	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
609												
610	**Nonparametric Distribution Free UCLs**											
611					95% CLT UCL	572.4			95% Jackknife UCL			594.7
612					95% Standard Bootstrap UCL	566			95% Bootstrap-t UCL			1455
613					95% Hall's Bootstrap UCL	1758			95% Percentile Bootstrap UCL			585.5
614					95% BCA Bootstrap UCL	716.6						
615					90% Chebyshev(Mean, Sd) UCL	772.5			95% Chebyshev(Mean, Sd) UCL			973.3
616					97.5% Chebyshev(Mean, Sd) UCL	1252			99% Chebyshev(Mean, Sd) UCL			1799
617												
618	**Suggested UCL to Use**											
619					95% Adjusted Gamma UCL	781.5						
620												
621	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
622	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
623	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
624	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
625												
626												
627	**Manganese**											
628												
629	**General Statistics**											
630					Total Number of Observations	12			Number of Distinct Observations			12
631									Number of Missing Observations			0
632					Minimum	366.6			Mean			765
633					Maximum	2850			Median			504.4
634					SD	677.2			Std. Error of Mean			195.5
635					Coefficient of Variation	0.885			Skewness			3.116
636												
637	**Normal GOF Test**											
638					Shapiro Wilk Test Statistic	0.537			**Shapiro Wilk GOF Test**			
639					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
640					Lilliefors Test Statistic	0.358			**Lilliefors GOF Test**			
641					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
642	**Data Not Normal at 5% Significance Level**											
643												
644	**Assuming Normal Distribution**											
645				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
646					95% Student's-t UCL	1116			95% Adjusted-CLT UCL (Chen-1995)			1275
647									95% Modified-t UCL (Johnson-1978)			1145
648												
649	**Gamma GOF Test**											
650					A-D Test Statistic	1.517			**Anderson-Darling Gamma GOF Test**			
651					5% A-D Critical Value	0.739			Data Not Gamma Distributed at 5% Significance Level			
652					K-S Test Statistic	0.291			**Kolmogrov-Smirnoff Gamma GOF Test**			
653					5% K-S Critical Value	0.248			Data Not Gamma Distributed at 5% Significance Level			
654	**Data Not Gamma Distributed at 5% Significance Level**											
655												
656	**Gamma Statistics**											
657					k hat (MLE)	2.855			k star (bias corrected MLE)			2.197
658					Theta hat (MLE)	268			Theta star (bias corrected MLE)			348.3
659					nu hat (MLE)	68.51			nu star (bias corrected)			52.72
660					MLE Mean (bias corrected)	765			MLE Sd (bias corrected)			516.2
661									Approximate Chi Square Value (0.05)			37.04
662					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			35.04
663												
664	**Assuming Gamma Distribution**											
665					95% Approximate Gamma UCL (use when n>=50))	1089			95% Adjusted Gamma UCL (use when n<50)			1151
666												
667	**Lognormal GOF Test**											
668					Shapiro Wilk Test Statistic	0.764			**Shapiro Wilk Lognormal GOF Test**			
669					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
670					Lilliefors Test Statistic	0.245			**Lilliefors Lognormal GOF Test**			
671					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
672	**Data appear Approximate Lognormal at 5% Significance Level**											
673												
674	**Lognormal Statistics**											
675					Minimum of Logged Data	5.904			Mean of logged Data			6.455
676					Maximum of Logged Data	7.955			SD of logged Data			0.542

	A	B	C	D	E	F	G	H	I	J	K	L
677												
678					Assuming Lognormal Distribution							
679					95% H-UCL	1053			90% Chebyshev (MVUE) UCL			1076
680				95% Chebyshev (MVUE) UCL		1235			97.5% Chebyshev (MVUE) UCL			1455
681				99% Chebyshev (MVUE) UCL		1887						
682												
683					Nonparametric Distribution Free UCL Statistics							
684					Data appear to follow a Discernible Distribution at 5% Significance Level							
685												
686					Nonparametric Distribution Free UCLs							
687					95% CLT UCL	1087			95% Jackknife UCL			1116
688				95% Standard Bootstrap UCL		1069			95% Bootstrap-t UCL			2185
689				95% Hall's Bootstrap UCL		2394			95% Percentile Bootstrap UCL			1115
690				95% BCA Bootstrap UCL		1305						
691				90% Chebyshev(Mean, Sd) UCL		1352			95% Chebyshev(Mean, Sd) UCL			1617
692				97.5% Chebyshev(Mean, Sd) UCL		1986			99% Chebyshev(Mean, Sd) UCL			2710
693												
694					Suggested UCL to Use							
695				95% Chebyshev (Mean, Sd) UCL		1617						
696												
697					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
698					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
699					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
700					For additional insight the user may want to consult a statistician.							
701												
702												
703	Mercury											
704												
705					General Statistics							
706				Total Number of Observations		12			Number of Distinct Observations			5
707									Number of Missing Observations			0
708				Minimum		0.0238			Mean			6.299
709				Maximum		12.23			Median			10
710				SD		5.054			Std. Error of Mean			1.459
711				Coefficient of Variation		0.802			Skewness			-0.389
712												
713					Normal GOF Test							
714				Shapiro Wilk Test Statistic		0.745			Shapiro Wilk GOF Test			
715				5% Shapiro Wilk Critical Value		0.859			Data Not Normal at 5% Significance Level			
716				Lilliefors Test Statistic		0.351			Lilliefors GOF Test			
717				5% Lilliefors Critical Value		0.256			Data Not Normal at 5% Significance Level			
718					Data Not Normal at 5% Significance Level							
719												
720					Assuming Normal Distribution							
721				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
722				95% Student's-t UCL		8.92			95% Adjusted-CLT UCL (Chen-1995)			8.524
723									95% Modified-t UCL (Johnson-1978)			8.892
724												
725					Gamma GOF Test							
726				A-D Test Statistic		1.61			Anderson-Darling Gamma GOF Test			
727				5% A-D Critical Value		0.78			Data Not Gamma Distributed at 5% Significance Level			
728				K-S Test Statistic		0.374			Kolmogrov-Smirnoff Gamma GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
729					5% K-S Critical Value	0.258	Data Not Gamma Distributed at 5% Significance Level					
730	**Data Not Gamma Distributed at 5% Significance Level**											
731												
732	**Gamma Statistics**											
733					k hat (MLE)	0.562				k star (bias corrected MLE)		0.477
734					Theta hat (MLE)	11.21				Theta star (bias corrected MLE)		13.21
735					nu hat (MLE)	13.49				nu star (bias corrected)		11.45
736					MLE Mean (bias corrected)	6.299				MLE Sd (bias corrected)		9.121
737										Approximate Chi Square Value (0.05)		4.866
738					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		4.23
739												
740	**Assuming Gamma Distribution**											
741					95% Approximate Gamma UCL (use when n>=50))	14.82				95% Adjusted Gamma UCL (use when n<50)		17.05
742												
743	**Lognormal GOF Test**											
744					Shapiro Wilk Test Statistic	0.747	**Shapiro Wilk Lognormal GOF Test**					
745					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
746					Lilliefors Test Statistic	0.343	**Lilliefors Lognormal GOF Test**					
747					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
748	**Data Not Lognormal at 5% Significance Level**											
749												
750	**Lognormal Statistics**											
751					Minimum of Logged Data	-3.738				Mean of logged Data		0.73
752					Maximum of Logged Data	2.504				SD of logged Data		2.225
753												
754	**Assuming Lognormal Distribution**											
755					95% H-UCL	956.9				90% Chebyshev (MVUE) UCL		45.87
756					95% Chebyshev (MVUE) UCL	59.84				97.5% Chebyshev (MVUE) UCL		79.23
757					99% Chebyshev (MVUE) UCL	117.3						
758												
759	**Nonparametric Distribution Free UCL Statistics**											
760	**Data do not follow a Discernible Distribution (0.05)**											
761												
762	**Nonparametric Distribution Free UCLs**											
763					95% CLT UCL	8.699				95% Jackknife UCL		8.92
764					95% Standard Bootstrap UCL	8.557				95% Bootstrap-t UCL		8.95
765					95% Hall's Bootstrap UCL	8.36				95% Percentile Bootstrap UCL		8.578
766					95% BCA Bootstrap UCL	8.304						
767					90% Chebyshev(Mean, Sd) UCL	10.68				95% Chebyshev(Mean, Sd) UCL		12.66
768					97.5% Chebyshev(Mean, Sd) UCL	15.41				99% Chebyshev(Mean, Sd) UCL		20.82
769												
770	**Suggested UCL to Use**											
771					99% Chebyshev (Mean, Sd) UCL	20.82						
772												
773	**Recommended UCL exceeds the maximum observation**											
774												
775	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
776	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
777	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
778	For additional insight the user may want to consult a statistician.											
779												
780	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											

	A	B	C	D	E	F	G	H	I	J	K	L
781	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
782												
783												
784	Neptunium-237											
785												
786	General Statistics											
787					Total Number of Observations	12				Number of Distinct Observations		6
788										Number of Missing Observations		0
789					Minimum	0.0127				Mean		0.996
790					Maximum	4.1				Median		0.996
791					SD	1.067				Std. Error of Mean		0.308
792					Coefficient of Variation	1.072				Skewness		2.434
793												
794	Normal GOF Test											
795					Shapiro Wilk Test Statistic	0.634				Shapiro Wilk GOF Test		
796					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
797					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
798					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
799	Data Not Normal at 5% Significance Level											
800												
801	Assuming Normal Distribution											
802					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
803					95% Student's-t UCL	1.549				95% Adjusted-CLT UCL (Chen-1995)		1.734
804										95% Modified-t UCL (Johnson-1978)		1.585
805												
806	Gamma GOF Test											
807					A-D Test Statistic	1.624				Anderson-Darling Gamma GOF Test		
808					5% A-D Critical Value	0.772				Data Not Gamma Distributed at 5% Significance Level		
809					K-S Test Statistic	0.354				Kolmogrov-Smirnoff Gamma GOF Test		
810					5% K-S Critical Value	0.256				Data Not Gamma Distributed at 5% Significance Level		
811	Data Not Gamma Distributed at 5% Significance Level											
812												
813	Gamma Statistics											
814					k hat (MLE)	0.668				k star (bias corrected MLE)		0.557
815					Theta hat (MLE)	1.489				Theta star (bias corrected MLE)		1.788
816					nu hat (MLE)	16.04				nu star (bias corrected)		13.37
817					MLE Mean (bias corrected)	0.996				MLE Sd (bias corrected)		1.334
818										Approximate Chi Square Value (0.05)		6.14
819					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.41
820												
821	Assuming Gamma Distribution											
822					95% Approximate Gamma UCL (use when n>=50))	2.167				95% Adjusted Gamma UCL (use when n<50)		2.46
823												
824	Lognormal GOF Test											
825					Shapiro Wilk Test Statistic	0.709				Shapiro Wilk Lognormal GOF Test		
826					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
827					Lilliefors Test Statistic	0.393				Lilliefors Lognormal GOF Test		
828					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
829	Data Not Lognormal at 5% Significance Level											
830												
831	Lognormal Statistics											
832					Minimum of Logged Data	-4.366				Mean of logged Data		-0.914

	A	B	C	D	E	F	G	H	I	J	K	L
833					Maximum of Logged Data	1.411					SD of logged Data	1.949
834												
835					Assuming Lognormal Distribution							
836					95% H-UCL	46.33					90% Chebyshev (MVUE) UCL	5.404
837					95% Chebyshev (MVUE) UCL	6.988					97.5% Chebyshev (MVUE) UCL	9.186
838					99% Chebyshev (MVUE) UCL	13.5						
839												
840					Nonparametric Distribution Free UCL Statistics							
841					Data do not follow a Discernible Distribution (0.05)							
842												
843					Nonparametric Distribution Free UCLs							
844					95% CLT UCL	1.502					95% Jackknife UCL	1.549
845					95% Standard Bootstrap UCL	1.466					95% Bootstrap-t UCL	1.909
846					95% Hall's Bootstrap UCL	3.782					95% Percentile Bootstrap UCL	1.526
847					95% BCA Bootstrap UCL	1.691						
848					90% Chebyshev(Mean, Sd) UCL	1.92					95% Chebyshev(Mean, Sd) UCL	2.338
849					97.5% Chebyshev(Mean, Sd) UCL	2.919					99% Chebyshev(Mean, Sd) UCL	4.061
850												
851					Suggested UCL to Use							
852					99% Chebyshev (Mean, Sd) UCL	4.061						
853												
854					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
855					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
856					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
857					For additional insight the user may want to consult a statistician.							
858												
859												
860	Nickel											
861												
862					General Statistics							
863					Total Number of Observations	12					Number of Distinct Observations	11
864											Number of Missing Observations	0
865					Minimum	63.2					Mean	401.5
866					Maximum	2410					Median	225.8
867					SD	644.8					Std. Error of Mean	186.1
868					Coefficient of Variation	1.606					Skewness	3.235
869												
870					Normal GOF Test							
871					Shapiro Wilk Test Statistic	0.508					Shapiro Wilk GOF Test	
872					5% Shapiro Wilk Critical Value	0.859					Data Not Normal at 5% Significance Level	
873					Lilliefors Test Statistic	0.386					Lilliefors GOF Test	
874					5% Lilliefors Critical Value	0.256					Data Not Normal at 5% Significance Level	
875					Data Not Normal at 5% Significance Level							
876												
877					Assuming Normal Distribution							
878					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
879					95% Student's-t UCL	735.7					95% Adjusted-CLT UCL (Chen-1995)	893.4
880											95% Modified-t UCL (Johnson-1978)	764.7
881												
882					Gamma GOF Test							
883					A-D Test Statistic	0.934					Anderson-Darling Gamma GOF Test	
884					5% A-D Critical Value	0.758					Data Not Gamma Distributed at 5% Significance Level	

	A	B	C	D	E	F	G	H	I	J	K	L
885					K-S Test Statistic	0.24	**Kolmogrov-Smirnoff Gamma GOF Test**					
886					5% K-S Critical Value	0.253	Detected data appear Gamma Distributed at 5% Significance Level					
887	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
888												
889	**Gamma Statistics**											
890					k hat (MLE)	0.972				k star (bias corrected MLE)		0.785
891					Theta hat (MLE)	413				Theta star (bias corrected MLE)		511.7
892					nu hat (MLE)	23.33				nu star (bias corrected)		18.83
893					MLE Mean (bias corrected)	401.5				MLE Sd (bias corrected)		453.3
894										Approximate Chi Square Value (0.05)		9.993
895					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		9.026
896												
897	**Assuming Gamma Distribution**											
898					95% Approximate Gamma UCL (use when n>=50)	756.5				95% Adjusted Gamma UCL (use when n<50)		837.6
899												
900	**Lognormal GOF Test**											
901					Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk Lognormal GOF Test**					
902					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
903					Lilliefors Test Statistic	0.159	**Lilliefors Lognormal GOF Test**					
904					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
905	**Data appear Lognormal at 5% Significance Level**											
906												
907	**Lognormal Statistics**											
908					Minimum of Logged Data	4.146				Mean of logged Data		5.399
909					Maximum of Logged Data	7.787				SD of logged Data		1.02
910												
911	**Assuming Lognormal Distribution**											
912					95% H-UCL	923				90% Chebyshev (MVUE) UCL		682.7
913					95% Chebyshev (MVUE) UCL	833.1				97.5% Chebyshev (MVUE) UCL		1042
914					99% Chebyshev (MVUE) UCL	1452						
915												
916	**Nonparametric Distribution Free UCL Statistics**											
917	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
918												
919	**Nonparametric Distribution Free UCLs**											
920					95% CLT UCL	707.6				95% Jackknife UCL		735.7
921					95% Standard Bootstrap UCL	695.4				95% Bootstrap-t UCL		1656
922					95% Hall's Bootstrap UCL	2011				95% Percentile Bootstrap UCL		747.5
923					95% BCA Bootstrap UCL	946.1						
924					90% Chebyshev(Mean, Sd) UCL	959.8				95% Chebyshev(Mean, Sd) UCL		1213
925					97.5% Chebyshev(Mean, Sd) UCL	1564				99% Chebyshev(Mean, Sd) UCL		2253
926												
927	**Suggested UCL to Use**											
928					95% Adjusted Gamma UCL	837.6						
929												
930	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
931	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
932	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
933	For additional insight the user may want to consult a statistician.											
934												
935												
936	**PAH, Total**											

	A	B	C	D	E	F	G	H	I	J	K	L
937												
938						General Statistics						
939					Total Number of Observations	12				Number of Distinct Observations		5
940										Number of Missing Observations		0
941					Minimum	0.026				Mean		0.588
942					Maximum	1.454				Median		0.588
943					SD	0.316				Std. Error of Mean		0.0912
944					Coefficient of Variation	0.537				Skewness		1.625
945												
946						Normal GOF Test						
947					Shapiro Wilk Test Statistic	0.669				Shapiro Wilk GOF Test		
948					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
949					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
950					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
951						Data Not Normal at 5% Significance Level						
952												
953						Assuming Normal Distribution						
954					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
955					95% Student's-t UCL	0.752				95% Adjusted-CLT UCL (Chen-1995)		0.784
956										95% Modified-t UCL (Johnson-1978)		0.759
957												
958						Gamma GOF Test						
959					A-D Test Statistic	2.187				Anderson-Darling Gamma GOF Test		
960					5% A-D Critical Value	0.741				Data Not Gamma Distributed at 5% Significance Level		
961					K-S Test Statistic	0.387				Kolmogrov-Smirnoff Gamma GOF Test		
962					5% K-S Critical Value	0.248				Data Not Gamma Distributed at 5% Significance Level		
963						Data Not Gamma Distributed at 5% Significance Level						
964												
965						Gamma Statistics						
966					k hat (MLE)	2.31				k star (bias corrected MLE)		1.788
967					Theta hat (MLE)	0.255				Theta star (bias corrected MLE)		0.329
968					nu hat (MLE)	55.45				nu star (bias corrected)		42.92
969					MLE Mean (bias corrected)	0.588				MLE Sd (bias corrected)		0.44
970										Approximate Chi Square Value (0.05)		28.9
971					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		27.15
972												
973						Assuming Gamma Distribution						
974					95% Approximate Gamma UCL (use when n>=50))	0.873				95% Adjusted Gamma UCL (use when n<50)		0.929
975												
976						Lognormal GOF Test						
977					Shapiro Wilk Test Statistic	0.548				Shapiro Wilk Lognormal GOF Test		
978					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
979					Lilliefors Test Statistic	0.429				Lilliefors Lognormal GOF Test		
980					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
981						Data Not Lognormal at 5% Significance Level						
982												
983						Lognormal Statistics						
984					Minimum of Logged Data	-3.65				Mean of logged Data		-0.763
985					Maximum of Logged Data	0.374				SD of logged Data		0.954
986												
987						Assuming Lognormal Distribution						
988					95% H-UCL	1.66				90% Chebyshev (MVUE) UCL		1.314

	A	B	C	D	E	F	G	H	I	J	K	L
989					95% Chebyshev (MVUE) UCL	1.593				97.5% Chebyshev (MVUE) UCL		1.98
990					99% Chebyshev (MVUE) UCL	2.739						
991												
992					Nonparametric Distribution Free UCL Statistics							
993					Data do not follow a Discernible Distribution (0.05)							
994												
995					Nonparametric Distribution Free UCLs							
996					95% CLT UCL	0.738				95% Jackknife UCL		0.752
997					95% Standard Bootstrap UCL	0.736				95% Bootstrap-t UCL		0.815
998					95% Hall's Bootstrap UCL	1.662				95% Percentile Bootstrap UCL		0.741
999					95% BCA Bootstrap UCL	0.787						
1000					90% Chebyshev(Mean, Sd) UCL	0.861				95% Chebyshev(Mean, Sd) UCL		0.985
1001					97.5% Chebyshev(Mean, Sd) UCL	1.157				99% Chebyshev(Mean, Sd) UCL		1.495
1002												
1003					Suggested UCL to Use							
1004					95% Chebyshev (Mean, Sd) UCL	0.985						
1005												
1006					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1007					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1008					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1009					For additional insight the user may want to consult a statistician.							
1010												
1011												
1012	PCB, Total											
1013												
1014					General Statistics							
1015					Total Number of Observations	12				Number of Distinct Observations		5
1016										Number of Missing Observations		0
1017					Minimum	0.13				Mean		4.631
1018					Maximum	10				Median		5
1019					SD	3.246				Std. Error of Mean		0.937
1020					Coefficient of Variation	0.701				Skewness		0.14
1021												
1022					Normal GOF Test							
1023					Shapiro Wilk Test Statistic	0.817				Shapiro Wilk GOF Test		
1024					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1025					Lilliefors Test Statistic	0.295				Lilliefors GOF Test		
1026					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1027					Data Not Normal at 5% Significance Level							
1028												
1029					Assuming Normal Distribution							
1030					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1031					95% Student's-t UCL	6.313				95% Adjusted-CLT UCL (Chen-1995)		6.212
1032										95% Modified-t UCL (Johnson-1978)		6.32
1033												
1034					Gamma GOF Test							
1035					A-D Test Statistic	1.664				Anderson-Darling Gamma GOF Test		
1036					5% A-D Critical Value	0.759				Data Not Gamma Distributed at 5% Significance Level		
1037					K-S Test Statistic	0.414				Kolmogrov-Smirnoff Gamma GOF Test		
1038					5% K-S Critical Value	0.253				Data Not Gamma Distributed at 5% Significance Level		
1039					Data Not Gamma Distributed at 5% Significance Level							
1040												

	A	B	C	D	E	F	G	H	I	J	K	L
1041	Gamma Statistics											
1042					k hat (MLE)	0.931					k star (bias corrected MLE)	0.754
1043					Theta hat (MLE)	4.974					Theta star (bias corrected MLE)	6.143
1044					nu hat (MLE)	22.34					nu star (bias corrected)	18.09
1045					MLE Mean (bias corrected)	4.631					MLE Sd (bias corrected)	5.334
1046											Approximate Chi Square Value (0.05)	9.457
1047					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	8.52
1048												
1049	Assuming Gamma Distribution											
1050				95% Approximate Gamma UCL (use when n>=50))		8.859					95% Adjusted Gamma UCL (use when n<50)	9.834
1051												
1052	Lognormal GOF Test											
1053					Shapiro Wilk Test Statistic	0.695			Shapiro Wilk Lognormal GOF Test			
1054					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
1055					Lilliefors Test Statistic	0.42			Lilliefors Lognormal GOF Test			
1056					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
1057	Data Not Lognormal at 5% Significance Level											
1058												
1059	Lognormal Statistics											
1060					Minimum of Logged Data	-2.04					Mean of logged Data	0.907
1061					Maximum of Logged Data	2.303					SD of logged Data	1.593
1062												
1063	Assuming Lognormal Distribution											
1064					95% H-UCL	62.93					90% Chebyshev (MVUE) UCL	18.27
1065					95% Chebyshev (MVUE) UCL	23.25					97.5% Chebyshev (MVUE) UCL	30.17
1066					99% Chebyshev (MVUE) UCL	43.75						
1067												
1068	Nonparametric Distribution Free UCL Statistics											
1069	Data do not follow a Discernible Distribution (0.05)											
1070												
1071	Nonparametric Distribution Free UCLs											
1072					95% CLT UCL	6.172					95% Jackknife UCL	6.313
1073					95% Standard Bootstrap UCL	6.077					95% Bootstrap-t UCL	6.313
1074					95% Hall's Bootstrap UCL	6.673					95% Percentile Bootstrap UCL	6.244
1075					95% BCA Bootstrap UCL	6.236						
1076					90% Chebyshev(Mean, Sd) UCL	7.442					95% Chebyshev(Mean, Sd) UCL	8.715
1077					97.5% Chebyshev(Mean, Sd) UCL	10.48					99% Chebyshev(Mean, Sd) UCL	13.95
1078												
1079	Suggested UCL to Use											
1080					99% Chebyshev (Mean, Sd) UCL	13.95						
1081												
1082	Recommended UCL exceeds the maximum observation											
1083												
1084	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1085	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1086	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1087	For additional insight the user may want to consult a statistician.											
1088												
1089												
1090	Technetium-99											
1091												
1092	General Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
1093					Total Number of Observations	12					Number of Distinct Observations	6
1094											Number of Missing Observations	0
1095					Minimum	2.1					Mean	90.6
1096					Maximum	367					Median	90.6
1097					SD	93.62					Std. Error of Mean	27.03
1098					Coefficient of Variation	1.033					Skewness	2.607
1099												
1100					Normal GOF Test							
1101					Shapiro Wilk Test Statistic	0.635			Shapiro Wilk GOF Test			
1102					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
1103					Lilliefors Test Statistic	0.417			Lilliefors GOF Test			
1104					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
1105					Data Not Normal at 5% Significance Level							
1106												
1107					Assuming Normal Distribution							
1108					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1109					95% Student's-t UCL	139.1			95% Adjusted-CLT UCL (Chen-1995)			156.8
1110									95% Modified-t UCL (Johnson-1978)			142.5
1111												
1112					Gamma GOF Test							
1113					A-D Test Statistic	1.052			Anderson-Darling Gamma GOF Test			
1114					5% A-D Critical Value	0.754			Data Not Gamma Distributed at 5% Significance Level			
1115					K-S Test Statistic	0.292			Kolmogrov-Smirnoff Gamma GOF Test			
1116					5% K-S Critical Value	0.252			Data Not Gamma Distributed at 5% Significance Level			
1117					Data Not Gamma Distributed at 5% Significance Level							
1118												
1119					Gamma Statistics							
1120					k hat (MLE)	1.115			k star (bias corrected MLE)			0.892
1121					Theta hat (MLE)	81.24			Theta star (bias corrected MLE)			101.6
1122					nu hat (MLE)	26.76			nu star (bias corrected)			21.41
1123					MLE Mean (bias corrected)	90.6			MLE Sd (bias corrected)			95.93
1124									Approximate Chi Square Value (0.05)			11.89
1125					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			10.83
1126												
1127					Assuming Gamma Distribution							
1128					95% Approximate Gamma UCL (use when n>=50))	163.1			95% Adjusted Gamma UCL (use when n<50)			179.1
1129												
1130					Lognormal GOF Test							
1131					Shapiro Wilk Test Statistic	0.798			Shapiro Wilk Lognormal GOF Test			
1132					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
1133					Lilliefors Test Statistic	0.321			Lilliefors Lognormal GOF Test			
1134					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
1135					Data Not Lognormal at 5% Significance Level							
1136												
1137					Lognormal Statistics							
1138					Minimum of Logged Data	0.742			Mean of logged Data			3.995
1139					Maximum of Logged Data	5.905			SD of logged Data			1.286
1140												
1141					Assuming Lognormal Distribution							
1142					95% H-UCL	474.7			90% Chebyshev (MVUE) UCL			246.6
1143					95% Chebyshev (MVUE) UCL	307.8			97.5% Chebyshev (MVUE) UCL			392.7
1144					99% Chebyshev (MVUE) UCL	559.5						

	A	B	C	D	E	F	G	H	I	J	K	L
1145												
1146						Nonparametric Distribution Free UCL Statistics						
1147						Data do not follow a Discernible Distribution (0.05)						
1148												
1149						Nonparametric Distribution Free UCLs						
1150					95% CLT UCL	135.1				95% Jackknife UCL		139.1
1151					95% Standard Bootstrap UCL	133.8				95% Bootstrap-t UCL		179.2
1152					95% Hall's Bootstrap UCL	326.6				95% Percentile Bootstrap UCL		136.8
1153					95% BCA Bootstrap UCL	153.8						
1154					90% Chebyshev(Mean, Sd) UCL	171.7				95% Chebyshev(Mean, Sd) UCL		208.4
1155					97.5% Chebyshev(Mean, Sd) UCL	259.4				99% Chebyshev(Mean, Sd) UCL		359.5
1156												
1157						Suggested UCL to Use						
1158					95% Chebyshev (Mean, Sd) UCL	208.4						
1159												
1160					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1161					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1162					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1163					For additional insight the user may want to consult a statistician.							
1164												
1165												
1166	Thallium											
1167												
1168						General Statistics						
1169					Total Number of Observations	12				Number of Distinct Observations		6
1170										Number of Missing Observations		0
1171					Minimum	0.26				Mean		9.804
1172					Maximum	16.3				Median		9.804
1173					SD	5.227				Std. Error of Mean		1.509
1174					Coefficient of Variation	0.533				Skewness		-0.725
1175												
1176						Normal GOF Test						
1177					Shapiro Wilk Test Statistic	0.797				Shapiro Wilk GOF Test		
1178					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1179					Lilliefors Test Statistic	0.333				Lilliefors GOF Test		
1180					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1181						Data Not Normal at 5% Significance Level						
1182												
1183						Assuming Normal Distribution						
1184					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1185					95% Student's-t UCL	12.51				95% Adjusted-CLT UCL (Chen-1995)		11.95
1186										95% Modified-t UCL (Johnson-1978)		12.46
1187												
1188						Gamma GOF Test						
1189					A-D Test Statistic	2.143				Anderson-Darling Gamma GOF Test		
1190					5% A-D Critical Value	0.751				Data Not Gamma Distributed at 5% Significance Level		
1191					K-S Test Statistic	0.452				Kolmogrov-Smirnoff Gamma GOF Test		
1192					5% K-S Critical Value	0.251				Data Not Gamma Distributed at 5% Significance Level		
1193						Data Not Gamma Distributed at 5% Significance Level						
1194												
1195						Gamma Statistics						
1196					k hat (MLE)	1.243				k star (bias corrected MLE)		0.988

	A	B	C	D	E	F	G	H	I	J	K	L
1197					Theta hat (MLE)	7.887				Theta star (bias corrected MLE)		9.924
1198					nu hat (MLE)	29.83				nu star (bias corrected)		23.71
1199					MLE Mean (bias corrected)	9.804				MLE Sd (bias corrected)		9.864
1200										Approximate Chi Square Value (0.05)		13.63
1201					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		12.47
1202												
1203					**Assuming Gamma Distribution**							
1204					95% Approximate Gamma UCL (use when n>=50))	17.06				95% Adjusted Gamma UCL (use when n<50)		18.63
1205												
1206					**Lognormal GOF Test**							
1207					Shapiro Wilk Test Statistic	0.594				**Shapiro Wilk Lognormal GOF Test**		
1208					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1209					Lilliefors Test Statistic	0.458				**Lilliefors Lognormal GOF Test**		
1210					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1211					**Data Not Lognormal at 5% Significance Level**							
1212												
1213					**Lognormal Statistics**							
1214					Minimum of Logged Data	-1.347				Mean of logged Data		1.829
1215					Maximum of Logged Data	2.791				SD of logged Data		1.426
1216												
1217					**Assuming Lognormal Distribution**							
1218					95% H-UCL	86.13				90% Chebyshev (MVUE) UCL		35.12
1219					95% Chebyshev (MVUE) UCL	44.26				97.5% Chebyshev (MVUE) UCL		56.95
1220					99% Chebyshev (MVUE) UCL	81.87						
1221												
1222					**Nonparametric Distribution Free UCL Statistics**							
1223					**Data do not follow a Discernible Distribution (0.05)**							
1224												
1225					**Nonparametric Distribution Free UCLs**							
1226					95% CLT UCL	12.29				95% Jackknife UCL		12.51
1227					95% Standard Bootstrap UCL	12.21				95% Bootstrap-t UCL		12.2
1228					95% Hall's Bootstrap UCL	12.17				95% Percentile Bootstrap UCL		11.95
1229					95% BCA Bootstrap UCL	11.89						
1230					90% Chebyshev(Mean, Sd) UCL	14.33				95% Chebyshev(Mean, Sd) UCL		16.38
1231					97.5% Chebyshev(Mean, Sd) UCL	19.23				99% Chebyshev(Mean, Sd) UCL		24.82
1232												
1233					**Suggested UCL to Use**							
1234					95% Chebyshev (Mean, Sd) UCL	16.38						
1235												
1236					**Recommended UCL exceeds the maximum observation**							
1237												
1238					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1239					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1240					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1241					For additional insight the user may want to consult a statistician.							
1242												
1243					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
1244					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
1245												
1246												
1247	**Thorium-230**											
1248												

	A	B	C	D	E	F	G	H	I	J	K	L
1249	General Statistics											
1250	Total Number of Observations					12	Number of Distinct Observations					6
1251							Number of Missing Observations					0
1252	Minimum					0.483	Mean					2.402
1253	Maximum					7.23	Median					2.402
1254	SD					1.756	Std. Error of Mean					0.507
1255	Coefficient of Variation					0.731	Skewness					1.896
1256												
1257	Normal GOF Test											
1258	Shapiro Wilk Test Statistic					0.722	**Shapiro Wilk GOF Test**					
1259	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
1260	Lilliefors Test Statistic					0.333	**Lilliefors GOF Test**					
1261	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
1262	**Data Not Normal at 5% Significance Level**											
1263												
1264	**Assuming Normal Distribution**											
1265	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1266	95% Student's-t UCL					3.312	95% Adjusted-CLT UCL (Chen-1995)					3.532
1267							95% Modified-t UCL (Johnson-1978)					3.358
1268												
1269	Gamma GOF Test											
1270	A-D Test Statistic					1.256	**Anderson-Darling Gamma GOF Test**					
1271	5% A-D Critical Value					0.741	Data Not Gamma Distributed at 5% Significance Level					
1272	K-S Test Statistic					0.341	**Kolmogrov-Smirnoff Gamma GOF Test**					
1273	5% K-S Critical Value					0.248	Data Not Gamma Distributed at 5% Significance Level					
1274	**Data Not Gamma Distributed at 5% Significance Level**											
1275												
1276	Gamma Statistics											
1277	k hat (MLE)					2.124	k star (bias corrected MLE)					1.648
1278	Theta hat (MLE)					1.131	Theta star (bias corrected MLE)					1.457
1279	nu hat (MLE)					50.97	nu star (bias corrected)					39.56
1280	MLE Mean (bias corrected)					2.402	MLE Sd (bias corrected)					1.871
1281							Approximate Chi Square Value (0.05)					26.15
1282	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					24.5
1283												
1284	**Assuming Gamma Distribution**											
1285	95% Approximate Gamma UCL (use when n>=50))					3.633	95% Adjusted Gamma UCL (use when n<50)					3.878
1286												
1287	Lognormal GOF Test											
1288	Shapiro Wilk Test Statistic					0.8	**Shapiro Wilk Lognormal GOF Test**					
1289	5% Shapiro Wilk Critical Value					0.859	Data Not Lognormal at 5% Significance Level					
1290	Lilliefors Test Statistic					0.374	**Lilliefors Lognormal GOF Test**					
1291	5% Lilliefors Critical Value					0.256	Data Not Lognormal at 5% Significance Level					
1292	**Data Not Lognormal at 5% Significance Level**											
1293												
1294	Lognormal Statistics											
1295	Minimum of Logged Data					-0.728	Mean of logged Data					0.623
1296	Maximum of Logged Data					1.978	SD of logged Data					0.8
1297												
1298	**Assuming Lognormal Distribution**											
1299	95% H-UCL					4.775	90% Chebyshev (MVUE) UCL					4.295
1300	95% Chebyshev (MVUE) UCL					5.115	97.5% Chebyshev (MVUE) UCL					6.254

	A	B	C	D	E	F	G	H	I	J	K	L
1301					99% Chebyshev (MVUE) UCL	8.49						
1302												
1303					Nonparametric Distribution Free UCL Statistics							
1304					Data do not follow a Discernible Distribution (0.05)							
1305												
1306					Nonparametric Distribution Free UCLs							
1307					95% CLT UCL	3.235				95% Jackknife UCL		3.312
1308					95% Standard Bootstrap UCL	3.199				95% Bootstrap-t UCL		3.63
1309					95% Hall's Bootstrap UCL	7.532				95% Percentile Bootstrap UCL		3.263
1310					95% BCA Bootstrap UCL	3.505						
1311					90% Chebyshev(Mean, Sd) UCL	3.922				95% Chebyshev(Mean, Sd) UCL		4.611
1312					97.5% Chebyshev(Mean, Sd) UCL	5.567				99% Chebyshev(Mean, Sd) UCL		7.446
1313												
1314					Suggested UCL to Use							
1315					95% Chebyshev (Mean, Sd) UCL	4.611						
1316												
1317					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1318					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1319					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1320					For additional insight the user may want to consult a statistician.							
1321												
1322												
1323	Uranium											
1324												
1325					General Statistics							
1326					Total Number of Observations	12				Number of Distinct Observations		12
1327										Number of Missing Observations		0
1328					Minimum	9.9				Mean		148.6
1329					Maximum	459				Median		127.8
1330					SD	129.9				Std. Error of Mean		37.51
1331					Coefficient of Variation	0.874				Skewness		1.194
1332												
1333					Normal GOF Test							
1334					Shapiro Wilk Test Statistic	0.894				Shapiro Wilk GOF Test		
1335					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
1336					Lilliefors Test Statistic	0.143				Lilliefors GOF Test		
1337					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
1338					Data appear Normal at 5% Significance Level							
1339												
1340					Assuming Normal Distribution							
1341					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1342					95% Student's-t UCL	216				95% Adjusted-CLT UCL (Chen-1995)		224.1
1343										95% Modified-t UCL (Johnson-1978)		218.1
1344												
1345					Gamma GOF Test							
1346					A-D Test Statistic	0.262				Anderson-Darling Gamma GOF Test		
1347					5% A-D Critical Value	0.753				Detected data appear Gamma Distributed at 5% Significance Level		
1348					K-S Test Statistic	0.134				Kolmogrov-Smirnoff Gamma GOF Test		
1349					5% K-S Critical Value	0.251				Detected data appear Gamma Distributed at 5% Significance Level		
1350					Detected data appear Gamma Distributed at 5% Significance Level							
1351												
1352					Gamma Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
1353					k hat (MLE)	1.166					k star (bias corrected MLE)	0.93
1354					Theta hat (MLE)	127.5					Theta star (bias corrected MLE)	159.9
1355					nu hat (MLE)	27.97					nu star (bias corrected)	22.31
1356					MLE Mean (bias corrected)	148.6					MLE Sd (bias corrected)	154.1
1357											Approximate Chi Square Value (0.05)	12.57
1358					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	11.47
1359												
1360					**Assuming Gamma Distribution**							
1361					95% Approximate Gamma UCL (use when n>=50))	263.8					95% Adjusted Gamma UCL (use when n<50)	289.1
1362												
1363					**Lognormal GOF Test**							
1364					Shapiro Wilk Test Statistic	0.929			**Shapiro Wilk Lognormal GOF Test**			
1365					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
1366					Lilliefors Test Statistic	0.177			**Lilliefors Lognormal GOF Test**			
1367					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
1368					**Data appear Lognormal at 5% Significance Level**							
1369												
1370					**Lognormal Statistics**							
1371					Minimum of Logged Data	2.293					Mean of logged Data	4.515
1372					Maximum of Logged Data	6.129					SD of logged Data	1.183
1373												
1374					**Assuming Lognormal Distribution**							
1375					95% H-UCL	588.4					90% Chebyshev (MVUE) UCL	355.8
1376					95% Chebyshev (MVUE) UCL	440.6					97.5% Chebyshev (MVUE) UCL	558.3
1377					99% Chebyshev (MVUE) UCL	789.4						
1378												
1379					**Nonparametric Distribution Free UCL Statistics**							
1380					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
1381												
1382					**Nonparametric Distribution Free UCLs**							
1383					95% CLT UCL	210.3					95% Jackknife UCL	216
1384					95% Standard Bootstrap UCL	207.7					95% Bootstrap-t UCL	240.7
1385					95% Hall's Bootstrap UCL	248.3					95% Percentile Bootstrap UCL	211.4
1386					95% BCA Bootstrap UCL	226.7						
1387					90% Chebyshev(Mean, Sd) UCL	261.2					95% Chebyshev(Mean, Sd) UCL	312.1
1388					97.5% Chebyshev(Mean, Sd) UCL	382.9					99% Chebyshev(Mean, Sd) UCL	521.8
1389												
1390					**Suggested UCL to Use**							
1391					95% Student's-t UCL	216						
1392												
1393					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1394					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1395					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1396					For additional insight the user may want to consult a statistician.							
1397												
1398												
1399	**Uranium-234**											
1400												
1401					**General Statistics**							
1402					Total Number of Observations	12					Number of Distinct Observations	6
1403											Number of Missing Observations	0
1404					Minimum	0.3					Mean	51.36

1405					Maximum	185					Median	51.36
1406					SD	48.51					Std. Error of Mean	14
1407					Coefficient of Variation	0.944					Skewness	1.915
1408												
1409					Normal GOF Test							
1410					Shapiro Wilk Test Statistic	0.712			Shapiro Wilk GOF Test			
1411					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
1412					Lilliefors Test Statistic	0.333			Lilliefors GOF Test			
1413					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
1414					Data Not Normal at 5% Significance Level							
1415												
1416					Assuming Normal Distribution							
1417					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1418					95% Student's-t UCL	76.51			95% Adjusted-CLT UCL (Chen-1995)			82.66
1419									95% Modified-t UCL (Johnson-1978)			77.8
1420												
1421					Gamma GOF Test							
1422					A-D Test Statistic	1.68			Anderson-Darling Gamma GOF Test			
1423					5% A-D Critical Value	0.774			Data Not Gamma Distributed at 5% Significance Level			
1424					K-S Test Statistic	0.414			Kolmogrov-Smirnoff Gamma GOF Test			
1425					5% K-S Critical Value	0.257			Data Not Gamma Distributed at 5% Significance Level			
1426					Data Not Gamma Distributed at 5% Significance Level							
1427												
1428					Gamma Statistics							
1429					k hat (MLE)	0.636			k star (bias corrected MLE)			0.532
1430					Theta hat (MLE)	80.79			Theta star (bias corrected MLE)			96.47
1431					nu hat (MLE)	15.26			nu star (bias corrected)			12.78
1432					MLE Mean (bias corrected)	51.36			MLE Sd (bias corrected)			70.39
1433									Approximate Chi Square Value (0.05)			5.743
1434					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			5.041
1435												
1436					Assuming Gamma Distribution							
1437					95% Approximate Gamma UCL (use when n>=50))	114.3			95% Adjusted Gamma UCL (use when n<50)			130.2
1438												
1439					Lognormal GOF Test							
1440					Shapiro Wilk Test Statistic	0.709			Shapiro Wilk Lognormal GOF Test			
1441					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
1442					Lilliefors Test Statistic	0.426			Lilliefors Lognormal GOF Test			
1443					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
1444					Data Not Lognormal at 5% Significance Level							
1445												
1446					Lognormal Statistics							
1447					Minimum of Logged Data	-1.204			Mean of logged Data			2.975
1448					Maximum of Logged Data	5.22			SD of logged Data			2.114
1449												
1450					Assuming Lognormal Distribution							
1451					95% H-UCL	5060			90% Chebyshev (MVUE) UCL			353.9
1452					95% Chebyshev (MVUE) UCL	460.2			97.5% Chebyshev (MVUE) UCL			607.8
1453					99% Chebyshev (MVUE) UCL	897.6						
1454												
1455					Nonparametric Distribution Free UCL Statistics							
1456					Data do not follow a Discernible Distribution (0.05)							

1457												
1458	**Nonparametric Distribution Free UCLs**											
1459					95% CLT UCL	74.39				95% Jackknife UCL		76.51
1460					95% Standard Bootstrap UCL	73.62				95% Bootstrap-t UCL		85.41
1461					95% Hall's Bootstrap UCL	192.2				95% Percentile Bootstrap UCL		75.15
1462					95% BCA Bootstrap UCL	82.05						
1463					90% Chebyshev(Mean, Sd) UCL	93.37				95% Chebyshev(Mean, Sd) UCL		112.4
1464					97.5% Chebyshev(Mean, Sd) UCL	138.8				99% Chebyshev(Mean, Sd) UCL		190.7
1465												
1466	**Suggested UCL to Use**											
1467					99% Chebyshev (Mean, Sd) UCL	190.7						
1468												
1469	**Recommended UCL exceeds the maximum observation**											
1470												
1471	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1472	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1473	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1474	For additional insight the user may want to consult a statistician.											
1475												
1476												
1477	**Uranium-235**											
1478												
1479	**General Statistics**											
1480					Total Number of Observations	12				Number of Distinct Observations		6
1481										Number of Missing Observations		0
1482					Minimum	0.00472				Mean		5.203
1483					Maximum	21.7				Median		5.203
1484					SD	5.667				Std. Error of Mean		1.636
1485					Coefficient of Variation	1.089				Skewness		2.442
1486												
1487	**Normal GOF Test**											
1488					Shapiro Wilk Test Statistic	0.634				**Shapiro Wilk GOF Test**		
1489					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1490					Lilliefors Test Statistic	0.417				**Lilliefors GOF Test**		
1491					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1492	**Data Not Normal at 5% Significance Level**											
1493												
1494	**Assuming Normal Distribution**											
1495	**95% Normal UCL**									**95% UCLs (Adjusted for Skewness)**		
1496					95% Student's-t UCL	8.141				95% Adjusted-CLT UCL (Chen-1995)		9.126
1497										95% Modified-t UCL (Johnson-1978)		8.333
1498												
1499	**Gamma GOF Test**											
1500					A-D Test Statistic	1.717				**Anderson-Darling Gamma GOF Test**		
1501					5% A-D Critical Value	0.786				Data Not Gamma Distributed at 5% Significance Level		
1502					K-S Test Statistic	0.383				**Kolmogrov-Smirnoff Gamma GOF Test**		
1503					5% K-S Critical Value	0.259				Data Not Gamma Distributed at 5% Significance Level		
1504	**Data Not Gamma Distributed at 5% Significance Level**											
1505												
1506	**Gamma Statistics**											
1507					k hat (MLE)	0.492				k star (bias corrected MLE)		0.425
1508					Theta hat (MLE)	10.57				Theta star (bias corrected MLE)		12.24

	A	B	C	D	E	F	G	H	I	J	K	L
1509					nu hat (MLE)	11.82				nu star (bias corrected)		10.2
1510					MLE Mean (bias corrected)	5.203				MLE Sd (bias corrected)		7.982
1511										Approximate Chi Square Value (0.05)		4.066
1512					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		3.495
1513												
1514					**Assuming Gamma Distribution**							
1515				95% Approximate Gamma UCL (use when n>=50))		13.05				95% Adjusted Gamma UCL (use when n<50)		15.18
1516												
1517					**Lognormal GOF Test**							
1518					Shapiro Wilk Test Statistic	0.705			**Shapiro Wilk Lognormal GOF Test**			
1519					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
1520					Lilliefors Test Statistic	0.406			**Lilliefors Lognormal GOF Test**			
1521					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
1522					**Data Not Lognormal at 5% Significance Level**							
1523												
1524					**Lognormal Statistics**							
1525					Minimum of Logged Data	-5.356				Mean of logged Data		0.356
1526					Maximum of Logged Data	3.077				SD of logged Data		2.686
1527												
1528					**Assuming Lognormal Distribution**							
1529					95% H-UCL	10010				90% Chebyshev (MVUE) UCL		75.31
1530					95% Chebyshev (MVUE) UCL	99.26				97.5% Chebyshev (MVUE) UCL		132.5
1531					99% Chebyshev (MVUE) UCL	197.8						
1532												
1533					**Nonparametric Distribution Free UCL Statistics**							
1534					**Data do not follow a Discernible Distribution (0.05)**							
1535												
1536					**Nonparametric Distribution Free UCLs**							
1537					95% CLT UCL	7.894				95% Jackknife UCL		8.141
1538					95% Standard Bootstrap UCL	7.784				95% Bootstrap-t UCL		10.07
1539					95% Hall's Bootstrap UCL	19.97				95% Percentile Bootstrap UCL		7.964
1540					95% BCA Bootstrap UCL	8.972						
1541					90% Chebyshev(Mean, Sd) UCL	10.11				95% Chebyshev(Mean, Sd) UCL		12.33
1542					97.5% Chebyshev(Mean, Sd) UCL	15.42				99% Chebyshev(Mean, Sd) UCL		21.48
1543												
1544					**Suggested UCL to Use**							
1545					99% Chebyshev (Mean, Sd) UCL	21.48						
1546												
1547					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1548					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1549					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1550					For additional insight the user may want to consult a statistician.							
1551												
1552												
1553	**Uranium-238**											
1554												
1555					**General Statistics**							
1556					Total Number of Observations	12				Number of Distinct Observations		6
1557										Number of Missing Observations		0
1558					Minimum	0.357				Mean		240
1559					Maximum	1100				Median		240
1560					SD	291				Std. Error of Mean		84

	A	B	C	D	E	F	G	H	I	J	K	L
1561					Coefficient of Variation	1.212					Skewness	2.622
1562												
1563					Normal GOF Test							
1564					Shapiro Wilk Test Statistic	0.62	Shapiro Wilk GOF Test					
1565					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
1566					Lilliefors Test Statistic	0.417	Lilliefors GOF Test					
1567					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
1568					Data Not Normal at 5% Significance Level							
1569												
1570					Assuming Normal Distribution							
1571			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
1572					95% Student's-t UCL	390.9					95% Adjusted-CLT UCL (Chen-1995)	446.1
1573											95% Modified-t UCL (Johnson-1978)	401.5
1574												
1575					Gamma GOF Test							
1576					A-D Test Statistic	1.429	Anderson-Darling Gamma GOF Test					
1577					5% A-D Critical Value	0.789	Data Not Gamma Distributed at 5% Significance Level					
1578					K-S Test Statistic	0.353	Kolmogrov-Smirnoff Gamma GOF Test					
1579					5% K-S Critical Value	0.259	Data Not Gamma Distributed at 5% Significance Level					
1580					Data Not Gamma Distributed at 5% Significance Level							
1581												
1582					Gamma Statistics							
1583					k hat (MLE)	0.477					k star (bias corrected MLE)	0.413
1584					Theta hat (MLE)	503.6					Theta star (bias corrected MLE)	581.2
1585					nu hat (MLE)	11.44					nu star (bias corrected)	9.913
1586					MLE Mean (bias corrected)	240					MLE Sd (bias corrected)	373.5
1587											Approximate Chi Square Value (0.05)	3.887
1588					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	3.332
1589												
1590					Assuming Gamma Distribution							
1591					95% Approximate Gamma UCL (use when n>=50))	612.1					95% Adjusted Gamma UCL (use when n<50)	714.1
1592												
1593					Lognormal GOF Test							
1594					Shapiro Wilk Test Statistic	0.732	Shapiro Wilk Lognormal GOF Test					
1595					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
1596					Lilliefors Test Statistic	0.362	Lilliefors Lognormal GOF Test					
1597					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
1598					Data Not Lognormal at 5% Significance Level							
1599												
1600					Lognormal Statistics							
1601					Minimum of Logged Data	-1.03					Mean of logged Data	4.138
1602					Maximum of Logged Data	7.003					SD of logged Data	2.634
1603												
1604					Assuming Lognormal Distribution							
1605					95% H-UCL	315863					90% Chebyshev (MVUE) UCL	2991
1606					95% Chebyshev (MVUE) UCL	3939					97.5% Chebyshev (MVUE) UCL	5254
1607					99% Chebyshev (MVUE) UCL	7838						
1608												
1609					Nonparametric Distribution Free UCL Statistics							
1610					Data do not follow a Discernible Distribution (0.05)							
1611												
1612					Nonparametric Distribution Free UCLs							

	A	B	C	D	E	F	G	H	I	J	K	L
1613					95% CLT UCL	378.2					95% Jackknife UCL	390.9
1614					95% Standard Bootstrap UCL	368.8					95% Bootstrap-t UCL	511.8
1615					95% Hall's Bootstrap UCL	966.4					95% Percentile Bootstrap UCL	383.4
1616					95% BCA Bootstrap UCL	462.9						
1617					90% Chebyshev(Mean, Sd) UCL	492					95% Chebyshev(Mean, Sd) UCL	606.2
1618					97.5% Chebyshev(Mean, Sd) UCL	764.6					99% Chebyshev(Mean, Sd) UCL	1076
1619												
1620					**Suggested UCL to Use**							
1621					99% Chebyshev (Mean, Sd) UCL	1076						
1622												
1623					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1624					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1625					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1626					For additional insight the user may want to consult a statistician.							
1627												
1628												
1629	**Vanadium**											
1630												
1631					**General Statistics**							
1632					Total Number of Observations	12					Number of Distinct Observations	8
1633											Number of Missing Observations	0
1634					Minimum	11.3					Mean	60.63
1635					Maximum	131.9					Median	70
1636					SD	31.98					Std. Error of Mean	9.232
1637					Coefficient of Variation	0.527					Skewness	0.497
1638												
1639					**Normal GOF Test**							
1640					Shapiro Wilk Test Statistic	0.86			**Shapiro Wilk GOF Test**			
1641					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
1642					Lilliefors Test Statistic	0.282			**Lilliefors GOF Test**			
1643					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
1644					**Data appear Approximate Normal at 5% Significance Level**							
1645												
1646					**Assuming Normal Distribution**							
1647					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
1648					95% Student's-t UCL	77.21			95% Adjusted-CLT UCL (Chen-1995)			77.23
1649									95% Modified-t UCL (Johnson-1978)			77.43
1650												
1651					**Gamma GOF Test**							
1652					A-D Test Statistic	0.984			**Anderson-Darling Gamma GOF Test**			
1653					5% A-D Critical Value	0.739			Data Not Gamma Distributed at 5% Significance Level			
1654					K-S Test Statistic	0.339			**Kolmogrov-Smirnoff Gamma GOF Test**			
1655					5% K-S Critical Value	0.247			Data Not Gamma Distributed at 5% Significance Level			
1656					**Data Not Gamma Distributed at 5% Significance Level**							
1657												
1658					**Gamma Statistics**							
1659					k hat (MLE)	3.095			k star (bias corrected MLE)			2.377
1660					Theta hat (MLE)	19.59			Theta star (bias corrected MLE)			25.51
1661					nu hat (MLE)	74.29			nu star (bias corrected)			57.05
1662					MLE Mean (bias corrected)	60.63			MLE Sd (bias corrected)			39.33
1663									Approximate Chi Square Value (0.05)			40.69
1664					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			38.59

	A	B	C	D	E	F	G	H	I	J	K	L
1665												
1666						Assuming Gamma Distribution						
1667					95% Approximate Gamma UCL (use when n>=50))	85.01				95% Adjusted Gamma UCL (use when n<50)		89.64
1668												
1669						Lognormal GOF Test						
1670					Shapiro Wilk Test Statistic	0.838			Shapiro Wilk Lognormal GOF Test			
1671					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
1672					Lilliefors Test Statistic	0.345			Lilliefors Lognormal GOF Test			
1673					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
1674						Data Not Lognormal at 5% Significance Level						
1675												
1676						Lognormal Statistics						
1677					Minimum of Logged Data	2.425			Mean of logged Data			3.935
1678					Maximum of Logged Data	4.882			SD of logged Data			0.677
1679												
1680						Assuming Lognormal Distribution						
1681					95% H-UCL	104.6			90% Chebyshev (MVUE) UCL			101.3
1682					95% Chebyshev (MVUE) UCL	118.7			97.5% Chebyshev (MVUE) UCL			142.8
1683					99% Chebyshev (MVUE) UCL	190.2						
1684												
1685						Nonparametric Distribution Free UCL Statistics						
1686						Data appear to follow a Discernible Distribution at 5% Significance Level						
1687												
1688						Nonparametric Distribution Free UCLs						
1689					95% CLT UCL	75.82			95% Jackknife UCL			77.21
1690					95% Standard Bootstrap UCL	75.01			95% Bootstrap-t UCL			78.06
1691					95% Hall's Bootstrap UCL	80.32			95% Percentile Bootstrap UCL			75.32
1692					95% BCA Bootstrap UCL	77.1						
1693					90% Chebyshev(Mean, Sd) UCL	88.33			95% Chebyshev(Mean, Sd) UCL			100.9
1694					97.5% Chebyshev(Mean, Sd) UCL	118.3			99% Chebyshev(Mean, Sd) UCL			152.5
1695												
1696						Suggested UCL to Use						
1697					95% Student's-t UCL	77.21						
1698												
1699						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
1700						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
1701						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
1702						For additional insight the user may want to consult a statistician.						
1703												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/1/2015 12:45:57 PM								
5	From File			EPC_015SubEU4.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Antimony											
12												
13	General Statistics											
14	Total Number of Observations					15	Number of Distinct Observations					14
15							Number of Missing Observations					0
16	Minimum					0.8	Mean					75.81
17	Maximum					120.4	Median					85.6
18	SD					37.74	Std. Error of Mean					9.744
19	Coefficient of Variation					0.498	Skewness					-0.903
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.89	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.881	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.233	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.229	Data Not Normal at 5% Significance Level					
26	Data appear Approximate Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					92.97	95% Adjusted-CLT UCL (Chen-1995)					89.41
31							95% Modified-t UCL (Johnson-1978)					92.59
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.785	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.755	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.344	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.226	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					1.433	k star (bias corrected MLE)					1.191
42	Theta hat (MLE)					52.9	Theta star (bias corrected MLE)					63.66
43	nu hat (MLE)					42.99	nu star (bias corrected)					35.73
44	MLE Mean (bias corrected)					75.81	MLE Sd (bias corrected)					69.47
45							Approximate Chi Square Value (0.05)					23.05
46	Adjusted Level of Significance					0.0324	Adjusted Chi Square Value					21.8
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					117.5	95% Adjusted Gamma UCL (use when n<50)					124.2
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.627	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53				5% Shapiro Wilk Critical Value		0.881	Data Not Lognormal at 5% Significance Level					
54				Lilliefors Test Statistic		0.346	**Lilliefors Lognormal GOF Test**					
55				5% Lilliefors Critical Value		0.229	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59				Minimum of Logged Data		-0.223	Mean of logged Data					3.94
60				Maximum of Logged Data		4.791	SD of logged Data					1.352
61												
62	**Assuming Lognormal Distribution**											
63				95% H-UCL		429.2	90% Chebyshev (MVUE) UCL					253.1
64				95% Chebyshev (MVUE) UCL		315.2	97.5% Chebyshev (MVUE) UCL					401.5
65				99% Chebyshev (MVUE) UCL		570.9						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71				95% CLT UCL		91.83	95% Jackknife UCL					92.97
72				95% Standard Bootstrap UCL		91.6	95% Bootstrap-t UCL					90.83
73				95% Hall's Bootstrap UCL		89.74	95% Percentile Bootstrap UCL					90.93
74				95% BCA Bootstrap UCL		89.46						
75				90% Chebyshev(Mean, Sd) UCL		105	95% Chebyshev(Mean, Sd) UCL					118.3
76				97.5% Chebyshev(Mean, Sd) UCL		136.7	99% Chebyshev(Mean, Sd) UCL					172.8
77												
78	**Suggested UCL to Use**											
79				95% Student's-t UCL		92.97						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												
90	**Arsenic**											
91												
92	**General Statistics**											
93				Total Number of Observations		15	Number of Distinct Observations					13
94							Number of Missing Observations					0
95				Minimum		6	Mean					22.86
96				Maximum		51.31	Median					15.33
97				SD		15.95	Std. Error of Mean					4.119
98				Coefficient of Variation		0.698	Skewness					0.712
99												
100	**Normal GOF Test**											
101				Shapiro Wilk Test Statistic		0.853	**Shapiro Wilk GOF Test**					
102				5% Shapiro Wilk Critical Value		0.881	Data Not Normal at 5% Significance Level					
103				Lilliefors Test Statistic		0.238	**Lilliefors GOF Test**					
104				5% Lilliefors Critical Value		0.229	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
105	**Data Not Normal at 5% Significance Level**											
106												
107	**Assuming Normal Distribution**											
108	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
109					95% Student's-t UCL	30.12			95% Adjusted-CLT UCL (Chen-1995)			30.45
110									95% Modified-t UCL (Johnson-1978)			30.25
111												
112	**Gamma GOF Test**											
113					A-D Test Statistic	0.714	**Anderson-Darling Gamma GOF Test**					
114					5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level					
115					K-S Test Statistic	0.238	**Kolmogrov-Smirnoff Gamma GOF Test**					
116					5% K-S Critical Value	0.224	Data Not Gamma Distributed at 5% Significance Level					
117	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
118												
119	**Gamma Statistics**											
120					k hat (MLE)	2.25			k star (bias corrected MLE)			1.844
121					Theta hat (MLE)	10.16			Theta star (bias corrected MLE)			12.4
122					nu hat (MLE)	67.49			nu star (bias corrected)			55.32
123					MLE Mean (bias corrected)	22.86			MLE Sd (bias corrected)			16.84
124									Approximate Chi Square Value (0.05)			39.23
125					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value			37.56
126												
127	**Assuming Gamma Distribution**											
128				95% Approximate Gamma UCL (use when n>=50)		32.24			95% Adjusted Gamma UCL (use when n<50)			33.67
129												
130	**Lognormal GOF Test**											
131					Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk Lognormal GOF Test**					
132					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
133					Lilliefors Test Statistic	0.219	**Lilliefors Lognormal GOF Test**					
134					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
135	**Data appear Lognormal at 5% Significance Level**											
136												
137	**Lognormal Statistics**											
138					Minimum of Logged Data	1.792			Mean of logged Data			2.891
139					Maximum of Logged Data	3.938			SD of logged Data			0.723
140												
141	**Assuming Lognormal Distribution**											
142					95% H-UCL	36.75			90% Chebyshev (MVUE) UCL			36.47
143					95% Chebyshev (MVUE) UCL	42.62			97.5% Chebyshev (MVUE) UCL			51.14
144					99% Chebyshev (MVUE) UCL	67.89						
145												
146	**Nonparametric Distribution Free UCL Statistics**											
147	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
148												
149	**Nonparametric Distribution Free UCLs**											
150					95% CLT UCL	29.64			95% Jackknife UCL			30.12
151					95% Standard Bootstrap UCL	29.34			95% Bootstrap-t UCL			31.4
152					95% Hall's Bootstrap UCL	29.22			95% Percentile Bootstrap UCL			29.68
153					95% BCA Bootstrap UCL	30.05						
154					90% Chebyshev(Mean, Sd) UCL	35.22			95% Chebyshev(Mean, Sd) UCL			40.82
155					97.5% Chebyshev(Mean, Sd) UCL	48.59			99% Chebyshev(Mean, Sd) UCL			63.85
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157						Suggested UCL to Use						
158					95% Adjusted Gamma UCL	33.67						
159												
160					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
161					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
162					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
163					For additional insight the user may want to consult a statistician.							
164												
165												
166	Cadmium											
167												
168						General Statistics						
169					Total Number of Observations	15			Number of Distinct Observations			11
170									Number of Missing Observations			0
171					Minimum	0.42			Mean			10.06
172					Maximum	24.15			Median			12
173					SD	7.446			Std. Error of Mean			1.923
174					Coefficient of Variation	0.74			Skewness			0.159
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.907			Shapiro Wilk GOF Test			
178					5% Shapiro Wilk Critical Value	0.881			Data appear Normal at 5% Significance Level			
179					Lilliefors Test Statistic	0.206			Lilliefors GOF Test			
180					5% Lilliefors Critical Value	0.229			Data appear Normal at 5% Significance Level			
181						Data appear Normal at 5% Significance Level						
182												
183						Assuming Normal Distribution						
184					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
185					95% Student's-t UCL	13.44			95% Adjusted-CLT UCL (Chen-1995)			13.3
186									95% Modified-t UCL (Johnson-1978)			13.46
187												
188						Gamma GOF Test						
189					A-D Test Statistic	1.135			Anderson-Darling Gamma GOF Test			
190					5% A-D Critical Value	0.761			Data Not Gamma Distributed at 5% Significance Level			
191					K-S Test Statistic	0.292			Kolmogrov-Smirnoff Gamma GOF Test			
192					5% K-S Critical Value	0.227			Data Not Gamma Distributed at 5% Significance Level			
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	1.109			k star (bias corrected MLE)			0.932
197					Theta hat (MLE)	9.069			Theta star (bias corrected MLE)			10.8
198					nu hat (MLE)	33.27			nu star (bias corrected)			27.95
199					MLE Mean (bias corrected)	10.06			MLE Sd (bias corrected)			10.42
200									Approximate Chi Square Value (0.05)			16.89
201					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value			15.83
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	16.64			95% Adjusted Gamma UCL (use when n<50)			17.75
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.82			Shapiro Wilk Lognormal GOF Test			
208					5% Shapiro Wilk Critical Value	0.881			Data Not Lognormal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.323	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	-0.868				Mean of logged Data		1.794
215					Maximum of Logged Data	3.184				SD of logged Data		1.282
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	41.25				90% Chebyshev (MVUE) UCL		26.52
219					95% Chebyshev (MVUE) UCL	32.86				97.5% Chebyshev (MVUE) UCL		41.66
220					99% Chebyshev (MVUE) UCL	58.94						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	13.22				95% Jackknife UCL		13.44
227					95% Standard Bootstrap UCL	13.12				95% Bootstrap-t UCL		13.6
228					95% Hall's Bootstrap UCL	13.3				95% Percentile Bootstrap UCL		12.98
229					95% BCA Bootstrap UCL	13.07						
230					90% Chebyshev(Mean, Sd) UCL	15.82				95% Chebyshev(Mean, Sd) UCL		18.44
231					97.5% Chebyshev(Mean, Sd) UCL	22.06				99% Chebyshev(Mean, Sd) UCL		29.19
232												
233	**Suggested UCL to Use**											
234					95% Student's-t UCL	13.44						
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241												
242	**Chromium**											
243												
244	**General Statistics**											
245					Total Number of Observations	15				Number of Distinct Observations		14
246										Number of Missing Observations		0
247					Minimum	12				Mean		66.89
248					Maximum	150.7				Median		61.63
249					SD	41				Std. Error of Mean		10.59
250					Coefficient of Variation	0.613				Skewness		0.612
251												
252	**Normal GOF Test**											
253					Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**					
254					5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level					
255					Lilliefors Test Statistic	0.0958	**Lilliefors GOF Test**					
256					5% Lilliefors Critical Value	0.229	Data appear Normal at 5% Significance Level					
257	**Data appear Normal at 5% Significance Level**											
258												
259	**Assuming Normal Distribution**											
260	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					95% Student's-t UCL	85.54				95% Adjusted-CLT UCL (Chen-1995)		86.09
262										95% Modified-t UCL (Johnson-1978)		85.81
263												
264						Gamma GOF Test						
265					A-D Test Statistic	0.274			Anderson-Darling Gamma GOF Test			
266					5% A-D Critical Value	0.746			Detected data appear Gamma Distributed at 5% Significance Level			
267					K-S Test Statistic	0.11			Kolmogrov-Smirnoff Gamma GOF Test			
268					5% K-S Critical Value	0.224			Detected data appear Gamma Distributed at 5% Significance Level			
269					Detected data appear Gamma Distributed at 5% Significance Level							
270												
271						Gamma Statistics						
272					k hat (MLE)	2.342			k star (bias corrected MLE)			1.918
273					Theta hat (MLE)	28.56			Theta star (bias corrected MLE)			34.87
274					nu hat (MLE)	70.27			nu star (bias corrected)			57.55
275					MLE Mean (bias corrected)	66.89			MLE Sd (bias corrected)			48.29
276									Approximate Chi Square Value (0.05)			41.11
277					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value			39.4
278												
279						Assuming Gamma Distribution						
280					95% Approximate Gamma UCL (use when n>=50))	93.64			95% Adjusted Gamma UCL (use when n<50)			97.69
281												
282						Lognormal GOF Test						
283					Shapiro Wilk Test Statistic	0.912			Shapiro Wilk Lognormal GOF Test			
284					5% Shapiro Wilk Critical Value	0.881			Data appear Lognormal at 5% Significance Level			
285					Lilliefors Test Statistic	0.159			Lilliefors Lognormal GOF Test			
286					5% Lilliefors Critical Value	0.229			Data appear Lognormal at 5% Significance Level			
287						Data appear Lognormal at 5% Significance Level						
288												
289						Lognormal Statistics						
290					Minimum of Logged Data	2.485			Mean of logged Data			3.975
291					Maximum of Logged Data	5.015			SD of logged Data			0.775
292												
293						Assuming Lognormal Distribution						
294					95% H-UCL	118.3			90% Chebyshev (MVUE) UCL			114.9
295					95% Chebyshev (MVUE) UCL	135.2			97.5% Chebyshev (MVUE) UCL			163.3
296					99% Chebyshev (MVUE) UCL	218.6						
297												
298						Nonparametric Distribution Free UCL Statistics						
299						Data appear to follow a Discernible Distribution at 5% Significance Level						
300												
301						Nonparametric Distribution Free UCLs						
302					95% CLT UCL	84.3			95% Jackknife UCL			85.54
303					95% Standard Bootstrap UCL	83.61			95% Bootstrap-t UCL			89.58
304					95% Hall's Bootstrap UCL	90.49			95% Percentile Bootstrap UCL			83.6
305					95% BCA Bootstrap UCL	86.22						
306					90% Chebyshev(Mean, Sd) UCL	98.65			95% Chebyshev(Mean, Sd) UCL			113
307					97.5% Chebyshev(Mean, Sd) UCL	133			99% Chebyshev(Mean, Sd) UCL			172.2
308												
309						Suggested UCL to Use						
310					95% Student's-t UCL	85.54						
311												
312	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											

	A	B	C	D	E	F	G	H	I	J	K	L
313	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
314	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
315	For additional insight the user may want to consult a statistician.											
316												
317												
318	**Copper**											
319												
320	**General Statistics**											
321					Total Number of Observations	15			Number of Distinct Observations		15	
322									Number of Missing Observations		0	
323					Minimum	38			Mean		432.4	
324					Maximum	1274			Median		372.9	
325					SD	367.7			Std. Error of Mean		94.95	
326					Coefficient of Variation	0.85			Skewness		1.273	
327												
328	**Normal GOF Test**											
329					Shapiro Wilk Test Statistic	0.866			**Shapiro Wilk GOF Test**			
330					5% Shapiro Wilk Critical Value	0.881			Data Not Normal at 5% Significance Level			
331					Lilliefors Test Statistic	0.166			**Lilliefors GOF Test**			
332					5% Lilliefors Critical Value	0.229			Data appear Normal at 5% Significance Level			
333	**Data appear Approximate Normal at 5% Significance Level**											
334												
335	**Assuming Normal Distribution**											
336				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
337					95% Student's-t UCL	599.6			95% Adjusted-CLT UCL (Chen-1995)		621.9	
338									95% Modified-t UCL (Johnson-1978)		604.8	
339												
340	**Gamma GOF Test**											
341					A-D Test Statistic	0.185			**Anderson-Darling Gamma GOF Test**			
342					5% A-D Critical Value	0.756			Detected data appear Gamma Distributed at 5% Significance Level			
343					K-S Test Statistic	0.0991			**Kolmogrov-Smirnoff Gamma GOF Test**			
344					5% K-S Critical Value	0.226			Detected data appear Gamma Distributed at 5% Significance Level			
345	**Detected data appear Gamma Distributed at 5% Significance Level**											
346												
347	**Gamma Statistics**											
348					k hat (MLE)	1.407			k star (bias corrected MLE)		1.17	
349					Theta hat (MLE)	307.3			Theta star (bias corrected MLE)		369.5	
350					nu hat (MLE)	42.21			nu star (bias corrected)		35.1	
351					MLE Mean (bias corrected)	432.4			MLE Sd (bias corrected)		399.7	
352									Approximate Chi Square Value (0.05)		22.55	
353					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value		21.31	
354												
355	**Assuming Gamma Distribution**											
356					95% Approximate Gamma UCL (use when n>=50))	673.1			95% Adjusted Gamma UCL (use when n<50)		712.1	
357												
358	**Lognormal GOF Test**											
359					Shapiro Wilk Test Statistic	0.948			**Shapiro Wilk Lognormal GOF Test**			
360					5% Shapiro Wilk Critical Value	0.881			Data appear Lognormal at 5% Significance Level			
361					Lilliefors Test Statistic	0.14			**Lilliefors Lognormal GOF Test**			
362					5% Lilliefors Critical Value	0.229			Data appear Lognormal at 5% Significance Level			
363	**Data appear Lognormal at 5% Significance Level**											
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365	**Lognormal Statistics**											
366					Minimum of Logged Data	3.638					Mean of logged Data	5.674
367					Maximum of Logged Data	7.15					SD of logged Data	1.019
368												
369	**Assuming Lognormal Distribution**											
370					95% H-UCL	1042					90% Chebyshev (MVUE) UCL	869.4
371					95% Chebyshev (MVUE) UCL	1052					97.5% Chebyshev (MVUE) UCL	1305
372					99% Chebyshev (MVUE) UCL	1803						
373												
374	**Nonparametric Distribution Free UCL Statistics**											
375	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
376												
377	**Nonparametric Distribution Free UCLs**											
378					95% CLT UCL	588.6					95% Jackknife UCL	599.6
379					95% Standard Bootstrap UCL	582.8					95% Bootstrap-t UCL	672.1
380					95% Hall's Bootstrap UCL	760.8					95% Percentile Bootstrap UCL	589.8
381					95% BCA Bootstrap UCL	605.4						
382					90% Chebyshev(Mean, Sd) UCL	717.2					95% Chebyshev(Mean, Sd) UCL	846.2
383					97.5% Chebyshev(Mean, Sd) UCL	1025					99% Chebyshev(Mean, Sd) UCL	1377
384												
385	**Suggested UCL to Use**											
386					95% Student's-t UCL	599.6						
387												
388	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
389	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
390	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
391	For additional insight the user may want to consult a statistician.											
392												
393												
394	**Iron**											
395												
396	**General Statistics**											
397					Total Number of Observations	15					Number of Distinct Observations	15
398											Number of Missing Observations	0
399					Minimum	16098					Mean	53989
400					Maximum	142401					Median	41867
401					SD	34488					Std. Error of Mean	8905
402					Coefficient of Variation	0.639					Skewness	1.339
403												
404	**Normal GOF Test**											
405					Shapiro Wilk Test Statistic	0.88			**Shapiro Wilk GOF Test**			
406					5% Shapiro Wilk Critical Value	0.881			Data Not Normal at 5% Significance Level			
407					Lilliefors Test Statistic	0.171			**Lilliefors GOF Test**			
408					5% Lilliefors Critical Value	0.229			Data appear Normal at 5% Significance Level			
409	**Data appear Approximate Normal at 5% Significance Level**											
410												
411	**Assuming Normal Distribution**											
412	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
413					95% Student's-t UCL	69673					95% Adjusted-CLT UCL (Chen-1995)	71925
414											95% Modified-t UCL (Johnson-1978)	70186
415												
416	**Gamma GOF Test**											

417					A-D Test Statistic	0.229	Anderson-Darling Gamma GOF Test					
418					5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level					
419					K-S Test Statistic	0.123	Kolmogrov-Smirnoff Gamma GOF Test					
420					5% K-S Critical Value	0.223	Detected data appear Gamma Distributed at 5% Significance Level					
421	Detected data appear Gamma Distributed at 5% Significance Level											
422												
423	Gamma Statistics											
424					k hat (MLE)	3.016	k star (bias corrected MLE)					2.457
425					Theta hat (MLE)	17902	Theta star (bias corrected MLE)					21973
426					nu hat (MLE)	90.48	nu star (bias corrected)					73.71
427					MLE Mean (bias corrected)	53989	MLE Sd (bias corrected)					34442
428							Approximate Chi Square Value (0.05)					54.94
429					Adjusted Level of Significance	0.0324	Adjusted Chi Square Value					52.95
430												
431	Assuming Gamma Distribution											
432					95% Approximate Gamma UCL (use when n>=50))	72435	95% Adjusted Gamma UCL (use when n<50)					75161
433												
434	Lognormal GOF Test											
435					Shapiro Wilk Test Statistic	0.986	Shapiro Wilk Lognormal GOF Test					
436					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
437					Lilliefors Test Statistic	0.0851	Lilliefors Lognormal GOF Test					
438					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
439	Data appear Lognormal at 5% Significance Level											
440												
441	Lognormal Statistics											
442					Minimum of Logged Data	9.686	Mean of logged Data					10.72
443					Maximum of Logged Data	11.87	SD of logged Data					0.61
444												
445	Assuming Lognormal Distribution											
446					95% H-UCL	78102	90% Chebyshev (MVUE) UCL					80376
447					95% Chebyshev (MVUE) UCL	92398	97.5% Chebyshev (MVUE) UCL					109084
448					99% Chebyshev (MVUE) UCL	141861						
449												
450	Nonparametric Distribution Free UCL Statistics											
451	Data appear to follow a Discernible Distribution at 5% Significance Level											
452												
453	Nonparametric Distribution Free UCLs											
454					95% CLT UCL	68636	95% Jackknife UCL					69673
455					95% Standard Bootstrap UCL	68216	95% Bootstrap-t UCL					76705
456					95% Hall's Bootstrap UCL	76421	95% Percentile Bootstrap UCL					68929
457					95% BCA Bootstrap UCL	71360						
458					90% Chebyshev(Mean, Sd) UCL	80704	95% Chebyshev(Mean, Sd) UCL					92804
459					97.5% Chebyshev(Mean, Sd) UCL	109600	99% Chebyshev(Mean, Sd) UCL					142591
460												
461	Suggested UCL to Use											
462					95% Student's-t UCL	69673						
463												
464	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
465	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
466	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
467	For additional insight the user may want to consult a statistician.											
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470	**Manganese**											
471												
472						**General Statistics**						
473					Total Number of Observations	15				Number of Distinct Observations		15
474										Number of Missing Observations		0
475					Minimum	151				Mean		981.3
476					Maximum	2488				Median		891.8
477					SD	672.4				Std. Error of Mean		173.6
478					Coefficient of Variation	0.685				Skewness		1.115
479												
480						**Normal GOF Test**						
481					Shapiro Wilk Test Statistic	0.892				**Shapiro Wilk GOF Test**		
482					5% Shapiro Wilk Critical Value	0.881				Data appear Normal at 5% Significance Level		
483					Lilliefors Test Statistic	0.176				**Lilliefors GOF Test**		
484					5% Lilliefors Critical Value	0.229				Data appear Normal at 5% Significance Level		
485						**Data appear Normal at 5% Significance Level**						
486												
487						**Assuming Normal Distribution**						
488					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
489					95% Student's-t UCL	1287				95% Adjusted-CLT UCL (Chen-1995)		1320
490										95% Modified-t UCL (Johnson-1978)		1295
491												
492						**Gamma GOF Test**						
493					A-D Test Statistic	0.296				**Anderson-Darling Gamma GOF Test**		
494					5% A-D Critical Value	0.747				Detected data appear Gamma Distributed at 5% Significance Level		
495					K-S Test Statistic	0.119				**Kolmogrov-Smirnoff Gamma GOF Test**		
496					5% K-S Critical Value	0.224				Detected data appear Gamma Distributed at 5% Significance Level		
497						**Detected data appear Gamma Distributed at 5% Significance Level**						
498												
499						**Gamma Statistics**						
500					k hat (MLE)	2.125				k star (bias corrected MLE)		1.744
501					Theta hat (MLE)	461.8				Theta star (bias corrected MLE)		562.5
502					nu hat (MLE)	63.75				nu star (bias corrected)		52.33
503					MLE Mean (bias corrected)	981.3				MLE Sd (bias corrected)		743
504										Approximate Chi Square Value (0.05)		36.72
505					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		35.11
506												
507						**Assuming Gamma Distribution**						
508					95% Approximate Gamma UCL (use when n>=50))	1399				95% Adjusted Gamma UCL (use when n<50)		1463
509												
510						**Lognormal GOF Test**						
511					Shapiro Wilk Test Statistic	0.919				**Shapiro Wilk Lognormal GOF Test**		
512					5% Shapiro Wilk Critical Value	0.881				Data appear Lognormal at 5% Significance Level		
513					Lilliefors Test Statistic	0.166				**Lilliefors Lognormal GOF Test**		
514					5% Lilliefors Critical Value	0.229				Data appear Lognormal at 5% Significance Level		
515						**Data appear Lognormal at 5% Significance Level**						
516												
517						**Lognormal Statistics**						
518					Minimum of Logged Data	5.017				Mean of logged Data		6.635
519					Maximum of Logged Data	7.819				SD of logged Data		0.807
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521					Assuming Lognormal Distribution							
522					95% H-UCL	1789			90% Chebyshev (MVUE) UCL			1711
523					95% Chebyshev (MVUE) UCL	2021			97.5% Chebyshev (MVUE) UCL			2451
524					99% Chebyshev (MVUE) UCL	3297						
525												
526					Nonparametric Distribution Free UCL Statistics							
527					Data appear to follow a Discernible Distribution at 5% Significance Level							
528												
529					Nonparametric Distribution Free UCLs							
530					95% CLT UCL	1267			95% Jackknife UCL			1287
531					95% Standard Bootstrap UCL	1263			95% Bootstrap-t UCL			1387
532					95% Hall's Bootstrap UCL	1520			95% Percentile Bootstrap UCL			1246
533					95% BCA Bootstrap UCL	1292						
534					90% Chebyshev(Mean, Sd) UCL	1502			95% Chebyshev(Mean, Sd) UCL			1738
535					97.5% Chebyshev(Mean, Sd) UCL	2065			99% Chebyshev(Mean, Sd) UCL			2709
536												
537					Suggested UCL to Use							
538					95% Student's-t UCL	1287						
539												
540					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
541					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
542					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
543					For additional insight the user may want to consult a statistician.							
544												
545												
546	Mercury											
547												
548					General Statistics							
549					Total Number of Observations	15			Number of Distinct Observations			7
550									Number of Missing Observations			0
551					Minimum	0.0262			Mean			14.03
552					Maximum	40			Median			10
553					SD	14.31			Std. Error of Mean			3.694
554					Coefficient of Variation	1.02			Skewness			1.184
555												
556					Normal GOF Test							
557					Shapiro Wilk Test Statistic	0.764			Shapiro Wilk GOF Test			
558					5% Shapiro Wilk Critical Value	0.881			Data Not Normal at 5% Significance Level			
559					Lilliefors Test Statistic	0.277			Lilliefors GOF Test			
560					5% Lilliefors Critical Value	0.229			Data Not Normal at 5% Significance Level			
561					Data Not Normal at 5% Significance Level							
562												
563					Assuming Normal Distribution							
564					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
565					95% Student's-t UCL	20.53			95% Adjusted-CLT UCL (Chen-1995)			21.31
566									95% Modified-t UCL (Johnson-1978)			20.72
567												
568					Gamma GOF Test							
569					A-D Test Statistic	0.979			Anderson-Darling Gamma GOF Test			
570					5% A-D Critical Value	0.787			Data Not Gamma Distributed at 5% Significance Level			
571					K-S Test Statistic	0.315			Kolmogrov-Smirnoff Gamma GOF Test			
572					5% K-S Critical Value	0.233			Data Not Gamma Distributed at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
573	Data Not Gamma Distributed at 5% Significance Level											
574												
575	Gamma Statistics											
576					k hat (MLE)	0.58				k star (bias corrected MLE)		0.509
577					Theta hat (MLE)	24.17				Theta star (bias corrected MLE)		27.57
578					nu hat (MLE)	17.41				nu star (bias corrected)		15.26
579					MLE Mean (bias corrected)	14.03				MLE Sd (bias corrected)		19.67
580										Approximate Chi Square Value (0.05)		7.442
581					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		6.779
582												
583	Assuming Gamma Distribution											
584				95% Approximate Gamma UCL (use when n>=50))		28.76				95% Adjusted Gamma UCL (use when n<50)		31.57
585												
586	Lognormal GOF Test											
587					Shapiro Wilk Test Statistic	0.793				Shapiro Wilk Lognormal GOF Test		
588					5% Shapiro Wilk Critical Value	0.881				Data Not Lognormal at 5% Significance Level		
589					Lilliefors Test Statistic	0.363				Lilliefors Lognormal GOF Test		
590					5% Lilliefors Critical Value	0.229				Data Not Lognormal at 5% Significance Level		
591	Data Not Lognormal at 5% Significance Level											
592												
593	Lognormal Statistics											
594					Minimum of Logged Data	-3.642				Mean of logged Data		1.571
595					Maximum of Logged Data	3.689				SD of logged Data		2.209
596												
597	Assuming Lognormal Distribution											
598					95% H-UCL	1040				90% Chebyshev (MVUE) UCL		108.1
599					95% Chebyshev (MVUE) UCL	140.5				97.5% Chebyshev (MVUE) UCL		185.5
600					99% Chebyshev (MVUE) UCL	273.8						
601												
602	Nonparametric Distribution Free UCL Statistics											
603	Data do not follow a Discernible Distribution (0.05)											
604												
605	Nonparametric Distribution Free UCLs											
606					95% CLT UCL	20.1				95% Jackknife UCL		20.53
607					95% Standard Bootstrap UCL	19.83				95% Bootstrap-t UCL		22.08
608					95% Hall's Bootstrap UCL	20.06				95% Percentile Bootstrap UCL		20.1
609					95% BCA Bootstrap UCL	21.16						
610					90% Chebyshev(Mean, Sd) UCL	25.11				95% Chebyshev(Mean, Sd) UCL		30.13
611					97.5% Chebyshev(Mean, Sd) UCL	37.09				99% Chebyshev(Mean, Sd) UCL		50.78
612												
613	Suggested UCL to Use											
614					99% Chebyshev (Mean, Sd) UCL	50.78						
615												
616	Recommended UCL exceeds the maximum observation											
617												
618	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
619	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
620	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
621	For additional insight the user may want to consult a statistician.											
622												
623												
624	Neptunium-237											

	A	B	C	D	E	F	G	H	I	J	K	L
625												
626						General Statistics						
627					Total Number of Observations	15				Number of Distinct Observations		8
628										Number of Missing Observations		0
629					Minimum	0.01				Mean		0.207
630					Maximum	0.8				Median		0.207
631					SD	0.201				Std. Error of Mean		0.0519
632					Coefficient of Variation	0.971				Skewness		2.003
633												
634						Normal GOF Test						
635					Shapiro Wilk Test Statistic	0.739				**Shapiro Wilk GOF Test**		
636					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
637					Lilliefors Test Statistic	0.367				**Lilliefors GOF Test**		
638					5% Lilliefors Critical Value	0.229				Data Not Normal at 5% Significance Level		
639						Data Not Normal at 5% Significance Level						
640												
641						Assuming Normal Distribution						
642					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
643					95% Student's-t UCL	0.299				95% Adjusted-CLT UCL (Chen-1995)		0.321
644										95% Modified-t UCL (Johnson-1978)		0.303
645												
646						Gamma GOF Test						
647					A-D Test Statistic	1.074				**Anderson-Darling Gamma GOF Test**		
648					5% A-D Critical Value	0.762				Data Not Gamma Distributed at 5% Significance Level		
649					K-S Test Statistic	0.296				**Kolmogrov-Smirnoff Gamma GOF Test**		
650					5% K-S Critical Value	0.228				Data Not Gamma Distributed at 5% Significance Level		
651						Data Not Gamma Distributed at 5% Significance Level						
652												
653						Gamma Statistics						
654					k hat (MLE)	1.042				k star (bias corrected MLE)		0.878
655					Theta hat (MLE)	0.199				Theta star (bias corrected MLE)		0.236
656					nu hat (MLE)	31.27				nu star (bias corrected)		26.35
657					MLE Mean (bias corrected)	0.207				MLE Sd (bias corrected)		0.221
658										Approximate Chi Square Value (0.05)		15.65
659					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		14.64
660												
661						Assuming Gamma Distribution						
662					95% Approximate Gamma UCL (use when n>=50))	0.349				95% Adjusted Gamma UCL (use when n<50)		0.373
663												
664						Lognormal GOF Test						
665					Shapiro Wilk Test Statistic	0.839				**Shapiro Wilk Lognormal GOF Test**		
666					5% Shapiro Wilk Critical Value	0.881				Data Not Lognormal at 5% Significance Level		
667					Lilliefors Test Statistic	0.333				**Lilliefors Lognormal GOF Test**		
668					5% Lilliefors Critical Value	0.229				Data Not Lognormal at 5% Significance Level		
669						Data Not Lognormal at 5% Significance Level						
670												
671						Lognormal Statistics						
672					Minimum of Logged Data	-4.605				Mean of logged Data		-2.126
673					Maximum of Logged Data	-0.223				SD of logged Data		1.285
674												
675						Assuming Lognormal Distribution						
676					95% H-UCL	0.824				90% Chebyshev (MVUE) UCL		0.529

677				95% Chebyshev (MVUE) UCL		0.655				97.5% Chebyshev (MVUE) UCL		0.83
678				99% Chebyshev (MVUE) UCL		1.175						
679												
680						**Nonparametric Distribution Free UCL Statistics**						
681						**Data do not follow a Discernible Distribution (0.05)**						
682												
683						**Nonparametric Distribution Free UCLs**						
684				95% CLT UCL		0.293				95% Jackknife UCL		0.299
685				95% Standard Bootstrap UCL		0.289				95% Bootstrap-t UCL		0.365
686				95% Hall's Bootstrap UCL		0.793				95% Percentile Bootstrap UCL		0.298
687				95% BCA Bootstrap UCL		0.324						
688				90% Chebyshev(Mean, Sd) UCL		0.363				95% Chebyshev(Mean, Sd) UCL		0.433
689				97.5% Chebyshev(Mean, Sd) UCL		0.531				99% Chebyshev(Mean, Sd) UCL		0.724
690												
691						**Suggested UCL to Use**						
692				95% Chebyshev (Mean, Sd) UCL		0.433						
693												
694						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
695						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
696						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
697						For additional insight the user may want to consult a statistician.						
698												
699												
700	**Nickel**											
701												
702						**General Statistics**						
703				Total Number of Observations		15				Number of Distinct Observations		14
704										Number of Missing Observations		0
705				Minimum		21				Mean		594.9
706				Maximum		3787				Median		275.6
707				SD		965.1				Std. Error of Mean		249.2
708				Coefficient of Variation		1.622				Skewness		2.97
709												
710						**Normal GOF Test**						
711				Shapiro Wilk Test Statistic		0.593				**Shapiro Wilk GOF Test**		
712				5% Shapiro Wilk Critical Value		0.881				Data Not Normal at 5% Significance Level		
713				Lilliefors Test Statistic		0.31				**Lilliefors GOF Test**		
714				5% Lilliefors Critical Value		0.229				Data Not Normal at 5% Significance Level		
715						**Data Not Normal at 5% Significance Level**						
716												
717						**Assuming Normal Distribution**						
718				**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**		
719				95% Student's-t UCL		1034				95% Adjusted-CLT UCL (Chen-1995)		1209
720										95% Modified-t UCL (Johnson-1978)		1066
721												
722						**Gamma GOF Test**						
723				A-D Test Statistic		0.466				**Anderson-Darling Gamma GOF Test**		
724				5% A-D Critical Value		0.779				Detected data appear Gamma Distributed at 5% Significance Level		
725				K-S Test Statistic		0.155				**Kolmogrov-Smirnoff Gamma GOF Test**		
726				5% K-S Critical Value		0.231				Detected data appear Gamma Distributed at 5% Significance Level		
727						**Detected data appear Gamma Distributed at 5% Significance Level**						
728												

	A	B	C	D	E	F	G	H	I	J	K	L
729						Gamma Statistics						
730					k hat (MLE)	0.693					k star (bias corrected MLE)	0.599
731					Theta hat (MLE)	857.9					Theta star (bias corrected MLE)	992.9
732					nu hat (MLE)	20.8					nu star (bias corrected)	17.98
733					MLE Mean (bias corrected)	594.9					MLE Sd (bias corrected)	768.6
734											Approximate Chi Square Value (0.05)	9.374
735					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	8.617
736												
737						Assuming Gamma Distribution						
738					95% Approximate Gamma UCL (use when n>=50)	1141					95% Adjusted Gamma UCL (use when n<50)	1241
739												
740						Lognormal GOF Test						
741					Shapiro Wilk Test Statistic	0.97					Shapiro Wilk Lognormal GOF Test	
742					5% Shapiro Wilk Critical Value	0.881					Data appear Lognormal at 5% Significance Level	
743					Lilliefors Test Statistic	0.113					Lilliefors Lognormal GOF Test	
744					5% Lilliefors Critical Value	0.229					Data appear Lognormal at 5% Significance Level	
745						Data appear Lognormal at 5% Significance Level						
746												
747						Lognormal Statistics						
748					Minimum of Logged Data	3.045					Mean of logged Data	5.516
749					Maximum of Logged Data	8.239					SD of logged Data	1.418
750												
751						Assuming Lognormal Distribution						
752					95% H-UCL	2520					90% Chebyshev (MVUE) UCL	1359
753					95% Chebyshev (MVUE) UCL	1701					97.5% Chebyshev (MVUE) UCL	2175
754					99% Chebyshev (MVUE) UCL	3107						
755												
756						Nonparametric Distribution Free UCL Statistics						
757						Data appear to follow a Discernible Distribution at 5% Significance Level						
758												
759						Nonparametric Distribution Free UCLs						
760					95% CLT UCL	1005					95% Jackknife UCL	1034
761					95% Standard Bootstrap UCL	998.5					95% Bootstrap-t UCL	1995
762					95% Hall's Bootstrap UCL	2614					95% Percentile Bootstrap UCL	1032
763					95% BCA Bootstrap UCL	1245						
764					90% Chebyshev(Mean, Sd) UCL	1342					95% Chebyshev(Mean, Sd) UCL	1681
765					97.5% Chebyshev(Mean, Sd) UCL	2151					99% Chebyshev(Mean, Sd) UCL	3074
766												
767						Suggested UCL to Use						
768					95% Adjusted Gamma UCL	1241						
769												
770						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
771						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
772						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
773						For additional insight the user may want to consult a statistician.						
774												
775												
776	PAH, Total											
777												
778						General Statistics						
779					Total Number of Observations	15					Number of Distinct Observations	6
780											Number of Missing Observations	0

	A	B	C	D	E	F	G	H	I	J	K	L
781					Minimum	0.0077					Mean	0.635
782					Maximum	2.445					Median	0.635
783					SD	0.543					Std. Error of Mean	0.14
784					Coefficient of Variation	0.855					Skewness	2.804
785												
786					Normal GOF Test							
787					Shapiro Wilk Test Statistic	0.584	Shapiro Wilk GOF Test					
788					5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level					
789					Lilliefors Test Statistic	0.433	Lilliefors GOF Test					
790					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
791					Data Not Normal at 5% Significance Level							
792												
793					Assuming Normal Distribution							
794				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
795					95% Student's-t UCL	0.882					95% Adjusted-CLT UCL (Chen-1995)	0.974
796											95% Modified-t UCL (Johnson-1978)	0.899
797												
798					Gamma GOF Test							
799					A-D Test Statistic	2.413	Anderson-Darling Gamma GOF Test					
800					5% A-D Critical Value	0.76	Data Not Gamma Distributed at 5% Significance Level					
801					K-S Test Statistic	0.388	Kolmogrov-Smirnoff Gamma GOF Test					
802					5% K-S Critical Value	0.227	Data Not Gamma Distributed at 5% Significance Level					
803					Data Not Gamma Distributed at 5% Significance Level							
804												
805					Gamma Statistics							
806					k hat (MLE)	1.153					k star (bias corrected MLE)	0.967
807					Theta hat (MLE)	0.551					Theta star (bias corrected MLE)	0.657
808					nu hat (MLE)	34.6					nu star (bias corrected)	29.01
809					MLE Mean (bias corrected)	0.635					MLE Sd (bias corrected)	0.646
810											Approximate Chi Square Value (0.05)	17.72
811					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	16.64
812												
813					Assuming Gamma Distribution							
814					95% Approximate Gamma UCL (use when n>=50))	1.04					95% Adjusted Gamma UCL (use when n<50)	1.108
815												
816					Lognormal GOF Test							
817					Shapiro Wilk Test Statistic	0.62	Shapiro Wilk Lognormal GOF Test					
818					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
819					Lilliefors Test Statistic	0.431	Lilliefors Lognormal GOF Test					
820					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
821					Data Not Lognormal at 5% Significance Level							
822												
823					Lognormal Statistics							
824					Minimum of Logged Data	-4.867					Mean of logged Data	-0.946
825					Maximum of Logged Data	0.894					SD of logged Data	1.435
826												
827					Assuming Lognormal Distribution							
828					95% H-UCL	4.149					90% Chebyshev (MVUE) UCL	2.184
829					95% Chebyshev (MVUE) UCL	2.736					97.5% Chebyshev (MVUE) UCL	3.502
830					99% Chebyshev (MVUE) UCL	5.007						
831												
832					Nonparametric Distribution Free UCL Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
833	Data do not follow a Discernible Distribution (0.05)											
834												
835	Nonparametric Distribution Free UCLs											
836					95% CLT UCL	0.866				95% Jackknife UCL		0.882
837					95% Standard Bootstrap UCL	0.862				95% Bootstrap-t UCL		1.052
838					95% Hall's Bootstrap UCL	1.953				95% Percentile Bootstrap UCL		0.887
839					95% BCA Bootstrap UCL	0.968						
840					90% Chebyshev(Mean, Sd) UCL	1.056				95% Chebyshev(Mean, Sd) UCL		1.246
841					97.5% Chebyshev(Mean, Sd) UCL	1.51				99% Chebyshev(Mean, Sd) UCL		2.03
842												
843	Suggested UCL to Use											
844					95% Chebyshev (Mean, Sd) UCL	1.246						
845												
846	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
847	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
848	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
849	For additional insight the user may want to consult a statistician.											
850												
851												
852	PCB, Total											
853												
854	General Statistics											
855					Total Number of Observations	15				Number of Distinct Observations		5
856										Number of Missing Observations		0
857					Minimum	5				Mean		13.09
858					Maximum	55				Median		6.4
859					SD	16.19				Std. Error of Mean		4.18
860					Coefficient of Variation	1.236				Skewness		2.325
861												
862	Normal GOF Test											
863					Shapiro Wilk Test Statistic	0.531				Shapiro Wilk GOF Test		
864					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
865					Lilliefors Test Statistic	0.442				Lilliefors GOF Test		
866					5% Lilliefors Critical Value	0.229				Data Not Normal at 5% Significance Level		
867	Data Not Normal at 5% Significance Level											
868												
869	Assuming Normal Distribution											
870			95% Normal UCL							95% UCLs (Adjusted for Skewness)		
871					95% Student's-t UCL	20.46				95% Adjusted-CLT UCL (Chen-1995)		22.65
872										95% Modified-t UCL (Johnson-1978)		20.87
873												
874	Gamma GOF Test											
875					A-D Test Statistic	2.364				Anderson-Darling Gamma GOF Test		
876					5% A-D Critical Value	0.756				Data Not Gamma Distributed at 5% Significance Level		
877					K-S Test Statistic	0.372				Kolmogrov-Smirnoff Gamma GOF Test		
878					5% K-S Critical Value	0.226				Data Not Gamma Distributed at 5% Significance Level		
879	Data Not Gamma Distributed at 5% Significance Level											
880												
881	Gamma Statistics											
882					k hat (MLE)	1.387				k star (bias corrected MLE)		1.154
883					Theta hat (MLE)	9.437				Theta star (bias corrected MLE)		11.34
884					nu hat (MLE)	41.62				nu star (bias corrected)		34.63

	A	B	C	D	E	F	G	H	I	J	K	L
885					MLE Mean (bias corrected)	13.09					MLE Sd (bias corrected)	12.19
886											Approximate Chi Square Value (0.05)	22.17
887					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	20.95
888												
889					**Assuming Gamma Distribution**							
890					95% Approximate Gamma UCL (use when n>=50))	20.45					95% Adjusted Gamma UCL (use when n<50)	21.65
891												
892					**Lognormal GOF Test**							
893					Shapiro Wilk Test Statistic	0.701			**Shapiro Wilk Lognormal GOF Test**			
894					5% Shapiro Wilk Critical Value	0.881			Data Not Lognormal at 5% Significance Level			
895					Lilliefors Test Statistic	0.3			**Lilliefors Lognormal GOF Test**			
896					5% Lilliefors Critical Value	0.229			Data Not Lognormal at 5% Significance Level			
897					**Data Not Lognormal at 5% Significance Level**							
898												
899					**Lognormal Statistics**							
900					Minimum of Logged Data	1.609					Mean of logged Data	2.17
901					Maximum of Logged Data	4.007					SD of logged Data	0.793
902												
903					**Assuming Lognormal Distribution**							
904					95% H-UCL	20.08					90% Chebyshev (MVUE) UCL	19.33
905					95% Chebyshev (MVUE) UCL	22.8					97.5% Chebyshev (MVUE) UCL	27.61
906					99% Chebyshev (MVUE) UCL	37.05						
907												
908					**Nonparametric Distribution Free UCL Statistics**							
909					**Data do not follow a Discernible Distribution (0.05)**							
910												
911					**Nonparametric Distribution Free UCLs**							
912					95% CLT UCL	19.97					95% Jackknife UCL	20.46
913					95% Standard Bootstrap UCL	19.8					95% Bootstrap-t UCL	55.85
914					95% Hall's Bootstrap UCL	64.32					95% Percentile Bootstrap UCL	20.09
915					95% BCA Bootstrap UCL	22.67						
916					90% Chebyshev(Mean, Sd) UCL	25.63					95% Chebyshev(Mean, Sd) UCL	31.31
917					97.5% Chebyshev(Mean, Sd) UCL	39.2					99% Chebyshev(Mean, Sd) UCL	54.69
918												
919					**Suggested UCL to Use**							
920					95% Chebyshev (Mean, Sd) UCL	31.31						
921												
922					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
923					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
924					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
925					For additional insight the user may want to consult a statistician.							
926												
927												
928	**Thallium**											
929												
930					**General Statistics**							
931					Total Number of Observations	15					Number of Distinct Observations	8
932											Number of Missing Observations	0
933					Minimum	0.15					Mean	8.133
934					Maximum	15.2					Median	8.133
935					SD	4.867					Std. Error of Mean	1.257
936					Coefficient of Variation	0.598					Skewness	-0.4

	A	B	C	D	E	F	G	H	I	J	K	L
937												
938						**Normal GOF Test**						
939					Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**					
940					5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level					
941					Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**					
942					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
943						**Data Not Normal at 5% Significance Level**						
944												
945						**Assuming Normal Distribution**						
946				**95% Normal UCL**			**95% UCLs (Adjusted for Skewness)**					
947					95% Student's-t UCL	10.35			95% Adjusted-CLT UCL (Chen-1995)			10.06
948									95% Modified-t UCL (Johnson-1978)			10.32
949												
950						**Gamma GOF Test**						
951					A-D Test Statistic	2.285	**Anderson-Darling Gamma GOF Test**					
952					5% A-D Critical Value	0.763	Data Not Gamma Distributed at 5% Significance Level					
953					K-S Test Statistic	0.432	**Kolmogrov-Smirnoff Gamma GOF Test**					
954					5% K-S Critical Value	0.228	Data Not Gamma Distributed at 5% Significance Level					
955						**Data Not Gamma Distributed at 5% Significance Level**						
956												
957						**Gamma Statistics**						
958					k hat (MLE)	1.01			k star (bias corrected MLE)			0.852
959					Theta hat (MLE)	8.055			Theta star (bias corrected MLE)			9.543
960					nu hat (MLE)	30.29			nu star (bias corrected)			25.57
961					MLE Mean (bias corrected)	8.133			MLE Sd (bias corrected)			8.81
962									Approximate Chi Square Value (0.05)			15.05
963					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value			14.06
964												
965						**Assuming Gamma Distribution**						
966					95% Approximate Gamma UCL (use when n>=50))	13.82			95% Adjusted Gamma UCL (use when n<50)			14.79
967												
968						**Lognormal GOF Test**						
969					Shapiro Wilk Test Statistic	0.646	**Shapiro Wilk Lognormal GOF Test**					
970					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
971					Lilliefors Test Statistic	0.441	**Lilliefors Lognormal GOF Test**					
972					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
973						**Data Not Lognormal at 5% Significance Level**						
974												
975						**Lognormal Statistics**						
976					Minimum of Logged Data	-1.897			Mean of logged Data			1.525
977					Maximum of Logged Data	2.721			SD of logged Data			1.585
978												
979						**Assuming Lognormal Distribution**						
980					95% H-UCL	79.71			90% Chebyshev (MVUE) UCL			33.19
981					95% Chebyshev (MVUE) UCL	41.97			97.5% Chebyshev (MVUE) UCL			54.17
982					99% Chebyshev (MVUE) UCL	78.12						
983												
984						**Nonparametric Distribution Free UCL Statistics**						
985						**Data do not follow a Discernible Distribution (0.05)**						
986												
987						**Nonparametric Distribution Free UCLs**						
988					95% CLT UCL	10.2			95% Jackknife UCL			10.35

	A	B	C	D	E	F	G	H	I	J	K	L
989					95% Standard Bootstrap UCL	10.05				95% Bootstrap-t UCL		10.3
990					95% Hall's Bootstrap UCL	10.18				95% Percentile Bootstrap UCL		9.981
991					95% BCA Bootstrap UCL	9.94						
992					90% Chebyshev(Mean, Sd) UCL	11.9				95% Chebyshev(Mean, Sd) UCL		13.61
993					97.5% Chebyshev(Mean, Sd) UCL	15.98				99% Chebyshev(Mean, Sd) UCL		20.64
994												
995					**Suggested UCL to Use**							
996					99% Chebyshev (Mean, Sd) UCL	20.64						
997												
998					**Recommended UCL exceeds the maximum observation**							
999												
1000	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1001	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1002	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1003	For additional insight the user may want to consult a statistician.											
1004												
1005	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1006	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1007												
1008												
1009	**Uranium**											
1010												
1011					**General Statistics**							
1012					Total Number of Observations	15				Number of Distinct Observations		14
1013										Number of Missing Observations		0
1014					Minimum	10				Mean		95.13
1015					Maximum	259.3				Median		62.87
1016					SD	74.58				Std. Error of Mean		19.26
1017					Coefficient of Variation	0.784				Skewness		1.143
1018												
1019					**Normal GOF Test**							
1020					Shapiro Wilk Test Statistic	0.878				**Shapiro Wilk GOF Test**		
1021					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
1022					Lilliefors Test Statistic	0.201				**Lilliefors GOF Test**		
1023					5% Lilliefors Critical Value	0.229				Data appear Normal at 5% Significance Level		
1024					**Data appear Approximate Normal at 5% Significance Level**							
1025												
1026					**Assuming Normal Distribution**							
1027					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1028					95% Student's-t UCL	129				95% Adjusted-CLT UCL (Chen-1995)		132.9
1029										95% Modified-t UCL (Johnson-1978)		130
1030												
1031					**Gamma GOF Test**							
1032					A-D Test Statistic	0.307				**Anderson-Darling Gamma GOF Test**		
1033					5% A-D Critical Value	0.753				Detected data appear Gamma Distributed at 5% Significance Level		
1034					K-S Test Statistic	0.125				**Kolmogrov-Smirnoff Gamma GOF Test**		
1035					5% K-S Critical Value	0.225				Detected data appear Gamma Distributed at 5% Significance Level		
1036					**Detected data appear Gamma Distributed at 5% Significance Level**							
1037												
1038					**Gamma Statistics**							
1039					k hat (MLE)	1.572				k star (bias corrected MLE)		1.302
1040					Theta hat (MLE)	60.53				Theta star (bias corrected MLE)		73.08

	A	B	C	D	E	F	G	H	I	J	K	L
1041					nu hat (MLE)	47.15				nu star (bias corrected)		39.05
1042					MLE Mean (bias corrected)	95.13				MLE Sd (bias corrected)		83.38
1043										Approximate Chi Square Value (0.05)		25.74
1044					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		24.41
1045												
1046					**Assuming Gamma Distribution**							
1047				95% Approximate Gamma UCL (use when n>=50))		144.3				95% Adjusted Gamma UCL (use when n<50)		152.2
1048												
1049					**Lognormal GOF Test**							
1050					Shapiro Wilk Test Statistic	0.914			**Shapiro Wilk Lognormal GOF Test**			
1051					5% Shapiro Wilk Critical Value	0.881			Data appear Lognormal at 5% Significance Level			
1052					Lilliefors Test Statistic	0.179			**Lilliefors Lognormal GOF Test**			
1053					5% Lilliefors Critical Value	0.229			Data appear Lognormal at 5% Significance Level			
1054					**Data appear Lognormal at 5% Significance Level**							
1055												
1056					**Lognormal Statistics**							
1057					Minimum of Logged Data	2.303				Mean of logged Data		4.205
1058					Maximum of Logged Data	5.558				SD of logged Data		0.971
1059												
1060					**Assuming Lognormal Distribution**							
1061					95% H-UCL	216.3				90% Chebyshev (MVUE) UCL		187.1
1062					95% Chebyshev (MVUE) UCL	225.3				97.5% Chebyshev (MVUE) UCL		278.3
1063					99% Chebyshev (MVUE) UCL	382.4						
1064												
1065					**Nonparametric Distribution Free UCL Statistics**							
1066					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
1067												
1068					**Nonparametric Distribution Free UCLs**							
1069					95% CLT UCL	126.8				95% Jackknife UCL		129
1070					95% Standard Bootstrap UCL	125.3				95% Bootstrap-t UCL		140.1
1071					95% Hall's Bootstrap UCL	158				95% Percentile Bootstrap UCL		128.5
1072					95% BCA Bootstrap UCL	132.1						
1073					90% Chebyshev(Mean, Sd) UCL	152.9				95% Chebyshev(Mean, Sd) UCL		179.1
1074					97.5% Chebyshev(Mean, Sd) UCL	215.4				99% Chebyshev(Mean, Sd) UCL		286.7
1075												
1076					**Suggested UCL to Use**							
1077					95% Student's-t UCL	129						
1078												
1079	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1080	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1081	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1082	For additional insight the user may want to consult a statistician.											
1083												
1084												
1085	**Uranium-234**											
1086												
1087					**General Statistics**							
1088					Total Number of Observations	15				Number of Distinct Observations		8
1089										Number of Missing Observations		0
1090					Minimum	0.666				Mean		3.077
1091					Maximum	10.7				Median		3.077
1092					SD	2.366				Std. Error of Mean		0.611

	A	B	C	D	E	F	G	H	I	J	K	L
1093					Coefficient of Variation	0.769					Skewness	2.491
1094												
1095					Normal GOF Test							
1096					Shapiro Wilk Test Statistic	0.658	Shapiro Wilk GOF Test					
1097					5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level					
1098					Lilliefors Test Statistic	0.332	Lilliefors GOF Test					
1099					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
1100					Data Not Normal at 5% Significance Level							
1101												
1102					Assuming Normal Distribution							
1103			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
1104					95% Student's-t UCL	4.153					95% Adjusted-CLT UCL (Chen-1995)	4.502
1105											95% Modified-t UCL (Johnson-1978)	4.219
1106												
1107					Gamma GOF Test							
1108					A-D Test Statistic	1.48	Anderson-Darling Gamma GOF Test					
1109					5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level					
1110					K-S Test Statistic	0.321	Kolmogrov-Smirnoff Gamma GOF Test					
1111					5% K-S Critical Value	0.224	Data Not Gamma Distributed at 5% Significance Level					
1112					Data Not Gamma Distributed at 5% Significance Level							
1113												
1114					Gamma Statistics							
1115					k hat (MLE)	2.28					k star (bias corrected MLE)	1.868
1116					Theta hat (MLE)	1.35					Theta star (bias corrected MLE)	1.647
1117					nu hat (MLE)	68.4					nu star (bias corrected)	56.05
1118					MLE Mean (bias corrected)	3.077					MLE Sd (bias corrected)	2.251
1119											Approximate Chi Square Value (0.05)	39.85
1120					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	38.17
1121												
1122					Assuming Gamma Distribution							
1123					95% Approximate Gamma UCL (use when n>=50))	4.329					95% Adjusted Gamma UCL (use when n<50)	4.519
1124												
1125					Lognormal GOF Test							
1126					Shapiro Wilk Test Statistic	0.817	Shapiro Wilk Lognormal GOF Test					
1127					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
1128					Lilliefors Test Statistic	0.359	Lilliefors Lognormal GOF Test					
1129					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
1130					Data Not Lognormal at 5% Significance Level							
1131												
1132					Lognormal Statistics							
1133					Minimum of Logged Data	-0.406					Mean of logged Data	0.889
1134					Maximum of Logged Data	2.37					SD of logged Data	0.734
1135												
1136					Assuming Lognormal Distribution							
1137					95% H-UCL	5.054					90% Chebyshev (MVUE) UCL	4.993
1138					95% Chebyshev (MVUE) UCL	5.843					97.5% Chebyshev (MVUE) UCL	7.022
1139					99% Chebyshev (MVUE) UCL	9.339						
1140												
1141					Nonparametric Distribution Free UCL Statistics							
1142					Data do not follow a Discernible Distribution (0.05)							
1143												
1144					Nonparametric Distribution Free UCLs							

	A	B	C	D	E	F	G	H	I	J	K	L
1145					95% CLT UCL	4.082					95% Jackknife UCL	4.153
1146					95% Standard Bootstrap UCL	4.062					95% Bootstrap-t UCL	4.777
1147					95% Hall's Bootstrap UCL	8.824					95% Percentile Bootstrap UCL	4.137
1148					95% BCA Bootstrap UCL	4.474						
1149					90% Chebyshev(Mean, Sd) UCL	4.91					95% Chebyshev(Mean, Sd) UCL	5.74
1150					97.5% Chebyshev(Mean, Sd) UCL	6.892					99% Chebyshev(Mean, Sd) UCL	9.156
1151												
1152					**Suggested UCL to Use**							
1153					95% Chebyshev (Mean, Sd) UCL	5.74						
1154												
1155	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1156	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1157	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1158	For additional insight the user may want to consult a statistician.											
1159												
1160												
1161	**Uranium-235**											
1162												
1163					**General Statistics**							
1164					Total Number of Observations	15					Number of Distinct Observations	8
1165											Number of Missing Observations	0
1166					Minimum	0.0454					Mean	0.162
1167					Maximum	0.43					Median	0.162
1168					SD	0.0951					Std. Error of Mean	0.0245
1169					Coefficient of Variation	0.588					Skewness	1.562
1170												
1171					**Normal GOF Test**							
1172					Shapiro Wilk Test Statistic	0.794			**Shapiro Wilk GOF Test**			
1173					5% Shapiro Wilk Critical Value	0.881			Data Not Normal at 5% Significance Level			
1174					Lilliefors Test Statistic	0.3			**Lilliefors GOF Test**			
1175					5% Lilliefors Critical Value	0.229			Data Not Normal at 5% Significance Level			
1176					**Data Not Normal at 5% Significance Level**							
1177												
1178					**Assuming Normal Distribution**							
1179			**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**			
1180					95% Student's-t UCL	0.205			95% Adjusted-CLT UCL (Chen-1995)			0.213
1181									95% Modified-t UCL (Johnson-1978)			0.207
1182												
1183					**Gamma GOF Test**							
1184					A-D Test Statistic	1.132			**Anderson-Darling Gamma GOF Test**			
1185					5% A-D Critical Value	0.743			Data Not Gamma Distributed at 5% Significance Level			
1186					K-S Test Statistic	0.306			**Kolmogrov-Smirnoff Gamma GOF Test**			
1187					5% K-S Critical Value	0.223			Data Not Gamma Distributed at 5% Significance Level			
1188					**Data Not Gamma Distributed at 5% Significance Level**							
1189												
1190					**Gamma Statistics**							
1191					k hat (MLE)	3.328			k star (bias corrected MLE)			2.707
1192					Theta hat (MLE)	0.0486			Theta star (bias corrected MLE)			0.0598
1193					nu hat (MLE)	99.84			nu star (bias corrected)			81.21
1194					MLE Mean (bias corrected)	0.162			MLE Sd (bias corrected)			0.0983
1195									Approximate Chi Square Value (0.05)			61.44
1196					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value			59.33

	A	B	C	D	E	F	G	H	I	J	K	L
1197												
1198						Assuming Gamma Distribution						
1199					95% Approximate Gamma UCL (use when n>=50))	0.214				95% Adjusted Gamma UCL (use when n<50)		0.221
1200												
1201						Lognormal GOF Test						
1202					Shapiro Wilk Test Statistic	0.867				Shapiro Wilk Lognormal GOF Test		
1203					5% Shapiro Wilk Critical Value	0.881				Data Not Lognormal at 5% Significance Level		
1204					Lilliefors Test Statistic	0.337				Lilliefors Lognormal GOF Test		
1205					5% Lilliefors Critical Value	0.229				Data Not Lognormal at 5% Significance Level		
1206						Data Not Lognormal at 5% Significance Level						
1207												
1208						Lognormal Statistics						
1209					Minimum of Logged Data	-3.092				Mean of logged Data		-1.979
1210					Maximum of Logged Data	-0.844				SD of logged Data		0.601
1211												
1212						Assuming Lognormal Distribution						
1213					95% H-UCL	0.235				90% Chebyshev (MVUE) UCL		0.242
1214					95% Chebyshev (MVUE) UCL	0.278				97.5% Chebyshev (MVUE) UCL		0.328
1215					99% Chebyshev (MVUE) UCL	0.426						
1216												
1217						Nonparametric Distribution Free UCL Statistics						
1218						Data do not follow a Discernible Distribution (0.05)						
1219												
1220						Nonparametric Distribution Free UCLs						
1221					95% CLT UCL	0.202				95% Jackknife UCL		0.205
1222					95% Standard Bootstrap UCL	0.201				95% Bootstrap-t UCL		0.22
1223					95% Hall's Bootstrap UCL	0.445				95% Percentile Bootstrap UCL		0.203
1224					95% BCA Bootstrap UCL	0.209						
1225					90% Chebyshev(Mean, Sd) UCL	0.235				95% Chebyshev(Mean, Sd) UCL		0.269
1226					97.5% Chebyshev(Mean, Sd) UCL	0.315				99% Chebyshev(Mean, Sd) UCL		0.406
1227												
1228						Suggested UCL to Use						
1229					95% Chebyshev (Mean, Sd) UCL	0.269						
1230												
1231						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
1232						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
1233						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
1234						For additional insight the user may want to consult a statistician.						
1235												
1236												
1237	Uranium-238											
1238												
1239						General Statistics						
1240					Total Number of Observations	15				Number of Distinct Observations		8
1241										Number of Missing Observations		0
1242					Minimum	0.765				Mean		4.891
1243					Maximum	18.7				Median		4.891
1244					SD	4.21				Std. Error of Mean		1.087
1245					Coefficient of Variation	0.861				Skewness		2.681
1246												
1247						Normal GOF Test						
1248					Shapiro Wilk Test Statistic	0.628				Shapiro Wilk GOF Test		

	A	B	C	D	E	F	G	H	I	J	K	L
1249					5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level					
1250					Lilliefors Test Statistic	0.367	**Lilliefors GOF Test**					
1251					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
1252	**Data Not Normal at 5% Significance Level**											
1253												
1254	**Assuming Normal Distribution**											
1255	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1256					95% Student's-t UCL	6.805	95% Adjusted-CLT UCL (Chen-1995)					7.482
1257							95% Modified-t UCL (Johnson-1978)					6.93
1258												
1259	**Gamma GOF Test**											
1260					A-D Test Statistic	1.535	**Anderson-Darling Gamma GOF Test**					
1261					5% A-D Critical Value	0.748	Data Not Gamma Distributed at 5% Significance Level					
1262					K-S Test Statistic	0.305	**Kolmogrov-Smirnoff Gamma GOF Test**					
1263					5% K-S Critical Value	0.225	Data Not Gamma Distributed at 5% Significance Level					
1264	**Data Not Gamma Distributed at 5% Significance Level**											
1265												
1266	**Gamma Statistics**											
1267					k hat (MLE)	1.889	k star (bias corrected MLE)					1.556
1268					Theta hat (MLE)	2.589	Theta star (bias corrected MLE)					3.144
1269					nu hat (MLE)	56.67	nu star (bias corrected)					46.67
1270					MLE Mean (bias corrected)	4.891	MLE Sd (bias corrected)					3.921
1271							Approximate Chi Square Value (0.05)					31.99
1272					Adjusted Level of Significance	0.0324	Adjusted Chi Square Value					30.5
1273												
1274	**Assuming Gamma Distribution**											
1275					95% Approximate Gamma UCL (use when n>=50))	7.134	95% Adjusted Gamma UCL (use when n<50)					7.483
1276												
1277	**Lognormal GOF Test**											
1278					Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk Lognormal GOF Test**					
1279					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
1280					Lilliefors Test Statistic	0.348	**Lilliefors Lognormal GOF Test**					
1281					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
1282	**Data Not Lognormal at 5% Significance Level**											
1283												
1284	**Lognormal Statistics**											
1285					Minimum of Logged Data	-0.268	Mean of logged Data					1.3
1286					Maximum of Logged Data	2.929	SD of logged Data					0.82
1287												
1288	**Assuming Lognormal Distribution**											
1289					95% H-UCL	8.82	90% Chebyshev (MVUE) UCL					8.378
1290					95% Chebyshev (MVUE) UCL	9.913	97.5% Chebyshev (MVUE) UCL					12.04
1291					99% Chebyshev (MVUE) UCL	16.23						
1292												
1293	**Nonparametric Distribution Free UCL Statistics**											
1294	**Data do not follow a Discernible Distribution (0.05)**											
1295												
1296	**Nonparametric Distribution Free UCLs**											
1297					95% CLT UCL	6.678	95% Jackknife UCL					6.805
1298					95% Standard Bootstrap UCL	6.613	95% Bootstrap-t UCL					7.944
1299					95% Hall's Bootstrap UCL	14.78	95% Percentile Bootstrap UCL					6.731
1300					95% BCA Bootstrap UCL	7.471						

	A	B	C	D	E	F	G	H	I	J	K	L
1301				90% Chebyshev(Mean, Sd) UCL		8.151				95% Chebyshev(Mean, Sd) UCL		9.628
1302				97.5% Chebyshev(Mean, Sd) UCL		11.68				99% Chebyshev(Mean, Sd) UCL		15.71
1303												
1304						**Suggested UCL to Use**						
1305				95% Chebyshev (Mean, Sd) UCL		9.628						
1306												
1307					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1308					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1309					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1310					For additional insight the user may want to consult a statistician.							
1311												
1312												
1313	**Vanadium**											
1314												
1315						**General Statistics**						
1316					Total Number of Observations	15				Number of Distinct Observations		10
1317										Number of Missing Observations		0
1318					Minimum	11.4				Mean		58.64
1319					Maximum	122				Median		70
1320					SD	37.78				Std. Error of Mean		9.756
1321					Coefficient of Variation	0.644				Skewness		0.271
1322												
1323						**Normal GOF Test**						
1324					Shapiro Wilk Test Statistic	0.874				**Shapiro Wilk GOF Test**		
1325					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
1326					Lilliefors Test Statistic	0.218				**Lilliefors GOF Test**		
1327					5% Lilliefors Critical Value	0.229				Data appear Normal at 5% Significance Level		
1328						**Data appear Approximate Normal at 5% Significance Level**						
1329												
1330						**Assuming Normal Distribution**						
1331					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1332					95% Student's-t UCL	75.82				95% Adjusted-CLT UCL (Chen-1995)		75.42
1333										95% Modified-t UCL (Johnson-1978)		75.94
1334												
1335						**Gamma GOF Test**						
1336					A-D Test Statistic	0.924				**Anderson-Darling Gamma GOF Test**		
1337					5% A-D Critical Value	0.747				Data Not Gamma Distributed at 5% Significance Level		
1338					K-S Test Statistic	0.289				**Kolmogrov-Smirnoff Gamma GOF Test**		
1339					5% K-S Critical Value	0.224				Data Not Gamma Distributed at 5% Significance Level		
1340						**Data Not Gamma Distributed at 5% Significance Level**						
1341												
1342						**Gamma Statistics**						
1343					k hat (MLE)	2.076				k star (bias corrected MLE)		1.705
1344					Theta hat (MLE)	28.25				Theta star (bias corrected MLE)		34.39
1345					nu hat (MLE)	62.28				nu star (bias corrected)		51.16
1346					MLE Mean (bias corrected)	58.64				MLE Sd (bias corrected)		44.91
1347										Approximate Chi Square Value (0.05)		35.73
1348					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		34.15
1349												
1350						**Assuming Gamma Distribution**						
1351					95% Approximate Gamma UCL (use when n>=50))	83.96				95% Adjusted Gamma UCL (use when n<50)		87.85
1352												

	A	B	C	D	E	F	G	H	I	J	K	L
1353					Lognormal GOF Test							
1354					Shapiro Wilk Test Statistic	0.867	Shapiro Wilk Lognormal GOF Test					
1355					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
1356					Lilliefors Test Statistic	0.306	Lilliefors Lognormal GOF Test					
1357					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
1358					Data Not Lognormal at 5% Significance Level							
1359												
1360					Lognormal Statistics							
1361					Minimum of Logged Data	2.434			Mean of logged Data			3.812
1362					Maximum of Logged Data	4.804			SD of logged Data			0.808
1363												
1364					Assuming Lognormal Distribution							
1365					95% H-UCL	106.6			90% Chebyshev (MVUE) UCL			101.8
1366					95% Chebyshev (MVUE) UCL	120.3			97.5% Chebyshev (MVUE) UCL			146
1367					99% Chebyshev (MVUE) UCL	196.3						
1368												
1369					Nonparametric Distribution Free UCL Statistics							
1370					Data appear to follow a Discernible Distribution at 5% Significance Level							
1371												
1372					Nonparametric Distribution Free UCLs							
1373					95% CLT UCL	74.69			95% Jackknife UCL			75.82
1374					95% Standard Bootstrap UCL	73.97			95% Bootstrap-t UCL			75.39
1375					95% Hall's Bootstrap UCL	75.15			95% Percentile Bootstrap UCL			73.73
1376					95% BCA Bootstrap UCL	73.82						
1377					90% Chebyshev(Mean, Sd) UCL	87.91			95% Chebyshev(Mean, Sd) UCL			101.2
1378					97.5% Chebyshev(Mean, Sd) UCL	119.6			99% Chebyshev(Mean, Sd) UCL			155.7
1379												
1380					Suggested UCL to Use							
1381					95% Student's-t UCL	75.82						
1382												
1383					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1384					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1385					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1386					For additional insight the user may want to consult a statistician.							
1387												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 1:45:23 PM								
5	From File			EPC_015Sub_EU05.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Aluminum											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		5
15										Number of Missing Observations		0
16					Minimum	5640				Mean		8638
17					Maximum	13800				Median		8638
18					SD	1870				Std. Error of Mean		539.7
19					Coefficient of Variation	0.216				Skewness		1.779
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.684				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
26						Data Not Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	9607				95% Adjusted-CLT UCL (Chen-1995)		9821
31										95% Modified-t UCL (Johnson-1978)		9653
32												
33						Gamma GOF Test						
34					A-D Test Statistic	1.74				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.391				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
38						Data Not Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	26.3				k star (bias corrected MLE)		19.78
42					Theta hat (MLE)	328.5				Theta star (bias corrected MLE)		436.7
43					nu hat (MLE)	631.1				nu star (bias corrected)		474.7
44					MLE Mean (bias corrected)	8638				MLE Sd (bias corrected)		1942
45										Approximate Chi Square Value (0.05)		425.2
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		418
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	9644				95% Adjusted Gamma UCL (use when n<50)		9809
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.744				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.379				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	8.638				Mean of logged Data		9.045
60					Maximum of Logged Data	9.532				SD of logged Data		0.2
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62					Assuming Lognormal Distribution							
63					95% H-UCL	9665				90% Chebyshev (MVUE) UCL		10136
64				95% Chebyshev (MVUE) UCL		10817				97.5% Chebyshev (MVUE) UCL		11763
65				99% Chebyshev (MVUE) UCL		13622						
66												
67					Nonparametric Distribution Free UCL Statistics							
68					Data do not follow a Discernible Distribution (0.05)							
69												
70					Nonparametric Distribution Free UCLs							
71					95% CLT UCL	9525				95% Jackknife UCL		9607
72				95% Standard Bootstrap UCL		9498				95% Bootstrap-t UCL		9854
73				95% Hall's Bootstrap UCL		14520				95% Percentile Bootstrap UCL		9498
74				95% BCA Bootstrap UCL		9748						
75				90% Chebyshev(Mean, Sd) UCL		10257				95% Chebyshev(Mean, Sd) UCL		10990
76				97.5% Chebyshev(Mean, Sd) UCL		12008				99% Chebyshev(Mean, Sd) UCL		14008
77												
78					Suggested UCL to Use							
79					95% Student's-t UCL	9607				or 95% Modified-t UCL		9653
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Antimony											
88												
89					General Statistics							
90					Total Number of Observations	12			Number of Distinct Observations			12
91									Number of Missing Observations			0
92					Minimum	71.81			Mean			107.7
93					Maximum	177			Median			100.4
94					SD	27.63			Std. Error of Mean			7.975
95					Coefficient of Variation	0.257			Skewness			1.372
96												
97					Normal GOF Test							
98					Shapiro Wilk Test Statistic	0.882			Shapiro Wilk GOF Test			
99					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
100					Lilliefors Test Statistic	0.2			Lilliefors GOF Test			
101					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
102					Data appear Normal at 5% Significance Level							
103												
104					Assuming Normal Distribution							
105					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
106					95% Student's-t UCL	122			95% Adjusted-CLT UCL (Chen-1995)			124.2
107									95% Modified-t UCL (Johnson-1978)			122.6
108												
109					Gamma GOF Test							
110					A-D Test Statistic	0.407			Anderson-Darling Gamma GOF Test			
111					5% A-D Critical Value	0.732			Detected data appear Gamma Distributed at 5% Significance Level			
112					K-S Test Statistic	0.173			Kolmogrov-Smirnoff Gamma GOF Test			
113					5% K-S Critical Value	0.245			Detected data appear Gamma Distributed at 5% Significance Level			
114					Detected data appear Gamma Distributed at 5% Significance Level							
115												
116					Gamma Statistics							
117					k hat (MLE)	18.55			k star (bias corrected MLE)			13.97
118					Theta hat (MLE)	5.806			Theta star (bias corrected MLE)			7.711
119					nu hat (MLE)	445.2			nu star (bias corrected)			335.2
120					MLE Mean (bias corrected)	107.7			MLE Sd (bias corrected)			28.82
121									Approximate Chi Square Value (0.05)			293.8
122					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			287.9
123												
124					Assuming Gamma Distribution							
125					95% Approximate Gamma UCL (use when n>=50))	122.9			95% Adjusted Gamma UCL (use when n<50)			125.4
126												
127					Lognormal GOF Test							
128					Shapiro Wilk Test Statistic	0.945			Shapiro Wilk Lognormal GOF Test			
129					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
130					Lilliefors Test Statistic	0.158			Lilliefors Lognormal GOF Test			
131					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
132					Data appear Lognormal at 5% Significance Level							
133												
134					Lognormal Statistics							
135					Minimum of Logged Data	4.274			Mean of logged Data			4.652
136					Maximum of Logged Data	5.176			SD of logged Data			0.239
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	123.4				90% Chebyshev (MVUE) UCL		130
140					95% Chebyshev (MVUE) UCL	140.1				97.5% Chebyshev (MVUE) UCL		154.2
141					99% Chebyshev (MVUE) UCL	181.8						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	120.8				95% Jackknife UCL		122
148					95% Standard Bootstrap UCL	120.4				95% Bootstrap-t UCL		127.5
149					95% Hall's Bootstrap UCL	145.5				95% Percentile Bootstrap UCL		121.7
150					95% BCA Bootstrap UCL	123.1						
151					90% Chebyshev(Mean, Sd) UCL	131.6				95% Chebyshev(Mean, Sd) UCL		142.5
152					97.5% Chebyshev(Mean, Sd) UCL	157.5				99% Chebyshev(Mean, Sd) UCL		187.1
153												
154	**Suggested UCL to Use**											
155					95% Student's-t UCL	122						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												

	A	B	C	D	E	F	G	H	I	J	K	L
163	Arsenic											
164												
165					General Statistics							
166					Total Number of Observations	12			Number of Distinct Observations			11
167									Number of Missing Observations			0
168					Minimum	6.2			Mean			11.21
169					Maximum	19.15			Median			11
170					SD	4.011			Std. Error of Mean			1.158
171					Coefficient of Variation	0.358			Skewness			0.511
172												
173					Normal GOF Test							
174					Shapiro Wilk Test Statistic	0.95			Shapiro Wilk GOF Test			
175					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
176					Lilliefors Test Statistic	0.108			Lilliefors GOF Test			
177					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
178					Data appear Normal at 5% Significance Level							
179												
180					Assuming Normal Distribution							
181					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
182					95% Student's-t UCL	13.29			95% Adjusted-CLT UCL (Chen-1995)			13.3
183									95% Modified-t UCL (Johnson-1978)			13.32
184												
185					Gamma GOF Test							
186					A-D Test Statistic	0.223			Anderson-Darling Gamma GOF Test			
187					5% A-D Critical Value	0.731			Detected data appear Gamma Distributed at 5% Significance Level			
188					K-S Test Statistic	0.128			Kolmogrov-Smirnoff Gamma GOF Test			
189					5% K-S Critical Value	0.246			Detected data appear Gamma Distributed at 5% Significance Level			
190					Detected data appear Gamma Distributed at 5% Significance Level							
191												
192					Gamma Statistics							
193					k hat (MLE)	8.546			k star (bias corrected MLE)			6.465
194					Theta hat (MLE)	1.312			Theta star (bias corrected MLE)			1.734
195					nu hat (MLE)	205.1			nu star (bias corrected)			155.2
196					MLE Mean (bias corrected)	11.21			MLE Sd (bias corrected)			4.41
197									Approximate Chi Square Value (0.05)			127.4
198					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			123.5
199												
200					Assuming Gamma Distribution							
201					95% Approximate Gamma UCL (use when n>=50))	13.66			95% Adjusted Gamma UCL (use when n<50)			14.08
202												
203					Lognormal GOF Test							
204					Shapiro Wilk Test Statistic	0.958			Shapiro Wilk Lognormal GOF Test			
205					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
206					Lilliefors Test Statistic	0.128			Lilliefors Lognormal GOF Test			
207					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
208					Data appear Lognormal at 5% Significance Level							
209												
210					Lognormal Statistics							
211					Minimum of Logged Data	1.825			Mean of logged Data			2.357
212					Maximum of Logged Data	2.952			SD of logged Data			0.364
213												

	A	B	C	D	E	F	G	H	I	J	K	L
214	**Assuming Lognormal Distribution**											
215					95% H-UCL	14.04				90% Chebyshev (MVUE) UCL		14.81
216				95% Chebyshev (MVUE) UCL		16.43				97.5% Chebyshev (MVUE) UCL		18.68
217				99% Chebyshev (MVUE) UCL		23.11						
218												
219	**Nonparametric Distribution Free UCL Statistics**											
220	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
221												
222	**Nonparametric Distribution Free UCLs**											
223					95% CLT UCL	13.12				95% Jackknife UCL		13.29
224				95% Standard Bootstrap UCL		13.01				95% Bootstrap-t UCL		13.5
225				95% Hall's Bootstrap UCL		13.41				95% Percentile Bootstrap UCL		13.01
226				95% BCA Bootstrap UCL		13.32						
227				90% Chebyshev(Mean, Sd) UCL		14.69				95% Chebyshev(Mean, Sd) UCL		16.26
228				97.5% Chebyshev(Mean, Sd) UCL		18.44				99% Chebyshev(Mean, Sd) UCL		22.73
229												
230	**Suggested UCL to Use**											
231				95% Student's-t UCL		13.29						
232												
233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
234	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
235	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
236	For additional insight the user may want to consult a statistician.											
237												
238												

	A	B	C	D	E	F	G	H	I	J	K	L
239	Cadmium											
240												
241					General Statistics							
242					Total Number of Observations	12				Number of Distinct Observations		11
243										Number of Missing Observations		0
244					Minimum	0.31				Mean		14.98
245					Maximum	24.04				Median		15.24
246					SD	5.892				Std. Error of Mean		1.701
247					Coefficient of Variation	0.393				Skewness		-1.168
248												
249					Normal GOF Test							
250					Shapiro Wilk Test Statistic	0.905				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.223				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
254					Data appear Normal at 5% Significance Level							
255												
256					Assuming Normal Distribution							
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	18.04				95% Adjusted-CLT UCL (Chen-1995)		17.17
259										95% Modified-t UCL (Johnson-1978)		17.94
260												
261					Gamma GOF Test							
262					A-D Test Statistic	1.873				Anderson-Darling Gamma GOF Test		
263					5% A-D Critical Value	0.741				Data Not Gamma Distributed at 5% Significance Level		
264					K-S Test Statistic	0.391				Kolmogrov-Smirnoff Gamma GOF Test		
265					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
266					Data Not Gamma Distributed at 5% Significance Level							
267												
268					Gamma Statistics							
269					k hat (MLE)	2.024				k star (bias corrected MLE)		1.574
270					Theta hat (MLE)	7.402				Theta star (bias corrected MLE)		9.521
271					nu hat (MLE)	48.58				nu star (bias corrected)		37.77
272					MLE Mean (bias corrected)	14.98				MLE Sd (bias corrected)		11.94
273										Approximate Chi Square Value (0.05)		24.7
274					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		23.09
275												
276					Assuming Gamma Distribution							
277					95% Approximate Gamma UCL (use when n>=50))	22.91				95% Adjusted Gamma UCL (use when n<50)		24.5
278												
279					Lognormal GOF Test							
280					Shapiro Wilk Test Statistic	0.51				Shapiro Wilk Lognormal GOF Test		
281					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
282					Lilliefors Test Statistic	0.432				Lilliefors Lognormal GOF Test		
283					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
284					Data Not Lognormal at 5% Significance Level							
285												
286					Lognormal Statistics							
287					Minimum of Logged Data	-1.171				Mean of logged Data		2.44
288					Maximum of Logged Data	3.18				SD of logged Data		1.158
289												

	A	B	C	D	E	F	G	H	I	J	K	L
290	**Assuming Lognormal Distribution**											
291					95% H-UCL	68.71				90% Chebyshev (MVUE) UCL		43.04
292				95% Chebyshev (MVUE) UCL		53.18				97.5% Chebyshev (MVUE) UCL		67.26
293				99% Chebyshev (MVUE) UCL		94.91						
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
297												
298	**Nonparametric Distribution Free UCLs**											
299					95% CLT UCL	17.78				95% Jackknife UCL		18.04
300				95% Standard Bootstrap UCL		17.58				95% Bootstrap-t UCL		17.61
301				95% Hall's Bootstrap UCL		17.39				95% Percentile Bootstrap UCL		17.59
302				95% BCA Bootstrap UCL		17.27						
303				90% Chebyshev(Mean, Sd) UCL		20.08				95% Chebyshev(Mean, Sd) UCL		22.4
304				97.5% Chebyshev(Mean, Sd) UCL		25.6				99% Chebyshev(Mean, Sd) UCL		31.9
305												
306	**Suggested UCL to Use**											
307				95% Student's-t UCL		18.04						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											
313												
314	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
315	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
316												
317												

	A	B	C	D	E	F	G	H	I	J	K	L
318	Chromium											
319												
320					General Statistics							
321					Total Number of Observations	12			Number of Distinct Observations			10
322									Number of Missing Observations			0
323					Minimum	10.8			Mean			53.63
324					Maximum	85			Median			46.31
325					SD	23.52			Std. Error of Mean			6.791
326					Coefficient of Variation	0.439			Skewness			0.0141
327												
328					Normal GOF Test							
329					Shapiro Wilk Test Statistic	0.911			Shapiro Wilk GOF Test			
330					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
331					Lilliefors Test Statistic	0.177			Lilliefors GOF Test			
332					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
333					Data appear Normal at 5% Significance Level							
334												
335					Assuming Normal Distribution							
336					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
337					95% Student's-t UCL	65.82			95% Adjusted-CLT UCL (Chen-1995)			64.83
338									95% Modified-t UCL (Johnson-1978)			65.83
339												
340					Gamma GOF Test							
341					A-D Test Statistic	0.523			Anderson-Darling Gamma GOF Test			
342					5% A-D Critical Value	0.735			Detected data appear Gamma Distributed at 5% Significance Level			
343					K-S Test Statistic	0.2			Kolmogrov-Smirnoff Gamma GOF Test			
344					5% K-S Critical Value	0.246			Detected data appear Gamma Distributed at 5% Significance Level			
345					Detected data appear Gamma Distributed at 5% Significance Level							
346												
347					Gamma Statistics							
348					k hat (MLE)	4.325			k star (bias corrected MLE)			3.299
349					Theta hat (MLE)	12.4			Theta star (bias corrected MLE)			16.25
350					nu hat (MLE)	103.8			nu star (bias corrected)			79.18
351					MLE Mean (bias corrected)	53.63			MLE Sd (bias corrected)			29.52
352									Approximate Chi Square Value (0.05)			59.68
353					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			57.1
354												
355					Assuming Gamma Distribution							
356					95% Approximate Gamma UCL (use when n>=50))	71.15			95% Adjusted Gamma UCL (use when n<50)			74.36
357												
358					Lognormal GOF Test							
359					Shapiro Wilk Test Statistic	0.831			Shapiro Wilk Lognormal GOF Test			
360					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
361					Lilliefors Test Statistic	0.243			Lilliefors Lognormal GOF Test			
362					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
363					Data appear Approximate Lognormal at 5% Significance Level							
364												
365					Lognormal Statistics							
366					Minimum of Logged Data	2.38			Mean of logged Data			3.862
367					Maximum of Logged Data	4.443			SD of logged Data			0.572
368												

	A	B	C	D	E	F	G	H	I	J	K	L
369	**Assuming Lognormal Distribution**											
370					95% H-UCL	82.37				90% Chebyshev (MVUE) UCL		83.34
371				95% Chebyshev (MVUE) UCL		96.1				97.5% Chebyshev (MVUE) UCL		113.8
372				99% Chebyshev (MVUE) UCL		148.6						
373												
374	**Nonparametric Distribution Free UCL Statistics**											
375	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
376												
377	**Nonparametric Distribution Free UCLs**											
378					95% CLT UCL	64.8				95% Jackknife UCL		65.82
379				95% Standard Bootstrap UCL		64.33				95% Bootstrap-t UCL		67.12
380				95% Hall's Bootstrap UCL		64.81				95% Percentile Bootstrap UCL		64.06
381				95% BCA Bootstrap UCL		63.98						
382				90% Chebyshev(Mean, Sd) UCL		74				95% Chebyshev(Mean, Sd) UCL		83.23
383				97.5% Chebyshev(Mean, Sd) UCL		96.04				99% Chebyshev(Mean, Sd) UCL		121.2
384												
385	**Suggested UCL to Use**											
386				95% Student's-t UCL		65.82						
387												
388	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
389	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
390	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
391	For additional insight the user may want to consult a statistician.											
392												
393												

	A	B	C	D	E	F	G	H	I	J	K	L
394	Copper											
395												
396					General Statistics							
397					Total Number of Observations	12				Number of Distinct Observations		12
398										Number of Missing Observations		0
399					Minimum	22.06				Mean		712
400					Maximum	6122				Median		245.9
401					SD	1713				Std. Error of Mean		494.5
402					Coefficient of Variation	2.406				Skewness		3.398
403												
404					Normal GOF Test							
405					Shapiro Wilk Test Statistic	0.42				Shapiro Wilk GOF Test		
406					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
407					Lilliefors Test Statistic	0.451				Lilliefors GOF Test		
408					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
409					Data Not Normal at 5% Significance Level							
410												
411					Assuming Normal Distribution							
412					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
413					95% Student's-t UCL	1600				95% Adjusted-CLT UCL (Chen-1995)		2044
414										95% Modified-t UCL (Johnson-1978)		1681
415												
416					Gamma GOF Test							
417					A-D Test Statistic	1.059				Anderson-Darling Gamma GOF Test		
418					5% A-D Critical Value	0.791				Data Not Gamma Distributed at 5% Significance Level		
419					K-S Test Statistic	0.281				Kolmogrov-Smirnoff Gamma GOF Test		
420					5% K-S Critical Value	0.26				Data Not Gamma Distributed at 5% Significance Level		
421					Data Not Gamma Distributed at 5% Significance Level							
422												
423					Gamma Statistics							
424					k hat (MLE)	0.467				k star (bias corrected MLE)		0.406
425					Theta hat (MLE)	1526				Theta star (bias corrected MLE)		1756
426					nu hat (MLE)	11.2				nu star (bias corrected)		9.733
427					MLE Mean (bias corrected)	712				MLE Sd (bias corrected)		1118
428										Approximate Chi Square Value (0.05)		3.776
429					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		3.23
430												
431					Assuming Gamma Distribution							
432					95% Approximate Gamma UCL (use when n>=50))	1835				95% Adjusted Gamma UCL (use when n<50)		2145
433												
434					Lognormal GOF Test							
435					Shapiro Wilk Test Statistic	0.92				Shapiro Wilk Lognormal GOF Test		
436					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
437					Lilliefors Test Statistic	0.156				Lilliefors Lognormal GOF Test		
438					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
439					Data appear Lognormal at 5% Significance Level							
440												
441					Lognormal Statistics							
442					Minimum of Logged Data	3.094				Mean of logged Data		5.192
443					Maximum of Logged Data	8.72				SD of logged Data		1.615
444												

	A	B	C	D	E	F	G	H	I	J	K	L
445	Assuming Lognormal Distribution											
446					95% H-UCL	4966				90% Chebyshev (MVUE) UCL		1374
447				95% Chebyshev (MVUE) UCL		1751				97.5% Chebyshev (MVUE) UCL		2274
448				99% Chebyshev (MVUE) UCL		3301						
449												
450	Nonparametric Distribution Free UCL Statistics											
451	Data appear to follow a Discernible Distribution at 5% Significance Level											
452												
453	Nonparametric Distribution Free UCLs											
454					95% CLT UCL	1525				95% Jackknife UCL		1600
455				95% Standard Bootstrap UCL		1473				95% Bootstrap-t UCL		6905
456				95% Hall's Bootstrap UCL		5430				95% Percentile Bootstrap UCL		1683
457				95% BCA Bootstrap UCL		2179						
458				90% Chebyshev(Mean, Sd) UCL		2196				95% Chebyshev(Mean, Sd) UCL		2868
459				97.5% Chebyshev(Mean, Sd) UCL		3800				99% Chebyshev(Mean, Sd) UCL		5632
460												
461	Suggested UCL to Use											
462				99% Chebyshev (Mean, Sd) UCL		5632						
463												
464	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
465	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
466	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
467	For additional insight the user may want to consult a statistician.											
468												
469												

	A	B	C	D	E	F	G	H	I	J	K	L
470	Iron											
471												
472					General Statistics							
473					Total Number of Observations	12				Number of Distinct Observations		12
474										Number of Missing Observations		0
475					Minimum	10545				Mean		19551
476					Maximum	34999				Median		18316
477					SD	6753				Std. Error of Mean		1949
478					Coefficient of Variation	0.345				Skewness		1.04
479												
480					Normal GOF Test							
481					Shapiro Wilk Test Statistic	0.929				Shapiro Wilk GOF Test		
482					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
483					Lilliefors Test Statistic	0.178				Lilliefors GOF Test		
484					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
485					Data appear Normal at 5% Significance Level							
486												
487					Assuming Normal Distribution							
488					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
489					95% Student's-t UCL	23052				95% Adjusted-CLT UCL (Chen-1995)		23383
490										95% Modified-t UCL (Johnson-1978)		23150
491												
492					Gamma GOF Test							
493					A-D Test Statistic	0.218				Anderson-Darling Gamma GOF Test		
494					5% A-D Critical Value	0.73				Detected data appear Gamma Distributed at 5% Significance Level		
495					K-S Test Statistic	0.137				Kolmogrov-Smirnoff Gamma GOF Test		
496					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
497					Detected data appear Gamma Distributed at 5% Significance Level							
498												
499					Gamma Statistics							
500					k hat (MLE)	9.955				k star (bias corrected MLE)		7.522
501					Theta hat (MLE)	1964				Theta star (bias corrected MLE)		2599
502					nu hat (MLE)	238.9				nu star (bias corrected)		180.5
503					MLE Mean (bias corrected)	19551				MLE Sd (bias corrected)		7129
504										Approximate Chi Square Value (0.05)		150.4
505					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		146.3
506												
507					Assuming Gamma Distribution							
508					95% Approximate Gamma UCL (use when n>=50))	23459				95% Adjusted Gamma UCL (use when n<50)		24131
509												
510					Lognormal GOF Test							
511					Shapiro Wilk Test Statistic	0.983				Shapiro Wilk Lognormal GOF Test		
512					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
513					Lilliefors Test Statistic	0.117				Lilliefors Lognormal GOF Test		
514					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
515					Data appear Lognormal at 5% Significance Level							
516												
517					Lognormal Statistics							
518					Minimum of Logged Data	9.263				Mean of logged Data		9.83
519					Maximum of Logged Data	10.46				SD of logged Data		0.331
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521	**Assuming Lognormal Distribution**											
522					95% H-UCL	23844				90% Chebyshev (MVUE) UCL		25181
523					95% Chebyshev (MVUE) UCL	27741				97.5% Chebyshev (MVUE) UCL		31295
524					99% Chebyshev (MVUE) UCL	38275						
525												
526	**Nonparametric Distribution Free UCL Statistics**											
527	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
528												
529	**Nonparametric Distribution Free UCLs**											
530					95% CLT UCL	22757				95% Jackknife UCL		23052
531					95% Standard Bootstrap UCL	22629				95% Bootstrap-t UCL		24117
532					95% Hall's Bootstrap UCL	24715				95% Percentile Bootstrap UCL		22846
533					95% BCA Bootstrap UCL	23380						
534					90% Chebyshev(Mean, Sd) UCL	25399				95% Chebyshev(Mean, Sd) UCL		28048
535					97.5% Chebyshev(Mean, Sd) UCL	31725				99% Chebyshev(Mean, Sd) UCL		38948
536												
537	**Suggested UCL to Use**											
538					95% Student's-t UCL	23052						
539												
540	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
541	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
542	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
543	For additional insight the user may want to consult a statistician.											
544												
545												

	A	B	C	D	E	F	G	H	I	J	K	L
546	Manganese											
547												
548					General Statistics							
549					Total Number of Observations	12				Number of Distinct Observations		12
550										Number of Missing Observations		0
551					Minimum	288.3				Mean		560.2
552					Maximum	1286				Median		530
553					SD	259.2				Std. Error of Mean		74.82
554					Coefficient of Variation	0.463				Skewness		2.109
555												
556					Normal GOF Test							
557					Shapiro Wilk Test Statistic	0.776				Shapiro Wilk GOF Test		
558					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
559					Lilliefors Test Statistic	0.27				Lilliefors GOF Test		
560					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
561					Data Not Normal at 5% Significance Level							
562												
563					Assuming Normal Distribution							
564					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
565					95% Student's-t UCL	694.6				95% Adjusted-CLT UCL (Chen-1995)		731.9
566										95% Modified-t UCL (Johnson-1978)		702.1
567												
568					Gamma GOF Test							
569					A-D Test Statistic	0.53				Anderson-Darling Gamma GOF Test		
570					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
571					K-S Test Statistic	0.208				Kolmogrov-Smirnoff Gamma GOF Test		
572					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
573					Detected data appear Gamma Distributed at 5% Significance Level							
574												
575					Gamma Statistics							
576					k hat (MLE)	6.565				k star (bias corrected MLE)		4.98
577					Theta hat (MLE)	85.33				Theta star (bias corrected MLE)		112.5
578					nu hat (MLE)	157.6				nu star (bias corrected)		119.5
579					MLE Mean (bias corrected)	560.2				MLE Sd (bias corrected)		251
580										Approximate Chi Square Value (0.05)		95.27
581					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		91.97
582												
583					Assuming Gamma Distribution							
584					95% Approximate Gamma UCL (use when n>=50)	702.7				95% Adjusted Gamma UCL (use when n<50)		728
585												
586					Lognormal GOF Test							
587					Shapiro Wilk Test Statistic	0.918				Shapiro Wilk Lognormal GOF Test		
588					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
589					Lilliefors Test Statistic	0.192				Lilliefors Lognormal GOF Test		
590					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
591					Data appear Lognormal at 5% Significance Level							
592												
593					Lognormal Statistics							
594					Minimum of Logged Data	5.664				Mean of logged Data		6.25
595					Maximum of Logged Data	7.159				SD of logged Data		0.398
596												

	A	B	C	D	E	F	G	H	I	J	K	L
597	Assuming Lognormal Distribution											
598					95% H-UCL	715				90% Chebyshev (MVUE) UCL		751.9
599				95% Chebyshev (MVUE) UCL		840.2				97.5% Chebyshev (MVUE) UCL		962.8
600				99% Chebyshev (MVUE) UCL		1204						
601												
602	Nonparametric Distribution Free UCL Statistics											
603	Data appear to follow a Discernible Distribution at 5% Significance Level											
604												
605	Nonparametric Distribution Free UCLs											
606					95% CLT UCL	683.3				95% Jackknife UCL		694.6
607				95% Standard Bootstrap UCL		676.6				95% Bootstrap-t UCL		782.6
608				95% Hall's Bootstrap UCL		1267				95% Percentile Bootstrap UCL		685.9
609				95% BCA Bootstrap UCL		745.9						
610				90% Chebyshev(Mean, Sd) UCL		784.6				95% Chebyshev(Mean, Sd) UCL		886.3
611				97.5% Chebyshev(Mean, Sd) UCL		1027				99% Chebyshev(Mean, Sd) UCL		1305
612												
613	Suggested UCL to Use											
614				95% Adjusted Gamma UCL		728						
615												
616	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
617	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
618	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
619	For additional insight the user may want to consult a statistician.											
620												
621												

	A	B	C	D	E	F	G	H	I	J	K	L
622	Mercury											
623												
624					General Statistics							
625					Total Number of Observations	12				Number of Distinct Observations		7
626										Number of Missing Observations		0
627					Minimum	0.0195				Mean		7.066
628					Maximum	10.63				Median		10
629					SD	4.356				Std. Error of Mean		1.258
630					Coefficient of Variation	0.617				Skewness		-1.06
631												
632					Normal GOF Test							
633					Shapiro Wilk Test Statistic	0.711				Shapiro Wilk GOF Test		
634					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
635					Lilliefors Test Statistic	0.333				Lilliefors GOF Test		
636					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
637					Data Not Normal at 5% Significance Level							
638												
639					Assuming Normal Distribution							
640					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
641					95% Student's-t UCL	9.325				95% Adjusted-CLT UCL (Chen-1995)		8.723
642										95% Modified-t UCL (Johnson-1978)		9.261
643												
644					Gamma GOF Test							
645					A-D Test Statistic	2.273				Anderson-Darling Gamma GOF Test		
646					5% A-D Critical Value	0.774				Data Not Gamma Distributed at 5% Significance Level		
647					K-S Test Statistic	0.394				Kolmogrov-Smirnoff Gamma GOF Test		
648					5% K-S Critical Value	0.257				Data Not Gamma Distributed at 5% Significance Level		
649					Data Not Gamma Distributed at 5% Significance Level							
650												
651					Gamma Statistics							
652					k hat (MLE)	0.639				k star (bias corrected MLE)		0.534
653					Theta hat (MLE)	11.07				Theta star (bias corrected MLE)		13.22
654					nu hat (MLE)	15.32				nu star (bias corrected)		12.83
655					MLE Mean (bias corrected)	7.066				MLE Sd (bias corrected)		9.666
656										Approximate Chi Square Value (0.05)		5.777
657					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.072
658												
659					Assuming Gamma Distribution							
660					95% Approximate Gamma UCL (use when n>=50))	15.69				95% Adjusted Gamma UCL (use when n<50)		17.87
661												
662					Lognormal GOF Test							
663					Shapiro Wilk Test Statistic	0.636				Shapiro Wilk Lognormal GOF Test		
664					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
665					Lilliefors Test Statistic	0.4				Lilliefors Lognormal GOF Test		
666					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
667					Data Not Lognormal at 5% Significance Level							
668												
669					Lognormal Statistics							
670					Minimum of Logged Data	-3.937				Mean of logged Data		0.996
671					Maximum of Logged Data	2.364				SD of logged Data		2.315
672												

	A	B	C	D	E	F	G	H	I	J	K	L
673					Assuming Lognormal Distribution							
674					95% H-UCL	2040				90% Chebyshev (MVUE) UCL		70.65
675				95% Chebyshev (MVUE) UCL		92.39				97.5% Chebyshev (MVUE) UCL		122.6
676				99% Chebyshev (MVUE) UCL		181.8						
677												
678					Nonparametric Distribution Free UCL Statistics							
679					Data do not follow a Discernible Distribution (0.05)							
680												
681					Nonparametric Distribution Free UCLs							
682					95% CLT UCL	9.135				95% Jackknife UCL		9.325
683				95% Standard Bootstrap UCL		9.04				95% Bootstrap-t UCL		8.966
684				95% Hall's Bootstrap UCL		8.631				95% Percentile Bootstrap UCL		9.011
685				95% BCA Bootstrap UCL		8.681						
686				90% Chebyshev(Mean, Sd) UCL		10.84				95% Chebyshev(Mean, Sd) UCL		12.55
687				97.5% Chebyshev(Mean, Sd) UCL		14.92				99% Chebyshev(Mean, Sd) UCL		19.58
688												
689					Suggested UCL to Use							
690				99% Chebyshev (Mean, Sd) UCL		19.58						
691												
692					Recommended UCL exceeds the maximum observation							
693												
694	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
695	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
696	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
697	For additional insight the user may want to consult a statistician.											
698												
699	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
700	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
701												
702												

	A	B	C	D	E	F	G	H	I	J	K	L
703	Neptunium-237											
704												
705					General Statistics							
706					Total Number of Observations	12				Number of Distinct Observations		3
707										Number of Missing Observations		0
708					Minimum	-0.001				Mean		0.345
709					Maximum	0.69				Median		0.345
710					SD	0.147				Std. Error of Mean		0.0425
711					Coefficient of Variation	0.428				Skewness		0
712												
713					Normal GOF Test							
714					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
715					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
716					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
717					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
718					Data Not Normal at 5% Significance Level							
719												
720					Assuming Normal Distribution							
721					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
722					95% Student's-t UCL	0.421				95% Adjusted-CLT UCL (Chen-1995)		0.414
723										95% Modified-t UCL (Johnson-1978)		0.421
724					Gamma Statistics Not Available							
725					Lognormal Statistics Not Available							
726												
727					Nonparametric Distribution Free UCL Statistics							
728					Data do not follow a Discernible Distribution (0.05)							
729												
730					Nonparametric Distribution Free UCLs							
731					95% CLT UCL	0.414				95% Jackknife UCL		0.421
732					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
733					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
734					95% BCA Bootstrap UCL	N/A						
735					90% Chebyshev(Mean, Sd) UCL	0.472				95% Chebyshev(Mean, Sd) UCL		0.53
736					97.5% Chebyshev(Mean, Sd) UCL	0.61				99% Chebyshev(Mean, Sd) UCL		0.768
737												
738					Suggested UCL to Use							
739					95% Chebyshev (Mean, Sd) UCL	0.53						
740												
741	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
742	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
743	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
744	For additional insight the user may want to consult a statistician.											
745												
746												

	A	B	C	D	E	F	G	H	I	J	K	L
747	Nickel											
748												
749					General Statistics							
750					Total Number of Observations	12				Number of Distinct Observations		11
751										Number of Missing Observations		0
752					Minimum	7.4				Mean		233
753					Maximum	676				Median		164
754					SD	222.2				Std. Error of Mean		64.14
755					Coefficient of Variation	0.954				Skewness		0.816
756												
757					Normal GOF Test							
758					Shapiro Wilk Test Statistic	0.868				Shapiro Wilk GOF Test		
759					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
760					Lilliefors Test Statistic	0.195				Lilliefors GOF Test		
761					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
762					Data appear Normal at 5% Significance Level							
763												
764					Assuming Normal Distribution							
765					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
766					95% Student's-t UCL	348.2				95% Adjusted-CLT UCL (Chen-1995)		354.6
767										95% Modified-t UCL (Johnson-1978)		350.7
768												
769					Gamma GOF Test							
770					A-D Test Statistic	0.318				Anderson-Darling Gamma GOF Test		
771					5% A-D Critical Value	0.761				Detected data appear Gamma Distributed at 5% Significance Level		
772					K-S Test Statistic	0.177				Kolmogrov-Smirnoff Gamma GOF Test		
773					5% K-S Critical Value	0.253				Detected data appear Gamma Distributed at 5% Significance Level		
774					Detected data appear Gamma Distributed at 5% Significance Level							
775												
776					Gamma Statistics							
777					k hat (MLE)	0.888				k star (bias corrected MLE)		0.722
778					Theta hat (MLE)	262.3				Theta star (bias corrected MLE)		322.8
779					nu hat (MLE)	21.32				nu star (bias corrected)		17.32
780					MLE Mean (bias corrected)	233				MLE Sd (bias corrected)		274.2
781										Approximate Chi Square Value (0.05)		8.903
782					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		7.997
783												
784					Assuming Gamma Distribution							
785					95% Approximate Gamma UCL (use when n>=50))	453.3				95% Adjusted Gamma UCL (use when n<50)		504.7
786												
787					Lognormal GOF Test							
788					Shapiro Wilk Test Statistic	0.92				Shapiro Wilk Lognormal GOF Test		
789					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
790					Lilliefors Test Statistic	0.152				Lilliefors Lognormal GOF Test		
791					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
792					Data appear Lognormal at 5% Significance Level							
793												
794					Lognormal Statistics							
795					Minimum of Logged Data	2.001				Mean of logged Data		4.792
796					Maximum of Logged Data	6.516				SD of logged Data		1.425
797												

	A	B	C	D	E	F	G	H	I	J	K	L
798	Assuming Lognormal Distribution											
799					95% H-UCL	1662				90% Chebyshev (MVUE) UCL		678.6
800				95% Chebyshev (MVUE) UCL		855.2				97.5% Chebyshev (MVUE) UCL		1100
801				99% Chebyshev (MVUE) UCL		1582						
802												
803	Nonparametric Distribution Free UCL Statistics											
804	Data appear to follow a Discernible Distribution at 5% Significance Level											
805												
806	Nonparametric Distribution Free UCLs											
807					95% CLT UCL	338.5				95% Jackknife UCL		348.2
808				95% Standard Bootstrap UCL		333.6				95% Bootstrap-t UCL		382
809				95% Hall's Bootstrap UCL		342.1				95% Percentile Bootstrap UCL		340.4
810				95% BCA Bootstrap UCL		351.8						
811				90% Chebyshev(Mean, Sd) UCL		425.4				95% Chebyshev(Mean, Sd) UCL		512.6
812				97.5% Chebyshev(Mean, Sd) UCL		633.6				99% Chebyshev(Mean, Sd) UCL		871.2
813												
814	Suggested UCL to Use											
815				95% Student's-t UCL		348.2						
816												
817	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
818	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
819	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
820	For additional insight the user may want to consult a statistician.											
821												
822												

	A	B	C	D	E	F	G	H	I	J	K	L
823	PAH, Total											
824												
825					General Statistics							
826					Total Number of Observations	12			Number of Distinct Observations			4
827									Number of Missing Observations			0
828					Minimum	0.0072			Mean			0.175
829					Maximum	0.511			Median			0.175
830					SD	0.124			Std. Error of Mean			0.0358
831					Coefficient of Variation	0.707			Skewness			1.625
832												
833					Normal GOF Test							
834					Shapiro Wilk Test Statistic	0.65			Shapiro Wilk GOF Test			
835					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
836					Lilliefors Test Statistic	0.417			Lilliefors GOF Test			
837					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
838					Data Not Normal at 5% Significance Level							
839												
840					Assuming Normal Distribution							
841					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
842					95% Student's-t UCL	0.239			95% Adjusted-CLT UCL (Chen-1995)			0.252
843									95% Modified-t UCL (Johnson-1978)			0.242
844												
845					Gamma GOF Test							
846					A-D Test Statistic	2.34			Anderson-Darling Gamma GOF Test			
847					5% A-D Critical Value	0.75			Data Not Gamma Distributed at 5% Significance Level			
848					K-S Test Statistic	0.45			Kolmogrov-Smirnoff Gamma GOF Test			
849					5% K-S Critical Value	0.251			Data Not Gamma Distributed at 5% Significance Level			
850					Data Not Gamma Distributed at 5% Significance Level							
851												
852					Gamma Statistics							
853					k hat (MLE)	1.287			k star (bias corrected MLE)			1.021
854					Theta hat (MLE)	0.136			Theta star (bias corrected MLE)			0.172
855					nu hat (MLE)	30.9			nu star (bias corrected)			24.51
856					MLE Mean (bias corrected)	0.175			MLE Sd (bias corrected)			0.173
857									Approximate Chi Square Value (0.05)			14.24
858					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			13.05
859												
860					Assuming Gamma Distribution							
861					95% Approximate Gamma UCL (use when n>=50))	0.302			95% Adjusted Gamma UCL (use when n<50)			0.329
862												
863					Lognormal GOF Test							
864					Shapiro Wilk Test Statistic	0.605			Shapiro Wilk Lognormal GOF Test			
865					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
866					Lilliefors Test Statistic	0.464			Lilliefors Lognormal GOF Test			
867					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
868					Data Not Lognormal at 5% Significance Level							
869												
870					Lognormal Statistics							
871					Minimum of Logged Data	-4.934			Mean of logged Data			-2.178
872					Maximum of Logged Data	-0.672			SD of logged Data			1.305
873												

	A	B	C	D	E	F	G	H	I	J	K	L
874	Assuming Lognormal Distribution											
875					95% H-UCL	1.051				90% Chebyshev (MVUE) UCL		0.529
876				95% Chebyshev (MVUE) UCL		0.662				97.5% Chebyshev (MVUE) UCL		0.845
877				99% Chebyshev (MVUE) UCL		1.206						
878												
879	Nonparametric Distribution Free UCL Statistics											
880	Data do not follow a Discernible Distribution (0.05)											
881												
882	Nonparametric Distribution Free UCLs											
883					95% CLT UCL	0.234				95% Jackknife UCL		0.239
884				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
885				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
886				95% BCA Bootstrap UCL		N/A						
887				90% Chebyshev(Mean, Sd) UCL		0.282				95% Chebyshev(Mean, Sd) UCL		0.331
888				97.5% Chebyshev(Mean, Sd) UCL		0.398				99% Chebyshev(Mean, Sd) UCL		0.531
889												
890	Suggested UCL to Use											
891				95% Chebyshev (Mean, Sd) UCL		0.331						
892												
893	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
894	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
895	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
896	For additional insight the user may want to consult a statistician.											
897												
898												

	A	B	C	D	E	F	G	H	I	J	K	L
899	PCB, Total											
900												
901						General Statistics						
902					Total Number of Observations	12				Number of Distinct Observations		5
903										Number of Missing Observations		0
904					Minimum	0.017				Mean		7.996
905					Maximum	50				Median		5
906					SD	13.36				Std. Error of Mean		3.858
907					Coefficient of Variation	1.671				Skewness		3.334
908												
909						Normal GOF Test						
910					Shapiro Wilk Test Statistic	0.432				Shapiro Wilk GOF Test		
911					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
912					Lilliefors Test Statistic	0.488				Lilliefors GOF Test		
913					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
914						Data Not Normal at 5% Significance Level						
915												
916						Assuming Normal Distribution						
917					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
918					95% Student's-t UCL	14.92				95% Adjusted-CLT UCL (Chen-1995)		18.31
919										95% Modified-t UCL (Johnson-1978)		15.54
920												
921						Gamma GOF Test						
922					A-D Test Statistic	1.886				Anderson-Darling Gamma GOF Test		
923					5% A-D Critical Value	0.775				Data Not Gamma Distributed at 5% Significance Level		
924					K-S Test Statistic	0.368				Kolmogrov-Smirnoff Gamma GOF Test		
925					5% K-S Critical Value	0.257				Data Not Gamma Distributed at 5% Significance Level		
926						Data Not Gamma Distributed at 5% Significance Level						
927												
928						Gamma Statistics						
929					k hat (MLE)	0.633				k star (bias corrected MLE)		0.53
930					Theta hat (MLE)	12.63				Theta star (bias corrected MLE)		15.07
931					nu hat (MLE)	15.19				nu star (bias corrected)		12.73
932					MLE Mean (bias corrected)	7.996				MLE Sd (bias corrected)		10.98
933										Approximate Chi Square Value (0.05)		5.711
934					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.012
935												
936						Assuming Gamma Distribution						
937					95% Approximate Gamma UCL (use when n>=50))	17.82				95% Adjusted Gamma UCL (use when n<50)		20.31
938												
939						Lognormal GOF Test						
940					Shapiro Wilk Test Statistic	0.672				Shapiro Wilk Lognormal GOF Test		
941					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
942					Lilliefors Test Statistic	0.434				Lilliefors Lognormal GOF Test		
943					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
944						Data Not Lognormal at 5% Significance Level						
945												
946						Lognormal Statistics						
947					Minimum of Logged Data	-4.075				Mean of logged Data		1.111
948					Maximum of Logged Data	3.912				SD of logged Data		1.955
949												

	A	B	C	D	E	F	G	H	I	J	K	L
950	Assuming Lognormal Distribution											
951					95% H-UCL	360.2				90% Chebyshev (MVUE) UCL		41.34
952				95% Chebyshev (MVUE) UCL		53.46				97.5% Chebyshev (MVUE) UCL		70.29
953				99% Chebyshev (MVUE) UCL		103.4						
954												
955	Nonparametric Distribution Free UCL Statistics											
956	Data do not follow a Discernible Distribution (0.05)											
957												
958	Nonparametric Distribution Free UCLs											
959					95% CLT UCL	14.34				95% Jackknife UCL		14.92
960				95% Standard Bootstrap UCL		14.14				95% Bootstrap-t UCL		39.68
961				95% Hall's Bootstrap UCL		63.91				95% Percentile Bootstrap UCL		15.16
962				95% BCA Bootstrap UCL		18.78						
963				90% Chebyshev(Mean, Sd) UCL		19.57				95% Chebyshev(Mean, Sd) UCL		24.81
964				97.5% Chebyshev(Mean, Sd) UCL		32.09				99% Chebyshev(Mean, Sd) UCL		46.38
965												
966	Suggested UCL to Use											
967				99% Chebyshev (Mean, Sd) UCL		46.38						
968												
969	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
970	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
971	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
972	For additional insight the user may want to consult a statistician.											
973												
974												

	A	B	C	D	E	F	G	H	I	J	K	L
975	Uranium											
976												
977					General Statistics							
978					Total Number of Observations	12			Number of Distinct Observations			12
979									Number of Missing Observations			0
980					Minimum	1.3			Mean			108.4
981					Maximum	364.2			Median			61.93
982					SD	125.7			Std. Error of Mean			36.29
983					Coefficient of Variation	1.16			Skewness			1.133
984												
985					Normal GOF Test							
986					Shapiro Wilk Test Statistic	0.807			Shapiro Wilk GOF Test			
987					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
988					Lilliefors Test Statistic	0.237			Lilliefors GOF Test			
989					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
990					Data appear Approximate Normal at 5% Significance Level							
991												
992					Assuming Normal Distribution							
993					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
994					95% Student's-t UCL	173.5			95% Adjusted-CLT UCL (Chen-1995)			180.7
995									95% Modified-t UCL (Johnson-1978)			175.5
996												
997					Gamma GOF Test							
998					A-D Test Statistic	0.314			Anderson-Darling Gamma GOF Test			
999					5% A-D Critical Value	0.775			Detected data appear Gamma Distributed at 5% Significance Level			
1000					K-S Test Statistic	0.152			Kolmogrov-Smirnoff Gamma GOF Test			
1001					5% K-S Critical Value	0.257			Detected data appear Gamma Distributed at 5% Significance Level			
1002					Detected data appear Gamma Distributed at 5% Significance Level							
1003												
1004					Gamma Statistics							
1005					k hat (MLE)	0.629			k star (bias corrected MLE)			0.527
1006					Theta hat (MLE)	172.2			Theta star (bias corrected MLE)			205.4
1007					nu hat (MLE)	15.1			nu star (bias corrected)			12.66
1008					MLE Mean (bias corrected)	108.4			MLE Sd (bias corrected)			149.2
1009									Approximate Chi Square Value (0.05)			5.664
1010					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			4.968
1011												
1012					Assuming Gamma Distribution							
1013					95% Approximate Gamma UCL (use when n>=50))	242.2			95% Adjusted Gamma UCL (use when n<50)			276.1
1014												
1015					Lognormal GOF Test							
1016					Shapiro Wilk Test Statistic	0.939			Shapiro Wilk Lognormal GOF Test			
1017					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
1018					Lilliefors Test Statistic	0.183			Lilliefors Lognormal GOF Test			
1019					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
1020					Data appear Lognormal at 5% Significance Level							
1021												
1022					Lognormal Statistics							
1023					Minimum of Logged Data	0.262			Mean of logged Data			3.71
1024					Maximum of Logged Data	5.898			SD of logged Data			1.75
1025												

	A	B	C	D	E	F	G	H	I	J	K	L
1026	**Assuming Lognormal Distribution**											
1027					95% H-UCL	1948				90% Chebyshev (MVUE) UCL		391
1028					95% Chebyshev (MVUE) UCL	501.4				97.5% Chebyshev (MVUE) UCL		654.8
1029					99% Chebyshev (MVUE) UCL	955.9						
1030												
1031	**Nonparametric Distribution Free UCL Statistics**											
1032	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1033												
1034	**Nonparametric Distribution Free UCLs**											
1035					95% CLT UCL	168				95% Jackknife UCL		173.5
1036					95% Standard Bootstrap UCL	166				95% Bootstrap-t UCL		199.4
1037					95% Hall's Bootstrap UCL	164				95% Percentile Bootstrap UCL		167.7
1038					95% BCA Bootstrap UCL	179.9						
1039					90% Chebyshev(Mean, Sd) UCL	217.2				95% Chebyshev(Mean, Sd) UCL		266.5
1040					97.5% Chebyshev(Mean, Sd) UCL	335				99% Chebyshev(Mean, Sd) UCL		469.4
1041												
1042	**Suggested UCL to Use**											
1043					95% Student's-t UCL	173.5						
1044												
1045	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1046	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1047	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1048	For additional insight the user may want to consult a statistician.											
1049												
1050												

	A	B	C	D	E	F	G	H	I	J	K	L
1051	Uranium-235											
1052												
1053						General Statistics						
1054					Total Number of Observations	12				Number of Distinct Observations		3
1055										Number of Missing Observations		0
1056					Minimum	0.037				Mean		0.249
1057					Maximum	0.46				Median		0.249
1058					SD	0.0902				Std. Error of Mean		0.026
1059					Coefficient of Variation	0.363				Skewness		1.548E-15
1060												
1061						Normal GOF Test						
1062					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1063					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1064					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1065					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1066						Data Not Normal at 5% Significance Level						
1067												
1068						Assuming Normal Distribution						
1069					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1070					95% Student's-t UCL	0.295				95% Adjusted-CLT UCL (Chen-1995)		0.291
1071										95% Modified-t UCL (Johnson-1978)		0.295
1072												
1073						Gamma GOF Test						
1074					A-D Test Statistic	2.917				Anderson-Darling Gamma GOF Test		
1075					5% A-D Critical Value	0.733				Data Not Gamma Distributed at 5% Significance Level		
1076					K-S Test Statistic	0.477				Kolmogrov-Smirnoff Gamma GOF Test		
1077					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1078						Data Not Gamma Distributed at 5% Significance Level						
1079												
1080						Gamma Statistics						
1081					k hat (MLE)	4.816				k star (bias corrected MLE)		3.668
1082					Theta hat (MLE)	0.0516				Theta star (bias corrected MLE)		0.0678
1083					nu hat (MLE)	115.6				nu star (bias corrected)		88.02
1084					MLE Mean (bias corrected)	0.249				MLE Sd (bias corrected)		0.13
1085										Approximate Chi Square Value (0.05)		67.39
1086					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		64.64
1087												
1088						Assuming Gamma Distribution						
1089					95% Approximate Gamma UCL (use when n>=50))	0.325				95% Adjusted Gamma UCL (use when n<50)		0.338
1090												
1091						Lognormal GOF Test						
1092					Shapiro Wilk Test Statistic	0.492				Shapiro Wilk Lognormal GOF Test		
1093					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1094					Lilliefors Test Statistic	0.489				Lilliefors Lognormal GOF Test		
1095					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1096						Data Not Lognormal at 5% Significance Level						
1097												
1098						Lognormal Statistics						
1099					Minimum of Logged Data	-3.297				Mean of logged Data		-1.5
1100					Maximum of Logged Data	-0.777				SD of logged Data		0.593
1101												

	A	B	C	D	E	F	G	H	I	J	K	L
1102					Assuming Lognormal Distribution							
1103					95% H-UCL	0.399				90% Chebyshev (MVUE) UCL		0.4
1104				95% Chebyshev (MVUE) UCL		0.463				97.5% Chebyshev (MVUE) UCL		0.55
1105				99% Chebyshev (MVUE) UCL		0.722						
1106												
1107					Nonparametric Distribution Free UCL Statistics							
1108					Data do not follow a Discernible Distribution (0.05)							
1109												
1110					Nonparametric Distribution Free UCLs							
1111					95% CLT UCL	0.291				95% Jackknife UCL		0.295
1112				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1113				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1114				95% BCA Bootstrap UCL		N/A						
1115				90% Chebyshev(Mean, Sd) UCL		0.327				95% Chebyshev(Mean, Sd) UCL		0.362
1116				97.5% Chebyshev(Mean, Sd) UCL		0.411				99% Chebyshev(Mean, Sd) UCL		0.508
1117												
1118					Suggested UCL to Use							
1119				95% Chebyshev (Mean, Sd) UCL		0.362						
1120												
1121	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1122	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1123	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1124	For additional insight the user may want to consult a statistician.											
1125												
1126												

	A	B	C	D	E	F	G	H	I	J	K	L
1127	Uranium-238											
1128												
1129						General Statistics						
1130					Total Number of Observations	12				Number of Distinct Observations		3
1131										Number of Missing Observations		0
1132					Minimum	0.99				Mean		5.645
1133					Maximum	10.3				Median		5.645
1134					SD	1.985				Std. Error of Mean		0.573
1135					Coefficient of Variation	0.352				Skewness		0
1136												
1137						Normal GOF Test						
1138					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1139					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1140					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1141					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1142						Data Not Normal at 5% Significance Level						
1143												
1144						Assuming Normal Distribution						
1145					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1146					95% Student's-t UCL	6.674				95% Adjusted-CLT UCL (Chen-1995)		6.587
1147										95% Modified-t UCL (Johnson-1978)		6.674
1148												
1149						Gamma GOF Test						
1150					A-D Test Statistic	2.893				Anderson-Darling Gamma GOF Test		
1151					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
1152					K-S Test Statistic	0.474				Kolmogrov-Smirnoff Gamma GOF Test		
1153					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1154						Data Not Gamma Distributed at 5% Significance Level						
1155												
1156						Gamma Statistics						
1157					k hat (MLE)	5.427				k star (bias corrected MLE)		4.126
1158					Theta hat (MLE)	1.04				Theta star (bias corrected MLE)		1.368
1159					nu hat (MLE)	130.2				nu star (bias corrected)		99.02
1160					MLE Mean (bias corrected)	5.645				MLE Sd (bias corrected)		2.779
1161										Approximate Chi Square Value (0.05)		77.06
1162					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		74.11
1163												
1164						Assuming Gamma Distribution						
1165					95% Approximate Gamma UCL (use when n>=50))	7.253				95% Adjusted Gamma UCL (use when n<50)		7.542
1166												
1167						Lognormal GOF Test						
1168					Shapiro Wilk Test Statistic	0.501				Shapiro Wilk Lognormal GOF Test		
1169					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1170					Lilliefors Test Statistic	0.486				Lilliefors Lognormal GOF Test		
1171					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1172						Data Not Lognormal at 5% Significance Level						
1173												
1174						Lognormal Statistics						
1175					Minimum of Logged Data	-0.0101				Mean of logged Data		1.636
1176					Maximum of Logged Data	2.332				SD of logged Data		0.546
1177												

	A	B	C	D	E	F	G	H	I	J	K	L
1178	**Assuming Lognormal Distribution**											
1179					95% H-UCL	8.563				90% Chebyshev (MVUE) UCL		8.737
1180					95% Chebyshev (MVUE) UCL	10.03				97.5% Chebyshev (MVUE) UCL		11.83
1181					99% Chebyshev (MVUE) UCL	15.36						
1182												
1183	**Nonparametric Distribution Free UCL Statistics**											
1184	**Data do not follow a Discernible Distribution (0.05)**											
1185												
1186	**Nonparametric Distribution Free UCLs**											
1187					95% CLT UCL	6.587				95% Jackknife UCL		6.674
1188					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1189					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1190					95% BCA Bootstrap UCL	N/A						
1191					90% Chebyshev(Mean, Sd) UCL	7.364				95% Chebyshev(Mean, Sd) UCL		8.143
1192					97.5% Chebyshev(Mean, Sd) UCL	9.223				99% Chebyshev(Mean, Sd) UCL		11.35
1193												
1194	**Suggested UCL to Use**											
1195					95% Chebyshev (Mean, Sd) UCL	8.143						
1196												
1197	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1198	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1199	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1200	For additional insight the user may want to consult a statistician.											
1201												
1202												

	A	B	C	D	E	F	G	H	I	J	K	L
1203	Zinc											
1204												
1205					General Statistics							
1206					Total Number of Observations	12				Number of Distinct Observations		12
1207										Number of Missing Observations		0
1208					Minimum	45.6				Mean		432.9
1209					Maximum	3169				Median		217.6
1210					SD	867.6				Std. Error of Mean		250.5
1211					Coefficient of Variation	2.004				Skewness		3.377
1212												
1213					Normal GOF Test							
1214					Shapiro Wilk Test Statistic	0.436				Shapiro Wilk GOF Test		
1215					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1216					Lilliefors Test Statistic	0.455				Lilliefors GOF Test		
1217					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1218					Data Not Normal at 5% Significance Level							
1219												
1220					Assuming Normal Distribution							
1221					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1222					95% Student's-t UCL	882.7				95% Adjusted-CLT UCL (Chen-1995)		1106
1223										95% Modified-t UCL (Johnson-1978)		923.4
1224												
1225					Gamma GOF Test							
1226					A-D Test Statistic	1.323				Anderson-Darling Gamma GOF Test		
1227					5% A-D Critical Value	0.767				Data Not Gamma Distributed at 5% Significance Level		
1228					K-S Test Statistic	0.329				Kolmogrov-Smirnoff Gamma GOF Test		
1229					5% K-S Critical Value	0.255				Data Not Gamma Distributed at 5% Significance Level		
1230					Data Not Gamma Distributed at 5% Significance Level							
1231												
1232					Gamma Statistics							
1233					k hat (MLE)	0.735				k star (bias corrected MLE)		0.607
1234					Theta hat (MLE)	588.9				Theta star (bias corrected MLE)		713.4
1235					nu hat (MLE)	17.64				nu star (bias corrected)		14.56
1236					MLE Mean (bias corrected)	432.9				MLE Sd (bias corrected)		555.7
1237										Approximate Chi Square Value (0.05)		6.959
1238					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		6.174
1239												
1240					Assuming Gamma Distribution							
1241					95% Approximate Gamma UCL (use when n>=50))	905.9				95% Adjusted Gamma UCL (use when n<50)		1021
1242												
1243					Lognormal GOF Test							
1244					Shapiro Wilk Test Statistic	0.878				Shapiro Wilk Lognormal GOF Test		
1245					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
1246					Lilliefors Test Statistic	0.216				Lilliefors Lognormal GOF Test		
1247					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
1248					Data appear Lognormal at 5% Significance Level							
1249												
1250					Lognormal Statistics							
1251					Minimum of Logged Data	3.82				Mean of logged Data		5.254
1252					Maximum of Logged Data	8.061				SD of logged Data		1.139
1253												

	A	B	C	D	E	F	G	H	I	J	K	L
1254	Assuming Lognormal Distribution											
1255					95% H-UCL	1089				90% Chebyshev (MVUE) UCL		699
1256				95% Chebyshev (MVUE) UCL		862.3				97.5% Chebyshev (MVUE) UCL		1089
1257				99% Chebyshev (MVUE) UCL		1534						
1258												
1259	Nonparametric Distribution Free UCL Statistics											
1260	Data appear to follow a Discernible Distribution at 5% Significance Level											
1261												
1262	Nonparametric Distribution Free UCLs											
1263					95% CLT UCL	844.9				95% Jackknife UCL		882.7
1264				95% Standard Bootstrap UCL		812.4				95% Bootstrap-t UCL		2974
1265				95% Hall's Bootstrap UCL		2967				95% Percentile Bootstrap UCL		923.1
1266				95% BCA Bootstrap UCL		1170						
1267				90% Chebyshev(Mean, Sd) UCL		1184				95% Chebyshev(Mean, Sd) UCL		1525
1268				97.5% Chebyshev(Mean, Sd) UCL		1997				99% Chebyshev(Mean, Sd) UCL		2925
1269												
1270	Suggested UCL to Use											
1271				95% Chebyshev (Mean, Sd) UCL		1525						
1272												
1273	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1274	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1275	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1276	For additional insight the user may want to consult a statistician.											
1277												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 1:44:26 PM								
5	From File			EPC_015Sub_EU06.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	63.18				Mean		90.85
17					Maximum	112.2				Median		93.34
18					SD	16.48				Std. Error of Mean		4.758
19					Coefficient of Variation	0.181				Skewness		-0.406
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.94				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.121				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	99.39				95% Adjusted-CLT UCL (Chen-1995)		98.08
31										95% Modified-t UCL (Johnson-1978)		99.3
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.34				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.143				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data appear Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	30.93				k star (bias corrected MLE)		23.25
42					Theta hat (MLE)	2.937				Theta star (bias corrected MLE)		3.907
43					nu hat (MLE)	742.4				nu star (bias corrected)		558.1
44					MLE Mean (bias corrected)	90.85				MLE Sd (bias corrected)		18.84
45										Approximate Chi Square Value (0.05)		504.3
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		496.5
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	100.5				95% Adjusted Gamma UCL (use when n<50)		102.1
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.918				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.144				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
56						Data appear Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	4.146				Mean of logged Data		4.493
60					Maximum of Logged Data	4.721				SD of logged Data		0.192
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	101.3				90% Chebyshev (MVUE) UCL		106.1
64				95% Chebyshev (MVUE) UCL		113				97.5% Chebyshev (MVUE) UCL		122.5
65				99% Chebyshev (MVUE) UCL		141.2						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	98.67				95% Jackknife UCL		99.39
72				95% Standard Bootstrap UCL		98.15				95% Bootstrap-t UCL		99.18
73				95% Hall's Bootstrap UCL		98.15				95% Percentile Bootstrap UCL		98.35
74				95% BCA Bootstrap UCL		97.62						
75				90% Chebyshev(Mean, Sd) UCL		105.1				95% Chebyshev(Mean, Sd) UCL		111.6
76				97.5% Chebyshev(Mean, Sd) UCL		120.6				99% Chebyshev(Mean, Sd) UCL		138.2
77												
78	**Suggested UCL to Use**											
79				95% Student's-t UCL		99.39						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												

	A	B	C	D	E	F	G	H	I	J	K	L
90	Arsenic											
91												
92						General Statistics						
93					Total Number of Observations	12				Number of Distinct Observations		7
94										Number of Missing Observations		0
95					Minimum	6.91				Mean		10.54
96					Maximum	18.04				Median		11
97					SD	2.882				Std. Error of Mean		0.832
98					Coefficient of Variation	0.273				Skewness		1.402
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.764				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.353				Lilliefors GOF Test		
104					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
105						Data Not Normal at 5% Significance Level						
106												
107						Assuming Normal Distribution						
108					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
109					95% Student's-t UCL	12.03				95% Adjusted-CLT UCL (Chen-1995)		12.27
110										95% Modified-t UCL (Johnson-1978)		12.09
111												
112						Gamma GOF Test						
113					A-D Test Statistic	1.188				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.316				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
117						Data Not Gamma Distributed at 5% Significance Level						
118												
119						Gamma Statistics						
120					k hat (MLE)	16.14				k star (bias corrected MLE)		12.16
121					Theta hat (MLE)	0.653				Theta star (bias corrected MLE)		0.867
122					nu hat (MLE)	387.4				nu star (bias corrected)		291.9
123					MLE Mean (bias corrected)	10.54				MLE Sd (bias corrected)		3.022
124										Approximate Chi Square Value (0.05)		253.3
125					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		247.8
126												
127						Assuming Gamma Distribution						
128					95% Approximate Gamma UCL (use when n>=50))	12.15				95% Adjusted Gamma UCL (use when n<50)		12.41
129												
130						Lognormal GOF Test						
131					Shapiro Wilk Test Statistic	0.818				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.304				Lilliefors Lognormal GOF Test		
134					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
135						Data Not Lognormal at 5% Significance Level						
136												
137						Lognormal Statistics						
138					Minimum of Logged Data	1.933				Mean of logged Data		2.324
139					Maximum of Logged Data	2.893				SD of logged Data		0.258
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141	Assuming Lognormal Distribution											
142					95% H-UCL	12.23				90% Chebyshev (MVUE) UCL		12.9
143				95% Chebyshev (MVUE) UCL		13.97				97.5% Chebyshev (MVUE) UCL		15.46
144				99% Chebyshev (MVUE) UCL		18.39						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data do not follow a Discernible Distribution (0.05)											
148												
149	Nonparametric Distribution Free UCLs											
150					95% CLT UCL	11.91				95% Jackknife UCL		12.03
151				95% Standard Bootstrap UCL		11.84				95% Bootstrap-t UCL		12.34
152				95% Hall's Bootstrap UCL		18.08				95% Percentile Bootstrap UCL		11.87
153				95% BCA Bootstrap UCL		12.14						
154				90% Chebyshev(Mean, Sd) UCL		13.04				95% Chebyshev(Mean, Sd) UCL		14.17
155				97.5% Chebyshev(Mean, Sd) UCL		15.74				99% Chebyshev(Mean, Sd) UCL		18.82
156												
157	Suggested UCL to Use											
158				95% Student's-t UCL		12.03				or 95% Modified-t UCL		12.09
159												
160	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
161	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
162	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
163	For additional insight the user may want to consult a statistician.											
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Cadmium											
167												
168					General Statistics							
169					Total Number of Observations	12			Number of Distinct Observations			6
170									Number of Missing Observations			0
171					Minimum	0.037			Mean			10.89
172					Maximum	15.36			Median			12
173					SD	4.925			Std. Error of Mean			1.422
174					Coefficient of Variation	0.452			Skewness			-1.715
175												
176					Normal GOF Test							
177					Shapiro Wilk Test Statistic	0.688			Shapiro Wilk GOF Test			
178					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
179					Lilliefors Test Statistic	0.422			Lilliefors GOF Test			
180					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
181					Data Not Normal at 5% Significance Level							
182												
183					Assuming Normal Distribution							
184					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
185					95% Student's-t UCL	13.44			95% Adjusted-CLT UCL (Chen-1995)			12.48
186									95% Modified-t UCL (Johnson-1978)			13.33
187												
188					Gamma GOF Test							
189					A-D Test Statistic	2.708			Anderson-Darling Gamma GOF Test			
190					5% A-D Critical Value	0.754			Data Not Gamma Distributed at 5% Significance Level			
191					K-S Test Statistic	0.496			Kolmogrov-Smirnoff Gamma GOF Test			
192					5% K-S Critical Value	0.252			Data Not Gamma Distributed at 5% Significance Level			
193					Data Not Gamma Distributed at 5% Significance Level							
194												
195					Gamma Statistics							
196					k hat (MLE)	1.135			k star (bias corrected MLE)			0.907
197					Theta hat (MLE)	9.599			Theta star (bias corrected MLE)			12.01
198					nu hat (MLE)	27.23			nu star (bias corrected)			21.76
199					MLE Mean (bias corrected)	10.89			MLE Sd (bias corrected)			11.44
200									Approximate Chi Square Value (0.05)			12.16
201					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			11.07
202												
203					Assuming Gamma Distribution							
204					95% Approximate Gamma UCL (use when n>=50))	19.49			95% Adjusted Gamma UCL (use when n<50)			21.4
205												
206					Lognormal GOF Test							
207					Shapiro Wilk Test Statistic	0.504			Shapiro Wilk Lognormal GOF Test			
208					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
209					Lilliefors Test Statistic	0.467			Lilliefors Lognormal GOF Test			
210					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
211					Data Not Lognormal at 5% Significance Level							
212												
213					Lognormal Statistics							
214					Minimum of Logged Data	-3.297			Mean of logged Data			1.886
215					Maximum of Logged Data	2.732			SD of logged Data			1.748
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	311.8				90% Chebyshev (MVUE) UCL		62.89
219					95% Chebyshev (MVUE) UCL	80.66				97.5% Chebyshev (MVUE) UCL		105.3
220					99% Chebyshev (MVUE) UCL	153.7						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	13.23				95% Jackknife UCL		13.44
227					95% Standard Bootstrap UCL	13.13				95% Bootstrap-t UCL		12.86
228					95% Hall's Bootstrap UCL	12.63				95% Percentile Bootstrap UCL		13.01
229					95% BCA Bootstrap UCL	12.76						
230					90% Chebyshev(Mean, Sd) UCL	15.16				95% Chebyshev(Mean, Sd) UCL		17.09
231					97.5% Chebyshev(Mean, Sd) UCL	19.77				99% Chebyshev(Mean, Sd) UCL		25.04
232												
233	**Suggested UCL to Use**											
234					99% Chebyshev (Mean, Sd) UCL	25.04						
235												
236	**Recommended UCL exceeds the maximum observation**											
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
241	For additional insight the user may want to consult a statistician.											
242												
243	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
244	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
245												
246												

	A	B	C	D	E	F	G	H	I	J	K	L
247	Chromium											
248												
249					General Statistics							
250					Total Number of Observations	12			Number of Distinct Observations			6
251									Number of Missing Observations			0
252					Minimum	35.2			Mean			69.02
253					Maximum	85			Median			85
254					SD	20.55			Std. Error of Mean			5.932
255					Coefficient of Variation	0.298			Skewness			-0.641
256												
257					Normal GOF Test							
258					Shapiro Wilk Test Statistic	0.74			Shapiro Wilk GOF Test			
259					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
260					Lilliefors Test Statistic	0.365			Lilliefors GOF Test			
261					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
262					Data Not Normal at 5% Significance Level							
263												
264					Assuming Normal Distribution							
265					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
266					95% Student's-t UCL	79.68			95% Adjusted-CLT UCL (Chen-1995)			77.61
267									95% Modified-t UCL (Johnson-1978)			79.49
268												
269					Gamma GOF Test							
270					A-D Test Statistic	1.49			Anderson-Darling Gamma GOF Test			
271					5% A-D Critical Value	0.73			Data Not Gamma Distributed at 5% Significance Level			
272					K-S Test Statistic	0.371			Kolmogrov-Smirnoff Gamma GOF Test			
273					5% K-S Critical Value	0.245			Data Not Gamma Distributed at 5% Significance Level			
274					Data Not Gamma Distributed at 5% Significance Level							
275												
276					Gamma Statistics							
277					k hat (MLE)	10.44			k star (bias corrected MLE)			7.887
278					Theta hat (MLE)	6.61			Theta star (bias corrected MLE)			8.751
279					nu hat (MLE)	250.6			nu star (bias corrected)			189.3
280					MLE Mean (bias corrected)	69.02			MLE Sd (bias corrected)			24.58
281									Approximate Chi Square Value (0.05)			158.5
282					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			154.2
283												
284					Assuming Gamma Distribution							
285					95% Approximate Gamma UCL (use when n>=50))	82.45			95% Adjusted Gamma UCL (use when n<50)			84.75
286												
287					Lognormal GOF Test							
288					Shapiro Wilk Test Statistic	0.753			Shapiro Wilk Lognormal GOF Test			
289					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
290					Lilliefors Test Statistic	0.358			Lilliefors Lognormal GOF Test			
291					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
292					Data Not Lognormal at 5% Significance Level							
293												
294					Lognormal Statistics							
295					Minimum of Logged Data	3.561			Mean of logged Data			4.186
296					Maximum of Logged Data	4.443			SD of logged Data			0.34
297												

	A	B	C	D	E	F	G	H	I	J	K	L
298	Assuming Lognormal Distribution											
299					95% H-UCL	85.24				90% Chebyshev (MVUE) UCL		90
300				95% Chebyshev (MVUE) UCL		99.36				97.5% Chebyshev (MVUE) UCL		112.4
301				99% Chebyshev (MVUE) UCL		137.9						
302												
303	Nonparametric Distribution Free UCL Statistics											
304	Data do not follow a Discernible Distribution (0.05)											
305												
306	Nonparametric Distribution Free UCLs											
307					95% CLT UCL	78.78				95% Jackknife UCL		79.68
308				95% Standard Bootstrap UCL		78.43				95% Bootstrap-t UCL		78.36
309				95% Hall's Bootstrap UCL		77.17				95% Percentile Bootstrap UCL		77.95
310				95% BCA Bootstrap UCL		77.28						
311				90% Chebyshev(Mean, Sd) UCL		86.82				95% Chebyshev(Mean, Sd) UCL		94.88
312				97.5% Chebyshev(Mean, Sd) UCL		106.1				99% Chebyshev(Mean, Sd) UCL		128
313												
314	Suggested UCL to Use											
315				95% Student's-t UCL		79.68				or 95% Modified-t UCL		79.49
316												
317	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
318	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
319	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
320	For additional insight the user may want to consult a statistician.											
321												
322	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
323	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
324												
325												

	A	B	C	D	E	F	G	H	I	J	K	L
326	Cobalt											
327												
328					General Statistics							
329					Total Number of Observations	12				Number of Distinct Observations		3
330										Number of Missing Observations		0
331					Minimum	3.6				Mean		9.9
332					Maximum	16.2				Median		9.9
333					SD	2.686				Std. Error of Mean		0.775
334					Coefficient of Variation	0.271				Skewness		-3.68E-15
335												
336					Normal GOF Test							
337					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
338					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
339					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
340					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
341					Data Not Normal at 5% Significance Level							
342												
343					Assuming Normal Distribution							
344					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
345					95% Student's-t UCL	11.29				95% Adjusted-CLT UCL (Chen-1995)		11.18
346										95% Modified-t UCL (Johnson-1978)		11.29
347												
348					Gamma GOF Test							
349					A-D Test Statistic	2.795				Anderson-Darling Gamma GOF Test		
350					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
351					K-S Test Statistic	0.456				Kolmogrov-Smirnoff Gamma GOF Test		
352					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
353					Data Not Gamma Distributed at 5% Significance Level							
354												
355					Gamma Statistics							
356					k hat (MLE)	11.72				k star (bias corrected MLE)		8.847
357					Theta hat (MLE)	0.845				Theta star (bias corrected MLE)		1.119
358					nu hat (MLE)	281.3				nu star (bias corrected)		212.3
359					MLE Mean (bias corrected)	9.9				MLE Sd (bias corrected)		3.328
360										Approximate Chi Square Value (0.05)		179.6
361					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		175
362												
363					Assuming Gamma Distribution							
364					95% Approximate Gamma UCL (use when n>=50))	11.7				95% Adjusted Gamma UCL (use when n<50)		12.01
365												
366					Lognormal GOF Test							
367					Shapiro Wilk Test Statistic	0.545				Shapiro Wilk Lognormal GOF Test		
368					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
369					Lilliefors Test Statistic	0.468				Lilliefors Lognormal GOF Test		
370					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
371					Data Not Lognormal at 5% Significance Level							
372												
373					Lognormal Statistics							
374					Minimum of Logged Data	1.281				Mean of logged Data		2.249
375					Maximum of Logged Data	2.785				SD of logged Data		0.336
376												

	A	B	C	D	E	F	G	H	I	J	K	L
377					Assuming Lognormal Distribution							
378					95% H-UCL	12.24				90% Chebyshev (MVUE) UCL		12.92
379				95% Chebyshev (MVUE) UCL		14.25				97.5% Chebyshev (MVUE) UCL		16.1
380				99% Chebyshev (MVUE) UCL		19.73						
381												
382					Nonparametric Distribution Free UCL Statistics							
383					Data do not follow a Discernible Distribution (0.05)							
384												
385					Nonparametric Distribution Free UCLs							
386					95% CLT UCL	11.18				95% Jackknife UCL		11.29
387				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
388				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
389				95% BCA Bootstrap UCL		N/A						
390				90% Chebyshev(Mean, Sd) UCL		12.23				95% Chebyshev(Mean, Sd) UCL		13.28
391				97.5% Chebyshev(Mean, Sd) UCL		14.74				99% Chebyshev(Mean, Sd) UCL		17.62
392												
393					Suggested UCL to Use							
394				95% Student's-t UCL		11.29				or 95% Modified-t UCL		11.29
395												
396					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
397					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
398					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
399					For additional insight the user may want to consult a statistician.							
400												
401					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
402					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
403												
404												

	A	B	C	D	E	F	G	H	I	J	K	L
405	Copper											
406												
407					General Statistics							
408					Total Number of Observations	12				Number of Distinct Observations		11
409										Number of Missing Observations		0
410					Minimum	22.41				Mean		294.1
411					Maximum	793.2				Median		286.9
412					SD	258.2				Std. Error of Mean		74.53
413					Coefficient of Variation	0.878				Skewness		0.868
414												
415					Normal GOF Test							
416					Shapiro Wilk Test Statistic	0.875				Shapiro Wilk GOF Test		
417					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
418					Lilliefors Test Statistic	0.168				Lilliefors GOF Test		
419					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
420					Data appear Normal at 5% Significance Level							
421												
422					Assuming Normal Distribution							
423					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
424					95% Student's-t UCL	428				95% Adjusted-CLT UCL (Chen-1995)		436.7
425										95% Modified-t UCL (Johnson-1978)		431.1
426												
427					Gamma GOF Test							
428					A-D Test Statistic	0.582				Anderson-Darling Gamma GOF Test		
429					5% A-D Critical Value	0.756				Detected data appear Gamma Distributed at 5% Significance Level		
430					K-S Test Statistic	0.198				Kolmogrov-Smirnoff Gamma GOF Test		
431					5% K-S Critical Value	0.252				Detected data appear Gamma Distributed at 5% Significance Level		
432					Detected data appear Gamma Distributed at 5% Significance Level							
433												
434					Gamma Statistics							
435					k hat (MLE)	1.048				k star (bias corrected MLE)		0.841
436					Theta hat (MLE)	280.7				Theta star (bias corrected MLE)		349.5
437					nu hat (MLE)	25.15				nu star (bias corrected)		20.19
438					MLE Mean (bias corrected)	294.1				MLE Sd (bias corrected)		320.6
439										Approximate Chi Square Value (0.05)		10.99
440					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		9.973
441												
442					Assuming Gamma Distribution							
443					95% Approximate Gamma UCL (use when n>=50))	540.2				95% Adjusted Gamma UCL (use when n<50)		595.6
444												
445					Lognormal GOF Test							
446					Shapiro Wilk Test Statistic	0.865				Shapiro Wilk Lognormal GOF Test		
447					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
448					Lilliefors Test Statistic	0.238				Lilliefors Lognormal GOF Test		
449					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
450					Data appear Lognormal at 5% Significance Level							
451												
452					Lognormal Statistics							
453					Minimum of Logged Data	3.11				Mean of logged Data		5.136
454					Maximum of Logged Data	6.676				SD of logged Data		1.266
455												

	A	B	C	D	E	F	G	H	I	J	K	L
456	Assuming Lognormal Distribution											
457					95% H-UCL	1397				90% Chebyshev (MVUE) UCL		748.8
458				95% Chebyshev (MVUE) UCL		933.2				97.5% Chebyshev (MVUE) UCL		1189
459				99% Chebyshev (MVUE) UCL		1692						
460												
461	Nonparametric Distribution Free UCL Statistics											
462	Data appear to follow a Discernible Distribution at 5% Significance Level											
463												
464	Nonparametric Distribution Free UCLs											
465					95% CLT UCL	416.7				95% Jackknife UCL		428
466				95% Standard Bootstrap UCL		410				95% Bootstrap-t UCL		464
467				95% Hall's Bootstrap UCL		519.5				95% Percentile Bootstrap UCL		408.4
468				95% BCA Bootstrap UCL		426.4						
469				90% Chebyshev(Mean, Sd) UCL		517.7				95% Chebyshev(Mean, Sd) UCL		619
470				97.5% Chebyshev(Mean, Sd) UCL		759.5				99% Chebyshev(Mean, Sd) UCL		1036
471												
472	Suggested UCL to Use											
473				95% Student's-t UCL		428						
474												
475	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
476	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
477	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
478	For additional insight the user may want to consult a statistician.											
479												
480												

	A	B	C	D	E	F	G	H	I	J	K	L
481	Iron											
482												
483					General Statistics							
484					Total Number of Observations	12				Number of Distinct Observations		12
485										Number of Missing Observations		0
486					Minimum	12350				Mean		24124
487					Maximum	54500				Median		18474
488					SD	13019				Std. Error of Mean		3758
489					Coefficient of Variation	0.54				Skewness		1.5
490												
491					Normal GOF Test							
492					Shapiro Wilk Test Statistic	0.788				Shapiro Wilk GOF Test		
493					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
494					Lilliefors Test Statistic	0.283				Lilliefors GOF Test		
495					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
496					Data Not Normal at 5% Significance Level							
497												
498					Assuming Normal Distribution							
499					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
500					95% Student's-t UCL	30874				95% Adjusted-CLT UCL (Chen-1995)		32045
501										95% Modified-t UCL (Johnson-1978)		31145
502												
503					Gamma GOF Test							
504					A-D Test Statistic	0.852				Anderson-Darling Gamma GOF Test		
505					5% A-D Critical Value	0.733				Data Not Gamma Distributed at 5% Significance Level		
506					K-S Test Statistic	0.243				Kolmogrov-Smirnoff Gamma GOF Test		
507					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
508					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
509												
510					Gamma Statistics							
511					k hat (MLE)	4.784				k star (bias corrected MLE)		3.643
512					Theta hat (MLE)	5043				Theta star (bias corrected MLE)		6622
513					nu hat (MLE)	114.8				nu star (bias corrected)		87.44
514					MLE Mean (bias corrected)	24124				MLE Sd (bias corrected)		12639
515										Approximate Chi Square Value (0.05)		66.88
516					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		64.14
517												
518					Assuming Gamma Distribution							
519					95% Approximate Gamma UCL (use when n>=50)	31539				95% Adjusted Gamma UCL (use when n<50)		32886
520												
521					Lognormal GOF Test							
522					Shapiro Wilk Test Statistic	0.887				Shapiro Wilk Lognormal GOF Test		
523					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
524					Lilliefors Test Statistic	0.214				Lilliefors Lognormal GOF Test		
525					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
526					Data appear Lognormal at 5% Significance Level							
527												
528					Lognormal Statistics							
529					Minimum of Logged Data	9.421				Mean of logged Data		9.983
530					Maximum of Logged Data	10.91				SD of logged Data		0.462
531												

	A	B	C	D	E	F	G	H	I	J	K	L
532	**Assuming Lognormal Distribution**											
533					95% H-UCL	32247				90% Chebyshev (MVUE) UCL		33595
534					95% Chebyshev (MVUE) UCL	38005				97.5% Chebyshev (MVUE) UCL		44127
535					99% Chebyshev (MVUE) UCL	56152						
536												
537	**Nonparametric Distribution Free UCL Statistics**											
538	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
539												
540	**Nonparametric Distribution Free UCLs**											
541					95% CLT UCL	30306				95% Jackknife UCL		30874
542					95% Standard Bootstrap UCL	30161				95% Bootstrap-t UCL		34487
543					95% Hall's Bootstrap UCL	30511				95% Percentile Bootstrap UCL		30244
544					95% BCA Bootstrap UCL	31989						
545					90% Chebyshev(Mean, Sd) UCL	35399				95% Chebyshev(Mean, Sd) UCL		40506
546					97.5% Chebyshev(Mean, Sd) UCL	47594				99% Chebyshev(Mean, Sd) UCL		61518
547												
548	**Suggested UCL to Use**											
549					95% Adjusted Gamma UCL	32886						
550												
551	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
552	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
553	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
554	For additional insight the user may want to consult a statistician.											
555												
556												

	A	B	C	D	E	F	G	H	I	J	K	L
557	Manganese											
558												
559					General Statistics							
560					Total Number of Observations	12			Number of Distinct Observations			12
561									Number of Missing Observations			0
562					Minimum	244.2			Mean			558
563					Maximum	1072			Median			455.8
564					SD	266.9			Std. Error of Mean			77.04
565					Coefficient of Variation	0.478			Skewness			0.792
566												
567					Normal GOF Test							
568					Shapiro Wilk Test Statistic	0.88			Shapiro Wilk GOF Test			
569					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
570					Lilliefors Test Statistic	0.231			Lilliefors GOF Test			
571					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
572					Data appear Normal at 5% Significance Level							
573												
574					Assuming Normal Distribution							
575					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
576					95% Student's-t UCL	696.3			95% Adjusted-CLT UCL (Chen-1995)			703.5
577									95% Modified-t UCL (Johnson-1978)			699.3
578												
579					Gamma GOF Test							
580					A-D Test Statistic	0.527			Anderson-Darling Gamma GOF Test			
581					5% A-D Critical Value	0.732			Detected data appear Gamma Distributed at 5% Significance Level			
582					K-S Test Statistic	0.183			Kolmogrov-Smirnoff Gamma GOF Test			
583					5% K-S Critical Value	0.246			Detected data appear Gamma Distributed at 5% Significance Level			
584					Detected data appear Gamma Distributed at 5% Significance Level							
585												
586					Gamma Statistics							
587					k hat (MLE)	5.133			k star (bias corrected MLE)			3.905
588					Theta hat (MLE)	108.7			Theta star (bias corrected MLE)			142.9
589					nu hat (MLE)	123.2			nu star (bias corrected)			93.72
590					MLE Mean (bias corrected)	558			MLE Sd (bias corrected)			282.4
591									Approximate Chi Square Value (0.05)			72.4
592					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			69.54
593												
594					Assuming Gamma Distribution							
595					95% Approximate Gamma UCL (use when n>=50))	722.3			95% Adjusted Gamma UCL (use when n<50)			752
596												
597					Lognormal GOF Test							
598					Shapiro Wilk Test Statistic	0.935			Shapiro Wilk Lognormal GOF Test			
599					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
600					Lilliefors Test Statistic	0.177			Lilliefors Lognormal GOF Test			
601					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
602					Data appear Lognormal at 5% Significance Level							
603												
604					Lognormal Statistics							
605					Minimum of Logged Data	5.498			Mean of logged Data			6.224
606					Maximum of Logged Data	6.978			SD of logged Data			0.465
607												

	A	B	C	D	E	F	G	H	I	J	K	L
608	**Assuming Lognormal Distribution**											
609					95% H-UCL	754.4				90% Chebyshev (MVUE) UCL		785.5
610					95% Chebyshev (MVUE) UCL	889.1				97.5% Chebyshev (MVUE) UCL		1033
611					99% Chebyshev (MVUE) UCL	1315						
612												
613	**Nonparametric Distribution Free UCL Statistics**											
614	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
615												
616	**Nonparametric Distribution Free UCLs**											
617					95% CLT UCL	684.7				95% Jackknife UCL		696.3
618					95% Standard Bootstrap UCL	675				95% Bootstrap-t UCL		731.2
619					95% Hall's Bootstrap UCL	684.6				95% Percentile Bootstrap UCL		686.5
620					95% BCA Bootstrap UCL	698						
621					90% Chebyshev(Mean, Sd) UCL	789.1				95% Chebyshev(Mean, Sd) UCL		893.8
622					97.5% Chebyshev(Mean, Sd) UCL	1039				99% Chebyshev(Mean, Sd) UCL		1324
623												
624	**Suggested UCL to Use**											
625					95% Student's-t UCL	696.3						
626												
627	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
628	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
629	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
630	For additional insight the user may want to consult a statistician.											
631												
632												

	A	B	C	D	E	F	G	H	I	J	K	L
633	Mercury											
634												
635					General Statistics							
636					Total Number of Observations	12				Number of Distinct Observations		5
637										Number of Missing Observations		0
638					Minimum	0.0201				Mean		7.91
639					Maximum	10				Median		10
640					SD	3.754				Std. Error of Mean		1.084
641					Coefficient of Variation	0.475				Skewness		-1.736
642												
643					Normal GOF Test							
644					Shapiro Wilk Test Statistic	0.617				Shapiro Wilk GOF Test		
645					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
646					Lilliefors Test Statistic	0.378				Lilliefors GOF Test		
647					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
648					Data Not Normal at 5% Significance Level							
649												
650					Assuming Normal Distribution							
651					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
652					95% Student's-t UCL	9.856				95% Adjusted-CLT UCL (Chen-1995)		9.112
653										95% Modified-t UCL (Johnson-1978)		9.766
654												
655					Gamma GOF Test							
656					A-D Test Statistic	2.856				Anderson-Darling Gamma GOF Test		
657					5% A-D Critical Value	0.758				Data Not Gamma Distributed at 5% Significance Level		
658					K-S Test Statistic	0.406				Kolmogrov-Smirnoff Gamma GOF Test		
659					5% K-S Critical Value	0.253				Data Not Gamma Distributed at 5% Significance Level		
660					Data Not Gamma Distributed at 5% Significance Level							
661												
662					Gamma Statistics							
663					k hat (MLE)	0.961				k star (bias corrected MLE)		0.776
664					Theta hat (MLE)	8.231				Theta star (bias corrected MLE)		10.19
665					nu hat (MLE)	23.07				nu star (bias corrected)		18.63
666					MLE Mean (bias corrected)	7.91				MLE Sd (bias corrected)		8.977
667										Approximate Chi Square Value (0.05)		9.849
668					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		8.89
669												
670					Assuming Gamma Distribution							
671					95% Approximate Gamma UCL (use when n>=50))	14.96				95% Adjusted Gamma UCL (use when n<50)		16.58
672												
673					Lognormal GOF Test							
674					Shapiro Wilk Test Statistic	0.521				Shapiro Wilk Lognormal GOF Test		
675					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
676					Lilliefors Test Statistic	0.422				Lilliefors Lognormal GOF Test		
677					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
678					Data Not Lognormal at 5% Significance Level							
679												
680					Lognormal Statistics							
681					Minimum of Logged Data	-3.907				Mean of logged Data		1.465
682					Maximum of Logged Data	2.303				SD of logged Data		1.92
683												

	A	B	C	D	E	F	G	H	I	J	K	L
684	**Assuming Lognormal Distribution**											
685					95% H-UCL	437.4				90% Chebyshev (MVUE) UCL		55.47
686				95% Chebyshev (MVUE) UCL		71.65				97.5% Chebyshev (MVUE) UCL		94.11
687				99% Chebyshev (MVUE) UCL		138.2						
688												
689	**Nonparametric Distribution Free UCL Statistics**											
690	**Data do not follow a Discernible Distribution (0.05)**											
691												
692	**Nonparametric Distribution Free UCLs**											
693					95% CLT UCL	9.692				95% Jackknife UCL		9.856
694				95% Standard Bootstrap UCL		9.564				95% Bootstrap-t UCL		9.427
695				95% Hall's Bootstrap UCL		9.153				95% Percentile Bootstrap UCL		9.458
696				95% BCA Bootstrap UCL		9.02						
697				90% Chebyshev(Mean, Sd) UCL		11.16				95% Chebyshev(Mean, Sd) UCL		12.63
698				97.5% Chebyshev(Mean, Sd) UCL		14.68				99% Chebyshev(Mean, Sd) UCL		18.69
699												
700	**Suggested UCL to Use**											
701				99% Chebyshev (Mean, Sd) UCL		18.69						
702												
703	**Recommended UCL exceeds the maximum observation**											
704												
705	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
706	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
707	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
708	For additional insight the user may want to consult a statistician.											
709												
710	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
711	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
712												
713												

	A	B	C	D	E	F	G	H	I	J	K	L
714	Neptunium-237											
715												
716					General Statistics							
717					Total Number of Observations	12				Number of Distinct Observations		3
718										Number of Missing Observations		0
719					Minimum	0.006				Mean		0.323
720					Maximum	0.64				Median		0.323
721					SD	0.135				Std. Error of Mean		0.039
722					Coefficient of Variation	0.418				Skewness		0
723												
724					Normal GOF Test							
725					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
726					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
727					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
728					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
729					Data Not Normal at 5% Significance Level							
730												
731					Assuming Normal Distribution							
732					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
733					95% Student's-t UCL	0.393				95% Adjusted-CLT UCL (Chen-1995)		0.387
734										95% Modified-t UCL (Johnson-1978)		0.393
735												
736					Gamma GOF Test							
737					A-D Test Statistic	3.218				Anderson-Darling Gamma GOF Test		
738					5% A-D Critical Value	0.742				Data Not Gamma Distributed at 5% Significance Level		
739					K-S Test Statistic	0.511				Kolmogrov-Smirnoff Gamma GOF Test		
740					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
741					Data Not Gamma Distributed at 5% Significance Level							
742												
743					Gamma Statistics							
744					k hat (MLE)	1.967				k star (bias corrected MLE)		1.531
745					Theta hat (MLE)	0.164				Theta star (bias corrected MLE)		0.211
746					nu hat (MLE)	47.22				nu star (bias corrected)		36.75
747					MLE Mean (bias corrected)	0.323				MLE Sd (bias corrected)		0.261
748										Approximate Chi Square Value (0.05)		23.87
749					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		22.3
750												
751					Assuming Gamma Distribution							
752					95% Approximate Gamma UCL (use when n>=50))	0.497				95% Adjusted Gamma UCL (use when n<50)		0.532
753												
754					Lognormal GOF Test							
755					Shapiro Wilk Test Statistic	0.423				Shapiro Wilk Lognormal GOF Test		
756					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
757					Lilliefors Test Statistic	0.508				Lilliefors Lognormal GOF Test		
758					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
759					Data Not Lognormal at 5% Significance Level							
760												
761					Lognormal Statistics							
762					Minimum of Logged Data	-5.116				Mean of logged Data		-1.405
763					Maximum of Logged Data	-0.446				SD of logged Data		1.185
764												

	A	B	C	D	E	F	G	H	I	J	K	L
765	Assuming Lognormal Distribution											
766					95% H-UCL	1.587				90% Chebyshev (MVUE) UCL		0.958
767				95% Chebyshev (MVUE) UCL		1.186				97.5% Chebyshev (MVUE) UCL		1.503
768				99% Chebyshev (MVUE) UCL		2.126						
769												
770	Nonparametric Distribution Free UCL Statistics											
771	Data do not follow a Discernible Distribution (0.05)											
772												
773	Nonparametric Distribution Free UCLs											
774					95% CLT UCL	0.387				95% Jackknife UCL		0.393
775				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
776				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
777				95% BCA Bootstrap UCL		N/A						
778				90% Chebyshev(Mean, Sd) UCL		0.44				95% Chebyshev(Mean, Sd) UCL		0.493
779				97.5% Chebyshev(Mean, Sd) UCL		0.567				99% Chebyshev(Mean, Sd) UCL		0.711
780												
781	Suggested UCL to Use											
782				95% Chebyshev (Mean, Sd) UCL		0.493						
783												
784	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
785	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
786	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
787	For additional insight the user may want to consult a statistician.											
788												
789												

	A	B	C	D	E	F	G	H	I	J	K	L
790	Nickel											
791												
792					General Statistics							
793					Total Number of Observations	12			Number of Distinct Observations			11
794									Number of Missing Observations			0
795					Minimum	65			Mean			215.5
796					Maximum	616.5			Median			168.4
797					SD	163.4			Std. Error of Mean			47.18
798					Coefficient of Variation	0.758			Skewness			1.464
799												
800					Normal GOF Test							
801					Shapiro Wilk Test Statistic	0.855			Shapiro Wilk GOF Test			
802					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
803					Lilliefors Test Statistic	0.18			Lilliefors GOF Test			
804					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
805					Data appear Approximate Normal at 5% Significance Level							
806												
807					Assuming Normal Distribution							
808					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
809					95% Student's-t UCL	300.3			95% Adjusted-CLT UCL (Chen-1995)			314.5
810									95% Modified-t UCL (Johnson-1978)			303.6
811												
812					Gamma GOF Test							
813					A-D Test Statistic	0.281			Anderson-Darling Gamma GOF Test			
814					5% A-D Critical Value	0.741			Detected data appear Gamma Distributed at 5% Significance Level			
815					K-S Test Statistic	0.141			Kolmogrov-Smirnoff Gamma GOF Test			
816					5% K-S Critical Value	0.248			Detected data appear Gamma Distributed at 5% Significance Level			
817					Detected data appear Gamma Distributed at 5% Significance Level							
818												
819					Gamma Statistics							
820					k hat (MLE)	2.184			k star (bias corrected MLE)			1.693
821					Theta hat (MLE)	98.7			Theta star (bias corrected MLE)			127.3
822					nu hat (MLE)	52.41			nu star (bias corrected)			40.64
823					MLE Mean (bias corrected)	215.5			MLE Sd (bias corrected)			165.6
824									Approximate Chi Square Value (0.05)			27.03
825					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			25.35
826												
827					Assuming Gamma Distribution							
828					95% Approximate Gamma UCL (use when n>=50))	324			95% Adjusted Gamma UCL (use when n<50)			345.6
829												
830					Lognormal GOF Test							
831					Shapiro Wilk Test Statistic	0.949			Shapiro Wilk Lognormal GOF Test			
832					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
833					Lilliefors Test Statistic	0.13			Lilliefors Lognormal GOF Test			
834					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
835					Data appear Lognormal at 5% Significance Level							
836												
837					Lognormal Statistics							
838					Minimum of Logged Data	4.174			Mean of logged Data			5.127
839					Maximum of Logged Data	6.424			SD of logged Data			0.736
840												

	A	B	C	D	E	F	G	H	I	J	K	L
841	**Assuming Lognormal Distribution**											
842					95% H-UCL	381.8				90% Chebyshev (MVUE) UCL		358.1
843					95% Chebyshev (MVUE) UCL	422.9				97.5% Chebyshev (MVUE) UCL		512.9
844					99% Chebyshev (MVUE) UCL	689.7						
845												
846	**Nonparametric Distribution Free UCL Statistics**											
847	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
848												
849	**Nonparametric Distribution Free UCLs**											
850					95% CLT UCL	293.1				95% Jackknife UCL		300.3
851					95% Standard Bootstrap UCL	288.1				95% Bootstrap-t UCL		333.2
852					95% Hall's Bootstrap UCL	354.7				95% Percentile Bootstrap UCL		294.5
853					95% BCA Bootstrap UCL	313.5						
854					90% Chebyshev(Mean, Sd) UCL	357.1				95% Chebyshev(Mean, Sd) UCL		421.2
855					97.5% Chebyshev(Mean, Sd) UCL	510.2				99% Chebyshev(Mean, Sd) UCL		685
856												
857	**Suggested UCL to Use**											
858					95% Student's-t UCL	300.3						
859												
860	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
861	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
862	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
863	For additional insight the user may want to consult a statistician.											
864												
865												

	A	B	C	D	E	F	G	H	I	J	K	L
866	PAH, Total											
867												
868						General Statistics						
869					Total Number of Observations	12				Number of Distinct Observations		3
870										Number of Missing Observations		0
871					Minimum	0.008				Mean		0.816
872					Maximum	1.624				Median		0.816
873					SD	0.344				Std. Error of Mean		0.0994
874					Coefficient of Variation	0.422				Skewness		1.186E-15
875												
876						Normal GOF Test						
877					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
878					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
879					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
880					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
881						Data Not Normal at 5% Significance Level						
882												
883						Assuming Normal Distribution						
884					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
885					95% Student's-t UCL	0.994				95% Adjusted-CLT UCL (Chen-1995)		0.979
886										95% Modified-t UCL (Johnson-1978)		0.994
887												
888						Gamma GOF Test						
889					A-D Test Statistic	3.305				Anderson-Darling Gamma GOF Test		
890					5% A-D Critical Value	0.744				Data Not Gamma Distributed at 5% Significance Level		
891					K-S Test Statistic	0.519				Kolmogrov-Smirnoff Gamma GOF Test		
892					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
893						Data Not Gamma Distributed at 5% Significance Level						
894												
895						Gamma Statistics						
896					k hat (MLE)	1.671				k star (bias corrected MLE)		1.309
897					Theta hat (MLE)	0.488				Theta star (bias corrected MLE)		0.623
898					nu hat (MLE)	40.12				nu star (bias corrected)		31.42
899					MLE Mean (bias corrected)	0.816				MLE Sd (bias corrected)		0.713
900										Approximate Chi Square Value (0.05)		19.61
901					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		18.2
902												
903						Assuming Gamma Distribution						
904					95% Approximate Gamma UCL (use when n>=50))	1.307				95% Adjusted Gamma UCL (use when n<50)		1.408
905												
906						Lognormal GOF Test						
907					Shapiro Wilk Test Statistic	0.411				Shapiro Wilk Lognormal GOF Test		
908					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
909					Lilliefors Test Statistic	0.511				Lilliefors Lognormal GOF Test		
910					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
911						Data Not Lognormal at 5% Significance Level						
912												
913						Lognormal Statistics						
914					Minimum of Logged Data	-4.828				Mean of logged Data		-0.532
915					Maximum of Logged Data	0.485				SD of logged Data		1.367
916												

	A	B	C	D	E	F	G	H	I	J	K	L
917					Assuming Lognormal Distribution							
918					95% H-UCL	6.667				90% Chebyshev (MVUE) UCL		3.022
919				95% Chebyshev (MVUE) UCL		3.794				97.5% Chebyshev (MVUE) UCL		4.866
920				99% Chebyshev (MVUE) UCL		6.971						
921												
922					Nonparametric Distribution Free UCL Statistics							
923					Data do not follow a Discernible Distribution (0.05)							
924												
925					Nonparametric Distribution Free UCLs							
926					95% CLT UCL	0.979				95% Jackknife UCL		0.994
927				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
928				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
929				95% BCA Bootstrap UCL		N/A						
930				90% Chebyshev(Mean, Sd) UCL		1.114				95% Chebyshev(Mean, Sd) UCL		1.249
931				97.5% Chebyshev(Mean, Sd) UCL		1.437				99% Chebyshev(Mean, Sd) UCL		1.805
932												
933					Suggested UCL to Use							
934				95% Chebyshev (Mean, Sd) UCL		1.249						
935												
936	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
937	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
938	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
939	For additional insight the user may want to consult a statistician.											
940												
941												

	A	B	C	D	E	F	G	H	I	J	K	L
942	PCB, Total											
943												
944					General Statistics							
945					Total Number of Observations	12			Number of Distinct Observations			2
946									Number of Missing Observations			0
947					Minimum	5			Mean			5.417
948					Maximum	10			Median			5
949					SD	1.443			Std. Error of Mean			0.417
950					Coefficient of Variation	0.266			Skewness			3.464
951												
952					Normal GOF Test							
953					Shapiro Wilk Test Statistic	0.327			Shapiro Wilk GOF Test			
954					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
955					Lilliefors Test Statistic	0.53			Lilliefors GOF Test			
956					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
957					Data Not Normal at 5% Significance Level							
958												
959					Assuming Normal Distribution							
960					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
961					95% Student's-t UCL	6.165			95% Adjusted-CLT UCL (Chen-1995)			6.547
962									95% Modified-t UCL (Johnson-1978)			6.234
963												
964					Gamma GOF Test							
965					A-D Test Statistic	4.092			Anderson-Darling Gamma GOF Test			
966					5% A-D Critical Value	0.732			Data Not Gamma Distributed at 5% Significance Level			
967					K-S Test Statistic	0.536			Kolmogrov-Smirnoff Gamma GOF Test			
968					5% K-S Critical Value	0.245			Data Not Gamma Distributed at 5% Significance Level			
969					Data Not Gamma Distributed at 5% Significance Level							
970												
971					Gamma Statistics							
972					k hat (MLE)	22.61			k star (bias corrected MLE)			17.01
973					Theta hat (MLE)	0.24			Theta star (bias corrected MLE)			0.318
974					nu hat (MLE)	542.6			nu star (bias corrected)			408.3
975					MLE Mean (bias corrected)	5.417			MLE Sd (bias corrected)			1.313
976									Approximate Chi Square Value (0.05)			362.4
977					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			355.8
978												
979					Assuming Gamma Distribution							
980					95% Approximate Gamma UCL (use when n>=50))	6.102			95% Adjusted Gamma UCL (use when n<50)			6.215
981												
982					Lognormal GOF Test							
983					Shapiro Wilk Test Statistic	0.327			Shapiro Wilk Lognormal GOF Test			
984					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
985					Lilliefors Test Statistic	0.53			Lilliefors Lognormal GOF Test			
986					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
987					Data Not Lognormal at 5% Significance Level							
988												
989					Lognormal Statistics							
990					Minimum of Logged Data	1.609			Mean of logged Data			1.667
991					Maximum of Logged Data	2.303			SD of logged Data			0.2
992												

	A	B	C	D	E	F	G	H	I	J	K	L
993					Assuming Lognormal Distribution							
994					95% H-UCL	6.04				90% Chebyshev (MVUE) UCL		6.334
995				95% Chebyshev (MVUE) UCL		6.759				97.5% Chebyshev (MVUE) UCL		7.35
996				99% Chebyshev (MVUE) UCL		8.509						
997												
998					Nonparametric Distribution Free UCL Statistics							
999					Data do not follow a Discernible Distribution (0.05)							
1000												
1001					Nonparametric Distribution Free UCLs							
1002					95% CLT UCL	6.102				95% Jackknife UCL		N/A
1003				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1004				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1005				95% BCA Bootstrap UCL		N/A						
1006				90% Chebyshev(Mean, Sd) UCL		6.667				95% Chebyshev(Mean, Sd) UCL		7.233
1007				97.5% Chebyshev(Mean, Sd) UCL		8.019				99% Chebyshev(Mean, Sd) UCL		9.562
1008												
1009					Suggested UCL to Use							
1010				95% Student's-t UCL		6.165				or 95% Modified-t UCL		6.234
1011												
1012	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1013	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1014	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1015	For additional insight the user may want to consult a statistician.											
1016												
1017												

	A	B	C	D	E	F	G	H	I	J	K	L
1018	Uranium											
1019												
1020						General Statistics						
1021					Total Number of Observations	12				Number of Distinct Observations		10
1022										Number of Missing Observations		0
1023					Minimum	9.11				Mean		45.89
1024					Maximum	112				Median		32.72
1025					SD	32.17				Std. Error of Mean		9.287
1026					Coefficient of Variation	0.701				Skewness		0.9
1027												
1028						Normal GOF Test						
1029					Shapiro Wilk Test Statistic	0.88				Shapiro Wilk GOF Test		
1030					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
1031					Lilliefors Test Statistic	0.239				Lilliefors GOF Test		
1032					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
1033						Data appear Normal at 5% Significance Level						
1034												
1035						Assuming Normal Distribution						
1036					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1037					95% Student's-t UCL	62.57				95% Adjusted-CLT UCL (Chen-1995)		63.75
1038										95% Modified-t UCL (Johnson-1978)		62.97
1039												
1040						Gamma GOF Test						
1041					A-D Test Statistic	0.401				Anderson-Darling Gamma GOF Test		
1042					5% A-D Critical Value	0.741				Detected data appear Gamma Distributed at 5% Significance Level		
1043					K-S Test Statistic	0.179				Kolmogrov-Smirnoff Gamma GOF Test		
1044					5% K-S Critical Value	0.248				Detected data appear Gamma Distributed at 5% Significance Level		
1045						Detected data appear Gamma Distributed at 5% Significance Level						
1046												
1047						Gamma Statistics						
1048					k hat (MLE)	2.255				k star (bias corrected MLE)		1.747
1049					Theta hat (MLE)	20.35				Theta star (bias corrected MLE)		26.27
1050					nu hat (MLE)	54.12				nu star (bias corrected)		41.92
1051					MLE Mean (bias corrected)	45.89				MLE Sd (bias corrected)		34.72
1052										Approximate Chi Square Value (0.05)		28.08
1053					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		26.36
1054												
1055						Assuming Gamma Distribution						
1056					95% Approximate Gamma UCL (use when n>=50))	68.52				95% Adjusted Gamma UCL (use when n<50)		72.98
1057												
1058						Lognormal GOF Test						
1059					Shapiro Wilk Test Statistic	0.951				Shapiro Wilk Lognormal GOF Test		
1060					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
1061					Lilliefors Test Statistic	0.165				Lilliefors Lognormal GOF Test		
1062					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
1063						Data appear Lognormal at 5% Significance Level						
1064												
1065						Lognormal Statistics						
1066					Minimum of Logged Data	2.209				Mean of logged Data		3.588
1067					Maximum of Logged Data	4.718				SD of logged Data		0.743
1068												

	A	B	C	D	E	F	G	H	I	J	K	L
1069	**Assuming Lognormal Distribution**											
1070					95% H-UCL	83.09				90% Chebyshev (MVUE) UCL		77.59
1071				95% Chebyshev (MVUE) UCL		91.73				97.5% Chebyshev (MVUE) UCL		111.4
1072				99% Chebyshev (MVUE) UCL		149.9						
1073												
1074	**Nonparametric Distribution Free UCL Statistics**											
1075	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1076												
1077	**Nonparametric Distribution Free UCLs**											
1078					95% CLT UCL	61.17				95% Jackknife UCL		62.57
1079				95% Standard Bootstrap UCL		60.85				95% Bootstrap-t UCL		67.2
1080				95% Hall's Bootstrap UCL		61.94				95% Percentile Bootstrap UCL		60.9
1081				95% BCA Bootstrap UCL		63.02						
1082				90% Chebyshev(Mean, Sd) UCL		73.75				95% Chebyshev(Mean, Sd) UCL		86.37
1083				97.5% Chebyshev(Mean, Sd) UCL		103.9				99% Chebyshev(Mean, Sd) UCL		138.3
1084												
1085	**Suggested UCL to Use**											
1086				95% Student's-t UCL		62.57						
1087												
1088	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1089	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1090	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1091	For additional insight the user may want to consult a statistician.											
1092												
1093												

	A	B	C	D	E	F	G	H	I	J	K	L
1094	Uranium-234											
1095												
1096						General Statistics						
1097					Total Number of Observations	12				Number of Distinct Observations		3
1098										Number of Missing Observations		0
1099					Minimum	0.86				Mean		4.8
1100					Maximum	8.74				Median		4.8
1101					SD	1.68				Std. Error of Mean		0.485
1102					Coefficient of Variation	0.35				Skewness		4.250E-15
1103												
1104						Normal GOF Test						
1105					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1106					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1107					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1108					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1109						Data Not Normal at 5% Significance Level						
1110												
1111						Assuming Normal Distribution						
1112					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1113					95% Student's-t UCL	5.671				95% Adjusted-CLT UCL (Chen-1995)		5.598
1114										95% Modified-t UCL (Johnson-1978)		5.671
1115												
1116						Gamma GOF Test						
1117					A-D Test Statistic	2.89				Anderson-Darling Gamma GOF Test		
1118					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
1119					K-S Test Statistic	0.473				Kolmogrov-Smirnoff Gamma GOF Test		
1120					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1121						Data Not Gamma Distributed at 5% Significance Level						
1122												
1123						Gamma Statistics						
1124					k hat (MLE)	5.518				k star (bias corrected MLE)		4.194
1125					Theta hat (MLE)	0.87				Theta star (bias corrected MLE)		1.145
1126					nu hat (MLE)	132.4				nu star (bias corrected)		100.7
1127					MLE Mean (bias corrected)	4.8				MLE Sd (bias corrected)		2.344
1128										Approximate Chi Square Value (0.05)		78.51
1129					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		75.53
1130												
1131						Assuming Gamma Distribution						
1132					95% Approximate Gamma UCL (use when n>=50))	6.154				95% Adjusted Gamma UCL (use when n<50)		6.397
1133												
1134						Lognormal GOF Test						
1135					Shapiro Wilk Test Statistic	0.502				Shapiro Wilk Lognormal GOF Test		
1136					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1137					Lilliefors Test Statistic	0.485				Lilliefors Lognormal GOF Test		
1138					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1139						Data Not Lognormal at 5% Significance Level						
1140												
1141						Lognormal Statistics						
1142					Minimum of Logged Data	-0.151				Mean of logged Data		1.475
1143					Maximum of Logged Data	2.168				SD of logged Data		0.54
1144												

	A	B	C	D	E	F	G	H	I	J	K	L
1145	Assuming Lognormal Distribution											
1146					95% H-UCL	7.23				90% Chebyshev (MVUE) UCL		7.39
1147				95% Chebyshev (MVUE) UCL		8.477				97.5% Chebyshev (MVUE) UCL		9.985
1148				99% Chebyshev (MVUE) UCL		12.95						
1149												
1150	Nonparametric Distribution Free UCL Statistics											
1151	Data do not follow a Discernible Distribution (0.05)											
1152												
1153	Nonparametric Distribution Free UCLs											
1154					95% CLT UCL	5.598				95% Jackknife UCL		5.671
1155				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1156				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1157				95% BCA Bootstrap UCL		N/A						
1158				90% Chebyshev(Mean, Sd) UCL		6.255				95% Chebyshev(Mean, Sd) UCL		6.914
1159				97.5% Chebyshev(Mean, Sd) UCL		7.829				99% Chebyshev(Mean, Sd) UCL		9.625
1160												
1161	Suggested UCL to Use											
1162				95% Chebyshev (Mean, Sd) UCL		6.914						
1163												
1164	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1165	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1166	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1167	For additional insight the user may want to consult a statistician.											
1168												
1169												

	A	B	C	D	E	F	G	H	I	J	K	L
1170	Uranium-235											
1171												
1172						General Statistics						
1173					Total Number of Observations	12				Number of Distinct Observations		3
1174										Number of Missing Observations		0
1175					Minimum	0.045				Mean		0.308
1176					Maximum	0.57				Median		0.308
1177					SD	0.112				Std. Error of Mean		0.0323
1178					Coefficient of Variation	0.364				Skewness		-2.70E-15
1179												
1180						Normal GOF Test						
1181					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1182					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1183					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1184					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1185						Data Not Normal at 5% Significance Level						
1186												
1187						Assuming Normal Distribution						
1188					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1189					95% Student's-t UCL	0.366				95% Adjusted-CLT UCL (Chen-1995)		0.361
1190										95% Modified-t UCL (Johnson-1978)		0.366
1191												
1192						Gamma GOF Test						
1193					A-D Test Statistic	2.919				Anderson-Darling Gamma GOF Test		
1194					5% A-D Critical Value	0.733				Data Not Gamma Distributed at 5% Significance Level		
1195					K-S Test Statistic	0.478				Kolmogrov-Smirnoff Gamma GOF Test		
1196					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1197						Data Not Gamma Distributed at 5% Significance Level						
1198												
1199						Gamma Statistics						
1200					k hat (MLE)	4.759				k star (bias corrected MLE)		3.625
1201					Theta hat (MLE)	0.0646				Theta star (bias corrected MLE)		0.0848
1202					nu hat (MLE)	114.2				nu star (bias corrected)		87
1203					MLE Mean (bias corrected)	0.308				MLE Sd (bias corrected)		0.162
1204										Approximate Chi Square Value (0.05)		66.5
1205					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		63.77
1206												
1207						Assuming Gamma Distribution						
1208					95% Approximate Gamma UCL (use when n>=50))	0.402				95% Adjusted Gamma UCL (use when n<50)		0.42
1209												
1210						Lognormal GOF Test						
1211					Shapiro Wilk Test Statistic	0.491				Shapiro Wilk Lognormal GOF Test		
1212					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1213					Lilliefors Test Statistic	0.489				Lilliefors Lognormal GOF Test		
1214					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1215						Data Not Lognormal at 5% Significance Level						
1216												
1217						Lognormal Statistics						
1218					Minimum of Logged Data	-3.101				Mean of logged Data		-1.288
1219					Maximum of Logged Data	-0.562				SD of logged Data		0.598
1220												

	A	B	C	D	E	F	G	H	I	J	K	L
1221	**Assuming Lognormal Distribution**											
1222					95% H-UCL	0.496				90% Chebyshev (MVUE) UCL		0.498
1223				95% Chebyshev (MVUE) UCL		0.576				97.5% Chebyshev (MVUE) UCL		0.685
1224				99% Chebyshev (MVUE) UCL		0.899						
1225												
1226	**Nonparametric Distribution Free UCL Statistics**											
1227	**Data do not follow a Discernible Distribution (0.05)**											
1228												
1229	**Nonparametric Distribution Free UCLs**											
1230					95% CLT UCL	0.361				95% Jackknife UCL		0.366
1231				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1232				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1233				95% BCA Bootstrap UCL		N/A						
1234				90% Chebyshev(Mean, Sd) UCL		0.404				95% Chebyshev(Mean, Sd) UCL		0.448
1235				97.5% Chebyshev(Mean, Sd) UCL		0.509				99% Chebyshev(Mean, Sd) UCL		0.629
1236												
1237	**Suggested UCL to Use**											
1238				95% Chebyshev (Mean, Sd) UCL		0.448						
1239												
1240	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1241	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1242	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1243	For additional insight the user may want to consult a statistician.											
1244												
1245	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1246	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1247												
1248												

	A	B	C	D	E	F	G	H	I	J	K	L
1249	Uranium-238											
1250												
1251						General Statistics						
1252					Total Number of Observations	12				Number of Distinct Observations		3
1253										Number of Missing Observations		0
1254					Minimum	0.95				Mean		8.175
1255					Maximum	15.4				Median		8.175
1256					SD	3.081				Std. Error of Mean		0.889
1257					Coefficient of Variation	0.377				Skewness		1.485E-15
1258												
1259						Normal GOF Test						
1260					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1261					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1262					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1263					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1264						Data Not Normal at 5% Significance Level						
1265												
1266						Assuming Normal Distribution						
1267					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1268					95% Student's-t UCL	9.772				95% Adjusted-CLT UCL (Chen-1995)		9.638
1269										95% Modified-t UCL (Johnson-1978)		9.772
1270												
1271						Gamma GOF Test						
1272					A-D Test Statistic	2.953				Anderson-Darling Gamma GOF Test		
1273					5% A-D Critical Value	0.735				Data Not Gamma Distributed at 5% Significance Level		
1274					K-S Test Statistic	0.482				Kolmogrov-Smirnoff Gamma GOF Test		
1275					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1276						Data Not Gamma Distributed at 5% Significance Level						
1277												
1278						Gamma Statistics						
1279					k hat (MLE)	4.109				k star (bias corrected MLE)		3.137
1280					Theta hat (MLE)	1.99				Theta star (bias corrected MLE)		2.606
1281					nu hat (MLE)	98.62				nu star (bias corrected)		75.3
1282					MLE Mean (bias corrected)	8.175				MLE Sd (bias corrected)		4.615
1283										Approximate Chi Square Value (0.05)		56.31
1284					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		53.81
1285												
1286						Assuming Gamma Distribution						
1287					95% Approximate Gamma UCL (use when n>=50))	10.93				95% Adjusted Gamma UCL (use when n<50)		11.44
1288												
1289						Lognormal GOF Test						
1290					Shapiro Wilk Test Statistic	0.48				Shapiro Wilk Lognormal GOF Test		
1291					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1292					Lilliefors Test Statistic	0.492				Lilliefors Lognormal GOF Test		
1293					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1294						Data Not Lognormal at 5% Significance Level						
1295												
1296						Lognormal Statistics						
1297					Minimum of Logged Data	-0.0513				Mean of logged Data		1.974
1298					Maximum of Logged Data	2.734				SD of logged Data		0.663
1299												

	A	B	C	D	E	F	G	H	I	J	K	L
1300	Assuming Lognormal Distribution											
1301					95% H-UCL	14.39				90% Chebyshev (MVUE) UCL		14.03
1302				95% Chebyshev (MVUE) UCL		16.4				97.5% Chebyshev (MVUE) UCL		19.7
1303				99% Chebyshev (MVUE) UCL		26.17						
1304												
1305	Nonparametric Distribution Free UCL Statistics											
1306	Data do not follow a Discernible Distribution (0.05)											
1307												
1308	Nonparametric Distribution Free UCLs											
1309					95% CLT UCL	9.638				95% Jackknife UCL		9.772
1310				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1311				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1312				95% BCA Bootstrap UCL		N/A						
1313				90% Chebyshev(Mean, Sd) UCL		10.84				95% Chebyshev(Mean, Sd) UCL		12.05
1314				97.5% Chebyshev(Mean, Sd) UCL		13.73				99% Chebyshev(Mean, Sd) UCL		17.02
1315												
1316	Suggested UCL to Use											
1317				95% Chebyshev (Mean, Sd) UCL		12.05						
1318												
1319	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1320	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1321	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1322	For additional insight the user may want to consult a statistician.											
1323												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 1:43:30 PM								
5	From File			EPC_015Sub_EU07.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Aluminum											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		4
15										Number of Missing Observations		0
16					Minimum	8360				Mean		10753
17					Maximum	12900				Median		10753
18					SD	972.2				Std. Error of Mean		280.7
19					Coefficient of Variation	0.0904				Skewness		-0.451
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.634				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
26						Data Not Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	11257				95% Adjusted-CLT UCL (Chen-1995)		11176
31										95% Modified-t UCL (Johnson-1978)		11251
32												
33						Gamma GOF Test						
34					A-D Test Statistic	2.466				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.428				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
38						Data Not Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	127.6				k star (bias corrected MLE)		95.79
42					Theta hat (MLE)	84.24				Theta star (bias corrected MLE)		112.3
43					nu hat (MLE)	3064				nu star (bias corrected)		2299
44					MLE Mean (bias corrected)	10753				MLE Sd (bias corrected)		1099
45										Approximate Chi Square Value (0.05)		2189
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		2172
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	11296				95% Adjusted Gamma UCL (use when n<50)		11381
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.62				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.433				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	9.031				Mean of logged Data		9.279
60					Maximum of Logged Data	9.465				SD of logged Data		0.0938
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		11629
64					95% Chebyshev (MVUE) UCL	12025				97.5% Chebyshev (MVUE) UCL		12575
65					99% Chebyshev (MVUE) UCL	13656						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	11215				95% Jackknife UCL		11257
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	11595				95% Chebyshev(Mean, Sd) UCL		11977
76					97.5% Chebyshev(Mean, Sd) UCL	12506				99% Chebyshev(Mean, Sd) UCL		13546
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	11257				or 95% Modified-t UCL		11251
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												

	A	B	C	D	E	F	G	H	I	J	K	L
90	Antimony											
91												
92						General Statistics						
93					Total Number of Observations	12				Number of Distinct Observations		12
94										Number of Missing Observations		0
95					Minimum	44.57				Mean		109.4
96					Maximum	283				Median		90.3
97					SD	61.63				Std. Error of Mean		17.79
98					Coefficient of Variation	0.563				Skewness		2.245
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.762				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.24				Lilliefors GOF Test		
104					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
105						Data appear Approximate Normal at 5% Significance Level						
106												
107						Assuming Normal Distribution						
108					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
109					95% Student's-t UCL	141.4				95% Adjusted-CLT UCL (Chen-1995)		151
110										95% Modified-t UCL (Johnson-1978)		143.3
111												
112						Gamma GOF Test						
113					A-D Test Statistic	0.515				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.733				Detected data appear Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.168				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
117						Detected data appear Gamma Distributed at 5% Significance Level						
118												
119						Gamma Statistics						
120					k hat (MLE)	4.753				k star (bias corrected MLE)		3.621
121					Theta hat (MLE)	23.02				Theta star (bias corrected MLE)		30.22
122					nu hat (MLE)	114.1				nu star (bias corrected)		86.9
123					MLE Mean (bias corrected)	109.4				MLE Sd (bias corrected)		57.5
124										Approximate Chi Square Value (0.05)		66.41
125					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		63.68
126												
127						Assuming Gamma Distribution						
128					95% Approximate Gamma UCL (use when n>=50))	143.2				95% Adjusted Gamma UCL (use when n<50)		149.3
129												
130						Lognormal GOF Test						
131					Shapiro Wilk Test Statistic	0.942				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.153				Lilliefors Lognormal GOF Test		
134					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
135						Data appear Lognormal at 5% Significance Level						
136												
137						Lognormal Statistics						
138					Minimum of Logged Data	3.797				Mean of logged Data		4.586
139					Maximum of Logged Data	5.645				SD of logged Data		0.464
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141	**Assuming Lognormal Distribution**											
142					95% H-UCL	146.5				90% Chebyshev (MVUE) UCL		152.6
143					95% Chebyshev (MVUE) UCL	172.7				97.5% Chebyshev (MVUE) UCL		200.5
144					99% Chebyshev (MVUE) UCL	255.3						
145												
146	**Nonparametric Distribution Free UCL Statistics**											
147	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
148												
149	**Nonparametric Distribution Free UCLs**											
150					95% CLT UCL	138.7				95% Jackknife UCL		141.4
151					95% Standard Bootstrap UCL	137.4				95% Bootstrap-t UCL		166.8
152					95% Hall's Bootstrap UCL	263.6				95% Percentile Bootstrap UCL		140.1
153					95% BCA Bootstrap UCL	149.6						
154					90% Chebyshev(Mean, Sd) UCL	162.8				95% Chebyshev(Mean, Sd) UCL		187
155					97.5% Chebyshev(Mean, Sd) UCL	220.5				99% Chebyshev(Mean, Sd) UCL		286.4
156												
157	**Suggested UCL to Use**											
158					95% Student's-t UCL	141.4						
159												
160	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
161	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
162	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
163	For additional insight the user may want to consult a statistician.											
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Arsenic											
167												
168					General Statistics							
169					Total Number of Observations	12				Number of Distinct Observations		10
170										Number of Missing Observations		0
171					Minimum	6.17				Mean		12.24
172					Maximum	33.09				Median		10.66
173					SD	7.511				Std. Error of Mean		2.168
174					Coefficient of Variation	0.614				Skewness		2.353
175												
176					Normal GOF Test							
177					Shapiro Wilk Test Statistic	0.677				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.399				Lilliefors GOF Test		
180					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
181					Data Not Normal at 5% Significance Level							
182												
183					Assuming Normal Distribution							
184					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
185					95% Student's-t UCL	16.13				95% Adjusted-CLT UCL (Chen-1995)		17.38
186										95% Modified-t UCL (Johnson-1978)		16.38
187												
188					Gamma GOF Test							
189					A-D Test Statistic	1.125				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.734				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.358				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
193					Data Not Gamma Distributed at 5% Significance Level							
194												
195					Gamma Statistics							
196					k hat (MLE)	4.454				k star (bias corrected MLE)		3.396
197					Theta hat (MLE)	2.748				Theta star (bias corrected MLE)		3.604
198					nu hat (MLE)	106.9				nu star (bias corrected)		81.51
199					MLE Mean (bias corrected)	12.24				MLE Sd (bias corrected)		6.641
200										Approximate Chi Square Value (0.05)		61.7
201					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		59.08
202												
203					Assuming Gamma Distribution							
204					95% Approximate Gamma UCL (use when n>=50))	16.17				95% Adjusted Gamma UCL (use when n<50)		16.89
205												
206					Lognormal GOF Test							
207					Shapiro Wilk Test Statistic	0.843				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.325				Lilliefors Lognormal GOF Test		
210					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
211					Data Not Lognormal at 5% Significance Level							
212												
213					Lognormal Statistics							
214					Minimum of Logged Data	1.82				Mean of logged Data		2.388
215					Maximum of Logged Data	3.499				SD of logged Data		0.46
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217					Assuming Lognormal Distribution							
218					95% H-UCL	16.19				90% Chebyshev (MVUE) UCL		16.88
219				95% Chebyshev (MVUE) UCL		19.09				97.5% Chebyshev (MVUE) UCL		22.15
220				99% Chebyshev (MVUE) UCL		28.18						
221												
222					Nonparametric Distribution Free UCL Statistics							
223					Data do not follow a Discernible Distribution (0.05)							
224												
225					Nonparametric Distribution Free UCLs							
226					95% CLT UCL	15.81				95% Jackknife UCL		16.13
227				95% Standard Bootstrap UCL		15.63				95% Bootstrap-t UCL		25.01
228				95% Hall's Bootstrap UCL		37.16				95% Percentile Bootstrap UCL		16.15
229				95% BCA Bootstrap UCL		17.46						
230				90% Chebyshev(Mean, Sd) UCL		18.74				95% Chebyshev(Mean, Sd) UCL		21.69
231				97.5% Chebyshev(Mean, Sd) UCL		25.78				99% Chebyshev(Mean, Sd) UCL		33.81
232												
233					Suggested UCL to Use							
234					95% Student's-t UCL	16.13				or 95% Modified-t UCL		16.38
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241												

	A	B	C	D	E	F	G	H	I	J	K	L
242	Cadmium											
243												
244					General Statistics							
245					Total Number of Observations	12				Number of Distinct Observations		6
246										Number of Missing Observations		0
247					Minimum	0.034				Mean		11.48
248					Maximum	17.97				Median		12
249					SD	5.675				Std. Error of Mean		1.638
250					Coefficient of Variation	0.495				Skewness		-1.17
251												
252					Normal GOF Test							
253					Shapiro Wilk Test Statistic	0.774				Shapiro Wilk GOF Test		
254					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
255					Lilliefors Test Statistic	0.37				Lilliefors GOF Test		
256					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
257					Data Not Normal at 5% Significance Level							
258												
259					Assuming Normal Distribution							
260					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
261					95% Student's-t UCL	14.42				95% Adjusted-CLT UCL (Chen-1995)		13.58
262										95% Modified-t UCL (Johnson-1978)		14.33
263												
264					Gamma GOF Test							
265					A-D Test Statistic	2.38				Anderson-Darling Gamma GOF Test		
266					5% A-D Critical Value	0.756				Data Not Gamma Distributed at 5% Significance Level		
267					K-S Test Statistic	0.48				Kolmogrov-Smirnoff Gamma GOF Test		
268					5% K-S Critical Value	0.252				Data Not Gamma Distributed at 5% Significance Level		
269					Data Not Gamma Distributed at 5% Significance Level							
270												
271					Gamma Statistics							
272					k hat (MLE)	1.034				k star (bias corrected MLE)		0.831
273					Theta hat (MLE)	11.1				Theta star (bias corrected MLE)		13.81
274					nu hat (MLE)	24.81				nu star (bias corrected)		19.94
275					MLE Mean (bias corrected)	11.48				MLE Sd (bias corrected)		12.59
276										Approximate Chi Square Value (0.05)		10.81
277					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		9.796
278												
279					Assuming Gamma Distribution							
280					95% Approximate Gamma UCL (use when n>=50))	21.17				95% Adjusted Gamma UCL (use when n<50)		23.36
281												
282					Lognormal GOF Test							
283					Shapiro Wilk Test Statistic	0.545				Shapiro Wilk Lognormal GOF Test		
284					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
285					Lilliefors Test Statistic	0.462				Lilliefors Lognormal GOF Test		
286					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
287					Data Not Lognormal at 5% Significance Level							
288												
289					Lognormal Statistics							
290					Minimum of Logged Data	-3.381				Mean of logged Data		1.884
291					Maximum of Logged Data	2.889				SD of logged Data		1.826
292												

	A	B	C	D	E	F	G	H	I	J	K	L
293	**Assuming Lognormal Distribution**											
294					95% H-UCL	435.7				90% Chebyshev (MVUE) UCL		71.72
295				95% Chebyshev (MVUE) UCL		92.29				97.5% Chebyshev (MVUE) UCL		120.8
296				99% Chebyshev (MVUE) UCL		176.9						
297												
298	**Nonparametric Distribution Free UCL Statistics**											
299	**Data do not follow a Discernible Distribution (0.05)**											
300												
301	**Nonparametric Distribution Free UCLs**											
302					95% CLT UCL	14.17				95% Jackknife UCL		14.42
303				95% Standard Bootstrap UCL		14.06				95% Bootstrap-t UCL		14.02
304				95% Hall's Bootstrap UCL		13.49				95% Percentile Bootstrap UCL		13.89
305				95% BCA Bootstrap UCL		13.7						
306				90% Chebyshev(Mean, Sd) UCL		16.39				95% Chebyshev(Mean, Sd) UCL		18.62
307				97.5% Chebyshev(Mean, Sd) UCL		21.71				99% Chebyshev(Mean, Sd) UCL		27.78
308												
309	**Suggested UCL to Use**											
310				99% Chebyshev (Mean, Sd) UCL		27.78						
311												
312	**Recommended UCL exceeds the maximum observation**											
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												
319	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
320	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
321												
322												

	A	B	C	D	E	F	G	H	I	J	K	L
323	Chromium											
324												
325					General Statistics							
326					Total Number of Observations	12			Number of Distinct Observations			11
327									Number of Missing Observations			0
328					Minimum	32.45			Mean			54.09
329					Maximum	85			Median			40.67
330					SD	21.85			Std. Error of Mean			6.308
331					Coefficient of Variation	0.404			Skewness			0.506
332												
333					Normal GOF Test							
334					Shapiro Wilk Test Statistic	0.8			Shapiro Wilk GOF Test			
335					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
336					Lilliefors Test Statistic	0.299			Lilliefors GOF Test			
337					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
338					Data Not Normal at 5% Significance Level							
339												
340					Assuming Normal Distribution							
341					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
342					95% Student's-t UCL	65.41			95% Adjusted-CLT UCL (Chen-1995)			65.45
343									95% Modified-t UCL (Johnson-1978)			65.57
344												
345					Gamma GOF Test							
346					A-D Test Statistic	1.038			Anderson-Darling Gamma GOF Test			
347					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
348					K-S Test Statistic	0.287			Kolmogrov-Smirnoff Gamma GOF Test			
349					5% K-S Critical Value	0.246			Data Not Gamma Distributed at 5% Significance Level			
350					Data Not Gamma Distributed at 5% Significance Level							
351												
352					Gamma Statistics							
353					k hat (MLE)	7.003			k star (bias corrected MLE)			5.308
354					Theta hat (MLE)	7.723			Theta star (bias corrected MLE)			10.19
355					nu hat (MLE)	168.1			nu star (bias corrected)			127.4
356					MLE Mean (bias corrected)	54.09			MLE Sd (bias corrected)			23.48
357									Approximate Chi Square Value (0.05)			102.3
358					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			98.9
359												
360					Assuming Gamma Distribution							
361					95% Approximate Gamma UCL (use when n>=50))	67.34			95% Adjusted Gamma UCL (use when n<50)			69.67
362												
363					Lognormal GOF Test							
364					Shapiro Wilk Test Statistic	0.823			Shapiro Wilk Lognormal GOF Test			
365					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
366					Lilliefors Test Statistic	0.267			Lilliefors Lognormal GOF Test			
367					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
368					Data Not Lognormal at 5% Significance Level							
369												
370					Lognormal Statistics							
371					Minimum of Logged Data	3.48			Mean of logged Data			3.917
372					Maximum of Logged Data	4.443			SD of logged Data			0.396
373												

	A	B	C	D	E	F	G	H	I	J	K	L
374	Assuming Lognormal Distribution											
375					95% H-UCL	69.19				90% Chebyshev (MVUE) UCL		72.77
376				95% Chebyshev (MVUE) UCL		81.28				97.5% Chebyshev (MVUE) UCL		93.09
377				99% Chebyshev (MVUE) UCL		116.3						
378												
379	Nonparametric Distribution Free UCL Statistics											
380	Data do not follow a Discernible Distribution (0.05)											
381												
382	Nonparametric Distribution Free UCLs											
383					95% CLT UCL	64.46				95% Jackknife UCL		65.41
384				95% Standard Bootstrap UCL		64.12				95% Bootstrap-t UCL		66.09
385				95% Hall's Bootstrap UCL		62.69				95% Percentile Bootstrap UCL		63.81
386				95% BCA Bootstrap UCL		64.76						
387				90% Chebyshev(Mean, Sd) UCL		73.01				95% Chebyshev(Mean, Sd) UCL		81.58
388				97.5% Chebyshev(Mean, Sd) UCL		93.48				99% Chebyshev(Mean, Sd) UCL		116.9
389												
390	Suggested UCL to Use											
391					95% Student's-t UCL	65.41				or 95% Modified-t UCL		65.57
392												
393	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
394	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
395	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
396	For additional insight the user may want to consult a statistician.											
397												
398												

	A	B	C	D	E	F	G	H	I	J	K	L
399	Copper											
400												
401					General Statistics							
402					Total Number of Observations	12				Number of Distinct Observations		12
403										Number of Missing Observations		0
404					Minimum	12				Mean		342.2
405					Maximum	1803				Median		138.9
406					SD	502.1				Std. Error of Mean		144.9
407					Coefficient of Variation	1.467				Skewness		2.559
408												
409					Normal GOF Test							
410					Shapiro Wilk Test Statistic	0.665				Shapiro Wilk GOF Test		
411					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
412					Lilliefors Test Statistic	0.255				Lilliefors GOF Test		
413					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
414					Data appear Approximate Normal at 5% Significance Level							
415												
416					Assuming Normal Distribution							
417					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
418					95% Student's-t UCL	602.4				95% Adjusted-CLT UCL (Chen-1995)		694.9
419										95% Modified-t UCL (Johnson-1978)		620.3
420												
421					Gamma GOF Test							
422					A-D Test Statistic	0.399				Anderson-Darling Gamma GOF Test		
423					5% A-D Critical Value	0.774				Detected data appear Gamma Distributed at 5% Significance Level		
424					K-S Test Statistic	0.157				Kolmogrov-Smirnoff Gamma GOF Test		
425					5% K-S Critical Value	0.256				Detected data appear Gamma Distributed at 5% Significance Level		
426					Detected data appear Gamma Distributed at 5% Significance Level							
427												
428					Gamma Statistics							
429					k hat (MLE)	0.647				k star (bias corrected MLE)		0.541
430					Theta hat (MLE)	528.5				Theta star (bias corrected MLE)		632.3
431					nu hat (MLE)	15.54				nu star (bias corrected)		12.99
432					MLE Mean (bias corrected)	342.2				MLE Sd (bias corrected)		465.1
433										Approximate Chi Square Value (0.05)		5.884
434					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.173
435												
436					Assuming Gamma Distribution							
437					95% Approximate Gamma UCL (use when n>=50))	755.2				95% Adjusted Gamma UCL (use when n<50)		859.1
438												
439					Lognormal GOF Test							
440					Shapiro Wilk Test Statistic	0.951				Shapiro Wilk Lognormal GOF Test		
441					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
442					Lilliefors Test Statistic	0.159				Lilliefors Lognormal GOF Test		
443					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
444					Data appear Lognormal at 5% Significance Level							
445												
446					Lognormal Statistics							
447					Minimum of Logged Data	2.485				Mean of logged Data		4.891
448					Maximum of Logged Data	7.497				SD of logged Data		1.545
449												

	A	B	C	D	E	F	G	H	I	J	K	L
450	**Assuming Lognormal Distribution**											
451					95% H-UCL	2822				90% Chebyshev (MVUE) UCL		908.1
452					95% Chebyshev (MVUE) UCL	1153				97.5% Chebyshev (MVUE) UCL		1492
453					99% Chebyshev (MVUE) UCL	2159						
454												
455	**Nonparametric Distribution Free UCL Statistics**											
456	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
457												
458	**Nonparametric Distribution Free UCLs**											
459					95% CLT UCL	580.6				95% Jackknife UCL		602.4
460					95% Standard Bootstrap UCL	571.7				95% Bootstrap-t UCL		894.6
461					95% Hall's Bootstrap UCL	1465				95% Percentile Bootstrap UCL		590.3
462					95% BCA Bootstrap UCL	689.7						
463					90% Chebyshev(Mean, Sd) UCL	777				95% Chebyshev(Mean, Sd) UCL		973.9
464					97.5% Chebyshev(Mean, Sd) UCL	1247				99% Chebyshev(Mean, Sd) UCL		1784
465												
466	**Suggested UCL to Use**											
467					95% Student's-t UCL	602.4						
468												
469	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
470	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
471	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
472	For additional insight the user may want to consult a statistician.											
473												
474												

	A	B	C	D	E	F	G	H	I	J	K	L
475	Iron											
476												
477						General Statistics						
478					Total Number of Observations	12				Number of Distinct Observations		12
479										Number of Missing Observations		0
480					Minimum	13693				Mean		27173
481					Maximum	60522				Median		21041
482					SD	14081				Std. Error of Mean		4065
483					Coefficient of Variation	0.518				Skewness		1.28
484												
485						Normal GOF Test						
486					Shapiro Wilk Test Statistic	0.852				Shapiro Wilk GOF Test		
487					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
488					Lilliefors Test Statistic	0.224				Lilliefors GOF Test		
489					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
490					Data appear Approximate Normal at 5% Significance Level							
491												
492						Assuming Normal Distribution						
493					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
494					95% Student's-t UCL	34473				95% Adjusted-CLT UCL (Chen-1995)		35463
495										95% Modified-t UCL (Johnson-1978)		34723
496												
497						Gamma GOF Test						
498					A-D Test Statistic	0.539				Anderson-Darling Gamma GOF Test		
499					5% A-D Critical Value	0.733				Detected data appear Gamma Distributed at 5% Significance Level		
500					K-S Test Statistic	0.225				Kolmogrov-Smirnoff Gamma GOF Test		
501					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
502					Detected data appear Gamma Distributed at 5% Significance Level							
503												
504						Gamma Statistics						
505					k hat (MLE)	4.761				k star (bias corrected MLE)		3.626
506					Theta hat (MLE)	5708				Theta star (bias corrected MLE)		7494
507					nu hat (MLE)	114.3				nu star (bias corrected)		87.02
508					MLE Mean (bias corrected)	27173				MLE Sd (bias corrected)		14270
509										Approximate Chi Square Value (0.05)		66.52
510					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		63.79
511												
512						Assuming Gamma Distribution						
513					95% Approximate Gamma UCL (use when n>=50))	35549				95% Adjusted Gamma UCL (use when n<50)		37070
514												
515						Lognormal GOF Test						
516					Shapiro Wilk Test Statistic	0.917				Shapiro Wilk Lognormal GOF Test		
517					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
518					Lilliefors Test Statistic	0.207				Lilliefors Lognormal GOF Test		
519					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
520					Data appear Lognormal at 5% Significance Level							
521												
522						Lognormal Statistics						
523					Minimum of Logged Data	9.525				Mean of logged Data		10.1
524					Maximum of Logged Data	11.01				SD of logged Data		0.475
525												

	A	B	C	D	E	F	G	H	I	J	K	L
526	**Assuming Lognormal Distribution**											
527					95% H-UCL	36902				90% Chebyshev (MVUE) UCL		38346
528					95% Chebyshev (MVUE) UCL	43484				97.5% Chebyshev (MVUE) UCL		50615
529					99% Chebyshev (MVUE) UCL	64622						
530												
531	**Nonparametric Distribution Free UCL Statistics**											
532	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
533												
534	**Nonparametric Distribution Free UCLs**											
535					95% CLT UCL	33859				95% Jackknife UCL		34473
536					95% Standard Bootstrap UCL	33469				95% Bootstrap-t UCL		37206
537					95% Hall's Bootstrap UCL	36736				95% Percentile Bootstrap UCL		34011
538					95% BCA Bootstrap UCL	35221						
539					90% Chebyshev(Mean, Sd) UCL	39367				95% Chebyshev(Mean, Sd) UCL		44891
540					97.5% Chebyshev(Mean, Sd) UCL	52558				99% Chebyshev(Mean, Sd) UCL		67618
541												
542	**Suggested UCL to Use**											
543					95% Student's-t UCL	34473						
544												
545	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
546	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
547	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
548	For additional insight the user may want to consult a statistician.											
549												
550												

	A	B	C	D	E	F	G	H	I	J	K	L
551	Manganese											
552												
553					General Statistics							
554					Total Number of Observations	12			Number of Distinct Observations			12
555									Number of Missing Observations			0
556					Minimum	232.7			Mean			722.5
557					Maximum	2903			Median			576.7
558					SD	715.8			Std. Error of Mean			206.6
559					Coefficient of Variation	0.991			Skewness			2.986
560												
561					Normal GOF Test							
562					Shapiro Wilk Test Statistic	0.594			Shapiro Wilk GOF Test			
563					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
564					Lilliefors Test Statistic	0.331			Lilliefors GOF Test			
565					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
566					Data Not Normal at 5% Significance Level							
567												
568					Assuming Normal Distribution							
569					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
570					95% Student's-t UCL	1094			95% Adjusted-CLT UCL (Chen-1995)			1253
571									95% Modified-t UCL (Johnson-1978)			1123
572												
573					Gamma GOF Test							
574					A-D Test Statistic	0.856			Anderson-Darling Gamma GOF Test			
575					5% A-D Critical Value	0.741			Data Not Gamma Distributed at 5% Significance Level			
576					K-S Test Statistic	0.238			Kolmogrov-Smirnoff Gamma GOF Test			
577					5% K-S Critical Value	0.248			Detected data appear Gamma Distributed at 5% Significance Level			
578					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
579												
580					Gamma Statistics							
581					k hat (MLE)	2.117			k star (bias corrected MLE)			1.643
582					Theta hat (MLE)	341.3			Theta star (bias corrected MLE)			439.7
583					nu hat (MLE)	50.81			nu star (bias corrected)			39.44
584					MLE Mean (bias corrected)	722.5			MLE Sd (bias corrected)			563.6
585									Approximate Chi Square Value (0.05)			26.05
586					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			24.4
587												
588					Assuming Gamma Distribution							
589					95% Approximate Gamma UCL (use when n>=50)	1094			95% Adjusted Gamma UCL (use when n<50)			1168
590												
591					Lognormal GOF Test							
592					Shapiro Wilk Test Statistic	0.898			Shapiro Wilk Lognormal GOF Test			
593					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
594					Lilliefors Test Statistic	0.181			Lilliefors Lognormal GOF Test			
595					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
596					Data appear Lognormal at 5% Significance Level							
597												
598					Lognormal Statistics							
599					Minimum of Logged Data	5.45			Mean of logged Data			6.328
600					Maximum of Logged Data	7.974			SD of logged Data			0.669
601												

	A	B	C	D	E	F	G	H	I	J	K	L
602	**Assuming Lognormal Distribution**											
603					95% H-UCL	1130				90% Chebyshev (MVUE) UCL		1098
604				95% Chebyshev (MVUE) UCL		1285				97.5% Chebyshev (MVUE) UCL		1545
605				99% Chebyshev (MVUE) UCL		2055						
606												
607	**Nonparametric Distribution Free UCL Statistics**											
608	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
609												
610	**Nonparametric Distribution Free UCLs**											
611					95% CLT UCL	1062				95% Jackknife UCL		1094
612				95% Standard Bootstrap UCL		1042				95% Bootstrap-t UCL		1777
613				95% Hall's Bootstrap UCL		2592				95% Percentile Bootstrap UCL		1097
614				95% BCA Bootstrap UCL		1269						
615				90% Chebyshev(Mean, Sd) UCL		1342				95% Chebyshev(Mean, Sd) UCL		1623
616				97.5% Chebyshev(Mean, Sd) UCL		2013				99% Chebyshev(Mean, Sd) UCL		2779
617												
618	**Suggested UCL to Use**											
619				95% Adjusted Gamma UCL		1168						
620												
621	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
622	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
623	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
624	For additional insight the user may want to consult a statistician.											
625												
626												

	A	B	C	D	E	F	G	H	I	J	K	L
627	Nickel											
628												
629					General Statistics							
630					Total Number of Observations	12				Number of Distinct Observations		11
631										Number of Missing Observations		0
632					Minimum	65				Mean		244.1
633					Maximum	834.4				Median		101.5
634					SD	250				Std. Error of Mean		72.16
635					Coefficient of Variation	1.024				Skewness		1.572
636												
637					Normal GOF Test							
638					Shapiro Wilk Test Statistic	0.757				Shapiro Wilk GOF Test		
639					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
640					Lilliefors Test Statistic	0.289				Lilliefors GOF Test		
641					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
642					Data Not Normal at 5% Significance Level							
643												
644					Assuming Normal Distribution							
645					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
646					95% Student's-t UCL	373.7				95% Adjusted-CLT UCL (Chen-1995)		397.8
647										95% Modified-t UCL (Johnson-1978)		379.1
648												
649					Gamma GOF Test							
650					A-D Test Statistic	0.904				Anderson-Darling Gamma GOF Test		
651					5% A-D Critical Value	0.749				Data Not Gamma Distributed at 5% Significance Level		
652					K-S Test Statistic	0.28				Kolmogrov-Smirnoff Gamma GOF Test		
653					5% K-S Critical Value	0.251				Data Not Gamma Distributed at 5% Significance Level		
654					Data Not Gamma Distributed at 5% Significance Level							
655												
656					Gamma Statistics							
657					k hat (MLE)	1.326				k star (bias corrected MLE)		1.05
658					Theta hat (MLE)	184				Theta star (bias corrected MLE)		232.4
659					nu hat (MLE)	31.84				nu star (bias corrected)		25.21
660					MLE Mean (bias corrected)	244.1				MLE Sd (bias corrected)		238.2
661										Approximate Chi Square Value (0.05)		14.77
662					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		13.57
663												
664					Assuming Gamma Distribution							
665					95% Approximate Gamma UCL (use when n>=50))	416.6				95% Adjusted Gamma UCL (use when n<50)		453.6
666												
667					Lognormal GOF Test							
668					Shapiro Wilk Test Statistic	0.852				Shapiro Wilk Lognormal GOF Test		
669					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
670					Lilliefors Test Statistic	0.245				Lilliefors Lognormal GOF Test		
671					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
672					Data appear Approximate Lognormal at 5% Significance Level							
673												
674					Lognormal Statistics							
675					Minimum of Logged Data	4.174				Mean of logged Data		5.075
676					Maximum of Logged Data	6.727				SD of logged Data		0.929
677												

	A	B	C	D	E	F	G	H	I	J	K	L
678	Assuming Lognormal Distribution											
679					95% H-UCL	537.5				90% Chebyshev (MVUE) UCL		435.8
680				95% Chebyshev (MVUE) UCL		526.8				97.5% Chebyshev (MVUE) UCL		653.1
681				99% Chebyshev (MVUE) UCL		901.2						
682												
683	Nonparametric Distribution Free UCL Statistics											
684	Data appear to follow a Discernible Distribution at 5% Significance Level											
685												
686	Nonparametric Distribution Free UCLs											
687					95% CLT UCL	362.8				95% Jackknife UCL		373.7
688				95% Standard Bootstrap UCL		358.6				95% Bootstrap-t UCL		492.1
689				95% Hall's Bootstrap UCL		541.9				95% Percentile Bootstrap UCL		368.2
690				95% BCA Bootstrap UCL		393.3						
691				90% Chebyshev(Mean, Sd) UCL		460.6				95% Chebyshev(Mean, Sd) UCL		558.6
692				97.5% Chebyshev(Mean, Sd) UCL		694.7				99% Chebyshev(Mean, Sd) UCL		962.1
693												
694	Suggested UCL to Use											
695				95% Chebyshev (Mean, Sd) UCL		558.6						
696												
697	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
698	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
699	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
700	For additional insight the user may want to consult a statistician.											
701												
702												

	A	B	C	D	E	F	G	H	I	J	K	L
703	PAH, Total											
704												
705						General Statistics						
706					Total Number of Observations	12				Number of Distinct Observations		3
707										Number of Missing Observations		0
708					Minimum	0.0073				Mean		0.0831
709					Maximum	0.159				Median		0.0831
710					SD	0.0323				Std. Error of Mean		0.00933
711					Coefficient of Variation	0.389				Skewness		1.578E-15
712												
713						Normal GOF Test						
714					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
715					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
716					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
717					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
718						Data Not Normal at 5% Significance Level						
719												
720						Assuming Normal Distribution						
721					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
722					95% Student's-t UCL	0.0998				95% Adjusted-CLT UCL (Chen-1995)		0.0984
723										95% Modified-t UCL (Johnson-1978)		0.0998
724												
725						Gamma GOF Test						
726					A-D Test Statistic	2.994				Anderson-Darling Gamma GOF Test		
727					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
728					K-S Test Statistic	0.488				Kolmogrov-Smirnoff Gamma GOF Test		
729					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
730						Data Not Gamma Distributed at 5% Significance Level						
731												
732						Gamma Statistics						
733					k hat (MLE)	3.522				k star (bias corrected MLE)		2.697
734					Theta hat (MLE)	0.0236				Theta star (bias corrected MLE)		0.0308
735					nu hat (MLE)	84.53				nu star (bias corrected)		64.73
736					MLE Mean (bias corrected)	0.0831				MLE Sd (bias corrected)		0.0506
737										Approximate Chi Square Value (0.05)		47.22
738					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		44.94
739												
740						Assuming Gamma Distribution						
741					95% Approximate Gamma UCL (use when n>=50))	0.114				95% Adjusted Gamma UCL (use when n<50)		0.12
742												
743						Lognormal GOF Test						
744					Shapiro Wilk Test Statistic	0.469				Shapiro Wilk Lognormal GOF Test		
745					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
746					Lilliefors Test Statistic	0.496				Lilliefors Lognormal GOF Test		
747					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
748						Data Not Lognormal at 5% Significance Level						
749												
750						Lognormal Statistics						
751					Minimum of Logged Data	-4.92				Mean of logged Data		-2.637
752					Maximum of Logged Data	-1.84				SD of logged Data		0.743
753												

	A	B	C	D	E	F	G	H	I	J	K	L
754	Assuming Lognormal Distribution											
755					95% H-UCL	0.164				90% Chebyshev (MVUE) UCL		0.154
756				95% Chebyshev (MVUE) UCL		0.181				97.5% Chebyshev (MVUE) UCL		0.22
757				99% Chebyshev (MVUE) UCL		0.297						
758												
759	Nonparametric Distribution Free UCL Statistics											
760	Data do not follow a Discernible Distribution (0.05)											
761												
762	Nonparametric Distribution Free UCLs											
763					95% CLT UCL	0.0984				95% Jackknife UCL		0.0998
764				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
765				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
766				95% BCA Bootstrap UCL		N/A						
767				90% Chebyshev(Mean, Sd) UCL		0.111				95% Chebyshev(Mean, Sd) UCL		0.124
768				97.5% Chebyshev(Mean, Sd) UCL		0.141				99% Chebyshev(Mean, Sd) UCL		0.176
769												
770	Suggested UCL to Use											
771				95% Chebyshev (Mean, Sd) UCL		0.124						
772												
773	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
774	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
775	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
776	For additional insight the user may want to consult a statistician.											
777												
778												

	A	B	C	D	E	F	G	H	I	J	K	L
779	PCB, Total											
780												
781						General Statistics						
782					Total Number of Observations	12				Number of Distinct Observations		5
783										Number of Missing Observations		0
784					Minimum	0.34				Mean		8.808
785					Maximum	50				Median		5
786					SD	13.3				Std. Error of Mean		3.838
787					Coefficient of Variation	1.51				Skewness		3.171
788												
789						Normal GOF Test						
790					Shapiro Wilk Test Statistic	0.513				Shapiro Wilk GOF Test		
791					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
792					Lilliefors Test Statistic	0.381				Lilliefors GOF Test		
793					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
794						Data Not Normal at 5% Significance Level						
795												
796						Assuming Normal Distribution						
797					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
798					95% Student's-t UCL	15.7				95% Adjusted-CLT UCL (Chen-1995)		18.87
799										95% Modified-t UCL (Johnson-1978)		16.29
800												
801						Gamma GOF Test						
802					A-D Test Statistic	1.288				Anderson-Darling Gamma GOF Test		
803					5% A-D Critical Value	0.762				Data Not Gamma Distributed at 5% Significance Level		
804					K-S Test Statistic	0.296				Kolmogrov-Smirnoff Gamma GOF Test		
805					5% K-S Critical Value	0.254				Data Not Gamma Distributed at 5% Significance Level		
806						Data Not Gamma Distributed at 5% Significance Level						
807												
808						Gamma Statistics						
809					k hat (MLE)	0.838				k star (bias corrected MLE)		0.684
810					Theta hat (MLE)	10.52				Theta star (bias corrected MLE)		12.88
811					nu hat (MLE)	20.1				nu star (bias corrected)		16.41
812					MLE Mean (bias corrected)	8.808				MLE Sd (bias corrected)		10.65
813										Approximate Chi Square Value (0.05)		8.252
814					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		7.385
815												
816						Assuming Gamma Distribution						
817					95% Approximate Gamma UCL (use when n>=50))	17.51				95% Adjusted Gamma UCL (use when n<50)		19.57
818												
819						Lognormal GOF Test						
820					Shapiro Wilk Test Statistic	0.791				Shapiro Wilk Lognormal GOF Test		
821					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
822					Lilliefors Test Statistic	0.374				Lilliefors Lognormal GOF Test		
823					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
824						Data Not Lognormal at 5% Significance Level						
825												
826						Lognormal Statistics						
827					Minimum of Logged Data	-1.079				Mean of logged Data		1.471
828					Maximum of Logged Data	3.912				SD of logged Data		1.36
829												

	A	B	C	D	E	F	G	H	I	J	K	L
830					Assuming Lognormal Distribution							
831					95% H-UCL	48.13				90% Chebyshev (MVUE) UCL		22.12
832				95% Chebyshev (MVUE) UCL		27.76				97.5% Chebyshev (MVUE) UCL		35.58
833				99% Chebyshev (MVUE) UCL		50.95						
834												
835					Nonparametric Distribution Free UCL Statistics							
836					Data do not follow a Discernible Distribution (0.05)							
837												
838					Nonparametric Distribution Free UCLs							
839					95% CLT UCL	15.12				95% Jackknife UCL		15.7
840				95% Standard Bootstrap UCL		14.94				95% Bootstrap-t UCL		33.19
841				95% Hall's Bootstrap UCL		42.3				95% Percentile Bootstrap UCL		16.25
842				95% BCA Bootstrap UCL		20.03						
843				90% Chebyshev(Mean, Sd) UCL		20.32				95% Chebyshev(Mean, Sd) UCL		25.54
844				97.5% Chebyshev(Mean, Sd) UCL		32.78				99% Chebyshev(Mean, Sd) UCL		46.99
845												
846					Suggested UCL to Use							
847				95% Chebyshev (Mean, Sd) UCL		25.54						
848												
849	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
850	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
851	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
852	For additional insight the user may want to consult a statistician.											
853												
854												

	A	B	C	D	E	F	G	H	I	J	K	L
855	Uranium											
856												
857					General Statistics							
858					Total Number of Observations	12				Number of Distinct Observations		12
859										Number of Missing Observations		0
860					Minimum	1.6				Mean		39.61
861					Maximum	82.92				Median		44.88
862					SD	26.66				Std. Error of Mean		7.696
863					Coefficient of Variation	0.673				Skewness		0.115
864												
865					Normal GOF Test							
866					Shapiro Wilk Test Statistic	0.949				Shapiro Wilk GOF Test		
867					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
868					Lilliefors Test Statistic	0.166				Lilliefors GOF Test		
869					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
870					Data appear Normal at 5% Significance Level							
871												
872					Assuming Normal Distribution							
873					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
874					95% Student's-t UCL	53.43				95% Adjusted-CLT UCL (Chen-1995)		52.54
875										95% Modified-t UCL (Johnson-1978)		53.47
876												
877					Gamma GOF Test							
878					A-D Test Statistic	0.442				Anderson-Darling Gamma GOF Test		
879					5% A-D Critical Value	0.747				Detected data appear Gamma Distributed at 5% Significance Level		
880					K-S Test Statistic	0.209				Kolmogrov-Smirnoff Gamma GOF Test		
881					5% K-S Critical Value	0.25				Detected data appear Gamma Distributed at 5% Significance Level		
882					Detected data appear Gamma Distributed at 5% Significance Level							
883												
884					Gamma Statistics							
885					k hat (MLE)	1.425				k star (bias corrected MLE)		1.124
886					Theta hat (MLE)	27.79				Theta star (bias corrected MLE)		35.22
887					nu hat (MLE)	34.21				nu star (bias corrected)		26.99
888					MLE Mean (bias corrected)	39.61				MLE Sd (bias corrected)		37.35
889										Approximate Chi Square Value (0.05)		16.14
890					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		14.87
891												
892					Assuming Gamma Distribution							
893					95% Approximate Gamma UCL (use when n>=50))	66.22				95% Adjusted Gamma UCL (use when n<50)		71.86
894												
895					Lognormal GOF Test							
896					Shapiro Wilk Test Statistic	0.849				Shapiro Wilk Lognormal GOF Test		
897					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
898					Lilliefors Test Statistic	0.227				Lilliefors Lognormal GOF Test		
899					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
900					Data appear Approximate Lognormal at 5% Significance Level							
901												
902					Lognormal Statistics							
903					Minimum of Logged Data	0.47				Mean of logged Data		3.289
904					Maximum of Logged Data	4.418				SD of logged Data		1.151
905												

	A	B	C	D	E	F	G	H	I	J	K	L
906					Assuming Lognormal Distribution							
907					95% H-UCL	157.8				90% Chebyshev (MVUE) UCL		99.69
908				95% Chebyshev (MVUE) UCL		123.1				97.5% Chebyshev (MVUE) UCL		155.6
909				99% Chebyshev (MVUE) UCL		219.5						
910												
911					Nonparametric Distribution Free UCL Statistics							
912					Data appear to follow a Discernible Distribution at 5% Significance Level							
913												
914					Nonparametric Distribution Free UCLs							
915					95% CLT UCL	52.27				95% Jackknife UCL		53.43
916				95% Standard Bootstrap UCL		51.58				95% Bootstrap-t UCL		53.49
917				95% Hall's Bootstrap UCL		51.77				95% Percentile Bootstrap UCL		51.37
918				95% BCA Bootstrap UCL		52.65						
919				90% Chebyshev(Mean, Sd) UCL		62.7				95% Chebyshev(Mean, Sd) UCL		73.15
920				97.5% Chebyshev(Mean, Sd) UCL		87.67				99% Chebyshev(Mean, Sd) UCL		116.2
921												
922					Suggested UCL to Use							
923					95% Student's-t UCL	53.43						
924												
925	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
926	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
927	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
928	For additional insight the user may want to consult a statistician.											
929												
930												

	A	B	C	D	E	F	G	H	I	J	K	L
931	Uranium-234											
932												
933					General Statistics							
934					Total Number of Observations	12			Number of Distinct Observations			3
935									Number of Missing Observations			0
936					Minimum	0.8			Mean			3.645
937					Maximum	6.49			Median			3.645
938					SD	1.213			Std. Error of Mean			0.35
939					Coefficient of Variation	0.333			Skewness			-1.95E-15
940												
941					Normal GOF Test							
942					Shapiro Wilk Test Statistic	0.6			Shapiro Wilk GOF Test			
943					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
944					Lilliefors Test Statistic	0.417			Lilliefors GOF Test			
945					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
946					Data Not Normal at 5% Significance Level							
947												
948					Assuming Normal Distribution							
949					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
950					95% Student's-t UCL	4.274			95% Adjusted-CLT UCL (Chen-1995)			4.221
951									95% Modified-t UCL (Johnson-1978)			4.274
952												
953					Gamma GOF Test							
954					A-D Test Statistic	2.862			Anderson-Darling Gamma GOF Test			
955					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
956					K-S Test Statistic	0.469			Kolmogrov-Smirnoff Gamma GOF Test			
957					5% K-S Critical Value	0.246			Data Not Gamma Distributed at 5% Significance Level			
958					Data Not Gamma Distributed at 5% Significance Level							
959												
960					Gamma Statistics							
961					k hat (MLE)	6.548			k star (bias corrected MLE)			4.966
962					Theta hat (MLE)	0.557			Theta star (bias corrected MLE)			0.734
963					nu hat (MLE)	157.1			nu star (bias corrected)			119.2
964					MLE Mean (bias corrected)	3.645			MLE Sd (bias corrected)			1.636
965									Approximate Chi Square Value (0.05)			94.99
966					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			91.69
967												
968					Assuming Gamma Distribution							
969					95% Approximate Gamma UCL (use when n>=50))	4.574			95% Adjusted Gamma UCL (use when n<50)			4.738
970												
971					Lognormal GOF Test							
972					Shapiro Wilk Test Statistic	0.513			Shapiro Wilk Lognormal GOF Test			
973					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
974					Lilliefors Test Statistic	0.481			Lilliefors Lognormal GOF Test			
975					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
976					Data Not Lognormal at 5% Significance Level							
977												
978					Lognormal Statistics							
979					Minimum of Logged Data	-0.223			Mean of logged Data			1.215
980					Maximum of Logged Data	1.87			SD of logged Data			0.482
981												

	A	B	C	D	E	F	G	H	I	J	K	L
982					Assuming Lognormal Distribution							
983					95% H-UCL	5.153				90% Chebyshev (MVUE) UCL		5.346
984				95% Chebyshev (MVUE) UCL		6.071				97.5% Chebyshev (MVUE) UCL		7.077
985				99% Chebyshev (MVUE) UCL		9.052						
986												
987					Nonparametric Distribution Free UCL Statistics							
988					Data do not follow a Discernible Distribution (0.05)							
989												
990					Nonparametric Distribution Free UCLs							
991					95% CLT UCL	4.221				95% Jackknife UCL		4.274
992				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
993				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
994				95% BCA Bootstrap UCL		N/A						
995				90% Chebyshev(Mean, Sd) UCL		4.696				95% Chebyshev(Mean, Sd) UCL		5.171
996				97.5% Chebyshev(Mean, Sd) UCL		5.832				99% Chebyshev(Mean, Sd) UCL		7.129
997												
998					Suggested UCL to Use							
999					95% Student's-t UCL	4.274				or 95% Modified-t UCL		4.274
1000												
1001	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1002	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1003	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1004	For additional insight the user may want to consult a statistician.											
1005												
1006	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
1007	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
1008												
1009												

	A	B	C	D	E	F	G	H	I	J	K	L
1010	Uranium-235											
1011												
1012						General Statistics						
1013					Total Number of Observations	12				Number of Distinct Observations		3
1014										Number of Missing Observations		0
1015					Minimum	0.055				Mean		0.253
1016					Maximum	0.45				Median		0.253
1017					SD	0.0842				Std. Error of Mean		0.0243
1018					Coefficient of Variation	0.334				Skewness		0
1019												
1020						Normal GOF Test						
1021					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1022					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1023					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1024					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1025						Data Not Normal at 5% Significance Level						
1026												
1027						Assuming Normal Distribution						
1028					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1029					95% Student's-t UCL	0.296				95% Adjusted-CLT UCL (Chen-1995)		0.292
1030										95% Modified-t UCL (Johnson-1978)		0.296
1031												
1032						Gamma GOF Test						
1033					A-D Test Statistic	2.863				Anderson-Darling Gamma GOF Test		
1034					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
1035					K-S Test Statistic	0.469				Kolmogrov-Smirnoff Gamma GOF Test		
1036					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1037						Data Not Gamma Distributed at 5% Significance Level						
1038												
1039						Gamma Statistics						
1040					k hat (MLE)	6.503				k star (bias corrected MLE)		4.933
1041					Theta hat (MLE)	0.0388				Theta star (bias corrected MLE)		0.0512
1042					nu hat (MLE)	156.1				nu star (bias corrected)		118.4
1043					MLE Mean (bias corrected)	0.253				MLE Sd (bias corrected)		0.114
1044										Approximate Chi Square Value (0.05)		94.26
1045					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		90.98
1046												
1047						Assuming Gamma Distribution						
1048					95% Approximate Gamma UCL (use when n>=50))	0.317				95% Adjusted Gamma UCL (use when n<50)		0.329
1049												
1050						Lognormal GOF Test						
1051					Shapiro Wilk Test Statistic	0.513				Shapiro Wilk Lognormal GOF Test		
1052					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1053					Lilliefors Test Statistic	0.481				Lilliefors Lognormal GOF Test		
1054					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1055						Data Not Lognormal at 5% Significance Level						
1056												
1057						Lognormal Statistics						
1058					Minimum of Logged Data	-2.9				Mean of logged Data		-1.455
1059					Maximum of Logged Data	-0.799				SD of logged Data		0.484
1060												

	A	B	C	D	E	F	G	H	I	J	K	L
1061					Assuming Lognormal Distribution							
1062					95% H-UCL	0.358				90% Chebyshev (MVUE) UCL		0.371
1063				95% Chebyshev (MVUE) UCL		0.421				97.5% Chebyshev (MVUE) UCL		0.491
1064				99% Chebyshev (MVUE) UCL		0.629						
1065												
1066					Nonparametric Distribution Free UCL Statistics							
1067					Data do not follow a Discernible Distribution (0.05)							
1068												
1069					Nonparametric Distribution Free UCLs							
1070					95% CLT UCL	0.292				95% Jackknife UCL		0.296
1071				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1072				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1073				95% BCA Bootstrap UCL		N/A						
1074				90% Chebyshev(Mean, Sd) UCL		0.325				95% Chebyshev(Mean, Sd) UCL		0.358
1075				97.5% Chebyshev(Mean, Sd) UCL		0.404				99% Chebyshev(Mean, Sd) UCL		0.494
1076												
1077					Suggested UCL to Use							
1078					95% Student's-t UCL	0.296				or 95% Modified-t UCL		0.296
1079												
1080	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1081	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1082	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1083	For additional insight the user may want to consult a statistician.											
1084												
1085												

	A	B	C	D	E	F	G	H	I	J	K	L
1086	Uranium-238											
1087												
1088						General Statistics						
1089					Total Number of Observations	12				Number of Distinct Observations		3
1090										Number of Missing Observations		0
1091					Minimum	0.89				Mean		4.47
1092					Maximum	8.05				Median		4.47
1093					SD	1.527				Std. Error of Mean		0.441
1094					Coefficient of Variation	0.342				Skewness		1.525E-15
1095												
1096						Normal GOF Test						
1097					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1098					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1099					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1100					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1101						Data Not Normal at 5% Significance Level						
1102												
1103						Assuming Normal Distribution						
1104					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1105					95% Student's-t UCL	5.261				95% Adjusted-CLT UCL (Chen-1995)		5.195
1106										95% Modified-t UCL (Johnson-1978)		5.261
1107												
1108						Gamma GOF Test						
1109					A-D Test Statistic	2.875				Anderson-Darling Gamma GOF Test		
1110					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
1111					K-S Test Statistic	0.471				Kolmogrov-Smirnoff Gamma GOF Test		
1112					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1113						Data Not Gamma Distributed at 5% Significance Level						
1114												
1115						Gamma Statistics						
1116					k hat (MLE)	6.012				k star (bias corrected MLE)		4.564
1117					Theta hat (MLE)	0.744				Theta star (bias corrected MLE)		0.979
1118					nu hat (MLE)	144.3				nu star (bias corrected)		109.5
1119					MLE Mean (bias corrected)	4.47				MLE Sd (bias corrected)		2.092
1120										Approximate Chi Square Value (0.05)		86.39
1121					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		83.25
1122												
1123						Assuming Gamma Distribution						
1124					95% Approximate Gamma UCL (use when n>=50))	5.668				95% Adjusted Gamma UCL (use when n<50)		5.882
1125												
1126						Lognormal GOF Test						
1127					Shapiro Wilk Test Statistic	0.508				Shapiro Wilk Lognormal GOF Test		
1128					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1129					Lilliefors Test Statistic	0.483				Lilliefors Lognormal GOF Test		
1130					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1131						Data Not Lognormal at 5% Significance Level						
1132												
1133						Lognormal Statistics						
1134					Minimum of Logged Data	-0.117				Mean of logged Data		1.412
1135					Maximum of Logged Data	2.086				SD of logged Data		0.51
1136												

	A	B	C	D	E	F	G	H	I	J	K	L
1137					Assuming Lognormal Distribution							
1138					95% H-UCL	6.51				90% Chebyshev (MVUE) UCL		6.71
1139				95% Chebyshev (MVUE) UCL		7.657				97.5% Chebyshev (MVUE) UCL		8.971
1140				99% Chebyshev (MVUE) UCL		11.55						
1141												
1142					Nonparametric Distribution Free UCL Statistics							
1143					Data do not follow a Discernible Distribution (0.05)							
1144												
1145					Nonparametric Distribution Free UCLs							
1146					95% CLT UCL	5.195				95% Jackknife UCL		5.261
1147				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1148				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1149				95% BCA Bootstrap UCL		N/A						
1150				90% Chebyshev(Mean, Sd) UCL		5.792				95% Chebyshev(Mean, Sd) UCL		6.391
1151				97.5% Chebyshev(Mean, Sd) UCL		7.222				99% Chebyshev(Mean, Sd) UCL		8.855
1152												
1153					Suggested UCL to Use							
1154				95% Chebyshev (Mean, Sd) UCL		6.391						
1155												
1156	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1157	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1158	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1159	For additional insight the user may want to consult a statistician.											
1160												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 1:41:58 PM								
5	From File			EPC_015Sub_EU08.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	55.87				Mean		87.57
17					Maximum	123.8				Median		85.18
18					SD	22.7				Std. Error of Mean		6.553
19					Coefficient of Variation	0.259				Skewness		0.0733
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.948				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.137				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	99.34				95% Adjusted-CLT UCL (Chen-1995)		98.49
31										95% Modified-t UCL (Johnson-1978)		99.36
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.299				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.16				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data appear Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	15.67				k star (bias corrected MLE)		11.81
42					Theta hat (MLE)	5.589				Theta star (bias corrected MLE)		7.417
43					nu hat (MLE)	376				nu star (bias corrected)		283.4
44					MLE Mean (bias corrected)	87.57				MLE Sd (bias corrected)		25.48
45										Approximate Chi Square Value (0.05)		245.4
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		240
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	101.1				95% Adjusted Gamma UCL (use when n<50)		103.4
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.94				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.157				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
56						Data appear Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	4.023				Mean of logged Data		4.44
60					Maximum of Logged Data	4.819				SD of logged Data		0.269
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62					Assuming Lognormal Distribution							
63					95% H-UCL	102.5				90% Chebyshev (MVUE) UCL		108.2
64				95% Chebyshev (MVUE) UCL		117.5				97.5% Chebyshev (MVUE) UCL		130.4
65				99% Chebyshev (MVUE) UCL		155.8						
66												
67					Nonparametric Distribution Free UCL Statistics							
68					Data appear to follow a Discernible Distribution at 5% Significance Level							
69												
70					Nonparametric Distribution Free UCLs							
71					95% CLT UCL	98.35				95% Jackknife UCL		99.34
72				95% Standard Bootstrap UCL		97.85				95% Bootstrap-t UCL		100.2
73				95% Hall's Bootstrap UCL		97.76				95% Percentile Bootstrap UCL		98.02
74				95% BCA Bootstrap UCL		97.7						
75				90% Chebyshev(Mean, Sd) UCL		107.2				95% Chebyshev(Mean, Sd) UCL		116.1
76				97.5% Chebyshev(Mean, Sd) UCL		128.5				99% Chebyshev(Mean, Sd) UCL		152.8
77												
78					Suggested UCL to Use							
79					95% Student's-t UCL	99.34						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Arsenic											
88												
89					General Statistics							
90					Total Number of Observations	12			Number of Distinct Observations			11
91									Number of Missing Observations			0
92					Minimum	4.7			Mean			10.09
93					Maximum	13.83			Median			10.74
94					SD	2.563			Std. Error of Mean			0.74
95					Coefficient of Variation	0.254			Skewness			-0.928
96												
97					Normal GOF Test							
98					Shapiro Wilk Test Statistic	0.926			Shapiro Wilk GOF Test			
99					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
100					Lilliefors Test Statistic	0.153			Lilliefors GOF Test			
101					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
102					Data appear Normal at 5% Significance Level							
103												
104					Assuming Normal Distribution							
105					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
106					95% Student's-t UCL	11.42			95% Adjusted-CLT UCL (Chen-1995)			11.1
107									95% Modified-t UCL (Johnson-1978)			11.39
108												
109					Gamma GOF Test							
110					A-D Test Statistic	0.682			Anderson-Darling Gamma GOF Test			
111					5% A-D Critical Value	0.731			Detected data appear Gamma Distributed at 5% Significance Level			
112					K-S Test Statistic	0.191			Kolmogrov-Smirnoff Gamma GOF Test			
113					5% K-S Critical Value	0.245			Detected data appear Gamma Distributed at 5% Significance Level			
114					Detected data appear Gamma Distributed at 5% Significance Level							
115												
116					Gamma Statistics							
117					k hat (MLE)	13.5			k star (bias corrected MLE)			10.18
118					Theta hat (MLE)	0.748			Theta star (bias corrected MLE)			0.991
119					nu hat (MLE)	324			nu star (bias corrected)			244.3
120					MLE Mean (bias corrected)	10.09			MLE Sd (bias corrected)			3.163
121									Approximate Chi Square Value (0.05)			209.1
122					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			204.2
123												
124					Assuming Gamma Distribution							
125					95% Approximate Gamma UCL (use when n>=50))	11.79			95% Adjusted Gamma UCL (use when n<50)			12.08
126												
127					Lognormal GOF Test							
128					Shapiro Wilk Test Statistic	0.844			Shapiro Wilk Lognormal GOF Test			
129					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
130					Lilliefors Test Statistic	0.218			Lilliefors Lognormal GOF Test			
131					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
132					Data appear Approximate Lognormal at 5% Significance Level							
133												
134					Lognormal Statistics							
135					Minimum of Logged Data	1.548			Mean of logged Data			2.274
136					Maximum of Logged Data	2.627			SD of logged Data			0.305
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138	Assuming Lognormal Distribution											
139					95% H-UCL	12.16				90% Chebyshev (MVUE) UCL		12.85
140				95% Chebyshev (MVUE) UCL		14.07				97.5% Chebyshev (MVUE) UCL		15.77
141				99% Chebyshev (MVUE) UCL		19.12						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	11.31				95% Jackknife UCL		11.42
148				95% Standard Bootstrap UCL		11.24				95% Bootstrap-t UCL		11.18
149				95% Hall's Bootstrap UCL		11.13				95% Percentile Bootstrap UCL		11.22
150				95% BCA Bootstrap UCL		11.14						
151				90% Chebyshev(Mean, Sd) UCL		12.31				95% Chebyshev(Mean, Sd) UCL		13.32
152				97.5% Chebyshev(Mean, Sd) UCL		14.71				99% Chebyshev(Mean, Sd) UCL		17.45
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	11.42						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
163	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Cadmium											
167												
168					General Statistics							
169					Total Number of Observations	12			Number of Distinct Observations			4
170									Number of Missing Observations			0
171					Minimum	0.74			Mean			11.85
172					Maximum	16.9			Median			12
173					SD	3.95			Std. Error of Mean			1.14
174					Coefficient of Variation	0.333			Skewness			-2.014
175												
176					Normal GOF Test							
177					Shapiro Wilk Test Statistic	0.627			Shapiro Wilk GOF Test			
178					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
179					Lilliefors Test Statistic	0.432			Lilliefors GOF Test			
180					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
181					Data Not Normal at 5% Significance Level							
182												
183					Assuming Normal Distribution							
184					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
185					95% Student's-t UCL	13.9			95% Adjusted-CLT UCL (Chen-1995)			13.02
186									95% Modified-t UCL (Johnson-1978)			13.79
187												
188					Gamma GOF Test							
189					A-D Test Statistic	2.946			Anderson-Darling Gamma GOF Test			
190					5% A-D Critical Value	0.738			Data Not Gamma Distributed at 5% Significance Level			
191					K-S Test Statistic	0.5			Kolmogrov-Smirnoff Gamma GOF Test			
192					5% K-S Critical Value	0.247			Data Not Gamma Distributed at 5% Significance Level			
193					Data Not Gamma Distributed at 5% Significance Level							
194												
195					Gamma Statistics							
196					k hat (MLE)	3.201			k star (bias corrected MLE)			2.456
197					Theta hat (MLE)	3.703			Theta star (bias corrected MLE)			4.826
198					nu hat (MLE)	76.82			nu star (bias corrected)			58.95
199					MLE Mean (bias corrected)	11.85			MLE Sd (bias corrected)			7.563
200									Approximate Chi Square Value (0.05)			42.29
201					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			40.15
202												
203					Assuming Gamma Distribution							
204					95% Approximate Gamma UCL (use when n>=50))	16.52			95% Adjusted Gamma UCL (use when n<50)			17.4
205												
206					Lognormal GOF Test							
207					Shapiro Wilk Test Statistic	0.436			Shapiro Wilk Lognormal GOF Test			
208					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
209					Lilliefors Test Statistic	0.501			Lilliefors Lognormal GOF Test			
210					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
211					Data Not Lognormal at 5% Significance Level							
212												
213					Lognormal Statistics							
214					Minimum of Logged Data	-0.301			Mean of logged Data			2.308
215					Maximum of Logged Data	2.827			SD of logged Data			0.832
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217	Assuming Lognormal Distribution											
218					95% H-UCL	27.43				90% Chebyshev (MVUE) UCL		24.12
219					95% Chebyshev (MVUE) UCL	28.84				97.5% Chebyshev (MVUE) UCL		35.38
220					99% Chebyshev (MVUE) UCL	48.24						
221												
222	Nonparametric Distribution Free UCL Statistics											
223	Data do not follow a Discernible Distribution (0.05)											
224												
225	Nonparametric Distribution Free UCLs											
226					95% CLT UCL	13.73				95% Jackknife UCL		13.9
227					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
228					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
229					95% BCA Bootstrap UCL	N/A						
230					90% Chebyshev(Mean, Sd) UCL	15.27				95% Chebyshev(Mean, Sd) UCL		16.82
231					97.5% Chebyshev(Mean, Sd) UCL	18.97				99% Chebyshev(Mean, Sd) UCL		23.2
232												
233	Suggested UCL to Use											
234					95% Chebyshev (Mean, Sd) UCL	16.82						
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
242	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
243												
244												

	A	B	C	D	E	F	G	H	I	J	K	L
245	Chromium											
246												
247					General Statistics							
248					Total Number of Observations	12			Number of Distinct Observations			9
249									Number of Missing Observations			0
250					Minimum	37.97			Mean			63.86
251					Maximum	97.61			Median			56.75
252					SD	22.13			Std. Error of Mean			6.389
253					Coefficient of Variation	0.347			Skewness			0.227
254												
255					Normal GOF Test							
256					Shapiro Wilk Test Statistic	0.852			Shapiro Wilk GOF Test			
257					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
258					Lilliefors Test Statistic	0.247			Lilliefors GOF Test			
259					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
260					Data appear Approximate Normal at 5% Significance Level							
261												
262					Assuming Normal Distribution							
263					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
264					95% Student's-t UCL	75.33			95% Adjusted-CLT UCL (Chen-1995)			74.81
265									95% Modified-t UCL (Johnson-1978)			75.4
266												
267					Gamma GOF Test							
268					A-D Test Statistic	0.818			Anderson-Darling Gamma GOF Test			
269					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
270					K-S Test Statistic	0.26			Kolmogrov-Smirnoff Gamma GOF Test			
271					5% K-S Critical Value	0.245			Data Not Gamma Distributed at 5% Significance Level			
272					Data Not Gamma Distributed at 5% Significance Level							
273												
274					Gamma Statistics							
275					k hat (MLE)	8.972			k star (bias corrected MLE)			6.784
276					Theta hat (MLE)	7.118			Theta star (bias corrected MLE)			9.413
277					nu hat (MLE)	215.3			nu star (bias corrected)			162.8
278					MLE Mean (bias corrected)	63.86			MLE Sd (bias corrected)			24.52
279									Approximate Chi Square Value (0.05)			134.3
280					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			130.4
281												
282					Assuming Gamma Distribution							
283					95% Approximate Gamma UCL (use when n>=50))	77.41			95% Adjusted Gamma UCL (use when n<50)			79.75
284												
285					Lognormal GOF Test							
286					Shapiro Wilk Test Statistic	0.865			Shapiro Wilk Lognormal GOF Test			
287					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
288					Lilliefors Test Statistic	0.25			Lilliefors Lognormal GOF Test			
289					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
290					Data appear Lognormal at 5% Significance Level							
291												
292					Lognormal Statistics							
293					Minimum of Logged Data	3.637			Mean of logged Data			4.1
294					Maximum of Logged Data	4.581			SD of logged Data			0.354
295												

	A	B	C	D	E	F	G	H	I	J	K	L
296	**Assuming Lognormal Distribution**											
297					95% H-UCL	79.35				90% Chebyshev (MVUE) UCL		83.72
298				95% Chebyshev (MVUE) UCL		92.71				97.5% Chebyshev (MVUE) UCL		105.2
299				99% Chebyshev (MVUE) UCL		129.7						
300												
301	**Nonparametric Distribution Free UCL Statistics**											
302	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
303												
304	**Nonparametric Distribution Free UCLs**											
305					95% CLT UCL	74.37				95% Jackknife UCL		75.33
306				95% Standard Bootstrap UCL		73.85				95% Bootstrap-t UCL		76.09
307				95% Hall's Bootstrap UCL		73.04				95% Percentile Bootstrap UCL		74.49
308				95% BCA Bootstrap UCL		74.64						
309				90% Chebyshev(Mean, Sd) UCL		83.03				95% Chebyshev(Mean, Sd) UCL		91.71
310				97.5% Chebyshev(Mean, Sd) UCL		103.8				99% Chebyshev(Mean, Sd) UCL		127.4
311												
312	**Suggested UCL to Use**											
313					95% Student's-t UCL	75.33						
314												
315	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
316	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
317	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
318	For additional insight the user may want to consult a statistician.											
319												
320												

	A	B	C	D	E	F	G	H	I	J	K	L
321	Iron											
322												
323					General Statistics							
324					Total Number of Observations	12			Number of Distinct Observations			12
325									Number of Missing Observations			0
326					Minimum	12854			Mean			24363
327					Maximum	39125			Median			23028
328					SD	7514			Std. Error of Mean			2169
329					Coefficient of Variation	0.308			Skewness			0.459
330												
331					Normal GOF Test							
332					Shapiro Wilk Test Statistic	0.965			Shapiro Wilk GOF Test			
333					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
334					Lilliefors Test Statistic	0.171			Lilliefors GOF Test			
335					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
336					Data appear Normal at 5% Significance Level							
337												
338					Assuming Normal Distribution							
339					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
340					95% Student's-t UCL	28258			95% Adjusted-CLT UCL (Chen-1995)			28238
341									95% Modified-t UCL (Johnson-1978)			28306
342												
343					Gamma GOF Test							
344					A-D Test Statistic	0.229			Anderson-Darling Gamma GOF Test			
345					5% A-D Critical Value	0.731			Detected data appear Gamma Distributed at 5% Significance Level			
346					K-S Test Statistic	0.166			Kolmogrov-Smirnoff Gamma GOF Test			
347					5% K-S Critical Value	0.245			Detected data appear Gamma Distributed at 5% Significance Level			
348					Detected data appear Gamma Distributed at 5% Significance Level							
349												
350					Gamma Statistics							
351					k hat (MLE)	11.32			k star (bias corrected MLE)			8.543
352					Theta hat (MLE)	2153			Theta star (bias corrected MLE)			2852
353					nu hat (MLE)	271.6			nu star (bias corrected)			205
354					MLE Mean (bias corrected)	24363			MLE Sd (bias corrected)			8335
355									Approximate Chi Square Value (0.05)			172.9
356					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			168.4
357												
358					Assuming Gamma Distribution							
359					95% Approximate Gamma UCL (use when n>=50))	28890			95% Adjusted Gamma UCL (use when n<50)			29663
360												
361					Lognormal GOF Test							
362					Shapiro Wilk Test Statistic	0.972			Shapiro Wilk Lognormal GOF Test			
363					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
364					Lilliefors Test Statistic	0.188			Lilliefors Lognormal GOF Test			
365					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
366					Data appear Lognormal at 5% Significance Level							
367												
368					Lognormal Statistics							
369					Minimum of Logged Data	9.461			Mean of logged Data			10.06
370					Maximum of Logged Data	10.57			SD of logged Data			0.317
371												

	A	B	C	D	E	F	G	H	I	J	K	L
372	Assuming Lognormal Distribution											
373					95% H-UCL	29498				90% Chebyshev (MVUE) UCL		31158
374					95% Chebyshev (MVUE) UCL	34223				97.5% Chebyshev (MVUE) UCL		38478
375					99% Chebyshev (MVUE) UCL	46836						
376												
377	Nonparametric Distribution Free UCL Statistics											
378	Data appear to follow a Discernible Distribution at 5% Significance Level											
379												
380	Nonparametric Distribution Free UCLs											
381					95% CLT UCL	27931				95% Jackknife UCL		28258
382					95% Standard Bootstrap UCL	27836				95% Bootstrap-t UCL		28903
383					95% Hall's Bootstrap UCL	28715				95% Percentile Bootstrap UCL		27700
384					95% BCA Bootstrap UCL	28161						
385					90% Chebyshev(Mean, Sd) UCL	30870				95% Chebyshev(Mean, Sd) UCL		33818
386					97.5% Chebyshev(Mean, Sd) UCL	37909				99% Chebyshev(Mean, Sd) UCL		45945
387												
388	Suggested UCL to Use											
389					95% Student's-t UCL	28258						
390												
391	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
392	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
393	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
394	For additional insight the user may want to consult a statistician.											
395												
396												

	A	B	C	D	E	F	G	H	I	J	K	L
397	Manganese											
398												
399					General Statistics							
400					Total Number of Observations	12			Number of Distinct Observations			12
401									Number of Missing Observations			0
402					Minimum	259			Mean			491.3
403					Maximum	934.6			Median			416.1
404					SD	215.1			Std. Error of Mean			62.09
405					Coefficient of Variation	0.438			Skewness			1.378
406												
407					Normal GOF Test							
408					Shapiro Wilk Test Statistic	0.823			Shapiro Wilk GOF Test			
409					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
410					Lilliefors Test Statistic	0.245			Lilliefors GOF Test			
411					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
412					Data appear Approximate Normal at 5% Significance Level							
413												
414					Assuming Normal Distribution							
415					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
416					95% Student's-t UCL	602.8			95% Adjusted-CLT UCL (Chen-1995)			619.8
417									95% Modified-t UCL (Johnson-1978)			606.9
418												
419					Gamma GOF Test							
420					A-D Test Statistic	0.586			Anderson-Darling Gamma GOF Test			
421					5% A-D Critical Value	0.731			Detected data appear Gamma Distributed at 5% Significance Level			
422					K-S Test Statistic	0.208			Kolmogrov-Smirnoff Gamma GOF Test			
423					5% K-S Critical Value	0.246			Detected data appear Gamma Distributed at 5% Significance Level			
424					Detected data appear Gamma Distributed at 5% Significance Level							
425												
426					Gamma Statistics							
427					k hat (MLE)	6.855			k star (bias corrected MLE)			5.197
428					Theta hat (MLE)	71.66			Theta star (bias corrected MLE)			94.53
429					nu hat (MLE)	164.5			nu star (bias corrected)			124.7
430					MLE Mean (bias corrected)	491.3			MLE Sd (bias corrected)			215.5
431									Approximate Chi Square Value (0.05)			99.93
432					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			96.55
433												
434					Assuming Gamma Distribution							
435					95% Approximate Gamma UCL (use when n>=50))	613.1			95% Adjusted Gamma UCL (use when n<50)			634.6
436												
437					Lognormal GOF Test							
438					Shapiro Wilk Test Statistic	0.925			Shapiro Wilk Lognormal GOF Test			
439					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
440					Lilliefors Test Statistic	0.182			Lilliefors Lognormal GOF Test			
441					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
442					Data appear Lognormal at 5% Significance Level							
443												
444					Lognormal Statistics							
445					Minimum of Logged Data	5.557			Mean of logged Data			6.122
446					Maximum of Logged Data	6.84			SD of logged Data			0.39
447												

	A	B	C	D	E	F	G	H	I	J	K	L
448					Assuming Lognormal Distribution							
449					95% H-UCL	623.3				90% Chebyshev (MVUE) UCL		656
450				95% Chebyshev (MVUE) UCL		731.8				97.5% Chebyshev (MVUE) UCL		837
451				99% Chebyshev (MVUE) UCL		1044						
452												
453					Nonparametric Distribution Free UCL Statistics							
454					Data appear to follow a Discernible Distribution at 5% Significance Level							
455												
456					Nonparametric Distribution Free UCLs							
457					95% CLT UCL	593.4				95% Jackknife UCL		602.8
458				95% Standard Bootstrap UCL		588.4				95% Bootstrap-t UCL		703.7
459				95% Hall's Bootstrap UCL		1193				95% Percentile Bootstrap UCL		598.8
460				95% BCA Bootstrap UCL		612.2						
461				90% Chebyshev(Mean, Sd) UCL		677.5				95% Chebyshev(Mean, Sd) UCL		761.9
462				97.5% Chebyshev(Mean, Sd) UCL		879				99% Chebyshev(Mean, Sd) UCL		1109
463												
464					Suggested UCL to Use							
465					95% Student's-t UCL	602.8						
466												
467					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
468					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
469					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
470					For additional insight the user may want to consult a statistician.							
471												
472												

	A	B	C	D	E	F	G	H	I	J	K	L
473	Mercury											
474												
475					General Statistics							
476					Total Number of Observations	12			Number of Distinct Observations			4
477									Number of Missing Observations			0
478					Minimum	0.021			Mean			9.091
479					Maximum	10.04			Median			10
480					SD	2.87			Std. Error of Mean			0.828
481					Coefficient of Variation	0.316			Skewness			-3.408
482												
483					Normal GOF Test							
484					Shapiro Wilk Test Statistic	0.372			Shapiro Wilk GOF Test			
485					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
486					Lilliefors Test Statistic	0.458			Lilliefors GOF Test			
487					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
488					Data Not Normal at 5% Significance Level							
489												
490					Assuming Normal Distribution							
491					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
492					95% Student's-t UCL	10.58			95% Adjusted-CLT UCL (Chen-1995)			9.583
493									95% Modified-t UCL (Johnson-1978)			10.44
494												
495					Gamma GOF Test							
496					A-D Test Statistic	4.242			Anderson-Darling Gamma GOF Test			
497					5% A-D Critical Value	0.75			Data Not Gamma Distributed at 5% Significance Level			
498					K-S Test Statistic	0.529			Kolmogrov-Smirnoff Gamma GOF Test			
499					5% K-S Critical Value	0.251			Data Not Gamma Distributed at 5% Significance Level			
500					Data Not Gamma Distributed at 5% Significance Level							
501												
502					Gamma Statistics							
503					k hat (MLE)	1.314			k star (bias corrected MLE)			1.041
504					Theta hat (MLE)	6.921			Theta star (bias corrected MLE)			8.735
505					nu hat (MLE)	31.52			nu star (bias corrected)			24.98
506					MLE Mean (bias corrected)	9.091			MLE Sd (bias corrected)			8.911
507									Approximate Chi Square Value (0.05)			14.59
508					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			13.4
509												
510					Assuming Gamma Distribution							
511					95% Approximate Gamma UCL (use when n>=50))	15.56			95% Adjusted Gamma UCL (use when n<50)			16.95
512												
513					Lognormal GOF Test							
514					Shapiro Wilk Test Statistic	0.335			Shapiro Wilk Lognormal GOF Test			
515					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
516					Lilliefors Test Statistic	0.51			Lilliefors Lognormal GOF Test			
517					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
518					Data Not Lognormal at 5% Significance Level							
519												
520					Lognormal Statistics							
521					Minimum of Logged Data	-3.863			Mean of logged Data			1.781
522					Maximum of Logged Data	2.307			SD of logged Data			1.778
523												

	A	B	C	D	E	F	G	H	I	J	K	L
524	Assuming Lognormal Distribution											
525					95% H-UCL	318				90% Chebyshev (MVUE) UCL		59.5
526				95% Chebyshev (MVUE) UCL		76.4				97.5% Chebyshev (MVUE) UCL		99.87
527				99% Chebyshev (MVUE) UCL		146						
528												
529	Nonparametric Distribution Free UCL Statistics											
530	Data do not follow a Discernible Distribution (0.05)											
531												
532	Nonparametric Distribution Free UCLs											
533					95% CLT UCL	10.45				95% Jackknife UCL		10.58
534				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
535				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
536				95% BCA Bootstrap UCL		N/A						
537				90% Chebyshev(Mean, Sd) UCL		11.58				95% Chebyshev(Mean, Sd) UCL		12.7
538				97.5% Chebyshev(Mean, Sd) UCL		14.26				99% Chebyshev(Mean, Sd) UCL		17.33
539												
540	Suggested UCL to Use											
541				99% Chebyshev (Mean, Sd) UCL		17.33						
542												
543	Recommended UCL exceeds the maximum observation											
544												
545	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
546	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
547	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
548	For additional insight the user may want to consult a statistician.											
549												
550	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
551	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
552												
553												

	A	B	C	D	E	F	G	H	I	J	K	L
554	Neptunium-237											
555												
556						General Statistics						
557					Total Number of Observations	12				Number of Distinct Observations		3
558										Number of Missing Observations		0
559					Minimum	0.013				Mean		0.189
560					Maximum	0.365				Median		0.189
561					SD	0.075				Std. Error of Mean		0.0217
562					Coefficient of Variation	0.397				Skewness		-1.34E-15
563												
564						Normal GOF Test						
565					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
566					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
567					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
568					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
569						Data Not Normal at 5% Significance Level						
570												
571						Assuming Normal Distribution						
572					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
573					95% Student's-t UCL	0.228				95% Adjusted-CLT UCL (Chen-1995)		0.225
574										95% Modified-t UCL (Johnson-1978)		0.228
575												
576						Gamma GOF Test						
577					A-D Test Statistic	3.03				Anderson-Darling Gamma GOF Test		
578					5% A-D Critical Value	0.739				Data Not Gamma Distributed at 5% Significance Level		
579					K-S Test Statistic	0.492				Kolmogrov-Smirnoff Gamma GOF Test		
580					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
581						Data Not Gamma Distributed at 5% Significance Level						
582												
583						Gamma Statistics						
584					k hat (MLE)	3.129				k star (bias corrected MLE)		2.402
585					Theta hat (MLE)	0.0604				Theta star (bias corrected MLE)		0.0787
586					nu hat (MLE)	75.1				nu star (bias corrected)		57.66
587					MLE Mean (bias corrected)	0.189				MLE Sd (bias corrected)		0.122
588										Approximate Chi Square Value (0.05)		41.2
589					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		39.09
590												
591						Assuming Gamma Distribution						
592					95% Approximate Gamma UCL (use when n>=50))	0.264				95% Adjusted Gamma UCL (use when n<50)		0.279
593												
594						Lognormal GOF Test						
595					Shapiro Wilk Test Statistic	0.459				Shapiro Wilk Lognormal GOF Test		
596					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
597					Lilliefors Test Statistic	0.499				Lilliefors Lognormal GOF Test		
598					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
599						Data Not Lognormal at 5% Significance Level						
600												
601						Lognormal Statistics						
602					Minimum of Logged Data	-4.343				Mean of logged Data		-1.834
603					Maximum of Logged Data	-1.008				SD of logged Data		0.812
604												

	A	B	C	D	E	F	G	H	I	J	K	L
605					Assuming Lognormal Distribution							
606					95% H-UCL	0.419				90% Chebyshev (MVUE) UCL		0.374
607				95% Chebyshev (MVUE) UCL		0.446				97.5% Chebyshev (MVUE) UCL		0.546
608				99% Chebyshev (MVUE) UCL		0.742						
609												
610					Nonparametric Distribution Free UCL Statistics							
611					Data do not follow a Discernible Distribution (0.05)							
612												
613					Nonparametric Distribution Free UCLs							
614					95% CLT UCL	0.225				95% Jackknife UCL		0.228
615				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
616				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
617				95% BCA Bootstrap UCL		N/A						
618				90% Chebyshev(Mean, Sd) UCL		0.254				95% Chebyshev(Mean, Sd) UCL		0.283
619				97.5% Chebyshev(Mean, Sd) UCL		0.324				99% Chebyshev(Mean, Sd) UCL		0.405
620												
621					Suggested UCL to Use							
622				95% Chebyshev (Mean, Sd) UCL		0.283						
623												
624	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
625	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
626	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
627	For additional insight the user may want to consult a statistician.											
628												
629	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
630	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
631												
632												

	A	B	C	D	E	F	G	H	I	J	K	L
633	Nickel											
634												
635					General Statistics							
636					Total Number of Observations	12			Number of Distinct Observations			11
637									Number of Missing Observations			0
638					Minimum	65			Mean			142.6
639					Maximum	318.1			Median			127.8
640					SD	76.52			Std. Error of Mean			22.09
641					Coefficient of Variation	0.537			Skewness			1.221
642												
643					Normal GOF Test							
644					Shapiro Wilk Test Statistic	0.888			Shapiro Wilk GOF Test			
645					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
646					Lilliefors Test Statistic	0.183			Lilliefors GOF Test			
647					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
648					Data appear Normal at 5% Significance Level							
649												
650					Assuming Normal Distribution							
651					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
652					95% Student's-t UCL	182.3			95% Adjusted-CLT UCL (Chen-1995)			187.2
653									95% Modified-t UCL (Johnson-1978)			183.6
654												
655					Gamma GOF Test							
656					A-D Test Statistic	0.255			Anderson-Darling Gamma GOF Test			
657					5% A-D Critical Value	0.735			Detected data appear Gamma Distributed at 5% Significance Level			
658					K-S Test Statistic	0.135			Kolmogrov-Smirnoff Gamma GOF Test			
659					5% K-S Critical Value	0.246			Detected data appear Gamma Distributed at 5% Significance Level			
660					Detected data appear Gamma Distributed at 5% Significance Level							
661												
662					Gamma Statistics							
663					k hat (MLE)	4.327			k star (bias corrected MLE)			3.301
664					Theta hat (MLE)	32.95			Theta star (bias corrected MLE)			43.2
665					nu hat (MLE)	103.8			nu star (bias corrected)			79.22
666					MLE Mean (bias corrected)	142.6			MLE Sd (bias corrected)			78.48
667									Approximate Chi Square Value (0.05)			59.71
668					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			57.14
669												
670					Assuming Gamma Distribution							
671					95% Approximate Gamma UCL (use when n>=50))	189.2			95% Adjusted Gamma UCL (use when n<50)			197.7
672												
673					Lognormal GOF Test							
674					Shapiro Wilk Test Statistic	0.961			Shapiro Wilk Lognormal GOF Test			
675					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
676					Lilliefors Test Statistic	0.114			Lilliefors Lognormal GOF Test			
677					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
678					Data appear Lognormal at 5% Significance Level							
679												
680					Lognormal Statistics							
681					Minimum of Logged Data	4.174			Mean of logged Data			4.84
682					Maximum of Logged Data	5.762			SD of logged Data			0.504
683												

	A	B	C	D	E	F	G	H	I	J	K	L
684	Assuming Lognormal Distribution											
685					95% H-UCL	199.1				90% Chebyshev (MVUE) UCL		205.5
686				95% Chebyshev (MVUE) UCL		234.2				97.5% Chebyshev (MVUE) UCL		274.2
687				99% Chebyshev (MVUE) UCL		352.6						
688												
689	Nonparametric Distribution Free UCL Statistics											
690	Data appear to follow a Discernible Distribution at 5% Significance Level											
691												
692	Nonparametric Distribution Free UCLs											
693					95% CLT UCL	178.9				95% Jackknife UCL		182.3
694				95% Standard Bootstrap UCL		177.6				95% Bootstrap-t UCL		198.8
695				95% Hall's Bootstrap UCL		207.9				95% Percentile Bootstrap UCL		176.6
696				95% BCA Bootstrap UCL		187.2						
697				90% Chebyshev(Mean, Sd) UCL		208.9				95% Chebyshev(Mean, Sd) UCL		238.9
698				97.5% Chebyshev(Mean, Sd) UCL		280.5				99% Chebyshev(Mean, Sd) UCL		362.4
699												
700	Suggested UCL to Use											
701					95% Student's-t UCL	182.3						
702												
703	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
704	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
705	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
706	For additional insight the user may want to consult a statistician.											
707												
708												

	A	B	C	D	E	F	G	H	I	J	K	L
709	PAH, Total											
710												
711						General Statistics						
712					Total Number of Observations	12				Number of Distinct Observations		3
713										Number of Missing Observations		0
714					Minimum	0.018				Mean		0.188
715					Maximum	0.359				Median		0.188
716					SD	0.0727				Std. Error of Mean		0.021
717					Coefficient of Variation	0.386				Skewness		-4.93E-16
718												
719						Normal GOF Test						
720					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
721					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
722					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
723					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
724						Data Not Normal at 5% Significance Level						
725												
726						Assuming Normal Distribution						
727					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
728					95% Student's-t UCL	0.226				95% Adjusted-CLT UCL (Chen-1995)		0.223
729										95% Modified-t UCL (Johnson-1978)		0.226
730												
731						Gamma GOF Test						
732					A-D Test Statistic	2.982				Anderson-Darling Gamma GOF Test		
733					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
734					K-S Test Statistic	0.486				Kolmogrov-Smirnoff Gamma GOF Test		
735					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
736						Data Not Gamma Distributed at 5% Significance Level						
737												
738						Gamma Statistics						
739					k hat (MLE)	3.68				k star (bias corrected MLE)		2.815
740					Theta hat (MLE)	0.0512				Theta star (bias corrected MLE)		0.0669
741					nu hat (MLE)	88.31				nu star (bias corrected)		67.57
742					MLE Mean (bias corrected)	0.188				MLE Sd (bias corrected)		0.112
743										Approximate Chi Square Value (0.05)		49.65
744					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		47.31
745												
746						Assuming Gamma Distribution						
747					95% Approximate Gamma UCL (use when n>=50))	0.256				95% Adjusted Gamma UCL (use when n<50)		0.269
748												
749						Lognormal GOF Test						
750					Shapiro Wilk Test Statistic	0.472				Shapiro Wilk Lognormal GOF Test		
751					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
752					Lilliefors Test Statistic	0.495				Lilliefors Lognormal GOF Test		
753					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
754						Data Not Lognormal at 5% Significance Level						
755												
756						Lognormal Statistics						
757					Minimum of Logged Data	-4.017				Mean of logged Data		-1.811
758					Maximum of Logged Data	-1.025				SD of logged Data		0.719
759												

	A	B	C	D	E	F	G	H	I	J	K	L
760					Assuming Lognormal Distribution							
761					95% H-UCL	0.359				90% Chebyshev (MVUE) UCL		0.34
762				95% Chebyshev (MVUE) UCL		0.401				97.5% Chebyshev (MVUE) UCL		0.485
763				99% Chebyshev (MVUE) UCL		0.651						
764												
765					Nonparametric Distribution Free UCL Statistics							
766					Data do not follow a Discernible Distribution (0.05)							
767												
768					Nonparametric Distribution Free UCLs							
769					95% CLT UCL	0.223				95% Jackknife UCL		0.226
770				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
771				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
772				95% BCA Bootstrap UCL		N/A						
773				90% Chebyshev(Mean, Sd) UCL		0.251				95% Chebyshev(Mean, Sd) UCL		0.28
774				97.5% Chebyshev(Mean, Sd) UCL		0.319				99% Chebyshev(Mean, Sd) UCL		0.397
775												
776					Suggested UCL to Use							
777				95% Chebyshev (Mean, Sd) UCL		0.28						
778												
779	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
780	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
781	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
782	For additional insight the user may want to consult a statistician.											
783												
784	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
785	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
786												

	A	B	C	D	E	F	G	H	I	J	K	L
787	PCB, Total											
788												
789						General Statistics						
790					Total Number of Observations	12				Number of Distinct Observations		3
791										Number of Missing Observations		0
792					Minimum	0.36				Mean		4.605
793					Maximum	5				Median		5
794					SD	1.337				Std. Error of Mean		0.386
795					Coefficient of Variation	0.29				Skewness		-3.461
796												
797						Normal GOF Test						
798					Shapiro Wilk Test Statistic	0.337				Shapiro Wilk GOF Test		
799					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
800					Lilliefors Test Statistic	0.504				Lilliefors GOF Test		
801					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
802						Data Not Normal at 5% Significance Level						
803												
804						Assuming Normal Distribution						
805					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
806					95% Student's-t UCL	5.298				95% Adjusted-CLT UCL (Chen-1995)		4.828
807										95% Modified-t UCL (Johnson-1978)		5.234
808												
809						Gamma GOF Test						
810					A-D Test Statistic	4.112				Anderson-Darling Gamma GOF Test		
811					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
812					K-S Test Statistic	0.532				Kolmogrov-Smirnoff Gamma GOF Test		
813					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
814						Data Not Gamma Distributed at 5% Significance Level						
815												
816						Gamma Statistics						
817					k hat (MLE)	3.765				k star (bias corrected MLE)		2.879
818					Theta hat (MLE)	1.223				Theta star (bias corrected MLE)		1.599
819					nu hat (MLE)	90.36				nu star (bias corrected)		69.1
820					MLE Mean (bias corrected)	4.605				MLE Sd (bias corrected)		2.714
821										Approximate Chi Square Value (0.05)		50.97
822					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		48.6
823												
824						Assuming Gamma Distribution						
825					95% Approximate Gamma UCL (use when n>=50))	6.244				95% Adjusted Gamma UCL (use when n<50)		6.548
826												
827						Lognormal GOF Test						
828					Shapiro Wilk Test Statistic	0.331				Shapiro Wilk Lognormal GOF Test		
829					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
830					Lilliefors Test Statistic	0.521				Lilliefors Lognormal GOF Test		
831					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
832						Data Not Lognormal at 5% Significance Level						
833												
834						Lognormal Statistics						
835					Minimum of Logged Data	-1.022				Mean of logged Data		1.388
836					Maximum of Logged Data	1.609				SD of logged Data		0.759
837												

	A	B	C	D	E	F	G	H	I	J	K	L
838						Assuming Lognormal Distribution						
839					95% H-UCL	9.485				90% Chebyshev (MVUE) UCL		8.77
840				95% Chebyshev (MVUE) UCL		10.39				97.5% Chebyshev (MVUE) UCL		12.64
841				99% Chebyshev (MVUE) UCL		17.05						
842												
843						Nonparametric Distribution Free UCL Statistics						
844						Data do not follow a Discernible Distribution (0.05)						
845												
846						Nonparametric Distribution Free UCLs						
847					95% CLT UCL	5.24				95% Jackknife UCL		5.298
848				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
849				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
850				95% BCA Bootstrap UCL		N/A						
851				90% Chebyshev(Mean, Sd) UCL		5.763				95% Chebyshev(Mean, Sd) UCL		6.288
852				97.5% Chebyshev(Mean, Sd) UCL		7.016				99% Chebyshev(Mean, Sd) UCL		8.446
853												
854						Suggested UCL to Use						
855				95% Chebyshev (Mean, Sd) UCL		6.288						
856												
857						Recommended UCL exceeds the maximum observation						
858												
859						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
860						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
861						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
862						For additional insight the user may want to consult a statistician.						
863												
864						Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
865						reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.						
866												
867												

	A	B	C	D	E	F	G	H	I	J	K	L
868	Uranium											
869												
870					General Statistics							
871					Total Number of Observations	12	Number of Distinct Observations					12
872							Number of Missing Observations					0
873					Minimum	7.69	Mean					33.27
874					Maximum	81.68	Median					28.85
875					SD	21.75	Std. Error of Mean					6.279
876					Coefficient of Variation	0.654	Skewness					0.994
877												
878					Normal GOF Test							
879					Shapiro Wilk Test Statistic	0.921	Shapiro Wilk GOF Test					
880					5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level					
881					Lilliefors Test Statistic	0.162	Lilliefors GOF Test					
882					5% Lilliefors Critical Value	0.256	Data appear Normal at 5% Significance Level					
883					Data appear Normal at 5% Significance Level							
884												
885					Assuming Normal Distribution							
886					95% Normal UCL		95% UCLs (Adjusted for Skewness)					
887					95% Student's-t UCL	44.55	95% Adjusted-CLT UCL (Chen-1995)					45.52
888							95% Modified-t UCL (Johnson-1978)					44.85
889												
890					Gamma GOF Test							
891					A-D Test Statistic	0.176	Anderson-Darling Gamma GOF Test					
892					5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level					
893					K-S Test Statistic	0.114	Kolmogrov-Smirnoff Gamma GOF Test					
894					5% K-S Critical Value	0.248	Detected data appear Gamma Distributed at 5% Significance Level					
895					Detected data appear Gamma Distributed at 5% Significance Level							
896												
897					Gamma Statistics							
898					k hat (MLE)	2.517	k star (bias corrected MLE)					1.944
899					Theta hat (MLE)	13.22	Theta star (bias corrected MLE)					17.12
900					nu hat (MLE)	60.42	nu star (bias corrected)					46.65
901					MLE Mean (bias corrected)	33.27	MLE Sd (bias corrected)					23.86
902							Approximate Chi Square Value (0.05)					31.98
903					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					30.13
904												
905					Assuming Gamma Distribution							
906					95% Approximate Gamma UCL (use when n>=50))	48.53	95% Adjusted Gamma UCL (use when n<50)					51.51
907												
908					Lognormal GOF Test							
909					Shapiro Wilk Test Statistic	0.972	Shapiro Wilk Lognormal GOF Test					
910					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
911					Lilliefors Test Statistic	0.13	Lilliefors Lognormal GOF Test					
912					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
913					Data appear Lognormal at 5% Significance Level							
914												
915					Lognormal Statistics							
916					Minimum of Logged Data	2.04	Mean of logged Data					3.293
917					Maximum of Logged Data	4.403	SD of logged Data					0.709
918												

	A	B	C	D	E	F	G	H	I	J	K	L
919	Assuming Lognormal Distribution											
920					95% H-UCL	58.18				90% Chebyshev (MVUE) UCL		55.4
921				95% Chebyshev (MVUE) UCL		65.19				97.5% Chebyshev (MVUE) UCL		78.79
922				99% Chebyshev (MVUE) UCL		105.5						
923												
924	Nonparametric Distribution Free UCL Statistics											
925	Data appear to follow a Discernible Distribution at 5% Significance Level											
926												
927	Nonparametric Distribution Free UCLs											
928					95% CLT UCL	43.6				95% Jackknife UCL		44.55
929				95% Standard Bootstrap UCL		42.91				95% Bootstrap-t UCL		48
930				95% Hall's Bootstrap UCL		50.73				95% Percentile Bootstrap UCL		43.53
931				95% BCA Bootstrap UCL		44.92						
932				90% Chebyshev(Mean, Sd) UCL		52.11				95% Chebyshev(Mean, Sd) UCL		60.64
933				97.5% Chebyshev(Mean, Sd) UCL		72.48				99% Chebyshev(Mean, Sd) UCL		95.75
934												
935	Suggested UCL to Use											
936				95% Student's-t UCL		44.55						
937												
938	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
939	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
940	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
941	For additional insight the user may want to consult a statistician.											
942												
943												

	A	B	C	D	E	F	G	H	I	J	K	L
944	Uranium-238											
945												
946					General Statistics							
947					Total Number of Observations	12			Number of Distinct Observations			3
948									Number of Missing Observations			0
949					Minimum	1.2			Mean			3.92
950					Maximum	6.64			Median			3.92
951					SD	1.16			Std. Error of Mean			0.335
952					Coefficient of Variation	0.296			Skewness			-1.99E-15
953												
954					Normal GOF Test							
955					Shapiro Wilk Test Statistic	0.6			Shapiro Wilk GOF Test			
956					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
957					Lilliefors Test Statistic	0.417			Lilliefors GOF Test			
958					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
959					Data Not Normal at 5% Significance Level							
960												
961					Assuming Normal Distribution							
962					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
963					95% Student's-t UCL	4.521			95% Adjusted-CLT UCL (Chen-1995)			4.471
964									95% Modified-t UCL (Johnson-1978)			4.521
965												
966					Gamma GOF Test							
967					A-D Test Statistic	2.817			Anderson-Darling Gamma GOF Test			
968					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
969					K-S Test Statistic	0.46			Kolmogrov-Smirnoff Gamma GOF Test			
970					5% K-S Critical Value	0.245			Data Not Gamma Distributed at 5% Significance Level			
971					Data Not Gamma Distributed at 5% Significance Level							
972												
973					Gamma Statistics							
974					k hat (MLE)	9.299			k star (bias corrected MLE)			7.03
975					Theta hat (MLE)	0.422			Theta star (bias corrected MLE)			0.558
976					nu hat (MLE)	223.2			nu star (bias corrected)			168.7
977					MLE Mean (bias corrected)	3.92			MLE Sd (bias corrected)			1.478
978									Approximate Chi Square Value (0.05)			139.7
979					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			135.7
980												
981					Assuming Gamma Distribution							
982					95% Approximate Gamma UCL (use when n>=50))	4.735			95% Adjusted Gamma UCL (use when n<50)			4.875
983												
984					Lognormal GOF Test							
985					Shapiro Wilk Test Statistic	0.534			Shapiro Wilk Lognormal GOF Test			
986					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
987					Lilliefors Test Statistic	0.473			Lilliefors Lognormal GOF Test			
988					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
989					Data Not Lognormal at 5% Significance Level							
990												
991					Lognormal Statistics							
992					Minimum of Logged Data	0.182			Mean of logged Data			1.311
993					Maximum of Logged Data	1.893			SD of logged Data			0.386
994												

	A	B	C	D	E	F	G	H	I	J	K	L
995					Assuming Lognormal Distribution							
996					95% H-UCL	5.056				90% Chebyshev (MVUE) UCL		5.322
997				95% Chebyshev (MVUE) UCL		5.933				97.5% Chebyshev (MVUE) UCL		6.782
998				99% Chebyshev (MVUE) UCL		8.448						
999												
1000					Nonparametric Distribution Free UCL Statistics							
1001					Data do not follow a Discernible Distribution (0.05)							
1002												
1003					Nonparametric Distribution Free UCLs							
1004					95% CLT UCL	4.471				95% Jackknife UCL		4.521
1005				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1006				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1007				95% BCA Bootstrap UCL		N/A						
1008				90% Chebyshev(Mean, Sd) UCL		4.924				95% Chebyshev(Mean, Sd) UCL		5.379
1009				97.5% Chebyshev(Mean, Sd) UCL		6.011				99% Chebyshev(Mean, Sd) UCL		7.251
1010												
1011					Suggested UCL to Use							
1012					95% Student's-t UCL	4.521				or 95% Modified-t UCL		4.521
1013												
1014					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1015					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1016					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1017					For additional insight the user may want to consult a statistician.							
1018												
1019					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
1020					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
1021												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 1:41:13 PM								
5	From File			EPC_015Sub_EU09.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	50.14				Mean		106.7
17					Maximum	161.4				Median		107.7
18					SD	30.34				Std. Error of Mean		8.76
19					Coefficient of Variation	0.284				Skewness		0.0426
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.986				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.107				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	122.4				95% Adjusted-CLT UCL (Chen-1995)		121.2
31										95% Modified-t UCL (Johnson-1978)		122.4
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.198				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.111				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data appear Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	12.29				k star (bias corrected MLE)		9.276
42					Theta hat (MLE)	8.677				Theta star (bias corrected MLE)		11.5
43					nu hat (MLE)	295.1				nu star (bias corrected)		222.6
44					MLE Mean (bias corrected)	106.7				MLE Sd (bias corrected)		35.03
45										Approximate Chi Square Value (0.05)		189.1
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		184.4
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	125.6				95% Adjusted Gamma UCL (use when n<50)		128.8
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.949				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.132				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
56						Data appear Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	3.915				Mean of logged Data		4.629
60					Maximum of Logged Data	5.084				SD of logged Data		0.311
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	128.8				90% Chebyshev (MVUE) UCL		136.1
64				95% Chebyshev (MVUE) UCL		149.3				97.5% Chebyshev (MVUE) UCL		167.6
65				99% Chebyshev (MVUE) UCL		203.5						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	121.1				95% Jackknife UCL		122.4
72				95% Standard Bootstrap UCL		120.6				95% Bootstrap-t UCL		122.5
73				95% Hall's Bootstrap UCL		123.5				95% Percentile Bootstrap UCL		120.7
74				95% BCA Bootstrap UCL		120.3						
75				90% Chebyshev(Mean, Sd) UCL		133				95% Chebyshev(Mean, Sd) UCL		144.9
76				97.5% Chebyshev(Mean, Sd) UCL		161.4				99% Chebyshev(Mean, Sd) UCL		193.8
77												
78	**Suggested UCL to Use**											
79				95% Student's-t UCL		122.4						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Arsenic											
88												
89					General Statistics							
90					Total Number of Observations	12			Number of Distinct Observations			11
91									Number of Missing Observations			0
92					Minimum	5.89			Mean			10.13
93					Maximum	23.59			Median			9.195
94					SD	4.747			Std. Error of Mean			1.37
95					Coefficient of Variation	0.469			Skewness			2.289
96												
97					Normal GOF Test							
98					Shapiro Wilk Test Statistic	0.746			Shapiro Wilk GOF Test			
99					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
100					Lilliefors Test Statistic	0.261			Lilliefors GOF Test			
101					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
102					Data Not Normal at 5% Significance Level							
103												
104					Assuming Normal Distribution							
105					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
106					95% Student's-t UCL	12.59			95% Adjusted-CLT UCL (Chen-1995)			13.35
107									95% Modified-t UCL (Johnson-1978)			12.74
108												
109					Gamma GOF Test							
110					A-D Test Statistic	0.599			Anderson-Darling Gamma GOF Test			
111					5% A-D Critical Value	0.731			Detected data appear Gamma Distributed at 5% Significance Level			
112					K-S Test Statistic	0.198			Kolmogrov-Smirnoff Gamma GOF Test			
113					5% K-S Critical Value	0.246			Detected data appear Gamma Distributed at 5% Significance Level			
114					Detected data appear Gamma Distributed at 5% Significance Level							
115												
116					Gamma Statistics							
117					k hat (MLE)	6.851			k star (bias corrected MLE)			5.194
118					Theta hat (MLE)	1.479			Theta star (bias corrected MLE)			1.95
119					nu hat (MLE)	164.4			nu star (bias corrected)			124.7
120					MLE Mean (bias corrected)	10.13			MLE Sd (bias corrected)			4.445
121									Approximate Chi Square Value (0.05)			99.87
122					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			96.49
123												
124					Assuming Gamma Distribution							
125					95% Approximate Gamma UCL (use when n>=50)	12.65			95% Adjusted Gamma UCL (use when n<50)			13.09
126												
127					Lognormal GOF Test							
128					Shapiro Wilk Test Statistic	0.901			Shapiro Wilk Lognormal GOF Test			
129					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
130					Lilliefors Test Statistic	0.173			Lilliefors Lognormal GOF Test			
131					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
132					Data appear Lognormal at 5% Significance Level							
133												
134					Lognormal Statistics							
135					Minimum of Logged Data	1.773			Mean of logged Data			2.241
136					Maximum of Logged Data	3.161			SD of logged Data			0.38
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	12.71				90% Chebyshev (MVUE) UCL		13.39
140				95% Chebyshev (MVUE) UCL		14.91				97.5% Chebyshev (MVUE) UCL		17.01
141				99% Chebyshev (MVUE) UCL		21.15						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	12.38				95% Jackknife UCL		12.59
148				95% Standard Bootstrap UCL		12.28				95% Bootstrap-t UCL		14.51
149				95% Hall's Bootstrap UCL		22.21				95% Percentile Bootstrap UCL		12.54
150				95% BCA Bootstrap UCL		13.57						
151				90% Chebyshev(Mean, Sd) UCL		14.24				95% Chebyshev(Mean, Sd) UCL		16.1
152				97.5% Chebyshev(Mean, Sd) UCL		18.69				99% Chebyshev(Mean, Sd) UCL		23.77
153												
154	**Suggested UCL to Use**											
155				95% Adjusted Gamma UCL		13.09						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												

	A	B	C	D	E	F	G	H	I	J	K	L
163	Cadmium											
164												
165					General Statistics							
166					Total Number of Observations	12				Number of Distinct Observations		5
167										Number of Missing Observations		0
168					Minimum	0.026				Mean		11.13
169					Maximum	21.56				Median		12
170					SD	5.899				Std. Error of Mean		1.703
171					Coefficient of Variation	0.53				Skewness		-0.782
172												
173					Normal GOF Test							
174					Shapiro Wilk Test Statistic	0.759				Shapiro Wilk GOF Test		
175					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
176					Lilliefors Test Statistic	0.392				Lilliefors GOF Test		
177					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
178					Data Not Normal at 5% Significance Level							
179												
180					Assuming Normal Distribution							
181					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
182					95% Student's-t UCL	14.18				95% Adjusted-CLT UCL (Chen-1995)		13.52
183										95% Modified-t UCL (Johnson-1978)		14.12
184												
185					Gamma GOF Test							
186					A-D Test Statistic	2.871				Anderson-Darling Gamma GOF Test		
187					5% A-D Critical Value	0.765				Data Not Gamma Distributed at 5% Significance Level		
188					K-S Test Statistic	0.508				Kolmogrov-Smirnoff Gamma GOF Test		
189					5% K-S Critical Value	0.255				Data Not Gamma Distributed at 5% Significance Level		
190					Data Not Gamma Distributed at 5% Significance Level							
191												
192					Gamma Statistics							
193					k hat (MLE)	0.76				k star (bias corrected MLE)		0.625
194					Theta hat (MLE)	14.64				Theta star (bias corrected MLE)		17.79
195					nu hat (MLE)	18.23				nu star (bias corrected)		15.01
196					MLE Mean (bias corrected)	11.13				MLE Sd (bias corrected)		14.07
197										Approximate Chi Square Value (0.05)		7.268
198					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		6.463
199												
200					Assuming Gamma Distribution							
201					95% Approximate Gamma UCL (use when n>=50))	22.98				95% Adjusted Gamma UCL (use when n<50)		25.84
202												
203					Lognormal GOF Test							
204					Shapiro Wilk Test Statistic	0.543				Shapiro Wilk Lognormal GOF Test		
205					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
206					Lilliefors Test Statistic	0.484				Lilliefors Lognormal GOF Test		
207					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
208					Data Not Lognormal at 5% Significance Level							
209												
210					Lognormal Statistics							
211					Minimum of Logged Data	-3.65				Mean of logged Data		1.623
212					Maximum of Logged Data	3.071				SD of logged Data		2.234
213												

	A	B	C	D	E	F	G	H	I	J	K	L
214	Assuming Lognormal Distribution											
215					95% H-UCL	2454				90% Chebyshev (MVUE) UCL		113.9
216				95% Chebyshev (MVUE) UCL		148.6				97.5% Chebyshev (MVUE) UCL		196.8
217				99% Chebyshev (MVUE) UCL		291.5						
218												
219	Nonparametric Distribution Free UCL Statistics											
220	Data do not follow a Discernible Distribution (0.05)											
221												
222	Nonparametric Distribution Free UCLs											
223					95% CLT UCL	13.93				95% Jackknife UCL		14.18
224				95% Standard Bootstrap UCL		13.83				95% Bootstrap-t UCL		13.44
225				95% Hall's Bootstrap UCL		13.73				95% Percentile Bootstrap UCL		13.72
226				95% BCA Bootstrap UCL		13.52						
227				90% Chebyshev(Mean, Sd) UCL		16.24				95% Chebyshev(Mean, Sd) UCL		18.55
228				97.5% Chebyshev(Mean, Sd) UCL		21.76				99% Chebyshev(Mean, Sd) UCL		28.07
229												
230	Suggested UCL to Use											
231				99% Chebyshev (Mean, Sd) UCL		28.07						
232												
233	Recommended UCL exceeds the maximum observation											
234												
235	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
236	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
237	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
238	For additional insight the user may want to consult a statistician.											
239												
240	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
241	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
242												
243												

	A	B	C	D	E	F	G	H	I	J	K	L
244	Chromium											
245												
246					General Statistics							
247					Total Number of Observations	12			Number of Distinct Observations			7
248									Number of Missing Observations			0
249					Minimum	37.69			Mean			74.94
250					Maximum	140.6			Median			85
251					SD	27.58			Std. Error of Mean			7.96
252					Coefficient of Variation	0.368			Skewness			0.974
253												
254					Normal GOF Test							
255					Shapiro Wilk Test Statistic	0.852			Shapiro Wilk GOF Test			
256					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
257					Lilliefors Test Statistic	0.274			Lilliefors GOF Test			
258					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
259					Data Not Normal at 5% Significance Level							
260												
261					Assuming Normal Distribution							
262					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
263					95% Student's-t UCL	89.23			95% Adjusted-CLT UCL (Chen-1995)			90.42
264									95% Modified-t UCL (Johnson-1978)			89.61
265												
266					Gamma GOF Test							
267					A-D Test Statistic	0.747			Anderson-Darling Gamma GOF Test			
268					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
269					K-S Test Statistic	0.271			Kolmogrov-Smirnoff Gamma GOF Test			
270					5% K-S Critical Value	0.246			Data Not Gamma Distributed at 5% Significance Level			
271					Data Not Gamma Distributed at 5% Significance Level							
272												
273					Gamma Statistics							
274					k hat (MLE)	8.455			k star (bias corrected MLE)			6.397
275					Theta hat (MLE)	8.863			Theta star (bias corrected MLE)			11.71
276					nu hat (MLE)	202.9			nu star (bias corrected)			153.5
277					MLE Mean (bias corrected)	74.94			MLE Sd (bias corrected)			29.63
278									Approximate Chi Square Value (0.05)			125.9
279					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			122.1
280												
281					Assuming Gamma Distribution							
282					95% Approximate Gamma UCL (use when n>=50))	91.39			95% Adjusted Gamma UCL (use when n<50)			94.25
283												
284					Lognormal GOF Test							
285					Shapiro Wilk Test Statistic	0.902			Shapiro Wilk Lognormal GOF Test			
286					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
287					Lilliefors Test Statistic	0.279			Lilliefors Lognormal GOF Test			
288					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
289					Data appear Approximate Lognormal at 5% Significance Level							
290												
291					Lognormal Statistics							
292					Minimum of Logged Data	3.629			Mean of logged Data			4.256
293					Maximum of Logged Data	4.946			SD of logged Data			0.364
294												

	A	B	C	D	E	F	G	H	I	J	K	L
295	**Assuming Lognormal Distribution**											
296					95% H-UCL	93.79				90% Chebyshev (MVUE) UCL		98.9
297				95% Chebyshev (MVUE) UCL		109.7				97.5% Chebyshev (MVUE) UCL		124.8
298				99% Chebyshev (MVUE) UCL		154.4						
299												
300	**Nonparametric Distribution Free UCL Statistics**											
301	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
302												
303	**Nonparametric Distribution Free UCLs**											
304					95% CLT UCL	88.03				95% Jackknife UCL		89.23
305				95% Standard Bootstrap UCL		87.49				95% Bootstrap-t UCL		91.06
306				95% Hall's Bootstrap UCL		96.34				95% Percentile Bootstrap UCL		88.3
307				95% BCA Bootstrap UCL		89.56						
308				90% Chebyshev(Mean, Sd) UCL		98.82				95% Chebyshev(Mean, Sd) UCL		109.6
309				97.5% Chebyshev(Mean, Sd) UCL		124.7				99% Chebyshev(Mean, Sd) UCL		154.1
310												
311	**Suggested UCL to Use**											
312				95% Student's-t UCL		89.23				or 95% Modified-t UCL		89.61
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												
319												

	A	B	C	D	E	F	G	H	I	J	K	L
320	Iron											
321												
322					General Statistics							
323					Total Number of Observations	12				Number of Distinct Observations		12
324										Number of Missing Observations		0
325					Minimum	9781				Mean		25381
326					Maximum	42172				Median		23105
327					SD	9288				Std. Error of Mean		2681
328					Coefficient of Variation	0.366				Skewness		0.133
329												
330					Normal GOF Test							
331					Shapiro Wilk Test Statistic	0.969				Shapiro Wilk GOF Test		
332					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
333					Lilliefors Test Statistic	0.162				Lilliefors GOF Test		
334					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
335					Data appear Normal at 5% Significance Level							
336												
337					Assuming Normal Distribution							
338					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
339					95% Student's-t UCL	30196				95% Adjusted-CLT UCL (Chen-1995)		29901
340										95% Modified-t UCL (Johnson-1978)		30213
341												
342					Gamma GOF Test							
343					A-D Test Statistic	0.285				Anderson-Darling Gamma GOF Test		
344					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
345					K-S Test Statistic	0.183				Kolmogrov-Smirnoff Gamma GOF Test		
346					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
347					Detected data appear Gamma Distributed at 5% Significance Level							
348												
349					Gamma Statistics							
350					k hat (MLE)	7.311				k star (bias corrected MLE)		5.539
351					Theta hat (MLE)	3471				Theta star (bias corrected MLE)		4582
352					nu hat (MLE)	175.5				nu star (bias corrected)		132.9
353					MLE Mean (bias corrected)	25381				MLE Sd (bias corrected)		10784
354										Approximate Chi Square Value (0.05)		107.3
355					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		103.8
356												
357					Assuming Gamma Distribution							
358					95% Approximate Gamma UCL (use when n>=50))	31445				95% Adjusted Gamma UCL (use when n<50)		32509
359												
360					Lognormal GOF Test							
361					Shapiro Wilk Test Statistic	0.944				Shapiro Wilk Lognormal GOF Test		
362					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
363					Lilliefors Test Statistic	0.175				Lilliefors Lognormal GOF Test		
364					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
365					Data appear Lognormal at 5% Significance Level							
366												
367					Lognormal Statistics							
368					Minimum of Logged Data	9.188				Mean of logged Data		10.07
369					Maximum of Logged Data	10.65				SD of logged Data		0.408
370												

	A	B	C	D	E	F	G	H	I	J	K	L
371	**Assuming Lognormal Distribution**											
372					95% H-UCL	33046				90% Chebyshev (MVUE) UCL		34710
373					95% Chebyshev (MVUE) UCL	38866				97.5% Chebyshev (MVUE) UCL		44635
374					99% Chebyshev (MVUE) UCL	55967						
375												
376	**Nonparametric Distribution Free UCL Statistics**											
377	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
378												
379	**Nonparametric Distribution Free UCLs**											
380					95% CLT UCL	29791				95% Jackknife UCL		30196
381					95% Standard Bootstrap UCL	29641				95% Bootstrap-t UCL		30483
382					95% Hall's Bootstrap UCL	30057				95% Percentile Bootstrap UCL		29453
383					95% BCA Bootstrap UCL	29774						
384					90% Chebyshev(Mean, Sd) UCL	33424				95% Chebyshev(Mean, Sd) UCL		37068
385					97.5% Chebyshev(Mean, Sd) UCL	42125				99% Chebyshev(Mean, Sd) UCL		52058
386												
387	**Suggested UCL to Use**											
388					95% Student's-t UCL	30196						
389												
390	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
391	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
392	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
393	For additional insight the user may want to consult a statistician.											
394												
395												

	A	B	C	D	E	F	G	H	I	J	K	L
396	Manganese											
397												
398					General Statistics							
399					Total Number of Observations	12				Number of Distinct Observations		12
400										Number of Missing Observations		0
401					Minimum	365.4				Mean		760.8
402					Maximum	2717				Median		538.2
403					SD	639.6				Std. Error of Mean		184.6
404					Coefficient of Variation	0.841				Skewness		3.032
405												
406					Normal GOF Test							
407					Shapiro Wilk Test Statistic	0.567				Shapiro Wilk GOF Test		
408					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
409					Lilliefors Test Statistic	0.356				Lilliefors GOF Test		
410					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
411					Data Not Normal at 5% Significance Level							
412												
413					Assuming Normal Distribution							
414					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
415					95% Student's-t UCL	1092				95% Adjusted-CLT UCL (Chen-1995)		1237
416										95% Modified-t UCL (Johnson-1978)		1119
417												
418					Gamma GOF Test							
419					A-D Test Statistic	1.231				Anderson-Darling Gamma GOF Test		
420					5% A-D Critical Value	0.739				Data Not Gamma Distributed at 5% Significance Level		
421					K-S Test Statistic	0.259				Kolmogrov-Smirnoff Gamma GOF Test		
422					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
423					Data Not Gamma Distributed at 5% Significance Level							
424												
425					Gamma Statistics							
426					k hat (MLE)	2.98				k star (bias corrected MLE)		2.291
427					Theta hat (MLE)	255.3				Theta star (bias corrected MLE)		332.1
428					nu hat (MLE)	71.52				nu star (bias corrected)		54.97
429					MLE Mean (bias corrected)	760.8				MLE Sd (bias corrected)		502.7
430										Approximate Chi Square Value (0.05)		38.94
431					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		36.88
432												
433					Assuming Gamma Distribution							
434					95% Approximate Gamma UCL (use when n>=50))	1074				95% Adjusted Gamma UCL (use when n<50)		1134
435												
436					Lognormal GOF Test							
437					Shapiro Wilk Test Statistic	0.801				Shapiro Wilk Lognormal GOF Test		
438					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
439					Lilliefors Test Statistic	0.208				Lilliefors Lognormal GOF Test		
440					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
441					Data appear Approximate Lognormal at 5% Significance Level							
442												
443					Lognormal Statistics							
444					Minimum of Logged Data	5.901				Mean of logged Data		6.457
445					Maximum of Logged Data	7.907				SD of logged Data		0.541
446												

	A	B	C	D	E	F	G	H	I	J	K	L
447	**Assuming Lognormal Distribution**											
448					95% H-UCL	1055			90% Chebyshev (MVUE) UCL			1078
449				95% Chebyshev (MVUE) UCL		1237			97.5% Chebyshev (MVUE) UCL			1457
450				99% Chebyshev (MVUE) UCL		1890						
451												
452	**Nonparametric Distribution Free UCL Statistics**											
453	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
454												
455	**Nonparametric Distribution Free UCLs**											
456					95% CLT UCL	1064			95% Jackknife UCL			1092
457				95% Standard Bootstrap UCL		1048			95% Bootstrap-t UCL			1728
458				95% Hall's Bootstrap UCL		2182			95% Percentile Bootstrap UCL			1110
459				95% BCA Bootstrap UCL		1271						
460				90% Chebyshev(Mean, Sd) UCL		1315			95% Chebyshev(Mean, Sd) UCL			1566
461				97.5% Chebyshev(Mean, Sd) UCL		1914			99% Chebyshev(Mean, Sd) UCL			2598
462												
463	**Suggested UCL to Use**											
464				95% Chebyshev (Mean, Sd) UCL		1566						
465												
466	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
467	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
468	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
469	For additional insight the user may want to consult a statistician.											
470												
471												

	A	B	C	D	E	F	G	H	I	J	K	L
472	Mercury											
473												
474					General Statistics							
475					Total Number of Observations	12				Number of Distinct Observations		3
476										Number of Missing Observations		0
477					Minimum	0.0196				Mean		8.88
478					Maximum	10				Median		10
479					SD	2.962				Std. Error of Mean		0.855
480					Coefficient of Variation	0.334				Skewness		-2.914
481												
482					Normal GOF Test							
483					Shapiro Wilk Test Statistic	0.453				Shapiro Wilk GOF Test		
484					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
485					Lilliefors Test Statistic	0.481				Lilliefors GOF Test		
486					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
487					Data Not Normal at 5% Significance Level							
488												
489					Assuming Normal Distribution							
490					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
491					95% Student's-t UCL	10.42				95% Adjusted-CLT UCL (Chen-1995)		9.518
492										95% Modified-t UCL (Johnson-1978)		10.3
493												
494					Gamma GOF Test							
495					A-D Test Statistic	3.886				Anderson-Darling Gamma GOF Test		
496					5% A-D Critical Value	0.75				Data Not Gamma Distributed at 5% Significance Level		
497					K-S Test Statistic	0.5				Kolmogrov-Smirnoff Gamma GOF Test		
498					5% K-S Critical Value	0.251				Data Not Gamma Distributed at 5% Significance Level		
499					Data Not Gamma Distributed at 5% Significance Level							
500												
501					Gamma Statistics							
502					k hat (MLE)	1.287				k star (bias corrected MLE)		1.021
503					Theta hat (MLE)	6.897				Theta star (bias corrected MLE)		8.696
504					nu hat (MLE)	30.9				nu star (bias corrected)		24.51
505					MLE Mean (bias corrected)	8.88				MLE Sd (bias corrected)		8.787
506										Approximate Chi Square Value (0.05)		14.24
507					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		13.05
508												
509					Assuming Gamma Distribution							
510					95% Approximate Gamma UCL (use when n>=50))	15.29				95% Adjusted Gamma UCL (use when n<50)		16.67
511												
512					Lognormal GOF Test							
513					Shapiro Wilk Test Statistic	0.357				Shapiro Wilk Lognormal GOF Test		
514					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
515					Lilliefors Test Statistic	0.455				Lilliefors Lognormal GOF Test		
516					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
517					Data Not Lognormal at 5% Significance Level							
518												
519					Lognormal Statistics							
520					Minimum of Logged Data	-3.932				Mean of logged Data		1.748
521					Maximum of Logged Data	2.303				SD of logged Data		1.793
522												

	A	B	C	D	E	F	G	H	I	J	K	L
523	Assuming Lognormal Distribution											
524					95% H-UCL	328.5				90% Chebyshev (MVUE) UCL		59.08
525				95% Chebyshev (MVUE) UCL		75.92				97.5% Chebyshev (MVUE) UCL		99.29
526				99% Chebyshev (MVUE) UCL		145.2						
527												
528	Nonparametric Distribution Free UCL Statistics											
529	Data do not follow a Discernible Distribution (0.05)											
530												
531	Nonparametric Distribution Free UCLs											
532					95% CLT UCL	10.29				95% Jackknife UCL		10.42
533				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
534				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
535				95% BCA Bootstrap UCL		N/A						
536				90% Chebyshev(Mean, Sd) UCL		11.45				95% Chebyshev(Mean, Sd) UCL		12.61
537				97.5% Chebyshev(Mean, Sd) UCL		14.22				99% Chebyshev(Mean, Sd) UCL		17.39
538												
539	Suggested UCL to Use											
540				99% Chebyshev (Mean, Sd) UCL		17.39						
541												
542	Recommended UCL exceeds the maximum observation											
543												
544	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
545	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
546	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
547	For additional insight the user may want to consult a statistician.											
548												
549	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
550	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
551												
552												

	A	B	C	D	E	F	G	H	I	J	K	L
553	Nickel											
554												
555					General Statistics							
556					Total Number of Observations	12				Number of Distinct Observations		11
557										Number of Missing Observations		0
558					Minimum	65				Mean		121.7
559					Maximum	208.3				Median		111.7
560					SD	53.17				Std. Error of Mean		15.35
561					Coefficient of Variation	0.437				Skewness		0.525
562												
563					Normal GOF Test							
564					Shapiro Wilk Test Statistic	0.892				Shapiro Wilk GOF Test		
565					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
566					Lilliefors Test Statistic	0.15				Lilliefors GOF Test		
567					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
568					Data appear Normal at 5% Significance Level							
569												
570					Assuming Normal Distribution							
571					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
572					95% Student's-t UCL	149.2				95% Adjusted-CLT UCL (Chen-1995)		149.4
573										95% Modified-t UCL (Johnson-1978)		149.6
574												
575					Gamma GOF Test							
576					A-D Test Statistic	0.42				Anderson-Darling Gamma GOF Test		
577					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
578					K-S Test Statistic	0.168				Kolmogrov-Smirnoff Gamma GOF Test		
579					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
580					Detected data appear Gamma Distributed at 5% Significance Level							
581												
582					Gamma Statistics							
583					k hat (MLE)	5.806				k star (bias corrected MLE)		4.41
584					Theta hat (MLE)	20.96				Theta star (bias corrected MLE)		27.59
585					nu hat (MLE)	139.3				nu star (bias corrected)		105.8
586					MLE Mean (bias corrected)	121.7				MLE Sd (bias corrected)		57.94
587										Approximate Chi Square Value (0.05)		83.09
588					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		80.02
589												
590					Assuming Gamma Distribution							
591					95% Approximate Gamma UCL (use when n>=50))	155				95% Adjusted Gamma UCL (use when n<50)		160.9
592												
593					Lognormal GOF Test							
594					Shapiro Wilk Test Statistic	0.907				Shapiro Wilk Lognormal GOF Test		
595					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
596					Lilliefors Test Statistic	0.159				Lilliefors Lognormal GOF Test		
597					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
598					Data appear Lognormal at 5% Significance Level							
599												
600					Lognormal Statistics							
601					Minimum of Logged Data	4.174				Mean of logged Data		4.713
602					Maximum of Logged Data	5.339				SD of logged Data		0.442
603												

	A	B	C	D	E	F	G	H	I	J	K	L
604	**Assuming Lognormal Distribution**											
605					95% H-UCL	161.7				90% Chebyshev (MVUE) UCL		169.1
606				95% Chebyshev (MVUE) UCL		190.6				97.5% Chebyshev (MVUE) UCL		220.4
607				99% Chebyshev (MVUE) UCL		278.9						
608												
609	**Nonparametric Distribution Free UCL Statistics**											
610	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
611												
612	**Nonparametric Distribution Free UCLs**											
613					95% CLT UCL	146.9				95% Jackknife UCL		149.2
614				95% Standard Bootstrap UCL		146.2				95% Bootstrap-t UCL		154.1
615				95% Hall's Bootstrap UCL		147.3				95% Percentile Bootstrap UCL		146.1
616				95% BCA Bootstrap UCL		148.9						
617				90% Chebyshev(Mean, Sd) UCL		167.7				95% Chebyshev(Mean, Sd) UCL		188.6
618				97.5% Chebyshev(Mean, Sd) UCL		217.5				99% Chebyshev(Mean, Sd) UCL		274.4
619												
620	**Suggested UCL to Use**											
621				95% Student's-t UCL		149.2						
622												
623	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
624	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
625	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
626	For additional insight the user may want to consult a statistician.											
627												
628												

	A	B	C	D	E	F	G	H	I	J	K	L
629	PAH, Total											
630												
631						General Statistics						
632					Total Number of Observations	12				Number of Distinct Observations		3
633										Number of Missing Observations		0
634					Minimum	0.0078				Mean		0.123
635					Maximum	0.238				Median		0.123
636					SD	0.0491				Std. Error of Mean		0.0142
637					Coefficient of Variation	0.399				Skewness		9.963E-16
638												
639						Normal GOF Test						
640					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
641					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
642					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
643					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
644						Data Not Normal at 5% Significance Level						
645												
646						Assuming Normal Distribution						
647					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
648					95% Student's-t UCL	0.149				95% Adjusted-CLT UCL (Chen-1995)		0.146
649										95% Modified-t UCL (Johnson-1978)		0.149
650												
651						Gamma GOF Test						
652					A-D Test Statistic	3.042				Anderson-Darling Gamma GOF Test		
653					5% A-D Critical Value	0.739				Data Not Gamma Distributed at 5% Significance Level		
654					K-S Test Statistic	0.493				Kolmogrov-Smirnoff Gamma GOF Test		
655					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
656						Data Not Gamma Distributed at 5% Significance Level						
657												
658						Gamma Statistics						
659					k hat (MLE)	3.017				k star (bias corrected MLE)		2.318
660					Theta hat (MLE)	0.0408				Theta star (bias corrected MLE)		0.0531
661					nu hat (MLE)	72.4				nu star (bias corrected)		55.64
662					MLE Mean (bias corrected)	0.123				MLE Sd (bias corrected)		0.0808
663										Approximate Chi Square Value (0.05)		39.49
664					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		37.43
665												
666						Assuming Gamma Distribution						
667					95% Approximate Gamma UCL (use when n>=50))	0.173				95% Adjusted Gamma UCL (use when n<50)		0.183
668												
669						Lognormal GOF Test						
670					Shapiro Wilk Test Statistic	0.456				Shapiro Wilk Lognormal GOF Test		
671					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
672					Lilliefors Test Statistic	0.5				Lilliefors Lognormal GOF Test		
673					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
674						Data Not Lognormal at 5% Significance Level						
675												
676						Lognormal Statistics						
677					Minimum of Logged Data	-4.854				Mean of logged Data		-2.27
678					Maximum of Logged Data	-1.434				SD of logged Data		0.836
679												

	A	B	C	D	E	F	G	H	I	J	K	L
680					Assuming Lognormal Distribution							
681					95% H-UCL	0.284				90% Chebyshev (MVUE) UCL		0.249
682				95% Chebyshev (MVUE) UCL		0.298				97.5% Chebyshev (MVUE) UCL		0.366
683				99% Chebyshev (MVUE) UCL		0.499						
684												
685					Nonparametric Distribution Free UCL Statistics							
686					Data do not follow a Discernible Distribution (0.05)							
687												
688					Nonparametric Distribution Free UCLs							
689					95% CLT UCL	0.146				95% Jackknife UCL		0.149
690				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
691				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
692				95% BCA Bootstrap UCL		N/A						
693				90% Chebyshev(Mean, Sd) UCL		0.166				95% Chebyshev(Mean, Sd) UCL		0.185
694				97.5% Chebyshev(Mean, Sd) UCL		0.212				99% Chebyshev(Mean, Sd) UCL		0.264
695												
696					Suggested UCL to Use							
697				95% Chebyshev (Mean, Sd) UCL		0.185						
698												
699	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
700	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
701	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
702	For additional insight the user may want to consult a statistician.											
703												
704												

	A	B	C	D	E	F	G	H	I	J	K	L
705	PCB, Total											
706												
707						General Statistics						
708					Total Number of Observations	12				Number of Distinct Observations		3
709										Number of Missing Observations		0
710					Minimum	0.33				Mean		4.223
711					Maximum	5				Median		5
712					SD	1.814				Std. Error of Mean		0.524
713					Coefficient of Variation	0.429				Skewness		-2.055
714												
715						Normal GOF Test						
716					Shapiro Wilk Test Statistic	0.465				Shapiro Wilk GOF Test		
717					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
718					Lilliefors Test Statistic	0.499				Lilliefors GOF Test		
719					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
720						Data Not Normal at 5% Significance Level						
721												
722						Assuming Normal Distribution						
723					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
724					95% Student's-t UCL	5.164				95% Adjusted-CLT UCL (Chen-1995)		4.753
725										95% Modified-t UCL (Johnson-1978)		5.112
726												
727						Gamma GOF Test						
728					A-D Test Statistic	3.522				Anderson-Darling Gamma GOF Test		
729					5% A-D Critical Value	0.742				Data Not Gamma Distributed at 5% Significance Level		
730					K-S Test Statistic	0.518				Kolmogrov-Smirnoff Gamma GOF Test		
731					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
732						Data Not Gamma Distributed at 5% Significance Level						
733												
734						Gamma Statistics						
735					k hat (MLE)	1.94				k star (bias corrected MLE)		1.511
736					Theta hat (MLE)	2.177				Theta star (bias corrected MLE)		2.795
737					nu hat (MLE)	46.57				nu star (bias corrected)		36.26
738					MLE Mean (bias corrected)	4.223				MLE Sd (bias corrected)		3.436
739										Approximate Chi Square Value (0.05)		23.48
740					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		21.92
741												
742						Assuming Gamma Distribution						
743					95% Approximate Gamma UCL (use when n>=50))	6.523				95% Adjusted Gamma UCL (use when n<50)		6.987
744												
745						Lognormal GOF Test						
746					Shapiro Wilk Test Statistic	0.467				Shapiro Wilk Lognormal GOF Test		
747					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
748					Lilliefors Test Statistic	0.499				Lilliefors Lognormal GOF Test		
749					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
750						Data Not Lognormal at 5% Significance Level						
751												
752						Lognormal Statistics						
753					Minimum of Logged Data	-1.109				Mean of logged Data		1.161
754					Maximum of Logged Data	1.609				SD of logged Data		1.047
755												

	A	B	C	D	E	F	G	H	I	J	K	L
756					Assuming Lognormal Distribution							
757					95% H-UCL	14.24				90% Chebyshev (MVUE) UCL		10.23
758				95% Chebyshev (MVUE) UCL		12.51				97.5% Chebyshev (MVUE) UCL		15.68
759				99% Chebyshev (MVUE) UCL		21.91						
760												
761					Nonparametric Distribution Free UCL Statistics							
762					Data do not follow a Discernible Distribution (0.05)							
763												
764					Nonparametric Distribution Free UCLs							
765					95% CLT UCL	5.085				95% Jackknife UCL		5.164
766				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
767				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
768				95% BCA Bootstrap UCL		N/A						
769				90% Chebyshev(Mean, Sd) UCL		5.794				95% Chebyshev(Mean, Sd) UCL		6.506
770				97.5% Chebyshev(Mean, Sd) UCL		7.493				99% Chebyshev(Mean, Sd) UCL		9.433
771												
772					Suggested UCL to Use							
773				95% Chebyshev (Mean, Sd) UCL		6.506						
774												
775					Recommended UCL exceeds the maximum observation							
776												
777	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
778	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
779	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
780	For additional insight the user may want to consult a statistician.											
781												
782	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
783	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
784												
785												

	A	B	C	D	E	F	G	H	I	J	K	L
786	Uranium											
787												
788					General Statistics							
789					Total Number of Observations	12			Number of Distinct Observations			12
790									Number of Missing Observations			0
791					Minimum	12.6			Mean			26.03
792					Maximum	43.96			Median			24.03
793					SD	8.931			Std. Error of Mean			2.578
794					Coefficient of Variation	0.343			Skewness			0.738
795												
796					Normal GOF Test							
797					Shapiro Wilk Test Statistic	0.948			Shapiro Wilk GOF Test			
798					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
799					Lilliefors Test Statistic	0.144			Lilliefors GOF Test			
800					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
801					Data appear Normal at 5% Significance Level							
802												
803					Assuming Normal Distribution							
804					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
805					95% Student's-t UCL	30.66			95% Adjusted-CLT UCL (Chen-1995)			30.85
806									95% Modified-t UCL (Johnson-1978)			30.75
807												
808					Gamma GOF Test							
809					A-D Test Statistic	0.212			Anderson-Darling Gamma GOF Test			
810					5% A-D Critical Value	0.73			Detected data appear Gamma Distributed at 5% Significance Level			
811					K-S Test Statistic	0.118			Kolmogrov-Smirnoff Gamma GOF Test			
812					5% K-S Critical Value	0.245			Detected data appear Gamma Distributed at 5% Significance Level			
813					Detected data appear Gamma Distributed at 5% Significance Level							
814												
815					Gamma Statistics							
816					k hat (MLE)	9.548			k star (bias corrected MLE)			7.216
817					Theta hat (MLE)	2.726			Theta star (bias corrected MLE)			3.607
818					nu hat (MLE)	229.1			nu star (bias corrected)			173.2
819					MLE Mean (bias corrected)	26.03			MLE Sd (bias corrected)			9.689
820									Approximate Chi Square Value (0.05)			143.8
821					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			139.7
822												
823					Assuming Gamma Distribution							
824					95% Approximate Gamma UCL (use when n>=50))	31.36			95% Adjusted Gamma UCL (use when n<50)			32.27
825												
826					Lognormal GOF Test							
827					Shapiro Wilk Test Statistic	0.978			Shapiro Wilk Lognormal GOF Test			
828					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
829					Lilliefors Test Statistic	0.124			Lilliefors Lognormal GOF Test			
830					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
831					Data appear Lognormal at 5% Significance Level							
832												
833					Lognormal Statistics							
834					Minimum of Logged Data	2.534			Mean of logged Data			3.206
835					Maximum of Logged Data	3.783			SD of logged Data			0.343
836												

	A	B	C	D	E	F	G	H	I	J	K	L
837					Assuming Lognormal Distribution							
838					95% H-UCL	32.08				90% Chebyshev (MVUE) UCL		33.86
839				95% Chebyshev (MVUE) UCL		37.41				97.5% Chebyshev (MVUE) UCL		42.33
840				99% Chebyshev (MVUE) UCL		51.99						
841												
842					Nonparametric Distribution Free UCL Statistics							
843					Data appear to follow a Discernible Distribution at 5% Significance Level							
844												
845					Nonparametric Distribution Free UCLs							
846					95% CLT UCL	30.27				95% Jackknife UCL		30.66
847				95% Standard Bootstrap UCL		30.16				95% Bootstrap-t UCL		31.46
848				95% Hall's Bootstrap UCL		32.29				95% Percentile Bootstrap UCL		30.05
849				95% BCA Bootstrap UCL		30.68						
850				90% Chebyshev(Mean, Sd) UCL		33.76				95% Chebyshev(Mean, Sd) UCL		37.26
851				97.5% Chebyshev(Mean, Sd) UCL		42.13				99% Chebyshev(Mean, Sd) UCL		51.68
852												
853					Suggested UCL to Use							
854				95% Student's-t UCL		30.66						
855												
856					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
857					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
858					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
859					For additional insight the user may want to consult a statistician.							
860												
861												

	A	B	C	D	E	F	G	H	I	J	K	L
862	Uranium-238											
863												
864					General Statistics							
865					Total Number of Observations	12			Number of Distinct Observations			3
866									Number of Missing Observations			0
867					Minimum	0.86			Mean			3.99
868					Maximum	7.12			Median			3.99
869					SD	1.335			Std. Error of Mean			0.385
870					Coefficient of Variation	0.334			Skewness			-1.79E-15
871												
872					Normal GOF Test							
873					Shapiro Wilk Test Statistic	0.6			Shapiro Wilk GOF Test			
874					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
875					Lilliefors Test Statistic	0.417			Lilliefors GOF Test			
876					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
877					Data Not Normal at 5% Significance Level							
878												
879					Assuming Normal Distribution							
880					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
881					95% Student's-t UCL	4.682			95% Adjusted-CLT UCL (Chen-1995)			4.624
882									95% Modified-t UCL (Johnson-1978)			4.682
883												
884					Gamma GOF Test							
885					A-D Test Statistic	2.864			Anderson-Darling Gamma GOF Test			
886					5% A-D Critical Value	0.732			Data Not Gamma Distributed at 5% Significance Level			
887					K-S Test Statistic	0.469			Kolmogrov-Smirnoff Gamma GOF Test			
888					5% K-S Critical Value	0.246			Data Not Gamma Distributed at 5% Significance Level			
889					Data Not Gamma Distributed at 5% Significance Level							
890												
891					Gamma Statistics							
892					k hat (MLE)	6.442			k star (bias corrected MLE)			4.887
893					Theta hat (MLE)	0.619			Theta star (bias corrected MLE)			0.817
894					nu hat (MLE)	154.6			nu star (bias corrected)			117.3
895					MLE Mean (bias corrected)	3.99			MLE Sd (bias corrected)			1.805
896									Approximate Chi Square Value (0.05)			93.28
897					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			90.01
898												
899					Assuming Gamma Distribution							
900					95% Approximate Gamma UCL (use when n>=50))	5.017			95% Adjusted Gamma UCL (use when n<50)			5.199
901												
902					Lognormal GOF Test							
903					Shapiro Wilk Test Statistic	0.512			Shapiro Wilk Lognormal GOF Test			
904					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
905					Lilliefors Test Statistic	0.482			Lilliefors Lognormal GOF Test			
906					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
907					Data Not Lognormal at 5% Significance Level							
908												
909					Lognormal Statistics							
910					Minimum of Logged Data	-0.151			Mean of logged Data			1.304
911					Maximum of Logged Data	1.963			SD of logged Data			0.488
912												

	A	B	C	D	E	F	G	H	I	J	K	L
913					Assuming Lognormal Distribution							
914					95% H-UCL	5.672				90% Chebyshev (MVUE) UCL		5.877
915				95% Chebyshev (MVUE) UCL		6.68				97.5% Chebyshev (MVUE) UCL		7.794
916				99% Chebyshev (MVUE) UCL		9.983						
917												
918					Nonparametric Distribution Free UCL Statistics							
919					Data do not follow a Discernible Distribution (0.05)							
920												
921					Nonparametric Distribution Free UCLs							
922					95% CLT UCL	4.624				95% Jackknife UCL		4.682
923				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
924				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
925				95% BCA Bootstrap UCL		N/A						
926				90% Chebyshev(Mean, Sd) UCL		5.146				95% Chebyshev(Mean, Sd) UCL		5.669
927				97.5% Chebyshev(Mean, Sd) UCL		6.396				99% Chebyshev(Mean, Sd) UCL		7.823
928												
929					Suggested UCL to Use							
930					95% Student's-t UCL	4.682				or 95% Modified-t UCL		4.682
931												
932	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
933	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
934	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
935	For additional insight the user may want to consult a statistician.											
936												
937	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
938	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
939												
940												

	A	B	C	D	E	F	G	H	I	J	K	L
941	Vanadium											
942												
943					General Statistics							
944					Total Number of Observations	12			Number of Distinct Observations			4
945									Number of Missing Observations			0
946					Minimum	31.9			Mean			67.37
947					Maximum	77.92			Median			70
948					SD	11.41			Std. Error of Mean			3.295
949					Coefficient of Variation	0.169			Skewness			-3.175
950												
951					Normal GOF Test							
952					Shapiro Wilk Test Statistic	0.459			Shapiro Wilk GOF Test			
953					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
954					Lilliefors Test Statistic	0.46			Lilliefors GOF Test			
955					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
956					Data Not Normal at 5% Significance Level							
957												
958					Assuming Normal Distribution							
959					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
960					95% Student's-t UCL	73.29			95% Adjusted-CLT UCL (Chen-1995)			69.56
961									95% Modified-t UCL (Johnson-1978)			72.78
962												
963					Gamma GOF Test							
964					A-D Test Statistic	3.35			Anderson-Darling Gamma GOF Test			
965					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
966					K-S Test Statistic	0.48			Kolmogrov-Smirnoff Gamma GOF Test			
967					5% K-S Critical Value	0.245			Data Not Gamma Distributed at 5% Significance Level			
968					Data Not Gamma Distributed at 5% Significance Level							
969												
970					Gamma Statistics							
971					k hat (MLE)	25.26			k star (bias corrected MLE)			19
972					Theta hat (MLE)	2.667			Theta star (bias corrected MLE)			3.545
973					nu hat (MLE)	606.3			nu star (bias corrected)			456.1
974					MLE Mean (bias corrected)	67.37			MLE Sd (bias corrected)			15.45
975									Approximate Chi Square Value (0.05)			407.6
976					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			400.6
977												
978					Assuming Gamma Distribution							
979					95% Approximate Gamma UCL (use when n>=50))	75.39			95% Adjusted Gamma UCL (use when n<50)			76.71
980												
981					Lognormal GOF Test							
982					Shapiro Wilk Test Statistic	0.417			Shapiro Wilk Lognormal GOF Test			
983					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
984					Lilliefors Test Statistic	0.482			Lilliefors Lognormal GOF Test			
985					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
986					Data Not Lognormal at 5% Significance Level							
987												
988					Lognormal Statistics							
989					Minimum of Logged Data	3.463			Mean of logged Data			4.19
990					Maximum of Logged Data	4.356			SD of logged Data			0.231
991												

	A	B	C	D	E	F	G	H	I	J	K	L
992					Assuming Lognormal Distribution							
993					95% H-UCL	77.27				90% Chebyshev (MVUE) UCL		81.31
994				95% Chebyshev (MVUE) UCL		87.49				97.5% Chebyshev (MVUE) UCL		96.06
995				99% Chebyshev (MVUE) UCL		112.9						
996												
997					Nonparametric Distribution Free UCL Statistics							
998					Data do not follow a Discernible Distribution (0.05)							
999												
1000					Nonparametric Distribution Free UCLs							
1001					95% CLT UCL	72.79				95% Jackknife UCL		73.29
1002				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1003				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1004				95% BCA Bootstrap UCL		N/A						
1005				90% Chebyshev(Mean, Sd) UCL		77.26				95% Chebyshev(Mean, Sd) UCL		81.73
1006				97.5% Chebyshev(Mean, Sd) UCL		87.95				99% Chebyshev(Mean, Sd) UCL		100.2
1007												
1008					Suggested UCL to Use							
1009				95% Student's-t UCL		73.29				or 95% Modified-t UCL		72.78
1010												
1011	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1012	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1013	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1014	For additional insight the user may want to consult a statistician.											
1015												
1016	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
1017	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
1018												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 11:22:05 AM								
5	From File			EPC_015Surf_EU01.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		9
15										Number of Missing Observations		0
16					Minimum	30				Mean		59.35
17					Maximum	106				Median		47.07
18					SD	29.97				Std. Error of Mean		8.652
19					Coefficient of Variation	0.505				Skewness		0.463
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.847				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.205				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Approximate Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	74.89				95% Adjusted-CLT UCL (Chen-1995)		74.82
31										95% Modified-t UCL (Johnson-1978)		75.08
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.744				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.735				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.198				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	4.308				k star (bias corrected MLE)		3.287
42					Theta hat (MLE)	13.78				Theta star (bias corrected MLE)		18.06
43					nu hat (MLE)	103.4				nu star (bias corrected)		78.88
44					MLE Mean (bias corrected)	59.35				MLE Sd (bias corrected)		32.74
45										Approximate Chi Square Value (0.05)		59.42
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		56.84
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	78.79				95% Adjusted Gamma UCL (use when n<50)		82.36
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.853				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.195				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
56						Data appear Approximate Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	3.401				Mean of logged Data		3.963
60					Maximum of Logged Data	4.663				SD of logged Data		0.515
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	84.05				90% Chebyshev (MVUE) UCL		86.51
64					95% Chebyshev (MVUE) UCL	98.81				97.5% Chebyshev (MVUE) UCL		115.9
65					99% Chebyshev (MVUE) UCL	149.4						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	73.58				95% Jackknife UCL		74.89
72					95% Standard Bootstrap UCL	72.81				95% Bootstrap-t UCL		77.52
73					95% Hall's Bootstrap UCL	71.79				95% Percentile Bootstrap UCL		72.71
74					95% BCA Bootstrap UCL	74.11						
75					90% Chebyshev(Mean, Sd) UCL	85.31				95% Chebyshev(Mean, Sd) UCL		97.06
76					97.5% Chebyshev(Mean, Sd) UCL	113.4				99% Chebyshev(Mean, Sd) UCL		145.4
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	74.89						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Arsenic											
88												
89						General Statistics						
90					Total Number of Observations	12				Number of Distinct Observations		11
91										Number of Missing Observations		0
92					Minimum	7.35				Mean		10.66
93					Maximum	20.04				Median		10.37
94					SD	3.293				Std. Error of Mean		0.951
95					Coefficient of Variation	0.309				Skewness		2.282
96												
97						Normal GOF Test						
98					Shapiro Wilk Test Statistic	0.752				Shapiro Wilk GOF Test		
99					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
100					Lilliefors Test Statistic	0.292				Lilliefors GOF Test		
101					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
102						Data Not Normal at 5% Significance Level						
103												
104						Assuming Normal Distribution						
105					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
106					95% Student's-t UCL	12.37				95% Adjusted-CLT UCL (Chen-1995)		12.89
107										95% Modified-t UCL (Johnson-1978)		12.47
108												
109						Gamma GOF Test						
110					A-D Test Statistic	0.705				Anderson-Darling Gamma GOF Test		
111					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
112					K-S Test Statistic	0.251				Kolmogrov-Smirnoff Gamma GOF Test		
113					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
114						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
115												
116						Gamma Statistics						
117					k hat (MLE)	14.66				k star (bias corrected MLE)		11.05
118					Theta hat (MLE)	0.727				Theta star (bias corrected MLE)		0.965
119					nu hat (MLE)	351.8				nu star (bias corrected)		265.2
120					MLE Mean (bias corrected)	10.66				MLE Sd (bias corrected)		3.207
121										Approximate Chi Square Value (0.05)		228.5
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		223.3
123												
124						Assuming Gamma Distribution						
125					95% Approximate Gamma UCL (use when n>=50)	12.37				95% Adjusted Gamma UCL (use when n<50)		12.66
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.874				Shapiro Wilk Lognormal GOF Test		
129					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
130					Lilliefors Test Statistic	0.234				Lilliefors Lognormal GOF Test		
131					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
132						Data appear Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	1.995				Mean of logged Data		2.332
136					Maximum of Logged Data	2.998				SD of logged Data		0.261
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138	Assuming Lognormal Distribution											
139					95% H-UCL	12.36				90% Chebyshev (MVUE) UCL		13.04
140					95% Chebyshev (MVUE) UCL	14.13				97.5% Chebyshev (MVUE) UCL		15.65
141					99% Chebyshev (MVUE) UCL	18.64						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	12.23				95% Jackknife UCL		12.37
148					95% Standard Bootstrap UCL	12.2				95% Bootstrap-t UCL		13.63
149					95% Hall's Bootstrap UCL	19.58				95% Percentile Bootstrap UCL		12.24
150					95% BCA Bootstrap UCL	13.01						
151					90% Chebyshev(Mean, Sd) UCL	13.51				95% Chebyshev(Mean, Sd) UCL		14.81
152					97.5% Chebyshev(Mean, Sd) UCL	16.6				99% Chebyshev(Mean, Sd) UCL		20.12
153												
154	Suggested UCL to Use											
155					95% Adjusted Gamma UCL	12.66						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												

	A	B	C	D	E	F	G	H	I	J	K	L
163	Cadmium											
164												
165						General Statistics						
166					Total Number of Observations	12				Number of Distinct Observations		3
167										Number of Missing Observations		0
168					Minimum	0.16				Mean		11.18
169					Maximum	14.01				Median		12
170					SD	3.518				Std. Error of Mean		1.016
171					Coefficient of Variation	0.315				Skewness		-3.282
172												
173						Normal GOF Test						
174					Shapiro Wilk Test Statistic	0.422				Shapiro Wilk GOF Test		
175					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
176					Lilliefors Test Statistic	0.509				Lilliefors GOF Test		
177					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
178						Data Not Normal at 5% Significance Level						
179												
180						Assuming Normal Distribution						
181					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
182					95% Student's-t UCL	13				95% Adjusted-CLT UCL (Chen-1995)		11.82
183										95% Modified-t UCL (Johnson-1978)		12.84
184												
185						Gamma GOF Test						
186					A-D Test Statistic	3.986				Anderson-Darling Gamma GOF Test		
187					5% A-D Critical Value	0.742				Data Not Gamma Distributed at 5% Significance Level		
188					K-S Test Statistic	0.549				Kolmogrov-Smirnoff Gamma GOF Test		
189					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
190						Data Not Gamma Distributed at 5% Significance Level						
191												
192						Gamma Statistics						
193					k hat (MLE)	1.961				k star (bias corrected MLE)		1.526
194					Theta hat (MLE)	5.702				Theta star (bias corrected MLE)		7.326
195					nu hat (MLE)	47.06				nu star (bias corrected)		36.63
196					MLE Mean (bias corrected)	11.18				MLE Sd (bias corrected)		9.051
197										Approximate Chi Square Value (0.05)		23.77
198					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		22.2
199												
200						Assuming Gamma Distribution						
201					95% Approximate Gamma UCL (use when n>=50))	17.23				95% Adjusted Gamma UCL (use when n<50)		18.44
202												
203						Lognormal GOF Test						
204					Shapiro Wilk Test Statistic	0.348				Shapiro Wilk Lognormal GOF Test		
205					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
206					Lilliefors Test Statistic	0.526				Lilliefors Lognormal GOF Test		
207					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
208						Data Not Lognormal at 5% Significance Level						
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-1.833				Mean of logged Data		2.138
212					Maximum of Logged Data	2.64				SD of logged Data		1.251
213												

	A	B	C	D	E	F	G	H	I	J	K	L
214					Assuming Lognormal Distribution							
215					95% H-UCL	66.7			90% Chebyshev (MVUE) UCL			36.54
216				95% Chebyshev (MVUE) UCL		45.49			97.5% Chebyshev (MVUE) UCL			57.92
217				99% Chebyshev (MVUE) UCL		82.32						
218												
219					Nonparametric Distribution Free UCL Statistics							
220					Data do not follow a Discernible Distribution (0.05)							
221												
222					Nonparametric Distribution Free UCLs							
223					95% CLT UCL	12.85			95% Jackknife UCL			13
224				95% Standard Bootstrap UCL		N/A			95% Bootstrap-t UCL			N/A
225				95% Hall's Bootstrap UCL		N/A			95% Percentile Bootstrap UCL			N/A
226				95% BCA Bootstrap UCL		N/A						
227				90% Chebyshev(Mean, Sd) UCL		14.23			95% Chebyshev(Mean, Sd) UCL			15.61
228				97.5% Chebyshev(Mean, Sd) UCL		17.52			99% Chebyshev(Mean, Sd) UCL			21.29
229												
230					Suggested UCL to Use							
231				95% Chebyshev (Mean, Sd) UCL		15.61						
232												
233					Recommended UCL exceeds the maximum observation							
234												
235					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
236					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
237					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
238					For additional insight the user may want to consult a statistician.							
239												
240					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
241					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
242												
243												

	A	B	C	D	E	F	G	H	I	J	K	L
244	Chromium											
245												
246						General Statistics						
247					Total Number of Observations	12				Number of Distinct Observations		5
248										Number of Missing Observations		0
249					Minimum	36.75				Mean		71.47
250					Maximum	85				Median		85
251					SD	20.49				Std. Error of Mean		5.916
252					Coefficient of Variation	0.287				Skewness		-0.973
253												
254						Normal GOF Test						
255					Shapiro Wilk Test Statistic	0.667				Shapiro Wilk GOF Test		
256					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
257					Lilliefors Test Statistic	0.412				Lilliefors GOF Test		
258					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
259						Data Not Normal at 5% Significance Level						
260												
261						Assuming Normal Distribution						
262					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
263					95% Student's-t UCL	82.09				95% Adjusted-CLT UCL (Chen-1995)		79.42
264										95% Modified-t UCL (Johnson-1978)		81.82
265												
266						Gamma GOF Test						
267					A-D Test Statistic	2.014				Anderson-Darling Gamma GOF Test		
268					5% A-D Critical Value	0.73				Data Not Gamma Distributed at 5% Significance Level		
269					K-S Test Statistic	0.42				Kolmogrov-Smirnoff Gamma GOF Test		
270					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
271						Data Not Gamma Distributed at 5% Significance Level						
272												
273						Gamma Statistics						
274					k hat (MLE)	10.67				k star (bias corrected MLE)		8.056
275					Theta hat (MLE)	6.7				Theta star (bias corrected MLE)		8.871
276					nu hat (MLE)	256				nu star (bias corrected)		193.4
277					MLE Mean (bias corrected)	71.47				MLE Sd (bias corrected)		25.18
278										Approximate Chi Square Value (0.05)		162.2
279					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		157.8
280												
281						Assuming Gamma Distribution						
282					95% Approximate Gamma UCL (use when n>=50))	85.2				95% Adjusted Gamma UCL (use when n<50)		87.55
283												
284						Lognormal GOF Test						
285					Shapiro Wilk Test Statistic	0.675				Shapiro Wilk Lognormal GOF Test		
286					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
287					Lilliefors Test Statistic	0.408				Lilliefors Lognormal GOF Test		
288					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
289						Data Not Lognormal at 5% Significance Level						
290												
291						Lognormal Statistics						
292					Minimum of Logged Data	3.604				Mean of logged Data		4.222
293					Maximum of Logged Data	4.443				SD of logged Data		0.341
294												

	A	B	C	D	E	F	G	H	I	J	K	L
295					Assuming Lognormal Distribution							
296					95% H-UCL	88.41				90% Chebyshev (MVUE) UCL		93.33
297					95% Chebyshev (MVUE) UCL	103.1				97.5% Chebyshev (MVUE) UCL		116.6
298					99% Chebyshev (MVUE) UCL	143.1						
299												
300					Nonparametric Distribution Free UCL Statistics							
301					Data do not follow a Discernible Distribution (0.05)							
302												
303					Nonparametric Distribution Free UCLs							
304					95% CLT UCL	81.2				95% Jackknife UCL		82.09
305					95% Standard Bootstrap UCL	80.45				95% Bootstrap-t UCL		80.46
306					95% Hall's Bootstrap UCL	79.18				95% Percentile Bootstrap UCL		80.18
307					95% BCA Bootstrap UCL	79.32						
308					90% Chebyshev(Mean, Sd) UCL	89.22				95% Chebyshev(Mean, Sd) UCL		97.26
309					97.5% Chebyshev(Mean, Sd) UCL	108.4				99% Chebyshev(Mean, Sd) UCL		130.3
310												
311					Suggested UCL to Use							
312					95% Student's-t UCL	82.09				or 95% Modified-t UCL		81.82
313												
314					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
315					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
316					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
317					For additional insight the user may want to consult a statistician.							
318												
319					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
320					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
321												
322												

	A	B	C	D	E	F	G	H	I	J	K	L
323	Iron											
324												
325					General Statistics							
326					Total Number of Observations	12				Number of Distinct Observations		12
327										Number of Missing Observations		0
328					Minimum	17604				Mean		26223
329					Maximum	37400				Median		26235
330					SD	6365				Std. Error of Mean		1837
331					Coefficient of Variation	0.243				Skewness		0.609
332												
333					Normal GOF Test							
334					Shapiro Wilk Test Statistic	0.93				Shapiro Wilk GOF Test		
335					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
336					Lilliefors Test Statistic	0.122				Lilliefors GOF Test		
337					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
338					Data appear Normal at 5% Significance Level							
339												
340					Assuming Normal Distribution							
341					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
342					95% Student's-t UCL	29523				95% Adjusted-CLT UCL (Chen-1995)		29590
343										95% Modified-t UCL (Johnson-1978)		29577
344												
345					Gamma GOF Test							
346					A-D Test Statistic	0.267				Anderson-Darling Gamma GOF Test		
347					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
348					K-S Test Statistic	0.127				Kolmogrov-Smirnoff Gamma GOF Test		
349					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
350					Detected data appear Gamma Distributed at 5% Significance Level							
351												
352					Gamma Statistics							
353					k hat (MLE)	19.18				k star (bias corrected MLE)		14.44
354					Theta hat (MLE)	1367				Theta star (bias corrected MLE)		1816
355					nu hat (MLE)	460.4				nu star (bias corrected)		346.7
356					MLE Mean (bias corrected)	26223				MLE Sd (bias corrected)		6900
357										Approximate Chi Square Value (0.05)		304.5
358					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		298.5
359												
360					Assuming Gamma Distribution							
361					95% Approximate Gamma UCL (use when n>=50))	29852				95% Adjusted Gamma UCL (use when n<50)		30455
362												
363					Lognormal GOF Test							
364					Shapiro Wilk Test Statistic	0.958				Shapiro Wilk Lognormal GOF Test		
365					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
366					Lilliefors Test Statistic	0.115				Lilliefors Lognormal GOF Test		
367					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
368					Data appear Lognormal at 5% Significance Level							
369												
370					Lognormal Statistics							
371					Minimum of Logged Data	9.776				Mean of logged Data		10.15
372					Maximum of Logged Data	10.53				SD of logged Data		0.238
373												

	A	B	C	D	E	F	G	H	I	J	K	L
374	**Assuming Lognormal Distribution**											
375					95% H-UCL	30068			90% Chebyshev (MVUE) UCL			31661
376					95% Chebyshev (MVUE) UCL	34128			97.5% Chebyshev (MVUE) UCL			37551
377					99% Chebyshev (MVUE) UCL	44277						
378												
379	**Nonparametric Distribution Free UCL Statistics**											
380	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
381												
382	**Nonparametric Distribution Free UCLs**											
383					95% CLT UCL	29245			95% Jackknife UCL			29523
384					95% Standard Bootstrap UCL	29062			95% Bootstrap-t UCL			30305
385					95% Hall's Bootstrap UCL	30512			95% Percentile Bootstrap UCL			29096
386					95% BCA Bootstrap UCL	29208						
387					90% Chebyshev(Mean, Sd) UCL	31735			95% Chebyshev(Mean, Sd) UCL			34232
388					97.5% Chebyshev(Mean, Sd) UCL	37698			99% Chebyshev(Mean, Sd) UCL			44506
389												
390	**Suggested UCL to Use**											
391					95% Student's-t UCL	29523						
392												
393	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
394	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
395	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
396	For additional insight the user may want to consult a statistician.											
397												
398												

	A	B	C	D	E	F	G	H	I	J	K	L
399	Nickel											
400												
401					General Statistics							
402					Total Number of Observations	12				Number of Distinct Observations		9
403										Number of Missing Observations		0
404					Minimum	61.44				Mean		102.1
405					Maximum	260.5				Median		83.77
406					SD	57.29				Std. Error of Mean		16.54
407					Coefficient of Variation	0.561				Skewness		2.217
408												
409					Normal GOF Test							
410					Shapiro Wilk Test Statistic	0.719				Shapiro Wilk GOF Test		
411					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
412					Lilliefors Test Statistic	0.254				Lilliefors GOF Test		
413					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
414					Data appear Approximate Normal at 5% Significance Level							
415												
416					Assuming Normal Distribution							
417					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
418					95% Student's-t UCL	131.8				95% Adjusted-CLT UCL (Chen-1995)		140.6
419										95% Modified-t UCL (Johnson-1978)		133.6
420												
421					Gamma GOF Test							
422					A-D Test Statistic	0.882				Anderson-Darling Gamma GOF Test		
423					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
424					K-S Test Statistic	0.222				Kolmogrov-Smirnoff Gamma GOF Test		
425					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
426					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
427												
428					Gamma Statistics							
429					k hat (MLE)	5.017				k star (bias corrected MLE)		3.819
430					Theta hat (MLE)	20.36				Theta star (bias corrected MLE)		26.75
431					nu hat (MLE)	120.4				nu star (bias corrected)		91.64
432					MLE Mean (bias corrected)	102.1				MLE Sd (bias corrected)		52.27
433										Approximate Chi Square Value (0.05)		70.57
434					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		67.75
435												
436					Assuming Gamma Distribution							
437					95% Approximate Gamma UCL (use when n>=50))	132.6				95% Adjusted Gamma UCL (use when n<50)		138.2
438												
439					Lognormal GOF Test							
440					Shapiro Wilk Test Statistic	0.844				Shapiro Wilk Lognormal GOF Test		
441					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
442					Lilliefors Test Statistic	0.203				Lilliefors Lognormal GOF Test		
443					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
444					Data appear Approximate Lognormal at 5% Significance Level							
445												
446					Lognormal Statistics							
447					Minimum of Logged Data	4.118				Mean of logged Data		4.523
448					Maximum of Logged Data	5.563				SD of logged Data		0.439
449												

	A	B	C	D	E	F	G	H	I	J	K	L
450					Assuming Lognormal Distribution							
451					95% H-UCL	133.4				90% Chebyshev (MVUE) UCL		139.6
452					95% Chebyshev (MVUE) UCL	157.2				97.5% Chebyshev (MVUE) UCL		181.7
453					99% Chebyshev (MVUE) UCL	229.8						
454												
455					Nonparametric Distribution Free UCL Statistics							
456					Data appear to follow a Discernible Distribution at 5% Significance Level							
457												
458					Nonparametric Distribution Free UCLs							
459					95% CLT UCL	129.3				95% Jackknife UCL		131.8
460					95% Standard Bootstrap UCL	126.8				95% Bootstrap-t UCL		163.7
461					95% Hall's Bootstrap UCL	243.8				95% Percentile Bootstrap UCL		131.3
462					95% BCA Bootstrap UCL	142.2						
463					90% Chebyshev(Mean, Sd) UCL	151.7				95% Chebyshev(Mean, Sd) UCL		174.2
464					97.5% Chebyshev(Mean, Sd) UCL	205.4				99% Chebyshev(Mean, Sd) UCL		266.7
465												
466					Suggested UCL to Use							
467					95% Student's-t UCL	131.8						
468												
469					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
470					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
471					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
472					For additional insight the user may want to consult a statistician.							
473												
474												
475	PAH, Total											
476												
477					General Statistics							
478					Total Number of Observations	12				Number of Distinct Observations		1
479										Number of Missing Observations		0
480					Minimum	1.488				Mean		1.488
481					Maximum	1.488				Median		1.488
482												
483					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
484					ProUCL (or any other software) should not be used on such a data set!							
485					The data set for variable PAH, Total was not processed!							
486												
487					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
488					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
489												
490												
491												

	A	B	C	D	E	F	G	H	I	J	K	L
492	Thallium											
493												
494					General Statistics							
495					Total Number of Observations	12			Number of Distinct Observations			1
496									Number of Missing Observations			0
497					Minimum	0.24			Mean			0.24
498					Maximum	0.24			Median			0.24
499												
500					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
501					ProUCL (or any other software) should not be used on such a data set!							
502					The data set for variable Thallium was not processed!							
503												
504					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
505					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
506												
507												
508												

	A	B	C	D	E	F	G	H	I	J	K	L
509	Uranium											
510												
511					General Statistics							
512					Total Number of Observations	12				Number of Distinct Observations		9
513										Number of Missing Observations		0
514					Minimum	6.9				Mean		22.33
515					Maximum	45.33				Median		20
516					SD	12.97				Std. Error of Mean		3.743
517					Coefficient of Variation	0.581				Skewness		0.846
518												
519					Normal GOF Test							
520					Shapiro Wilk Test Statistic	0.852				Shapiro Wilk GOF Test		
521					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
522					Lilliefors Test Statistic	0.321				Lilliefors GOF Test		
523					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
524					Data Not Normal at 5% Significance Level							
525												
526					Assuming Normal Distribution							
527					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
528					95% Student's-t UCL	29.05				95% Adjusted-CLT UCL (Chen-1995)		29.47
529										95% Modified-t UCL (Johnson-1978)		29.21
530												
531					Gamma GOF Test							
532					A-D Test Statistic	0.551				Anderson-Darling Gamma GOF Test		
533					5% A-D Critical Value	0.738				Detected data appear Gamma Distributed at 5% Significance Level		
534					K-S Test Statistic	0.255				Kolmogrov-Smirnoff Gamma GOF Test		
535					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
536					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
537												
538					Gamma Statistics							
539					k hat (MLE)	3.315				k star (bias corrected MLE)		2.542
540					Theta hat (MLE)	6.736				Theta star (bias corrected MLE)		8.785
541					nu hat (MLE)	79.57				nu star (bias corrected)		61.01
542					MLE Mean (bias corrected)	22.33				MLE Sd (bias corrected)		14.01
543										Approximate Chi Square Value (0.05)		44.05
544					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		41.86
545												
546					Assuming Gamma Distribution							
547					95% Approximate Gamma UCL (use when n>=50)	30.93				95% Adjusted Gamma UCL (use when n<50)		32.55
548												
549					Lognormal GOF Test							
550					Shapiro Wilk Test Statistic	0.918				Shapiro Wilk Lognormal GOF Test		
551					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
552					Lilliefors Test Statistic	0.218				Lilliefors Lognormal GOF Test		
553					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
554					Data appear Lognormal at 5% Significance Level							
555												
556					Lognormal Statistics							
557					Minimum of Logged Data	1.932				Mean of logged Data		2.948
558					Maximum of Logged Data	3.814				SD of logged Data		0.601
559												

	A	B	C	D	E	F	G	H	I	J	K	L
560					Assuming Lognormal Distribution							
561					95% H-UCL	34.48				90% Chebyshev (MVUE) UCL		34.52
562					95% Chebyshev (MVUE) UCL	39.98				97.5% Chebyshev (MVUE) UCL		47.57
563					99% Chebyshev (MVUE) UCL	62.48						
564												
565					Nonparametric Distribution Free UCL Statistics							
566					Data appear to follow a Discernible Distribution at 5% Significance Level							
567												
568					Nonparametric Distribution Free UCLs							
569					95% CLT UCL	28.49				95% Jackknife UCL		29.05
570					95% Standard Bootstrap UCL	28.34				95% Bootstrap-t UCL		30.84
571					95% Hall's Bootstrap UCL	28.6				95% Percentile Bootstrap UCL		28.12
572					95% BCA Bootstrap UCL	29.29						
573					90% Chebyshev(Mean, Sd) UCL	33.56				95% Chebyshev(Mean, Sd) UCL		38.65
574					97.5% Chebyshev(Mean, Sd) UCL	45.71				99% Chebyshev(Mean, Sd) UCL		59.57
575												
576					Suggested UCL to Use							
577					95% Adjusted Gamma UCL	32.55						
578												
579					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
580					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
581					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
582					For additional insight the user may want to consult a statistician.							
583												
584												
585	Uranium-238											
586												
587					General Statistics							
588					Total Number of Observations	12				Number of Distinct Observations		1
589										Number of Missing Observations		0
590					Minimum	1.85				Mean		1.85
591					Maximum	1.85				Median		1.85
592												
593					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
594					ProUCL (or any other software) should not be used on such a data set!							
595					The data set for variable Uranium-238 was not processed!							
596												
597					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
598					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
599												
600												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/3/2015 7:31:46 AM								
5	From File			EPC_015SurfEU3.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Antimony**											
12												
13	**General Statistics**											
14	Total Number of Observations					12	Number of Distinct Observations					8
15							Number of Missing Observations					0
16	Minimum					30	Mean					56.04
17	Maximum					112.2	Median					46.72
18	SD					28.82	Std. Error of Mean					8.318
19	Coefficient of Variation					0.514	Skewness					0.719
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.846	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.234	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.256	Data appear Normal at 5% Significance Level					
26	**Data appear Approximate Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					70.98	95% Adjusted-CLT UCL (Chen-1995)					71.57
31							95% Modified-t UCL (Johnson-1978)					71.26
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.837	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.734	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.261	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.246	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					4.355	k star (bias corrected MLE)					3.322
42	Theta hat (MLE)					12.87	Theta star (bias corrected MLE)					16.87
43	nu hat (MLE)					104.5	nu star (bias corrected)					79.73
44	MLE Mean (bias corrected)					56.04	MLE Sd (bias corrected)					30.75
45							Approximate Chi Square Value (0.05)					60.16
46	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					57.57
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					74.27	95% Adjusted Gamma UCL (use when n<50)					77.61
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.842	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.257	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	3.401	Mean of logged Data					3.907
60					Maximum of Logged Data	4.72	SD of logged Data					0.508
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	78.64	90% Chebyshev (MVUE) UCL					81.1
64					95% Chebyshev (MVUE) UCL	92.51	97.5% Chebyshev (MVUE) UCL					108.3
65					99% Chebyshev (MVUE) UCL	139.4						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	69.72	95% Jackknife UCL					70.98
72					95% Standard Bootstrap UCL	69.02	95% Bootstrap-t UCL					73.67
73					95% Hall's Bootstrap UCL	70.49	95% Percentile Bootstrap UCL					69.09
74					95% BCA Bootstrap UCL	71						
75					90% Chebyshev(Mean, Sd) UCL	80.99	95% Chebyshev(Mean, Sd) UCL					92.3
76					97.5% Chebyshev(Mean, Sd) UCL	108	99% Chebyshev(Mean, Sd) UCL					138.8
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	70.98						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Arsenic**											
88												
89	**General Statistics**											
90					Total Number of Observations	12	Number of Distinct Observations					10
91							Number of Missing Observations					0
92					Minimum	8.47	Mean					18.62
93					Maximum	62.55	Median					14.45
94					SD	14.57	Std. Error of Mean					4.207
95					Coefficient of Variation	0.783	Skewness					2.877
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.617	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.33	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	26.18				95% Adjusted-CLT UCL (Chen-1995)		29.28
107										95% Modified-t UCL (Johnson-1978)		26.76
108												
109	Gamma GOF Test											
110					A-D Test Statistic	0.931	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.738	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.234	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.247	Detected data appear Gamma Distributed at 5% Significance Level					
114	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	3.175				k star (bias corrected MLE)		2.437
118					Theta hat (MLE)	5.865				Theta star (bias corrected MLE)		7.641
119					nu hat (MLE)	76.21				nu star (bias corrected)		58.49
120					MLE Mean (bias corrected)	18.62				MLE Sd (bias corrected)		11.93
121										Approximate Chi Square Value (0.05)		41.91
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		39.77
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50)	25.99				95% Adjusted Gamma UCL (use when n<50)		27.39
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.858	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.19	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
132	Data appear Approximate Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	2.137				Mean of logged Data		2.759
136					Maximum of Logged Data	4.136				SD of logged Data		0.536
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	25.95				90% Chebyshev (MVUE) UCL		26.55
140					95% Chebyshev (MVUE) UCL	30.44				97.5% Chebyshev (MVUE) UCL		35.83
141					99% Chebyshev (MVUE) UCL	46.41						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	25.54				95% Jackknife UCL		26.18
148					95% Standard Bootstrap UCL	25.09				95% Bootstrap-t UCL		37.21
149					95% Hall's Bootstrap UCL	51.62				95% Percentile Bootstrap UCL		26.57
150					95% BCA Bootstrap UCL	30.99						
151					90% Chebyshev(Mean, Sd) UCL	31.25				95% Chebyshev(Mean, Sd) UCL		36.96
152					97.5% Chebyshev(Mean, Sd) UCL	44.9				99% Chebyshev(Mean, Sd) UCL		60.49
153												
154	Suggested UCL to Use											
155					95% Adjusted Gamma UCL	27.39						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Cadmium**											
164												
165	**General Statistics**											
166	Total Number of Observations					12	Number of Distinct Observations				3	
167							Number of Missing Observations				0	
168	Minimum					11.9	Mean				12.18	
169	Maximum					14.2	Median				12	
170	SD					0.638	Std. Error of Mean				0.184	
171	Coefficient of Variation					0.0524	Skewness				3.451	
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.354	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.525	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					12.51	95% Adjusted-CLT UCL (Chen-1995)				12.67	
183							95% Modified-t UCL (Johnson-1978)				12.54	
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					3.864	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.529	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.245	Data Not Gamma Distributed at 5% Significance Level					
190	**Data Not Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					435.9	k star (bias corrected MLE)				327	
194	Theta hat (MLE)					0.0279	Theta star (bias corrected MLE)				0.0372	
195	nu hat (MLE)					10462	nu star (bias corrected)				7848	
196	MLE Mean (bias corrected)					12.18	MLE Sd (bias corrected)				0.673	
197							Approximate Chi Square Value (0.05)				7643	
198	Adjusted Level of Significance					0.029	Adjusted Chi Square Value				7612	
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					12.5	95% Adjusted Gamma UCL (use when n<50)				12.55	
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.356	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.859	Data Not Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.524	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.256	Data Not Lognormal at 5% Significance Level					
208	**Data Not Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	2.477				Mean of logged Data		2.498
212					Maximum of Logged Data	2.653				SD of logged Data		0.0489
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		12.69
216					95% Chebyshev (MVUE) UCL	12.92				97.5% Chebyshev (MVUE) UCL		13.25
217					99% Chebyshev (MVUE) UCL	13.88						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data do not follow a Discernible Distribution (0.05)						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	12.48				95% Jackknife UCL		12.51
224					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
225					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
226					95% BCA Bootstrap UCL	N/A						
227					90% Chebyshev(Mean, Sd) UCL	12.73				95% Chebyshev(Mean, Sd) UCL		12.98
228					97.5% Chebyshev(Mean, Sd) UCL	13.33				99% Chebyshev(Mean, Sd) UCL		14.01
229												
230						Suggested UCL to Use						
231					95% Student's-t UCL	12.51				or 95% Modified-t UCL		12.54
232												
233					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
234					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
235					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
236					For additional insight the user may want to consult a statistician.							
237												
238												
239	Chromium											
240												
241						General Statistics						
242					Total Number of Observations	12				Number of Distinct Observations		10
243										Number of Missing Observations		0
244					Minimum	35.36				Mean		62.81
245					Maximum	112				Median		57.59
246					SD	24.18				Std. Error of Mean		6.98
247					Coefficient of Variation	0.385				Skewness		0.705
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.91				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.163				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
254						Data appear Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	75.34				95% Adjusted-CLT UCL (Chen-1995)		75.8
259										95% Modified-t UCL (Johnson-1978)		75.58
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Gamma GOF Test**											
262					A-D Test Statistic	0.372	**Anderson-Darling Gamma GOF Test**					
263					5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.175	**Kolmogrov-Smirnoff Gamma GOF Test**					
265					5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level					
266	**Detected data appear Gamma Distributed at 5% Significance Level**											
267												
268	**Gamma Statistics**											
269					k hat (MLE)	7.701	k star (bias corrected MLE)					5.831
270					Theta hat (MLE)	8.156	Theta star (bias corrected MLE)					10.77
271					nu hat (MLE)	184.8	nu star (bias corrected)					139.9
272					MLE Mean (bias corrected)	62.81	MLE Sd (bias corrected)					26.01
273							Approximate Chi Square Value (0.05)					113.6
274					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					110
275												
276	**Assuming Gamma Distribution**											
277				95% Approximate Gamma UCL (use when n>=50))		77.36	95% Adjusted Gamma UCL (use when n<50)					79.91
278												
279	**Lognormal GOF Test**											
280					Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk Lognormal GOF Test**					
281					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.168	**Lilliefors Lognormal GOF Test**					
283					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
284	**Data appear Lognormal at 5% Significance Level**											
285												
286	**Lognormal Statistics**											
287					Minimum of Logged Data	3.566	Mean of logged Data					4.074
288					Maximum of Logged Data	4.718	SD of logged Data					0.38
289												
290	**Assuming Lognormal Distribution**											
291					95% H-UCL	79.45	90% Chebyshev (MVUE) UCL					83.69
292					95% Chebyshev (MVUE) UCL	93.17	97.5% Chebyshev (MVUE) UCL					106.3
293					99% Chebyshev (MVUE) UCL	132.2						
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
297												
298	**Nonparametric Distribution Free UCLs**											
299					95% CLT UCL	74.29	95% Jackknife UCL					75.34
300					95% Standard Bootstrap UCL	73.65	95% Bootstrap-t UCL					77.56
301					95% Hall's Bootstrap UCL	75.61	95% Percentile Bootstrap UCL					74.39
302					95% BCA Bootstrap UCL	75.48						
303					90% Chebyshev(Mean, Sd) UCL	83.74	95% Chebyshev(Mean, Sd) UCL					93.23
304					97.5% Chebyshev(Mean, Sd) UCL	106.4	99% Chebyshev(Mean, Sd) UCL					132.3
305												
306	**Suggested UCL to Use**											
307					95% Student's-t UCL	75.34						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314												
315	**Cobalt**											
316												
317						**General Statistics**						
318					Total Number of Observations	12				Number of Distinct Observations		1
319										Number of Missing Observations		0
320					Minimum	34.1				Mean		34.1
321					Maximum	34.1				Median		34.1
322												
323						**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**						
324						**ProUCL (or any other software) should not be used on such a data set!**						
325						**The data set for variable Cobalt was not processed!**						
326												
327						**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**						
328						**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**						
329												
330												
331												
332	**Copper**											
333												
334						**General Statistics**						
335					Total Number of Observations	12				Number of Distinct Observations		12
336										Number of Missing Observations		0
337					Minimum	22.56				Mean		600.5
338					Maximum	4360				Median		288.2
339					SD	1201				Std. Error of Mean		346.6
340					Coefficient of Variation	1.999				Skewness		3.294
341												
342						**Normal GOF Test**						
343					Shapiro Wilk Test Statistic	0.477				**Shapiro Wilk GOF Test**		
344					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
345					Lilliefors Test Statistic	0.437				**Lilliefors GOF Test**		
346					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
347						**Data Not Normal at 5% Significance Level**						
348												
349						**Assuming Normal Distribution**						
350					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
351					95% Student's-t UCL	1223				95% Adjusted-CLT UCL (Chen-1995)		1523
352										95% Modified-t UCL (Johnson-1978)		1278
353												
354						**Gamma GOF Test**						
355					A-D Test Statistic	0.738				**Anderson-Darling Gamma GOF Test**		
356					5% A-D Critical Value	0.779				Detected data appear Gamma Distributed at 5% Significance Level		
357					K-S Test Statistic	0.273				**Kolmogrov-Smirnoff Gamma GOF Test**		
358					5% K-S Critical Value	0.257				Data Not Gamma Distributed at 5% Significance Level		
359						**Detected data follow Appr. Gamma Distribution at 5% Significance Level**						
360												
361						**Gamma Statistics**						
362					k hat (MLE)	0.576				k star (bias corrected MLE)		0.488
363					Theta hat (MLE)	1042				Theta star (bias corrected MLE)		1231
364					nu hat (MLE)	13.83				nu star (bias corrected)		11.71

365					MLE Mean (bias corrected)	600.5					MLE Sd (bias corrected)	859.8
366											Approximate Chi Square Value (0.05)	5.035
367					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	4.386
368												
369					**Assuming Gamma Distribution**							
370				95% Approximate Gamma UCL (use when n>=50)		1396					95% Adjusted Gamma UCL (use when n<50)	1603
371												
372					**Lognormal GOF Test**							
373					Shapiro Wilk Test Statistic	0.933			**Shapiro Wilk Lognormal GOF Test**			
374					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
375					Lilliefors Test Statistic	0.178			**Lilliefors Lognormal GOF Test**			
376					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
377					**Data appear Lognormal at 5% Significance Level**							
378												
379					**Lognormal Statistics**							
380					Minimum of Logged Data	3.116					Mean of logged Data	5.319
381					Maximum of Logged Data	8.38					SD of logged Data	1.523
382												
383					**Assuming Lognormal Distribution**							
384					95% H-UCL	3981					90% Chebyshev (MVUE) UCL	1343
385					95% Chebyshev (MVUE) UCL	1702					97.5% Chebyshev (MVUE) UCL	2201
386					99% Chebyshev (MVUE) UCL	3181						
387												
388					**Nonparametric Distribution Free UCL Statistics**							
389					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
390												
391					**Nonparametric Distribution Free UCLs**							
392					95% CLT UCL	1171					95% Jackknife UCL	1223
393					95% Standard Bootstrap UCL	1131					95% Bootstrap-t UCL	3190
394					95% Hall's Bootstrap UCL	3549					95% Percentile Bootstrap UCL	1251
395					95% BCA Bootstrap UCL	1354						
396					90% Chebyshev(Mean, Sd) UCL	1640					95% Chebyshev(Mean, Sd) UCL	2111
397					97.5% Chebyshev(Mean, Sd) UCL	2765					99% Chebyshev(Mean, Sd) UCL	4049
398												
399					**Suggested UCL to Use**							
400					95% Adjusted Gamma UCL	1603						
401												
402					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
403					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
404					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
405					For additional insight the user may want to consult a statistician.							
406												
407												
408	**Iron**											
409												
410					**General Statistics**							
411					Total Number of Observations	12					Number of Distinct Observations	12
412											Number of Missing Observations	0
413					Minimum	12087					Mean	37616
414					Maximum	171000					Median	23378
415					SD	43226					Std. Error of Mean	12478
416					Coefficient of Variation	1.149					Skewness	3.138

	A	B	C	D	E	F	G	H	I	J	K	L
417												
418						Normal GOF Test						
419					Shapiro Wilk Test Statistic	0.532	Shapiro Wilk GOF Test					
420					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
421					Lilliefors Test Statistic	0.339	Lilliefors GOF Test					
422					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
423						Data Not Normal at 5% Significance Level						
424												
425						Assuming Normal Distribution						
426					95% Normal UCL		95% UCLs (Adjusted for Skewness)					
427					95% Student's-t UCL	60026	95% Adjusted-CLT UCL (Chen-1995)					70219
428							95% Modified-t UCL (Johnson-1978)					61910
429												
430						Gamma GOF Test						
431					A-D Test Statistic	1.338	Anderson-Darling Gamma GOF Test					
432					5% A-D Critical Value	0.743	Data Not Gamma Distributed at 5% Significance Level					
433					K-S Test Statistic	0.302	Kolmogrov-Smirnoff Gamma GOF Test					
434					5% K-S Critical Value	0.249	Data Not Gamma Distributed at 5% Significance Level					
435						Data Not Gamma Distributed at 5% Significance Level						
436												
437						Gamma Statistics						
438					k hat (MLE)	1.829	k star (bias corrected MLE)					1.428
439					Theta hat (MLE)	20563	Theta star (bias corrected MLE)					26351
440					nu hat (MLE)	43.9	nu star (bias corrected)					34.26
441					MLE Mean (bias corrected)	37616	MLE Sd (bias corrected)					31483
442							Approximate Chi Square Value (0.05)					21.87
443					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					20.37
444												
445						Assuming Gamma Distribution						
446					95% Approximate Gamma UCL (use when n>=50))	58920	95% Adjusted Gamma UCL (use when n<50)					63258
447												
448						Lognormal GOF Test						
449					Shapiro Wilk Test Statistic	0.83	Shapiro Wilk Lognormal GOF Test					
450					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
451					Lilliefors Test Statistic	0.25	Lilliefors Lognormal GOF Test					
452					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
453						Data appear Approximate Lognormal at 5% Significance Level						
454												
455						Lognormal Statistics						
456					Minimum of Logged Data	9.4	Mean of logged Data					10.24
457					Maximum of Logged Data	12.05	SD of logged Data					0.684
458												
459						Assuming Lognormal Distribution						
460					95% H-UCL	57798	90% Chebyshev (MVUE) UCL					55767
461					95% Chebyshev (MVUE) UCL	65400	97.5% Chebyshev (MVUE) UCL					78770
462					99% Chebyshev (MVUE) UCL	105033						
463												
464						Nonparametric Distribution Free UCL Statistics						
465						Data appear to follow a Discernible Distribution at 5% Significance Level						
466												
467						Nonparametric Distribution Free UCLs						
468					95% CLT UCL	58141	95% Jackknife UCL					60026

469				95% Standard Bootstrap UCL		57129				95% Bootstrap-t UCL		119117
470				95% Hall's Bootstrap UCL		127754				95% Percentile Bootstrap UCL		62129
471				95% BCA Bootstrap UCL		73542						
472				90% Chebyshev(Mean, Sd) UCL		75051				95% Chebyshev(Mean, Sd) UCL		92008
473				97.5% Chebyshev(Mean, Sd) UCL		115543				99% Chebyshev(Mean, Sd) UCL		161773
474												
475						**Suggested UCL to Use**						
476				95% Chebyshev (Mean, Sd) UCL		92008						
477												
478				Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.								
479				These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)								
480				and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.								
481				For additional insight the user may want to consult a statistician.								
482												
483												
484	**Manganese**											
485												
486						**General Statistics**						
487				Total Number of Observations		12				Number of Distinct Observations		12
488										Number of Missing Observations		0
489				Minimum		304.1				Mean		728
490				Maximum		2850				Median		455.7
491				SD		695.9				Std. Error of Mean		200.9
492				Coefficient of Variation		0.956				Skewness		3.014
493												
494						**Normal GOF Test**						
495				Shapiro Wilk Test Statistic		0.57				**Shapiro Wilk GOF Test**		
496				5% Shapiro Wilk Critical Value		0.859				Data Not Normal at 5% Significance Level		
497				Lilliefors Test Statistic		0.336				**Lilliefors GOF Test**		
498				5% Lilliefors Critical Value		0.256				Data Not Normal at 5% Significance Level		
499						**Data Not Normal at 5% Significance Level**						
500												
501						**Assuming Normal Distribution**						
502				**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**		
503				95% Student's-t UCL		1089				95% Adjusted-CLT UCL (Chen-1995)		1245
504										95% Modified-t UCL (Johnson-1978)		1118
505												
506						**Gamma GOF Test**						
507				A-D Test Statistic		1.191				**Anderson-Darling Gamma GOF Test**		
508				5% A-D Critical Value		0.741				Data Not Gamma Distributed at 5% Significance Level		
509				K-S Test Statistic		0.252				**Kolmogrov-Smirnoff Gamma GOF Test**		
510				5% K-S Critical Value		0.248				Data Not Gamma Distributed at 5% Significance Level		
511						**Data Not Gamma Distributed at 5% Significance Level**						
512												
513						**Gamma Statistics**						
514				k hat (MLE)		2.394				k star (bias corrected MLE)		1.851
515				Theta hat (MLE)		304.1				Theta star (bias corrected MLE)		393.3
516				nu hat (MLE)		57.45				nu star (bias corrected)		44.42
517				MLE Mean (bias corrected)		728				MLE Sd (bias corrected)		535.1
518										Approximate Chi Square Value (0.05)		30.13
519				Adjusted Level of Significance		0.029				Adjusted Chi Square Value		28.35
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521	**Assuming Gamma Distribution**											
522	95% Approximate Gamma UCL (use when n>=50))					1073	95% Adjusted Gamma UCL (use when n<50)					1141
523												
524	**Lognormal GOF Test**											
525	Shapiro Wilk Test Statistic					0.827	**Shapiro Wilk Lognormal GOF Test**					
526	5% Shapiro Wilk Critical Value					0.859	Data Not Lognormal at 5% Significance Level					
527	Lilliefors Test Statistic					0.236	**Lilliefors Lognormal GOF Test**					
528	5% Lilliefors Critical Value					0.256	Data appear Lognormal at 5% Significance Level					
529	**Data appear Approximate Lognormal at 5% Significance Level**											
530												
531	**Lognormal Statistics**											
532	Minimum of Logged Data					5.717	Mean of logged Data					6.367
533	Maximum of Logged Data					7.955	SD of logged Data					0.604
534												
535	**Assuming Lognormal Distribution**											
536	95% H-UCL					1057	90% Chebyshev (MVUE) UCL					1058
537	95% Chebyshev (MVUE) UCL					1226	97.5% Chebyshev (MVUE) UCL					1459
538	99% Chebyshev (MVUE) UCL					1917						
539												
540	**Nonparametric Distribution Free UCL Statistics**											
541	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
542												
543	**Nonparametric Distribution Free UCLs**											
544	95% CLT UCL					1058	95% Jackknife UCL					1089
545	95% Standard Bootstrap UCL					1049	95% Bootstrap-t UCL					1911
546	95% Hall's Bootstrap UCL					2350	95% Percentile Bootstrap UCL					1085
547	95% BCA Bootstrap UCL					1290						
548	90% Chebyshev(Mean, Sd) UCL					1331	95% Chebyshev(Mean, Sd) UCL					1604
549	97.5% Chebyshev(Mean, Sd) UCL					1983	99% Chebyshev(Mean, Sd) UCL					2727
550												
551	**Suggested UCL to Use**											
552	95% Chebyshev (Mean, Sd) UCL					1604						
553												
554	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
555	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
556	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
557	For additional insight the user may want to consult a statistician.											
558												
559												
560	**Mercury**											
561												
562	**General Statistics**											
563	Total Number of Observations					12	Number of Distinct Observations					2
564							Number of Missing Observations					0
565	Minimum					2.74	Mean					9.395
566	Maximum					10	Median					10
567	SD					2.096	Std. Error of Mean					0.605
568	Coefficient of Variation					0.223	Skewness					-3.464
569												
570	**Normal GOF Test**											
571	Shapiro Wilk Test Statistic					0.327	**Shapiro Wilk GOF Test**					
572	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
573					Lilliefors Test Statistic	0.53	**Lilliefors GOF Test**					
574					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
575	**Data Not Normal at 5% Significance Level**											
576												
577	**Assuming Normal Distribution**											
578	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
579					95% Student's-t UCL	10.48	95% Adjusted-CLT UCL (Chen-1995)					9.744
580							95% Modified-t UCL (Johnson-1978)					10.38
581												
582	**Gamma GOF Test**											
583					A-D Test Statistic	4.107	**Anderson-Darling Gamma GOF Test**					
584					5% A-D Critical Value	0.73	Data Not Gamma Distributed at 5% Significance Level					
585					K-S Test Statistic	0.538	**Kolmogrov-Smirnoff Gamma GOF Test**					
586					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
587	**Data Not Gamma Distributed at 5% Significance Level**											
588												
589	**Gamma Statistics**											
590					k hat (MLE)	11.16	k star (bias corrected MLE)					8.424
591					Theta hat (MLE)	0.842	Theta star (bias corrected MLE)					1.115
592					nu hat (MLE)	267.8	nu star (bias corrected)					202.2
593					MLE Mean (bias corrected)	9.395	MLE Sd (bias corrected)					3.237
594							Approximate Chi Square Value (0.05)					170.3
595					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					165.8
596												
597	**Assuming Gamma Distribution**											
598					95% Approximate Gamma UCL (use when n>=50))	11.16	95% Adjusted Gamma UCL (use when n<50)					11.46
599												
600	**Lognormal GOF Test**											
601					Shapiro Wilk Test Statistic	0.327	**Shapiro Wilk Lognormal GOF Test**					
602					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
603					Lilliefors Test Statistic	0.53	**Lilliefors Lognormal GOF Test**					
604					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
605	**Data Not Lognormal at 5% Significance Level**											
606												
607	**Lognormal Statistics**											
608					Minimum of Logged Data	1.008	Mean of logged Data					2.195
609					Maximum of Logged Data	2.303	SD of logged Data					0.374
610												
611	**Assuming Lognormal Distribution**											
612					95% H-UCL	12.06	90% Chebyshev (MVUE) UCL					12.71
613					95% Chebyshev (MVUE) UCL	14.13	97.5% Chebyshev (MVUE) UCL					16.1
614					99% Chebyshev (MVUE) UCL	19.98						
615												
616	**Nonparametric Distribution Free UCL Statistics**											
617	**Data do not follow a Discernible Distribution (0.05)**											
618												
619	**Nonparametric Distribution Free UCLs**											
620					95% CLT UCL	10.39	95% Jackknife UCL					N/A
621					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
622					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
623					95% BCA Bootstrap UCL	N/A						
624					90% Chebyshev(Mean, Sd) UCL	11.21	95% Chebyshev(Mean, Sd) UCL					12.03

	A	B	C	D	E	F	G	H	I	J	K	L
625					97.5% Chebyshev(Mean, Sd) UCL	13.17					99% Chebyshev(Mean, Sd) UCL	15.41
626												
627						**Suggested UCL to Use**						
628					95% Student's-t UCL	10.48					or 95% Modified-t UCL	10.38
629												
630						**Recommended UCL exceeds the maximum observation**						
631												
632					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
633					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
634					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
635					For additional insight the user may want to consult a statistician.							
636												
637					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
638					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
639												
640												
641	**Neptunium-237**											
642												
643						**General Statistics**						
644					Total Number of Observations	12					Number of Distinct Observations	3
645											Number of Missing Observations	0
646					Minimum	0.368					Mean	2.234
647					Maximum	4.1					Median	2.234
648					SD	0.796					Std. Error of Mean	0.23
649					Coefficient of Variation	0.356					Skewness	-2.89E-15
650												
651						**Normal GOF Test**						
652					Shapiro Wilk Test Statistic	0.6					**Shapiro Wilk GOF Test**	
653					5% Shapiro Wilk Critical Value	0.859					Data Not Normal at 5% Significance Level	
654					Lilliefors Test Statistic	0.417					**Lilliefors GOF Test**	
655					5% Lilliefors Critical Value	0.256					Data Not Normal at 5% Significance Level	
656						**Data Not Normal at 5% Significance Level**						
657												
658						**Assuming Normal Distribution**						
659					**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**	
660					95% Student's-t UCL	2.646					95% Adjusted-CLT UCL (Chen-1995)	2.612
661											95% Modified-t UCL (Johnson-1978)	2.646
662												
663						**Gamma GOF Test**						
664					A-D Test Statistic	2.902					**Anderson-Darling Gamma GOF Test**	
665					5% A-D Critical Value	0.732					Data Not Gamma Distributed at 5% Significance Level	
666					K-S Test Statistic	0.475					**Kolmogrov-Smirnoff Gamma GOF Test**	
667					5% K-S Critical Value	0.246					Data Not Gamma Distributed at 5% Significance Level	
668						**Data Not Gamma Distributed at 5% Significance Level**						
669												
670						**Gamma Statistics**						
671					k hat (MLE)	5.176					k star (bias corrected MLE)	3.938
672					Theta hat (MLE)	0.432					Theta star (bias corrected MLE)	0.567
673					nu hat (MLE)	124.2					nu star (bias corrected)	94.51
674					MLE Mean (bias corrected)	2.234					MLE Sd (bias corrected)	1.126
675											Approximate Chi Square Value (0.05)	73.09
676					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	70.22

	A	B	C	D	E	F	G	H	I	J	K	L
677												
678						Assuming Gamma Distribution						
679					95% Approximate Gamma UCL (use when n>=50))	2.889				95% Adjusted Gamma UCL (use when n<50)		3.007
680												
681						Lognormal GOF Test						
682					Shapiro Wilk Test Statistic	0.497			Shapiro Wilk Lognormal GOF Test			
683					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
684					Lilliefors Test Statistic	0.487			Lilliefors Lognormal GOF Test			
685					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
686						Data Not Lognormal at 5% Significance Level						
687												
688						Lognormal Statistics						
689					Minimum of Logged Data	-1			Mean of logged Data			0.704
690					Maximum of Logged Data	1.411			SD of logged Data			0.564
691												
692						Assuming Lognormal Distribution						
693					95% H-UCL	3.461			90% Chebyshev (MVUE) UCL			3.511
694					95% Chebyshev (MVUE) UCL	4.043			97.5% Chebyshev (MVUE) UCL			4.782
695					99% Chebyshev (MVUE) UCL	6.233						
696												
697						Nonparametric Distribution Free UCL Statistics						
698						Data do not follow a Discernible Distribution (0.05)						
699												
700						Nonparametric Distribution Free UCLs						
701					95% CLT UCL	2.612			95% Jackknife UCL			2.646
702					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
703					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
704					95% BCA Bootstrap UCL	N/A						
705					90% Chebyshev(Mean, Sd) UCL	2.923			95% Chebyshev(Mean, Sd) UCL			3.235
706					97.5% Chebyshev(Mean, Sd) UCL	3.668			99% Chebyshev(Mean, Sd) UCL			4.519
707												
708						Suggested UCL to Use						
709					95% Chebyshev (Mean, Sd) UCL	3.235						
710												
711						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
712						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
713						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
714						For additional insight the user may want to consult a statistician.						
715												
716						Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
717						reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.						
718												
719												
720	Nickel											
721												
722						General Statistics						
723					Total Number of Observations	12			Number of Distinct Observations			11
724									Number of Missing Observations			0
725					Minimum	63.2			Mean			401.5
726					Maximum	2410			Median			225.8
727					SD	644.8			Std. Error of Mean			186.1
728					Coefficient of Variation	1.606			Skewness			3.235

	A	B	C	D	E	F	G	H	I	J	K	L
729												
730						Normal GOF Test						
731					Shapiro Wilk Test Statistic	0.508	Shapiro Wilk GOF Test					
732					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
733					Lilliefors Test Statistic	0.386	Lilliefors GOF Test					
734					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
735						Data Not Normal at 5% Significance Level						
736												
737						Assuming Normal Distribution						
738					95% Normal UCL		95% UCLs (Adjusted for Skewness)					
739					95% Student's-t UCL	735.7	95% Adjusted-CLT UCL (Chen-1995)					893.4
740							95% Modified-t UCL (Johnson-1978)					764.7
741												
742						Gamma GOF Test						
743					A-D Test Statistic	0.934	Anderson-Darling Gamma GOF Test					
744					5% A-D Critical Value	0.758	Data Not Gamma Distributed at 5% Significance Level					
745					K-S Test Statistic	0.24	Kolmogrov-Smirnoff Gamma GOF Test					
746					5% K-S Critical Value	0.253	Detected data appear Gamma Distributed at 5% Significance Level					
747						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
748												
749						Gamma Statistics						
750					k hat (MLE)	0.972	k star (bias corrected MLE)					0.785
751					Theta hat (MLE)	413	Theta star (bias corrected MLE)					511.7
752					nu hat (MLE)	23.33	nu star (bias corrected)					18.83
753					MLE Mean (bias corrected)	401.5	MLE Sd (bias corrected)					453.3
754							Approximate Chi Square Value (0.05)					9.993
755					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					9.026
756												
757						Assuming Gamma Distribution						
758					95% Approximate Gamma UCL (use when n>=50)	756.5	95% Adjusted Gamma UCL (use when n<50)					837.6
759												
760						Lognormal GOF Test						
761					Shapiro Wilk Test Statistic	0.902	Shapiro Wilk Lognormal GOF Test					
762					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
763					Lilliefors Test Statistic	0.159	Lilliefors Lognormal GOF Test					
764					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
765						Data appear Lognormal at 5% Significance Level						
766												
767						Lognormal Statistics						
768					Minimum of Logged Data	4.146	Mean of logged Data					5.399
769					Maximum of Logged Data	7.787	SD of logged Data					1.02
770												
771						Assuming Lognormal Distribution						
772					95% H-UCL	923	90% Chebyshev (MVUE) UCL					682.7
773					95% Chebyshev (MVUE) UCL	833.1	97.5% Chebyshev (MVUE) UCL					1042
774					99% Chebyshev (MVUE) UCL	1452						
775												
776						Nonparametric Distribution Free UCL Statistics						
777						Data appear to follow a Discernible Distribution at 5% Significance Level						
778												
779						Nonparametric Distribution Free UCLs						
780					95% CLT UCL	707.6	95% Jackknife UCL					735.7

	A	B	C	D	E	F	G	H	I	J	K	L
781					95% Standard Bootstrap UCL	691.4				95% Bootstrap-t UCL		1742
782					95% Hall's Bootstrap UCL	2010				95% Percentile Bootstrap UCL		758.9
783					95% BCA Bootstrap UCL	933.4						
784					90% Chebyshev(Mean, Sd) UCL	959.8				95% Chebyshev(Mean, Sd) UCL		1213
785					97.5% Chebyshev(Mean, Sd) UCL	1564				99% Chebyshev(Mean, Sd) UCL		2253
786												
787						Suggested UCL to Use						
788					95% Adjusted Gamma UCL	837.6						
789												
790					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
791					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
792					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
793					For additional insight the user may want to consult a statistician.							
794												
795												
796	PAH, Total											
797												
798						General Statistics						
799					Total Number of Observations	12				Number of Distinct Observations		1
800										Number of Missing Observations		0
801					Minimum	1.166				Mean		1.166
802					Maximum	1.166				Median		1.166
803												
804						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
805						ProUCL (or any other software) should not be used on such a data set!						
806						The data set for variable PAH, Total was not processed!						
807												
808						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
809						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
810												
811												
812												
813	PCB, Total											
814												
815						General Statistics						
816					Total Number of Observations	12				Number of Distinct Observations		3
817										Number of Missing Observations		0
818					Minimum	5				Mean		5.825
819					Maximum	10				Median		5
820					SD	1.927				Std. Error of Mean		0.556
821					Coefficient of Variation	0.331				Skewness		2.056
822												
823						Normal GOF Test						
824					Shapiro Wilk Test Statistic	0.467				Shapiro Wilk GOF Test		
825					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
826					Lilliefors Test Statistic	0.499				Lilliefors GOF Test		
827					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
828						Data Not Normal at 5% Significance Level						
829												
830						Assuming Normal Distribution						
831					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
832					95% Student's-t UCL	6.824				95% Adjusted-CLT UCL (Chen-1995)		7.093

	A	B	C	D	E	F	G	H	I	J	K	L
833										95% Modified-t UCL (Johnson-1978)		6.879
834												
835					Gamma GOF Test							
836					A-D Test Statistic	3.432	Anderson-Darling Gamma GOF Test					
837					5% A-D Critical Value	0.731	Data Not Gamma Distributed at 5% Significance Level					
838					K-S Test Statistic	0.507	Kolmogrov-Smirnoff Gamma GOF Test					
839					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
840					Data Not Gamma Distributed at 5% Significance Level							
841												
842					Gamma Statistics							
843					k hat (MLE)	13.31	k star (bias corrected MLE)					10.04
844					Theta hat (MLE)	0.438	Theta star (bias corrected MLE)					0.58
845					nu hat (MLE)	319.5	nu star (bias corrected)					240.9
846					MLE Mean (bias corrected)	5.825	MLE Sd (bias corrected)					1.838
847							Approximate Chi Square Value (0.05)					206
848					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					201.1
849												
850					Assuming Gamma Distribution							
851					95% Approximate Gamma UCL (use when n>=50))	6.813	95% Adjusted Gamma UCL (use when n<50)					6.98
852												
853					Lognormal GOF Test							
854					Shapiro Wilk Test Statistic	0.466	Shapiro Wilk Lognormal GOF Test					
855					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
856					Lilliefors Test Statistic	0.499	Lilliefors Lognormal GOF Test					
857					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
858					Data Not Lognormal at 5% Significance Level							
859												
860					Lognormal Statistics							
861					Minimum of Logged Data	1.609	Mean of logged Data					1.724
862					Maximum of Logged Data	2.303	SD of logged Data					0.268
863												
864					Assuming Lognormal Distribution							
865					95% H-UCL	6.775	90% Chebyshev (MVUE) UCL					7.149
866					95% Chebyshev (MVUE) UCL	7.762	97.5% Chebyshev (MVUE) UCL					8.613
867					99% Chebyshev (MVUE) UCL	10.29						
868												
869					Nonparametric Distribution Free UCL Statistics							
870					Data do not follow a Discernible Distribution (0.05)							
871												
872					Nonparametric Distribution Free UCLs							
873					95% CLT UCL	6.74	95% Jackknife UCL					6.824
874					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
875					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
876					95% BCA Bootstrap UCL	N/A						
877					90% Chebyshev(Mean, Sd) UCL	7.494	95% Chebyshev(Mean, Sd) UCL					8.25
878					97.5% Chebyshev(Mean, Sd) UCL	9.299	99% Chebyshev(Mean, Sd) UCL					11.36
879												
880					Suggested UCL to Use							
881					95% Student's-t UCL	6.824				or 95% Modified-t UCL		6.879
882												
883					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
884					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							

	A	B	C	D	E	F	G	H	I	J	K	L
885	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
886	For additional insight the user may want to consult a statistician.											
887												
888												
889	**Technetium-99**											
890												
891	**General Statistics**											
892					Total Number of Observations	12			Number of Distinct Observations			3
893									Number of Missing Observations			0
894					Minimum	34.6			Mean			200.8
895					Maximum	367			Median			200.8
896					SD	70.87			Std. Error of Mean			20.46
897					Coefficient of Variation	0.353			Skewness			-2.00E-15
898												
899	**Normal GOF Test**											
900					Shapiro Wilk Test Statistic	0.6			**Shapiro Wilk GOF Test**			
901					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
902					Lilliefors Test Statistic	0.417			**Lilliefors GOF Test**			
903					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
904	**Data Not Normal at 5% Significance Level**											
905												
906	**Assuming Normal Distribution**											
907	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
908					95% Student's-t UCL	237.5			95% Adjusted-CLT UCL (Chen-1995)			234.5
909									95% Modified-t UCL (Johnson-1978)			237.5
910												
911	**Gamma GOF Test**											
912					A-D Test Statistic	2.896			**Anderson-Darling Gamma GOF Test**			
913					5% A-D Critical Value	0.732			Data Not Gamma Distributed at 5% Significance Level			
914					K-S Test Statistic	0.474			**Kolmogrov-Smirnoff Gamma GOF Test**			
915					5% K-S Critical Value	0.246			Data Not Gamma Distributed at 5% Significance Level			
916	**Data Not Gamma Distributed at 5% Significance Level**											
917												
918	**Gamma Statistics**											
919					k hat (MLE)	5.354			k star (bias corrected MLE)			4.071
920					Theta hat (MLE)	37.5			Theta star (bias corrected MLE)			49.32
921					nu hat (MLE)	128.5			nu star (bias corrected)			97.71
922					MLE Mean (bias corrected)	200.8			MLE Sd (bias corrected)			99.52
923									Approximate Chi Square Value (0.05)			75.91
924					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			72.98
925												
926	**Assuming Gamma Distribution**											
927					95% Approximate Gamma UCL (use when n>=50))	258.5			95% Adjusted Gamma UCL (use when n<50)			268.8
928												
929	**Lognormal GOF Test**											
930					Shapiro Wilk Test Statistic	0.5			**Shapiro Wilk Lognormal GOF Test**			
931					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
932					Lilliefors Test Statistic	0.486			**Lilliefors Lognormal GOF Test**			
933					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
934	**Data Not Lognormal at 5% Significance Level**											
935												
936	**Lognormal Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
937					Minimum of Logged Data	3.544					Mean of logged Data	5.206
938					Maximum of Logged Data	5.905					SD of logged Data	0.551
939												
940					Assuming Lognormal Distribution							
941					95% H-UCL	306.4					90% Chebyshev (MVUE) UCL	312.1
942					95% Chebyshev (MVUE) UCL	358.7					97.5% Chebyshev (MVUE) UCL	423.3
943					99% Chebyshev (MVUE) UCL	550.2						
944												
945					Nonparametric Distribution Free UCL Statistics							
946					Data do not follow a Discernible Distribution (0.05)							
947												
948					Nonparametric Distribution Free UCLs							
949					95% CLT UCL	234.5					95% Jackknife UCL	237.5
950					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
951					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
952					95% BCA Bootstrap UCL	N/A						
953					90% Chebyshev(Mean, Sd) UCL	262.2					95% Chebyshev(Mean, Sd) UCL	290
954					97.5% Chebyshev(Mean, Sd) UCL	328.6					99% Chebyshev(Mean, Sd) UCL	404.4
955												
956					Suggested UCL to Use							
957					95% Chebyshev (Mean, Sd) UCL	290						
958												
959					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
960					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
961					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
962					For additional insight the user may want to consult a statistician.							
963												
964					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
965					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
966												
967												
968	Thallium											
969												
970					General Statistics							
971					Total Number of Observations	12					Number of Distinct Observations	1
972											Number of Missing Observations	0
973					Minimum	0.26					Mean	0.26
974					Maximum	0.26					Median	0.26
975												
976					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
977					ProUCL (or any other software) should not be used on such a data set!							
978					The data set for variable Thallium was not processed!							
979												
980					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
981					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
982												
983												
984												
985	Thorium-230											
986												
987					General Statistics							
988					Total Number of Observations	12					Number of Distinct Observations	3

	A	B	C	D	E	F	G	H	I	J	K	L
989											Number of Missing Observations	0
990					Minimum	1.86					Mean	4.545
991					Maximum	7.23					Median	4.545
992					SD	1.145					Std. Error of Mean	0.331
993					Coefficient of Variation	0.252					Skewness	-1.29E-15
994												
995					Normal GOF Test							
996					Shapiro Wilk Test Statistic	0.6	Shapiro Wilk GOF Test					
997					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
998					Lilliefors Test Statistic	0.417	Lilliefors GOF Test					
999					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
1000					Data Not Normal at 5% Significance Level							
1001												
1002					Assuming Normal Distribution							
1003			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
1004					95% Student's-t UCL	5.139					95% Adjusted-CLT UCL (Chen-1995)	5.089
1005											95% Modified-t UCL (Johnson-1978)	5.139
1006												
1007					Gamma GOF Test							
1008					A-D Test Statistic	2.781	Anderson-Darling Gamma GOF Test					
1009					5% A-D Critical Value	0.731	Data Not Gamma Distributed at 5% Significance Level					
1010					K-S Test Statistic	0.452	Kolmogrov-Smirnoff Gamma GOF Test					
1011					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
1012					Data Not Gamma Distributed at 5% Significance Level							
1013												
1014					Gamma Statistics							
1015					k hat (MLE)	14.14					k star (bias corrected MLE)	10.66
1016					Theta hat (MLE)	0.321					Theta star (bias corrected MLE)	0.426
1017					nu hat (MLE)	339.4					nu star (bias corrected)	255.9
1018					MLE Mean (bias corrected)	4.545					MLE Sd (bias corrected)	1.392
1019											Approximate Chi Square Value (0.05)	219.9
1020					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	214.8
1021												
1022					Assuming Gamma Distribution							
1023					95% Approximate Gamma UCL (use when n>=50))	5.29					95% Adjusted Gamma UCL (use when n<50)	5.416
1024												
1025					Lognormal GOF Test							
1026					Shapiro Wilk Test Statistic	0.553	Shapiro Wilk Lognormal GOF Test					
1027					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
1028					Lilliefors Test Statistic	0.464	Lilliefors Lognormal GOF Test					
1029					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
1030					Data Not Lognormal at 5% Significance Level							
1031												
1032					Lognormal Statistics							
1033					Minimum of Logged Data	0.621					Mean of logged Data	1.478
1034					Maximum of Logged Data	1.978					SD of logged Data	0.301
1035												
1036					Assuming Lognormal Distribution							
1037					95% H-UCL	5.467					90% Chebyshev (MVUE) UCL	5.775
1038					95% Chebyshev (MVUE) UCL	6.32					97.5% Chebyshev (MVUE) UCL	7.076
1039					99% Chebyshev (MVUE) UCL	8.563						
1040												

	A	B	C	D	E	F	G	H	I	J	K	L
1041	Nonparametric Distribution Free UCL Statistics											
1042	Data do not follow a Discernible Distribution (0.05)											
1043												
1044	Nonparametric Distribution Free UCLs											
1045					95% CLT UCL	5.089				95% Jackknife UCL		5.139
1046					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1047					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1048					95% BCA Bootstrap UCL	N/A						
1049					90% Chebyshev(Mean, Sd) UCL	5.537				95% Chebyshev(Mean, Sd) UCL		5.986
1050					97.5% Chebyshev(Mean, Sd) UCL	6.609				99% Chebyshev(Mean, Sd) UCL		7.833
1051												
1052	Suggested UCL to Use											
1053					95% Student's-t UCL	5.139				or 95% Modified-t UCL		5.139
1054												
1055	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1056	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1057	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1058	For additional insight the user may want to consult a statistician.											
1059												
1060	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
1061	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
1062												
1063												
1064	Uranium											
1065												
1066	General Statistics											
1067					Total Number of Observations	12				Number of Distinct Observations		12
1068										Number of Missing Observations		0
1069					Minimum	9.9				Mean		148.6
1070					Maximum	459				Median		127.8
1071					SD	129.9				Std. Error of Mean		37.51
1072					Coefficient of Variation	0.874				Skewness		1.194
1073												
1074	Normal GOF Test											
1075					Shapiro Wilk Test Statistic	0.894				Shapiro Wilk GOF Test		
1076					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
1077					Lilliefors Test Statistic	0.143				Lilliefors GOF Test		
1078					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
1079	Data appear Normal at 5% Significance Level											
1080												
1081	Assuming Normal Distribution											
1082	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1083					95% Student's-t UCL	216				95% Adjusted-CLT UCL (Chen-1995)		224.1
1084										95% Modified-t UCL (Johnson-1978)		218.1
1085												
1086	Gamma GOF Test											
1087					A-D Test Statistic	0.262				Anderson-Darling Gamma GOF Test		
1088					5% A-D Critical Value	0.753				Detected data appear Gamma Distributed at 5% Significance Level		
1089					K-S Test Statistic	0.134				Kolmogrov-Smirnoff Gamma GOF Test		
1090					5% K-S Critical Value	0.251				Detected data appear Gamma Distributed at 5% Significance Level		
1091	Detected data appear Gamma Distributed at 5% Significance Level											
1092												

	A	B	C	D	E	F	G	H	I	J	K	L
1093	Gamma Statistics											
1094					k hat (MLE)	1.166					k star (bias corrected MLE)	0.93
1095					Theta hat (MLE)	127.5					Theta star (bias corrected MLE)	159.9
1096					nu hat (MLE)	27.97					nu star (bias corrected)	22.31
1097					MLE Mean (bias corrected)	148.6					MLE Sd (bias corrected)	154.1
1098											Approximate Chi Square Value (0.05)	12.57
1099					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	11.47
1100												
1101	Assuming Gamma Distribution											
1102					95% Approximate Gamma UCL (use when n>=50))	263.8					95% Adjusted Gamma UCL (use when n<50)	289.1
1103												
1104	Lognormal GOF Test											
1105					Shapiro Wilk Test Statistic	0.929					Shapiro Wilk Lognormal GOF Test	
1106					5% Shapiro Wilk Critical Value	0.859					Data appear Lognormal at 5% Significance Level	
1107					Lilliefors Test Statistic	0.177					Lilliefors Lognormal GOF Test	
1108					5% Lilliefors Critical Value	0.256					Data appear Lognormal at 5% Significance Level	
1109	Data appear Lognormal at 5% Significance Level											
1110												
1111	Lognormal Statistics											
1112					Minimum of Logged Data	2.293					Mean of logged Data	4.515
1113					Maximum of Logged Data	6.129					SD of logged Data	1.183
1114												
1115	Assuming Lognormal Distribution											
1116					95% H-UCL	588.4					90% Chebyshev (MVUE) UCL	355.8
1117					95% Chebyshev (MVUE) UCL	440.6					97.5% Chebyshev (MVUE) UCL	558.3
1118					99% Chebyshev (MVUE) UCL	789.4						
1119												
1120	Nonparametric Distribution Free UCL Statistics											
1121	Data appear to follow a Discernible Distribution at 5% Significance Level											
1122												
1123	Nonparametric Distribution Free UCLs											
1124					95% CLT UCL	210.3					95% Jackknife UCL	216
1125					95% Standard Bootstrap UCL	207.5					95% Bootstrap-t UCL	235.1
1126					95% Hall's Bootstrap UCL	249.8					95% Percentile Bootstrap UCL	211.9
1127					95% BCA Bootstrap UCL	225.1						
1128					90% Chebyshev(Mean, Sd) UCL	261.2					95% Chebyshev(Mean, Sd) UCL	312.1
1129					97.5% Chebyshev(Mean, Sd) UCL	382.9					99% Chebyshev(Mean, Sd) UCL	521.8
1130												
1131	Suggested UCL to Use											
1132					95% Student's-t UCL	216						
1133												
1134	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1135	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1136	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1137	For additional insight the user may want to consult a statistician.											
1138												
1139												
1140	Uranium-234											
1141												
1142	General Statistics											
1143					Total Number of Observations	12					Number of Distinct Observations	3
1144											Number of Missing Observations	0

	A	B	C	D	E	F	G	H	I	J	K	L
1145					Minimum	69.6					Mean	127.3
1146					Maximum	185					Median	127.3
1147					SD	24.6					Std. Error of Mean	7.102
1148					Coefficient of Variation	0.193					Skewness	4.264E-15
1149												
1150					Normal GOF Test							
1151					Shapiro Wilk Test Statistic	0.6	Shapiro Wilk GOF Test					
1152					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
1153					Lilliefors Test Statistic	0.417	Lilliefors GOF Test					
1154					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
1155					Data Not Normal at 5% Significance Level							
1156												
1157					Assuming Normal Distribution							
1158			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
1159					95% Student's-t UCL	140.1					95% Adjusted-CLT UCL (Chen-1995)	139
1160											95% Modified-t UCL (Johnson-1978)	140.1
1161												
1162					Gamma GOF Test							
1163					A-D Test Statistic	2.749	Anderson-Darling Gamma GOF Test					
1164					5% A-D Critical Value	0.731	Data Not Gamma Distributed at 5% Significance Level					
1165					K-S Test Statistic	0.443	Kolmogrov-Smirnoff Gamma GOF Test					
1166					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
1167					Data Not Gamma Distributed at 5% Significance Level							
1168												
1169					Gamma Statistics							
1170					k hat (MLE)	26.26					k star (bias corrected MLE)	19.75
1171					Theta hat (MLE)	4.848					Theta star (bias corrected MLE)	6.446
1172					nu hat (MLE)	630.1					nu star (bias corrected)	473.9
1173					MLE Mean (bias corrected)	127.3					MLE Sd (bias corrected)	28.65
1174											Approximate Chi Square Value (0.05)	424.5
1175					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	417.3
1176												
1177					Assuming Gamma Distribution							
1178					95% Approximate Gamma UCL (use when n>=50))	142.1					95% Adjusted Gamma UCL (use when n<50)	144.6
1179												
1180					Lognormal GOF Test							
1181					Shapiro Wilk Test Statistic	0.573	Shapiro Wilk Lognormal GOF Test					
1182					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
1183					Lilliefors Test Statistic	0.452	Lilliefors Lognormal GOF Test					
1184					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
1185					Data Not Lognormal at 5% Significance Level							
1186												
1187					Lognormal Statistics							
1188					Minimum of Logged Data	4.243					Mean of logged Data	4.827
1189					Maximum of Logged Data	5.22					SD of logged Data	0.213
1190												
1191					Assuming Lognormal Distribution							
1192					95% H-UCL	143.9					90% Chebyshev (MVUE) UCL	151.2
1193					95% Chebyshev (MVUE) UCL	161.9					97.5% Chebyshev (MVUE) UCL	176.7
1194					99% Chebyshev (MVUE) UCL	205.9						
1195												
1196					Nonparametric Distribution Free UCL Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
1197	Data do not follow a Discernible Distribution (0.05)											
1198												
1199	Nonparametric Distribution Free UCLs											
1200					95% CLT UCL	139				95% Jackknife UCL		140.1
1201					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1202					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1203					95% BCA Bootstrap UCL	N/A						
1204					90% Chebyshev(Mean, Sd) UCL	148.6				95% Chebyshev(Mean, Sd) UCL		158.3
1205					97.5% Chebyshev(Mean, Sd) UCL	171.7				99% Chebyshev(Mean, Sd) UCL		198
1206												
1207	Suggested UCL to Use											
1208					95% Student's-t UCL	140.1				or 95% Modified-t UCL		140.1
1209												
1210	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1211	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1212	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1213	For additional insight the user may want to consult a statistician.											
1214												
1215												
1216	Uranium-235											
1217												
1218	General Statistics											
1219					Total Number of Observations	12				Number of Distinct Observations		3
1220										Number of Missing Observations		0
1221					Minimum	4.21				Mean		12.96
1222					Maximum	21.7				Median		12.96
1223					SD	3.729				Std. Error of Mean		1.076
1224					Coefficient of Variation	0.288				Skewness		-7.18E-16
1225												
1226	Normal GOF Test											
1227					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1228					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1229					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1230					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1231	Data Not Normal at 5% Significance Level											
1232												
1233	Assuming Normal Distribution											
1234					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1235					95% Student's-t UCL	14.89				95% Adjusted-CLT UCL (Chen-1995)		14.73
1236										95% Modified-t UCL (Johnson-1978)		14.89
1237												
1238	Gamma GOF Test											
1239					A-D Test Statistic	2.809				Anderson-Darling Gamma GOF Test		
1240					5% A-D Critical Value	0.73				Data Not Gamma Distributed at 5% Significance Level		
1241					K-S Test Statistic	0.459				Kolmogrov-Smirnoff Gamma GOF Test		
1242					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
1243	Data Not Gamma Distributed at 5% Significance Level											
1244												
1245	Gamma Statistics											
1246					k hat (MLE)	10.03				k star (bias corrected MLE)		7.577
1247					Theta hat (MLE)	1.292				Theta star (bias corrected MLE)		1.71
1248					nu hat (MLE)	240.7				nu star (bias corrected)		181.9

	A	B	C	D	E	F	G	H	I	J	K	L
1249					MLE Mean (bias corrected)	12.96					MLE Sd (bias corrected)	4.706
1250											Approximate Chi Square Value (0.05)	151.7
1251					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	147.5
1252												
1253					**Assuming Gamma Distribution**							
1254					95% Approximate Gamma UCL (use when n>=50))	15.53					95% Adjusted Gamma UCL (use when n<50)	15.98
1255												
1256					**Lognormal GOF Test**							
1257					Shapiro Wilk Test Statistic	0.538			**Shapiro Wilk Lognormal GOF Test**			
1258					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
1259					Lilliefors Test Statistic	0.471			**Lilliefors Lognormal GOF Test**			
1260					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
1261					**Data Not Lognormal at 5% Significance Level**							
1262												
1263					**Lognormal Statistics**							
1264					Minimum of Logged Data	1.437					Mean of logged Data	2.511
1265					Maximum of Logged Data	3.077					SD of logged Data	0.369
1266												
1267					**Assuming Lognormal Distribution**							
1268					95% H-UCL	16.46					90% Chebyshev (MVUE) UCL	17.35
1269					95% Chebyshev (MVUE) UCL	19.27					97.5% Chebyshev (MVUE) UCL	21.94
1270					99% Chebyshev (MVUE) UCL	27.19						
1271												
1272					**Nonparametric Distribution Free UCL Statistics**							
1273					**Data do not follow a Discernible Distribution (0.05)**							
1274												
1275					**Nonparametric Distribution Free UCLs**							
1276					95% CLT UCL	14.73					95% Jackknife UCL	14.89
1277					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
1278					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
1279					95% BCA Bootstrap UCL	N/A						
1280					90% Chebyshev(Mean, Sd) UCL	16.18					95% Chebyshev(Mean, Sd) UCL	17.65
1281					97.5% Chebyshev(Mean, Sd) UCL	19.68					99% Chebyshev(Mean, Sd) UCL	23.67
1282												
1283					**Suggested UCL to Use**							
1284					95% Student's-t UCL	14.89					or 95% Modified-t UCL	14.89
1285												
1286					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1287					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1288					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1289					For additional insight the user may want to consult a statistician.							
1290												
1291					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
1292					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
1293												
1294												
1295	**Uranium-238**											
1296												
1297					**General Statistics**							
1298					Total Number of Observations	12					Number of Distinct Observations	3
1299											Number of Missing Observations	0
1300					Minimum	96.7					Mean	598.4

	A	B	C	D	E	F	G	H	I	J	K	L
1301					Maximum	1100					Median	598.4
1302					SD	213.9					Std. Error of Mean	61.75
1303					Coefficient of Variation	0.357					Skewness	-2.33E-15
1304												
1305					Normal GOF Test							
1306					Shapiro Wilk Test Statistic	0.6			Shapiro Wilk GOF Test			
1307					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
1308					Lilliefors Test Statistic	0.417			Lilliefors GOF Test			
1309					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
1310					Data Not Normal at 5% Significance Level							
1311												
1312					Assuming Normal Distribution							
1313					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1314					95% Student's-t UCL	709.2			95% Adjusted-CLT UCL (Chen-1995)			699.9
1315									95% Modified-t UCL (Johnson-1978)			709.2
1316												
1317					Gamma GOF Test							
1318					A-D Test Statistic	2.905			Anderson-Darling Gamma GOF Test			
1319					5% A-D Critical Value	0.732			Data Not Gamma Distributed at 5% Significance Level			
1320					K-S Test Statistic	0.476			Kolmogrov-Smirnoff Gamma GOF Test			
1321					5% K-S Critical Value	0.246			Data Not Gamma Distributed at 5% Significance Level			
1322					Data Not Gamma Distributed at 5% Significance Level							
1323												
1324					Gamma Statistics							
1325					k hat (MLE)	5.104			k star (bias corrected MLE)			3.884
1326					Theta hat (MLE)	117.2			Theta star (bias corrected MLE)			154.1
1327					nu hat (MLE)	122.5			nu star (bias corrected)			93.21
1328					MLE Mean (bias corrected)	598.4			MLE Sd (bias corrected)			303.6
1329									Approximate Chi Square Value (0.05)			71.95
1330					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			69.1
1331												
1332					Assuming Gamma Distribution							
1333					95% Approximate Gamma UCL (use when n>=50))	775.2			95% Adjusted Gamma UCL (use when n<50)			807.1
1334												
1335					Lognormal GOF Test							
1336					Shapiro Wilk Test Statistic	0.496			Shapiro Wilk Lognormal GOF Test			
1337					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
1338					Lilliefors Test Statistic	0.487			Lilliefors Lognormal GOF Test			
1339					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
1340					Data Not Lognormal at 5% Significance Level							
1341												
1342					Lognormal Statistics							
1343					Minimum of Logged Data	4.572			Mean of logged Data			6.293
1344					Maximum of Logged Data	7.003			SD of logged Data			0.57
1345												
1346					Assuming Lognormal Distribution							
1347					95% H-UCL	932.9			90% Chebyshev (MVUE) UCL			944.8
1348					95% Chebyshev (MVUE) UCL	1089			97.5% Chebyshev (MVUE) UCL			1289
1349					99% Chebyshev (MVUE) UCL	1682						
1350												
1351					Nonparametric Distribution Free UCL Statistics							
1352					Data do not follow a Discernible Distribution (0.05)							

	A	B	C	D	E	F	G	H	I	J	K	L
1353												
1354					Nonparametric Distribution Free UCLs							
1355					95% CLT UCL	699.9				95% Jackknife UCL		709.2
1356					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1357					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1358					95% BCA Bootstrap UCL	N/A						
1359					90% Chebyshev(Mean, Sd) UCL	783.6				95% Chebyshev(Mean, Sd) UCL		867.5
1360					97.5% Chebyshev(Mean, Sd) UCL	984				99% Chebyshev(Mean, Sd) UCL		1213
1361												
1362					Suggested UCL to Use							
1363					95% Chebyshev (Mean, Sd) UCL	867.5						
1364												
1365					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1366					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1367					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1368					For additional insight the user may want to consult a statistician.							
1369												
1370					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
1371					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
1372												
1373												
1374	**Vanadium**											
1375												
1376					General Statistics							
1377					Total Number of Observations	12				Number of Distinct Observations		4
1378										Number of Missing Observations		0
1379					Minimum	32.8				Mean		67.37
1380					Maximum	74.72				Median		70
1381					SD	10.97				Std. Error of Mean		3.167
1382					Coefficient of Variation	0.163				Skewness		-3.363
1383												
1384					Normal GOF Test							
1385					Shapiro Wilk Test Statistic	0.409				**Shapiro Wilk GOF Test**		
1386					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1387					Lilliefors Test Statistic	0.511				**Lilliefors GOF Test**		
1388					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1389					**Data Not Normal at 5% Significance Level**							
1390												
1391					Assuming Normal Distribution							
1392					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1393					95% Student's-t UCL	73.06				95% Adjusted-CLT UCL (Chen-1995)		69.29
1394										95% Modified-t UCL (Johnson-1978)		72.55
1395												
1396					Gamma GOF Test							
1397					A-D Test Statistic	3.601				**Anderson-Darling Gamma GOF Test**		
1398					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
1399					K-S Test Statistic	0.521				**Kolmogrov-Smirnoff Gamma GOF Test**		
1400					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
1401					**Data Not Gamma Distributed at 5% Significance Level**							
1402												
1403					Gamma Statistics							
1404					k hat (MLE)	27.41				k star (bias corrected MLE)		20.61

	A	B	C	D	E	F	G	H	I	J	K	L
1405					Theta hat (MLE)	2.458				Theta star (bias corrected MLE)		3.268
1406					nu hat (MLE)	657.9				nu star (bias corrected)		494.8
1407					MLE Mean (bias corrected)	67.37				MLE Sd (bias corrected)		14.84
1408										Approximate Chi Square Value (0.05)		444.2
1409					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		436.9
1410												
1411					**Assuming Gamma Distribution**							
1412					95% Approximate Gamma UCL (use when n>=50))	75.04				95% Adjusted Gamma UCL (use when n<50)		76.3
1413												
1414					**Lognormal GOF Test**							
1415					Shapiro Wilk Test Statistic	0.383				**Shapiro Wilk Lognormal GOF Test**		
1416					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1417					Lilliefors Test Statistic	0.518				**Lilliefors Lognormal GOF Test**		
1418					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1419					**Data Not Lognormal at 5% Significance Level**							
1420												
1421					**Lognormal Statistics**							
1422					Minimum of Logged Data	3.49				Mean of logged Data		4.192
1423					Maximum of Logged Data	4.314				SD of logged Data		0.222
1424												
1425					**Assuming Lognormal Distribution**							
1426					95% H-UCL	76.76				90% Chebyshev (MVUE) UCL		80.7
1427					95% Chebyshev (MVUE) UCL	86.62				97.5% Chebyshev (MVUE) UCL		94.82
1428					99% Chebyshev (MVUE) UCL	110.9						
1429												
1430					**Nonparametric Distribution Free UCL Statistics**							
1431					**Data do not follow a Discernible Distribution (0.05)**							
1432												
1433					**Nonparametric Distribution Free UCLs**							
1434					95% CLT UCL	72.58				95% Jackknife UCL		73.06
1435					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1436					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1437					95% BCA Bootstrap UCL	N/A						
1438					90% Chebyshev(Mean, Sd) UCL	76.87				95% Chebyshev(Mean, Sd) UCL		81.17
1439					97.5% Chebyshev(Mean, Sd) UCL	87.15				99% Chebyshev(Mean, Sd) UCL		98.88
1440												
1441					**Suggested UCL to Use**							
1442					95% Student's-t UCL	73.06				or 95% Modified-t UCL		72.55
1443												
1444					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1445					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1446					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1447					For additional insight the user may want to consult a statistician.							
1448												
1449					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
1450					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
1451												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/1/2015 12:31:59 PM								
5	From File			EPC_015SurfEU4.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Antimony**											
12												
13	**General Statistics**											
14	Total Number of Observations					15	Number of Distinct Observations					11
15							Number of Missing Observations					0
16	Minimum					0.8	Mean					61.09
17	Maximum					118.5	Median					61.09
18	SD					33.46	Std. Error of Mean					8.64
19	Coefficient of Variation					0.548	Skewness					0.0163
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.955	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.881	Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.157	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.229	Data appear Normal at 5% Significance Level					
26	**Data appear Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					76.31	95% Adjusted-CLT UCL (Chen-1995)					75.34
31							95% Modified-t UCL (Johnson-1978)					76.32
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.9	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.751	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.225	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.225	Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					1.669	k star (bias corrected MLE)					1.38
42	Theta hat (MLE)					36.6	Theta star (bias corrected MLE)					44.27
43	nu hat (MLE)					50.08	nu star (bias corrected)					41.4
44	MLE Mean (bias corrected)					61.09	MLE Sd (bias corrected)					52.01
45							Approximate Chi Square Value (0.05)					27.65
46	Adjusted Level of Significance					0.0324	Adjusted Chi Square Value					26.27
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					91.46	95% Adjusted Gamma UCL (use when n<50)					96.26
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.654	**Shapiro Wilk Lognormal GOF Test**					

53	5% Shapiro Wilk Critical Value					0.881	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.309	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.229	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					-0.223	Mean of logged Data					3.784
60	Maximum of Logged Data					4.775	SD of logged Data					1.21
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					248.7	90% Chebyshev (MVUE) UCL					173.6
64	95% Chebyshev (MVUE) UCL					213.9	97.5% Chebyshev (MVUE) UCL					269.7
65	99% Chebyshev (MVUE) UCL					379.4						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					75.3	95% Jackknife UCL					76.31
72	95% Standard Bootstrap UCL					75.18	95% Bootstrap-t UCL					76.68
73	95% Hall's Bootstrap UCL					75	95% Percentile Bootstrap UCL					75.28
74	95% BCA Bootstrap UCL					74.15						
75	90% Chebyshev(Mean, Sd) UCL					87.01	95% Chebyshev(Mean, Sd) UCL					98.75
76	97.5% Chebyshev(Mean, Sd) UCL					115	99% Chebyshev(Mean, Sd) UCL					147.1
77												
78	**Suggested UCL to Use**											
79	95% Student's-t UCL					76.31						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	Arsenic											
88												
89	**General Statistics**											
90	Total Number of Observations					15	Number of Distinct Observations					12
91							Number of Missing Observations					0
92	Minimum					6	Mean					22.9
93	Maximum					51.31	Median					15.33
94	SD					15.93	Std. Error of Mean					4.113
95	Coefficient of Variation					0.696	Skewness					0.713
96												
97	**Normal GOF Test**											
98	Shapiro Wilk Test Statistic					0.853	**Shapiro Wilk GOF Test**					
99	5% Shapiro Wilk Critical Value					0.881	Data Not Normal at 5% Significance Level					
100	Lilliefors Test Statistic					0.239	**Lilliefors GOF Test**					
101	5% Lilliefors Critical Value					0.229	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	30.14				95% Adjusted-CLT UCL (Chen-1995)		30.47
107										95% Modified-t UCL (Johnson-1978)		30.27
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.707	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.24	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.224	Data Not Gamma Distributed at 5% Significance Level					
114	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	2.263	k star (bias corrected MLE)					1.855
118					Theta hat (MLE)	10.12	Theta star (bias corrected MLE)					12.34
119					nu hat (MLE)	67.9	nu star (bias corrected)					55.65
120					MLE Mean (bias corrected)	22.9	MLE Sd (bias corrected)					16.81
121							Approximate Chi Square Value (0.05)					39.51
122					Adjusted Level of Significance	0.0324	Adjusted Chi Square Value					37.84
123												
124	**Assuming Gamma Distribution**											
125					95% Approximate Gamma UCL (use when n>=50)	32.25	95% Adjusted Gamma UCL (use when n<50)					33.68
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.221	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	1.792	Mean of logged Data					2.894
136					Maximum of Logged Data	3.938	SD of logged Data					0.721
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	36.73	90% Chebyshev (MVUE) UCL					36.48
140					95% Chebyshev (MVUE) UCL	42.61	97.5% Chebyshev (MVUE) UCL					51.12
141					99% Chebyshev (MVUE) UCL	67.84						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	29.66	95% Jackknife UCL					30.14
148					95% Standard Bootstrap UCL	29.54	95% Bootstrap-t UCL					31.66
149					95% Hall's Bootstrap UCL	29.27	95% Percentile Bootstrap UCL					29.86
150					95% BCA Bootstrap UCL	30.06						
151					90% Chebyshev(Mean, Sd) UCL	35.23	95% Chebyshev(Mean, Sd) UCL					40.82
152					97.5% Chebyshev(Mean, Sd) UCL	48.58	99% Chebyshev(Mean, Sd) UCL					63.82
153												
154	**Suggested UCL to Use**											
155					95% Adjusted Gamma UCL	33.68						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Cadmium**											
164												
165	**General Statistics**											
166	Total Number of Observations					15	Number of Distinct Observations				6	
167							Number of Missing Observations				0	
168	Minimum					0.42	Mean				12.97	
169	Maximum					24.15	Median				12	
170	SD					4.984	Std. Error of Mean				1.287	
171	Coefficient of Variation					0.384	Skewness				-0.16	
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.751	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.881	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.356	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.229	Data Not Normal at 5% Significance Level					
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					15.24	95% Adjusted-CLT UCL (Chen-1995)				15.03	
183							95% Modified-t UCL (Johnson-1978)				15.23	
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					2.873	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.745	Data Not Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.463	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.224	Data Not Gamma Distributed at 5% Significance Level					
190	**Data Not Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					2.778	k star (bias corrected MLE)				2.267	
194	Theta hat (MLE)					4.668	Theta star (bias corrected MLE)				5.72	
195	nu hat (MLE)					83.35	nu star (bias corrected)				68.02	
196	MLE Mean (bias corrected)					12.97	MLE Sd (bias corrected)				8.613	
197							Approximate Chi Square Value (0.05)				50.03	
198	Adjusted Level of Significance					0.0324	Adjusted Chi Square Value				48.14	
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					17.63	95% Adjusted Gamma UCL (use when n<50)				18.32	
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.465	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.881	Data Not Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.482	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.229	Data Not Lognormal at 5% Significance Level					
208	**Data Not Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-0.868				Mean of logged Data		2.372
212					Maximum of Logged Data	3.184				SD of logged Data		0.922
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	31.26				90% Chebyshev (MVUE) UCL		27.98
216					95% Chebyshev (MVUE) UCL	33.51				97.5% Chebyshev (MVUE) UCL		41.18
217					99% Chebyshev (MVUE) UCL	56.24						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data do not follow a Discernible Distribution (0.05)						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	15.09				95% Jackknife UCL		15.24
224					95% Standard Bootstrap UCL	14.98				95% Bootstrap-t UCL		15.44
225					95% Hall's Bootstrap UCL	16.35				95% Percentile Bootstrap UCL		15
226					95% BCA Bootstrap UCL	14.88						
227					90% Chebyshev(Mean, Sd) UCL	16.83				95% Chebyshev(Mean, Sd) UCL		18.58
228					97.5% Chebyshev(Mean, Sd) UCL	21.01				99% Chebyshev(Mean, Sd) UCL		25.77
229												
230						Suggested UCL to Use						
231					95% Chebyshev (Mean, Sd) UCL	18.58						
232												
233						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
234						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
235						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
236						For additional insight the user may want to consult a statistician.						
237												
238						Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
239						reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.						
240												
241												
242	Chromium											
243												
244						General Statistics						
245					Total Number of Observations	15				Number of Distinct Observations		13
246										Number of Missing Observations		0
247					Minimum	12				Mean		71.84
248					Maximum	150.7				Median		77.11
249					SD	40.43				Std. Error of Mean		10.44
250					Coefficient of Variation	0.563				Skewness		0.258
251												
252						Normal GOF Test						
253					Shapiro Wilk Test Statistic	0.953				Shapiro Wilk GOF Test		
254					5% Shapiro Wilk Critical Value	0.881				Data appear Normal at 5% Significance Level		
255					Lilliefors Test Statistic	0.129				Lilliefors GOF Test		
256					5% Lilliefors Critical Value	0.229				Data appear Normal at 5% Significance Level		
257						Data appear Normal at 5% Significance Level						
258												
259						Assuming Normal Distribution						
260						95% Normal UCL				95% UCLs (Adjusted for Skewness)		

	A	B	C	D	E	F	G	H	I	J	K	L
261					95% Student's-t UCL	90.23				95% Adjusted-CLT UCL (Chen-1995)		89.75
262										95% Modified-t UCL (Johnson-1978)		90.34
263												
264						**Gamma GOF Test**						
265					A-D Test Statistic	0.594			**Anderson-Darling Gamma GOF Test**			
266					5% A-D Critical Value	0.746			Detected data appear Gamma Distributed at 5% Significance Level			
267					K-S Test Statistic	0.169			**Kolmogrov-Smirnoff Gamma GOF Test**			
268					5% K-S Critical Value	0.224			Detected data appear Gamma Distributed at 5% Significance Level			
269						**Detected data appear Gamma Distributed at 5% Significance Level**						
270												
271						**Gamma Statistics**						
272					k hat (MLE)	2.423			k star (bias corrected MLE)			1.983
273					Theta hat (MLE)	29.65			Theta star (bias corrected MLE)			36.23
274					nu hat (MLE)	72.7			nu star (bias corrected)			59.49
275					MLE Mean (bias corrected)	71.84			MLE Sd (bias corrected)			51.02
276									Approximate Chi Square Value (0.05)			42.76
277					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value			41.01
278												
279						**Assuming Gamma Distribution**						
280					95% Approximate Gamma UCL (use when n>=50))	99.96			95% Adjusted Gamma UCL (use when n<50)			104.2
281												
282						**Lognormal GOF Test**						
283					Shapiro Wilk Test Statistic	0.856			**Shapiro Wilk Lognormal GOF Test**			
284					5% Shapiro Wilk Critical Value	0.881			Data Not Lognormal at 5% Significance Level			
285					Lilliefors Test Statistic	0.197			**Lilliefors Lognormal GOF Test**			
286					5% Lilliefors Critical Value	0.229			Data appear Lognormal at 5% Significance Level			
287						**Data appear Approximate Lognormal at 5% Significance Level**						
288												
289						**Lognormal Statistics**						
290					Minimum of Logged Data	2.485			Mean of logged Data			4.054
291					Maximum of Logged Data	5.015			SD of logged Data			0.785
292												
293						**Assuming Lognormal Distribution**						
294					95% H-UCL	130.4			90% Chebyshev (MVUE) UCL			126
295					95% Chebyshev (MVUE) UCL	148.4			97.5% Chebyshev (MVUE) UCL			179.6
296					99% Chebyshev (MVUE) UCL	240.8						
297												
298						**Nonparametric Distribution Free UCL Statistics**						
299						**Data appear to follow a Discernible Distribution at 5% Significance Level**						
300												
301						**Nonparametric Distribution Free UCLs**						
302					95% CLT UCL	89.01			95% Jackknife UCL			90.23
303					95% Standard Bootstrap UCL	88.3			95% Bootstrap-t UCL			91.46
304					95% Hall's Bootstrap UCL	91.62			95% Percentile Bootstrap UCL			89.41
305					95% BCA Bootstrap UCL	89.28						
306					90% Chebyshev(Mean, Sd) UCL	103.2			95% Chebyshev(Mean, Sd) UCL			117.3
307					97.5% Chebyshev(Mean, Sd) UCL	137			99% Chebyshev(Mean, Sd) UCL			175.7
308												
309						**Suggested UCL to Use**						
310					95% Student's-t UCL	90.23						
311												
312	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											

	A	B	C	D	E	F	G	H	I	J	K	L
313	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
314	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
315	For additional insight the user may want to consult a statistician.											
316												
317												
318	**Copper**											
319												
320	**General Statistics**											
321					Total Number of Observations	15			Number of Distinct Observations		15	
322									Number of Missing Observations		0	
323					Minimum	38			Mean		431.5	
324					Maximum	1274			Median		372.9	
325					SD	368.6			Std. Error of Mean		95.18	
326					Coefficient of Variation	0.854			Skewness		1.265	
327												
328	**Normal GOF Test**											
329					Shapiro Wilk Test Statistic	0.867			**Shapiro Wilk GOF Test**			
330					5% Shapiro Wilk Critical Value	0.881			Data Not Normal at 5% Significance Level			
331					Lilliefors Test Statistic	0.164			**Lilliefors GOF Test**			
332					5% Lilliefors Critical Value	0.229			Data appear Normal at 5% Significance Level			
333	**Data appear Approximate Normal at 5% Significance Level**											
334												
335	**Assuming Normal Distribution**											
336					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
337					95% Student's-t UCL	599.1			95% Adjusted-CLT UCL (Chen-1995)		621.2	
338									95% Modified-t UCL (Johnson-1978)		604.3	
339												
340	**Gamma GOF Test**											
341					A-D Test Statistic	0.194			**Anderson-Darling Gamma GOF Test**			
342					5% A-D Critical Value	0.756			Detected data appear Gamma Distributed at 5% Significance Level			
343					K-S Test Statistic	0.0945			**Kolmogrov-Smirnoff Gamma GOF Test**			
344					5% K-S Critical Value	0.226			Detected data appear Gamma Distributed at 5% Significance Level			
345	**Detected data appear Gamma Distributed at 5% Significance Level**											
346												
347	**Gamma Statistics**											
348					k hat (MLE)	1.377			k star (bias corrected MLE)		1.146	
349					Theta hat (MLE)	313.4			Theta star (bias corrected MLE)		376.5	
350					nu hat (MLE)	41.31			nu star (bias corrected)		34.38	
351					MLE Mean (bias corrected)	431.5			MLE Sd (bias corrected)		403.1	
352									Approximate Chi Square Value (0.05)		21.97	
353					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value		20.75	
354												
355	**Assuming Gamma Distribution**											
356					95% Approximate Gamma UCL (use when n>=50))	675.2			95% Adjusted Gamma UCL (use when n<50)		714.8	
357												
358	**Lognormal GOF Test**											
359					Shapiro Wilk Test Statistic	0.943			**Shapiro Wilk Lognormal GOF Test**			
360					5% Shapiro Wilk Critical Value	0.881			Data appear Lognormal at 5% Significance Level			
361					Lilliefors Test Statistic	0.146			**Lilliefors Lognormal GOF Test**			
362					5% Lilliefors Critical Value	0.229			Data appear Lognormal at 5% Significance Level			
363	**Data appear Lognormal at 5% Significance Level**											
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365	**Lognormal Statistics**											
366					Minimum of Logged Data	3.638					Mean of logged Data	5.662
367					Maximum of Logged Data	7.15					SD of logged Data	1.036
368												
369	**Assuming Lognormal Distribution**											
370					95% H-UCL	1069					90% Chebyshev (MVUE) UCL	880
371					95% Chebyshev (MVUE) UCL	1067					97.5% Chebyshev (MVUE) UCL	1326
372					99% Chebyshev (MVUE) UCL	1835						
373												
374	**Nonparametric Distribution Free UCL Statistics**											
375	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
376												
377	**Nonparametric Distribution Free UCLs**											
378					95% CLT UCL	588					95% Jackknife UCL	599.1
379					95% Standard Bootstrap UCL	582					95% Bootstrap-t UCL	658.4
380					95% Hall's Bootstrap UCL	805.4					95% Percentile Bootstrap UCL	584.6
381					95% BCA Bootstrap UCL	609						
382					90% Chebyshev(Mean, Sd) UCL	717					95% Chebyshev(Mean, Sd) UCL	846.4
383					97.5% Chebyshev(Mean, Sd) UCL	1026					99% Chebyshev(Mean, Sd) UCL	1379
384												
385	**Suggested UCL to Use**											
386					95% Student's-t UCL	599.1						
387												
388	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
389	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
390	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
391	For additional insight the user may want to consult a statistician.											
392												
393												
394	**Iron**											
395												
396	**General Statistics**											
397					Total Number of Observations	15					Number of Distinct Observations	15
398											Number of Missing Observations	0
399					Minimum	16098					Mean	53013
400					Maximum	142401					Median	38012
401					SD	35059					Std. Error of Mean	9052
402					Coefficient of Variation	0.661					Skewness	1.338
403												
404	**Normal GOF Test**											
405					Shapiro Wilk Test Statistic	0.868			**Shapiro Wilk GOF Test**			
406					5% Shapiro Wilk Critical Value	0.881			Data Not Normal at 5% Significance Level			
407					Lilliefors Test Statistic	0.199			**Lilliefors GOF Test**			
408					5% Lilliefors Critical Value	0.229			Data appear Normal at 5% Significance Level			
409	**Data appear Approximate Normal at 5% Significance Level**											
410												
411	**Assuming Normal Distribution**											
412	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
413					95% Student's-t UCL	68956					95% Adjusted-CLT UCL (Chen-1995)	71242
414											95% Modified-t UCL (Johnson-1978)	69477
415												
416	**Gamma GOF Test**											

417					A-D Test Statistic	0.337	Anderson-Darling Gamma GOF Test					
418					5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level					
419					K-S Test Statistic	0.162	Kolmogrov-Smirnoff Gamma GOF Test					
420					5% K-S Critical Value	0.223	Detected data appear Gamma Distributed at 5% Significance Level					
421	Detected data appear Gamma Distributed at 5% Significance Level											
422												
423	Gamma Statistics											
424					k hat (MLE)	2.854	k star (bias corrected MLE)					2.328
425					Theta hat (MLE)	18575	Theta star (bias corrected MLE)					22776
426					nu hat (MLE)	85.62	nu star (bias corrected)					69.83
427					MLE Mean (bias corrected)	53013	MLE Sd (bias corrected)					34748
428							Approximate Chi Square Value (0.05)					51.59
429					Adjusted Level of Significance	0.0324	Adjusted Chi Square Value					49.66
430												
431	Assuming Gamma Distribution											
432					95% Approximate Gamma UCL (use when n>=50))	71752	95% Adjusted Gamma UCL (use when n<50)					74536
433												
434	Lognormal GOF Test											
435					Shapiro Wilk Test Statistic	0.972	Shapiro Wilk Lognormal GOF Test					
436					5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level					
437					Lilliefors Test Statistic	0.129	Lilliefors Lognormal GOF Test					
438					5% Lilliefors Critical Value	0.229	Data appear Lognormal at 5% Significance Level					
439	Data appear Lognormal at 5% Significance Level											
440												
441	Lognormal Statistics											
442					Minimum of Logged Data	9.686	Mean of logged Data					10.69
443					Maximum of Logged Data	11.87	SD of logged Data					0.624
444												
445	Assuming Lognormal Distribution											
446					95% H-UCL	77396	90% Chebyshev (MVUE) UCL					79358
447					95% Chebyshev (MVUE) UCL	91421	97.5% Chebyshev (MVUE) UCL					108164
448					99% Chebyshev (MVUE) UCL	141053						
449												
450	Nonparametric Distribution Free UCL Statistics											
451	Data appear to follow a Discernible Distribution at 5% Significance Level											
452												
453	Nonparametric Distribution Free UCLs											
454					95% CLT UCL	67902	95% Jackknife UCL					68956
455					95% Standard Bootstrap UCL	67072	95% Bootstrap-t UCL					73641
456					95% Hall's Bootstrap UCL	74703	95% Percentile Bootstrap UCL					67567
457					95% BCA Bootstrap UCL	72994						
458					90% Chebyshev(Mean, Sd) UCL	80169	95% Chebyshev(Mean, Sd) UCL					92470
459					97.5% Chebyshev(Mean, Sd) UCL	109543	99% Chebyshev(Mean, Sd) UCL					143080
460												
461	Suggested UCL to Use											
462					95% Student's-t UCL	68956						
463												
464	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
465	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
466	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
467	For additional insight the user may want to consult a statistician.											
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470	**Manganese**											
471												
472						**General Statistics**						
473					Total Number of Observations	15				Number of Distinct Observations		15
474										Number of Missing Observations		0
475					Minimum	151				Mean		981.3
476					Maximum	2488				Median		891.8
477					SD	672.4				Std. Error of Mean		173.6
478					Coefficient of Variation	0.685				Skewness		1.115
479												
480						**Normal GOF Test**						
481					Shapiro Wilk Test Statistic	0.892				**Shapiro Wilk GOF Test**		
482					5% Shapiro Wilk Critical Value	0.881				Data appear Normal at 5% Significance Level		
483					Lilliefors Test Statistic	0.176				**Lilliefors GOF Test**		
484					5% Lilliefors Critical Value	0.229				Data appear Normal at 5% Significance Level		
485						**Data appear Normal at 5% Significance Level**						
486												
487						**Assuming Normal Distribution**						
488					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
489					95% Student's-t UCL	1287				95% Adjusted-CLT UCL (Chen-1995)		1320
490										95% Modified-t UCL (Johnson-1978)		1295
491												
492						**Gamma GOF Test**						
493					A-D Test Statistic	0.296				**Anderson-Darling Gamma GOF Test**		
494					5% A-D Critical Value	0.747				Detected data appear Gamma Distributed at 5% Significance Level		
495					K-S Test Statistic	0.119				**Kolmogrov-Smirnoff Gamma GOF Test**		
496					5% K-S Critical Value	0.224				Detected data appear Gamma Distributed at 5% Significance Level		
497						**Detected data appear Gamma Distributed at 5% Significance Level**						
498												
499						**Gamma Statistics**						
500					k hat (MLE)	2.125				k star (bias corrected MLE)		1.744
501					Theta hat (MLE)	461.8				Theta star (bias corrected MLE)		562.5
502					nu hat (MLE)	63.75				nu star (bias corrected)		52.33
503					MLE Mean (bias corrected)	981.3				MLE Sd (bias corrected)		743
504										Approximate Chi Square Value (0.05)		36.72
505					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		35.11
506												
507						**Assuming Gamma Distribution**						
508					95% Approximate Gamma UCL (use when n>=50))	1399				95% Adjusted Gamma UCL (use when n<50)		1463
509												
510						**Lognormal GOF Test**						
511					Shapiro Wilk Test Statistic	0.919				**Shapiro Wilk Lognormal GOF Test**		
512					5% Shapiro Wilk Critical Value	0.881				Data appear Lognormal at 5% Significance Level		
513					Lilliefors Test Statistic	0.166				**Lilliefors Lognormal GOF Test**		
514					5% Lilliefors Critical Value	0.229				Data appear Lognormal at 5% Significance Level		
515						**Data appear Lognormal at 5% Significance Level**						
516												
517						**Lognormal Statistics**						
518					Minimum of Logged Data	5.017				Mean of logged Data		6.635
519					Maximum of Logged Data	7.819				SD of logged Data		0.807
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521	Assuming Lognormal Distribution											
522					95% H-UCL	1789				90% Chebyshev (MVUE) UCL		1711
523					95% Chebyshev (MVUE) UCL	2021				97.5% Chebyshev (MVUE) UCL		2451
524					99% Chebyshev (MVUE) UCL	3297						
525												
526	Nonparametric Distribution Free UCL Statistics											
527	Data appear to follow a Discernible Distribution at 5% Significance Level											
528												
529	Nonparametric Distribution Free UCLs											
530					95% CLT UCL	1267				95% Jackknife UCL		1287
531					95% Standard Bootstrap UCL	1258				95% Bootstrap-t UCL		1390
532					95% Hall's Bootstrap UCL	1587				95% Percentile Bootstrap UCL		1271
533					95% BCA Bootstrap UCL	1308						
534					90% Chebyshev(Mean, Sd) UCL	1502				95% Chebyshev(Mean, Sd) UCL		1738
535					97.5% Chebyshev(Mean, Sd) UCL	2065				99% Chebyshev(Mean, Sd) UCL		2709
536												
537	Suggested UCL to Use											
538					95% Student's-t UCL	1287						
539												
540	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
541	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
542	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
543	For additional insight the user may want to consult a statistician.											
544												
545												
546	Mercury											
547												
548	General Statistics											
549					Total Number of Observations	15				Number of Distinct Observations		5
550										Number of Missing Observations		0
551					Minimum	1.24				Mean		16
552					Maximum	40				Median		10
553					SD	12.75				Std. Error of Mean		3.293
554					Coefficient of Variation	0.797				Skewness		1.443
555												
556	Normal GOF Test											
557					Shapiro Wilk Test Statistic	0.662				Shapiro Wilk GOF Test		
558					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
559					Lilliefors Test Statistic	0.348				Lilliefors GOF Test		
560					5% Lilliefors Critical Value	0.229				Data Not Normal at 5% Significance Level		
561	Data Not Normal at 5% Significance Level											
562												
563	Assuming Normal Distribution											
564					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
565					95% Student's-t UCL	21.8				95% Adjusted-CLT UCL (Chen-1995)		22.72
566										95% Modified-t UCL (Johnson-1978)		22
567												
568	Gamma GOF Test											
569					A-D Test Statistic	1.902				Anderson-Darling Gamma GOF Test		
570					5% A-D Critical Value	0.748				Data Not Gamma Distributed at 5% Significance Level		
571					K-S Test Statistic	0.304				Kolmogrov-Smirnoff Gamma GOF Test		
572					5% K-S Critical Value	0.225				Data Not Gamma Distributed at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
573	Data Not Gamma Distributed at 5% Significance Level											
574												
575	Gamma Statistics											
576					k hat (MLE)	1.912			k star (bias corrected MLE)			1.574
577					Theta hat (MLE)	8.368			Theta star (bias corrected MLE)			10.16
578					nu hat (MLE)	57.36			nu star (bias corrected)			47.22
579					MLE Mean (bias corrected)	16			MLE Sd (bias corrected)			12.75
580									Approximate Chi Square Value (0.05)			32.45
581					Adjusted Level of Significance	0.0324			Adjusted Chi Square Value			30.94
582												
583	Assuming Gamma Distribution											
584				95% Approximate Gamma UCL (use when n>=50))		23.28			95% Adjusted Gamma UCL (use when n<50)			24.41
585												
586	Lognormal GOF Test											
587					Shapiro Wilk Test Statistic	0.746			Shapiro Wilk Lognormal GOF Test			
588					5% Shapiro Wilk Critical Value	0.881			Data Not Lognormal at 5% Significance Level			
589					Lilliefors Test Statistic	0.346			Lilliefors Lognormal GOF Test			
590					5% Lilliefors Critical Value	0.229			Data Not Lognormal at 5% Significance Level			
591	Data Not Lognormal at 5% Significance Level											
592												
593	Lognormal Statistics											
594					Minimum of Logged Data	0.215			Mean of logged Data			2.489
595					Maximum of Logged Data	3.689			SD of logged Data			0.84
596												
597	Assuming Lognormal Distribution											
598					95% H-UCL	30.03			90% Chebyshev (MVUE) UCL			28.23
599					95% Chebyshev (MVUE) UCL	33.48			97.5% Chebyshev (MVUE) UCL			40.77
600					99% Chebyshev (MVUE) UCL	55.09						
601												
602	Nonparametric Distribution Free UCL Statistics											
603	Data do not follow a Discernible Distribution (0.05)											
604												
605	Nonparametric Distribution Free UCLs											
606					95% CLT UCL	21.41			95% Jackknife UCL			21.8
607					95% Standard Bootstrap UCL	21.49			95% Bootstrap-t UCL			23.27
608					95% Hall's Bootstrap UCL	21.22			95% Percentile Bootstrap UCL			21.42
609					95% BCA Bootstrap UCL	22.35						
610					90% Chebyshev(Mean, Sd) UCL	25.88			95% Chebyshev(Mean, Sd) UCL			30.35
611					97.5% Chebyshev(Mean, Sd) UCL	36.56			99% Chebyshev(Mean, Sd) UCL			48.76
612												
613	Suggested UCL to Use											
614					95% Chebyshev (Mean, Sd) UCL	30.35						
615												
616	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
617	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
618	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
619	For additional insight the user may want to consult a statistician.											
620												
621												
622	Neptunium-237											
623												
624	General Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
625					Total Number of Observations	15					Number of Distinct Observations	3
626											Number of Missing Observations	0
627					Minimum	0.461					Mean	0.631
628					Maximum	0.8					Median	0.631
629					SD	0.0641					Std. Error of Mean	0.0165
630					Coefficient of Variation	0.102					Skewness	4.350E-15
631												
632					**Normal GOF Test**							
633					Shapiro Wilk Test Statistic	0.53	**Shapiro Wilk GOF Test**					
634					5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level					
635					Lilliefors Test Statistic	0.433	**Lilliefors GOF Test**					
636					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
637					**Data Not Normal at 5% Significance Level**							
638												
639					**Assuming Normal Distribution**							
640			**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**					
641					95% Student's-t UCL	0.66					95% Adjusted-CLT UCL (Chen-1995)	0.658
642											95% Modified-t UCL (Johnson-1978)	0.66
643												
644					**Gamma GOF Test**							
645					A-D Test Statistic	3.815	**Anderson-Darling Gamma GOF Test**					
646					5% A-D Critical Value	0.734	Data Not Gamma Distributed at 5% Significance Level					
647					K-S Test Statistic	0.447	**Kolmogrov-Smirnoff Gamma GOF Test**					
648					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
649					**Data Not Gamma Distributed at 5% Significance Level**							
650												
651					**Gamma Statistics**							
652					k hat (MLE)	100.1					k star (bias corrected MLE)	80.16
653					Theta hat (MLE)	0.0063					Theta star (bias corrected MLE)	0.00787
654					nu hat (MLE)	3004					nu star (bias corrected)	2405
655					MLE Mean (bias corrected)	0.631					MLE Sd (bias corrected)	0.0704
656											Approximate Chi Square Value (0.05)	2292
657					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	2278
658												
659					**Assuming Gamma Distribution**							
660					95% Approximate Gamma UCL (use when n>=50))	0.662					95% Adjusted Gamma UCL (use when n<50)	0.666
661												
662					**Lognormal GOF Test**							
663					Shapiro Wilk Test Statistic	0.522	**Shapiro Wilk Lognormal GOF Test**					
664					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
665					Lilliefors Test Statistic	0.452	**Lilliefors Lognormal GOF Test**					
666					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
667					**Data Not Lognormal at 5% Significance Level**							
668												
669					**Lognormal Statistics**							
670					Minimum of Logged Data	-0.774					Mean of logged Data	-0.466
671					Maximum of Logged Data	-0.223					SD of logged Data	0.105
672												
673					**Assuming Lognormal Distribution**							
674					95% H-UCL	0.663					90% Chebyshev (MVUE) UCL	0.682
675					95% Chebyshev (MVUE) UCL	0.705					97.5% Chebyshev (MVUE) UCL	0.738
676					99% Chebyshev (MVUE) UCL	0.801						

	A	B	C	D	E	F	G	H	I	J	K	L
677												
678						Nonparametric Distribution Free UCL Statistics						
679						Data do not follow a Discernible Distribution (0.05)						
680												
681						Nonparametric Distribution Free UCLs						
682					95% CLT UCL	0.658				95% Jackknife UCL		0.66
683					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
684					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
685					95% BCA Bootstrap UCL	N/A						
686					90% Chebyshev(Mean, Sd) UCL	0.68				95% Chebyshev(Mean, Sd) UCL		0.703
687					97.5% Chebyshev(Mean, Sd) UCL	0.734				99% Chebyshev(Mean, Sd) UCL		0.795
688												
689						Suggested UCL to Use						
690					95% Student's-t UCL	0.66				or 95% Modified-t UCL		0.66
691												
692						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
693						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
694						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
695						For additional insight the user may want to consult a statistician.						
696												
697												
698	Nickel											
699												
700						General Statistics						
701					Total Number of Observations	15				Number of Distinct Observations		14
702										Number of Missing Observations		0
703					Minimum	21				Mean		594.9
704					Maximum	3787				Median		275.6
705					SD	965.1				Std. Error of Mean		249.2
706					Coefficient of Variation	1.622				Skewness		2.97
707												
708						Normal GOF Test						
709					Shapiro Wilk Test Statistic	0.593				Shapiro Wilk GOF Test		
710					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
711					Lilliefors Test Statistic	0.31				Lilliefors GOF Test		
712					5% Lilliefors Critical Value	0.229				Data Not Normal at 5% Significance Level		
713						Data Not Normal at 5% Significance Level						
714												
715						Assuming Normal Distribution						
716					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
717					95% Student's-t UCL	1034				95% Adjusted-CLT UCL (Chen-1995)		1209
718										95% Modified-t UCL (Johnson-1978)		1066
719												
720						Gamma GOF Test						
721					A-D Test Statistic	0.466				Anderson-Darling Gamma GOF Test		
722					5% A-D Critical Value	0.779				Detected data appear Gamma Distributed at 5% Significance Level		
723					K-S Test Statistic	0.155				Kolmogrov-Smirnoff Gamma GOF Test		
724					5% K-S Critical Value	0.231				Detected data appear Gamma Distributed at 5% Significance Level		
725						Detected data appear Gamma Distributed at 5% Significance Level						
726												
727						Gamma Statistics						
728					k hat (MLE)	0.693				k star (bias corrected MLE)		0.599

	A	B	C	D	E	F	G	H	I	J	K	L
729					Theta hat (MLE)	857.9				Theta star (bias corrected MLE)		992.9
730					nu hat (MLE)	20.8				nu star (bias corrected)		17.98
731					MLE Mean (bias corrected)	594.9				MLE Sd (bias corrected)		768.6
732										Approximate Chi Square Value (0.05)		9.374
733					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		8.617
734												
735					**Assuming Gamma Distribution**							
736					95% Approximate Gamma UCL (use when n>=50)	1141				95% Adjusted Gamma UCL (use when n<50)		1241
737												
738					**Lognormal GOF Test**							
739					Shapiro Wilk Test Statistic	0.97				**Shapiro Wilk Lognormal GOF Test**		
740					5% Shapiro Wilk Critical Value	0.881				Data appear Lognormal at 5% Significance Level		
741					Lilliefors Test Statistic	0.113				**Lilliefors Lognormal GOF Test**		
742					5% Lilliefors Critical Value	0.229				Data appear Lognormal at 5% Significance Level		
743					**Data appear Lognormal at 5% Significance Level**							
744												
745					**Lognormal Statistics**							
746					Minimum of Logged Data	3.045				Mean of logged Data		5.516
747					Maximum of Logged Data	8.239				SD of logged Data		1.418
748												
749					**Assuming Lognormal Distribution**							
750					95% H-UCL	2520				90% Chebyshev (MVUE) UCL		1359
751					95% Chebyshev (MVUE) UCL	1701				97.5% Chebyshev (MVUE) UCL		2175
752					99% Chebyshev (MVUE) UCL	3107						
753												
754					**Nonparametric Distribution Free UCL Statistics**							
755					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
756												
757					**Nonparametric Distribution Free UCLs**							
758					95% CLT UCL	1005				95% Jackknife UCL		1034
759					95% Standard Bootstrap UCL	991.5				95% Bootstrap-t UCL		1991
760					95% Hall's Bootstrap UCL	2648				95% Percentile Bootstrap UCL		1043
761					95% BCA Bootstrap UCL	1327						
762					90% Chebyshev(Mean, Sd) UCL	1342				95% Chebyshev(Mean, Sd) UCL		1681
763					97.5% Chebyshev(Mean, Sd) UCL	2151				99% Chebyshev(Mean, Sd) UCL		3074
764												
765					**Suggested UCL to Use**							
766					95% Adjusted Gamma UCL	1241						
767												
768					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
769					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
770					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
771					For additional insight the user may want to consult a statistician.							
772												
773												
774	**PAH, Total**											
775												
776					**General Statistics**							
777					Total Number of Observations	15				Number of Distinct Observations		3
778										Number of Missing Observations		0
779					Minimum	0.0233				Mean		1.234
780					Maximum	2.445				Median		1.234

	A	B	C	D	E	F	G	H	I	J	K	L
781					SD	0.458					Std. Error of Mean	0.118
782					Coefficient of Variation	0.371					Skewness	-7.64E-16
783												
784					Normal GOF Test							
785					Shapiro Wilk Test Statistic	0.53	Shapiro Wilk GOF Test					
786					5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level					
787					Lilliefors Test Statistic	0.433	Lilliefors GOF Test					
788					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
789					Data Not Normal at 5% Significance Level							
790												
791					Assuming Normal Distribution							
792				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
793					95% Student's-t UCL	1.442					95% Adjusted-CLT UCL (Chen-1995)	1.428
794											95% Modified-t UCL (Johnson-1978)	1.442
795												
796					Gamma GOF Test							
797					A-D Test Statistic	4.312	Anderson-Darling Gamma GOF Test					
798					5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level					
799					K-S Test Statistic	0.519	Kolmogrov-Smirnoff Gamma GOF Test					
800					5% K-S Critical Value	0.224	Data Not Gamma Distributed at 5% Significance Level					
801					Data Not Gamma Distributed at 5% Significance Level							
802												
803					Gamma Statistics							
804					k hat (MLE)	2.436					k star (bias corrected MLE)	1.993
805					Theta hat (MLE)	0.507					Theta star (bias corrected MLE)	0.619
806					nu hat (MLE)	73.08					nu star (bias corrected)	59.8
807					MLE Mean (bias corrected)	1.234					MLE Sd (bias corrected)	0.874
808											Approximate Chi Square Value (0.05)	43.02
809					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	41.27
810												
811					Assuming Gamma Distribution							
812					95% Approximate Gamma UCL (use when n>=50))	1.716					95% Adjusted Gamma UCL (use when n<50)	1.788
813												
814					Lognormal GOF Test							
815					Shapiro Wilk Test Statistic	0.37	Shapiro Wilk Lognormal GOF Test					
816					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
817					Lilliefors Test Statistic	0.516	Lilliefors Lognormal GOF Test					
818					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
819					Data Not Lognormal at 5% Significance Level							
820												
821					Lognormal Statistics							
822					Minimum of Logged Data	-3.759					Mean of logged Data	-0.00872
823					Maximum of Logged Data	0.894					SD of logged Data	1.052
824												
825					Assuming Lognormal Distribution							
826					95% H-UCL	3.821					90% Chebyshev (MVUE) UCL	3.103
827					95% Chebyshev (MVUE) UCL	3.767					97.5% Chebyshev (MVUE) UCL	4.689
828					99% Chebyshev (MVUE) UCL	6.5						
829												
830					Nonparametric Distribution Free UCL Statistics							
831					Data do not follow a Discernible Distribution (0.05)							
832												

	A	B	C	D	E	F	G	H	I	J	K	L
833	Nonparametric Distribution Free UCLs											
834					95% CLT UCL	1.428				95% Jackknife UCL		1.442
835					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
836					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
837					95% BCA Bootstrap UCL	N/A						
838					90% Chebyshev(Mean, Sd) UCL	1.589				95% Chebyshev(Mean, Sd) UCL		1.749
839					97.5% Chebyshev(Mean, Sd) UCL	1.972				99% Chebyshev(Mean, Sd) UCL		2.41
840												
841	Suggested UCL to Use											
842					95% Chebyshev (Mean, Sd) UCL	1.749						
843												
844	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
845	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
846	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
847	For additional insight the user may want to consult a statistician.											
848												
849	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
850	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
851												
852	**PCB, Total**											
853												
854	General Statistics											
855					Total Number of Observations	15				Number of Distinct Observations		5
856										Number of Missing Observations		0
857					Minimum	5				Mean		13.09
858					Maximum	55				Median		6.4
859					SD	16.19				Std. Error of Mean		4.18
860					Coefficient of Variation	1.236				Skewness		2.325
861												
862	Normal GOF Test											
863					Shapiro Wilk Test Statistic	0.531				**Shapiro Wilk GOF Test**		
864					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
865					Lilliefors Test Statistic	0.442				**Lilliefors GOF Test**		
866					5% Lilliefors Critical Value	0.229				Data Not Normal at 5% Significance Level		
867	**Data Not Normal at 5% Significance Level**											
868												
869	Assuming Normal Distribution											
870	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
871					95% Student's-t UCL	20.46				95% Adjusted-CLT UCL (Chen-1995)		22.65
872										95% Modified-t UCL (Johnson-1978)		20.87
873												
874	Gamma GOF Test											
875					A-D Test Statistic	2.364				**Anderson-Darling Gamma GOF Test**		
876					5% A-D Critical Value	0.756				Data Not Gamma Distributed at 5% Significance Level		
877					K-S Test Statistic	0.372				**Kolmogrov-Smirnoff Gamma GOF Test**		
878					5% K-S Critical Value	0.226				Data Not Gamma Distributed at 5% Significance Level		
879	**Data Not Gamma Distributed at 5% Significance Level**											
880												
881	Gamma Statistics											
882					k hat (MLE)	1.387				k star (bias corrected MLE)		1.154
883					Theta hat (MLE)	9.437				Theta star (bias corrected MLE)		11.34
884					nu hat (MLE)	41.62				nu star (bias corrected)		34.63

	A	B	C	D	E	F	G	H	I	J	K	L
885					MLE Mean (bias corrected)	13.09					MLE Sd (bias corrected)	12.19
886											Approximate Chi Square Value (0.05)	22.17
887					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	20.95
888												
889					**Assuming Gamma Distribution**							
890					95% Approximate Gamma UCL (use when n>=50))	20.45					95% Adjusted Gamma UCL (use when n<50)	21.65
891												
892					**Lognormal GOF Test**							
893					Shapiro Wilk Test Statistic	0.701			**Shapiro Wilk Lognormal GOF Test**			
894					5% Shapiro Wilk Critical Value	0.881			Data Not Lognormal at 5% Significance Level			
895					Lilliefors Test Statistic	0.3			**Lilliefors Lognormal GOF Test**			
896					5% Lilliefors Critical Value	0.229			Data Not Lognormal at 5% Significance Level			
897					**Data Not Lognormal at 5% Significance Level**							
898												
899					**Lognormal Statistics**							
900					Minimum of Logged Data	1.609					Mean of logged Data	2.17
901					Maximum of Logged Data	4.007					SD of logged Data	0.793
902												
903					**Assuming Lognormal Distribution**							
904					95% H-UCL	20.08					90% Chebyshev (MVUE) UCL	19.33
905					95% Chebyshev (MVUE) UCL	22.8					97.5% Chebyshev (MVUE) UCL	27.61
906					99% Chebyshev (MVUE) UCL	37.05						
907												
908					**Nonparametric Distribution Free UCL Statistics**							
909					**Data do not follow a Discernible Distribution (0.05)**							
910												
911					**Nonparametric Distribution Free UCLs**							
912					95% CLT UCL	19.97					95% Jackknife UCL	20.46
913					95% Standard Bootstrap UCL	19.51					95% Bootstrap-t UCL	52.56
914					95% Hall's Bootstrap UCL	65.02					95% Percentile Bootstrap UCL	19.85
915					95% BCA Bootstrap UCL	23.43						
916					90% Chebyshev(Mean, Sd) UCL	25.63					95% Chebyshev(Mean, Sd) UCL	31.31
917					97.5% Chebyshev(Mean, Sd) UCL	39.2					99% Chebyshev(Mean, Sd) UCL	54.69
918												
919					**Suggested UCL to Use**							
920					95% Chebyshev (Mean, Sd) UCL	31.31						
921												
922					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
923					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
924					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
925					For additional insight the user may want to consult a statistician.							
926												
927												
928	**Thallium**											
929												
930					**General Statistics**							
931					Total Number of Observations	15					Number of Distinct Observations	3
932											Number of Missing Observations	0
933					Minimum	0.15					Mean	0.18
934					Maximum	0.21					Median	0.18
935					SD	0.0113					Std. Error of Mean	0.00293
936					Coefficient of Variation	0.063					Skewness	0

	A	B	C	D	E	F	G	H	I	J	K	L
937												
938						Normal GOF Test						
939					Shapiro Wilk Test Statistic	0.53	Shapiro Wilk GOF Test					
940					5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level					
941					Lilliefors Test Statistic	0.433	Lilliefors GOF Test					
942					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
943						Data Not Normal at 5% Significance Level						
944												
945						Assuming Normal Distribution						
946				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
947					95% Student's-t UCL	0.185	95% Adjusted-CLT UCL (Chen-1995)					0.185
948							95% Modified-t UCL (Johnson-1978)					0.185
949												
950						Gamma GOF Test						
951					A-D Test Statistic	3.809	Anderson-Darling Gamma GOF Test					
952					5% A-D Critical Value	0.734	Data Not Gamma Distributed at 5% Significance Level					
953					K-S Test Statistic	0.441	Kolmogrov-Smirnoff Gamma GOF Test					
954					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
955						Data Not Gamma Distributed at 5% Significance Level						
956												
957						Gamma Statistics						
958					k hat (MLE)	266.4	k star (bias corrected MLE)					213.2
959					Theta hat (MLE)	6.7568E-4	Theta star (bias corrected MLE)					8.4442E-4
960					nu hat (MLE)	7992	nu star (bias corrected)					6395
961					MLE Mean (bias corrected)	0.18	MLE Sd (bias corrected)					0.0123
962							Approximate Chi Square Value (0.05)					6210
963					Adjusted Level of Significance	0.0324	Adjusted Chi Square Value					6188
964												
965						Assuming Gamma Distribution						
966					95% Approximate Gamma UCL (use when n>=50))	0.185	95% Adjusted Gamma UCL (use when n<50)					0.186
967												
968						Lognormal GOF Test						
969					Shapiro Wilk Test Statistic	0.527	Shapiro Wilk Lognormal GOF Test					
970					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
971					Lilliefors Test Statistic	0.445	Lilliefors Lognormal GOF Test					
972					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
973						Data Not Lognormal at 5% Significance Level						
974												
975						Lognormal Statistics						
976					Minimum of Logged Data	-1.897	Mean of logged Data					-1.717
977					Maximum of Logged Data	-1.561	SD of logged Data					0.0638
978												
979						Assuming Lognormal Distribution						
980					95% H-UCL	N/A	90% Chebyshev (MVUE) UCL					0.189
981					95% Chebyshev (MVUE) UCL	0.193	97.5% Chebyshev (MVUE) UCL					0.199
982					99% Chebyshev (MVUE) UCL	0.21						
983												
984						Nonparametric Distribution Free UCL Statistics						
985						Data do not follow a Discernible Distribution (0.05)						
986												
987						Nonparametric Distribution Free UCLs						
988					95% CLT UCL	0.185	95% Jackknife UCL					0.185

	A	B	C	D	E	F	G	H	I	J	K	L
989					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
990					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
991					95% BCA Bootstrap UCL	N/A						
992					90% Chebyshev(Mean, Sd) UCL	0.189				95% Chebyshev(Mean, Sd) UCL		0.193
993					97.5% Chebyshev(Mean, Sd) UCL	0.198				99% Chebyshev(Mean, Sd) UCL		0.209
994												
995					**Suggested UCL to Use**							
996					95% Student's-t UCL	0.185				or 95% Modified-t UCL		0.185
997												
998					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
999					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1000					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1001					For additional insight the user may want to consult a statistician.							
1002												
1003												
1004	**Uranium**											
1005												
1006					**General Statistics**							
1007					Total Number of Observations	15				Number of Distinct Observations		14
1008										Number of Missing Observations		0
1009					Minimum	10				Mean		95.13
1010					Maximum	259.3				Median		62.87
1011					SD	74.58				Std. Error of Mean		19.26
1012					Coefficient of Variation	0.784				Skewness		1.143
1013												
1014					**Normal GOF Test**							
1015					Shapiro Wilk Test Statistic	0.878				**Shapiro Wilk GOF Test**		
1016					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
1017					Lilliefors Test Statistic	0.201				**Lilliefors GOF Test**		
1018					5% Lilliefors Critical Value	0.229				Data appear Normal at 5% Significance Level		
1019					**Data appear Approximate Normal at 5% Significance Level**							
1020												
1021					**Assuming Normal Distribution**							
1022					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1023					95% Student's-t UCL	129				95% Adjusted-CLT UCL (Chen-1995)		132.9
1024										95% Modified-t UCL (Johnson-1978)		130
1025												
1026					**Gamma GOF Test**							
1027					A-D Test Statistic	0.307				**Anderson-Darling Gamma GOF Test**		
1028					5% A-D Critical Value	0.753				Detected data appear Gamma Distributed at 5% Significance Level		
1029					K-S Test Statistic	0.125				**Kolmogrov-Smirnoff Gamma GOF Test**		
1030					5% K-S Critical Value	0.225				Detected data appear Gamma Distributed at 5% Significance Level		
1031					**Detected data appear Gamma Distributed at 5% Significance Level**							
1032												
1033					**Gamma Statistics**							
1034					k hat (MLE)	1.572				k star (bias corrected MLE)		1.302
1035					Theta hat (MLE)	60.53				Theta star (bias corrected MLE)		73.08
1036					nu hat (MLE)	47.15				nu star (bias corrected)		39.05
1037					MLE Mean (bias corrected)	95.13				MLE Sd (bias corrected)		83.38
1038										Approximate Chi Square Value (0.05)		25.74
1039					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		24.41
1040												

	A	B	C	D	E	F	G	H	I	J	K	L
1041	**Assuming Gamma Distribution**											
1042	95% Approximate Gamma UCL (use when n>=50))					144.3	95% Adjusted Gamma UCL (use when n<50)					152.2
1043												
1044	**Lognormal GOF Test**											
1045	Shapiro Wilk Test Statistic					0.914	**Shapiro Wilk Lognormal GOF Test**					
1046	5% Shapiro Wilk Critical Value					0.881	Data appear Lognormal at 5% Significance Level					
1047	Lilliefors Test Statistic					0.179	**Lilliefors Lognormal GOF Test**					
1048	5% Lilliefors Critical Value					0.229	Data appear Lognormal at 5% Significance Level					
1049	**Data appear Lognormal at 5% Significance Level**											
1050												
1051	**Lognormal Statistics**											
1052	Minimum of Logged Data					2.303	Mean of logged Data					4.205
1053	Maximum of Logged Data					5.558	SD of logged Data					0.971
1054												
1055	**Assuming Lognormal Distribution**											
1056	95% H-UCL					216.3	90% Chebyshev (MVUE) UCL					187.1
1057	95% Chebyshev (MVUE) UCL					225.3	97.5% Chebyshev (MVUE) UCL					278.3
1058	99% Chebyshev (MVUE) UCL					382.4						
1059												
1060	**Nonparametric Distribution Free UCL Statistics**											
1061	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1062												
1063	**Nonparametric Distribution Free UCLs**											
1064	95% CLT UCL					126.8	95% Jackknife UCL					129
1065	95% Standard Bootstrap UCL					126	95% Bootstrap-t UCL					135.7
1066	95% Hall's Bootstrap UCL					152.8	95% Percentile Bootstrap UCL					127
1067	95% BCA Bootstrap UCL					128.7						
1068	90% Chebyshev(Mean, Sd) UCL					152.9	95% Chebyshev(Mean, Sd) UCL					179.1
1069	97.5% Chebyshev(Mean, Sd) UCL					215.4	99% Chebyshev(Mean, Sd) UCL					286.7
1070												
1071	**Suggested UCL to Use**											
1072	95% Student's-t UCL					129						
1073												
1074	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1075	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1076	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1077	For additional insight the user may want to consult a statistician.											
1078												
1079												
1080	**Uranium-234**											
1081												
1082	**General Statistics**											
1083	Total Number of Observations					15	Number of Distinct Observations					3
1084							Number of Missing Observations					0
1085	Minimum					4	Mean					7.35
1086	Maximum					10.7	Median					7.35
1087	SD					1.266	Std. Error of Mean					0.327
1088	Coefficient of Variation					0.172	Skewness					2.308E-15
1089												
1090	**Normal GOF Test**											
1091	Shapiro Wilk Test Statistic					0.53	**Shapiro Wilk GOF Test**					
1092	5% Shapiro Wilk Critical Value					0.881	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
1093					Lilliefors Test Statistic	0.433	**Lilliefors GOF Test**					
1094					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
1095	**Data Not Normal at 5% Significance Level**											
1096												
1097	**Assuming Normal Distribution**											
1098	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1099					95% Student's-t UCL	7.926	95% Adjusted-CLT UCL (Chen-1995)					7.888
1100							95% Modified-t UCL (Johnson-1978)					7.926
1101												
1102	**Gamma GOF Test**											
1103					A-D Test Statistic	3.839	**Anderson-Darling Gamma GOF Test**					
1104					5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level					
1105					K-S Test Statistic	0.457	**Kolmogrov-Smirnoff Gamma GOF Test**					
1106					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
1107	**Data Not Gamma Distributed at 5% Significance Level**											
1108												
1109	**Gamma Statistics**											
1110					k hat (MLE)	32.37	k star (bias corrected MLE)					25.94
1111					Theta hat (MLE)	0.227	Theta star (bias corrected MLE)					0.283
1112					nu hat (MLE)	971.2	nu star (bias corrected)					778.3
1113					MLE Mean (bias corrected)	7.35	MLE Sd (bias corrected)					1.443
1114							Approximate Chi Square Value (0.05)					714.6
1115					Adjusted Level of Significance	0.0324	Adjusted Chi Square Value					707
1116												
1117	**Assuming Gamma Distribution**											
1118					95% Approximate Gamma UCL (use when n>=50))	8.006	95% Adjusted Gamma UCL (use when n<50)					8.091
1119												
1120	**Lognormal GOF Test**											
1121					Shapiro Wilk Test Statistic	0.506	**Shapiro Wilk Lognormal GOF Test**					
1122					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
1123					Lilliefors Test Statistic	0.466	**Lilliefors Lognormal GOF Test**					
1124					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
1125	**Data Not Lognormal at 5% Significance Level**											
1126												
1127	**Lognormal Statistics**											
1128					Minimum of Logged Data	1.386	Mean of logged Data					1.979
1129					Maximum of Logged Data	2.37	SD of logged Data					0.19
1130												
1131	**Assuming Lognormal Distribution**											
1132					95% H-UCL	8.077	90% Chebyshev (MVUE) UCL					8.451
1133					95% Chebyshev (MVUE) UCL	8.945	97.5% Chebyshev (MVUE) UCL					9.63
1134					99% Chebyshev (MVUE) UCL	10.98						
1135												
1136	**Nonparametric Distribution Free UCL Statistics**											
1137	**Data do not follow a Discernible Distribution (0.05)**											
1138												
1139	**Nonparametric Distribution Free UCLs**											
1140					95% CLT UCL	7.888	95% Jackknife UCL					7.926
1141					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
1142					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
1143					95% BCA Bootstrap UCL	N/A						
1144					90% Chebyshev(Mean, Sd) UCL	8.331	95% Chebyshev(Mean, Sd) UCL					8.775

	A	B	C	D	E	F	G	H	I	J	K	L
1145					97.5% Chebyshev(Mean, Sd) UCL	9.392					99% Chebyshev(Mean, Sd) UCL	10.6
1146												
1147						Suggested UCL to Use						
1148					95% Student's-t UCL	7.926					or 95% Modified-t UCL	7.926
1149												
1150	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1151	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1152	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1153	For additional insight the user may want to consult a statistician.											
1154												
1155												
1156	Uranium-235											
1157												
1158						General Statistics						
1159					Total Number of Observations	15					Number of Distinct Observations	3
1160											Number of Missing Observations	0
1161					Minimum	0.271					Mean	0.351
1162					Maximum	0.43					Median	0.351
1163					SD	0.03					Std. Error of Mean	0.00776
1164					Coefficient of Variation	0.0857					Skewness	-9.55E-15
1165												
1166						Normal GOF Test						
1167					Shapiro Wilk Test Statistic	0.53					Shapiro Wilk GOF Test	
1168					5% Shapiro Wilk Critical Value	0.881					Data Not Normal at 5% Significance Level	
1169					Lilliefors Test Statistic	0.433					Lilliefors GOF Test	
1170					5% Lilliefors Critical Value	0.229					Data Not Normal at 5% Significance Level	
1171						Data Not Normal at 5% Significance Level						
1172												
1173						Assuming Normal Distribution						
1174					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
1175					95% Student's-t UCL	0.364					95% Adjusted-CLT UCL (Chen-1995)	0.363
1176											95% Modified-t UCL (Johnson-1978)	0.364
1177												
1178						Gamma GOF Test						
1179					A-D Test Statistic	3.812					Anderson-Darling Gamma GOF Test	
1180					5% A-D Critical Value	0.734					Data Not Gamma Distributed at 5% Significance Level	
1181					K-S Test Statistic	0.444					Kolmogrov-Smirnoff Gamma GOF Test	
1182					5% K-S Critical Value	0.221					Data Not Gamma Distributed at 5% Significance Level	
1183						Data Not Gamma Distributed at 5% Significance Level						
1184												
1185						Gamma Statistics						
1186					k hat (MLE)	142.2					k star (bias corrected MLE)	113.8
1187					Theta hat (MLE)	0.00247					Theta star (bias corrected MLE)	0.00308
1188					nu hat (MLE)	4265					nu star (bias corrected)	3413
1189					MLE Mean (bias corrected)	0.351					MLE Sd (bias corrected)	0.0329
1190											Approximate Chi Square Value (0.05)	3279
1191					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	3262
1192												
1193						Assuming Gamma Distribution						
1194					95% Approximate Gamma UCL (use when n>=50))	0.365					95% Adjusted Gamma UCL (use when n<50)	0.367
1195												
1196						Lognormal GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
1197					Shapiro Wilk Test Statistic	0.525	Shapiro Wilk Lognormal GOF Test					
1198					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
1199					Lilliefors Test Statistic	0.449	Lilliefors Lognormal GOF Test					
1200					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
1201	Data Not Lognormal at 5% Significance Level											
1202												
1203	Lognormal Statistics											
1204					Minimum of Logged Data	-1.306	Mean of logged Data					-1.052
1205					Maximum of Logged Data	-0.844	SD of logged Data					0.0877
1206												
1207	Assuming Lognormal Distribution											
1208					95% H-UCL	N/A	90% Chebyshev (MVUE) UCL					0.374
1209					95% Chebyshev (MVUE) UCL	0.385	97.5% Chebyshev (MVUE) UCL					0.4
1210					99% Chebyshev (MVUE) UCL	0.43						
1211												
1212	Nonparametric Distribution Free UCL Statistics											
1213	Data do not follow a Discernible Distribution (0.05)											
1214												
1215	Nonparametric Distribution Free UCLs											
1216					95% CLT UCL	0.363	95% Jackknife UCL					0.364
1217					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
1218					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
1219					95% BCA Bootstrap UCL	N/A						
1220					90% Chebyshev(Mean, Sd) UCL	0.374	95% Chebyshev(Mean, Sd) UCL					0.384
1221					97.5% Chebyshev(Mean, Sd) UCL	0.399	99% Chebyshev(Mean, Sd) UCL					0.428
1222												
1223	Suggested UCL to Use											
1224					95% Student's-t UCL	0.364	or 95% Modified-t UCL					0.364
1225												
1226	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1227	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1228	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1229	For additional insight the user may want to consult a statistician.											
1230												
1231	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
1232	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
1233												
1234												
1235	Uranium-238											
1236												
1237	General Statistics											
1238					Total Number of Observations	15	Number of Distinct Observations					3
1239							Number of Missing Observations					0
1240					Minimum	6.19	Mean					12.45
1241					Maximum	18.7	Median					12.45
1242					SD	2.364	Std. Error of Mean					0.61
1243					Coefficient of Variation	0.19	Skewness					4.609E-15
1244												
1245	Normal GOF Test											
1246					Shapiro Wilk Test Statistic	0.53	Shapiro Wilk GOF Test					
1247					5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level					
1248					Lilliefors Test Statistic	0.433	Lilliefors GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
1249					5% Lilliefors Critical Value	0.229	Data Not Normal at 5% Significance Level					
1250	**Data Not Normal at 5% Significance Level**											
1251												
1252	**Assuming Normal Distribution**											
1253	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1254					95% Student's-t UCL	13.52				95% Adjusted-CLT UCL (Chen-1995)		13.45
1255										95% Modified-t UCL (Johnson-1978)		13.52
1256												
1257	**Gamma GOF Test**											
1258					A-D Test Statistic	3.847	**Anderson-Darling Gamma GOF Test**					
1259					5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level					
1260					K-S Test Statistic	0.459	**Kolmogrov-Smirnoff Gamma GOF Test**					
1261					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
1262	**Data Not Gamma Distributed at 5% Significance Level**											
1263												
1264	**Gamma Statistics**											
1265					k hat (MLE)	25.92				k star (bias corrected MLE)		20.78
1266					Theta hat (MLE)	0.48				Theta star (bias corrected MLE)		0.599
1267					nu hat (MLE)	777.7				nu star (bias corrected)		623.5
1268					MLE Mean (bias corrected)	12.45				MLE Sd (bias corrected)		2.73
1269										Approximate Chi Square Value (0.05)		566.6
1270					Adjusted Level of Significance	0.0324				Adjusted Chi Square Value		559.9
1271												
1272	**Assuming Gamma Distribution**											
1273					95% Approximate Gamma UCL (use when n>=50))	13.7				95% Adjusted Gamma UCL (use when n<50)		13.86
1274												
1275	**Lognormal GOF Test**											
1276					Shapiro Wilk Test Statistic	0.5	**Shapiro Wilk Lognormal GOF Test**					
1277					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
1278					Lilliefors Test Statistic	0.469	**Lilliefors Lognormal GOF Test**					
1279					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
1280	**Data Not Lognormal at 5% Significance Level**											
1281												
1282	**Lognormal Statistics**											
1283					Minimum of Logged Data	1.823				Mean of logged Data		2.502
1284					Maximum of Logged Data	2.929				SD of logged Data		0.215
1285												
1286	**Assuming Lognormal Distribution**											
1287					95% H-UCL	13.87				90% Chebyshev (MVUE) UCL		14.56
1288					95% Chebyshev (MVUE) UCL	15.51				97.5% Chebyshev (MVUE) UCL		16.82
1289					99% Chebyshev (MVUE) UCL	19.41						
1290												
1291	**Nonparametric Distribution Free UCL Statistics**											
1292	**Data do not follow a Discernible Distribution (0.05)**											
1293												
1294	**Nonparametric Distribution Free UCLs**											
1295					95% CLT UCL	13.45				95% Jackknife UCL		13.52
1296					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1297					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1298					95% BCA Bootstrap UCL	N/A						
1299					90% Chebyshev(Mean, Sd) UCL	14.28				95% Chebyshev(Mean, Sd) UCL		15.11
1300					97.5% Chebyshev(Mean, Sd) UCL	16.26				99% Chebyshev(Mean, Sd) UCL		18.52

	A	B	C	D	E	F	G	H	I	J	K	L
1301												
1302						**Suggested UCL to Use**						
1303					95% Student's-t UCL	13.52					or 95% Modified-t UCL	13.52
1304												
1305					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1306					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1307					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1308					For additional insight the user may want to consult a statistician.							
1309												
1310												
1311	**Vanadium**											
1312												
1313						**General Statistics**						
1314					Total Number of Observations	15					Number of Distinct Observations	5
1315											Number of Missing Observations	0
1316					Minimum	25.6					Mean	74.64
1317					Maximum	122					Median	70
1318					SD	21.25					Std. Error of Mean	5.488
1319					Coefficient of Variation	0.285					Skewness	0.238
1320												
1321						**Normal GOF Test**						
1322					Shapiro Wilk Test Statistic	0.732					**Shapiro Wilk GOF Test**	
1323					5% Shapiro Wilk Critical Value	0.881					Data Not Normal at 5% Significance Level	
1324					Lilliefors Test Statistic	0.386					**Lilliefors GOF Test**	
1325					5% Lilliefors Critical Value	0.229					Data Not Normal at 5% Significance Level	
1326						**Data Not Normal at 5% Significance Level**						
1327												
1328						**Assuming Normal Distribution**						
1329					**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**	
1330					95% Student's-t UCL	84.31					95% Adjusted-CLT UCL (Chen-1995)	84.03
1331											95% Modified-t UCL (Johnson-1978)	84.36
1332												
1333						**Gamma GOF Test**						
1334					A-D Test Statistic	2.349					**Anderson-Darling Gamma GOF Test**	
1335					5% A-D Critical Value	0.737					Data Not Gamma Distributed at 5% Significance Level	
1336					K-S Test Statistic	0.389					**Kolmogrov-Smirnoff Gamma GOF Test**	
1337					5% K-S Critical Value	0.221					Data Not Gamma Distributed at 5% Significance Level	
1338						**Data Not Gamma Distributed at 5% Significance Level**						
1339												
1340						**Gamma Statistics**						
1341					k hat (MLE)	11.16					k star (bias corrected MLE)	8.969
1342					Theta hat (MLE)	6.69					Theta star (bias corrected MLE)	8.322
1343					nu hat (MLE)	334.7					nu star (bias corrected)	269.1
1344					MLE Mean (bias corrected)	74.64					MLE Sd (bias corrected)	24.92
1345											Approximate Chi Square Value (0.05)	232.1
1346					Adjusted Level of Significance	0.0324					Adjusted Chi Square Value	227.9
1347												
1348						**Assuming Gamma Distribution**						
1349					95% Approximate Gamma UCL (use when n>=50))	86.53					95% Adjusted Gamma UCL (use when n<50)	88.14
1350												
1351						**Lognormal GOF Test**						
1352					Shapiro Wilk Test Statistic	0.656					**Shapiro Wilk Lognormal GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
1353					5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level					
1354					Lilliefors Test Statistic	0.411	**Lilliefors Lognormal GOF Test**					
1355					5% Lilliefors Critical Value	0.229	Data Not Lognormal at 5% Significance Level					
1356	**Data Not Lognormal at 5% Significance Level**											
1357												
1358	**Lognormal Statistics**											
1359					Minimum of Logged Data	3.243				Mean of logged Data		4.267
1360					Maximum of Logged Data	4.804				SD of logged Data		0.337
1361												
1362	**Assuming Lognormal Distribution**											
1363					95% H-UCL	89.65				90% Chebyshev (MVUE) UCL		95.07
1364					95% Chebyshev (MVUE) UCL	104.1				97.5% Chebyshev (MVUE) UCL		116.6
1365					99% Chebyshev (MVUE) UCL	141.1						
1366												
1367	**Nonparametric Distribution Free UCL Statistics**											
1368	**Data do not follow a Discernible Distribution (0.05)**											
1369												
1370	**Nonparametric Distribution Free UCLs**											
1371					95% CLT UCL	83.67				95% Jackknife UCL		84.31
1372					95% Standard Bootstrap UCL	83.4				95% Bootstrap-t UCL		83.84
1373					95% Hall's Bootstrap UCL	87.63				95% Percentile Bootstrap UCL		83.47
1374					95% BCA Bootstrap UCL	82.8						
1375					90% Chebyshev(Mean, Sd) UCL	91.1				95% Chebyshev(Mean, Sd) UCL		98.56
1376					97.5% Chebyshev(Mean, Sd) UCL	108.9				99% Chebyshev(Mean, Sd) UCL		129.2
1377												
1378	**Suggested UCL to Use**											
1379					95% Student's-t UCL	84.31				or 95% Modified-t UCL		84.36
1380												
1381	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1382	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1383	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1384	For additional insight the user may want to consult a statistician.											
1385												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 11:26:56 AM								
5	From File			EPC_015Surf_EU05.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	46.02				Mean		88.02
17					Maximum	125.4				Median		94.06
18					SD	25.35				Std. Error of Mean		7.316
19					Coefficient of Variation	0.288				Skewness		-0.132
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.961				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.144				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	101.2				95% Adjusted-CLT UCL (Chen-1995)		99.76
31										95% Modified-t UCL (Johnson-1978)		101.1
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.292				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.181				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data appear Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	12.04				k star (bias corrected MLE)		9.088
42					Theta hat (MLE)	7.309				Theta star (bias corrected MLE)		9.685
43					nu hat (MLE)	289				nu star (bias corrected)		218.1
44					MLE Mean (bias corrected)	88.02				MLE Sd (bias corrected)		29.2
45										Approximate Chi Square Value (0.05)		184.9
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		180.3
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	103.8				95% Adjusted Gamma UCL (use when n<50)		106.5
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.943				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.191				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
56						Data appear Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	3.829				Mean of logged Data		4.436
60					Maximum of Logged Data	4.832				SD of logged Data		0.312
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	106.3				90% Chebyshev (MVUE) UCL		112.3
64					95% Chebyshev (MVUE) UCL	123.2				97.5% Chebyshev (MVUE) UCL		138.3
65					99% Chebyshev (MVUE) UCL	168.1						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	100.1				95% Jackknife UCL		101.2
72					95% Standard Bootstrap UCL	99.54				95% Bootstrap-t UCL		100.5
73					95% Hall's Bootstrap UCL	99.65				95% Percentile Bootstrap UCL		99.27
74					95% BCA Bootstrap UCL	99.33						
75					90% Chebyshev(Mean, Sd) UCL	110				95% Chebyshev(Mean, Sd) UCL		119.9
76					97.5% Chebyshev(Mean, Sd) UCL	133.7				99% Chebyshev(Mean, Sd) UCL		160.8
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	101.2						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												

	A	B	C	D	E	F	G	H	I	J	K	L
90	Arsenic											
91												
92						General Statistics						
93					Total Number of Observations	12				Number of Distinct Observations		6
94										Number of Missing Observations		0
95					Minimum	6.52				Mean		11.26
96					Maximum	19.15				Median		11
97					SD	2.951				Std. Error of Mean		0.852
98					Coefficient of Variation	0.262				Skewness		1.536
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.748				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.299				Lilliefors GOF Test		
104					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
105						Data Not Normal at 5% Significance Level						
106												
107						Assuming Normal Distribution						
108					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
109					95% Student's-t UCL	12.79				95% Adjusted-CLT UCL (Chen-1995)		13.06
110										95% Modified-t UCL (Johnson-1978)		12.85
111												
112						Gamma GOF Test						
113					A-D Test Statistic	1.391				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.327				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
117						Data Not Gamma Distributed at 5% Significance Level						
118												
119						Gamma Statistics						
120					k hat (MLE)	17.51				k star (bias corrected MLE)		13.19
121					Theta hat (MLE)	0.643				Theta star (bias corrected MLE)		0.853
122					nu hat (MLE)	420.3				nu star (bias corrected)		316.6
123					MLE Mean (bias corrected)	11.26				MLE Sd (bias corrected)		3.099
124										Approximate Chi Square Value (0.05)		276.4
125					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		270.6
126												
127						Assuming Gamma Distribution						
128					95% Approximate Gamma UCL (use when n>=50))	12.89				95% Adjusted Gamma UCL (use when n<50)		13.17
129												
130						Lognormal GOF Test						
131					Shapiro Wilk Test Statistic	0.803				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.343				Lilliefors Lognormal GOF Test		
134					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
135						Data Not Lognormal at 5% Significance Level						
136												
137						Lognormal Statistics						
138					Minimum of Logged Data	1.875				Mean of logged Data		2.392
139					Maximum of Logged Data	2.952				SD of logged Data		0.249
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141					Assuming Lognormal Distribution							
142					95% H-UCL	12.99				90% Chebyshev (MVUE) UCL		13.69
143					95% Chebyshev (MVUE) UCL	14.79				97.5% Chebyshev (MVUE) UCL		16.33
144					99% Chebyshev (MVUE) UCL	19.34						
145												
146					Nonparametric Distribution Free UCL Statistics							
147					Data do not follow a Discernible Distribution (0.05)							
148												
149					Nonparametric Distribution Free UCLs							
150					95% CLT UCL	12.66				95% Jackknife UCL		12.79
151					95% Standard Bootstrap UCL	12.56				95% Bootstrap-t UCL		13.17
152					95% Hall's Bootstrap UCL	21.27				95% Percentile Bootstrap UCL		12.59
153					95% BCA Bootstrap UCL	12.99						
154					90% Chebyshev(Mean, Sd) UCL	13.81				95% Chebyshev(Mean, Sd) UCL		14.97
155					97.5% Chebyshev(Mean, Sd) UCL	16.58				99% Chebyshev(Mean, Sd) UCL		19.73
156												
157					Suggested UCL to Use							
158					95% Student's-t UCL	12.79				or 95% Modified-t UCL		12.85
159												
160					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
161					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
162					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
163					For additional insight the user may want to consult a statistician.							
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Cadmium											
167												
168						General Statistics						
169					Total Number of Observations	12				Number of Distinct Observations		5
170										Number of Missing Observations		0
171					Minimum	12				Mean		13.26
172					Maximum	20.65				Median		12
173					SD	2.549				Std. Error of Mean		0.736
174					Coefficient of Variation	0.192				Skewness		2.587
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.583				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.357				Lilliefors GOF Test		
180					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
181						Data Not Normal at 5% Significance Level						
182												
183						Assuming Normal Distribution						
184					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
185					95% Student's-t UCL	14.58				95% Adjusted-CLT UCL (Chen-1995)		15.06
186										95% Modified-t UCL (Johnson-1978)		14.68
187												
188						Gamma GOF Test						
189					A-D Test Statistic	2.039				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.373				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	36.75				k star (bias corrected MLE)		27.62
197					Theta hat (MLE)	0.361				Theta star (bias corrected MLE)		0.48
198					nu hat (MLE)	882				nu star (bias corrected)		662.8
199					MLE Mean (bias corrected)	13.26				MLE Sd (bias corrected)		2.524
200										Approximate Chi Square Value (0.05)		604.1
201					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		595.5
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	14.55				95% Adjusted Gamma UCL (use when n<50)		14.76
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.618				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.368				Lilliefors Lognormal GOF Test		
210					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
211						Data Not Lognormal at 5% Significance Level						
212												
213						Lognormal Statistics						
214					Minimum of Logged Data	2.485				Mean of logged Data		2.571
215					Maximum of Logged Data	3.028				SD of logged Data		0.164
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217					Assuming Lognormal Distribution							
218					95% H-UCL	14.5				90% Chebyshev (MVUE) UCL		15.13
219					95% Chebyshev (MVUE) UCL	15.98				97.5% Chebyshev (MVUE) UCL		17.17
220					99% Chebyshev (MVUE) UCL	19.49						
221												
222					Nonparametric Distribution Free UCL Statistics							
223					Data do not follow a Discernible Distribution (0.05)							
224												
225					Nonparametric Distribution Free UCLs							
226					95% CLT UCL	14.47				95% Jackknife UCL		14.58
227					95% Standard Bootstrap UCL	14.42				95% Bootstrap-t UCL		16.39
228					95% Hall's Bootstrap UCL	18.08				95% Percentile Bootstrap UCL		14.49
229					95% BCA Bootstrap UCL	14.94						
230					90% Chebyshev(Mean, Sd) UCL	15.47				95% Chebyshev(Mean, Sd) UCL		16.47
231					97.5% Chebyshev(Mean, Sd) UCL	17.86				99% Chebyshev(Mean, Sd) UCL		20.59
232												
233					Suggested UCL to Use							
234					95% Student's-t UCL	14.58				or 95% Modified-t UCL		14.68
235												
236					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
237					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
238					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
239					For additional insight the user may want to consult a statistician.							
240												
241												

	A	B	C	D	E	F	G	H	I	J	K	L
242	Chromium											
243												
244					General Statistics							
245					Total Number of Observations	12				Number of Distinct Observations		4
246										Number of Missing Observations		0
247					Minimum	32.22				Mean		72.78
248					Maximum	85				Median		85
249					SD	22.24				Std. Error of Mean		6.419
250					Coefficient of Variation	0.306				Skewness		-1.373
251												
252					Normal GOF Test							
253					Shapiro Wilk Test Statistic	0.576				Shapiro Wilk GOF Test		
254					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
255					Lilliefors Test Statistic	0.459				Lilliefors GOF Test		
256					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
257					Data Not Normal at 5% Significance Level							
258												
259					Assuming Normal Distribution							
260					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
261					95% Student's-t UCL	84.31				95% Adjusted-CLT UCL (Chen-1995)		80.62
262										95% Modified-t UCL (Johnson-1978)		83.89
263												
264					Gamma GOF Test							
265					A-D Test Statistic	2.683				Anderson-Darling Gamma GOF Test		
266					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
267					K-S Test Statistic	0.467				Kolmogrov-Smirnoff Gamma GOF Test		
268					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
269					Data Not Gamma Distributed at 5% Significance Level							
270												
271					Gamma Statistics							
272					k hat (MLE)	8.397				k star (bias corrected MLE)		6.354
273					Theta hat (MLE)	8.668				Theta star (bias corrected MLE)		11.46
274					nu hat (MLE)	201.5				nu star (bias corrected)		152.5
275					MLE Mean (bias corrected)	72.78				MLE Sd (bias corrected)		28.88
276										Approximate Chi Square Value (0.05)		124.9
277					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		121.1
278												
279					Assuming Gamma Distribution							
280					95% Approximate Gamma UCL (use when n>=50))	88.83				95% Adjusted Gamma UCL (use when n<50)		91.62
281												
282					Lognormal GOF Test							
283					Shapiro Wilk Test Statistic	0.583				Shapiro Wilk Lognormal GOF Test		
284					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
285					Lilliefors Test Statistic	0.457				Lilliefors Lognormal GOF Test		
286					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
287					Data Not Lognormal at 5% Significance Level							
288												
289					Lognormal Statistics							
290					Minimum of Logged Data	3.473				Mean of logged Data		4.227
291					Maximum of Logged Data	4.443				SD of logged Data		0.396
292												

	A	B	C	D	E	F	G	H	I	J	K	L
293					Assuming Lognormal Distribution							
294					95% H-UCL	94.31				90% Chebyshev (MVUE) UCL		99.2
295					95% Chebyshev (MVUE) UCL	110.8				97.5% Chebyshev (MVUE) UCL		126.9
296					99% Chebyshev (MVUE) UCL	158.6						
297												
298					Nonparametric Distribution Free UCL Statistics							
299					Data do not follow a Discernible Distribution (0.05)							
300												
301					Nonparametric Distribution Free UCLs							
302					95% CLT UCL	83.34				95% Jackknife UCL		84.31
303					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
304					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
305					95% BCA Bootstrap UCL	N/A						
306					90% Chebyshev(Mean, Sd) UCL	92.04				95% Chebyshev(Mean, Sd) UCL		100.8
307					97.5% Chebyshev(Mean, Sd) UCL	112.9				99% Chebyshev(Mean, Sd) UCL		136.7
308												
309					Suggested UCL to Use							
310					95% Student's-t UCL	84.31				or 95% Modified-t UCL		83.89
311												
312					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
313					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
314					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
315					For additional insight the user may want to consult a statistician.							
316												
317					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
318					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
319												
320												

	A	B	C	D	E	F	G	H	I	J	K	L
321	Copper											
322												
323					General Statistics							
324					Total Number of Observations	12				Number of Distinct Observations		12
325										Number of Missing Observations		0
326					Minimum	21.89				Mean		711.9
327					Maximum	6122				Median		245.9
328					SD	1713				Std. Error of Mean		494.5
329					Coefficient of Variation	2.406				Skewness		3.398
330												
331					Normal GOF Test							
332					Shapiro Wilk Test Statistic	0.42				Shapiro Wilk GOF Test		
333					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
334					Lilliefors Test Statistic	0.451				Lilliefors GOF Test		
335					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
336					Data Not Normal at 5% Significance Level							
337												
338					Assuming Normal Distribution							
339					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
340					95% Student's-t UCL	1600				95% Adjusted-CLT UCL (Chen-1995)		2044
341										95% Modified-t UCL (Johnson-1978)		1681
342												
343					Gamma GOF Test							
344					A-D Test Statistic	1.057				Anderson-Darling Gamma GOF Test		
345					5% A-D Critical Value	0.792				Data Not Gamma Distributed at 5% Significance Level		
346					K-S Test Statistic	0.281				Kolmogrov-Smirnoff Gamma GOF Test		
347					5% K-S Critical Value	0.26				Data Not Gamma Distributed at 5% Significance Level		
348					Data Not Gamma Distributed at 5% Significance Level							
349												
350					Gamma Statistics							
351					k hat (MLE)	0.466				k star (bias corrected MLE)		0.405
352					Theta hat (MLE)	1529				Theta star (bias corrected MLE)		1759
353					nu hat (MLE)	11.17				nu star (bias corrected)		9.714
354					MLE Mean (bias corrected)	711.9				MLE Sd (bias corrected)		1119
355										Approximate Chi Square Value (0.05)		3.764
356					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		3.219
357												
358					Assuming Gamma Distribution							
359					95% Approximate Gamma UCL (use when n>=50))	1837				95% Adjusted Gamma UCL (use when n<50)		2148
360												
361					Lognormal GOF Test							
362					Shapiro Wilk Test Statistic	0.919				Shapiro Wilk Lognormal GOF Test		
363					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
364					Lilliefors Test Statistic	0.155				Lilliefors Lognormal GOF Test		
365					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
366					Data appear Lognormal at 5% Significance Level							
367												
368					Lognormal Statistics							
369					Minimum of Logged Data	3.086				Mean of logged Data		5.188
370					Maximum of Logged Data	8.72				SD of logged Data		1.62
371												

	A	B	C	D	E	F	G	H	I	J	K	L
372					Assuming Lognormal Distribution							
373					95% H-UCL	5047				90% Chebyshev (MVUE) UCL		1381
374					95% Chebyshev (MVUE) UCL	1760				97.5% Chebyshev (MVUE) UCL		2285
375					99% Chebyshev (MVUE) UCL	3319						
376												
377					Nonparametric Distribution Free UCL Statistics							
378					Data appear to follow a Discernible Distribution at 5% Significance Level							
379												
380					Nonparametric Distribution Free UCLs							
381					95% CLT UCL	1525				95% Jackknife UCL		1600
382					95% Standard Bootstrap UCL	1488				95% Bootstrap-t UCL		6860
383					95% Hall's Bootstrap UCL	5481				95% Percentile Bootstrap UCL		1678
384					95% BCA Bootstrap UCL	2225						
385					90% Chebyshev(Mean, Sd) UCL	2195				95% Chebyshev(Mean, Sd) UCL		2867
386					97.5% Chebyshev(Mean, Sd) UCL	3800				99% Chebyshev(Mean, Sd) UCL		5632
387												
388					Suggested UCL to Use							
389					99% Chebyshev (Mean, Sd) UCL	5632						
390												
391					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
392					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
393					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
394					For additional insight the user may want to consult a statistician.							
395												
396												
397	Neptunium-237											
398												
399					General Statistics							
400					Total Number of Observations	12				Number of Distinct Observations		1
401										Number of Missing Observations		0
402					Minimum	0.69				Mean		0.69
403					Maximum	0.69				Median		0.69
404												
405					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
406					ProUCL (or any other software) should not be used on such a data set!							
407					The data set for variable Neptunium-237 was not processed!							
408												
409					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
410					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
411												
412												
413												

	A	B	C	D	E	F	G	H	I	J	K	L
414	Nickel											
415												
416						General Statistics						
417					Total Number of Observations	12				Number of Distinct Observations		8
418										Number of Missing Observations		0
419					Minimum	65				Mean		242.6
420					Maximum	676				Median		164
421					SD	212.7				Std. Error of Mean		61.39
422					Coefficient of Variation	0.877				Skewness		0.916
423												
424						Normal GOF Test						
425					Shapiro Wilk Test Statistic	0.815				Shapiro Wilk GOF Test		
426					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
427					Lilliefors Test Statistic	0.215				Lilliefors GOF Test		
428					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
429						Data appear Approximate Normal at 5% Significance Level						
430												
431						Assuming Normal Distribution						
432					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
433					95% Student's-t UCL	352.8				95% Adjusted-CLT UCL (Chen-1995)		360.9
434										95% Modified-t UCL (Johnson-1978)		355.5
435												
436						Gamma GOF Test						
437					A-D Test Statistic	0.879				Anderson-Darling Gamma GOF Test		
438					5% A-D Critical Value	0.747				Data Not Gamma Distributed at 5% Significance Level		
439					K-S Test Statistic	0.258				Kolmogrov-Smirnoff Gamma GOF Test		
440					5% K-S Critical Value	0.25				Data Not Gamma Distributed at 5% Significance Level		
441						Data Not Gamma Distributed at 5% Significance Level						
442												
443						Gamma Statistics						
444					k hat (MLE)	1.441				k star (bias corrected MLE)		1.136
445					Theta hat (MLE)	168.4				Theta star (bias corrected MLE)		213.5
446					nu hat (MLE)	34.58				nu star (bias corrected)		27.27
447					MLE Mean (bias corrected)	242.6				MLE Sd (bias corrected)		227.6
448										Approximate Chi Square Value (0.05)		16.36
449					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		15.08
450												
451						Assuming Gamma Distribution						
452					95% Approximate Gamma UCL (use when n>=50))	404.4				95% Adjusted Gamma UCL (use when n<50)		438.6
453												
454						Lognormal GOF Test						
455					Shapiro Wilk Test Statistic	0.831				Shapiro Wilk Lognormal GOF Test		
456					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
457					Lilliefors Test Statistic	0.257				Lilliefors Lognormal GOF Test		
458					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
459						Data Not Lognormal at 5% Significance Level						
460												
461						Lognormal Statistics						
462					Minimum of Logged Data	4.174				Mean of logged Data		5.106
463					Maximum of Logged Data	6.516				SD of logged Data		0.935
464												

	A	B	C	D	E	F	G	H	I	J	K	L
465					Assuming Lognormal Distribution							
466					95% H-UCL	561.8				90% Chebyshev (MVUE) UCL		453
467					95% Chebyshev (MVUE) UCL	547.9				97.5% Chebyshev (MVUE) UCL		679.6
468					99% Chebyshev (MVUE) UCL	938.5						
469												
470					Nonparametric Distribution Free UCL Statistics							
471					Data appear to follow a Discernible Distribution at 5% Significance Level							
472												
473					Nonparametric Distribution Free UCLs							
474					95% CLT UCL	343.6				95% Jackknife UCL		352.8
475					95% Standard Bootstrap UCL	340.8				95% Bootstrap-t UCL		377.9
476					95% Hall's Bootstrap UCL	343.1				95% Percentile Bootstrap UCL		342
477					95% BCA Bootstrap UCL	357.3						
478					90% Chebyshev(Mean, Sd) UCL	426.8				95% Chebyshev(Mean, Sd) UCL		510.2
479					97.5% Chebyshev(Mean, Sd) UCL	626				99% Chebyshev(Mean, Sd) UCL		853.4
480												
481					Suggested UCL to Use							
482					95% Student's-t UCL	352.8						
483												
484					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
485					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
486					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
487					For additional insight the user may want to consult a statistician.							
488												
489												
490	PAH, Total											
491												
492					General Statistics							
493					Total Number of Observations	12				Number of Distinct Observations		1
494										Number of Missing Observations		0
495					Minimum	0.419				Mean		0.419
496					Maximum	0.419				Median		0.419
497												
498					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
499					ProUCL (or any other software) should not be used on such a data set!							
500					The data set for variable PAH, Total was not processed!							
501												
502					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
503					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
504												
505												
506												

	A	B	C	D	E	F	G	H	I	J	K	L
507	PCB, Total											
508												
509						General Statistics						
510					Total Number of Observations	12				Number of Distinct Observations		3
511										Number of Missing Observations		0
512					Minimum	5				Mean		8.8
513					Maximum	50				Median		5
514					SD	12.98				Std. Error of Mean		3.746
515					Coefficient of Variation	1.475				Skewness		3.463
516												
517						Normal GOF Test						
518					Shapiro Wilk Test Statistic	0.333				Shapiro Wilk GOF Test		
519					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
520					Lilliefors Test Statistic	0.514				Lilliefors GOF Test		
521					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
522						Data Not Normal at 5% Significance Level						
523												
524						Assuming Normal Distribution						
525					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
526					95% Student's-t UCL	15.53				95% Adjusted-CLT UCL (Chen-1995)		18.96
527										95% Modified-t UCL (Johnson-1978)		16.15
528												
529						Gamma GOF Test						
530					A-D Test Statistic	4.029				Anderson-Darling Gamma GOF Test		
531					5% A-D Critical Value	0.745				Data Not Gamma Distributed at 5% Significance Level		
532					K-S Test Statistic	0.51				Kolmogrov-Smirnoff Gamma GOF Test		
533					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
534						Data Not Gamma Distributed at 5% Significance Level						
535												
536						Gamma Statistics						
537					k hat (MLE)	1.519				k star (bias corrected MLE)		1.195
538					Theta hat (MLE)	5.794				Theta star (bias corrected MLE)		7.366
539					nu hat (MLE)	36.45				nu star (bias corrected)		28.67
540					MLE Mean (bias corrected)	8.8				MLE Sd (bias corrected)		8.051
541										Approximate Chi Square Value (0.05)		17.45
542					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		16.13
543												
544						Assuming Gamma Distribution						
545					95% Approximate Gamma UCL (use when n>=50))	14.46				95% Adjusted Gamma UCL (use when n<50)		15.64
546												
547						Lognormal GOF Test						
548					Shapiro Wilk Test Statistic	0.349				Shapiro Wilk Lognormal GOF Test		
549					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
550					Lilliefors Test Statistic	0.469				Lilliefors Lognormal GOF Test		
551					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
552						Data Not Lognormal at 5% Significance Level						
553												
554						Lognormal Statistics						
555					Minimum of Logged Data	1.609				Mean of logged Data		1.811
556					Maximum of Logged Data	3.912				SD of logged Data		0.663
557												

	A	B	C	D	E	F	G	H	I	J	K	L
558					Assuming Lognormal Distribution							
559					95% H-UCL	12.2				90% Chebyshev (MVUE) UCL		11.9
560					95% Chebyshev (MVUE) UCL	13.91				97.5% Chebyshev (MVUE) UCL		16.7
561					99% Chebyshev (MVUE) UCL	22.19						
562												
563					Nonparametric Distribution Free UCL Statistics							
564					Data do not follow a Discernible Distribution (0.05)							
565												
566					Nonparametric Distribution Free UCLs							
567					95% CLT UCL	14.96				95% Jackknife UCL		15.53
568					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
569					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
570					95% BCA Bootstrap UCL	N/A						
571					90% Chebyshev(Mean, Sd) UCL	20.04				95% Chebyshev(Mean, Sd) UCL		25.13
572					97.5% Chebyshev(Mean, Sd) UCL	32.19				99% Chebyshev(Mean, Sd) UCL		46.07
573												
574					Suggested UCL to Use							
575					95% Chebyshev (Mean, Sd) UCL	25.13						
576												
577					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
578					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
579					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
580					For additional insight the user may want to consult a statistician.							
581												
582												

	A	B	C	D	E	F	G	H	I	J	K	L
583	Uranium											
584												
585					General Statistics							
586					Total Number of Observations	12				Number of Distinct Observations		10
587										Number of Missing Observations		0
588					Minimum	12.65				Mean		112
589					Maximum	364.2				Median		61.93
590					SD	122.6				Std. Error of Mean		35.38
591					Coefficient of Variation	1.094				Skewness		1.187
592												
593					Normal GOF Test							
594					Shapiro Wilk Test Statistic	0.784				Shapiro Wilk GOF Test		
595					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
596					Lilliefors Test Statistic	0.249				Lilliefors GOF Test		
597					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
598					Data appear Approximate Normal at 5% Significance Level							
599												
600					Assuming Normal Distribution							
601					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
602					95% Student's-t UCL	175.5				95% Adjusted-CLT UCL (Chen-1995)		183.1
603										95% Modified-t UCL (Johnson-1978)		177.6
604												
605					Gamma GOF Test							
606					A-D Test Statistic	0.707				Anderson-Darling Gamma GOF Test		
607					5% A-D Critical Value	0.759				Detected data appear Gamma Distributed at 5% Significance Level		
608					K-S Test Statistic	0.252				Kolmogrov-Smirnoff Gamma GOF Test		
609					5% K-S Critical Value	0.253				Detected data appear Gamma Distributed at 5% Significance Level		
610					Detected data appear Gamma Distributed at 5% Significance Level							
611												
612					Gamma Statistics							
613					k hat (MLE)	0.942				k star (bias corrected MLE)		0.762
614					Theta hat (MLE)	118.9				Theta star (bias corrected MLE)		147
615					nu hat (MLE)	22.6				nu star (bias corrected)		18.28
616					MLE Mean (bias corrected)	112				MLE Sd (bias corrected)		128.3
617										Approximate Chi Square Value (0.05)		9.596
618					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		8.651
619												
620					Assuming Gamma Distribution							
621					95% Approximate Gamma UCL (use when n>=50))	213.4				95% Adjusted Gamma UCL (use when n<50)		236.7
622												
623					Lognormal GOF Test							
624					Shapiro Wilk Test Statistic	0.891				Shapiro Wilk Lognormal GOF Test		
625					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
626					Lilliefors Test Statistic	0.221				Lilliefors Lognormal GOF Test		
627					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
628					Data appear Lognormal at 5% Significance Level							
629												
630					Lognormal Statistics							
631					Minimum of Logged Data	2.538				Mean of logged Data		4.101
632					Maximum of Logged Data	5.898				SD of logged Data		1.197
633												

	A	B	C	D	E	F	G	H	I	J	K	L
634					Assuming Lognormal Distribution							
635					95% H-UCL	404.7				90% Chebyshev (MVUE) UCL		240.1
636				95% Chebyshev (MVUE) UCL		297.6				97.5% Chebyshev (MVUE) UCL		377.5
637				99% Chebyshev (MVUE) UCL		534.4						
638												
639					Nonparametric Distribution Free UCL Statistics							
640					Data appear to follow a Discernible Distribution at 5% Significance Level							
641												
642					Nonparametric Distribution Free UCLs							
643					95% CLT UCL	170.2				95% Jackknife UCL		175.5
644				95% Standard Bootstrap UCL		167.2				95% Bootstrap-t UCL		209.5
645				95% Hall's Bootstrap UCL		167.2				95% Percentile Bootstrap UCL		169.2
646				95% BCA Bootstrap UCL		185.4						
647				90% Chebyshev(Mean, Sd) UCL		218.1				95% Chebyshev(Mean, Sd) UCL		266.2
648				97.5% Chebyshev(Mean, Sd) UCL		333				99% Chebyshev(Mean, Sd) UCL		464.1
649												
650					Suggested UCL to Use							
651					95% Student's-t UCL	175.5						
652												
653					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
654					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
655					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
656					For additional insight the user may want to consult a statistician.							
657												
658												
659	Uranium-235											
660												
661					General Statistics							
662					Total Number of Observations	12				Number of Distinct Observations		1
663										Number of Missing Observations		0
664					Minimum	0.46				Mean		0.46
665					Maximum	0.46				Median		0.46
666												
667					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
668					ProUCL (or any other software) should not be used on such a data set!							
669					The data set for variable Uranium-235 was not processed!							
670												
671					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
672					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
673												
674												
675												

	A	B	C	D	E	F	G	H	I	J	K	L
676	Uranium-238											
677												
678						General Statistics						
679					Total Number of Observations	12				Number of Distinct Observations		1
680										Number of Missing Observations		0
681					Minimum	10.3				Mean		10.3
682					Maximum	10.3				Median		10.3
683												
684						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
685						ProUCL (or any other software) should not be used on such a data set!						
686						The data set for variable Uranium-238 was not processed!						
687												
688						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
689						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
690												
691												
692												

	A	B	C	D	E	F	G	H	I	J	K	L
693	Zinc											
694												
695					General Statistics							
696					Total Number of Observations	12				Number of Distinct Observations		12
697										Number of Missing Observations		0
698					Minimum	37.22				Mean		430.9
699					Maximum	3169				Median		217.6
700					SD	868.6				Std. Error of Mean		250.7
701					Coefficient of Variation	2.016				Skewness		3.372
702												
703					Normal GOF Test							
704					Shapiro Wilk Test Statistic	0.439				Shapiro Wilk GOF Test		
705					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
706					Lilliefors Test Statistic	0.454				Lilliefors GOF Test		
707					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
708					Data Not Normal at 5% Significance Level							
709												
710					Assuming Normal Distribution							
711					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
712					95% Student's-t UCL	881.2				95% Adjusted-CLT UCL (Chen-1995)		1104
713										95% Modified-t UCL (Johnson-1978)		921.9
714												
715					Gamma GOF Test							
716					A-D Test Statistic	1.241				Anderson-Darling Gamma GOF Test		
717					5% A-D Critical Value	0.769				Data Not Gamma Distributed at 5% Significance Level		
718					K-S Test Statistic	0.324				Kolmogrov-Smirnoff Gamma GOF Test		
719					5% K-S Critical Value	0.255				Data Not Gamma Distributed at 5% Significance Level		
720					Data Not Gamma Distributed at 5% Significance Level							
721												
722					Gamma Statistics							
723					k hat (MLE)	0.708				k star (bias corrected MLE)		0.586
724					Theta hat (MLE)	609				Theta star (bias corrected MLE)		735.1
725					nu hat (MLE)	16.98				nu star (bias corrected)		14.07
726					MLE Mean (bias corrected)	430.9				MLE Sd (bias corrected)		562.8
727										Approximate Chi Square Value (0.05)		6.619
728					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.856
729												
730					Assuming Gamma Distribution							
731					95% Approximate Gamma UCL (use when n>=50))	916				95% Adjusted Gamma UCL (use when n<50)		1035
732												
733					Lognormal GOF Test							
734					Shapiro Wilk Test Statistic	0.891				Shapiro Wilk Lognormal GOF Test		
735					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
736					Lilliefors Test Statistic	0.212				Lilliefors Lognormal GOF Test		
737					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
738					Data appear Lognormal at 5% Significance Level							
739												
740					Lognormal Statistics							
741					Minimum of Logged Data	3.617				Mean of logged Data		5.213
742					Maximum of Logged Data	8.061				SD of logged Data		1.192
743												

	A	B	C	D	E	F	G	H	I	J	K	L
744	**Assuming Lognormal Distribution**											
745					95% H-UCL	1212			90% Chebyshev (MVUE) UCL			724.5
746					95% Chebyshev (MVUE) UCL	897.7			97.5% Chebyshev (MVUE) UCL			1138
747					99% Chebyshev (MVUE) UCL	1610						
748												
749	**Nonparametric Distribution Free UCL Statistics**											
750	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
751												
752	**Nonparametric Distribution Free UCLs**											
753					95% CLT UCL	843.4			95% Jackknife UCL			881.2
754					95% Standard Bootstrap UCL	818.9			95% Bootstrap-t UCL			2928
755					95% Hall's Bootstrap UCL	2990			95% Percentile Bootstrap UCL			919.1
756					95% BCA Bootstrap UCL	1190						
757					90% Chebyshev(Mean, Sd) UCL	1183			95% Chebyshev(Mean, Sd) UCL			1524
758					97.5% Chebyshev(Mean, Sd) UCL	1997			99% Chebyshev(Mean, Sd) UCL			2926
759												
760	**Suggested UCL to Use**											
761					95% Chebyshev (Mean, Sd) UCL	1524						
762												
763	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
764	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
765	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
766	For additional insight the user may want to consult a statistician.											
767												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 11:31:10 AM								
5	From File			EPC_015Surf_EU06.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	42.46				Mean		75.6
17					Maximum	112.2				Median		76.3
18					SD	24.81				Std. Error of Mean		7.163
19					Coefficient of Variation	0.328				Skewness		0.168
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.931				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.136				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	88.46				95% Adjusted-CLT UCL (Chen-1995)		87.75
31										95% Modified-t UCL (Johnson-1978)		88.52
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.314				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.73				Detected data appear Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.144				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data appear Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	9.754				k star (bias corrected MLE)		7.371
42					Theta hat (MLE)	7.75				Theta star (bias corrected MLE)		10.26
43					nu hat (MLE)	234.1				nu star (bias corrected)		176.9
44					MLE Mean (bias corrected)	75.6				MLE Sd (bias corrected)		27.84
45										Approximate Chi Square Value (0.05)		147.1
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		143
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	90.89				95% Adjusted Gamma UCL (use when n<50)		93.52
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.934				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.135				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
56						Data appear Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	3.749				Mean of logged Data		4.273
60					Maximum of Logged Data	4.721				SD of logged Data		0.342
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	93.22				90% Chebyshev (MVUE) UCL		98.41
64					95% Chebyshev (MVUE) UCL	108.7				97.5% Chebyshev (MVUE) UCL		123
65					99% Chebyshev (MVUE) UCL	151						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	87.38				95% Jackknife UCL		88.46
72					95% Standard Bootstrap UCL	86.97				95% Bootstrap-t UCL		88.71
73					95% Hall's Bootstrap UCL	86.57				95% Percentile Bootstrap UCL		86.43
74					95% BCA Bootstrap UCL	86.51						
75					90% Chebyshev(Mean, Sd) UCL	97.09				95% Chebyshev(Mean, Sd) UCL		106.8
76					97.5% Chebyshev(Mean, Sd) UCL	120.3				99% Chebyshev(Mean, Sd) UCL		146.9
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	88.46						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Arsenic											
88												
89						General Statistics						
90					Total Number of Observations	12				Number of Distinct Observations		5
91										Number of Missing Observations		0
92					Minimum	6.61				Mean		11.12
93					Maximum	18.04				Median		11
94					SD	2.512				Std. Error of Mean		0.725
95					Coefficient of Variation	0.226				Skewness		1.637
96												
97						Normal GOF Test						
98					Shapiro Wilk Test Statistic	0.629				Shapiro Wilk GOF Test		
99					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
100					Lilliefors Test Statistic	0.436				Lilliefors GOF Test		
101					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
102						Data Not Normal at 5% Significance Level						
103												
104						Assuming Normal Distribution						
105					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
106					95% Student's-t UCL	12.43				95% Adjusted-CLT UCL (Chen-1995)		12.68
107										95% Modified-t UCL (Johnson-1978)		12.48
108												
109						Gamma GOF Test						
110					A-D Test Statistic	2.221				Anderson-Darling Gamma GOF Test		
111					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
112					K-S Test Statistic	0.411				Kolmogrov-Smirnoff Gamma GOF Test		
113					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
114						Data Not Gamma Distributed at 5% Significance Level						
115												
116						Gamma Statistics						
117					k hat (MLE)	23.41				k star (bias corrected MLE)		17.62
118					Theta hat (MLE)	0.475				Theta star (bias corrected MLE)		0.632
119					nu hat (MLE)	561.9				nu star (bias corrected)		422.8
120					MLE Mean (bias corrected)	11.12				MLE Sd (bias corrected)		2.65
121										Approximate Chi Square Value (0.05)		376.1
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		369.4
123												
124						Assuming Gamma Distribution						
125					95% Approximate Gamma UCL (use when n>=50))	12.5				95% Adjusted Gamma UCL (use when n<50)		12.73
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.666				Shapiro Wilk Lognormal GOF Test		
129					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
130					Lilliefors Test Statistic	0.398				Lilliefors Lognormal GOF Test		
131					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
132						Data Not Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	1.889				Mean of logged Data		2.388
136					Maximum of Logged Data	2.893				SD of logged Data		0.215
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138					Assuming Lognormal Distribution							
139					95% H-UCL	12.57				90% Chebyshev (MVUE) UCL		13.2
140					95% Chebyshev (MVUE) UCL	14.15				97.5% Chebyshev (MVUE) UCL		15.46
141					99% Chebyshev (MVUE) UCL	18.03						
142												
143					Nonparametric Distribution Free UCL Statistics							
144					Data do not follow a Discernible Distribution (0.05)							
145												
146					Nonparametric Distribution Free UCLs							
147					95% CLT UCL	12.32				95% Jackknife UCL		12.43
148					95% Standard Bootstrap UCL	12.26				95% Bootstrap-t UCL		13.61
149					95% Hall's Bootstrap UCL	21.61				95% Percentile Bootstrap UCL		12.23
150					95% BCA Bootstrap UCL	12.69						
151					90% Chebyshev(Mean, Sd) UCL	13.3				95% Chebyshev(Mean, Sd) UCL		14.29
152					97.5% Chebyshev(Mean, Sd) UCL	15.65				99% Chebyshev(Mean, Sd) UCL		18.34
153												
154					Suggested UCL to Use							
155					95% Student's-t UCL	12.43				or 95% Modified-t UCL		12.48
156												
157					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
158					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
159					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
160					For additional insight the user may want to consult a statistician.							
161												
162												

	A	B	C	D	E	F	G	H	I	J	K	L
163	Cadmium											
164												
165						General Statistics						
166					Total Number of Observations	12				Number of Distinct Observations		5
167										Number of Missing Observations		0
168					Minimum	1.5				Mean		11.89
169					Maximum	15.36				Median		12
170					SD	3.546				Std. Error of Mean		1.024
171					Coefficient of Variation	0.298				Skewness		-2.504
172												
173						Normal GOF Test						
174					Shapiro Wilk Test Statistic	0.62				Shapiro Wilk GOF Test		
175					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
176					Lilliefors Test Statistic	0.429				Lilliefors GOF Test		
177					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
178						Data Not Normal at 5% Significance Level						
179												
180						Assuming Normal Distribution						
181					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
182					95% Student's-t UCL	13.73				95% Adjusted-CLT UCL (Chen-1995)		12.78
183										95% Modified-t UCL (Johnson-1978)		13.6
184												
185						Gamma GOF Test						
186					A-D Test Statistic	2.732				Anderson-Darling Gamma GOF Test		
187					5% A-D Critical Value	0.733				Data Not Gamma Distributed at 5% Significance Level		
188					K-S Test Statistic	0.485				Kolmogrov-Smirnoff Gamma GOF Test		
189					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
190						Data Not Gamma Distributed at 5% Significance Level						
191												
192						Gamma Statistics						
193					k hat (MLE)	4.82				k star (bias corrected MLE)		3.671
194					Theta hat (MLE)	2.466				Theta star (bias corrected MLE)		3.239
195					nu hat (MLE)	115.7				nu star (bias corrected)		88.09
196					MLE Mean (bias corrected)	11.89				MLE Sd (bias corrected)		6.205
197										Approximate Chi Square Value (0.05)		67.46
198					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		64.71
199												
200						Assuming Gamma Distribution						
201					95% Approximate Gamma UCL (use when n>=50))	15.52				95% Adjusted Gamma UCL (use when n<50)		16.18
202												
203						Lognormal GOF Test						
204					Shapiro Wilk Test Statistic	0.453				Shapiro Wilk Lognormal GOF Test		
205					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
206					Lilliefors Test Statistic	0.491				Lilliefors Lognormal GOF Test		
207					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
208						Data Not Lognormal at 5% Significance Level						
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	0.405				Mean of logged Data		2.368
212					Maximum of Logged Data	2.732				SD of logged Data		0.626
213												

	A	B	C	D	E	F	G	H	I	J	K	L
214					Assuming Lognormal Distribution							
215					95% H-UCL	20.09				90% Chebyshev (MVUE) UCL		19.91
216				95% Chebyshev (MVUE) UCL		23.15				97.5% Chebyshev (MVUE) UCL		27.65
217				99% Chebyshev (MVUE) UCL		36.49						
218												
219					Nonparametric Distribution Free UCL Statistics							
220					Data do not follow a Discernible Distribution (0.05)							
221												
222					Nonparametric Distribution Free UCLs							
223					95% CLT UCL	13.57				95% Jackknife UCL		13.73
224				95% Standard Bootstrap UCL		13.49				95% Bootstrap-t UCL		13.22
225				95% Hall's Bootstrap UCL		12.99				95% Percentile Bootstrap UCL		13.28
226				95% BCA Bootstrap UCL		13.03						
227				90% Chebyshev(Mean, Sd) UCL		14.96				95% Chebyshev(Mean, Sd) UCL		16.35
228				97.5% Chebyshev(Mean, Sd) UCL		18.28				99% Chebyshev(Mean, Sd) UCL		22.07
229												
230					Suggested UCL to Use							
231				95% Chebyshev (Mean, Sd) UCL		16.35						
232												
233					Recommended UCL exceeds the maximum observation							
234												
235	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
236	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
237	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
238	For additional insight the user may want to consult a statistician.											
239												
240	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
241	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
242												
243												

	A	B	C	D	E	F	G	H	I	J	K	L
244	Chromium											
245												
246					General Statistics							
247					Total Number of Observations	12				Number of Distinct Observations		5
248										Number of Missing Observations		0
249					Minimum	36.58				Mean		72.71
250					Maximum	85				Median		85
251					SD	18.89				Std. Error of Mean		5.453
252					Coefficient of Variation	0.26				Skewness		-1.084
253												
254					Normal GOF Test							
255					Shapiro Wilk Test Statistic	0.684				Shapiro Wilk GOF Test		
256					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
257					Lilliefors Test Statistic	0.409				Lilliefors GOF Test		
258					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
259					Data Not Normal at 5% Significance Level							
260												
261					Assuming Normal Distribution							
262					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
263					95% Student's-t UCL	82.5				95% Adjusted-CLT UCL (Chen-1995)		79.85
264										95% Modified-t UCL (Johnson-1978)		82.22
265												
266					Gamma GOF Test							
267					A-D Test Statistic	1.902				Anderson-Darling Gamma GOF Test		
268					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
269					K-S Test Statistic	0.415				Kolmogrov-Smirnoff Gamma GOF Test		
270					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
271					Data Not Gamma Distributed at 5% Significance Level							
272												
273					Gamma Statistics							
274					k hat (MLE)	12.98				k star (bias corrected MLE)		9.789
275					Theta hat (MLE)	5.602				Theta star (bias corrected MLE)		7.428
276					nu hat (MLE)	311.5				nu star (bias corrected)		234.9
277					MLE Mean (bias corrected)	72.71				MLE Sd (bias corrected)		23.24
278										Approximate Chi Square Value (0.05)		200.5
279					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		195.6
280												
281					Assuming Gamma Distribution							
282					95% Approximate Gamma UCL (use when n>=50))	85.21				95% Adjusted Gamma UCL (use when n<50)		87.33
283												
284					Lognormal GOF Test							
285					Shapiro Wilk Test Statistic	0.688				Shapiro Wilk Lognormal GOF Test		
286					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
287					Lilliefors Test Statistic	0.403				Lilliefors Lognormal GOF Test		
288					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
289					Data Not Lognormal at 5% Significance Level							
290												
291					Lognormal Statistics							
292					Minimum of Logged Data	3.6				Mean of logged Data		4.247
293					Maximum of Logged Data	4.443				SD of logged Data		0.309
294												

	A	B	C	D	E	F	G	H	I	J	K	L
295					Assuming Lognormal Distribution							
296					95% H-UCL	87.85				90% Chebyshev (MVUE) UCL		92.8
297					95% Chebyshev (MVUE) UCL	101.7				97.5% Chebyshev (MVUE) UCL		114.2
298					99% Chebyshev (MVUE) UCL	138.6						
299												
300					Nonparametric Distribution Free UCL Statistics							
301					Data do not follow a Discernible Distribution (0.05)							
302												
303					Nonparametric Distribution Free UCLs							
304					95% CLT UCL	81.68				95% Jackknife UCL		82.5
305					95% Standard Bootstrap UCL	81.26				95% Bootstrap-t UCL		80.89
306					95% Hall's Bootstrap UCL	79.97				95% Percentile Bootstrap UCL		80.97
307					95% BCA Bootstrap UCL	79.96						
308					90% Chebyshev(Mean, Sd) UCL	89.07				95% Chebyshev(Mean, Sd) UCL		96.48
309					97.5% Chebyshev(Mean, Sd) UCL	106.8				99% Chebyshev(Mean, Sd) UCL		127
310												
311					Suggested UCL to Use							
312					95% Student's-t UCL	82.5				or 95% Modified-t UCL		82.22
313												
314					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
315					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
316					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
317					For additional insight the user may want to consult a statistician.							
318												
319					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
320					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
321												
322												
323	Cobalt											
324												
325					General Statistics							
326					Total Number of Observations	12				Number of Distinct Observations		1
327										Number of Missing Observations		0
328					Minimum	16.2				Mean		16.2
329					Maximum	16.2				Median		16.2
330												
331					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
332					ProUCL (or any other software) should not be used on such a data set!							
333					The data set for variable Cobalt was not processed!							
334												
335					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
336					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
337												
338												
339												

	A	B	C	D	E	F	G	H	I	J	K	L
340	Copper											
341												
342						General Statistics						
343					Total Number of Observations	12				Number of Distinct Observations		11
344										Number of Missing Observations		0
345					Minimum	22.41				Mean		289.3
346					Maximum	793.2				Median		285.8
347					SD	257.6				Std. Error of Mean		74.37
348					Coefficient of Variation	0.89				Skewness		0.939
349												
350						Normal GOF Test						
351					Shapiro Wilk Test Statistic	0.862				Shapiro Wilk GOF Test		
352					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
353					Lilliefors Test Statistic	0.216				Lilliefors GOF Test		
354					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
355						Data appear Normal at 5% Significance Level						
356												
357						Assuming Normal Distribution						
358					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
359					95% Student's-t UCL	422.9				95% Adjusted-CLT UCL (Chen-1995)		433.2
360										95% Modified-t UCL (Johnson-1978)		426.3
361												
362						Gamma GOF Test						
363					A-D Test Statistic	0.6				Anderson-Darling Gamma GOF Test		
364					5% A-D Critical Value	0.756				Detected data appear Gamma Distributed at 5% Significance Level		
365					K-S Test Statistic	0.202				Kolmogrov-Smirnoff Gamma GOF Test		
366					5% K-S Critical Value	0.252				Detected data appear Gamma Distributed at 5% Significance Level		
367						Detected data appear Gamma Distributed at 5% Significance Level						
368												
369						Gamma Statistics						
370					k hat (MLE)	1.05				k star (bias corrected MLE)		0.843
371					Theta hat (MLE)	275.5				Theta star (bias corrected MLE)		343.2
372					nu hat (MLE)	25.2				nu star (bias corrected)		20.24
373					MLE Mean (bias corrected)	289.3				MLE Sd (bias corrected)		315.1
374										Approximate Chi Square Value (0.05)		11.03
375					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		10
376												
377						Assuming Gamma Distribution						
378					95% Approximate Gamma UCL (use when n>=50))	531.1				95% Adjusted Gamma UCL (use when n<50)		585.4
379												
380						Lognormal GOF Test						
381					Shapiro Wilk Test Statistic	0.866				Shapiro Wilk Lognormal GOF Test		
382					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
383					Lilliefors Test Statistic	0.244				Lilliefors Lognormal GOF Test		
384					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
385						Data appear Lognormal at 5% Significance Level						
386												
387						Lognormal Statistics						
388					Minimum of Logged Data	3.11				Mean of logged Data		5.121
389					Maximum of Logged Data	6.676				SD of logged Data		1.258
390												

	A	B	C	D	E	F	G	H	I	J	K	L
391	**Assuming Lognormal Distribution**											
392					95% H-UCL	1343				90% Chebyshev (MVUE) UCL		728.5
393					95% Chebyshev (MVUE) UCL	907.4				97.5% Chebyshev (MVUE) UCL		1156
394					99% Chebyshev (MVUE) UCL	1643						
395												
396	**Nonparametric Distribution Free UCL Statistics**											
397	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
398												
399	**Nonparametric Distribution Free UCLs**											
400					95% CLT UCL	411.7				95% Jackknife UCL		422.9
401					95% Standard Bootstrap UCL	404				95% Bootstrap-t UCL		463
402					95% Hall's Bootstrap UCL	550.6				95% Percentile Bootstrap UCL		405.8
403					95% BCA Bootstrap UCL	423.8						
404					90% Chebyshev(Mean, Sd) UCL	512.4				95% Chebyshev(Mean, Sd) UCL		613.5
405					97.5% Chebyshev(Mean, Sd) UCL	753.8				99% Chebyshev(Mean, Sd) UCL		1029
406												
407	**Suggested UCL to Use**											
408					95% Student's-t UCL	422.9						
409												
410	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
411	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
412	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
413	For additional insight the user may want to consult a statistician.											
414												
415												

	A	B	C	D	E	F	G	H	I	J	K	L
416	Iron											
417												
418						General Statistics						
419					Total Number of Observations	12				Number of Distinct Observations		12
420										Number of Missing Observations		0
421					Minimum	12350				Mean		23969
422					Maximum	54500				Median		18474
423					SD	13140				Std. Error of Mean		3793
424					Coefficient of Variation	0.548				Skewness		1.477
425												
426						Normal GOF Test						
427					Shapiro Wilk Test Statistic	0.791				Shapiro Wilk GOF Test		
428					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
429					Lilliefors Test Statistic	0.278				Lilliefors GOF Test		
430					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
431						Data Not Normal at 5% Significance Level						
432												
433						Assuming Normal Distribution						
434					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
435					95% Student's-t UCL	30781				95% Adjusted-CLT UCL (Chen-1995)		31937
436										95% Modified-t UCL (Johnson-1978)		31051
437												
438						Gamma GOF Test						
439					A-D Test Statistic	0.815				Anderson-Darling Gamma GOF Test		
440					5% A-D Critical Value	0.733				Data Not Gamma Distributed at 5% Significance Level		
441					K-S Test Statistic	0.234				Kolmogrov-Smirnoff Gamma GOF Test		
442					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
443						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
444												
445						Gamma Statistics						
446					k hat (MLE)	4.613				k star (bias corrected MLE)		3.515
447					Theta hat (MLE)	5196				Theta star (bias corrected MLE)		6819
448					nu hat (MLE)	110.7				nu star (bias corrected)		84.36
449					MLE Mean (bias corrected)	23969				MLE Sd (bias corrected)		12785
450										Approximate Chi Square Value (0.05)		64.19
451					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		61.51
452												
453						Assuming Gamma Distribution						
454					95% Approximate Gamma UCL (use when n>=50)	31500				95% Adjusted Gamma UCL (use when n<50)		32872
455												
456						Lognormal GOF Test						
457					Shapiro Wilk Test Statistic	0.887				Shapiro Wilk Lognormal GOF Test		
458					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
459					Lilliefors Test Statistic	0.204				Lilliefors Lognormal GOF Test		
460					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
461						Data appear Lognormal at 5% Significance Level						
462												
463						Lognormal Statistics						
464					Minimum of Logged Data	9.421				Mean of logged Data		9.972
465					Maximum of Logged Data	10.91				SD of logged Data		0.471
466												

	A	B	C	D	E	F	G	H	I	J	K	L
467	Assuming Lognormal Distribution											
468					95% H-UCL	32296				90% Chebyshev (MVUE) UCL		33583
469					95% Chebyshev (MVUE) UCL	38059				97.5% Chebyshev (MVUE) UCL		44271
470					99% Chebyshev (MVUE) UCL	56475						
471												
472	Nonparametric Distribution Free UCL Statistics											
473	Data appear to follow a Discernible Distribution at 5% Significance Level											
474												
475	Nonparametric Distribution Free UCLs											
476					95% CLT UCL	30209				95% Jackknife UCL		30781
477					95% Standard Bootstrap UCL	29802				95% Bootstrap-t UCL		34286
478					95% Hall's Bootstrap UCL	30622				95% Percentile Bootstrap UCL		30656
479					95% BCA Bootstrap UCL	32197						
480					90% Chebyshev(Mean, Sd) UCL	35349				95% Chebyshev(Mean, Sd) UCL		40504
481					97.5% Chebyshev(Mean, Sd) UCL	47658				99% Chebyshev(Mean, Sd) UCL		61712
482												
483	Suggested UCL to Use											
484					95% Adjusted Gamma UCL	32872						
485												
486	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
487	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
488	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
489	For additional insight the user may want to consult a statistician.											
490												
491												
492	Neptunium-237											
493												
494	General Statistics											
495					Total Number of Observations	12				Number of Distinct Observations		1
496										Number of Missing Observations		0
497					Minimum	0.64				Mean		0.64
498					Maximum	0.64				Median		0.64
499												
500	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
501	ProUCL (or any other software) should not be used on such a data set!											
502	The data set for variable Neptunium-237 was not processed!											
503												
504	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
505	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
506												
507												
508												

	A	B	C	D	E	F	G	H	I	J	K	L
509	Nickel											
510												
511					General Statistics							
512					Total Number of Observations	12				Number of Distinct Observations		11
513										Number of Missing Observations		0
514					Minimum	65				Mean		215.5
515					Maximum	616.5				Median		168.4
516					SD	163.4				Std. Error of Mean		47.18
517					Coefficient of Variation	0.758				Skewness		1.464
518												
519					Normal GOF Test							
520					Shapiro Wilk Test Statistic	0.855				Shapiro Wilk GOF Test		
521					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
522					Lilliefors Test Statistic	0.18				Lilliefors GOF Test		
523					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
524					Data appear Approximate Normal at 5% Significance Level							
525												
526					Assuming Normal Distribution							
527					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
528					95% Student's-t UCL	300.3				95% Adjusted-CLT UCL (Chen-1995)		314.5
529										95% Modified-t UCL (Johnson-1978)		303.6
530												
531					Gamma GOF Test							
532					A-D Test Statistic	0.281				Anderson-Darling Gamma GOF Test		
533					5% A-D Critical Value	0.741				Detected data appear Gamma Distributed at 5% Significance Level		
534					K-S Test Statistic	0.141				Kolmogrov-Smirnoff Gamma GOF Test		
535					5% K-S Critical Value	0.248				Detected data appear Gamma Distributed at 5% Significance Level		
536					Detected data appear Gamma Distributed at 5% Significance Level							
537												
538					Gamma Statistics							
539					k hat (MLE)	2.184				k star (bias corrected MLE)		1.693
540					Theta hat (MLE)	98.7				Theta star (bias corrected MLE)		127.3
541					nu hat (MLE)	52.41				nu star (bias corrected)		40.64
542					MLE Mean (bias corrected)	215.5				MLE Sd (bias corrected)		165.6
543										Approximate Chi Square Value (0.05)		27.03
544					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		25.35
545												
546					Assuming Gamma Distribution							
547					95% Approximate Gamma UCL (use when n>=50))	324				95% Adjusted Gamma UCL (use when n<50)		345.6
548												
549					Lognormal GOF Test							
550					Shapiro Wilk Test Statistic	0.949				Shapiro Wilk Lognormal GOF Test		
551					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
552					Lilliefors Test Statistic	0.13				Lilliefors Lognormal GOF Test		
553					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
554					Data appear Lognormal at 5% Significance Level							
555												
556					Lognormal Statistics							
557					Minimum of Logged Data	4.174				Mean of logged Data		5.127
558					Maximum of Logged Data	6.424				SD of logged Data		0.736
559												

	A	B	C	D	E	F	G	H	I	J	K	L
560						Assuming Lognormal Distribution						
561					95% H-UCL	381.8				90% Chebyshev (MVUE) UCL		358.1
562					95% Chebyshev (MVUE) UCL	422.9				97.5% Chebyshev (MVUE) UCL		512.9
563					99% Chebyshev (MVUE) UCL	689.7						
564												
565						Nonparametric Distribution Free UCL Statistics						
566						Data appear to follow a Discernible Distribution at 5% Significance Level						
567												
568						Nonparametric Distribution Free UCLs						
569					95% CLT UCL	293.1				95% Jackknife UCL		300.3
570					95% Standard Bootstrap UCL	291.3				95% Bootstrap-t UCL		342.8
571					95% Hall's Bootstrap UCL	368.2				95% Percentile Bootstrap UCL		294.8
572					95% BCA Bootstrap UCL	312.9						
573					90% Chebyshev(Mean, Sd) UCL	357.1				95% Chebyshev(Mean, Sd) UCL		421.2
574					97.5% Chebyshev(Mean, Sd) UCL	510.2				99% Chebyshev(Mean, Sd) UCL		685
575												
576						Suggested UCL to Use						
577					95% Student's-t UCL	300.3						
578												
579						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
580						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
581						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
582						For additional insight the user may want to consult a statistician.						
583												
584												
585	PAH, Total											
586												
587						General Statistics						
588					Total Number of Observations	12				Number of Distinct Observations		1
589										Number of Missing Observations		0
590					Minimum	1.386				Mean		1.386
591					Maximum	1.386				Median		1.386
592												
593						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
594						ProUCL (or any other software) should not be used on such a data set!						
595						The data set for variable PAH, Total was not processed!						
596												
597						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
598						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
599												
600												
601												

	A	B	C	D	E	F	G	H	I	J	K	L
602	PCB, Total											
603												
604						General Statistics						
605					Total Number of Observations	12				Number of Distinct Observations		2
606										Number of Missing Observations		0
607					Minimum	5				Mean		5.417
608					Maximum	10				Median		5
609					SD	1.443				Std. Error of Mean		0.417
610					Coefficient of Variation	0.266				Skewness		3.464
611												
612						Normal GOF Test						
613					Shapiro Wilk Test Statistic	0.327				Shapiro Wilk GOF Test		
614					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
615					Lilliefors Test Statistic	0.53				Lilliefors GOF Test		
616					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
617						Data Not Normal at 5% Significance Level						
618												
619						Assuming Normal Distribution						
620					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
621					95% Student's-t UCL	6.165				95% Adjusted-CLT UCL (Chen-1995)		6.547
622										95% Modified-t UCL (Johnson-1978)		6.234
623												
624						Gamma GOF Test						
625					A-D Test Statistic	4.092				Anderson-Darling Gamma GOF Test		
626					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
627					K-S Test Statistic	0.536				Kolmogrov-Smirnoff Gamma GOF Test		
628					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
629						Data Not Gamma Distributed at 5% Significance Level						
630												
631						Gamma Statistics						
632					k hat (MLE)	22.61				k star (bias corrected MLE)		17.01
633					Theta hat (MLE)	0.24				Theta star (bias corrected MLE)		0.318
634					nu hat (MLE)	542.6				nu star (bias corrected)		408.3
635					MLE Mean (bias corrected)	5.417				MLE Sd (bias corrected)		1.313
636										Approximate Chi Square Value (0.05)		362.4
637					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		355.8
638												
639						Assuming Gamma Distribution						
640					95% Approximate Gamma UCL (use when n>=50))	6.102				95% Adjusted Gamma UCL (use when n<50)		6.215
641												
642						Lognormal GOF Test						
643					Shapiro Wilk Test Statistic	0.327				Shapiro Wilk Lognormal GOF Test		
644					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
645					Lilliefors Test Statistic	0.53				Lilliefors Lognormal GOF Test		
646					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
647						Data Not Lognormal at 5% Significance Level						
648												
649						Lognormal Statistics						
650					Minimum of Logged Data	1.609				Mean of logged Data		1.667
651					Maximum of Logged Data	2.303				SD of logged Data		0.2
652												

	A	B	C	D	E	F	G	H	I	J	K	L
653					Assuming Lognormal Distribution							
654					95% H-UCL	6.04				90% Chebyshev (MVUE) UCL		6.334
655				95% Chebyshev (MVUE) UCL		6.759				97.5% Chebyshev (MVUE) UCL		7.35
656				99% Chebyshev (MVUE) UCL		8.509						
657												
658					Nonparametric Distribution Free UCL Statistics							
659					Data do not follow a Discernible Distribution (0.05)							
660												
661					Nonparametric Distribution Free UCLs							
662					95% CLT UCL	6.102				95% Jackknife UCL		N/A
663				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
664				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
665				95% BCA Bootstrap UCL		N/A						
666				90% Chebyshev(Mean, Sd) UCL		6.667				95% Chebyshev(Mean, Sd) UCL		7.233
667				97.5% Chebyshev(Mean, Sd) UCL		8.019				99% Chebyshev(Mean, Sd) UCL		9.562
668												
669					Suggested UCL to Use							
670				95% Student's-t UCL		6.165					or 95% Modified-t UCL	6.234
671												
672	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
673	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
674	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
675	For additional insight the user may want to consult a statistician.											
676												
677												

	A	B	C	D	E	F	G	H	I	J	K	L
678	Uranium											
679												
680					General Statistics							
681					Total Number of Observations	12				Number of Distinct Observations		9
682										Number of Missing Observations		0
683					Minimum	20				Mean		46.8
684					Maximum	112				Median		32.72
685					SD	31.18				Std. Error of Mean		9
686					Coefficient of Variation	0.666				Skewness		1.001
687												
688					Normal GOF Test							
689					Shapiro Wilk Test Statistic	0.829				Shapiro Wilk GOF Test		
690					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
691					Lilliefors Test Statistic	0.255				Lilliefors GOF Test		
692					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
693					Data appear Approximate Normal at 5% Significance Level							
694												
695					Assuming Normal Distribution							
696					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
697					95% Student's-t UCL	62.96				95% Adjusted-CLT UCL (Chen-1995)		64.38
698										95% Modified-t UCL (Johnson-1978)		63.4
699												
700					Gamma GOF Test							
701					A-D Test Statistic	0.731				Anderson-Darling Gamma GOF Test		
702					5% A-D Critical Value	0.74				Detected data appear Gamma Distributed at 5% Significance Level		
703					K-S Test Statistic	0.217				Kolmogrov-Smirnoff Gamma GOF Test		
704					5% K-S Critical Value	0.248				Detected data appear Gamma Distributed at 5% Significance Level		
705					Detected data appear Gamma Distributed at 5% Significance Level							
706												
707					Gamma Statistics							
708					k hat (MLE)	2.761				k star (bias corrected MLE)		2.126
709					Theta hat (MLE)	16.95				Theta star (bias corrected MLE)		22.01
710					nu hat (MLE)	66.27				nu star (bias corrected)		51.04
711					MLE Mean (bias corrected)	46.8				MLE Sd (bias corrected)		32.09
712										Approximate Chi Square Value (0.05)		35.63
713					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		33.67
714												
715					Assuming Gamma Distribution							
716					95% Approximate Gamma UCL (use when n>=50))	67.04				95% Adjusted Gamma UCL (use when n<50)		70.93
717												
718					Lognormal GOF Test							
719					Shapiro Wilk Test Statistic	0.871				Shapiro Wilk Lognormal GOF Test		
720					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
721					Lilliefors Test Statistic	0.182				Lilliefors Lognormal GOF Test		
722					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
723					Data appear Lognormal at 5% Significance Level							
724												
725					Lognormal Statistics							
726					Minimum of Logged Data	2.996				Mean of logged Data		3.654
727					Maximum of Logged Data	4.718				SD of logged Data		0.637
728												

	A	B	C	D	E	F	G	H	I	J	K	L
729					Assuming Lognormal Distribution							
730					95% H-UCL	73.98				90% Chebyshev (MVUE) UCL		72.97
731					95% Chebyshev (MVUE) UCL	84.99				97.5% Chebyshev (MVUE) UCL		101.7
732					99% Chebyshev (MVUE) UCL	134.5						
733												
734					Nonparametric Distribution Free UCL Statistics							
735					Data appear to follow a Discernible Distribution at 5% Significance Level							
736												
737					Nonparametric Distribution Free UCLs							
738					95% CLT UCL	61.6				95% Jackknife UCL		62.96
739					95% Standard Bootstrap UCL	61.14				95% Bootstrap-t UCL		67.8
740					95% Hall's Bootstrap UCL	62.04				95% Percentile Bootstrap UCL		61.98
741					95% BCA Bootstrap UCL	63.16						
742					90% Chebyshev(Mean, Sd) UCL	73.8				95% Chebyshev(Mean, Sd) UCL		86.03
743					97.5% Chebyshev(Mean, Sd) UCL	103				99% Chebyshev(Mean, Sd) UCL		136.3
744												
745					Suggested UCL to Use							
746					95% Student's-t UCL	62.96						
747												
748					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
749					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
750					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
751					For additional insight the user may want to consult a statistician.							
752												
753												
754	Uranium-234											
755												
756					General Statistics							
757					Total Number of Observations	12				Number of Distinct Observations		1
758										Number of Missing Observations		0
759					Minimum	8.74				Mean		8.74
760					Maximum	8.74				Median		8.74
761												
762					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
763					ProUCL (or any other software) should not be used on such a data set!							
764					The data set for variable Uranium-234 was not processed!							
765												
766					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
767					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
768												
769												
770												

	A	B	C	D	E	F	G	H	I	J	K	L
771	Uranium-235											
772												
773						General Statistics						
774					Total Number of Observations	12				Number of Distinct Observations		1
775										Number of Missing Observations		0
776					Minimum	0.57				Mean		0.57
777					Maximum	0.57				Median		0.57
778												
779						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
780						ProUCL (or any other software) should not be used on such a data set!						
781						The data set for variable Uranium-235 was not processed!						
782												
783						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
784						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
785												
786												
787												
788	Uranium-238											
789												
790						General Statistics						
791					Total Number of Observations	12				Number of Distinct Observations		1
792										Number of Missing Observations		0
793					Minimum	15.4				Mean		15.4
794					Maximum	15.4				Median		15.4
795												
796						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
797						ProUCL (or any other software) should not be used on such a data set!						
798						The data set for variable Uranium-238 was not processed!						
799												
800						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
801						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
802												
803												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 11:32:10 AM								
5	From File			EPC_015Surf_EU07.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	44.57				Mean		103.8
17					Maximum	283				Median		85.6
18					SD	64.48				Std. Error of Mean		18.61
19					Coefficient of Variation	0.621				Skewness		2.179
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.757				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.231				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Approximate Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	137.2				95% Adjusted-CLT UCL (Chen-1995)		146.9
31										95% Modified-t UCL (Johnson-1978)		139.1
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.558				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.736				Detected data appear Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.182				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data appear Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	3.987				k star (bias corrected MLE)		3.046
42					Theta hat (MLE)	26.02				Theta star (bias corrected MLE)		34.06
43					nu hat (MLE)	95.69				nu star (bias corrected)		73.1
44					MLE Mean (bias corrected)	103.8				MLE Sd (bias corrected)		59.45
45										Approximate Chi Square Value (0.05)		54.41
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		51.96
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	139.4				95% Adjusted Gamma UCL (use when n<50)		146
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.93				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.165				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
56						Data appear Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	3.797				Mean of logged Data		4.511
60					Maximum of Logged Data	5.645				SD of logged Data		0.503
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62					Assuming Lognormal Distribution							
63					95% H-UCL	143.1				90% Chebyshev (MVUE) UCL		147.8
64					95% Chebyshev (MVUE) UCL	168.4				97.5% Chebyshev (MVUE) UCL		197.1
65					99% Chebyshev (MVUE) UCL	253.4						
66												
67					Nonparametric Distribution Free UCL Statistics							
68					Data appear to follow a Discernible Distribution at 5% Significance Level							
69												
70					Nonparametric Distribution Free UCLs							
71					95% CLT UCL	134.4				95% Jackknife UCL		137.2
72					95% Standard Bootstrap UCL	132.7				95% Bootstrap-t UCL		164.5
73					95% Hall's Bootstrap UCL	258.1				95% Percentile Bootstrap UCL		135.7
74					95% BCA Bootstrap UCL	146.7						
75					90% Chebyshev(Mean, Sd) UCL	159.6				95% Chebyshev(Mean, Sd) UCL		184.9
76					97.5% Chebyshev(Mean, Sd) UCL	220				99% Chebyshev(Mean, Sd) UCL		289
77												
78					Suggested UCL to Use							
79					95% Student's-t UCL	137.2						
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Arsenic											
88												
89						General Statistics						
90					Total Number of Observations	12				Number of Distinct Observations		9
91										Number of Missing Observations		0
92					Minimum	6.04				Mean		12.14
93					Maximum	33.09				Median		10.74
94					SD	7.598				Std. Error of Mean		2.193
95					Coefficient of Variation	0.626				Skewness		2.29
96												
97						Normal GOF Test						
98					Shapiro Wilk Test Statistic	0.693				Shapiro Wilk GOF Test		
99					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
100					Lilliefors Test Statistic	0.393				Lilliefors GOF Test		
101					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
102						Data Not Normal at 5% Significance Level						
103												
104						Assuming Normal Distribution						
105					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
106					95% Student's-t UCL	16.08				95% Adjusted-CLT UCL (Chen-1995)		17.3
107										95% Modified-t UCL (Johnson-1978)		16.32
108												
109						Gamma GOF Test						
110					A-D Test Statistic	1.001				Anderson-Darling Gamma GOF Test		
111					5% A-D Critical Value	0.735				Data Not Gamma Distributed at 5% Significance Level		
112					K-S Test Statistic	0.347				Kolmogrov-Smirnoff Gamma GOF Test		
113					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
114						Data Not Gamma Distributed at 5% Significance Level						
115												
116						Gamma Statistics						
117					k hat (MLE)	4.194				k star (bias corrected MLE)		3.201
118					Theta hat (MLE)	2.895				Theta star (bias corrected MLE)		3.792
119					nu hat (MLE)	100.7				nu star (bias corrected)		76.82
120					MLE Mean (bias corrected)	12.14				MLE Sd (bias corrected)		6.785
121										Approximate Chi Square Value (0.05)		57.63
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		55.1
123												
124						Assuming Gamma Distribution						
125					95% Approximate Gamma UCL (use when n>=50))	16.18				95% Adjusted Gamma UCL (use when n<50)		16.92
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.861				Shapiro Wilk Lognormal GOF Test		
129					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
130					Lilliefors Test Statistic	0.312				Lilliefors Lognormal GOF Test		
131					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
132						Data appear Approximate Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	1.798				Mean of logged Data		2.373
136					Maximum of Logged Data	3.499				SD of logged Data		0.479
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	16.33				90% Chebyshev (MVUE) UCL		16.95
140					95% Chebyshev (MVUE) UCL	19.24				97.5% Chebyshev (MVUE) UCL		22.41
141					99% Chebyshev (MVUE) UCL	28.65						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	15.75				95% Jackknife UCL		16.08
148					95% Standard Bootstrap UCL	15.59				95% Bootstrap-t UCL		24.34
149					95% Hall's Bootstrap UCL	37.29				95% Percentile Bootstrap UCL		15.98
150					95% BCA Bootstrap UCL	17.7						
151					90% Chebyshev(Mean, Sd) UCL	18.72				95% Chebyshev(Mean, Sd) UCL		21.7
152					97.5% Chebyshev(Mean, Sd) UCL	25.84				99% Chebyshev(Mean, Sd) UCL		33.96
153												
154	**Suggested UCL to Use**											
155					95% Student's-t UCL	16.08				or 95% Modified-t UCL		16.32
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												

	A	B	C	D	E	F	G	H	I	J	K	L
163	Cadmium											
164												
165					General Statistics							
166					Total Number of Observations	12				Number of Distinct Observations		5
167										Number of Missing Observations		0
168					Minimum	1				Mean		12.47
169					Maximum	17.97				Median		12
170					SD	4.387				Std. Error of Mean		1.266
171					Coefficient of Variation	0.352				Skewness		-1.43
172												
173					Normal GOF Test							
174					Shapiro Wilk Test Statistic	0.723				Shapiro Wilk GOF Test		
175					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
176					Lilliefors Test Statistic	0.374				Lilliefors GOF Test		
177					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
178					Data Not Normal at 5% Significance Level							
179												
180					Assuming Normal Distribution							
181					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
182					95% Student's-t UCL	14.75				95% Adjusted-CLT UCL (Chen-1995)		14
183										95% Modified-t UCL (Johnson-1978)		14.66
184												
185					Gamma GOF Test							
186					A-D Test Statistic	2.313				Anderson-Darling Gamma GOF Test		
187					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
188					K-S Test Statistic	0.46				Kolmogrov-Smirnoff Gamma GOF Test		
189					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
190					Data Not Gamma Distributed at 5% Significance Level							
191												
192					Gamma Statistics							
193					k hat (MLE)	3.476				k star (bias corrected MLE)		2.663
194					Theta hat (MLE)	3.588				Theta star (bias corrected MLE)		4.684
195					nu hat (MLE)	83.43				nu star (bias corrected)		63.91
196					MLE Mean (bias corrected)	12.47				MLE Sd (bias corrected)		7.644
197										Approximate Chi Square Value (0.05)		46.52
198					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		44.26
199												
200					Assuming Gamma Distribution							
201					95% Approximate Gamma UCL (use when n>=50))	17.14				95% Adjusted Gamma UCL (use when n<50)		18.01
202												
203					Lognormal GOF Test							
204					Shapiro Wilk Test Statistic	0.498				Shapiro Wilk Lognormal GOF Test		
205					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
206					Lilliefors Test Statistic	0.475				Lilliefors Lognormal GOF Test		
207					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
208					Data Not Lognormal at 5% Significance Level							
209												
210					Lognormal Statistics							
211					Minimum of Logged Data	0				Mean of logged Data		2.373
212					Maximum of Logged Data	2.889				SD of logged Data		0.766
213												

	A	B	C	D	E	F	G	H	I	J	K	L
214					Assuming Lognormal Distribution							
215					95% H-UCL	25.74				90% Chebyshev (MVUE) UCL		23.69
216				95% Chebyshev (MVUE) UCL		28.09				97.5% Chebyshev (MVUE) UCL		34.2
217				99% Chebyshev (MVUE) UCL		46.2						
218												
219					Nonparametric Distribution Free UCL Statistics							
220					Data do not follow a Discernible Distribution (0.05)							
221												
222					Nonparametric Distribution Free UCLs							
223					95% CLT UCL	14.56				95% Jackknife UCL		14.75
224				95% Standard Bootstrap UCL		14.41				95% Bootstrap-t UCL		14.25
225				95% Hall's Bootstrap UCL		14.28				95% Percentile Bootstrap UCL		14.31
226				95% BCA Bootstrap UCL		13.89						
227				90% Chebyshev(Mean, Sd) UCL		16.27				95% Chebyshev(Mean, Sd) UCL		17.99
228				97.5% Chebyshev(Mean, Sd) UCL		20.38				99% Chebyshev(Mean, Sd) UCL		25.07
229												
230					Suggested UCL to Use							
231				95% Chebyshev (Mean, Sd) UCL		17.99						
232												
233					Recommended UCL exceeds the maximum observation							
234												
235					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
236					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
237					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
238					For additional insight the user may want to consult a statistician.							
239												
240					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
241					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
242												
243												

	A	B	C	D	E	F	G	H	I	J	K	L
244	Chromium											
245												
246						General Statistics						
247					Total Number of Observations	12				Number of Distinct Observations		7
248										Number of Missing Observations		0
249					Minimum	32.45				Mean		67.54
250					Maximum	85				Median		81.86
251					SD	23.41				Std. Error of Mean		6.757
252					Coefficient of Variation	0.347				Skewness		-0.797
253												
254						Normal GOF Test						
255					Shapiro Wilk Test Statistic	0.697				Shapiro Wilk GOF Test		
256					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
257					Lilliefors Test Statistic	0.325				Lilliefors GOF Test		
258					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
259						Data Not Normal at 5% Significance Level						
260												
261						Assuming Normal Distribution						
262					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
263					95% Student's-t UCL	79.67				95% Adjusted-CLT UCL (Chen-1995)		76.99
264										95% Modified-t UCL (Johnson-1978)		79.42
265												
266						Gamma GOF Test						
267					A-D Test Statistic	1.836				Anderson-Darling Gamma GOF Test		
268					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
269					K-S Test Statistic	0.353				Kolmogrov-Smirnoff Gamma GOF Test		
270					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
271						Data Not Gamma Distributed at 5% Significance Level						
272												
273						Gamma Statistics						
274					k hat (MLE)	7.212				k star (bias corrected MLE)		5.465
275					Theta hat (MLE)	9.365				Theta star (bias corrected MLE)		12.36
276					nu hat (MLE)	173.1				nu star (bias corrected)		131.2
277					MLE Mean (bias corrected)	67.54				MLE Sd (bias corrected)		28.89
278										Approximate Chi Square Value (0.05)		105.7
279					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		102.2
280												
281						Assuming Gamma Distribution						
282					95% Approximate Gamma UCL (use when n>=50))	83.8				95% Adjusted Gamma UCL (use when n<50)		86.66
283												
284						Lognormal GOF Test						
285					Shapiro Wilk Test Statistic	0.694				Shapiro Wilk Lognormal GOF Test		
286					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
287					Lilliefors Test Statistic	0.353				Lilliefors Lognormal GOF Test		
288					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
289						Data Not Lognormal at 5% Significance Level						
290												
291						Lognormal Statistics						
292					Minimum of Logged Data	3.48				Mean of logged Data		4.142
293					Maximum of Logged Data	4.443				SD of logged Data		0.417
294												

	A	B	C	D	E	F	G	H	I	J	K	L
295	**Assuming Lognormal Distribution**											
296					95% H-UCL	88.79				90% Chebyshev (MVUE) UCL		93.16
297					95% Chebyshev (MVUE) UCL	104.5				97.5% Chebyshev (MVUE) UCL		120.2
298					99% Chebyshev (MVUE) UCL	151.2						
299												
300	**Nonparametric Distribution Free UCL Statistics**											
301	**Data do not follow a Discernible Distribution (0.05)**											
302												
303	**Nonparametric Distribution Free UCLs**											
304					95% CLT UCL	78.65				95% Jackknife UCL		79.67
305					95% Standard Bootstrap UCL	78.11				95% Bootstrap-t UCL		77.59
306					95% Hall's Bootstrap UCL	76.68				95% Percentile Bootstrap UCL		76.79
307					95% BCA Bootstrap UCL	76.22						
308					90% Chebyshev(Mean, Sd) UCL	87.81				95% Chebyshev(Mean, Sd) UCL		96.99
309					97.5% Chebyshev(Mean, Sd) UCL	109.7				99% Chebyshev(Mean, Sd) UCL		134.8
310												
311	**Suggested UCL to Use**											
312					95% Student's-t UCL	79.67				or 95% Modified-t UCL		79.42
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												
319	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
320	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
321												
322												

	A	B	C	D	E	F	G	H	I	J	K	L
323	Copper											
324												
325					General Statistics							
326					Total Number of Observations	12				Number of Distinct Observations		11
327										Number of Missing Observations		0
328					Minimum	25.24				Mean		344.2
329					Maximum	1803				Median		138.9
330					SD	500.7				Std. Error of Mean		144.5
331					Coefficient of Variation	1.455				Skewness		2.572
332												
333					Normal GOF Test							
334					Shapiro Wilk Test Statistic	0.659				Shapiro Wilk GOF Test		
335					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
336					Lilliefors Test Statistic	0.262				Lilliefors GOF Test		
337					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
338					Data Not Normal at 5% Significance Level							
339												
340					Assuming Normal Distribution							
341					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
342					95% Student's-t UCL	603.8				95% Adjusted-CLT UCL (Chen-1995)		696.6
343										95% Modified-t UCL (Johnson-1978)		621.6
344												
345					Gamma GOF Test							
346					A-D Test Statistic	0.511				Anderson-Darling Gamma GOF Test		
347					5% A-D Critical Value	0.769				Detected data appear Gamma Distributed at 5% Significance Level		
348					K-S Test Statistic	0.166				Kolmogrov-Smirnoff Gamma GOF Test		
349					5% K-S Critical Value	0.256				Detected data appear Gamma Distributed at 5% Significance Level		
350					Detected data appear Gamma Distributed at 5% Significance Level							
351												
352					Gamma Statistics							
353					k hat (MLE)	0.704				k star (bias corrected MLE)		0.584
354					Theta hat (MLE)	489				Theta star (bias corrected MLE)		589.9
355					nu hat (MLE)	16.89				nu star (bias corrected)		14
356					MLE Mean (bias corrected)	344.2				MLE Sd (bias corrected)		450.6
357										Approximate Chi Square Value (0.05)		6.574
358					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.815
359												
360					Assuming Gamma Distribution							
361					95% Approximate Gamma UCL (use when n>=50)	733.2				95% Adjusted Gamma UCL (use when n<50)		829
362												
363					Lognormal GOF Test							
364					Shapiro Wilk Test Statistic	0.922				Shapiro Wilk Lognormal GOF Test		
365					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
366					Lilliefors Test Statistic	0.176				Lilliefors Lognormal GOF Test		
367					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
368					Data appear Lognormal at 5% Significance Level							
369												
370					Lognormal Statistics							
371					Minimum of Logged Data	3.228				Mean of logged Data		4.983
372					Maximum of Logged Data	7.497				SD of logged Data		1.418
373												

	A	B	C	D	E	F	G	H	I	J	K	L
374	**Assuming Lognormal Distribution**											
375					95% H-UCL	1960				90% Chebyshev (MVUE) UCL		811.9
376					95% Chebyshev (MVUE) UCL	1023				97.5% Chebyshev (MVUE) UCL		1315
377					99% Chebyshev (MVUE) UCL	1890						
378												
379	**Nonparametric Distribution Free UCL Statistics**											
380	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
381												
382	**Nonparametric Distribution Free UCLs**											
383					95% CLT UCL	581.9				95% Jackknife UCL		603.8
384					95% Standard Bootstrap UCL	572.1				95% Bootstrap-t UCL		899.8
385					95% Hall's Bootstrap UCL	1457				95% Percentile Bootstrap UCL		597
386					95% BCA Bootstrap UCL	741						
387					90% Chebyshev(Mean, Sd) UCL	777.8				95% Chebyshev(Mean, Sd) UCL		974.2
388					97.5% Chebyshev(Mean, Sd) UCL	1247				99% Chebyshev(Mean, Sd) UCL		1782
389												
390	**Suggested UCL to Use**											
391					95% Adjusted Gamma UCL	829						
392												
393	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
394	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
395	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
396	For additional insight the user may want to consult a statistician.											
397												
398												

	A	B	C	D	E	F	G	H	I	J	K	L
399	Iron											
400												
401					General Statistics							
402					Total Number of Observations	12				Number of Distinct Observations		12
403										Number of Missing Observations		0
404					Minimum	10461				Mean		26619
405					Maximum	60522				Median		21041
406					SD	14633				Std. Error of Mean		4224
407					Coefficient of Variation	0.55				Skewness		1.15
408												
409					Normal GOF Test							
410					Shapiro Wilk Test Statistic	0.887				Shapiro Wilk GOF Test		
411					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
412					Lilliefors Test Statistic	0.203				Lilliefors GOF Test		
413					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
414					Data appear Normal at 5% Significance Level							
415												
416					Assuming Normal Distribution							
417					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
418					95% Student's-t UCL	34205				95% Adjusted-CLT UCL (Chen-1995)		35065
419										95% Modified-t UCL (Johnson-1978)		34439
420												
421					Gamma GOF Test							
422					A-D Test Statistic	0.36				Anderson-Darling Gamma GOF Test		
423					5% A-D Critical Value	0.736				Detected data appear Gamma Distributed at 5% Significance Level		
424					K-S Test Statistic	0.187				Kolmogrov-Smirnoff Gamma GOF Test		
425					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
426					Detected data appear Gamma Distributed at 5% Significance Level							
427												
428					Gamma Statistics							
429					k hat (MLE)	4.033				k star (bias corrected MLE)		3.08
430					Theta hat (MLE)	6601				Theta star (bias corrected MLE)		8642
431					nu hat (MLE)	96.79				nu star (bias corrected)		73.93
432					MLE Mean (bias corrected)	26619				MLE Sd (bias corrected)		15167
433										Approximate Chi Square Value (0.05)		55.13
434					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		52.65
435												
436					Assuming Gamma Distribution							
437					95% Approximate Gamma UCL (use when n>=50))	35698				95% Adjusted Gamma UCL (use when n<50)		37373
438												
439					Lognormal GOF Test							
440					Shapiro Wilk Test Statistic	0.96				Shapiro Wilk Lognormal GOF Test		
441					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
442					Lilliefors Test Statistic	0.161				Lilliefors Lognormal GOF Test		
443					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
444					Data appear Lognormal at 5% Significance Level							
445												
446					Lognormal Statistics							
447					Minimum of Logged Data	9.255				Mean of logged Data		10.06
448					Maximum of Logged Data	11.01				SD of logged Data		0.526
449												

	A	B	C	D	E	F	G	H	I	J	K	L
450	Assuming Lognormal Distribution											
451					95% H-UCL	37948				90% Chebyshev (MVUE) UCL		38944
452					95% Chebyshev (MVUE) UCL	44566				97.5% Chebyshev (MVUE) UCL		52369
453					99% Chebyshev (MVUE) UCL	67696						
454												
455	Nonparametric Distribution Free UCL Statistics											
456	Data appear to follow a Discernible Distribution at 5% Significance Level											
457												
458	Nonparametric Distribution Free UCLs											
459					95% CLT UCL	33567				95% Jackknife UCL		34205
460					95% Standard Bootstrap UCL	33468				95% Bootstrap-t UCL		36730
461					95% Hall's Bootstrap UCL	36328				95% Percentile Bootstrap UCL		33741
462					95% BCA Bootstrap UCL	34511						
463					90% Chebyshev(Mean, Sd) UCL	39291				95% Chebyshev(Mean, Sd) UCL		45031
464					97.5% Chebyshev(Mean, Sd) UCL	52998				99% Chebyshev(Mean, Sd) UCL		68648
465												
466	Suggested UCL to Use											
467					95% Student's-t UCL	34205						
468												
469	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
470	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
471	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
472	For additional insight the user may want to consult a statistician.											
473												
474												

	A	B	C	D	E	F	G	H	I	J	K	L
475	Manganese											
476												
477					General Statistics							
478					Total Number of Observations	12				Number of Distinct Observations		12
479										Number of Missing Observations		0
480					Minimum	159.4				Mean		716.4
481					Maximum	2903				Median		576.7
482					SD	720.7				Std. Error of Mean		208
483					Coefficient of Variation	1.006				Skewness		2.939
484												
485					Normal GOF Test							
486					Shapiro Wilk Test Statistic	0.612				Shapiro Wilk GOF Test		
487					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
488					Lilliefors Test Statistic	0.327				Lilliefors GOF Test		
489					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
490					Data Not Normal at 5% Significance Level							
491												
492					Assuming Normal Distribution							
493					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
494					95% Student's-t UCL	1090				95% Adjusted-CLT UCL (Chen-1995)		1247
495										95% Modified-t UCL (Johnson-1978)		1119
496												
497					Gamma GOF Test							
498					A-D Test Statistic	0.738				Anderson-Darling Gamma GOF Test		
499					5% A-D Critical Value	0.742				Detected data appear Gamma Distributed at 5% Significance Level		
500					K-S Test Statistic	0.23				Kolmogrov-Smirnoff Gamma GOF Test		
501					5% K-S Critical Value	0.249				Detected data appear Gamma Distributed at 5% Significance Level		
502					Detected data appear Gamma Distributed at 5% Significance Level							
503												
504					Gamma Statistics							
505					k hat (MLE)	1.952				k star (bias corrected MLE)		1.52
506					Theta hat (MLE)	366.9				Theta star (bias corrected MLE)		471.3
507					nu hat (MLE)	46.86				nu star (bias corrected)		36.48
508					MLE Mean (bias corrected)	716.4				MLE Sd (bias corrected)		581.1
509										Approximate Chi Square Value (0.05)		23.65
510					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		22.09
511												
512					Assuming Gamma Distribution							
513					95% Approximate Gamma UCL (use when n>=50)	1105				95% Adjusted Gamma UCL (use when n<50)		1183
514												
515					Lognormal GOF Test							
516					Shapiro Wilk Test Statistic	0.933				Shapiro Wilk Lognormal GOF Test		
517					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
518					Lilliefors Test Statistic	0.176				Lilliefors Lognormal GOF Test		
519					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
520					Data appear Lognormal at 5% Significance Level							
521												
522					Lognormal Statistics							
523					Minimum of Logged Data	5.071				Mean of logged Data		6.297
524					Maximum of Logged Data	7.974				SD of logged Data		0.721
525												

	A	B	C	D	E	F	G	H	I	J	K	L
526	**Assuming Lognormal Distribution**											
527					95% H-UCL	1198				90% Chebyshev (MVUE) UCL		1133
528					95% Chebyshev (MVUE) UCL	1336				97.5% Chebyshev (MVUE) UCL		1617
529					99% Chebyshev (MVUE) UCL	2169						
530												
531	**Nonparametric Distribution Free UCL Statistics**											
532	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
533												
534	**Nonparametric Distribution Free UCLs**											
535					95% CLT UCL	1059				95% Jackknife UCL		1090
536					95% Standard Bootstrap UCL	1048				95% Bootstrap-t UCL		1755
537					95% Hall's Bootstrap UCL	2627				95% Percentile Bootstrap UCL		1089
538					95% BCA Bootstrap UCL	1260						
539					90% Chebyshev(Mean, Sd) UCL	1341				95% Chebyshev(Mean, Sd) UCL		1623
540					97.5% Chebyshev(Mean, Sd) UCL	2016				99% Chebyshev(Mean, Sd) UCL		2786
541												
542	**Suggested UCL to Use**											
543					95% Adjusted Gamma UCL	1183						
544												
545	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
546	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
547	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
548	For additional insight the user may want to consult a statistician.											
549												
550												

	A	B	C	D	E	F	G	H	I	J	K	L
551	Nickel											
552												
553					General Statistics							
554					Total Number of Observations	12				Number of Distinct Observations		11
555										Number of Missing Observations		0
556					Minimum	65				Mean		243.6
557					Maximum	834.4				Median		101.5
558					SD	250.4				Std. Error of Mean		72.27
559					Coefficient of Variation	1.028				Skewness		1.568
560												
561					Normal GOF Test							
562					Shapiro Wilk Test Statistic	0.758				Shapiro Wilk GOF Test		
563					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
564					Lilliefors Test Statistic	0.289				Lilliefors GOF Test		
565					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
566					Data Not Normal at 5% Significance Level							
567												
568					Assuming Normal Distribution							
569					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
570					95% Student's-t UCL	373.4				95% Adjusted-CLT UCL (Chen-1995)		397.4
571										95% Modified-t UCL (Johnson-1978)		378.8
572												
573					Gamma GOF Test							
574					A-D Test Statistic	0.901				Anderson-Darling Gamma GOF Test		
575					5% A-D Critical Value	0.75				Data Not Gamma Distributed at 5% Significance Level		
576					K-S Test Statistic	0.278				Kolmogrov-Smirnoff Gamma GOF Test		
577					5% K-S Critical Value	0.251				Data Not Gamma Distributed at 5% Significance Level		
578					Data Not Gamma Distributed at 5% Significance Level							
579												
580					Gamma Statistics							
581					k hat (MLE)	1.313				k star (bias corrected MLE)		1.04
582					Theta hat (MLE)	185.6				Theta star (bias corrected MLE)		234.2
583					nu hat (MLE)	31.51				nu star (bias corrected)		24.96
584					MLE Mean (bias corrected)	243.6				MLE Sd (bias corrected)		238.8
585										Approximate Chi Square Value (0.05)		14.58
586					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		13.39
587												
588					Assuming Gamma Distribution							
589					95% Approximate Gamma UCL (use when n>=50))	417				95% Adjusted Gamma UCL (use when n<50)		454.3
590												
591					Lognormal GOF Test							
592					Shapiro Wilk Test Statistic	0.85				Shapiro Wilk Lognormal GOF Test		
593					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
594					Lilliefors Test Statistic	0.242				Lilliefors Lognormal GOF Test		
595					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
596					Data appear Approximate Lognormal at 5% Significance Level							
597												
598					Lognormal Statistics							
599					Minimum of Logged Data	4.174				Mean of logged Data		5.069
600					Maximum of Logged Data	6.727				SD of logged Data		0.935
601												

	A	B	C	D	E	F	G	H	I	J	K	L
602					**Assuming Lognormal Distribution**							
603					95% H-UCL	541.5				90% Chebyshev (MVUE) UCL		436.5
604				95% Chebyshev (MVUE) UCL		528				97.5% Chebyshev (MVUE) UCL		655
605				99% Chebyshev (MVUE) UCL		904.5						
606												
607					**Nonparametric Distribution Free UCL Statistics**							
608					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
609												
610					**Nonparametric Distribution Free UCLs**							
611					95% CLT UCL	362.5				95% Jackknife UCL		373.4
612				95% Standard Bootstrap UCL		357.5				95% Bootstrap-t UCL		454.7
613				95% Hall's Bootstrap UCL		551.7				95% Percentile Bootstrap UCL		365.8
614				95% BCA Bootstrap UCL		393.1						
615				90% Chebyshev(Mean, Sd) UCL		460.4				95% Chebyshev(Mean, Sd) UCL		558.6
616				97.5% Chebyshev(Mean, Sd) UCL		694.9				99% Chebyshev(Mean, Sd) UCL		962.7
617												
618					**Suggested UCL to Use**							
619				95% Chebyshev (Mean, Sd) UCL		558.6						
620												
621	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
622	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
623	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
624	For additional insight the user may want to consult a statistician.											
625												
626												

	A	B	C	D	E	F	G	H	I	J	K	L
627	PAH, Total											
628												
629						General Statistics						
630					Total Number of Observations	12				Number of Distinct Observations		1
631										Number of Missing Observations		0
632					Minimum	0.135				Mean		0.135
633					Maximum	0.135				Median		0.135
634												
635						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
636						ProUCL (or any other software) should not be used on such a data set!						
637						The data set for variable PAH, Total was not processed!						
638												
639						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
640						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
641												
642												
643												

	A	B	C	D	E	F	G	H	I	J	K	L
644	PCB, Total											
645												
646						General Statistics						
647					Total Number of Observations	12				Number of Distinct Observations		4
648										Number of Missing Observations		0
649					Minimum	0.34				Mean		9.195
650					Maximum	50				Median		5
651					SD	13.09				Std. Error of Mean		3.779
652					Coefficient of Variation	1.424				Skewness		3.24
653												
654						Normal GOF Test						
655					Shapiro Wilk Test Statistic	0.478				Shapiro Wilk GOF Test		
656					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
657					Lilliefors Test Statistic	0.392				Lilliefors GOF Test		
658					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
659						Data Not Normal at 5% Significance Level						
660												
661						Assuming Normal Distribution						
662					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
663					95% Student's-t UCL	15.98				95% Adjusted-CLT UCL (Chen-1995)		19.19
664										95% Modified-t UCL (Johnson-1978)		16.57
665												
666						Gamma GOF Test						
667					A-D Test Statistic	1.812				Anderson-Darling Gamma GOF Test		
668					5% A-D Critical Value	0.755				Data Not Gamma Distributed at 5% Significance Level		
669					K-S Test Statistic	0.345				Kolmogrov-Smirnoff Gamma GOF Test		
670					5% K-S Critical Value	0.252				Data Not Gamma Distributed at 5% Significance Level		
671						Data Not Gamma Distributed at 5% Significance Level						
672												
673						Gamma Statistics						
674					k hat (MLE)	1.087				k star (bias corrected MLE)		0.871
675					Theta hat (MLE)	8.457				Theta star (bias corrected MLE)		10.56
676					nu hat (MLE)	26.09				nu star (bias corrected)		20.9
677					MLE Mean (bias corrected)	9.195				MLE Sd (bias corrected)		9.852
678										Approximate Chi Square Value (0.05)		11.52
679					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		10.47
680												
681						Assuming Gamma Distribution						
682					95% Approximate Gamma UCL (use when n>=50))	16.68				95% Adjusted Gamma UCL (use when n<50)		18.36
683												
684						Lognormal GOF Test						
685					Shapiro Wilk Test Statistic	0.729				Shapiro Wilk Lognormal GOF Test		
686					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
687					Lilliefors Test Statistic	0.387				Lilliefors Lognormal GOF Test		
688					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
689						Data Not Lognormal at 5% Significance Level						
690												
691						Lognormal Statistics						
692					Minimum of Logged Data	-1.079				Mean of logged Data		1.693
693					Maximum of Logged Data	3.912				SD of logged Data		1.104
694												

	A	B	C	D	E	F	G	H	I	J	K	L
695					Assuming Lognormal Distribution							
696					95% H-UCL	28.11				90% Chebyshev (MVUE) UCL		18.87
697				95% Chebyshev (MVUE) UCL		23.21				97.5% Chebyshev (MVUE) UCL		29.23
698				99% Chebyshev (MVUE) UCL		41.05						
699												
700					Nonparametric Distribution Free UCL Statistics							
701					Data do not follow a Discernible Distribution (0.05)							
702												
703					Nonparametric Distribution Free UCLs							
704					95% CLT UCL	15.41				95% Jackknife UCL		15.98
705				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
706				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
707				95% BCA Bootstrap UCL		N/A						
708				90% Chebyshev(Mean, Sd) UCL		20.53				95% Chebyshev(Mean, Sd) UCL		25.67
709				97.5% Chebyshev(Mean, Sd) UCL		32.8				99% Chebyshev(Mean, Sd) UCL		46.8
710												
711					Suggested UCL to Use							
712				95% Chebyshev (Mean, Sd) UCL		25.67						
713												
714	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
715	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
716	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
717	For additional insight the user may want to consult a statistician.											
718												
719												

	A	B	C	D	E	F	G	H	I	J	K	L
720	Thallium											
721												
722					General Statistics							
723					Total Number of Observations	12				Number of Distinct Observations		1
724										Number of Missing Observations		0
725					Minimum	0.3				Mean		0.3
726					Maximum	0.3				Median		0.3
727												
728					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
729					ProUCL (or any other software) should not be used on such a data set!							
730					The data set for variable Thallium was not processed!							
731												
732					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
733					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
734												
735												
736												

	A	B	C	D	E	F	G	H	I	J	K	L
737	Uranium											
738												
739					General Statistics							
740					Total Number of Observations	12				Number of Distinct Observations		10
741										Number of Missing Observations		0
742					Minimum	7.36				Mean		41
743					Maximum	82.92				Median		44.88
744					SD	24.86				Std. Error of Mean		7.176
745					Coefficient of Variation	0.606				Skewness		0.263
746												
747					Normal GOF Test							
748					Shapiro Wilk Test Statistic	0.931				Shapiro Wilk GOF Test		
749					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
750					Lilliefors Test Statistic	0.218				Lilliefors GOF Test		
751					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
752					Data appear Normal at 5% Significance Level							
753												
754					Assuming Normal Distribution							
755					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
756					95% Student's-t UCL	53.89				95% Adjusted-CLT UCL (Chen-1995)		53.39
757										95% Modified-t UCL (Johnson-1978)		53.98
758												
759					Gamma GOF Test							
760					A-D Test Statistic	0.434				Anderson-Darling Gamma GOF Test		
761					5% A-D Critical Value	0.74				Detected data appear Gamma Distributed at 5% Significance Level		
762					K-S Test Statistic	0.196				Kolmogrov-Smirnoff Gamma GOF Test		
763					5% K-S Critical Value	0.248				Detected data appear Gamma Distributed at 5% Significance Level		
764					Detected data appear Gamma Distributed at 5% Significance Level							
765												
766					Gamma Statistics							
767					k hat (MLE)	2.416				k star (bias corrected MLE)		1.868
768					Theta hat (MLE)	16.97				Theta star (bias corrected MLE)		21.95
769					nu hat (MLE)	57.99				nu star (bias corrected)		44.83
770					MLE Mean (bias corrected)	41				MLE Sd (bias corrected)		30
771										Approximate Chi Square Value (0.05)		30.47
772					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		28.67
773												
774					Assuming Gamma Distribution							
775					95% Approximate Gamma UCL (use when n>=50))	60.32				95% Adjusted Gamma UCL (use when n<50)		64.1
776												
777					Lognormal GOF Test							
778					Shapiro Wilk Test Statistic	0.916				Shapiro Wilk Lognormal GOF Test		
779					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
780					Lilliefors Test Statistic	0.2				Lilliefors Lognormal GOF Test		
781					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
782					Data appear Lognormal at 5% Significance Level							
783												
784					Lognormal Statistics							
785					Minimum of Logged Data	1.996				Mean of logged Data		3.493
786					Maximum of Logged Data	4.418				SD of logged Data		0.755
787												

	A	B	C	D	E	F	G	H	I	J	K	L
788	**Assuming Lognormal Distribution**											
789					95% H-UCL	77.16				90% Chebyshev (MVUE) UCL		71.53
790					95% Chebyshev (MVUE) UCL	84.7				97.5% Chebyshev (MVUE) UCL		103
791					99% Chebyshev (MVUE) UCL	138.9						
792												
793	**Nonparametric Distribution Free UCL Statistics**											
794	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
795												
796	**Nonparametric Distribution Free UCLs**											
797					95% CLT UCL	52.8				95% Jackknife UCL		53.89
798					95% Standard Bootstrap UCL	52.34				95% Bootstrap-t UCL		54.9
799					95% Hall's Bootstrap UCL	52.31				95% Percentile Bootstrap UCL		51.95
800					95% BCA Bootstrap UCL	52.08						
801					90% Chebyshev(Mean, Sd) UCL	62.53				95% Chebyshev(Mean, Sd) UCL		72.28
802					97.5% Chebyshev(Mean, Sd) UCL	85.82				99% Chebyshev(Mean, Sd) UCL		112.4
803												
804	**Suggested UCL to Use**											
805					95% Student's-t UCL	53.89						
806												
807	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
808	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
809	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
810	For additional insight the user may want to consult a statistician.											
811												
812												

	A	B	C	D	E	F	G	H	I	J	K	L
813	Uranium-234											
814												
815						General Statistics						
816					Total Number of Observations	12				Number of Distinct Observations		1
817										Number of Missing Observations		0
818					Minimum	6.49				Mean		6.49
819					Maximum	6.49				Median		6.49
820												
821					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
822					ProUCL (or any other software) should not be used on such a data set!							
823					The data set for variable Uranium-234 was not processed!							
824												
825					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
826					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
827												
828												
829												
830	Uranium-235											
831												
832						General Statistics						
833					Total Number of Observations	12				Number of Distinct Observations		1
834										Number of Missing Observations		0
835					Minimum	0.45				Mean		0.45
836					Maximum	0.45				Median		0.45
837												
838					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
839					ProUCL (or any other software) should not be used on such a data set!							
840					The data set for variable Uranium-235 was not processed!							
841												
842					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
843					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
844												
845												
846												
847	Uranium-238											
848												
849						General Statistics						
850					Total Number of Observations	12				Number of Distinct Observations		1
851										Number of Missing Observations		0
852					Minimum	8.05				Mean		8.05
853					Maximum	8.05				Median		8.05
854												
855					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
856					ProUCL (or any other software) should not be used on such a data set!							
857					The data set for variable Uranium-238 was not processed!							
858												
859					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
860					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
861												
862												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 11:33:06 AM								
5	From File			EPC_015Surf_EU08.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		8
15										Number of Missing Observations		0
16					Minimum	30				Mean		57.08
17					Maximum	123.8				Median		45.03
18					SD	33.02				Std. Error of Mean		9.532
19					Coefficient of Variation	0.578				Skewness		1.014
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.823				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.211				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Approximate Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	74.19				95% Adjusted-CLT UCL (Chen-1995)		75.74
31										95% Modified-t UCL (Johnson-1978)		74.66
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.803				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.243				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.247				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	3.726				k star (bias corrected MLE)		2.85
42					Theta hat (MLE)	15.32				Theta star (bias corrected MLE)		20.02
43					nu hat (MLE)	89.44				nu star (bias corrected)		68.41
44					MLE Mean (bias corrected)	57.08				MLE Sd (bias corrected)		33.81
45										Approximate Chi Square Value (0.05)		50.37
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		48.02
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	77.51				95% Adjusted Gamma UCL (use when n<50)		81.32
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.848				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.241				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
56						Data appear Approximate Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	3.401				Mean of logged Data		3.904
60					Maximum of Logged Data	4.819				SD of logged Data		0.54
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	82.04				90% Chebyshev (MVUE) UCL		83.86
64					95% Chebyshev (MVUE) UCL	96.19				97.5% Chebyshev (MVUE) UCL		113.3
65					99% Chebyshev (MVUE) UCL	146.9						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	72.75				95% Jackknife UCL		74.19
72					95% Standard Bootstrap UCL	72.12				95% Bootstrap-t UCL		80.06
73					95% Hall's Bootstrap UCL	75.5				95% Percentile Bootstrap UCL		72.92
74					95% BCA Bootstrap UCL	74.39						
75					90% Chebyshev(Mean, Sd) UCL	85.67				95% Chebyshev(Mean, Sd) UCL		98.62
76					97.5% Chebyshev(Mean, Sd) UCL	116.6				99% Chebyshev(Mean, Sd) UCL		151.9
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	74.19						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Arsenic											
88												
89						General Statistics						
90					Total Number of Observations	12				Number of Distinct Observations		9
91										Number of Missing Observations		0
92					Minimum	7.37				Mean		10.71
93					Maximum	13.83				Median		11
94					SD	1.815				Std. Error of Mean		0.524
95					Coefficient of Variation	0.169				Skewness		-0.518
96												
97						Normal GOF Test						
98					Shapiro Wilk Test Statistic	0.924				Shapiro Wilk GOF Test		
99					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
100					Lilliefors Test Statistic	0.231				Lilliefors GOF Test		
101					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
102						Data appear Normal at 5% Significance Level						
103												
104						Assuming Normal Distribution						
105					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
106					95% Student's-t UCL	11.65				95% Adjusted-CLT UCL (Chen-1995)		11.48
107										95% Modified-t UCL (Johnson-1978)		11.63
108												
109						Gamma GOF Test						
110					A-D Test Statistic	0.628				Anderson-Darling Gamma GOF Test		
111					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
112					K-S Test Statistic	0.252				Kolmogrov-Smirnoff Gamma GOF Test		
113					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
114						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
115												
116						Gamma Statistics						
117					k hat (MLE)	34.97				k star (bias corrected MLE)		26.28
118					Theta hat (MLE)	0.306				Theta star (bias corrected MLE)		0.407
119					nu hat (MLE)	839.3				nu star (bias corrected)		630.8
120					MLE Mean (bias corrected)	10.71				MLE Sd (bias corrected)		2.088
121										Approximate Chi Square Value (0.05)		573.5
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		565.2
123												
124						Assuming Gamma Distribution						
125					95% Approximate Gamma UCL (use when n>=50))	11.78				95% Adjusted Gamma UCL (use when n<50)		11.95
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.889				Shapiro Wilk Lognormal GOF Test		
129					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
130					Lilliefors Test Statistic	0.257				Lilliefors Lognormal GOF Test		
131					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
132						Data appear Approximate Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	1.997				Mean of logged Data		2.357
136					Maximum of Logged Data	2.627				SD of logged Data		0.181
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	11.86				90% Chebyshev (MVUE) UCL		12.4
140					95% Chebyshev (MVUE) UCL	13.17				97.5% Chebyshev (MVUE) UCL		14.23
141					99% Chebyshev (MVUE) UCL	16.31						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	11.57				95% Jackknife UCL		11.65
148					95% Standard Bootstrap UCL	11.53				95% Bootstrap-t UCL		11.55
149					95% Hall's Bootstrap UCL	11.54				95% Percentile Bootstrap UCL		11.5
150					95% BCA Bootstrap UCL	11.46						
151					90% Chebyshev(Mean, Sd) UCL	12.28				95% Chebyshev(Mean, Sd) UCL		12.99
152					97.5% Chebyshev(Mean, Sd) UCL	13.98				99% Chebyshev(Mean, Sd) UCL		15.92
153												
154	**Suggested UCL to Use**											
155					95% Student's-t UCL	11.65						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
163	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Cadmium											
167												
168						General Statistics						
169					Total Number of Observations	12				Number of Distinct Observations		4
170										Number of Missing Observations		0
171					Minimum	0.74				Mean		11.85
172					Maximum	16.9				Median		12
173					SD	3.95				Std. Error of Mean		1.14
174					Coefficient of Variation	0.333				Skewness		-2.014
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.627				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.432				Lilliefors GOF Test		
180					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
181						Data Not Normal at 5% Significance Level						
182												
183						Assuming Normal Distribution						
184					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
185					95% Student's-t UCL	13.9				95% Adjusted-CLT UCL (Chen-1995)		13.02
186										95% Modified-t UCL (Johnson-1978)		13.79
187												
188						Gamma GOF Test						
189					A-D Test Statistic	2.946				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.738				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.5				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	3.201				k star (bias corrected MLE)		2.456
197					Theta hat (MLE)	3.703				Theta star (bias corrected MLE)		4.826
198					nu hat (MLE)	76.82				nu star (bias corrected)		58.95
199					MLE Mean (bias corrected)	11.85				MLE Sd (bias corrected)		7.563
200										Approximate Chi Square Value (0.05)		42.29
201					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		40.15
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	16.52				95% Adjusted Gamma UCL (use when n<50)		17.4
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.436				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.501				Lilliefors Lognormal GOF Test		
210					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
211						Data Not Lognormal at 5% Significance Level						
212												
213						Lognormal Statistics						
214					Minimum of Logged Data	-0.301				Mean of logged Data		2.308
215					Maximum of Logged Data	2.827				SD of logged Data		0.832
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	27.43				90% Chebyshev (MVUE) UCL		24.12
219					95% Chebyshev (MVUE) UCL	28.84				97.5% Chebyshev (MVUE) UCL		35.38
220					99% Chebyshev (MVUE) UCL	48.24						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	13.73				95% Jackknife UCL		13.9
227					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
228					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
229					95% BCA Bootstrap UCL	N/A						
230					90% Chebyshev(Mean, Sd) UCL	15.27				95% Chebyshev(Mean, Sd) UCL		16.82
231					97.5% Chebyshev(Mean, Sd) UCL	18.97				99% Chebyshev(Mean, Sd) UCL		23.2
232												
233	**Suggested UCL to Use**											
234					95% Chebyshev (Mean, Sd) UCL	16.82						
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
242	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
243												
244												

	A	B	C	D	E	F	G	H	I	J	K	L
245	Chromium											
246												
247						General Statistics						
248					Total Number of Observations	12				Number of Distinct Observations		8
249										Number of Missing Observations		0
250					Minimum	33.8				Mean		65.16
251					Maximum	97.61				Median		67.39
252					SD	23.59				Std. Error of Mean		6.81
253					Coefficient of Variation	0.362				Skewness		-0.0379
254												
255						Normal GOF Test						
256					Shapiro Wilk Test Statistic	0.828				Shapiro Wilk GOF Test		
257					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
258					Lilliefors Test Statistic	0.3				Lilliefors GOF Test		
259					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
260						Data Not Normal at 5% Significance Level						
261												
262						Assuming Normal Distribution						
263					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
264					95% Student's-t UCL	77.39				95% Adjusted-CLT UCL (Chen-1995)		76.28
265										95% Modified-t UCL (Johnson-1978)		77.38
266												
267						Gamma GOF Test						
268					A-D Test Statistic	1.045				Anderson-Darling Gamma GOF Test		
269					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
270					K-S Test Statistic	0.314				Kolmogrov-Smirnoff Gamma GOF Test		
271					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
272						Data Not Gamma Distributed at 5% Significance Level						
273												
274						Gamma Statistics						
275					k hat (MLE)	7.761				k star (bias corrected MLE)		5.876
276					Theta hat (MLE)	8.396				Theta star (bias corrected MLE)		11.09
277					nu hat (MLE)	186.3				nu star (bias corrected)		141
278					MLE Mean (bias corrected)	65.16				MLE Sd (bias corrected)		26.88
279										Approximate Chi Square Value (0.05)		114.6
280					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		110.9
281												
282						Assuming Gamma Distribution						
283					95% Approximate Gamma UCL (use when n>=50))	80.2				95% Adjusted Gamma UCL (use when n<50)		82.83
284												
285						Lognormal GOF Test						
286					Shapiro Wilk Test Statistic	0.841				Shapiro Wilk Lognormal GOF Test		
287					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
288					Lilliefors Test Statistic	0.304				Lilliefors Lognormal GOF Test		
289					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
290						Data Not Lognormal at 5% Significance Level						
291												
292						Lognormal Statistics						
293					Minimum of Logged Data	3.52				Mean of logged Data		4.111
294					Maximum of Logged Data	4.581				SD of logged Data		0.387
295												

	A	B	C	D	E	F	G	H	I	J	K	L
296	**Assuming Lognormal Distribution**											
297					95% H-UCL	83.15				90% Chebyshev (MVUE) UCL		87.54
298					95% Chebyshev (MVUE) UCL	97.6				97.5% Chebyshev (MVUE) UCL		111.6
299					99% Chebyshev (MVUE) UCL	139						
300												
301	**Nonparametric Distribution Free UCL Statistics**											
302	**Data do not follow a Discernible Distribution (0.05)**											
303												
304	**Nonparametric Distribution Free UCLs**											
305					95% CLT UCL	76.36				95% Jackknife UCL		77.39
306					95% Standard Bootstrap UCL	75.79				95% Bootstrap-t UCL		76.51
307					95% Hall's Bootstrap UCL	74.64				95% Percentile Bootstrap UCL		75.68
308					95% BCA Bootstrap UCL	76.41						
309					90% Chebyshev(Mean, Sd) UCL	85.59				95% Chebyshev(Mean, Sd) UCL		94.85
310					97.5% Chebyshev(Mean, Sd) UCL	107.7				99% Chebyshev(Mean, Sd) UCL		132.9
311												
312	**Suggested UCL to Use**											
313					95% Student's-t UCL	77.39				or 95% Modified-t UCL		77.38
314												
315	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
316	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
317	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
318	For additional insight the user may want to consult a statistician.											
319												
320	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
321	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
322												
323												

	A	B	C	D	E	F	G	H	I	J	K	L
324	Iron											
325												
326					General Statistics							
327					Total Number of Observations	12				Number of Distinct Observations		12
328										Number of Missing Observations		0
329					Minimum	12854				Mean		24363
330					Maximum	39125				Median		23028
331					SD	7514				Std. Error of Mean		2169
332					Coefficient of Variation	0.308				Skewness		0.459
333												
334					Normal GOF Test							
335					Shapiro Wilk Test Statistic	0.965				Shapiro Wilk GOF Test		
336					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
337					Lilliefors Test Statistic	0.171				Lilliefors GOF Test		
338					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
339					Data appear Normal at 5% Significance Level							
340												
341					Assuming Normal Distribution							
342					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
343					95% Student's-t UCL	28258				95% Adjusted-CLT UCL (Chen-1995)		28238
344										95% Modified-t UCL (Johnson-1978)		28306
345												
346					Gamma GOF Test							
347					A-D Test Statistic	0.229				Anderson-Darling Gamma GOF Test		
348					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
349					K-S Test Statistic	0.166				Kolmogrov-Smirnoff Gamma GOF Test		
350					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
351					Detected data appear Gamma Distributed at 5% Significance Level							
352												
353					Gamma Statistics							
354					k hat (MLE)	11.32				k star (bias corrected MLE)		8.543
355					Theta hat (MLE)	2153				Theta star (bias corrected MLE)		2852
356					nu hat (MLE)	271.6				nu star (bias corrected)		205
357					MLE Mean (bias corrected)	24363				MLE Sd (bias corrected)		8335
358										Approximate Chi Square Value (0.05)		172.9
359					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		168.4
360												
361					Assuming Gamma Distribution							
362					95% Approximate Gamma UCL (use when n>=50))	28890				95% Adjusted Gamma UCL (use when n<50)		29663
363												
364					Lognormal GOF Test							
365					Shapiro Wilk Test Statistic	0.972				Shapiro Wilk Lognormal GOF Test		
366					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
367					Lilliefors Test Statistic	0.188				Lilliefors Lognormal GOF Test		
368					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
369					Data appear Lognormal at 5% Significance Level							
370												
371					Lognormal Statistics							
372					Minimum of Logged Data	9.461				Mean of logged Data		10.06
373					Maximum of Logged Data	10.57				SD of logged Data		0.317
374												

	A	B	C	D	E	F	G	H	I	J	K	L
375	**Assuming Lognormal Distribution**											
376					95% H-UCL	29498				90% Chebyshev (MVUE) UCL		31158
377					95% Chebyshev (MVUE) UCL	34223				97.5% Chebyshev (MVUE) UCL		38478
378					99% Chebyshev (MVUE) UCL	46836						
379												
380	**Nonparametric Distribution Free UCL Statistics**											
381	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
382												
383	**Nonparametric Distribution Free UCLs**											
384					95% CLT UCL	27931				95% Jackknife UCL		28258
385					95% Standard Bootstrap UCL	27753				95% Bootstrap-t UCL		28677
386					95% Hall's Bootstrap UCL	29268				95% Percentile Bootstrap UCL		27751
387					95% BCA Bootstrap UCL	27993						
388					90% Chebyshev(Mean, Sd) UCL	30870				95% Chebyshev(Mean, Sd) UCL		33818
389					97.5% Chebyshev(Mean, Sd) UCL	37909				99% Chebyshev(Mean, Sd) UCL		45945
390												
391	**Suggested UCL to Use**											
392					95% Student's-t UCL	28258						
393												
394	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
395	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
396	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
397	For additional insight the user may want to consult a statistician.											
398												
399												

	A	B	C	D	E	F	G	H	I	J	K	L
400	Mercury											
401												
402						General Statistics						
403					Total Number of Observations	12				Number of Distinct Observations		3
404										Number of Missing Observations		0
405					Minimum	9.03				Mean		9.923
406					Maximum	10.04				Median		10
407					SD	0.281				Std. Error of Mean		0.0812
408					Coefficient of Variation	0.0283				Skewness		-3.453
409												
410						Normal GOF Test						
411					Shapiro Wilk Test Statistic	0.351				Shapiro Wilk GOF Test		
412					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
413					Lilliefors Test Statistic	0.525				Lilliefors GOF Test		
414					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
415						Data Not Normal at 5% Significance Level						
416												
417						Assuming Normal Distribution						
418					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
419					95% Student's-t UCL	10.07				95% Adjusted-CLT UCL (Chen-1995)		9.97
420										95% Modified-t UCL (Johnson-1978)		10.05
421												
422						Gamma GOF Test						
423					A-D Test Statistic	3.9				Anderson-Darling Gamma GOF Test		
424					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
425					K-S Test Statistic	0.53				Kolmogrov-Smirnoff Gamma GOF Test		
426					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
427						Data Not Gamma Distributed at 5% Significance Level						
428												
429						Gamma Statistics						
430					k hat (MLE)	1283				k star (bias corrected MLE)		962
431					Theta hat (MLE)	0.00774				Theta star (bias corrected MLE)		0.0103
432					nu hat (MLE)	30783				nu star (bias corrected)		23089
433					MLE Mean (bias corrected)	9.923				MLE Sd (bias corrected)		0.32
434										Approximate Chi Square Value (0.05)		22737
435					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		22683
436												
437						Assuming Gamma Distribution						
438					95% Approximate Gamma UCL (use when n>=50))	10.08				95% Adjusted Gamma UCL (use when n<50)		10.1
439												
440						Lognormal GOF Test						
441					Shapiro Wilk Test Statistic	0.35				Shapiro Wilk Lognormal GOF Test		
442					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
443					Lilliefors Test Statistic	0.525				Lilliefors Lognormal GOF Test		
444					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
445						Data Not Lognormal at 5% Significance Level						
446												
447						Lognormal Statistics						
448					Minimum of Logged Data	2.201				Mean of logged Data		2.294
449					Maximum of Logged Data	2.307				SD of logged Data		0.0296
450												

	A	B	C	D	E	F	G	H	I	J	K	L
451					Assuming Lognormal Distribution							
452					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		10.18
453				95% Chebyshev (MVUE) UCL		10.29				97.5% Chebyshev (MVUE) UCL		10.45
454				99% Chebyshev (MVUE) UCL		10.77						
455												
456					Nonparametric Distribution Free UCL Statistics							
457					Data do not follow a Discernible Distribution (0.05)							
458												
459					Nonparametric Distribution Free UCLs							
460					95% CLT UCL	10.06				95% Jackknife UCL		10.07
461				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
462				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
463				95% BCA Bootstrap UCL		N/A						
464				90% Chebyshev(Mean, Sd) UCL		10.17				95% Chebyshev(Mean, Sd) UCL		10.28
465				97.5% Chebyshev(Mean, Sd) UCL		10.43				99% Chebyshev(Mean, Sd) UCL		10.73
466												
467					Suggested UCL to Use							
468					95% Student's-t UCL	10.07				or 95% Modified-t UCL		10.05
469												
470					Recommended UCL exceeds the maximum observation							
471												
472					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
473					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
474					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
475					For additional insight the user may want to consult a statistician.							
476												
477					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
478					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
479												
480												

	A	B	C	D	E	F	G	H	I	J	K	L
481	Neptunium-237											
482												
483						General Statistics						
484					Total Number of Observations	12				Number of Distinct Observations		1
485										Number of Missing Observations		0
486					Minimum	0.365				Mean		0.365
487					Maximum	0.365				Median		0.365
488												
489						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
490						ProUCL (or any other software) should not be used on such a data set!						
491						The data set for variable Neptunium-237 was not processed!						
492												
493						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
494						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
495												
496												
497												

	A	B	C	D	E	F	G	H	I	J	K	L
498	Nickel											
499												
500						General Statistics						
501					Total Number of Observations	12				Number of Distinct Observations		11
502										Number of Missing Observations		0
503					Minimum	65				Mean		141.7
504					Maximum	318.1				Median		127.8
505					SD	77.11				Std. Error of Mean		22.26
506					Coefficient of Variation	0.544				Skewness		1.214
507												
508						Normal GOF Test						
509					Shapiro Wilk Test Statistic	0.882				Shapiro Wilk GOF Test		
510					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
511					Lilliefors Test Statistic	0.179				Lilliefors GOF Test		
512					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
513						Data appear Normal at 5% Significance Level						
514												
515						Assuming Normal Distribution						
516					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
517					95% Student's-t UCL	181.7				95% Adjusted-CLT UCL (Chen-1995)		186.7
518										95% Modified-t UCL (Johnson-1978)		183
519												
520						Gamma GOF Test						
521					A-D Test Statistic	0.316				Anderson-Darling Gamma GOF Test		
522					5% A-D Critical Value	0.735				Detected data appear Gamma Distributed at 5% Significance Level		
523					K-S Test Statistic	0.189				Kolmogrov-Smirnoff Gamma GOF Test		
524					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
525						Detected data appear Gamma Distributed at 5% Significance Level						
526												
527						Gamma Statistics						
528					k hat (MLE)	4.22				k star (bias corrected MLE)		3.22
529					Theta hat (MLE)	33.59				Theta star (bias corrected MLE)		44.02
530					nu hat (MLE)	101.3				nu star (bias corrected)		77.29
531					MLE Mean (bias corrected)	141.7				MLE Sd (bias corrected)		78.99
532										Approximate Chi Square Value (0.05)		58.04
533					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		55.5
534												
535						Assuming Gamma Distribution						
536					95% Approximate Gamma UCL (use when n>=50))	188.8				95% Adjusted Gamma UCL (use when n<50)		197.4
537												
538						Lognormal GOF Test						
539					Shapiro Wilk Test Statistic	0.95				Shapiro Wilk Lognormal GOF Test		
540					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
541					Lilliefors Test Statistic	0.176				Lilliefors Lognormal GOF Test		
542					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
543						Data appear Lognormal at 5% Significance Level						
544												
545						Lognormal Statistics						
546					Minimum of Logged Data	4.174				Mean of logged Data		4.831
547					Maximum of Logged Data	5.762				SD of logged Data		0.51
548												

	A	B	C	D	E	F	G	H	I	J	K	L
549	**Assuming Lognormal Distribution**											
550					95% H-UCL	198.9				90% Chebyshev (MVUE) UCL		205
551					95% Chebyshev (MVUE) UCL	233.9				97.5% Chebyshev (MVUE) UCL		274.1
552					99% Chebyshev (MVUE) UCL	353						
553												
554	**Nonparametric Distribution Free UCL Statistics**											
555	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
556												
557	**Nonparametric Distribution Free UCLs**											
558					95% CLT UCL	178.4				95% Jackknife UCL		181.7
559					95% Standard Bootstrap UCL	177				95% Bootstrap-t UCL		202.2
560					95% Hall's Bootstrap UCL	210.7				95% Percentile Bootstrap UCL		179
561					95% BCA Bootstrap UCL	186.9						
562					90% Chebyshev(Mean, Sd) UCL	208.5				95% Chebyshev(Mean, Sd) UCL		238.8
563					97.5% Chebyshev(Mean, Sd) UCL	280.8				99% Chebyshev(Mean, Sd) UCL		363.2
564												
565	**Suggested UCL to Use**											
566					95% Student's-t UCL	181.7						
567												
568	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
569	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
570	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
571	For additional insight the user may want to consult a statistician.											
572												
573												

	A	B	C	D	E	F	G	H	I	J	K	L
574	PAH, Total											
575												
576						General Statistics						
577					Total Number of Observations	12				Number of Distinct Observations		1
578										Number of Missing Observations		0
579					Minimum	0.308				Mean		0.308
580					Maximum	0.308				Median		0.308
581												
582						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
583						ProUCL (or any other software) should not be used on such a data set!						
584						The data set for variable PAH, Total was not processed!						
585												
586						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
587						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
588												
589												
590												

	A	B	C	D	E	F	G	H	I	J	K	L
591	PCB, Total											
592												
593						General Statistics						
594					Total Number of Observations	12				Number of Distinct Observations		2
595										Number of Missing Observations		0
596					Minimum	4.9				Mean		4.992
597					Maximum	5				Median		5
598					SD	0.0289				Std. Error of Mean		0.00833
599					Coefficient of Variation	0.00578				Skewness		-3.464
600												
601						Normal GOF Test						
602					Shapiro Wilk Test Statistic	0.327				Shapiro Wilk GOF Test		
603					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
604					Lilliefors Test Statistic	0.53				Lilliefors GOF Test		
605					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
606						Data Not Normal at 5% Significance Level						
607												
608						Assuming Normal Distribution						
609					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
610					95% Student's-t UCL	5.007				95% Adjusted-CLT UCL (Chen-1995)		4.996
611										95% Modified-t UCL (Johnson-1978)		5.005
612												
613						Gamma GOF Test						
614					A-D Test Statistic	4.094				Anderson-Darling Gamma GOF Test		
615					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
616					K-S Test Statistic	0.535				Kolmogrov-Smirnoff Gamma GOF Test		
617					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
618						Data Not Gamma Distributed at 5% Significance Level						
619												
620						Gamma Statistics						
621					k hat (MLE)	32254				k star (bias corrected MLE)		24191
622					Theta hat (MLE)	1.5476E-4				Theta star (bias corrected MLE)		2.0635E-4
623					nu hat (MLE)	774106				nu star (bias corrected)		580580
624					MLE Mean (bias corrected)	4.992				MLE Sd (bias corrected)		0.0321
625										Approximate Chi Square Value (0.05)		578809
626					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		578539
627												
628						Assuming Gamma Distribution						
629					95% Approximate Gamma UCL (use when n>=50))	5.007				95% Adjusted Gamma UCL (use when n<50)		5.009
630												
631						Lognormal GOF Test						
632					Shapiro Wilk Test Statistic	0.327				Shapiro Wilk Lognormal GOF Test		
633					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
634					Lilliefors Test Statistic	0.53				Lilliefors Lognormal GOF Test		
635					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
636						Data Not Lognormal at 5% Significance Level						
637												
638						Lognormal Statistics						
639					Minimum of Logged Data	1.589				Mean of logged Data		1.608
640					Maximum of Logged Data	1.609				SD of logged Data		0.00583
641												

	A	B	C	D	E	F	G	H	I	J	K	L
642						Assuming Lognormal Distribution						
643					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		5.017
644					95% Chebyshev (MVUE) UCL	5.028				97.5% Chebyshev (MVUE) UCL		5.044
645					99% Chebyshev (MVUE) UCL	5.075						
646												
647						Nonparametric Distribution Free UCL Statistics						
648						Data do not follow a Discernible Distribution (0.05)						
649												
650						Nonparametric Distribution Free UCLs						
651					95% CLT UCL	5.005				95% Jackknife UCL		N/A
652					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
653					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
654					95% BCA Bootstrap UCL	N/A						
655					90% Chebyshev(Mean, Sd) UCL	5.017				95% Chebyshev(Mean, Sd) UCL		5.028
656					97.5% Chebyshev(Mean, Sd) UCL	5.044				99% Chebyshev(Mean, Sd) UCL		5.075
657												
658						Suggested UCL to Use						
659					95% Student's-t UCL	5.007				or 95% Modified-t UCL		5.005
660												
661						Recommended UCL exceeds the maximum observation						
662												
663					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
664					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
665					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
666					For additional insight the user may want to consult a statistician.							
667												
668					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
669					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
670												
671												

	A	B	C	D	E	F	G	H	I	J	K	L
672	Uranium											
673												
674					General Statistics							
675					Total Number of Observations	12				Number of Distinct Observations		12
676										Number of Missing Observations		0
677					Minimum	7.69				Mean		33.27
678					Maximum	81.68				Median		28.85
679					SD	21.75				Std. Error of Mean		6.279
680					Coefficient of Variation	0.654				Skewness		0.994
681												
682					Normal GOF Test							
683					Shapiro Wilk Test Statistic	0.921				Shapiro Wilk GOF Test		
684					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
685					Lilliefors Test Statistic	0.162				Lilliefors GOF Test		
686					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
687					Data appear Normal at 5% Significance Level							
688												
689					Assuming Normal Distribution							
690					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
691					95% Student's-t UCL	44.55				95% Adjusted-CLT UCL (Chen-1995)		45.52
692										95% Modified-t UCL (Johnson-1978)		44.85
693												
694					Gamma GOF Test							
695					A-D Test Statistic	0.176				Anderson-Darling Gamma GOF Test		
696					5% A-D Critical Value	0.74				Detected data appear Gamma Distributed at 5% Significance Level		
697					K-S Test Statistic	0.114				Kolmogrov-Smirnoff Gamma GOF Test		
698					5% K-S Critical Value	0.248				Detected data appear Gamma Distributed at 5% Significance Level		
699					Detected data appear Gamma Distributed at 5% Significance Level							
700												
701					Gamma Statistics							
702					k hat (MLE)	2.517				k star (bias corrected MLE)		1.944
703					Theta hat (MLE)	13.22				Theta star (bias corrected MLE)		17.12
704					nu hat (MLE)	60.42				nu star (bias corrected)		46.65
705					MLE Mean (bias corrected)	33.27				MLE Sd (bias corrected)		23.86
706										Approximate Chi Square Value (0.05)		31.98
707					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		30.13
708												
709					Assuming Gamma Distribution							
710					95% Approximate Gamma UCL (use when n>=50))	48.53				95% Adjusted Gamma UCL (use when n<50)		51.51
711												
712					Lognormal GOF Test							
713					Shapiro Wilk Test Statistic	0.972				Shapiro Wilk Lognormal GOF Test		
714					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
715					Lilliefors Test Statistic	0.13				Lilliefors Lognormal GOF Test		
716					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
717					Data appear Lognormal at 5% Significance Level							
718												
719					Lognormal Statistics							
720					Minimum of Logged Data	2.04				Mean of logged Data		3.293
721					Maximum of Logged Data	4.403				SD of logged Data		0.709
722												

	A	B	C	D	E	F	G	H	I	J	K	L
723					Assuming Lognormal Distribution							
724					95% H-UCL	58.18				90% Chebyshev (MVUE) UCL		55.4
725					95% Chebyshev (MVUE) UCL	65.19				97.5% Chebyshev (MVUE) UCL		78.79
726					99% Chebyshev (MVUE) UCL	105.5						
727												
728					Nonparametric Distribution Free UCL Statistics							
729					Data appear to follow a Discernible Distribution at 5% Significance Level							
730												
731					Nonparametric Distribution Free UCLs							
732					95% CLT UCL	43.6				95% Jackknife UCL		44.55
733					95% Standard Bootstrap UCL	43.11				95% Bootstrap-t UCL		47.79
734					95% Hall's Bootstrap UCL	50.9				95% Percentile Bootstrap UCL		44.13
735					95% BCA Bootstrap UCL	45.63						
736					90% Chebyshev(Mean, Sd) UCL	52.11				95% Chebyshev(Mean, Sd) UCL		60.64
737					97.5% Chebyshev(Mean, Sd) UCL	72.48				99% Chebyshev(Mean, Sd) UCL		95.75
738												
739					Suggested UCL to Use							
740					95% Student's-t UCL	44.55						
741												
742					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
743					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
744					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
745					For additional insight the user may want to consult a statistician.							
746												
747												
748	Uranium-238											
749												
750					General Statistics							
751					Total Number of Observations	12				Number of Distinct Observations		1
752										Number of Missing Observations		0
753					Minimum	6.64				Mean		6.64
754					Maximum	6.64				Median		6.64
755												
756					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
757					ProUCL (or any other software) should not be used on such a data set!							
758					The data set for variable Uranium-238 was not processed!							
759												
760					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
761					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
762												
763												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/18/2015 11:33:57 AM								
5	From File			EPC_015Surf_EU09.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	0.28				Mean		87.25
17					Maximum	161.4				Median		86.77
18					SD	47.33				Std. Error of Mean		13.66
19					Coefficient of Variation	0.543				Skewness		-0.215
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.978				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.128				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	111.8				95% Adjusted-CLT UCL (Chen-1995)		108.8
31										95% Modified-t UCL (Johnson-1978)		111.6
32												
33						Gamma GOF Test						
34					A-D Test Statistic	1.224				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.753				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.265				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.251				Data Not Gamma Distributed at 5% Significance Level		
38						Data Not Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	1.158				k star (bias corrected MLE)		0.924
42					Theta hat (MLE)	75.34				Theta star (bias corrected MLE)		94.41
43					nu hat (MLE)	27.79				nu star (bias corrected)		22.18
44					MLE Mean (bias corrected)	87.25				MLE Sd (bias corrected)		90.76
45										Approximate Chi Square Value (0.05)		12.47
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		11.37
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	155.1				95% Adjusted Gamma UCL (use when n<50)		170.1
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.58				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.307				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	-1.273				Mean of logged Data		3.978
60					Maximum of Logged Data	5.084				SD of logged Data		1.721
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	2255			90% Chebyshev (MVUE) UCL			486.7
64					95% Chebyshev (MVUE) UCL	623.4			97.5% Chebyshev (MVUE) UCL			813.1
65					99% Chebyshev (MVUE) UCL	1186						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	109.7			95% Jackknife UCL			111.8
72					95% Standard Bootstrap UCL	108.4			95% Bootstrap-t UCL			110.6
73					95% Hall's Bootstrap UCL	110.2			95% Percentile Bootstrap UCL			109.3
74					95% BCA Bootstrap UCL	107.6						
75					90% Chebyshev(Mean, Sd) UCL	128.2			95% Chebyshev(Mean, Sd) UCL			146.8
76					97.5% Chebyshev(Mean, Sd) UCL	172.6			99% Chebyshev(Mean, Sd) UCL			223.2
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	111.8						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												

	A	B	C	D	E	F	G	H	I	J	K	L
90	Arsenic											
91												
92						General Statistics						
93					Total Number of Observations	12				Number of Distinct Observations		7
94										Number of Missing Observations		0
95					Minimum	7.72				Mean		10.27
96					Maximum	12.41				Median		11
97					SD	1.497				Std. Error of Mean		0.432
98					Coefficient of Variation	0.146				Skewness		-0.873
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.79				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.299				Lilliefors GOF Test		
104					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
105						Data Not Normal at 5% Significance Level						
106												
107						Assuming Normal Distribution						
108					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
109					95% Student's-t UCL	11.04				95% Adjusted-CLT UCL (Chen-1995)		10.86
110										95% Modified-t UCL (Johnson-1978)		11.02
111												
112						Gamma GOF Test						
113					A-D Test Statistic	1.493				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.73				Data Not Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.315				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
117						Data Not Gamma Distributed at 5% Significance Level						
118												
119						Gamma Statistics						
120					k hat (MLE)	46.95				k star (bias corrected MLE)		35.26
121					Theta hat (MLE)	0.219				Theta star (bias corrected MLE)		0.291
122					nu hat (MLE)	1127				nu star (bias corrected)		846.3
123					MLE Mean (bias corrected)	10.27				MLE Sd (bias corrected)		1.729
124										Approximate Chi Square Value (0.05)		779.8
125					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		770.1
126												
127						Assuming Gamma Distribution						
128					95% Approximate Gamma UCL (use when n>=50))	11.14				95% Adjusted Gamma UCL (use when n<50)		11.28
129												
130						Lognormal GOF Test						
131					Shapiro Wilk Test Statistic	0.767				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.313				Lilliefors Lognormal GOF Test		
134					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
135						Data Not Lognormal at 5% Significance Level						
136												
137						Lognormal Statistics						
138					Minimum of Logged Data	2.044				Mean of logged Data		2.318
139					Maximum of Logged Data	2.519				SD of logged Data		0.156
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141					Assuming Lognormal Distribution							
142					95% H-UCL	11.2				90% Chebyshev (MVUE) UCL		11.66
143					95% Chebyshev (MVUE) UCL	12.3				97.5% Chebyshev (MVUE) UCL		13.17
144					99% Chebyshev (MVUE) UCL	14.89						
145												
146					Nonparametric Distribution Free UCL Statistics							
147					Data do not follow a Discernible Distribution (0.05)							
148												
149					Nonparametric Distribution Free UCLs							
150					95% CLT UCL	10.98				95% Jackknife UCL		11.04
151					95% Standard Bootstrap UCL	10.94				95% Bootstrap-t UCL		10.9
152					95% Hall's Bootstrap UCL	10.84				95% Percentile Bootstrap UCL		10.94
153					95% BCA Bootstrap UCL	10.85						
154					90% Chebyshev(Mean, Sd) UCL	11.56				95% Chebyshev(Mean, Sd) UCL		12.15
155					97.5% Chebyshev(Mean, Sd) UCL	12.96				99% Chebyshev(Mean, Sd) UCL		14.56
156												
157					Suggested UCL to Use							
158					95% Student's-t UCL	11.04				or 95% Modified-t UCL		11.02
159												
160					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
161					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
162					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
163					For additional insight the user may want to consult a statistician.							
164												
165					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
166					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
167												
168												

	A	B	C	D	E	F	G	H	I	J	K	L
169	Cadmium											
170												
171						General Statistics						
172					Total Number of Observations	12				Number of Distinct Observations		4
173										Number of Missing Observations		0
174					Minimum	0.075				Mean		12.12
175					Maximum	21.56				Median		12
176					SD	4.751				Std. Error of Mean		1.372
177					Coefficient of Variation	0.392				Skewness		-0.872
178												
179						Normal GOF Test						
180					Shapiro Wilk Test Statistic	0.685				Shapiro Wilk GOF Test		
181					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
182					Lilliefors Test Statistic	0.406				Lilliefors GOF Test		
183					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
184						Data Not Normal at 5% Significance Level						
185												
186						Assuming Normal Distribution						
187					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
188					95% Student's-t UCL	14.59				95% Adjusted-CLT UCL (Chen-1995)		14.01
189										95% Modified-t UCL (Johnson-1978)		14.53
190												
191						Gamma GOF Test						
192					A-D Test Statistic	3.139				Anderson-Darling Gamma GOF Test		
193					5% A-D Critical Value	0.745				Data Not Gamma Distributed at 5% Significance Level		
194					K-S Test Statistic	0.519				Kolmogrov-Smirnoff Gamma GOF Test		
195					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
196						Data Not Gamma Distributed at 5% Significance Level						
197												
198						Gamma Statistics						
199					k hat (MLE)	1.53				k star (bias corrected MLE)		1.203
200					Theta hat (MLE)	7.926				Theta star (bias corrected MLE)		10.08
201					nu hat (MLE)	36.71				nu star (bias corrected)		28.87
202					MLE Mean (bias corrected)	12.12				MLE Sd (bias corrected)		11.06
203										Approximate Chi Square Value (0.05)		17.6
204					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		16.27
205												
206						Assuming Gamma Distribution						
207					95% Approximate Gamma UCL (use when n>=50))	19.88				95% Adjusted Gamma UCL (use when n<50)		21.51
208												
209						Lognormal GOF Test						
210					Shapiro Wilk Test Statistic	0.413				Shapiro Wilk Lognormal GOF Test		
211					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
212					Lilliefors Test Statistic	0.509				Lilliefors Lognormal GOF Test		
213					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
214						Data Not Lognormal at 5% Significance Level						
215												
216						Lognormal Statistics						
217					Minimum of Logged Data	-2.59				Mean of logged Data		2.134
218					Maximum of Logged Data	3.071				SD of logged Data		1.499
219												

	A	B	C	D	E	F	G	H	I	J	K	L
220	Assuming Lognormal Distribution											
221					95% H-UCL	150.8				90% Chebyshev (MVUE) UCL		53.42
222					95% Chebyshev (MVUE) UCL	67.63				97.5% Chebyshev (MVUE) UCL		87.34
223					99% Chebyshev (MVUE) UCL	126.1						
224												
225	Nonparametric Distribution Free UCL Statistics											
226	Data do not follow a Discernible Distribution (0.05)											
227												
228	Nonparametric Distribution Free UCLs											
229					95% CLT UCL	14.38				95% Jackknife UCL		14.59
230					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
231					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
232					95% BCA Bootstrap UCL	N/A						
233					90% Chebyshev(Mean, Sd) UCL	16.24				95% Chebyshev(Mean, Sd) UCL		18.1
234					97.5% Chebyshev(Mean, Sd) UCL	20.69				99% Chebyshev(Mean, Sd) UCL		25.77
235												
236	Suggested UCL to Use											
237					95% Chebyshev (Mean, Sd) UCL	18.1						
238												
239	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
240	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
241	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
242	For additional insight the user may want to consult a statistician.											
243												
244	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
245	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
246												
247												

	A	B	C	D	E	F	G	H	I	J	K	L
248	Chromium											
249												
250					General Statistics							
251					Total Number of Observations	12				Number of Distinct Observations		4
252										Number of Missing Observations		0
253					Minimum	51.88				Mean		84.74
254					Maximum	140.6				Median		85
255					SD	20.97				Std. Error of Mean		6.055
256					Coefficient of Variation	0.248				Skewness		1.446
257												
258					Normal GOF Test							
259					Shapiro Wilk Test Statistic	0.673				Shapiro Wilk GOF Test		
260					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
261					Lilliefors Test Statistic	0.412				Lilliefors GOF Test		
262					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
263					Data Not Normal at 5% Significance Level							
264												
265					Assuming Normal Distribution							
266					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
267					95% Student's-t UCL	95.61				95% Adjusted-CLT UCL (Chen-1995)		97.4
268										95% Modified-t UCL (Johnson-1978)		96.03
269												
270					Gamma GOF Test							
271					A-D Test Statistic	1.981				Anderson-Darling Gamma GOF Test		
272					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
273					K-S Test Statistic	0.381				Kolmogrov-Smirnoff Gamma GOF Test		
274					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
275					Data Not Gamma Distributed at 5% Significance Level							
276												
277					Gamma Statistics							
278					k hat (MLE)	19.4				k star (bias corrected MLE)		14.61
279					Theta hat (MLE)	4.367				Theta star (bias corrected MLE)		5.8
280					nu hat (MLE)	465.7				nu star (bias corrected)		350.6
281					MLE Mean (bias corrected)	84.74				MLE Sd (bias corrected)		22.17
282										Approximate Chi Square Value (0.05)		308.2
283					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		302.2
284												
285					Assuming Gamma Distribution							
286					95% Approximate Gamma UCL (use when n>=50))	96.39				95% Adjusted Gamma UCL (use when n<50)		98.33
287												
288					Lognormal GOF Test							
289					Shapiro Wilk Test Statistic	0.719				Shapiro Wilk Lognormal GOF Test		
290					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
291					Lilliefors Test Statistic	0.382				Lilliefors Lognormal GOF Test		
292					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
293					Data Not Lognormal at 5% Significance Level							
294												
295					Lognormal Statistics							
296					Minimum of Logged Data	3.949				Mean of logged Data		4.414
297					Maximum of Logged Data	4.946				SD of logged Data		0.236
298												

	A	B	C	D	E	F	G	H	I	J	K	L
299					Assuming Lognormal Distribution							
300					95% H-UCL	97.03				90% Chebyshev (MVUE) UCL		102.1
301					95% Chebyshev (MVUE) UCL	110				97.5% Chebyshev (MVUE) UCL		121
302					99% Chebyshev (MVUE) UCL	142.6						
303												
304					Nonparametric Distribution Free UCL Statistics							
305					Data do not follow a Discernible Distribution (0.05)							
306												
307					Nonparametric Distribution Free UCLs							
308					95% CLT UCL	94.7				95% Jackknife UCL		95.61
309					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
310					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
311					95% BCA Bootstrap UCL	N/A						
312					90% Chebyshev(Mean, Sd) UCL	102.9				95% Chebyshev(Mean, Sd) UCL		111.1
313					97.5% Chebyshev(Mean, Sd) UCL	122.5				99% Chebyshev(Mean, Sd) UCL		145
314												
315					Suggested UCL to Use							
316					95% Student's-t UCL	95.61				or 95% Modified-t UCL		96.03
317												
318	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
319	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
320	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
321	For additional insight the user may want to consult a statistician.											
322												
323												

	A	B	C	D	E	F	G	H	I	J	K	L
324	Iron											
325												
326					General Statistics							
327					Total Number of Observations	12				Number of Distinct Observations		12
328										Number of Missing Observations		0
329					Minimum	9781				Mean		23609
330					Maximum	34775				Median		22115
331					SD	7683				Std. Error of Mean		2218
332					Coefficient of Variation	0.325				Skewness		-0.0789
333												
334					Normal GOF Test							
335					Shapiro Wilk Test Statistic	0.938				Shapiro Wilk GOF Test		
336					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
337					Lilliefors Test Statistic	0.181				Lilliefors GOF Test		
338					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
339					Data appear Normal at 5% Significance Level							
340												
341					Assuming Normal Distribution							
342					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
343					95% Student's-t UCL	27592				95% Adjusted-CLT UCL (Chen-1995)		27203
344										95% Modified-t UCL (Johnson-1978)		27584
345												
346					Gamma GOF Test							
347					A-D Test Statistic	0.396				Anderson-Darling Gamma GOF Test		
348					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
349					K-S Test Statistic	0.18				Kolmogrov-Smirnoff Gamma GOF Test		
350					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
351					Detected data appear Gamma Distributed at 5% Significance Level							
352												
353					Gamma Statistics							
354					k hat (MLE)	9.086				k star (bias corrected MLE)		6.87
355					Theta hat (MLE)	2598				Theta star (bias corrected MLE)		3437
356					nu hat (MLE)	218.1				nu star (bias corrected)		164.9
357					MLE Mean (bias corrected)	23609				MLE Sd (bias corrected)		9007
358										Approximate Chi Square Value (0.05)		136.2
359					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		132.2
360												
361					Assuming Gamma Distribution							
362					95% Approximate Gamma UCL (use when n>=50))	28583				95% Adjusted Gamma UCL (use when n<50)		29442
363												
364					Lognormal GOF Test							
365					Shapiro Wilk Test Statistic	0.912				Shapiro Wilk Lognormal GOF Test		
366					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
367					Lilliefors Test Statistic	0.179				Lilliefors Lognormal GOF Test		
368					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
369					Data appear Lognormal at 5% Significance Level							
370												
371					Lognormal Statistics							
372					Minimum of Logged Data	9.188				Mean of logged Data		10.01
373					Maximum of Logged Data	10.46				SD of logged Data		0.366
374												

	A	B	C	D	E	F	G	H	I	J	K	L
375	**Assuming Lognormal Distribution**											
376					95% H-UCL	29735				90% Chebyshev (MVUE) UCL		31353
377					95% Chebyshev (MVUE) UCL	34806				97.5% Chebyshev (MVUE) UCL		39599
378					99% Chebyshev (MVUE) UCL	49013						
379												
380	**Nonparametric Distribution Free UCL Statistics**											
381	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
382												
383	**Nonparametric Distribution Free UCLs**											
384					95% CLT UCL	27257				95% Jackknife UCL		27592
385					95% Standard Bootstrap UCL	27133				95% Bootstrap-t UCL		27563
386					95% Hall's Bootstrap UCL	27112				95% Percentile Bootstrap UCL		27173
387					95% BCA Bootstrap UCL	27326						
388					90% Chebyshev(Mean, Sd) UCL	30263				95% Chebyshev(Mean, Sd) UCL		33276
389					97.5% Chebyshev(Mean, Sd) UCL	37459				99% Chebyshev(Mean, Sd) UCL		45676
390												
391	**Suggested UCL to Use**											
392					95% Student's-t UCL	27592						
393												
394	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
395	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
396	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
397	For additional insight the user may want to consult a statistician.											
398												
399	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
400	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
401												
402												

	A	B	C	D	E	F	G	H	I	J	K	L
403	Nickel											
404												
405					General Statistics							
406					Total Number of Observations	12				Number of Distinct Observations		10
407										Number of Missing Observations		0
408					Minimum	65				Mean		120.9
409					Maximum	208.3				Median		111.7
410					SD	53.94				Std. Error of Mean		15.57
411					Coefficient of Variation	0.446				Skewness		0.502
412												
413					Normal GOF Test							
414					Shapiro Wilk Test Statistic	0.883				Shapiro Wilk GOF Test		
415					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
416					Lilliefors Test Statistic	0.175				Lilliefors GOF Test		
417					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
418					Data appear Normal at 5% Significance Level							
419												
420					Assuming Normal Distribution							
421					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
422					95% Student's-t UCL	148.9				95% Adjusted-CLT UCL (Chen-1995)		149
423										95% Modified-t UCL (Johnson-1978)		149.3
424												
425					Gamma GOF Test							
426					A-D Test Statistic	0.502				Anderson-Darling Gamma GOF Test		
427					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
428					K-S Test Statistic	0.202				Kolmogrov-Smirnoff Gamma GOF Test		
429					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
430					Detected data appear Gamma Distributed at 5% Significance Level							
431												
432					Gamma Statistics							
433					k hat (MLE)	5.534				k star (bias corrected MLE)		4.206
434					Theta hat (MLE)	21.85				Theta star (bias corrected MLE)		28.75
435					nu hat (MLE)	132.8				nu star (bias corrected)		101
436					MLE Mean (bias corrected)	120.9				MLE Sd (bias corrected)		58.97
437										Approximate Chi Square Value (0.05)		78.77
438					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		75.78
439												
440					Assuming Gamma Distribution							
441					95% Approximate Gamma UCL (use when n>=50))	155				95% Adjusted Gamma UCL (use when n<50)		161.1
442												
443					Lognormal GOF Test							
444					Shapiro Wilk Test Statistic	0.887				Shapiro Wilk Lognormal GOF Test		
445					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
446					Lilliefors Test Statistic	0.198				Lilliefors Lognormal GOF Test		
447					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
448					Data appear Lognormal at 5% Significance Level							
449												
450					Lognormal Statistics							
451					Minimum of Logged Data	4.174				Mean of logged Data		4.702
452					Maximum of Logged Data	5.339				SD of logged Data		0.453
453												

	A	B	C	D	E	F	G	H	I	J	K	L
454					Assuming Lognormal Distribution							
455					95% H-UCL	162.4				90% Chebyshev (MVUE) UCL		169.5
456					95% Chebyshev (MVUE) UCL	191.4				97.5% Chebyshev (MVUE) UCL		221.9
457					99% Chebyshev (MVUE) UCL	281.7						
458												
459					Nonparametric Distribution Free UCL Statistics							
460					Data appear to follow a Discernible Distribution at 5% Significance Level							
461												
462					Nonparametric Distribution Free UCLs							
463					95% CLT UCL	146.6				95% Jackknife UCL		148.9
464					95% Standard Bootstrap UCL	145.4				95% Bootstrap-t UCL		152.8
465					95% Hall's Bootstrap UCL	147.5				95% Percentile Bootstrap UCL		146.1
466					95% BCA Bootstrap UCL	148.1						
467					90% Chebyshev(Mean, Sd) UCL	167.7				95% Chebyshev(Mean, Sd) UCL		188.8
468					97.5% Chebyshev(Mean, Sd) UCL	218.2				99% Chebyshev(Mean, Sd) UCL		275.9
469												
470					Suggested UCL to Use							
471					95% Student's-t UCL	148.9						
472												
473					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
474					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
475					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
476					For additional insight the user may want to consult a statistician.							
477												
478												
479	PAH, Total											
480												
481					General Statistics							
482					Total Number of Observations	12				Number of Distinct Observations		1
483										Number of Missing Observations		0
484					Minimum	0.204				Mean		0.204
485					Maximum	0.204				Median		0.204
486												
487					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
488					ProUCL (or any other software) should not be used on such a data set!							
489					The data set for variable PAH, Total was not processed!							
490												
491					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
492					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
493												
494												
495												

	A	B	C	D	E	F	G	H	I	J	K	L
496	PCB, Total											
497												
498	General Statistics											
499	Total Number of Observations					12	Number of Distinct Observations					2
500							Number of Missing Observations					0
501	Minimum					0.33	Mean					4.611
502	Maximum					5	Median					5
503	SD					1.348	Std. Error of Mean					0.389
504	Coefficient of Variation					0.292	Skewness					-3.464
505												
506	Normal GOF Test											
507	Shapiro Wilk Test Statistic					0.327	Shapiro Wilk GOF Test					
508	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
509	Lilliefors Test Statistic					0.53	Lilliefors GOF Test					
510	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
511	Data Not Normal at 5% Significance Level											
512												
513	Assuming Normal Distribution											
514	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
515	95% Student's-t UCL					5.31	95% Adjusted-CLT UCL (Chen-1995)					4.835
516							95% Modified-t UCL (Johnson-1978)					5.245
517												
518	Gamma GOF Test											
519	A-D Test Statistic					4.17	Anderson-Darling Gamma GOF Test					
520	5% A-D Critical Value					0.737	Data Not Gamma Distributed at 5% Significance Level					
521	K-S Test Statistic					0.546	Kolmogrov-Smirnoff Gamma GOF Test					
522	5% K-S Critical Value					0.247	Data Not Gamma Distributed at 5% Significance Level					
523	Data Not Gamma Distributed at 5% Significance Level											
524												
525	Gamma Statistics											
526	k hat (MLE)					3.595	k star (bias corrected MLE)					2.752
527	Theta hat (MLE)					1.283	Theta star (bias corrected MLE)					1.676
528	nu hat (MLE)					86.28	nu star (bias corrected)					66.04
529	MLE Mean (bias corrected)					4.611	MLE Sd (bias corrected)					2.78
530							Approximate Chi Square Value (0.05)					48.34
531	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					46.04
532												
533	Assuming Gamma Distribution											
534	95% Approximate Gamma UCL (use when n>=50))					6.299	95% Adjusted Gamma UCL (use when n<50)					6.614
535												
536	Lognormal GOF Test											
537	Shapiro Wilk Test Statistic					0.327	Shapiro Wilk Lognormal GOF Test					
538	5% Shapiro Wilk Critical Value					0.859	Data Not Lognormal at 5% Significance Level					
539	Lilliefors Test Statistic					0.53	Lilliefors Lognormal GOF Test					
540	5% Lilliefors Critical Value					0.256	Data Not Lognormal at 5% Significance Level					
541	Data Not Lognormal at 5% Significance Level											
542												
543	Lognormal Statistics											
544	Minimum of Logged Data					-1.109	Mean of logged Data					1.383
545	Maximum of Logged Data					1.609	SD of logged Data					0.785
546												

	A	B	C	D	E	F	G	H	I	J	K	L
547					Assuming Lognormal Distribution							
548					95% H-UCL	9.904				90% Chebyshev (MVUE) UCL		9.005
549				95% Chebyshev (MVUE) UCL		10.7				97.5% Chebyshev (MVUE) UCL		13.06
550				99% Chebyshev (MVUE) UCL		17.69						
551												
552					Nonparametric Distribution Free UCL Statistics							
553					Data do not follow a Discernible Distribution (0.05)							
554												
555					Nonparametric Distribution Free UCLs							
556					95% CLT UCL	5.251				95% Jackknife UCL		N/A
557				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
558				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
559				95% BCA Bootstrap UCL		N/A						
560				90% Chebyshev(Mean, Sd) UCL		5.778				95% Chebyshev(Mean, Sd) UCL		6.307
561				97.5% Chebyshev(Mean, Sd) UCL		7.041				99% Chebyshev(Mean, Sd) UCL		8.483
562												
563					Suggested UCL to Use							
564				95% Chebyshev (Mean, Sd) UCL		6.307						
565												
566					Recommended UCL exceeds the maximum observation							
567												
568					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
569					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
570					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
571					For additional insight the user may want to consult a statistician.							
572												
573					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
574					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
575												
576												

	A	B	C	D	E	F	G	H	I	J	K	L
577	Uranium											
578												
579					General Statistics							
580					Total Number of Observations	12				Number of Distinct Observations		12
581										Number of Missing Observations		0
582					Minimum	12.6				Mean		26.03
583					Maximum	43.96				Median		24.03
584					SD	8.931				Std. Error of Mean		2.578
585					Coefficient of Variation	0.343				Skewness		0.738
586												
587					Normal GOF Test							
588					Shapiro Wilk Test Statistic	0.948				Shapiro Wilk GOF Test		
589					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
590					Lilliefors Test Statistic	0.144				Lilliefors GOF Test		
591					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
592					Data appear Normal at 5% Significance Level							
593												
594					Assuming Normal Distribution							
595					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
596					95% Student's-t UCL	30.66				95% Adjusted-CLT UCL (Chen-1995)		30.85
597										95% Modified-t UCL (Johnson-1978)		30.75
598												
599					Gamma GOF Test							
600					A-D Test Statistic	0.212				Anderson-Darling Gamma GOF Test		
601					5% A-D Critical Value	0.73				Detected data appear Gamma Distributed at 5% Significance Level		
602					K-S Test Statistic	0.118				Kolmogrov-Smirnoff Gamma GOF Test		
603					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
604					Detected data appear Gamma Distributed at 5% Significance Level							
605												
606					Gamma Statistics							
607					k hat (MLE)	9.548				k star (bias corrected MLE)		7.216
608					Theta hat (MLE)	2.726				Theta star (bias corrected MLE)		3.607
609					nu hat (MLE)	229.1				nu star (bias corrected)		173.2
610					MLE Mean (bias corrected)	26.03				MLE Sd (bias corrected)		9.689
611										Approximate Chi Square Value (0.05)		143.8
612					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		139.7
613												
614					Assuming Gamma Distribution							
615					95% Approximate Gamma UCL (use when n>=50))	31.36				95% Adjusted Gamma UCL (use when n<50)		32.27
616												
617					Lognormal GOF Test							
618					Shapiro Wilk Test Statistic	0.978				Shapiro Wilk Lognormal GOF Test		
619					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
620					Lilliefors Test Statistic	0.124				Lilliefors Lognormal GOF Test		
621					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
622					Data appear Lognormal at 5% Significance Level							
623												
624					Lognormal Statistics							
625					Minimum of Logged Data	2.534				Mean of logged Data		3.206
626					Maximum of Logged Data	3.783				SD of logged Data		0.343
627												

	A	B	C	D	E	F	G	H	I	J	K	L
628					Assuming Lognormal Distribution							
629					95% H-UCL	32.08				90% Chebyshev (MVUE) UCL		33.86
630					95% Chebyshev (MVUE) UCL	37.41				97.5% Chebyshev (MVUE) UCL		42.33
631					99% Chebyshev (MVUE) UCL	51.99						
632												
633					Nonparametric Distribution Free UCL Statistics							
634					Data appear to follow a Discernible Distribution at 5% Significance Level							
635												
636					Nonparametric Distribution Free UCLs							
637					95% CLT UCL	30.27				95% Jackknife UCL		30.66
638					95% Standard Bootstrap UCL	30.07				95% Bootstrap-t UCL		31.47
639					95% Hall's Bootstrap UCL	32.16				95% Percentile Bootstrap UCL		30.34
640					95% BCA Bootstrap UCL	30.57						
641					90% Chebyshev(Mean, Sd) UCL	33.76				95% Chebyshev(Mean, Sd) UCL		37.26
642					97.5% Chebyshev(Mean, Sd) UCL	42.13				99% Chebyshev(Mean, Sd) UCL		51.68
643												
644					Suggested UCL to Use							
645					95% Student's-t UCL	30.66						
646												
647					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
648					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
649					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
650					For additional insight the user may want to consult a statistician.							
651												
652												
653	Uranium-238											
654												
655					General Statistics							
656					Total Number of Observations	12				Number of Distinct Observations		1
657										Number of Missing Observations		0
658					Minimum	7.12				Mean		7.12
659					Maximum	7.12				Median		7.12
660												
661					Warning: There is only one distinct observation value in this data set - resulting in '0' variance!							
662					ProUCL (or any other software) should not be used on such a data set!							
663					The data set for variable Uranium-238 was not processed!							
664												
665					If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.							
666					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
667												
668												
669												

	A	B	C	D	E	F	G	H	I	J	K	L
670	Vanadium											
671												
672						General Statistics						
673					Total Number of Observations	12				Number of Distinct Observations		4
674										Number of Missing Observations		0
675					Minimum	31.9				Mean		67.37
676					Maximum	77.92				Median		70
677					SD	11.41				Std. Error of Mean		3.295
678					Coefficient of Variation	0.169				Skewness		-3.175
679												
680						Normal GOF Test						
681					Shapiro Wilk Test Statistic	0.459				Shapiro Wilk GOF Test		
682					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
683					Lilliefors Test Statistic	0.46				Lilliefors GOF Test		
684					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
685						Data Not Normal at 5% Significance Level						
686												
687						Assuming Normal Distribution						
688					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
689					95% Student's-t UCL	73.29				95% Adjusted-CLT UCL (Chen-1995)		69.56
690										95% Modified-t UCL (Johnson-1978)		72.78
691												
692						Gamma GOF Test						
693					A-D Test Statistic	3.35				Anderson-Darling Gamma GOF Test		
694					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
695					K-S Test Statistic	0.48				Kolmogrov-Smirnoff Gamma GOF Test		
696					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
697						Data Not Gamma Distributed at 5% Significance Level						
698												
699						Gamma Statistics						
700					k hat (MLE)	25.26				k star (bias corrected MLE)		19
701					Theta hat (MLE)	2.667				Theta star (bias corrected MLE)		3.545
702					nu hat (MLE)	606.3				nu star (bias corrected)		456.1
703					MLE Mean (bias corrected)	67.37				MLE Sd (bias corrected)		15.45
704										Approximate Chi Square Value (0.05)		407.6
705					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		400.6
706												
707						Assuming Gamma Distribution						
708					95% Approximate Gamma UCL (use when n>=50))	75.39				95% Adjusted Gamma UCL (use when n<50)		76.71
709												
710						Lognormal GOF Test						
711					Shapiro Wilk Test Statistic	0.417				Shapiro Wilk Lognormal GOF Test		
712					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
713					Lilliefors Test Statistic	0.482				Lilliefors Lognormal GOF Test		
714					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
715						Data Not Lognormal at 5% Significance Level						
716												
717						Lognormal Statistics						
718					Minimum of Logged Data	3.463				Mean of logged Data		4.19
719					Maximum of Logged Data	4.356				SD of logged Data		0.231
720												

	A	B	C	D	E	F	G	H	I	J	K	L
721					Assuming Lognormal Distribution							
722					95% H-UCL	77.27				90% Chebyshev (MVUE) UCL		81.31
723					95% Chebyshev (MVUE) UCL	87.49				97.5% Chebyshev (MVUE) UCL		96.06
724					99% Chebyshev (MVUE) UCL	112.9						
725												
726					Nonparametric Distribution Free UCL Statistics							
727					Data do not follow a Discernible Distribution (0.05)							
728												
729					Nonparametric Distribution Free UCLs							
730					95% CLT UCL	72.79				95% Jackknife UCL		73.29
731					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
732					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
733					95% BCA Bootstrap UCL	N/A						
734					90% Chebyshev(Mean, Sd) UCL	77.26				95% Chebyshev(Mean, Sd) UCL		81.73
735					97.5% Chebyshev(Mean, Sd) UCL	87.95				99% Chebyshev(Mean, Sd) UCL		100.2
736												
737					Suggested UCL to Use							
738					95% Student's-t UCL	73.29				or 95% Modified-t UCL		72.78
739												
740					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
741					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
742					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
743					For additional insight the user may want to consult a statistician.							
744												
745					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
746					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
747												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/10/2015 11:16:06 AM								
5	From File			EPC_026SubR1.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Aluminum**											
12												
13	**General Statistics**											
14	Total Number of Observations					13	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					6000	Mean					11500
17	Maximum					16100	Median					11500
18	SD					2086	Std. Error of Mean					578.6
19	Coefficient of Variation					0.181	Skewness					-0.741
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.625	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.866	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.423	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.246	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					12531	95% Adjusted-CLT UCL (Chen-1995)					12325
31							95% Modified-t UCL (Johnson-1978)					12511
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					2.758	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.733	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.448	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.236	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					27.39	k star (bias corrected MLE)					21.12
42	Theta hat (MLE)					419.9	Theta star (bias corrected MLE)					544.5
43	nu hat (MLE)					712.1	nu star (bias corrected)					549.1
44	MLE Mean (bias corrected)					11500	MLE Sd (bias corrected)					2502
45							Approximate Chi Square Value (0.05)					495.8
46	Adjusted Level of Significance					0.0301	Adjusted Chi Square Value					488.5
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					12738	95% Adjusted Gamma UCL (use when n<50)					12926
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.571	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53				5% Shapiro Wilk Critical Value		0.866	Data Not Lognormal at 5% Significance Level					
54				Lilliefors Test Statistic		0.458	**Lilliefors Lognormal GOF Test**					
55				5% Lilliefors Critical Value		0.246	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59				Minimum of Logged Data		8.7	Mean of logged Data					9.332
60				Maximum of Logged Data		9.687	SD of logged Data					0.212
61												
62	**Assuming Lognormal Distribution**											
63				95% H-UCL		12920	90% Chebyshev (MVUE) UCL					13567
64				95% Chebyshev (MVUE) UCL		14491	97.5% Chebyshev (MVUE) UCL					15774
65				99% Chebyshev (MVUE) UCL		18294						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71				95% CLT UCL		12452	95% Jackknife UCL					12531
72				95% Standard Bootstrap UCL		N/A	95% Bootstrap-t UCL					N/A
73				95% Hall's Bootstrap UCL		N/A	95% Percentile Bootstrap UCL					N/A
74				95% BCA Bootstrap UCL		N/A						
75				90% Chebyshev(Mean, Sd) UCL		13236	95% Chebyshev(Mean, Sd) UCL					14022
76				97.5% Chebyshev(Mean, Sd) UCL		15113	99% Chebyshev(Mean, Sd) UCL					17257
77												
78	**Suggested UCL to Use**											
79				95% Student's-t UCL		12531	or 95% Modified-t UCL					12511
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												
90	**Antimony**											
91												
92	**General Statistics**											
93				Total Number of Observations		13	Number of Distinct Observations					8
94							Number of Missing Observations					0
95				Minimum		0.15	Mean					59.37
96				Maximum		121.4	Median					59.37
97				SD		27.92	Std. Error of Mean					7.743
98				Coefficient of Variation		0.47	Skewness					0.0612
99												
100	**Normal GOF Test**											
101				Shapiro Wilk Test Statistic		0.895	**Shapiro Wilk GOF Test**					
102				5% Shapiro Wilk Critical Value		0.866	Data appear Normal at 5% Significance Level					
103				Lilliefors Test Statistic		0.269	**Lilliefors GOF Test**					
104				5% Lilliefors Critical Value		0.246	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
105	Data appear Approximate Normal at 5% Significance Level											
106												
107	Assuming Normal Distribution											
108	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
109	95% Student's-t UCL					73.17	95% Adjusted-CLT UCL (Chen-1995)					72.25
110							95% Modified-t UCL (Johnson-1978)					73.2
111												
112	Gamma GOF Test											
113	A-D Test Statistic					2.201	Anderson-Darling Gamma GOF Test					
114	5% A-D Critical Value					0.753	Data Not Gamma Distributed at 5% Significance Level					
115	K-S Test Statistic					0.386	Kolmogrov-Smirnoff Gamma GOF Test					
116	5% K-S Critical Value					0.242	Data Not Gamma Distributed at 5% Significance Level					
117	Data Not Gamma Distributed at 5% Significance Level											
118												
119	Gamma Statistics											
120	k hat (MLE)					1.29	k star (bias corrected MLE)					1.044
121	Theta hat (MLE)					46.02	Theta star (bias corrected MLE)					56.88
122	nu hat (MLE)					33.55	nu star (bias corrected)					27.14
123	MLE Mean (bias corrected)					59.37	MLE Sd (bias corrected)					58.11
124							Approximate Chi Square Value (0.05)					16.26
125	Adjusted Level of Significance					0.0301	Adjusted Chi Square Value					15.07
126												
127	Assuming Gamma Distribution											
128	95% Approximate Gamma UCL (use when n>=50))					99.1	95% Adjusted Gamma UCL (use when n<50)					106.9
129												
130	Lognormal GOF Test											
131	Shapiro Wilk Test Statistic					0.483	Shapiro Wilk Lognormal GOF Test					
132	5% Shapiro Wilk Critical Value					0.866	Data Not Lognormal at 5% Significance Level					
133	Lilliefors Test Statistic					0.37	Lilliefors Lognormal GOF Test					
134	5% Lilliefors Critical Value					0.246	Data Not Lognormal at 5% Significance Level					
135	Data Not Lognormal at 5% Significance Level											
136												
137	Lognormal Statistics											
138	Minimum of Logged Data					-1.897	Mean of logged Data					3.649
139	Maximum of Logged Data					4.799	SD of logged Data					1.698
140												
141	Assuming Lognormal Distribution											
142	95% H-UCL					1235	90% Chebyshev (MVUE) UCL					337.3
143	95% Chebyshev (MVUE) UCL					430.7	97.5% Chebyshev (MVUE) UCL					560.4
144	99% Chebyshev (MVUE) UCL					815.2						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data appear to follow a Discernible Distribution at 5% Significance Level											
148												
149	Nonparametric Distribution Free UCLs											
150	95% CLT UCL					72.11	95% Jackknife UCL					73.17
151	95% Standard Bootstrap UCL					71.56	95% Bootstrap-t UCL					73.37
152	95% Hall's Bootstrap UCL					76.18	95% Percentile Bootstrap UCL					71.96
153	95% BCA Bootstrap UCL					71.57						
154	90% Chebyshev(Mean, Sd) UCL					82.6	95% Chebyshev(Mean, Sd) UCL					93.12
155	97.5% Chebyshev(Mean, Sd) UCL					107.7	99% Chebyshev(Mean, Sd) UCL					136.4
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157						Suggested UCL to Use						
158					95% Student's-t UCL	73.17						
159												
160					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
161					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
162					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
163					For additional insight the user may want to consult a statistician.							
164												
165												
166	Arsenic											
167												
168						General Statistics						
169					Total Number of Observations	13			Number of Distinct Observations			5
170									Number of Missing Observations			0
171					Minimum	7.6			Mean			9.796
172					Maximum	10.3			Median			10
173					SD	0.678			Std. Error of Mean			0.188
174					Coefficient of Variation	0.0692			Skewness			-3.282
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.476			Shapiro Wilk GOF Test			
178					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			
179					Lilliefors Test Statistic	0.407			Lilliefors GOF Test			
180					5% Lilliefors Critical Value	0.246			Data Not Normal at 5% Significance Level			
181						Data Not Normal at 5% Significance Level						
182												
183						Assuming Normal Distribution						
184					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
185					95% Student's-t UCL	10.13			95% Adjusted-CLT UCL (Chen-1995)			9.923
186									95% Modified-t UCL (Johnson-1978)			10.1
187												
188						Gamma GOF Test						
189					A-D Test Statistic	3.196			Anderson-Darling Gamma GOF Test			
190					5% A-D Critical Value	0.732			Data Not Gamma Distributed at 5% Significance Level			
191					K-S Test Statistic	0.414			Kolmogrov-Smirnoff Gamma GOF Test			
192					5% K-S Critical Value	0.236			Data Not Gamma Distributed at 5% Significance Level			
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	195.7			k star (bias corrected MLE)			150.6
197					Theta hat (MLE)	0.05			Theta star (bias corrected MLE)			0.065
198					nu hat (MLE)	5089			nu star (bias corrected)			3916
199					MLE Mean (bias corrected)	9.796			MLE Sd (bias corrected)			0.798
200									Approximate Chi Square Value (0.05)			3772
201					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			3752
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	10.17			95% Adjusted Gamma UCL (use when n<50)			10.23
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.457			Shapiro Wilk Lognormal GOF Test			
208					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.414	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	2.028				Mean of logged Data		2.279
215					Maximum of Logged Data	2.332				SD of logged Data		0.0772
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		10.43
219					95% Chebyshev (MVUE) UCL	10.71				97.5% Chebyshev (MVUE) UCL		11.11
220					99% Chebyshev (MVUE) UCL	11.89						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	10.11				95% Jackknife UCL		10.13
227					95% Standard Bootstrap UCL	10.1				95% Bootstrap-t UCL		10.03
228					95% Hall's Bootstrap UCL	9.985				95% Percentile Bootstrap UCL		10.02
229					95% BCA Bootstrap UCL	9.992						
230					90% Chebyshev(Mean, Sd) UCL	10.36				95% Chebyshev(Mean, Sd) UCL		10.62
231					97.5% Chebyshev(Mean, Sd) UCL	10.97				99% Chebyshev(Mean, Sd) UCL		11.67
232												
233	**Suggested UCL to Use**											
234					95% Student's-t UCL	10.13				or 95% Modified-t UCL		10.1
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
242	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
243												
244												
245	**Beryllium**											
246												
247	**General Statistics**											
248					Total Number of Observations	13				Number of Distinct Observations		4
249										Number of Missing Observations		0
250					Minimum	0.73				Mean		8.857
251					Maximum	24.9				Median		8.857
252					SD	5.672				Std. Error of Mean		1.573
253					Coefficient of Variation	0.64				Skewness		1.671
254												
255	**Normal GOF Test**											
256					Shapiro Wilk Test Statistic	0.629	**Shapiro Wilk GOF Test**					
257					5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level					
258					Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**					
259					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
260	**Data Not Normal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
261												
262	**Assuming Normal Distribution**											
263	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
264					95% Student's-t UCL	11.66				95% Adjusted-CLT UCL (Chen-1995)		12.22
265										95% Modified-t UCL (Johnson-1978)		11.78
266												
267	**Gamma GOF Test**											
268					A-D Test Statistic	2.54	**Anderson-Darling Gamma GOF Test**					
269					5% A-D Critical Value	0.745	Data Not Gamma Distributed at 5% Significance Level					
270					K-S Test Statistic	0.442	**Kolmogrov-Smirnoff Gamma GOF Test**					
271					5% K-S Critical Value	0.24	Data Not Gamma Distributed at 5% Significance Level					
272	**Data Not Gamma Distributed at 5% Significance Level**											
273												
274	**Gamma Statistics**											
275					k hat (MLE)	1.904				k star (bias corrected MLE)		1.516
276					Theta hat (MLE)	4.652				Theta star (bias corrected MLE)		5.842
277					nu hat (MLE)	49.51				nu star (bias corrected)		39.41
278					MLE Mean (bias corrected)	8.857				MLE Sd (bias corrected)		7.193
279										Approximate Chi Square Value (0.05)		26.03
280					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		24.49
281												
282	**Assuming Gamma Distribution**											
283					95% Approximate Gamma UCL (use when n>=50))	13.41				95% Adjusted Gamma UCL (use when n<50)		14.25
284												
285	**Lognormal GOF Test**											
286					Shapiro Wilk Test Statistic	0.617	**Shapiro Wilk Lognormal GOF Test**					
287					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
288					Lilliefors Test Statistic	0.462	**Lilliefors Lognormal GOF Test**					
289					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
290	**Data Not Lognormal at 5% Significance Level**											
291												
292	**Lognormal Statistics**											
293					Minimum of Logged Data	-0.315				Mean of logged Data		1.896
294					Maximum of Logged Data	3.215				SD of logged Data		0.969
295												
296	**Assuming Lognormal Distribution**											
297					95% H-UCL	23.29				90% Chebyshev (MVUE) UCL		18.94
298					95% Chebyshev (MVUE) UCL	22.93				97.5% Chebyshev (MVUE) UCL		28.46
299					99% Chebyshev (MVUE) UCL	39.32						
300												
301	**Nonparametric Distribution Free UCL Statistics**											
302	**Data do not follow a Discernible Distribution (0.05)**											
303												
304	**Nonparametric Distribution Free UCLs**											
305					95% CLT UCL	11.44				95% Jackknife UCL		11.66
306					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
307					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
308					95% BCA Bootstrap UCL	N/A						
309					90% Chebyshev(Mean, Sd) UCL	13.58				95% Chebyshev(Mean, Sd) UCL		15.71
310					97.5% Chebyshev(Mean, Sd) UCL	18.68				99% Chebyshev(Mean, Sd) UCL		24.51
311												
312	**Suggested UCL to Use**											

	A	B	C	D	E	F	G	H	I	J	K	L
313					95% Chebyshev (Mean, Sd) UCL	15.71						
314												
315	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
316	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
317	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
318	For additional insight the user may want to consult a statistician.											
319												
320												
321	**Cadmium**											
322												
323	**General Statistics**											
324	Total Number of Observations					13	Number of Distinct Observations					7
325							Number of Missing Observations					0
326	Minimum					0.14	Mean					7.633
327	Maximum					19.6	Median					7.633
328	SD					5.485	Std. Error of Mean					1.521
329	Coefficient of Variation					0.719	Skewness					0.546
330												
331	**Normal GOF Test**											
332	Shapiro Wilk Test Statistic					0.915	**Shapiro Wilk GOF Test**					
333	5% Shapiro Wilk Critical Value					0.866	Data appear Normal at 5% Significance Level					
334	Lilliefors Test Statistic					0.192	**Lilliefors GOF Test**					
335	5% Lilliefors Critical Value					0.246	Data appear Normal at 5% Significance Level					
336	**Data appear Normal at 5% Significance Level**											
337												
338	**Assuming Normal Distribution**											
339	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
340	95% Student's-t UCL					10.34	95% Adjusted-CLT UCL (Chen-1995)					10.38
341							95% Modified-t UCL (Johnson-1978)					10.38
342												
343	**Gamma GOF Test**											
344	A-D Test Statistic					0.766	**Anderson-Darling Gamma GOF Test**					
345	5% A-D Critical Value					0.755	Data Not Gamma Distributed at 5% Significance Level					
346	K-S Test Statistic					0.315	**Kolmogrov-Smirnoff Gamma GOF Test**					
347	5% K-S Critical Value					0.242	Data Not Gamma Distributed at 5% Significance Level					
348	**Data Not Gamma Distributed at 5% Significance Level**											
349												
350	**Gamma Statistics**											
351	k hat (MLE)					1.164	k star (bias corrected MLE)					0.946
352	Theta hat (MLE)					6.56	Theta star (bias corrected MLE)					8.066
353	nu hat (MLE)					30.25	nu star (bias corrected)					24.6
354	MLE Mean (bias corrected)					7.633	MLE Sd (bias corrected)					7.846
355							Approximate Chi Square Value (0.05)					14.31
356	Adjusted Level of Significance					0.0301	Adjusted Chi Square Value					13.2
357												
358	**Assuming Gamma Distribution**											
359	95% Approximate Gamma UCL (use when n>=50))					13.12	95% Adjusted Gamma UCL (use when n<50)					14.23
360												
361	**Lognormal GOF Test**											
362	Shapiro Wilk Test Statistic					0.805	**Shapiro Wilk Lognormal GOF Test**					
363	5% Shapiro Wilk Critical Value					0.866	Data Not Lognormal at 5% Significance Level					
364	Lilliefors Test Statistic					0.333	**Lilliefors Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
365					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
366					Data Not Lognormal at 5% Significance Level							
367												
368					Lognormal Statistics							
369					Minimum of Logged Data	-1.966				Mean of logged Data		1.545
370					Maximum of Logged Data	2.976				SD of logged Data		1.359
371												
372					Assuming Lognormal Distribution							
373					95% H-UCL	46.67				90% Chebyshev (MVUE) UCL		23.62
374					95% Chebyshev (MVUE) UCL	29.57				97.5% Chebyshev (MVUE) UCL		37.82
375					99% Chebyshev (MVUE) UCL	54.03						
376												
377					Nonparametric Distribution Free UCL Statistics							
378					Data appear to follow a Discernible Distribution at 5% Significance Level							
379												
380					Nonparametric Distribution Free UCLs							
381					95% CLT UCL	10.13				95% Jackknife UCL		10.34
382					95% Standard Bootstrap UCL	10.09				95% Bootstrap-t UCL		10.59
383					95% Hall's Bootstrap UCL	10.98				95% Percentile Bootstrap UCL		10.16
384					95% BCA Bootstrap UCL	10.25						
385					90% Chebyshev(Mean, Sd) UCL	12.2				95% Chebyshev(Mean, Sd) UCL		14.26
386					97.5% Chebyshev(Mean, Sd) UCL	17.13				99% Chebyshev(Mean, Sd) UCL		22.77
387												
388					Suggested UCL to Use							
389					95% Student's-t UCL	10.34						
390												
391					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
392					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
393					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
394					For additional insight the user may want to consult a statistician.							
395												
396												
397	Cobalt											
398												
399					General Statistics							
400					Total Number of Observations	13				Number of Distinct Observations		4
401										Number of Missing Observations		0
402					Minimum	7.2				Mean		10.7
403					Maximum	16.2				Median		10.7
404					SD	1.969				Std. Error of Mean		0.546
405					Coefficient of Variation	0.184				Skewness		1.491
406												
407					Normal GOF Test							
408					Shapiro Wilk Test Statistic	0.648				Shapiro Wilk GOF Test		
409					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
410					Lilliefors Test Statistic	0.423				Lilliefors GOF Test		
411					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
412					Data Not Normal at 5% Significance Level							
413												
414					Assuming Normal Distribution							
415					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
416					95% Student's-t UCL	11.67				95% Adjusted-CLT UCL (Chen-1995)		11.84

	A	B	C	D	E	F	G	H	I	J	K	L
417										95% Modified-t UCL (Johnson-1978)		11.71
418												
419					Gamma GOF Test							
420					A-D Test Statistic	2.317	Anderson-Darling Gamma GOF Test					
421					5% A-D Critical Value	0.733	Data Not Gamma Distributed at 5% Significance Level					
422					K-S Test Statistic	0.4	Kolmogrov-Smirnoff Gamma GOF Test					
423					5% K-S Critical Value	0.236	Data Not Gamma Distributed at 5% Significance Level					
424					Data Not Gamma Distributed at 5% Significance Level							
425												
426					Gamma Statistics							
427					k hat (MLE)	34.68	k star (bias corrected MLE)					26.73
428					Theta hat (MLE)	0.309	Theta star (bias corrected MLE)					0.4
429					nu hat (MLE)	901.7	nu star (bias corrected)					695
430					MLE Mean (bias corrected)	10.7	MLE Sd (bias corrected)					2.07
431							Approximate Chi Square Value (0.05)					634.8
432					Adjusted Level of Significance	0.0301	Adjusted Chi Square Value					626.6
433												
434					Assuming Gamma Distribution							
435					95% Approximate Gamma UCL (use when n>=50))	11.71	95% Adjusted Gamma UCL (use when n<50)					11.87
436												
437					Lognormal GOF Test							
438					Shapiro Wilk Test Statistic	0.687	Shapiro Wilk Lognormal GOF Test					
439					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
440					Lilliefors Test Statistic	0.39	Lilliefors Lognormal GOF Test					
441					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
442					Data Not Lognormal at 5% Significance Level							
443												
444					Lognormal Statistics							
445					Minimum of Logged Data	1.974	Mean of logged Data					2.356
446					Maximum of Logged Data	2.785	SD of logged Data					0.175
447												
448					Assuming Lognormal Distribution							
449					95% H-UCL	11.74	90% Chebyshev (MVUE) UCL					12.26
450					95% Chebyshev (MVUE) UCL	12.97	97.5% Chebyshev (MVUE) UCL					13.96
451					99% Chebyshev (MVUE) UCL	15.89						
452												
453					Nonparametric Distribution Free UCL Statistics							
454					Data do not follow a Discernible Distribution (0.05)							
455												
456					Nonparametric Distribution Free UCLs							
457					95% CLT UCL	11.6	95% Jackknife UCL					11.67
458					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
459					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
460					95% BCA Bootstrap UCL	N/A						
461					90% Chebyshev(Mean, Sd) UCL	12.34	95% Chebyshev(Mean, Sd) UCL					13.08
462					97.5% Chebyshev(Mean, Sd) UCL	14.11	99% Chebyshev(Mean, Sd) UCL					16.13
463												
464					Suggested UCL to Use							
465					95% Student's-t UCL	11.67				or 95% Modified-t UCL		11.71
466												
467					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
468					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							

	A	B	C	D	E	F	G	H	I	J	K	L
469	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
470	For additional insight the user may want to consult a statistician.											
471												
472												
473	Iron											
474												
475	**General Statistics**											
476					Total Number of Observations	13			Number of Distinct Observations			13
477									Number of Missing Observations			0
478					Minimum	6836			Mean			25614
479					Maximum	37876			Median			26244
480					SD	7389			Std. Error of Mean			2049
481					Coefficient of Variation	0.288			Skewness			-0.961
482												
483	**Normal GOF Test**											
484					Shapiro Wilk Test Statistic	0.88			**Shapiro Wilk GOF Test**			
485					5% Shapiro Wilk Critical Value	0.866			Data appear Normal at 5% Significance Level			
486					Lilliefors Test Statistic	0.222			**Lilliefors GOF Test**			
487					5% Lilliefors Critical Value	0.246			Data appear Normal at 5% Significance Level			
488	**Data appear Normal at 5% Significance Level**											
489												
490	**Assuming Normal Distribution**											
491					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
492					95% Student's-t UCL	29267			95% Adjusted-CLT UCL (Chen-1995)			28401
493									95% Modified-t UCL (Johnson-1978)			29175
494												
495	**Gamma GOF Test**											
496					A-D Test Statistic	1.174			**Anderson-Darling Gamma GOF Test**			
497					5% A-D Critical Value	0.734			Data Not Gamma Distributed at 5% Significance Level			
498					K-S Test Statistic	0.285			**Kolmogrov-Smirnoff Gamma GOF Test**			
499					5% K-S Critical Value	0.237			Data Not Gamma Distributed at 5% Significance Level			
500	**Data Not Gamma Distributed at 5% Significance Level**											
501												
502	**Gamma Statistics**											
503					k hat (MLE)	8.507			k star (bias corrected MLE)			6.595
504					Theta hat (MLE)	3011			Theta star (bias corrected MLE)			3884
505					nu hat (MLE)	221.2			nu star (bias corrected)			171.5
506					MLE Mean (bias corrected)	25614			MLE Sd (bias corrected)			9974
507									Approximate Chi Square Value (0.05)			142.2
508					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			138.4
509												
510	**Assuming Gamma Distribution**											
511					95% Approximate Gamma UCL (use when n>=50))	30889			95% Adjusted Gamma UCL (use when n<50)			31737
512												
513	**Lognormal GOF Test**											
514					Shapiro Wilk Test Statistic	0.694			**Shapiro Wilk Lognormal GOF Test**			
515					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
516					Lilliefors Test Statistic	0.323			**Lilliefors Lognormal GOF Test**			
517					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
518	**Data Not Lognormal at 5% Significance Level**											
519												
520	**Lognormal Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
521					Minimum of Logged Data	8.83					Mean of logged Data	10.09
522					Maximum of Logged Data	10.54					SD of logged Data	0.413
523												
524					Assuming Lognormal Distribution							
525					95% H-UCL	33418					90% Chebyshev (MVUE) UCL	35225
526					95% Chebyshev (MVUE) UCL	39363					97.5% Chebyshev (MVUE) UCL	45106
527					99% Chebyshev (MVUE) UCL	56386						
528												
529					Nonparametric Distribution Free UCL Statistics							
530					Data appear to follow a Discernible Distribution at 5% Significance Level							
531												
532					Nonparametric Distribution Free UCLs							
533					95% CLT UCL	28985					95% Jackknife UCL	29267
534					95% Standard Bootstrap UCL	28882					95% Bootstrap-t UCL	28842
535					95% Hall's Bootstrap UCL	29166					95% Percentile Bootstrap UCL	28808
536					95% BCA Bootstrap UCL	28216						
537					90% Chebyshev(Mean, Sd) UCL	31762					95% Chebyshev(Mean, Sd) UCL	34547
538					97.5% Chebyshev(Mean, Sd) UCL	38412					99% Chebyshev(Mean, Sd) UCL	46004
539												
540					Suggested UCL to Use							
541					95% Student's-t UCL	29267						
542												
543					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
544					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
545					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
546					For additional insight the user may want to consult a statistician.							
547												
548					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
549					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
550												
551												
552	Manganese											
553												
554					General Statistics							
555					Total Number of Observations	13					Number of Distinct Observations	13
556											Number of Missing Observations	0
557					Minimum	86					Mean	544.1
558					Maximum	1790					Median	500
559					SD	430.8					Std. Error of Mean	119.5
560					Coefficient of Variation	0.792					Skewness	2.154
561												
562					Normal GOF Test							
563					Shapiro Wilk Test Statistic	0.785					Shapiro Wilk GOF Test	
564					5% Shapiro Wilk Critical Value	0.866					Data Not Normal at 5% Significance Level	
565					Lilliefors Test Statistic	0.249					Lilliefors GOF Test	
566					5% Lilliefors Critical Value	0.246					Data Not Normal at 5% Significance Level	
567					Data Not Normal at 5% Significance Level							
568												
569					Assuming Normal Distribution							
570					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
571					95% Student's-t UCL	757					95% Adjusted-CLT UCL (Chen-1995)	816.9
572											95% Modified-t UCL (Johnson-1978)	768.9

	A	B	C	D	E	F	G	H	I	J	K	L
573												
574						Gamma GOF Test						
575					A-D Test Statistic	0.281	Anderson-Darling Gamma GOF Test					
576					5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level					
577					K-S Test Statistic	0.167	Kolmogrov-Smirnoff Gamma GOF Test					
578					5% K-S Critical Value	0.239	Detected data appear Gamma Distributed at 5% Significance Level					
579					Detected data appear Gamma Distributed at 5% Significance Level							
580												
581						Gamma Statistics						
582					k hat (MLE)	2.124	k star (bias corrected MLE)					1.685
583					Theta hat (MLE)	256.1	Theta star (bias corrected MLE)					322.9
584					nu hat (MLE)	55.22	nu star (bias corrected)					43.81
585					MLE Mean (bias corrected)	544.1	MLE Sd (bias corrected)					419.1
586							Approximate Chi Square Value (0.05)					29.63
587					Adjusted Level of Significance	0.0301	Adjusted Chi Square Value					27.98
588												
589						Assuming Gamma Distribution						
590					95% Approximate Gamma UCL (use when n>=50)	804.4	95% Adjusted Gamma UCL (use when n<50)					851.9
591												
592						Lognormal GOF Test						
593					Shapiro Wilk Test Statistic	0.967	Shapiro Wilk Lognormal GOF Test					
594					5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level					
595					Lilliefors Test Statistic	0.156	Lilliefors Lognormal GOF Test					
596					5% Lilliefors Critical Value	0.246	Data appear Lognormal at 5% Significance Level					
597					Data appear Lognormal at 5% Significance Level							
598												
599						Lognormal Statistics						
600					Minimum of Logged Data	4.454	Mean of logged Data					6.046
601					Maximum of Logged Data	7.49	SD of logged Data					0.766
602												
603						Assuming Lognormal Distribution						
604					95% H-UCL	977.1	90% Chebyshev (MVUE) UCL					920.6
605					95% Chebyshev (MVUE) UCL	1088	97.5% Chebyshev (MVUE) UCL					1321
606					99% Chebyshev (MVUE) UCL	1777						
607												
608						Nonparametric Distribution Free UCL Statistics						
609						Data appear to follow a Discernible Distribution at 5% Significance Level						
610												
611						Nonparametric Distribution Free UCLs						
612					95% CLT UCL	740.6	95% Jackknife UCL					757
613					95% Standard Bootstrap UCL	732.4	95% Bootstrap-t UCL					911.4
614					95% Hall's Bootstrap UCL	1648	95% Percentile Bootstrap UCL					754.2
615					95% BCA Bootstrap UCL	826						
616					90% Chebyshev(Mean, Sd) UCL	902.5	95% Chebyshev(Mean, Sd) UCL					1065
617					97.5% Chebyshev(Mean, Sd) UCL	1290	99% Chebyshev(Mean, Sd) UCL					1733
618												
619						Suggested UCL to Use						
620					95% Adjusted Gamma UCL	851.9						
621												
622					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
623					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
624					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							

	A	B	C	D	E	F	G	H	I	J	K	L
625	For additional insight the user may want to consult a statistician.											
626												
627												
628	Mercury											
629												
630	**General Statistics**											
631					Total Number of Observations	13			Number of Distinct Observations			7
632									Number of Missing Observations			0
633					Minimum	0.021			Mean			18.24
634					Maximum	40			Median			10
635					SD	18.3			Std. Error of Mean			5.077
636					Coefficient of Variation	1.003			Skewness			0.392
637												
638	**Normal GOF Test**											
639					Shapiro Wilk Test Statistic	0.746			**Shapiro Wilk GOF Test**			
640					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			
641					Lilliefors Test Statistic	0.289			**Lilliefors GOF Test**			
642					5% Lilliefors Critical Value	0.246			Data Not Normal at 5% Significance Level			
643	**Data Not Normal at 5% Significance Level**											
644												
645	**Assuming Normal Distribution**											
646				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
647					95% Student's-t UCL	27.29			95% Adjusted-CLT UCL (Chen-1995)			27.18
648									95% Modified-t UCL (Johnson-1978)			27.38
649												
650	**Gamma GOF Test**											
651					A-D Test Statistic	1.062			**Anderson-Darling Gamma GOF Test**			
652					5% A-D Critical Value	0.811			Data Not Gamma Distributed at 5% Significance Level			
653					K-S Test Statistic	0.242			**Kolmogrov-Smirnoff Gamma GOF Test**			
654					5% K-S Critical Value	0.253			Detected data appear Gamma Distributed at 5% Significance Level			
655	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
656												
657	**Gamma Statistics**											
658					k hat (MLE)	0.395			k star (bias corrected MLE)			0.355
659					Theta hat (MLE)	46.21			Theta star (bias corrected MLE)			51.39
660					nu hat (MLE)	10.26			nu star (bias corrected)			9.228
661					MLE Mean (bias corrected)	18.24			MLE Sd (bias corrected)			30.62
662									Approximate Chi Square Value (0.05)			3.465
663					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			2.98
664												
665	**Assuming Gamma Distribution**											
666					95% Approximate Gamma UCL (use when n>=50)	48.58			95% Adjusted Gamma UCL (use when n<50)			56.48
667												
668	**Lognormal GOF Test**											
669					Shapiro Wilk Test Statistic	0.784			**Shapiro Wilk Lognormal GOF Test**			
670					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
671					Lilliefors Test Statistic	0.284			**Lilliefors Lognormal GOF Test**			
672					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
673	**Data Not Lognormal at 5% Significance Level**											
674												
675	**Lognormal Statistics**											
676					Minimum of Logged Data	-3.863			Mean of logged Data			1.233

	A	B	C	D	E	F	G	H	I	J	K	L
677					Maximum of Logged Data	3.689					SD of logged Data	2.925
678												
679					Assuming Lognormal Distribution							
680					95% H-UCL	75799					90% Chebyshev (MVUE) UCL	304.3
681					95% Chebyshev (MVUE) UCL	402.3					97.5% Chebyshev (MVUE) UCL	538.3
682					99% Chebyshev (MVUE) UCL	805.5						
683												
684					Nonparametric Distribution Free UCL Statistics							
685					Data appear to follow a Discernible Distribution at 5% Significance Level							
686												
687					Nonparametric Distribution Free UCLs							
688					95% CLT UCL	26.59					95% Jackknife UCL	27.29
689					95% Standard Bootstrap UCL	26.41					95% Bootstrap-t UCL	28.71
690					95% Hall's Bootstrap UCL	25.29					95% Percentile Bootstrap UCL	26.69
691					95% BCA Bootstrap UCL	26.69						
692					90% Chebyshev(Mean, Sd) UCL	33.47					95% Chebyshev(Mean, Sd) UCL	40.37
693					97.5% Chebyshev(Mean, Sd) UCL	49.94					99% Chebyshev(Mean, Sd) UCL	68.75
694												
695					Suggested UCL to Use							
696					95% Adjusted Gamma UCL	56.48						
697												
698					Recommended UCL exceeds the maximum observation							
699												
700					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
701					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
702					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
703					For additional insight the user may want to consult a statistician.							
704												
705												
706	Nickel											
707												
708					General Statistics							
709					Total Number of Observations	13					Number of Distinct Observations	10
710											Number of Missing Observations	0
711					Minimum	15					Mean	39.77
712					Maximum	264					Median	23
713					SD	67.5					Std. Error of Mean	18.72
714					Coefficient of Variation	1.697					Skewness	3.582
715												
716					Normal GOF Test							
717					Shapiro Wilk Test Statistic	0.366					Shapiro Wilk GOF Test	
718					5% Shapiro Wilk Critical Value	0.866					Data Not Normal at 5% Significance Level	
719					Lilliefors Test Statistic	0.481					Lilliefors GOF Test	
720					5% Lilliefors Critical Value	0.246					Data Not Normal at 5% Significance Level	
721					Data Not Normal at 5% Significance Level							
722												
723					Assuming Normal Distribution							
724					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
725					95% Student's-t UCL	73.13					95% Adjusted-CLT UCL (Chen-1995)	90.43
726											95% Modified-t UCL (Johnson-1978)	76.23
727												
728					Gamma GOF Test							

	A	B	C	D	E	F	G	H	I	J	K	L
729					A-D Test Statistic	3.06	Anderson-Darling Gamma GOF Test					
730					5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level					
731					K-S Test Statistic	0.419	Kolmogrov-Smirnoff Gamma GOF Test					
732					5% K-S Critical Value	0.242	Data Not Gamma Distributed at 5% Significance Level					
733	Data Not Gamma Distributed at 5% Significance Level											
734												
735	Gamma Statistics											
736					k hat (MLE)	1.233				k star (bias corrected MLE)		0.999
737					Theta hat (MLE)	32.26				Theta star (bias corrected MLE)		39.79
738					nu hat (MLE)	32.05				nu star (bias corrected)		25.99
739					MLE Mean (bias corrected)	39.77				MLE Sd (bias corrected)		39.78
740										Approximate Chi Square Value (0.05)		15.37
741					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		14.21
742												
743	Assuming Gamma Distribution											
744					95% Approximate Gamma UCL (use when n>=50))	67.24				95% Adjusted Gamma UCL (use when n<50)		72.7
745												
746	Lognormal GOF Test											
747					Shapiro Wilk Test Statistic	0.565	Shapiro Wilk Lognormal GOF Test					
748					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
749					Lilliefors Test Statistic	0.35	Lilliefors Lognormal GOF Test					
750					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
751	Data Not Lognormal at 5% Significance Level											
752												
753	Lognormal Statistics											
754					Minimum of Logged Data	2.708				Mean of logged Data		3.225
755					Maximum of Logged Data	5.576				SD of logged Data		0.733
756												
757	Assuming Lognormal Distribution											
758					95% H-UCL	54.88				90% Chebyshev (MVUE) UCL		52.64
759					95% Chebyshev (MVUE) UCL	61.95				97.5% Chebyshev (MVUE) UCL		74.86
760					99% Chebyshev (MVUE) UCL	100.2						
761												
762	Nonparametric Distribution Free UCL Statistics											
763	Data do not follow a Discernible Distribution (0.05)											
764												
765	Nonparametric Distribution Free UCLs											
766					95% CLT UCL	70.56				95% Jackknife UCL		73.13
767					95% Standard Bootstrap UCL	69.03				95% Bootstrap-t UCL		453.8
768					95% Hall's Bootstrap UCL	284.9				95% Percentile Bootstrap UCL		76.31
769					95% BCA Bootstrap UCL	95.92						
770					90% Chebyshev(Mean, Sd) UCL	95.93				95% Chebyshev(Mean, Sd) UCL		121.4
771					97.5% Chebyshev(Mean, Sd) UCL	156.7				99% Chebyshev(Mean, Sd) UCL		226
772												
773	Suggested UCL to Use											
774					95% Chebyshev (Mean, Sd) UCL	121.4						
775												
776	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
777	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
778	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
779	For additional insight the user may want to consult a statistician.											
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781												
782	PAH, Total											
783												
784						General Statistics						
785					Total Number of Observations	13				Number of Distinct Observations		4
786										Number of Missing Observations		0
787					Minimum	0.109				Mean		0.265
788					Maximum	0.43				Median		0.265
789					SD	0.0657				Std. Error of Mean		0.0182
790					Coefficient of Variation	0.248				Skewness		0.258
791												
792						Normal GOF Test						
793					Shapiro Wilk Test Statistic	0.594				Shapiro Wilk GOF Test		
794					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
795					Lilliefors Test Statistic	0.423				Lilliefors GOF Test		
796					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
797						Data Not Normal at 5% Significance Level						
798												
799						Assuming Normal Distribution						
800					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
801					95% Student's-t UCL	0.297				95% Adjusted-CLT UCL (Chen-1995)		0.296
802										95% Modified-t UCL (Johnson-1978)		0.297
803												
804						Gamma GOF Test						
805					A-D Test Statistic	2.959				Anderson-Darling Gamma GOF Test		
806					5% A-D Critical Value	0.734				Data Not Gamma Distributed at 5% Significance Level		
807					K-S Test Statistic	0.401				Kolmogrov-Smirnoff Gamma GOF Test		
808					5% K-S Critical Value	0.236				Data Not Gamma Distributed at 5% Significance Level		
809						Data Not Gamma Distributed at 5% Significance Level						
810												
811						Gamma Statistics						
812					k hat (MLE)	14.92				k star (bias corrected MLE)		11.53
813					Theta hat (MLE)	0.0177				Theta star (bias corrected MLE)		0.023
814					nu hat (MLE)	387.8				nu star (bias corrected)		299.7
815					MLE Mean (bias corrected)	0.265				MLE Sd (bias corrected)		0.0779
816										Approximate Chi Square Value (0.05)		260.6
817					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		255.4
818												
819						Assuming Gamma Distribution						
820					95% Approximate Gamma UCL (use when n>=50))	0.304				95% Adjusted Gamma UCL (use when n<50)		0.31
821												
822						Lognormal GOF Test						
823					Shapiro Wilk Test Statistic	0.554				Shapiro Wilk Lognormal GOF Test		
824					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
825					Lilliefors Test Statistic	0.419				Lilliefors Lognormal GOF Test		
826					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
827						Data Not Lognormal at 5% Significance Level						
828												
829						Lognormal Statistics						
830					Minimum of Logged Data	-2.219				Mean of logged Data		-1.364
831					Maximum of Logged Data	-0.844				SD of logged Data		0.291
832												

	A	B	C	D	E	F	G	H	I	J	K	L
833					Assuming Lognormal Distribution							
834					95% H-UCL	0.313				90% Chebyshev (MVUE) UCL		0.331
835					95% Chebyshev (MVUE) UCL	0.36				97.5% Chebyshev (MVUE) UCL		0.401
836					99% Chebyshev (MVUE) UCL	0.481						
837												
838					Nonparametric Distribution Free UCL Statistics							
839					Data do not follow a Discernible Distribution (0.05)							
840												
841					Nonparametric Distribution Free UCLs							
842					95% CLT UCL	0.295				95% Jackknife UCL		0.297
843					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
844					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
845					95% BCA Bootstrap UCL	N/A						
846					90% Chebyshev(Mean, Sd) UCL	0.319				95% Chebyshev(Mean, Sd) UCL		0.344
847					97.5% Chebyshev(Mean, Sd) UCL	0.378				99% Chebyshev(Mean, Sd) UCL		0.446
848												
849					Suggested UCL to Use							
850					95% Student's-t UCL	0.297				or 95% Modified-t UCL		0.297
851												
852					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
853					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
854					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
855					For additional insight the user may want to consult a statistician.							
856												
857												
858	PCB, Total											
859												
860					General Statistics							
861					Total Number of Observations	13				Number of Distinct Observations		4
862										Number of Missing Observations		0
863					Minimum	0.048				Mean		3.972
864					Maximum	5				Median		5
865					SD	1.964				Std. Error of Mean		0.545
866					Coefficient of Variation	0.494				Skewness		-1.495
867												
868					Normal GOF Test							
869					Shapiro Wilk Test Statistic	0.56				Shapiro Wilk GOF Test		
870					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
871					Lilliefors Test Statistic	0.469				Lilliefors GOF Test		
872					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
873					Data Not Normal at 5% Significance Level							
874												
875					Assuming Normal Distribution							
876					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
877					95% Student's-t UCL	4.943				95% Adjusted-CLT UCL (Chen-1995)		4.627
878										95% Modified-t UCL (Johnson-1978)		4.905
879												
880					Gamma GOF Test							
881					A-D Test Statistic	2.929				Anderson-Darling Gamma GOF Test		
882					5% A-D Critical Value	0.753				Data Not Gamma Distributed at 5% Significance Level		
883					K-S Test Statistic	0.483				Kolmogrov-Smirnoff Gamma GOF Test		
884					5% K-S Critical Value	0.242				Data Not Gamma Distributed at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
885	**Data Not Gamma Distributed at 5% Significance Level**											
886												
887	**Gamma Statistics**											
888					k hat (MLE)	1.335				k star (bias corrected MLE)		1.078
889					Theta hat (MLE)	2.976				Theta star (bias corrected MLE)		3.685
890					nu hat (MLE)	34.7				nu star (bias corrected)		28.03
891					MLE Mean (bias corrected)	3.972				MLE Sd (bias corrected)		3.826
892										Approximate Chi Square Value (0.05)		16.95
893					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		15.73
894												
895	**Assuming Gamma Distribution**											
896				95% Approximate Gamma UCL (use when n>=50))		6.568				95% Adjusted Gamma UCL (use when n<50)		7.077
897												
898	**Lognormal GOF Test**											
899					Shapiro Wilk Test Statistic	0.554				**Shapiro Wilk Lognormal GOF Test**		
900					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
901					Lilliefors Test Statistic	0.448				**Lilliefors Lognormal GOF Test**		
902					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
903	**Data Not Lognormal at 5% Significance Level**											
904												
905	**Lognormal Statistics**											
906					Minimum of Logged Data	-3.037				Mean of logged Data		0.96
907					Maximum of Logged Data	1.609				SD of logged Data		1.401
908												
909	**Assuming Lognormal Distribution**											
910					95% H-UCL	29.73				90% Chebyshev (MVUE) UCL		14.07
911					95% Chebyshev (MVUE) UCL	17.66				97.5% Chebyshev (MVUE) UCL		22.64
912					99% Chebyshev (MVUE) UCL	32.43						
913												
914	**Nonparametric Distribution Free UCL Statistics**											
915	**Data do not follow a Discernible Distribution (0.05)**											
916												
917	**Nonparametric Distribution Free UCLs**											
918					95% CLT UCL	4.868				95% Jackknife UCL		4.943
919					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
920					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
921					95% BCA Bootstrap UCL	N/A						
922					90% Chebyshev(Mean, Sd) UCL	5.606				95% Chebyshev(Mean, Sd) UCL		6.347
923					97.5% Chebyshev(Mean, Sd) UCL	7.374				99% Chebyshev(Mean, Sd) UCL		9.392
924												
925	**Suggested UCL to Use**											
926					95% Chebyshev (Mean, Sd) UCL	6.347						
927												
928	**Recommended UCL exceeds the maximum observation**											
929												
930	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
931	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
932	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
933	For additional insight the user may want to consult a statistician.											
934												
935	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
936	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											

	A	B	C	D	E	F	G	H	I	J	K	L
937												
938												
939	**Thallium**											
940												
941						**General Statistics**						
942					Total Number of Observations	13			Number of Distinct Observations			4
943									Number of Missing Observations			0
944					Minimum	0.098			Mean			0.226
945					Maximum	0.41			Median			0.226
946					SD	0.0667			Std. Error of Mean			0.0185
947					Coefficient of Variation	0.295			Skewness			1.314
948												
949						**Normal GOF Test**						
950					Shapiro Wilk Test Statistic	0.647			**Shapiro Wilk GOF Test**			
951					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			
952					Lilliefors Test Statistic	0.423			**Lilliefors GOF Test**			
953					5% Lilliefors Critical Value	0.246			Data Not Normal at 5% Significance Level			
954						**Data Not Normal at 5% Significance Level**						
955												
956						**Assuming Normal Distribution**						
957					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
958					95% Student's-t UCL	0.259			95% Adjusted-CLT UCL (Chen-1995)			0.264
959									95% Modified-t UCL (Johnson-1978)			0.26
960												
961						**Gamma GOF Test**						
962					A-D Test Statistic	2.356			**Anderson-Darling Gamma GOF Test**			
963					5% A-D Critical Value	0.734			Data Not Gamma Distributed at 5% Significance Level			
964					K-S Test Statistic	0.386			**Kolmogrov-Smirnoff Gamma GOF Test**			
965					5% K-S Critical Value	0.237			Data Not Gamma Distributed at 5% Significance Level			
966						**Data Not Gamma Distributed at 5% Significance Level**						
967												
968						**Gamma Statistics**						
969					k hat (MLE)	12.55			k star (bias corrected MLE)			9.707
970					Theta hat (MLE)	0.018			Theta star (bias corrected MLE)			0.0233
971					nu hat (MLE)	326.4			nu star (bias corrected)			252.4
972					MLE Mean (bias corrected)	0.226			MLE Sd (bias corrected)			0.0725
973									Approximate Chi Square Value (0.05)			216.6
974					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			211.9
975												
976						**Assuming Gamma Distribution**						
977					95% Approximate Gamma UCL (use when n>=50))	0.263			95% Adjusted Gamma UCL (use when n<50)			0.269
978												
979						**Lognormal GOF Test**						
980					Shapiro Wilk Test Statistic	0.667			**Shapiro Wilk Lognormal GOF Test**			
981					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
982					Lilliefors Test Statistic	0.399			**Lilliefors Lognormal GOF Test**			
983					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
984						**Data Not Lognormal at 5% Significance Level**						
985												
986						**Lognormal Statistics**						
987					Minimum of Logged Data	-2.323			Mean of logged Data			-1.528
988					Maximum of Logged Data	-0.892			SD of logged Data			0.305

	A	B	C	D	E	F	G	H	I	J	K	L
989												
990					Assuming Lognormal Distribution							
991					95% H-UCL	0.269			90% Chebyshev (MVUE) UCL			0.285
992				95% Chebyshev (MVUE) UCL		0.311			97.5% Chebyshev (MVUE) UCL			0.347
993				99% Chebyshev (MVUE) UCL		0.419						
994												
995					Nonparametric Distribution Free UCL Statistics							
996					Data do not follow a Discernible Distribution (0.05)							
997												
998					Nonparametric Distribution Free UCLs							
999					95% CLT UCL	0.256			95% Jackknife UCL			0.259
1000				95% Standard Bootstrap UCL		N/A			95% Bootstrap-t UCL			N/A
1001				95% Hall's Bootstrap UCL		N/A			95% Percentile Bootstrap UCL			N/A
1002				95% BCA Bootstrap UCL		N/A						
1003				90% Chebyshev(Mean, Sd) UCL		0.281			95% Chebyshev(Mean, Sd) UCL			0.307
1004				97.5% Chebyshev(Mean, Sd) UCL		0.342			99% Chebyshev(Mean, Sd) UCL			0.41
1005												
1006					Suggested UCL to Use							
1007				95% Student's-t UCL		0.259			or 95% Modified-t UCL			0.26
1008												
1009					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1010					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1011					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1012					For additional insight the user may want to consult a statistician.							
1013												
1014												
1015	Uranium											
1016												
1017					General Statistics							
1018				Total Number of Observations		13			Number of Distinct Observations			9
1019									Number of Missing Observations			0
1020				Minimum		6.7			Mean			142.1
1021				Maximum		481.5			Median			11.54
1022				SD		191.4			Std. Error of Mean			53.1
1023				Coefficient of Variation		1.348			Skewness			1.101
1024												
1025					Normal GOF Test							
1026				Shapiro Wilk Test Statistic		0.712			Shapiro Wilk GOF Test			
1027				5% Shapiro Wilk Critical Value		0.866			Data Not Normal at 5% Significance Level			
1028				Lilliefors Test Statistic		0.309			Lilliefors GOF Test			
1029				5% Lilliefors Critical Value		0.246			Data Not Normal at 5% Significance Level			
1030					Data Not Normal at 5% Significance Level							
1031												
1032					Assuming Normal Distribution							
1033				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
1034				95% Student's-t UCL		236.7			95% Adjusted-CLT UCL (Chen-1995)			246.7
1035									95% Modified-t UCL (Johnson-1978)			239.4
1036												
1037					Gamma GOF Test							
1038				A-D Test Statistic		1.327			Anderson-Darling Gamma GOF Test			
1039				5% A-D Critical Value		0.789			Data Not Gamma Distributed at 5% Significance Level			
1040				K-S Test Statistic		0.32			Kolmogrov-Smirnoff Gamma GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
1041					5% K-S Critical Value	0.25	Data Not Gamma Distributed at 5% Significance Level					
1042	**Data Not Gamma Distributed at 5% Significance Level**											
1043												
1044	**Gamma Statistics**											
1045					k hat (MLE)	0.511				k star (bias corrected MLE)		0.445
1046					Theta hat (MLE)	277.9				Theta star (bias corrected MLE)		319.6
1047					nu hat (MLE)	13.29				nu star (bias corrected)		11.56
1048					MLE Mean (bias corrected)	142.1				MLE Sd (bias corrected)		213.1
1049										Approximate Chi Square Value (0.05)		4.937
1050					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		4.336
1051												
1052	**Assuming Gamma Distribution**											
1053				95% Approximate Gamma UCL (use when n>=50))		332.6				95% Adjusted Gamma UCL (use when n<50)		378.6
1054												
1055	**Lognormal GOF Test**											
1056					Shapiro Wilk Test Statistic	0.788	**Shapiro Wilk Lognormal GOF Test**					
1057					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
1058					Lilliefors Test Statistic	0.305	**Lilliefors Lognormal GOF Test**					
1059					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
1060	**Data Not Lognormal at 5% Significance Level**											
1061												
1062	**Lognormal Statistics**											
1063					Minimum of Logged Data	1.902				Mean of logged Data		3.718
1064					Maximum of Logged Data	6.177				SD of logged Data		1.747
1065												
1066	**Assuming Lognormal Distribution**											
1067					95% H-UCL	1592				90% Chebyshev (MVUE) UCL		392.9
1068					95% Chebyshev (MVUE) UCL	503				97.5% Chebyshev (MVUE) UCL		655.8
1069					99% Chebyshev (MVUE) UCL	955.8						
1070												
1071	**Nonparametric Distribution Free UCL Statistics**											
1072	**Data do not follow a Discernible Distribution (0.05)**											
1073												
1074	**Nonparametric Distribution Free UCLs**											
1075					95% CLT UCL	229.4				95% Jackknife UCL		236.7
1076					95% Standard Bootstrap UCL	223.9				95% Bootstrap-t UCL		272.7
1077					95% Hall's Bootstrap UCL	214.2				95% Percentile Bootstrap UCL		230.4
1078					95% BCA Bootstrap UCL	244						
1079					90% Chebyshev(Mean, Sd) UCL	301.4				95% Chebyshev(Mean, Sd) UCL		373.5
1080					97.5% Chebyshev(Mean, Sd) UCL	473.7				99% Chebyshev(Mean, Sd) UCL		670.4
1081												
1082	**Suggested UCL to Use**											
1083					99% Chebyshev (Mean, Sd) UCL	670.4						
1084												
1085	**Recommended UCL exceeds the maximum observation**											
1086												
1087	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1088	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1089	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1090	For additional insight the user may want to consult a statistician.											
1091												
1092												

	A	B	C	D	E	F	G	H	I	J	K	L
1093	Uranium-234											
1094												
1095						General Statistics						
1096					Total Number of Observations	13				Number of Distinct Observations		4
1097										Number of Missing Observations		0
1098					Minimum	0.299				Mean		4.88
1099					Maximum	12.2				Median		4.88
1100					SD	2.615				Std. Error of Mean		0.725
1101					Coefficient of Variation	0.536				Skewness		1.517
1102												
1103						Normal GOF Test						
1104					Shapiro Wilk Test Statistic	0.647				Shapiro Wilk GOF Test		
1105					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
1106					Lilliefors Test Statistic	0.423				Lilliefors GOF Test		
1107					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
1108						Data Not Normal at 5% Significance Level						
1109												
1110						Assuming Normal Distribution						
1111					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1112					95% Student's-t UCL	6.172				95% Adjusted-CLT UCL (Chen-1995)		6.399
1113										95% Modified-t UCL (Johnson-1978)		6.223
1114												
1115						Gamma GOF Test						
1116					A-D Test Statistic	2.432				Anderson-Darling Gamma GOF Test		
1117					5% A-D Critical Value	0.741				Data Not Gamma Distributed at 5% Significance Level		
1118					K-S Test Statistic	0.429				Kolmogrov-Smirnoff Gamma GOF Test		
1119					5% K-S Critical Value	0.239				Data Not Gamma Distributed at 5% Significance Level		
1120						Data Not Gamma Distributed at 5% Significance Level						
1121												
1122						Gamma Statistics						
1123					k hat (MLE)	2.562				k star (bias corrected MLE)		2.022
1124					Theta hat (MLE)	1.905				Theta star (bias corrected MLE)		2.414
1125					nu hat (MLE)	66.6				nu star (bias corrected)		52.56
1126					MLE Mean (bias corrected)	4.88				MLE Sd (bias corrected)		3.432
1127										Approximate Chi Square Value (0.05)		36.91
1128					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		35.05
1129												
1130						Assuming Gamma Distribution						
1131					95% Approximate Gamma UCL (use when n>=50))	6.949				95% Adjusted Gamma UCL (use when n<50)		7.318
1132												
1133						Lognormal GOF Test						
1134					Shapiro Wilk Test Statistic	0.584				Shapiro Wilk Lognormal GOF Test		
1135					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
1136					Lilliefors Test Statistic	0.442				Lilliefors Lognormal GOF Test		
1137					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
1138						Data Not Lognormal at 5% Significance Level						
1139												
1140						Lognormal Statistics						
1141					Minimum of Logged Data	-1.207				Mean of logged Data		1.377
1142					Maximum of Logged Data	2.501				SD of logged Data		0.854
1143												
1144						Assuming Lognormal Distribution						

1145					95% H-UCL	10.85				90% Chebyshev (MVUE) UCL		9.672
1146				95% Chebyshev (MVUE) UCL		11.56				97.5% Chebyshev (MVUE) UCL		14.17
1147				99% Chebyshev (MVUE) UCL		19.31						
1148												
1149					Nonparametric Distribution Free UCL Statistics							
1150					Data do not follow a Discernible Distribution (0.05)							
1151												
1152					Nonparametric Distribution Free UCLs							
1153					95% CLT UCL	6.073				95% Jackknife UCL		6.172
1154				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1155				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1156				95% BCA Bootstrap UCL		N/A						
1157				90% Chebyshev(Mean, Sd) UCL		7.056				95% Chebyshev(Mean, Sd) UCL		8.041
1158				97.5% Chebyshev(Mean, Sd) UCL		9.409				99% Chebyshev(Mean, Sd) UCL		12.1
1159												
1160					Suggested UCL to Use							
1161				95% Chebyshev (Mean, Sd) UCL		8.041						
1162												
1163					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1164					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1165					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1166					For additional insight the user may want to consult a statistician.							
1167												
1168												
1169	Uranium-235											
1170												
1171					General Statistics							
1172				Total Number of Observations		13				Number of Distinct Observations		4
1173										Number of Missing Observations		0
1174					Minimum	0.0335				Mean		0.746
1175					Maximum	1.96				Median		0.746
1176					SD	0.432				Std. Error of Mean		0.12
1177					Coefficient of Variation	0.579				Skewness		1.598
1178												
1179					Normal GOF Test							
1180					Shapiro Wilk Test Statistic	0.644				Shapiro Wilk GOF Test		
1181					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
1182					Lilliefors Test Statistic	0.423				Lilliefors GOF Test		
1183					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
1184					Data Not Normal at 5% Significance Level							
1185												
1186					Assuming Normal Distribution							
1187				95% Normal UCL						95% UCLs (Adjusted for Skewness)		
1188					95% Student's-t UCL	0.959				95% Adjusted-CLT UCL (Chen-1995)		0.999
1189										95% Modified-t UCL (Johnson-1978)		0.968
1190												
1191					Gamma GOF Test							
1192					A-D Test Statistic	2.421				Anderson-Darling Gamma GOF Test		
1193					5% A-D Critical Value	0.743				Data Not Gamma Distributed at 5% Significance Level		
1194					K-S Test Statistic	0.437				Kolmogrov-Smirnoff Gamma GOF Test		
1195					5% K-S Critical Value	0.239				Data Not Gamma Distributed at 5% Significance Level		
1196					Data Not Gamma Distributed at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
1197												
1198					Gamma Statistics							
1199					k hat (MLE)	2.148				k star (bias corrected MLE)		1.703
1200					Theta hat (MLE)	0.347				Theta star (bias corrected MLE)		0.438
1201					nu hat (MLE)	55.84				nu star (bias corrected)		44.29
1202					MLE Mean (bias corrected)	0.746				MLE Sd (bias corrected)		0.571
1203										Approximate Chi Square Value (0.05)		30.02
1204					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		28.36
1205												
1206					Assuming Gamma Distribution							
1207					95% Approximate Gamma UCL (use when n>=50))	1.1				95% Adjusted Gamma UCL (use when n<50)		1.164
1208												
1209					Lognormal GOF Test							
1210					Shapiro Wilk Test Statistic	0.593				Shapiro Wilk Lognormal GOF Test		
1211					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
1212					Lilliefors Test Statistic	0.449				Lilliefors Lognormal GOF Test		
1213					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
1214					Data Not Lognormal at 5% Significance Level							
1215												
1216					Lognormal Statistics							
1217					Minimum of Logged Data	-3.396				Mean of logged Data		-0.544
1218					Maximum of Logged Data	0.673				SD of logged Data		0.957
1219												
1220					Assuming Lognormal Distribution							
1221					95% H-UCL	1.976				90% Chebyshev (MVUE) UCL		1.624
1222					95% Chebyshev (MVUE) UCL	1.963				97.5% Chebyshev (MVUE) UCL		2.434
1223					99% Chebyshev (MVUE) UCL	3.359						
1224												
1225					Nonparametric Distribution Free UCL Statistics							
1226					Data do not follow a Discernible Distribution (0.05)							
1227												
1228					Nonparametric Distribution Free UCLs							
1229					95% CLT UCL	0.942				95% Jackknife UCL		0.959
1230					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1231					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1232					95% BCA Bootstrap UCL	N/A						
1233					90% Chebyshev(Mean, Sd) UCL	1.105				95% Chebyshev(Mean, Sd) UCL		1.267
1234					97.5% Chebyshev(Mean, Sd) UCL	1.493				99% Chebyshev(Mean, Sd) UCL		1.936
1235												
1236					Suggested UCL to Use							
1237					95% Chebyshev (Mean, Sd) UCL	1.267						
1238												
1239					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1240					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1241					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1242					For additional insight the user may want to consult a statistician.							
1243												
1244												
1245	Uranium-238											
1246												
1247					General Statistics							
1248					Total Number of Observations	13				Number of Distinct Observations		4

1249							Number of Missing Observations					0
1250					Minimum	1.68	Mean					40.49
1251					Maximum	108	Median					40.49
1252					SD	23.96	Std. Error of Mean					6.644
1253					Coefficient of Variation	0.592	Skewness					1.616
1254												
1255					**Normal GOF Test**							
1256					Shapiro Wilk Test Statistic	0.642	**Shapiro Wilk GOF Test**					
1257					5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level					
1258					Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**					
1259					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
1260					**Data Not Normal at 5% Significance Level**							
1261												
1262					**Assuming Normal Distribution**							
1263			**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**					
1264					95% Student's-t UCL	52.34	95% Adjusted-CLT UCL (Chen-1995)					54.6
1265							95% Modified-t UCL (Johnson-1978)					52.83
1266												
1267					**Gamma GOF Test**							
1268					A-D Test Statistic	2.424	**Anderson-Darling Gamma GOF Test**					
1269					5% A-D Critical Value	0.743	Data Not Gamma Distributed at 5% Significance Level					
1270					K-S Test Statistic	0.439	**Kolmogrov-Smirnoff Gamma GOF Test**					
1271					5% K-S Critical Value	0.239	Data Not Gamma Distributed at 5% Significance Level					
1272					**Data Not Gamma Distributed at 5% Significance Level**							
1273												
1274					**Gamma Statistics**							
1275					k hat (MLE)	2.044	k star (bias corrected MLE)					1.623
1276					Theta hat (MLE)	19.81	Theta star (bias corrected MLE)					24.95
1277					nu hat (MLE)	53.13	nu star (bias corrected)					42.21
1278					MLE Mean (bias corrected)	40.49	MLE Sd (bias corrected)					31.78
1279							Approximate Chi Square Value (0.05)					28.31
1280					Adjusted Level of Significance	0.0301	Adjusted Chi Square Value					26.7
1281												
1282					**Assuming Gamma Distribution**							
1283					95% Approximate Gamma UCL (use when n>=50))	60.36	95% Adjusted Gamma UCL (use when n<50)					64.01
1284												
1285					**Lognormal GOF Test**							
1286					Shapiro Wilk Test Statistic	0.596	**Shapiro Wilk Lognormal GOF Test**					
1287					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
1288					Lilliefors Test Statistic	0.452	**Lilliefors Lognormal GOF Test**					
1289					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
1290					**Data Not Lognormal at 5% Significance Level**							
1291												
1292					**Lognormal Statistics**							
1293					Minimum of Logged Data	0.519	Mean of logged Data					3.437
1294					Maximum of Logged Data	4.682	SD of logged Data					0.988
1295												
1296					**Assuming Lognormal Distribution**							
1297					95% H-UCL	113.3	90% Chebyshev (MVUE) UCL					90.68
1298					95% Chebyshev (MVUE) UCL	110	97.5% Chebyshev (MVUE) UCL					136.7
1299					99% Chebyshev (MVUE) UCL	189.3						
1300												

	A	B	C	D	E	F	G	H	I	J	K	L
1301	Nonparametric Distribution Free UCL Statistics											
1302	Data do not follow a Discernible Distribution (0.05)											
1303												
1304	Nonparametric Distribution Free UCLs											
1305					95% CLT UCL	51.42	95% Jackknife UCL					52.34
1306					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
1307					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
1308					95% BCA Bootstrap UCL	N/A						
1309					90% Chebyshev(Mean, Sd) UCL	60.43	95% Chebyshev(Mean, Sd) UCL					69.46
1310					97.5% Chebyshev(Mean, Sd) UCL	81.99	99% Chebyshev(Mean, Sd) UCL					106.6
1311												
1312	Suggested UCL to Use											
1313					95% Chebyshev (Mean, Sd) UCL	69.46						
1314												
1315	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1316	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1317	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1318	For additional insight the user may want to consult a statistician.											
1319												
1320												
1321	Vanadium											
1322												
1323	General Statistics											
1324					Total Number of Observations	13	Number of Distinct Observations					13
1325							Number of Missing Observations					0
1326					Minimum	5	Mean					113.3
1327					Maximum	184	Median					119
1328					SD	39.41	Std. Error of Mean					10.93
1329					Coefficient of Variation	0.348	Skewness					-1.481
1330												
1331	Normal GOF Test											
1332					Shapiro Wilk Test Statistic	0.793	Shapiro Wilk GOF Test					
1333					5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level					
1334					Lilliefors Test Statistic	0.266	Lilliefors GOF Test					
1335					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
1336	Data Not Normal at 5% Significance Level											
1337												
1338	Assuming Normal Distribution											
1339	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1340					95% Student's-t UCL	132.8	95% Adjusted-CLT UCL (Chen-1995)					126.5
1341							95% Modified-t UCL (Johnson-1978)					132
1342												
1343	Gamma GOF Test											
1344					A-D Test Statistic	2.452	Anderson-Darling Gamma GOF Test					
1345					5% A-D Critical Value	0.74	Data Not Gamma Distributed at 5% Significance Level					
1346					K-S Test Statistic	0.346	Kolmogrov-Smirnoff Gamma GOF Test					
1347					5% K-S Critical Value	0.238	Data Not Gamma Distributed at 5% Significance Level					
1348	Data Not Gamma Distributed at 5% Significance Level											
1349												
1350	Gamma Statistics											
1351					k hat (MLE)	2.887	k star (bias corrected MLE)					2.272
1352					Theta hat (MLE)	39.25	Theta star (bias corrected MLE)					49.88

	A	B	C	D	E	F	G	H	I	J	K	L
1353					nu hat (MLE)	75.05					nu star (bias corrected)	59.07
1354					MLE Mean (bias corrected)	113.3					MLE Sd (bias corrected)	75.18
1355											Approximate Chi Square Value (0.05)	42.4
1356					Adjusted Level of Significance	0.0301					Adjusted Chi Square Value	40.39
1357												
1358					**Assuming Gamma Distribution**							
1359					95% Approximate Gamma UCL (use when n>=50))	157.9					95% Adjusted Gamma UCL (use when n<50)	165.7
1360												
1361					**Lognormal GOF Test**							
1362					Shapiro Wilk Test Statistic	0.482			**Shapiro Wilk Lognormal GOF Test**			
1363					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
1364					Lilliefors Test Statistic	0.387			**Lilliefors Lognormal GOF Test**			
1365					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
1366					**Data Not Lognormal at 5% Significance Level**							
1367												
1368					**Lognormal Statistics**							
1369					Minimum of Logged Data	1.609					Mean of logged Data	4.547
1370					Maximum of Logged Data	5.215					SD of logged Data	0.899
1371												
1372					**Assuming Lognormal Distribution**							
1373					95% H-UCL	283					90% Chebyshev (MVUE) UCL	244.1
1374					95% Chebyshev (MVUE) UCL	293.1					97.5% Chebyshev (MVUE) UCL	361.3
1375					99% Chebyshev (MVUE) UCL	495.1						
1376												
1377					**Nonparametric Distribution Free UCL Statistics**							
1378					**Data do not follow a Discernible Distribution (0.05)**							
1379												
1380					**Nonparametric Distribution Free UCLs**							
1381					95% CLT UCL	131.3					95% Jackknife UCL	132.8
1382					95% Standard Bootstrap UCL	130.9					95% Bootstrap-t UCL	129.1
1383					95% Hall's Bootstrap UCL	128.9					95% Percentile Bootstrap UCL	129.8
1384					95% BCA Bootstrap UCL	126.7						
1385					90% Chebyshev(Mean, Sd) UCL	146.1					95% Chebyshev(Mean, Sd) UCL	161
1386					97.5% Chebyshev(Mean, Sd) UCL	181.6					99% Chebyshev(Mean, Sd) UCL	222.1
1387												
1388					**Suggested UCL to Use**							
1389					95% Chebyshev (Mean, Sd) UCL	161						
1390												
1391	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1392	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1393	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1394	For additional insight the user may want to consult a statistician.											
1395												
1396	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1397	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1398												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/10/2015 11:13:39 AM								
5	From File			EPC_026SubR1_EU2.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Aluminum											
12												
13	General Statistics											
14	Total Number of Observations					10	Number of Distinct Observations					7
15							Number of Missing Observations					0
16	Minimum					4300	Mean					13627
17	Maximum					34600	Median					13627
18	SD					8282	Std. Error of Mean					2619
19	Coefficient of Variation					0.608	Skewness					1.911
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.752	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.348	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					18428	95% Adjusted-CLT UCL (Chen-1995)					19626
31							95% Modified-t UCL (Johnson-1978)					18691
32												
33	Gamma GOF Test											
34	A-D Test Statistic					0.787	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.73	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.274	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.268	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					3.609	k star (bias corrected MLE)					2.593
42	Theta hat (MLE)					3776	Theta star (bias corrected MLE)					5255
43	nu hat (MLE)					72.18	nu star (bias corrected)					51.86
44	MLE Mean (bias corrected)					13627	MLE Sd (bias corrected)					8462
45							Approximate Chi Square Value (0.05)					36.32
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					34.07
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					19457	95% Adjusted Gamma UCL (use when n<50)					20741
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.884	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.301	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
56	**Data appear Approximate Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	8.366	Mean of logged Data					9.375
60					Maximum of Logged Data	10.45	SD of logged Data					0.569
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	21519	90% Chebyshev (MVUE) UCL					21121
64					95% Chebyshev (MVUE) UCL	24523	97.5% Chebyshev (MVUE) UCL					29244
65					99% Chebyshev (MVUE) UCL	38519						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	17935	95% Jackknife UCL					18428
72					95% Standard Bootstrap UCL	17739	95% Bootstrap-t UCL					20715
73					95% Hall's Bootstrap UCL	38658	95% Percentile Bootstrap UCL					17926
74					95% BCA Bootstrap UCL	19525						
75					90% Chebyshev(Mean, Sd) UCL	21484	95% Chebyshev(Mean, Sd) UCL					25043
76					97.5% Chebyshev(Mean, Sd) UCL	29982	99% Chebyshev(Mean, Sd) UCL					39686
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	25043						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Antimony**											
88												
89	**General Statistics**											
90					Total Number of Observations	10	Number of Distinct Observations					10
91							Number of Missing Observations					0
92					Minimum	0.12	Mean					102
93					Maximum	156.7	Median					121
94					SD	54.43	Std. Error of Mean					17.21
95					Coefficient of Variation	0.533	Skewness					-1.496
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.74	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.356	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	133.6				95% Adjusted-CLT UCL (Chen-1995)		121.6
107										95% Modified-t UCL (Johnson-1978)		132.2
108												
109	Gamma GOF Test											
110					A-D Test Statistic	2.181	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.476	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.276	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	0.724				k star (bias corrected MLE)		0.573
118					Theta hat (MLE)	141				Theta star (bias corrected MLE)		178
119					nu hat (MLE)	14.47				nu star (bias corrected)		11.46
120					MLE Mean (bias corrected)	102				MLE Sd (bias corrected)		134.8
121										Approximate Chi Square Value (0.05)		4.875
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		4.154
123												
124	Assuming Gamma Distribution											
125				95% Approximate Gamma UCL (use when n>=50))		239.9				95% Adjusted Gamma UCL (use when n<50)		281.5
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.575	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.45	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-2.12				Mean of logged Data		3.794
136					Maximum of Logged Data	5.054				SD of logged Data		2.352
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	94949				90% Chebyshev (MVUE) UCL		1168
140					95% Chebyshev (MVUE) UCL	1532				97.5% Chebyshev (MVUE) UCL		2038
141					99% Chebyshev (MVUE) UCL	3031						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	130.3				95% Jackknife UCL		133.6
148					95% Standard Bootstrap UCL	128.7				95% Bootstrap-t UCL		127.1
149					95% Hall's Bootstrap UCL	122.4				95% Percentile Bootstrap UCL		127.3
150					95% BCA Bootstrap UCL	123.3						
151					90% Chebyshev(Mean, Sd) UCL	153.7				95% Chebyshev(Mean, Sd) UCL		177.1
152					97.5% Chebyshev(Mean, Sd) UCL	209.5				99% Chebyshev(Mean, Sd) UCL		273.3
153												
154	Suggested UCL to Use											
155					99% Chebyshev (Mean, Sd) UCL	273.3						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	**Recommended UCL exceeds the maximum observation**											
158												
159	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
160	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
161	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
162	For additional insight the user may want to consult a statistician.											
163												
164	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
165	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
166												
167												
168	**Arsenic**											
169												
170	**General Statistics**											
171	Total Number of Observations					10	Number of Distinct Observations					8
172							Number of Missing Observations					0
173	Minimum					5.99	Mean					15.96
174	Maximum					81.4	Median					9.055
175	SD					23.09	Std. Error of Mean					7.301
176	Coefficient of Variation					1.447	Skewness					3.115
177												
178	**Normal GOF Test**											
179	Shapiro Wilk Test Statistic					0.443	**Shapiro Wilk GOF Test**					
180	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
181	Lilliefors Test Statistic					0.485	**Lilliefors GOF Test**					
182	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
183	**Data Not Normal at 5% Significance Level**											
184												
185	**Assuming Normal Distribution**											
186	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
187	95% Student's-t UCL					29.34	95% Adjusted-CLT UCL (Chen-1995)					35.65
188							95% Modified-t UCL (Johnson-1978)					30.54
189												
190	**Gamma GOF Test**											
191	A-D Test Statistic					2.021	**Anderson-Darling Gamma GOF Test**					
192	5% A-D Critical Value					0.742	Data Not Gamma Distributed at 5% Significance Level					
193	K-S Test Statistic					0.445	**Kolmogrov-Smirnoff Gamma GOF Test**					
194	5% K-S Critical Value					0.272	Data Not Gamma Distributed at 5% Significance Level					
195	**Data Not Gamma Distributed at 5% Significance Level**											
196												
197	**Gamma Statistics**											
198	k hat (MLE)					1.362	k star (bias corrected MLE)					1.02
199	Theta hat (MLE)					11.72	Theta star (bias corrected MLE)					15.64
200	nu hat (MLE)					27.24	nu star (bias corrected)					20.4
201	MLE Mean (bias corrected)					15.96	MLE Sd (bias corrected)					15.8
202							Approximate Chi Square Value (0.05)					11.15
203	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					9.977
204												
205	**Assuming Gamma Distribution**											
206	95% Approximate Gamma UCL (use when n>=50))					29.2	95% Adjusted Gamma UCL (use when n<50)					32.62
207												
208	**Lognormal GOF Test**											

209	Shapiro Wilk Test Statistic					0.643	Shapiro Wilk Lognormal GOF Test					
210	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
211	Lilliefors Test Statistic					0.38	Lilliefors Lognormal GOF Test					
212	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					
213	Data Not Lognormal at 5% Significance Level											
214												
215	Lognormal Statistics											
216	Minimum of Logged Data					1.79	Mean of logged Data					2.36
217	Maximum of Logged Data					4.399	SD of logged Data					0.755
218												
219	Assuming Lognormal Distribution											
220	95% H-UCL					27.3	90% Chebyshev (MVUE) UCL					23.7
221	95% Chebyshev (MVUE) UCL					28.27	97.5% Chebyshev (MVUE) UCL					34.62
222	99% Chebyshev (MVUE) UCL					47.08						
223												
224	Nonparametric Distribution Free UCL Statistics											
225	Data do not follow a Discernible Distribution (0.05)											
226												
227	Nonparametric Distribution Free UCLs											
228	95% CLT UCL					27.96	95% Jackknife UCL					29.34
229	95% Standard Bootstrap UCL					27.25	95% Bootstrap-t UCL					110.5
230	95% Hall's Bootstrap UCL					94.57	95% Percentile Bootstrap UCL					30.12
231	95% BCA Bootstrap UCL					37.85						
232	90% Chebyshev(Mean, Sd) UCL					37.86	95% Chebyshev(Mean, Sd) UCL					47.78
233	97.5% Chebyshev(Mean, Sd) UCL					61.55	99% Chebyshev(Mean, Sd) UCL					88.6
234												
235	Suggested UCL to Use											
236	95% Chebyshev (Mean, Sd) UCL					47.78						
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
241	For additional insight the user may want to consult a statistician.											
242												
243												
244	Beryllium											
245												
246	General Statistics											
247	Total Number of Observations					10	Number of Distinct Observations					6
248							Number of Missing Observations					0
249	Minimum					0.37	Mean					5.744
250	Maximum					16.8	Median					5.744
251	SD					6.072	Std. Error of Mean					1.92
252	Coefficient of Variation					1.057	Skewness					1.091
253												
254	Normal GOF Test											
255	Shapiro Wilk Test Statistic					0.789	Shapiro Wilk GOF Test					
256	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
257	Lilliefors Test Statistic					0.3	Lilliefors GOF Test					
258	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
259	Data Not Normal at 5% Significance Level											
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Assuming Normal Distribution**											
262	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
263					95% Student's-t UCL	9.263				95% Adjusted-CLT UCL (Chen-1995)		9.61
264										95% Modified-t UCL (Johnson-1978)		9.374
265												
266	**Gamma GOF Test**											
267					A-D Test Statistic	0.795	**Anderson-Darling Gamma GOF Test**					
268					5% A-D Critical Value	0.756	Data Not Gamma Distributed at 5% Significance Level					
269					K-S Test Statistic	0.26	**Kolmogrov-Smirnoff Gamma GOF Test**					
270					5% K-S Critical Value	0.276	Detected data appear Gamma Distributed at 5% Significance Level					
271	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
272												
273	**Gamma Statistics**											
274					k hat (MLE)	0.765				k star (bias corrected MLE)		0.602
275					Theta hat (MLE)	7.512				Theta star (bias corrected MLE)		9.543
276					nu hat (MLE)	15.29				nu star (bias corrected)		12.04
277					MLE Mean (bias corrected)	5.744				MLE Sd (bias corrected)		7.404
278										Approximate Chi Square Value (0.05)		5.251
279					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		4.497
280												
281	**Assuming Gamma Distribution**											
282				95% Approximate Gamma UCL (use when n>=50)		13.17				95% Adjusted Gamma UCL (use when n<50)		15.37
283												
284	**Lognormal GOF Test**											
285					Shapiro Wilk Test Statistic	0.82	**Shapiro Wilk Lognormal GOF Test**					
286					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
287					Lilliefors Test Statistic	0.297	**Lilliefors Lognormal GOF Test**					
288					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
289	**Data Not Lognormal at 5% Significance Level**											
290												
291	**Lognormal Statistics**											
292					Minimum of Logged Data	-0.994				Mean of logged Data		0.967
293					Maximum of Logged Data	2.821				SD of logged Data		1.513
294												
295	**Assuming Lognormal Distribution**											
296					95% H-UCL	70.07				90% Chebyshev (MVUE) UCL		17.11
297					95% Chebyshev (MVUE) UCL	21.78				97.5% Chebyshev (MVUE) UCL		28.26
298					99% Chebyshev (MVUE) UCL	40.99						
299												
300	**Nonparametric Distribution Free UCL Statistics**											
301	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
302												
303	**Nonparametric Distribution Free UCLs**											
304					95% CLT UCL	8.902				95% Jackknife UCL		9.263
305					95% Standard Bootstrap UCL	8.762				95% Bootstrap-t UCL		11.5
306					95% Hall's Bootstrap UCL	18.23				95% Percentile Bootstrap UCL		8.841
307					95% BCA Bootstrap UCL	9.423						
308					90% Chebyshev(Mean, Sd) UCL	11.5				95% Chebyshev(Mean, Sd) UCL		14.11
309					97.5% Chebyshev(Mean, Sd) UCL	17.73				99% Chebyshev(Mean, Sd) UCL		24.85
310												
311	**Suggested UCL to Use**											
312					95% Adjusted Gamma UCL	15.37						

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												
319												
320	**Cadmium**											
321												
322	**General Statistics**											
323	Total Number of Observations					10	Number of Distinct Observations					10
324							Number of Missing Observations					0
325	Minimum					0.039	Mean					10.19
326	Maximum					28.31	Median					8.725
327	SD					10.01	Std. Error of Mean					3.166
328	Coefficient of Variation					0.983	Skewness					0.526
329												
330	**Normal GOF Test**											
331	Shapiro Wilk Test Statistic					0.859	**Shapiro Wilk GOF Test**					
332	5% Shapiro Wilk Critical Value					0.842	Data appear Normal at 5% Significance Level					
333	Lilliefors Test Statistic					0.279	**Lilliefors GOF Test**					
334	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
335	**Data appear Normal at 5% Significance Level**											
336												
337	**Assuming Normal Distribution**											
338	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
339	95% Student's-t UCL					16	95% Adjusted-CLT UCL (Chen-1995)					15.96
340							95% Modified-t UCL (Johnson-1978)					16.08
341												
342	**Gamma GOF Test**											
343	A-D Test Statistic					0.513	**Anderson-Darling Gamma GOF Test**					
344	5% A-D Critical Value					0.768	Detected data appear Gamma Distributed at 5% Significance Level					
345	K-S Test Statistic					0.27	**Kolmogrov-Smirnoff Gamma GOF Test**					
346	5% K-S Critical Value					0.279	Detected data appear Gamma Distributed at 5% Significance Level					
347	**Detected data appear Gamma Distributed at 5% Significance Level**											
348												
349	**Gamma Statistics**											
350	k hat (MLE)					0.608	k star (bias corrected MLE)					0.493
351	Theta hat (MLE)					16.75	Theta star (bias corrected MLE)					20.69
352	nu hat (MLE)					12.17	nu star (bias corrected)					9.851
353	MLE Mean (bias corrected)					10.19	MLE Sd (bias corrected)					14.52
354							Approximate Chi Square Value (0.05)					3.849
355	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					3.224
356												
357	**Assuming Gamma Distribution**											
358	95% Approximate Gamma UCL (use when n>=50))					26.08	95% Adjusted Gamma UCL (use when n<50)					31.14
359												
360	**Lognormal GOF Test**											
361	Shapiro Wilk Test Statistic					0.858	**Shapiro Wilk Lognormal GOF Test**					
362	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
363	Lilliefors Test Statistic					0.252	**Lilliefors Lognormal GOF Test**					
364	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
365	Data appear Lognormal at 5% Significance Level											
366												
367	Lognormal Statistics											
368					Minimum of Logged Data	-3.244				Mean of logged Data		1.308
369					Maximum of Logged Data	3.343				SD of logged Data		2.051
370												
371	Assuming Lognormal Distribution											
372					95% H-UCL	1322				90% Chebyshev (MVUE) UCL		57.82
373					95% Chebyshev (MVUE) UCL	75.25				97.5% Chebyshev (MVUE) UCL		99.45
374					99% Chebyshev (MVUE) UCL	147						
375												
376	Nonparametric Distribution Free UCL Statistics											
377	Data appear to follow a Discernible Distribution at 5% Significance Level											
378												
379	Nonparametric Distribution Free UCLs											
380					95% CLT UCL	15.4				95% Jackknife UCL		16
381					95% Standard Bootstrap UCL	15.22				95% Bootstrap-t UCL		16.77
382					95% Hall's Bootstrap UCL	15.12				95% Percentile Bootstrap UCL		15.05
383					95% BCA Bootstrap UCL	15.46						
384					90% Chebyshev(Mean, Sd) UCL	19.69				95% Chebyshev(Mean, Sd) UCL		23.99
385					97.5% Chebyshev(Mean, Sd) UCL	29.97				99% Chebyshev(Mean, Sd) UCL		41.7
386												
387	Suggested UCL to Use											
388					95% Student's-t UCL	16						
389												
390	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
391	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
392	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
393	For additional insight the user may want to consult a statistician.											
394												
395												
396	Cesium-137											
397												
398	General Statistics											
399					Total Number of Observations	10				Number of Distinct Observations		6
400										Number of Missing Observations		0
401					Minimum	-0.00934				Mean		3.563
402					Maximum	11.2				Median		3.563
403					SD	3.384				Std. Error of Mean		1.07
404					Coefficient of Variation	0.95				Skewness		1.22
405												
406	Normal GOF Test											
407					Shapiro Wilk Test Statistic	0.83				Shapiro Wilk GOF Test		
408					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
409					Lilliefors Test Statistic	0.3				Lilliefors GOF Test		
410					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
411	Data Not Normal at 5% Significance Level											
412												
413	Assuming Normal Distribution											
414					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
415					95% Student's-t UCL	5.524				95% Adjusted-CLT UCL (Chen-1995)		5.764
416										95% Modified-t UCL (Johnson-1978)		5.593

	A	B	C	D	E	F	G	H	I	J	K	L
417	Gamma Statistics Not Available											
418	Lognormal Statistics Not Available											
419												
420	Nonparametric Distribution Free UCL Statistics											
421	Data do not follow a Discernible Distribution (0.05)											
422												
423	Nonparametric Distribution Free UCLs											
424					95% CLT UCL	5.323			95% Jackknife UCL			5.524
425					95% Standard Bootstrap UCL	5.253			95% Bootstrap-t UCL			6.184
426					95% Hall's Bootstrap UCL	15.78			95% Percentile Bootstrap UCL			5.375
427					95% BCA Bootstrap UCL	5.781						
428					90% Chebyshev(Mean, Sd) UCL	6.773			95% Chebyshev(Mean, Sd) UCL			8.228
429					97.5% Chebyshev(Mean, Sd) UCL	10.25			99% Chebyshev(Mean, Sd) UCL			14.21
430												
431	Suggested UCL to Use											
432					95% Chebyshev (Mean, Sd) UCL	8.228						
433												
434	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
435	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
436	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
437	For additional insight the user may want to consult a statistician.											
438												
439												
440	Chromium											
441												
442	General Statistics											
443					Total Number of Observations	10			Number of Distinct Observations			7
444									Number of Missing Observations			0
445					Minimum	8.2			Mean			54.65
446					Maximum	85			Median			59.4
447					SD	31.03			Std. Error of Mean			9.814
448					Coefficient of Variation	0.568			Skewness			-0.404
449												
450	Normal GOF Test											
451					Shapiro Wilk Test Statistic	0.851			Shapiro Wilk GOF Test			
452					5% Shapiro Wilk Critical Value	0.842			Data appear Normal at 5% Significance Level			
453					Lilliefors Test Statistic	0.236			Lilliefors GOF Test			
454					5% Lilliefors Critical Value	0.28			Data appear Normal at 5% Significance Level			
455	Data appear Normal at 5% Significance Level											
456												
457	Assuming Normal Distribution											
458	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
459					95% Student's-t UCL	72.64			95% Adjusted-CLT UCL (Chen-1995)			69.45
460									95% Modified-t UCL (Johnson-1978)			72.43
461												
462	Gamma GOF Test											
463					A-D Test Statistic	0.726			Anderson-Darling Gamma GOF Test			
464					5% A-D Critical Value	0.735			Detected data appear Gamma Distributed at 5% Significance Level			
465					K-S Test Statistic	0.232			Kolmogrov-Smirnoff Gamma GOF Test			
466					5% K-S Critical Value	0.27			Detected data appear Gamma Distributed at 5% Significance Level			
467	Detected data appear Gamma Distributed at 5% Significance Level											
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469						Gamma Statistics						
470					k hat (MLE)	2.215					k star (bias corrected MLE)	1.617
471					Theta hat (MLE)	24.67					Theta star (bias corrected MLE)	33.79
472					nu hat (MLE)	44.3					nu star (bias corrected)	32.35
473					MLE Mean (bias corrected)	54.65					MLE Sd (bias corrected)	42.97
474											Approximate Chi Square Value (0.05)	20.35
475					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	18.71
476												
477						Assuming Gamma Distribution						
478					95% Approximate Gamma UCL (use when n>=50))	86.87					95% Adjusted Gamma UCL (use when n<50)	94.48
479												
480						Lognormal GOF Test						
481					Shapiro Wilk Test Statistic	0.821					Shapiro Wilk Lognormal GOF Test	
482					5% Shapiro Wilk Critical Value	0.842					Data Not Lognormal at 5% Significance Level	
483					Lilliefors Test Statistic	0.247					Lilliefors Lognormal GOF Test	
484					5% Lilliefors Critical Value	0.28					Data appear Lognormal at 5% Significance Level	
485						Data appear Approximate Lognormal at 5% Significance Level						
486												
487						Lognormal Statistics						
488					Minimum of Logged Data	2.104					Mean of logged Data	3.758
489					Maximum of Logged Data	4.443					SD of logged Data	0.843
490												
491						Assuming Lognormal Distribution						
492					95% H-UCL	134.1					90% Chebyshev (MVUE) UCL	107.3
493					95% Chebyshev (MVUE) UCL	129.3					97.5% Chebyshev (MVUE) UCL	160
494					99% Chebyshev (MVUE) UCL	220.1						
495												
496						Nonparametric Distribution Free UCL Statistics						
497						Data appear to follow a Discernible Distribution at 5% Significance Level						
498												
499						Nonparametric Distribution Free UCLs						
500					95% CLT UCL	70.79					95% Jackknife UCL	72.64
501					95% Standard Bootstrap UCL	69.96					95% Bootstrap-t UCL	71.49
502					95% Hall's Bootstrap UCL	68.17					95% Percentile Bootstrap UCL	69.61
503					95% BCA Bootstrap UCL	68.73						
504					90% Chebyshev(Mean, Sd) UCL	84.09					95% Chebyshev(Mean, Sd) UCL	97.42
505					97.5% Chebyshev(Mean, Sd) UCL	115.9					99% Chebyshev(Mean, Sd) UCL	152.3
506												
507						Suggested UCL to Use						
508					95% Student's-t UCL	72.64						
509												
510						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
511						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
512						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
513						For additional insight the user may want to consult a statistician.						
514												
515						Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
516						reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.						
517												
518												
519	Cobalt											
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521	General Statistics											
522	Total Number of Observations					10	Number of Distinct Observations					7
523							Number of Missing Observations					0
524	Minimum					5.5	Mean					21.67
525	Maximum					90.5	Median					16.29
526	SD					25.19	Std. Error of Mean					7.967
527	Coefficient of Variation					1.162	Skewness					2.709
528												
529	Normal GOF Test											
530	Shapiro Wilk Test Statistic					0.609	**Shapiro Wilk GOF Test**					
531	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
532	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
533	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
534	Data Not Normal at 5% Significance Level											
535												
536	Assuming Normal Distribution											
537	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
538	95% Student's-t UCL					36.28	95% Adjusted-CLT UCL (Chen-1995)					42.07
539							95% Modified-t UCL (Johnson-1978)					37.41
540												
541	Gamma GOF Test											
542	A-D Test Statistic					0.779	**Anderson-Darling Gamma GOF Test**					
543	5% A-D Critical Value					0.74	Data Not Gamma Distributed at 5% Significance Level					
544	K-S Test Statistic					0.29	**Kolmogrov-Smirnoff Gamma GOF Test**					
545	5% K-S Critical Value					0.271	Data Not Gamma Distributed at 5% Significance Level					
546	Data Not Gamma Distributed at 5% Significance Level											
547												
548	Gamma Statistics											
549	k hat (MLE)					1.45	k star (bias corrected MLE)					1.082
550	Theta hat (MLE)					14.95	Theta star (bias corrected MLE)					20.04
551	nu hat (MLE)					29	nu star (bias corrected)					21.63
552	MLE Mean (bias corrected)					21.67	MLE Sd (bias corrected)					20.84
553							Approximate Chi Square Value (0.05)					12.06
554	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					10.84
555												
556	Assuming Gamma Distribution											
557	95% Approximate Gamma UCL (use when n>=50))					38.87	95% Adjusted Gamma UCL (use when n<50)					43.25
558												
559	Lognormal GOF Test											
560	Shapiro Wilk Test Statistic					0.884	**Shapiro Wilk Lognormal GOF Test**					
561	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
562	Lilliefors Test Statistic					0.227	**Lilliefors Lognormal GOF Test**					
563	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
564	Data appear Lognormal at 5% Significance Level											
565												
566	Lognormal Statistics											
567	Minimum of Logged Data					1.705	Mean of logged Data					2.693
568	Maximum of Logged Data					4.505	SD of logged Data					0.852
569												
570	Assuming Lognormal Distribution											
571	95% H-UCL					47.17	90% Chebyshev (MVUE) UCL					37.38
572	95% Chebyshev (MVUE) UCL					45.12	97.5% Chebyshev (MVUE) UCL					55.85

	A	B	C	D	E	F	G	H	I	J	K	L
573					99% Chebyshev (MVUE) UCL	76.95						
574												
575					Nonparametric Distribution Free UCL Statistics							
576					Data appear to follow a Discernible Distribution at 5% Significance Level							
577												
578					Nonparametric Distribution Free UCLs							
579					95% CLT UCL	34.78				95% Jackknife UCL		36.28
580					95% Standard Bootstrap UCL	34.1				95% Bootstrap-t UCL		57.03
581					95% Hall's Bootstrap UCL	83.82				95% Percentile Bootstrap UCL		36.52
582					95% BCA Bootstrap UCL	42.93						
583					90% Chebyshev(Mean, Sd) UCL	45.57				95% Chebyshev(Mean, Sd) UCL		56.4
584					97.5% Chebyshev(Mean, Sd) UCL	71.43				99% Chebyshev(Mean, Sd) UCL		100.9
585												
586					Suggested UCL to Use							
587					95% H-UCL	47.17						
588												
589					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
590					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
591					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
592					For additional insight the user may want to consult a statistician.							
593												
594					ProUCL computes and outputs H-statistic based UCLs for historical reasons only.							
595					H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.							
596					It is therefore recommended to avoid the use of H-statistic based 95% UCLs.							
597					Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.							
598												
599												
600	Iron											
601												
602					General Statistics							
603					Total Number of Observations	10				Number of Distinct Observations		10
604										Number of Missing Observations		0
605					Minimum	6162				Mean		24313
606					Maximum	85100				Median		17713
607					SD	23538				Std. Error of Mean		7443
608					Coefficient of Variation	0.968				Skewness		2.294
609												
610					Normal GOF Test							
611					Shapiro Wilk Test Statistic	0.705				Shapiro Wilk GOF Test		
612					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
613					Lilliefors Test Statistic	0.334				Lilliefors GOF Test		
614					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
615					Data Not Normal at 5% Significance Level							
616												
617					Assuming Normal Distribution							
618					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
619					95% Student's-t UCL	37958				95% Adjusted-CLT UCL (Chen-1995)		42326
620										95% Modified-t UCL (Johnson-1978)		38858
621												
622					Gamma GOF Test							
623					A-D Test Statistic	0.572				Anderson-Darling Gamma GOF Test		
624					5% A-D Critical Value	0.737				Detected data appear Gamma Distributed at 5% Significance Level		

625					K-S Test Statistic	0.246	**Kolmogrov-Smirnoff Gamma GOF Test**					
626					5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level					
627	**Detected data appear Gamma Distributed at 5% Significance Level**											
628												
629	**Gamma Statistics**											
630					k hat (MLE)	1.831	k star (bias corrected MLE)					1.348
631					Theta hat (MLE)	13280	Theta star (bias corrected MLE)					18033
632					nu hat (MLE)	36.62	nu star (bias corrected)					26.96
633					MLE Mean (bias corrected)	24313	MLE Sd (bias corrected)					20939
634							Approximate Chi Square Value (0.05)					16.12
635					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					14.68
636												
637	**Assuming Gamma Distribution**											
638					95% Approximate Gamma UCL (use when n>=50)	40659	95% Adjusted Gamma UCL (use when n<50)					44645
639												
640	**Lognormal GOF Test**											
641					Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**					
642					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
643					Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**					
644					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
645	**Data appear Lognormal at 5% Significance Level**											
646												
647	**Lognormal Statistics**											
648					Minimum of Logged Data	8.726	Mean of logged Data					9.801
649					Maximum of Logged Data	11.35	SD of logged Data					0.765
650												
651	**Assuming Lognormal Distribution**											
652					95% H-UCL	47502	90% Chebyshev (MVUE) UCL					40905
653					95% Chebyshev (MVUE) UCL	48853	97.5% Chebyshev (MVUE) UCL					59884
654					99% Chebyshev (MVUE) UCL	81553						
655												
656	**Nonparametric Distribution Free UCL Statistics**											
657	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
658												
659	**Nonparametric Distribution Free UCLs**											
660					95% CLT UCL	36557	95% Jackknife UCL					37958
661					95% Standard Bootstrap UCL	35937	95% Bootstrap-t UCL					66455
662					95% Hall's Bootstrap UCL	102130	95% Percentile Bootstrap UCL					37417
663					95% BCA Bootstrap UCL	42194						
664					90% Chebyshev(Mean, Sd) UCL	46644	95% Chebyshev(Mean, Sd) UCL					56759
665					97.5% Chebyshev(Mean, Sd) UCL	70798	99% Chebyshev(Mean, Sd) UCL					98374
666												
667	**Suggested UCL to Use**											
668					95% Adjusted Gamma UCL	44645						
669												
670	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
671	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
672	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
673	For additional insight the user may want to consult a statistician.											
674												
675												
676	**Manganese**											

	A	B	C	D	E	F	G	H	I	J	K	L
677												
678						General Statistics						
679					Total Number of Observations	10				Number of Distinct Observations		10
680										Number of Missing Observations		0
681					Minimum	201.4				Mean		662.1
682					Maximum	1506				Median		531
683					SD	433.8				Std. Error of Mean		137.2
684					Coefficient of Variation	0.655				Skewness		0.966
685												
686						Normal GOF Test						
687					Shapiro Wilk Test Statistic	0.899				Shapiro Wilk GOF Test		
688					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
689					Lilliefors Test Statistic	0.201				Lilliefors GOF Test		
690					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
691						Data appear Normal at 5% Significance Level						
692												
693						Assuming Normal Distribution						
694					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
695					95% Student's-t UCL	913.6				95% Adjusted-CLT UCL (Chen-1995)		932.6
696										95% Modified-t UCL (Johnson-1978)		920.6
697												
698						Gamma GOF Test						
699					A-D Test Statistic	0.236				Anderson-Darling Gamma GOF Test		
700					5% A-D Critical Value	0.733				Detected data appear Gamma Distributed at 5% Significance Level		
701					K-S Test Statistic	0.133				Kolmogrov-Smirnoff Gamma GOF Test		
702					5% K-S Critical Value	0.269				Detected data appear Gamma Distributed at 5% Significance Level		
703						Detected data appear Gamma Distributed at 5% Significance Level						
704												
705						Gamma Statistics						
706					k hat (MLE)	2.684				k star (bias corrected MLE)		1.945
707					Theta hat (MLE)	246.7				Theta star (bias corrected MLE)		340.4
708					nu hat (MLE)	53.67				nu star (bias corrected)		38.91
709					MLE Mean (bias corrected)	662.1				MLE Sd (bias corrected)		474.7
710										Approximate Chi Square Value (0.05)		25.62
711					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		23.76
712												
713						Assuming Gamma Distribution						
714					95% Approximate Gamma UCL (use when n>=50))	1006				95% Adjusted Gamma UCL (use when n<50)		1084
715												
716						Lognormal GOF Test						
717					Shapiro Wilk Test Statistic	0.957				Shapiro Wilk Lognormal GOF Test		
718					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
719					Lilliefors Test Statistic	0.119				Lilliefors Lognormal GOF Test		
720					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
721						Data appear Lognormal at 5% Significance Level						
722												
723						Lognormal Statistics						
724					Minimum of Logged Data	5.305				Mean of logged Data		6.298
725					Maximum of Logged Data	7.317				SD of logged Data		0.677
726												
727						Assuming Lognormal Distribution						
728					95% H-UCL	1199				90% Chebyshev (MVUE) UCL		1105

729	95% Chebyshev (MVUE) UCL					1304	97.5% Chebyshev (MVUE) UCL					1580
730	99% Chebyshev (MVUE) UCL					2123						
731												
732	**Nonparametric Distribution Free UCL Statistics**											
733	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
734												
735	**Nonparametric Distribution Free UCLs**											
736	95% CLT UCL					887.8	95% Jackknife UCL					913.6
737	95% Standard Bootstrap UCL					872.4	95% Bootstrap-t UCL					1016
738	95% Hall's Bootstrap UCL					1033	95% Percentile Bootstrap UCL					874
739	95% BCA Bootstrap UCL					924.9						
740	90% Chebyshev(Mean, Sd) UCL					1074	95% Chebyshev(Mean, Sd) UCL					1260
741	97.5% Chebyshev(Mean, Sd) UCL					1519	99% Chebyshev(Mean, Sd) UCL					2027
742												
743	**Suggested UCL to Use**											
744	95% Student's-t UCL					913.6						
745												
746	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
747	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
748	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
749	For additional insight the user may want to consult a statistician.											
750												
751												
752	**Mercury**											
753												
754	**General Statistics**											
755	Total Number of Observations					10	Number of Distinct Observations					7
756							Number of Missing Observations					0
757	Minimum					0.023	Mean					5.441
758	Maximum					14.04	Median					5.056
759	SD					5.784	Std. Error of Mean					1.829
760	Coefficient of Variation					1.063	Skewness					0.174
761												
762	**Normal GOF Test**											
763	Shapiro Wilk Test Statistic					0.752	**Shapiro Wilk GOF Test**					
764	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
765	Lilliefors Test Statistic					0.322	**Lilliefors GOF Test**					
766	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
767	**Data Not Normal at 5% Significance Level**											
768												
769	**Assuming Normal Distribution**											
770	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
771	95% Student's-t UCL					8.794	95% Adjusted-CLT UCL (Chen-1995)					8.557
772							95% Modified-t UCL (Johnson-1978)					8.811
773												
774	**Gamma GOF Test**											
775	A-D Test Statistic					1.309	**Anderson-Darling Gamma GOF Test**					
776	5% A-D Critical Value					0.804	Data Not Gamma Distributed at 5% Significance Level					
777	K-S Test Statistic					0.327	**Kolmogrov-Smirnoff Gamma GOF Test**					
778	5% K-S Critical Value					0.286	Data Not Gamma Distributed at 5% Significance Level					
779	**Data Not Gamma Distributed at 5% Significance Level**											
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781						Gamma Statistics						
782					k hat (MLE)	0.353					k star (bias corrected MLE)	0.314
783					Theta hat (MLE)	15.41					Theta star (bias corrected MLE)	17.34
784					nu hat (MLE)	7.062					nu star (bias corrected)	6.277
785					MLE Mean (bias corrected)	5.441					MLE Sd (bias corrected)	9.712
786											Approximate Chi Square Value (0.05)	1.783
787					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	1.399
788												
789						Assuming Gamma Distribution						
790				95% Approximate Gamma UCL (use when n>=50))		19.15					95% Adjusted Gamma UCL (use when n<50)	24.41
791												
792						Lognormal GOF Test						
793					Shapiro Wilk Test Statistic	0.77					Shapiro Wilk Lognormal GOF Test	
794					5% Shapiro Wilk Critical Value	0.842					Data Not Lognormal at 5% Significance Level	
795					Lilliefors Test Statistic	0.318					Lilliefors Lognormal GOF Test	
796					5% Lilliefors Critical Value	0.28					Data Not Lognormal at 5% Significance Level	
797						Data Not Lognormal at 5% Significance Level						
798												
799						Lognormal Statistics						
800					Minimum of Logged Data	-3.772					Mean of logged Data	-0.208
801					Maximum of Logged Data	2.642					SD of logged Data	2.761
802												
803						Assuming Lognormal Distribution						
804					95% H-UCL	29529					90% Chebyshev (MVUE) UCL	44.74
805					95% Chebyshev (MVUE) UCL	59.13					97.5% Chebyshev (MVUE) UCL	79.1
806					99% Chebyshev (MVUE) UCL	118.3						
807												
808						Nonparametric Distribution Free UCL Statistics						
809						Data do not follow a Discernible Distribution (0.05)						
810												
811						Nonparametric Distribution Free UCLs						
812					95% CLT UCL	8.449					95% Jackknife UCL	8.794
813					95% Standard Bootstrap UCL	8.286					95% Bootstrap-t UCL	8.785
814					95% Hall's Bootstrap UCL	7.83					95% Percentile Bootstrap UCL	8.235
815					95% BCA Bootstrap UCL	8.425						
816					90% Chebyshev(Mean, Sd) UCL	10.93					95% Chebyshev(Mean, Sd) UCL	13.41
817					97.5% Chebyshev(Mean, Sd) UCL	16.86					99% Chebyshev(Mean, Sd) UCL	23.64
818												
819						Suggested UCL to Use						
820					99% Chebyshev (Mean, Sd) UCL	23.64						
821												
822						Recommended UCL exceeds the maximum observation						
823												
824						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
825						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
826						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
827						For additional insight the user may want to consult a statistician.						
828												
829												
830	Neptunium-237											
831												
832						General Statistics						

	A	B	C	D	E	F	G	H	I	J	K	L
833					Total Number of Observations	10					Number of Distinct Observations	5
834											Number of Missing Observations	0
835					Minimum	0.00303					Mean	0.119
836					Maximum	0.26					Median	0.119
837					SD	0.0616					Std. Error of Mean	0.0195
838					Coefficient of Variation	0.519					Skewness	0.742
839												
840					Normal GOF Test							
841					Shapiro Wilk Test Statistic	0.765			Shapiro Wilk GOF Test			
842					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
843					Lilliefors Test Statistic	0.322			Lilliefors GOF Test			
844					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
845					Data Not Normal at 5% Significance Level							
846												
847					Assuming Normal Distribution							
848				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
849					95% Student's-t UCL	0.155			95% Adjusted-CLT UCL (Chen-1995)			0.156
850									95% Modified-t UCL (Johnson-1978)			0.155
851												
852					Gamma GOF Test							
853					A-D Test Statistic	1.834			Anderson-Darling Gamma GOF Test			
854					5% A-D Critical Value	0.737			Data Not Gamma Distributed at 5% Significance Level			
855					K-S Test Statistic	0.415			Kolmogrov-Smirnoff Gamma GOF Test			
856					5% K-S Critical Value	0.27			Data Not Gamma Distributed at 5% Significance Level			
857					Data Not Gamma Distributed at 5% Significance Level							
858												
859					Gamma Statistics							
860					k hat (MLE)	1.744			k star (bias corrected MLE)			1.288
861					Theta hat (MLE)	0.0681			Theta star (bias corrected MLE)			0.0923
862					nu hat (MLE)	34.88			nu star (bias corrected)			25.75
863					MLE Mean (bias corrected)	0.119			MLE Sd (bias corrected)			0.105
864									Approximate Chi Square Value (0.05)			15.19
865					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			13.8
866												
867					Assuming Gamma Distribution							
868					95% Approximate Gamma UCL (use when n>=50))	0.201			95% Adjusted Gamma UCL (use when n<50)			0.222
869												
870					Lognormal GOF Test							
871					Shapiro Wilk Test Statistic	0.546			Shapiro Wilk Lognormal GOF Test			
872					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
873					Lilliefors Test Statistic	0.446			Lilliefors Lognormal GOF Test			
874					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
875					Data Not Lognormal at 5% Significance Level							
876												
877					Lognormal Statistics							
878					Minimum of Logged Data	-5.799			Mean of logged Data			-2.444
879					Maximum of Logged Data	-1.347			SD of logged Data			1.209
880												
881					Assuming Lognormal Distribution							
882					95% H-UCL	0.754			90% Chebyshev (MVUE) UCL			0.358
883					95% Chebyshev (MVUE) UCL	0.447			97.5% Chebyshev (MVUE) UCL			0.57
884					99% Chebyshev (MVUE) UCL	0.813						

	A	B	C	D	E	F	G	H	I	J	K	L
885												
886						Nonparametric Distribution Free UCL Statistics						
887						Data do not follow a Discernible Distribution (0.05)						
888												
889						Nonparametric Distribution Free UCLs						
890					95% CLT UCL	0.151				95% Jackknife UCL		0.155
891					95% Standard Bootstrap UCL	0.15				95% Bootstrap-t UCL		0.157
892					95% Hall's Bootstrap UCL	0.194				95% Percentile Bootstrap UCL		0.148
893					95% BCA Bootstrap UCL	0.157						
894					90% Chebyshev(Mean, Sd) UCL	0.177				95% Chebyshev(Mean, Sd) UCL		0.204
895					97.5% Chebyshev(Mean, Sd) UCL	0.241				99% Chebyshev(Mean, Sd) UCL		0.313
896												
897						Suggested UCL to Use						
898					95% Chebyshev (Mean, Sd) UCL	0.204						
899												
900					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
901					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
902					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
903					For additional insight the user may want to consult a statistician.							
904												
905												
906	Nickel											
907												
908						General Statistics						
909					Total Number of Observations	10				Number of Distinct Observations		7
910										Number of Missing Observations		0
911					Minimum	14				Mean		60.64
912					Maximum	188				Median		65
913					SD	50.33				Std. Error of Mean		15.91
914					Coefficient of Variation	0.83				Skewness		1.974
915												
916						Normal GOF Test						
917					Shapiro Wilk Test Statistic	0.752				Shapiro Wilk GOF Test		
918					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
919					Lilliefors Test Statistic	0.297				Lilliefors GOF Test		
920					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
921						Data Not Normal at 5% Significance Level						
922												
923						Assuming Normal Distribution						
924					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
925					95% Student's-t UCL	89.81				95% Adjusted-CLT UCL (Chen-1995)		97.43
926										95% Modified-t UCL (Johnson-1978)		91.47
927												
928						Gamma GOF Test						
929					A-D Test Statistic	0.618				Anderson-Darling Gamma GOF Test		
930					5% A-D Critical Value	0.736				Detected data appear Gamma Distributed at 5% Significance Level		
931					K-S Test Statistic	0.232				Kolmogrov-Smirnoff Gamma GOF Test		
932					5% K-S Critical Value	0.27				Detected data appear Gamma Distributed at 5% Significance Level		
933						Detected data appear Gamma Distributed at 5% Significance Level						
934												
935						Gamma Statistics						
936					k hat (MLE)	1.99				k star (bias corrected MLE)		1.46

	A	B	C	D	E	F	G	H	I	J	K	L
937					Theta hat (MLE)	30.47					Theta star (bias corrected MLE)	41.54
938					nu hat (MLE)	39.8					nu star (bias corrected)	29.2
939					MLE Mean (bias corrected)	60.64					MLE Sd (bias corrected)	50.19
940											Approximate Chi Square Value (0.05)	17.86
941					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	16.34
942												
943					**Assuming Gamma Distribution**							
944					95% Approximate Gamma UCL (use when n>=50)	99.11					95% Adjusted Gamma UCL (use when n<50)	108.4
945												
946					**Lognormal GOF Test**							
947					Shapiro Wilk Test Statistic	0.91			**Shapiro Wilk Lognormal GOF Test**			
948					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
949					Lilliefors Test Statistic	0.269			**Lilliefors Lognormal GOF Test**			
950					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
951					**Data appear Lognormal at 5% Significance Level**							
952												
953					**Lognormal Statistics**							
954					Minimum of Logged Data	2.639					Mean of logged Data	3.833
955					Maximum of Logged Data	5.236					SD of logged Data	0.782
956												
957					**Assuming Lognormal Distribution**							
958					95% H-UCL	126.1					90% Chebyshev (MVUE) UCL	107
959					95% Chebyshev (MVUE) UCL	128					97.5% Chebyshev (MVUE) UCL	157.2
960					99% Chebyshev (MVUE) UCL	214.7						
961												
962					**Nonparametric Distribution Free UCL Statistics**							
963					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
964												
965					**Nonparametric Distribution Free UCLs**							
966					95% CLT UCL	86.81					95% Jackknife UCL	89.81
967					95% Standard Bootstrap UCL	85.44					95% Bootstrap-t UCL	108.5
968					95% Hall's Bootstrap UCL	200.5					95% Percentile Bootstrap UCL	87.76
969					95% BCA Bootstrap UCL	95.77						
970					90% Chebyshev(Mean, Sd) UCL	108.4					95% Chebyshev(Mean, Sd) UCL	130
971					97.5% Chebyshev(Mean, Sd) UCL	160					99% Chebyshev(Mean, Sd) UCL	219
972												
973					**Suggested UCL to Use**							
974					95% Adjusted Gamma UCL	108.4						
975												
976					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
977					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
978					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
979					For additional insight the user may want to consult a statistician.							
980												
981												
982	**PAH, Total**											
983												
984					**General Statistics**							
985					Total Number of Observations	10					Number of Distinct Observations	6
986											Number of Missing Observations	0
987					Minimum	0.0076					Mean	0.288
988					Maximum	0.5					Median	0.288

	A	B	C	D	E	F	G	H	I	J	K	L
989					SD	0.167					Std. Error of Mean	0.0528
990					Coefficient of Variation	0.579					Skewness	-0.635
991												
992					Normal GOF Test							
993					Shapiro Wilk Test Statistic	0.856	Shapiro Wilk GOF Test					
994					5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level					
995					Lilliefors Test Statistic	0.3	Lilliefors GOF Test					
996					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
997					Data appear Approximate Normal at 5% Significance Level							
998												
999					Assuming Normal Distribution							
1000			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
1001					95% Student's-t UCL	0.385					95% Adjusted-CLT UCL (Chen-1995)	0.364
1002											95% Modified-t UCL (Johnson-1978)	0.383
1003												
1004					Gamma GOF Test							
1005					A-D Test Statistic	1.424	Anderson-Darling Gamma GOF Test					
1006					5% A-D Critical Value	0.745	Data Not Gamma Distributed at 5% Significance Level					
1007					K-S Test Statistic	0.421	Kolmogrov-Smirnoff Gamma GOF Test					
1008					5% K-S Critical Value	0.273	Data Not Gamma Distributed at 5% Significance Level					
1009					Data Not Gamma Distributed at 5% Significance Level							
1010												
1011					Gamma Statistics							
1012					k hat (MLE)	1.203					k star (bias corrected MLE)	0.909
1013					Theta hat (MLE)	0.24					Theta star (bias corrected MLE)	0.317
1014					nu hat (MLE)	24.06					nu star (bias corrected)	18.17
1015					MLE Mean (bias corrected)	0.288					MLE Sd (bias corrected)	0.302
1016											Approximate Chi Square Value (0.05)	9.517
1017					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	8.449
1018												
1019					Assuming Gamma Distribution							
1020					95% Approximate Gamma UCL (use when n>=50))	0.55					95% Adjusted Gamma UCL (use when n<50)	0.62
1021												
1022					Lognormal GOF Test							
1023					Shapiro Wilk Test Statistic	0.672	Shapiro Wilk Lognormal GOF Test					
1024					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
1025					Lilliefors Test Statistic	0.43	Lilliefors Lognormal GOF Test					
1026					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
1027					Data Not Lognormal at 5% Significance Level							
1028												
1029					Lognormal Statistics							
1030					Minimum of Logged Data	-4.88					Mean of logged Data	-1.714
1031					Maximum of Logged Data	-0.693					SD of logged Data	1.419
1032												
1033					Assuming Lognormal Distribution							
1034					95% H-UCL	3.297					90% Chebyshev (MVUE) UCL	1.013
1035					95% Chebyshev (MVUE) UCL	1.283					97.5% Chebyshev (MVUE) UCL	1.657
1036					99% Chebyshev (MVUE) UCL	2.392						
1037												
1038					Nonparametric Distribution Free UCL Statistics							
1039					Data appear to follow a Discernible Distribution at 5% Significance Level							
1040												

	A	B	C	D	E	F	G	H	I	J	K	L
1041	**Nonparametric Distribution Free UCLs**											
1042					95% CLT UCL	0.375				95% Jackknife UCL		0.385
1043					95% Standard Bootstrap UCL	0.372				95% Bootstrap-t UCL		0.376
1044					95% Hall's Bootstrap UCL	0.364				95% Percentile Bootstrap UCL		0.367
1045					95% BCA Bootstrap UCL	0.369						
1046					90% Chebyshev(Mean, Sd) UCL	0.446				95% Chebyshev(Mean, Sd) UCL		0.518
1047					97.5% Chebyshev(Mean, Sd) UCL	0.618				99% Chebyshev(Mean, Sd) UCL		0.813
1048												
1049	**Suggested UCL to Use**											
1050					95% Student's-t UCL	0.385						
1051												
1052	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1053	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1054	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1055	For additional insight the user may want to consult a statistician.											
1056												
1057	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1058	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1059												
1060												
1061	**PCB, Total**											
1062												
1063	**General Statistics**											
1064					Total Number of Observations	10				Number of Distinct Observations		6
1065										Number of Missing Observations		0
1066					Minimum	0.021				Mean		2.158
1067					Maximum	5				Median		0.7
1068					SD	2.459				Std. Error of Mean		0.778
1069					Coefficient of Variation	1.139				Skewness		0.446
1070												
1071	**Normal GOF Test**											
1072					Shapiro Wilk Test Statistic	0.698				**Shapiro Wilk GOF Test**		
1073					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
1074					Lilliefors Test Statistic	0.308				**Lilliefors GOF Test**		
1075					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
1076	**Data Not Normal at 5% Significance Level**											
1077												
1078	**Assuming Normal Distribution**											
1079					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1080					95% Student's-t UCL	3.584				95% Adjusted-CLT UCL (Chen-1995)		3.555
1081										95% Modified-t UCL (Johnson-1978)		3.602
1082												
1083	**Gamma GOF Test**											
1084					A-D Test Statistic	0.82				**Anderson-Darling Gamma GOF Test**		
1085					5% A-D Critical Value	0.79				Data Not Gamma Distributed at 5% Significance Level		
1086					K-S Test Statistic	0.269				**Kolmogrov-Smirnoff Gamma GOF Test**		
1087					5% K-S Critical Value	0.283				Detected data appear Gamma Distributed at 5% Significance Level		
1088	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
1089												
1090	**Gamma Statistics**											
1091					k hat (MLE)	0.43				k star (bias corrected MLE)		0.368
1092					Theta hat (MLE)	5.015				Theta star (bias corrected MLE)		5.866

	A	B	C	D	E	F	G	H	I	J	K	L
1093					nu hat (MLE)	8.607					nu star (bias corrected)	7.358
1094					MLE Mean (bias corrected)	2.158					MLE Sd (bias corrected)	3.558
1095											Approximate Chi Square Value (0.05)	2.369
1096					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	1.908
1097												
1098					**Assuming Gamma Distribution**							
1099					95% Approximate Gamma UCL (use when n>=50)	6.703					95% Adjusted Gamma UCL (use when n<50)	8.325
1100												
1101					**Lognormal GOF Test**							
1102					Shapiro Wilk Test Statistic	0.831			**Shapiro Wilk Lognormal GOF Test**			
1103					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
1104					Lilliefors Test Statistic	0.241			**Lilliefors Lognormal GOF Test**			
1105					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
1106					**Data appear Approximate Lognormal at 5% Significance Level**							
1107												
1108					**Lognormal Statistics**							
1109					Minimum of Logged Data	-3.863					Mean of logged Data	-0.742
1110					Maximum of Logged Data	1.609					SD of logged Data	2.351
1111												
1112					**Assuming Lognormal Distribution**							
1113					95% H-UCL	1014					90% Chebyshev (MVUE) UCL	12.51
1114					95% Chebyshev (MVUE) UCL	16.41					97.5% Chebyshev (MVUE) UCL	21.83
1115					99% Chebyshev (MVUE) UCL	32.46						
1116												
1117					**Nonparametric Distribution Free UCL Statistics**							
1118					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
1119												
1120					**Nonparametric Distribution Free UCLs**							
1121					95% CLT UCL	3.437					95% Jackknife UCL	3.584
1122					95% Standard Bootstrap UCL	3.345					95% Bootstrap-t UCL	3.434
1123					95% Hall's Bootstrap UCL	3.049					95% Percentile Bootstrap UCL	3.509
1124					95% BCA Bootstrap UCL	3.52						
1125					90% Chebyshev(Mean, Sd) UCL	4.491					95% Chebyshev(Mean, Sd) UCL	5.548
1126					97.5% Chebyshev(Mean, Sd) UCL	7.015					99% Chebyshev(Mean, Sd) UCL	9.896
1127												
1128					**Suggested UCL to Use**							
1129					95% Adjusted Gamma UCL	8.325						
1130												
1131					**Recommended UCL exceeds the maximum observation**							
1132												
1133					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1134					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1135					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1136					For additional insight the user may want to consult a statistician.							
1137												
1138												
1139	**Radium-228**											
1140												
1141					**General Statistics**							
1142					Total Number of Observations	10					Number of Distinct Observations	1
1143											Number of Missing Observations	0
1144					Minimum	1.69					Mean	1.69

	A	B	C	D	E	F	G	H	I	J	K	L
1145					Maximum	1.69					Median	1.69
1146												
1147	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
1148	ProUCL (or any other software) should not be used on such a data set!											
1149	The data set for variable Radium-228 was not processed!											
1150												
1151	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
1152	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
1153												
1154												
1155												
1156	Thallium											
1157												
1158	General Statistics											
1159					Total Number of Observations	10	Number of Distinct Observations					7
1160							Number of Missing Observations					0
1161					Minimum	0.095	Mean					5.38
1162					Maximum	17.1	Median					5.38
1163					SD	5.894	Std. Error of Mean					1.864
1164					Coefficient of Variation	1.096	Skewness					1.157
1165												
1166	Normal GOF Test											
1167					Shapiro Wilk Test Statistic	0.813	Shapiro Wilk GOF Test					
1168					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
1169					Lilliefors Test Statistic	0.3	Lilliefors GOF Test					
1170					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
1171	Data Not Normal at 5% Significance Level											
1172												
1173	Assuming Normal Distribution											
1174	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1175					95% Student's-t UCL	8.796	95% Adjusted-CLT UCL (Chen-1995)					9.174
1176							95% Modified-t UCL (Johnson-1978)					8.91
1177												
1178	Gamma GOF Test											
1179					A-D Test Statistic	0.57	Anderson-Darling Gamma GOF Test					
1180					5% A-D Critical Value	0.77	Detected data appear Gamma Distributed at 5% Significance Level					
1181					K-S Test Statistic	0.27	Kolmogrov-Smirnoff Gamma GOF Test					
1182					5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level					
1183	Detected data appear Gamma Distributed at 5% Significance Level											
1184												
1185	Gamma Statistics											
1186					k hat (MLE)	0.586	k star (bias corrected MLE)					0.477
1187					Theta hat (MLE)	9.175	Theta star (bias corrected MLE)					11.28
1188					nu hat (MLE)	11.73	nu star (bias corrected)					9.542
1189					MLE Mean (bias corrected)	5.38	MLE Sd (bias corrected)					7.788
1190							Approximate Chi Square Value (0.05)					3.657
1191					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					3.052
1192												
1193	Assuming Gamma Distribution											
1194					95% Approximate Gamma UCL (use when n>=50)	14.03	95% Adjusted Gamma UCL (use when n<50)					16.82
1195												
1196	Lognormal GOF Test											

1197	Shapiro Wilk Test Statistic	0.859	**Shapiro Wilk Lognormal GOF Test**	
1198	5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level	
1199	Lilliefors Test Statistic	0.307	**Lilliefors Lognormal GOF Test**	
1200	5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level	
1201	**Data appear Approximate Lognormal at 5% Significance Level**			
1202				
1203	**Lognormal Statistics**			
1204	Minimum of Logged Data	-2.354	Mean of logged Data	0.625
1205	Maximum of Logged Data	2.839	SD of logged Data	1.943
1206				
1207	**Assuming Lognormal Distribution**			
1208	95% H-UCL	370.9	90% Chebyshev (MVUE) UCL	24.31
1209	95% Chebyshev (MVUE) UCL	31.53	97.5% Chebyshev (MVUE) UCL	41.55
1210	99% Chebyshev (MVUE) UCL	61.24		
1211				
1212	**Nonparametric Distribution Free UCL Statistics**			
1213	**Data appear to follow a Discernible Distribution at 5% Significance Level**			
1214				
1215	**Nonparametric Distribution Free UCLs**			
1216	95% CLT UCL	8.445	95% Jackknife UCL	8.796
1217	95% Standard Bootstrap UCL	8.257	95% Bootstrap-t UCL	10.96
1218	95% Hall's Bootstrap UCL	28.24	95% Percentile Bootstrap UCL	8.394
1219	95% BCA Bootstrap UCL	9.013		
1220	90% Chebyshev(Mean, Sd) UCL	10.97	95% Chebyshev(Mean, Sd) UCL	13.5
1221	97.5% Chebyshev(Mean, Sd) UCL	17.02	99% Chebyshev(Mean, Sd) UCL	23.93
1222				
1223	**Suggested UCL to Use**			
1224	95% Adjusted Gamma UCL	16.82		
1225				
1226	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1227	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)			
1228	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.			
1229	For additional insight the user may want to consult a statistician.			
1230				
1231				
1232	**Thorium-230**			
1233				
1234	**General Statistics**			
1235	Total Number of Observations	10	Number of Distinct Observations	6
1236			Number of Missing Observations	0
1237	Minimum	1.14	Mean	2.316
1238	Maximum	5.42	Median	2.316
1239	SD	1.207	Std. Error of Mean	0.382
1240	Coefficient of Variation	0.521	Skewness	2.063
1241				
1242	**Normal GOF Test**			
1243	Shapiro Wilk Test Statistic	0.711	**Shapiro Wilk GOF Test**	
1244	5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level	
1245	Lilliefors Test Statistic	0.366	**Lilliefors GOF Test**	
1246	5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level	
1247	**Data Not Normal at 5% Significance Level**			
1248				

	A	B	C	D	E	F	G	H	I	J	K	L
1249	Assuming Normal Distribution											
1250	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1251					95% Student's-t UCL	3.016				95% Adjusted-CLT UCL (Chen-1995)		3.21
1252										95% Modified-t UCL (Johnson-1978)		3.057
1253												
1254	Gamma GOF Test											
1255					A-D Test Statistic	0.969	Anderson-Darling Gamma GOF Test					
1256					5% A-D Critical Value	0.729	Data Not Gamma Distributed at 5% Significance Level					
1257					K-S Test Statistic	0.303	Kolmogrov-Smirnoff Gamma GOF Test					
1258					5% K-S Critical Value	0.267	Data Not Gamma Distributed at 5% Significance Level					
1259	Data Not Gamma Distributed at 5% Significance Level											
1260												
1261	Gamma Statistics											
1262					k hat (MLE)	5.286				k star (bias corrected MLE)		3.767
1263					Theta hat (MLE)	0.438				Theta star (bias corrected MLE)		0.615
1264					nu hat (MLE)	105.7				nu star (bias corrected)		75.34
1265					MLE Mean (bias corrected)	2.316				MLE Sd (bias corrected)		1.193
1266										Approximate Chi Square Value (0.05)		56.35
1267					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		53.51
1268												
1269	Assuming Gamma Distribution											
1270				95% Approximate Gamma UCL (use when n>=50))		3.097				95% Adjusted Gamma UCL (use when n<50)		3.261
1271												
1272	Lognormal GOF Test											
1273					Shapiro Wilk Test Statistic	0.837	Shapiro Wilk Lognormal GOF Test					
1274					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
1275					Lilliefors Test Statistic	0.286	Lilliefors Lognormal GOF Test					
1276					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
1277	Data Not Lognormal at 5% Significance Level											
1278												
1279	Lognormal Statistics											
1280					Minimum of Logged Data	0.131				Mean of logged Data		0.742
1281					Maximum of Logged Data	1.69				SD of logged Data		0.449
1282												
1283	Assuming Lognormal Distribution											
1284					95% H-UCL	3.208				90% Chebyshev (MVUE) UCL		3.294
1285					95% Chebyshev (MVUE) UCL	3.744				97.5% Chebyshev (MVUE) UCL		4.37
1286					99% Chebyshev (MVUE) UCL	5.598						
1287												
1288	Nonparametric Distribution Free UCL Statistics											
1289	Data do not follow a Discernible Distribution (0.05)											
1290												
1291	Nonparametric Distribution Free UCLs											
1292					95% CLT UCL	2.944				95% Jackknife UCL		3.016
1293					95% Standard Bootstrap UCL	2.901				95% Bootstrap-t UCL		3.409
1294					95% Hall's Bootstrap UCL	5.805				95% Percentile Bootstrap UCL		2.958
1295					95% BCA Bootstrap UCL	3.166						
1296					90% Chebyshev(Mean, Sd) UCL	3.461				95% Chebyshev(Mean, Sd) UCL		3.98
1297					97.5% Chebyshev(Mean, Sd) UCL	4.7				99% Chebyshev(Mean, Sd) UCL		6.114
1298												
1299	Suggested UCL to Use											
1300					95% Student's-t UCL	3.016				or 95% Modified-t UCL		3.057

	A	B	C	D	E	F	G	H	I	J	K	L
1301												
1302	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1303	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1304	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1305	For additional insight the user may want to consult a statistician.											
1306												
1307												
1308	**Uranium**											
1309												
1310	**General Statistics**											
1311	Total Number of Observations					10	Number of Distinct Observations					6
1312							Number of Missing Observations					0
1313	Minimum					1.9	Mean					118.5
1314	Maximum					1050	Median					20
1315	SD					327.4	Std. Error of Mean					103.5
1316	Coefficient of Variation					2.764	Skewness					3.158
1317												
1318	**Normal GOF Test**											
1319	Shapiro Wilk Test Statistic					0.389	**Shapiro Wilk GOF Test**					
1320	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
1321	Lilliefors Test Statistic					0.508	**Lilliefors GOF Test**					
1322	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
1323	**Data Not Normal at 5% Significance Level**											
1324												
1325	**Assuming Normal Distribution**											
1326	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1327	95% Student's-t UCL					308.3	95% Adjusted-CLT UCL (Chen-1995)					399.3
1328							95% Modified-t UCL (Johnson-1978)					325.5
1329												
1330	**Gamma GOF Test**											
1331	A-D Test Statistic					1.896	**Anderson-Darling Gamma GOF Test**					
1332	5% A-D Critical Value					0.803	Data Not Gamma Distributed at 5% Significance Level					
1333	K-S Test Statistic					0.442	**Kolmogrov-Smirnoff Gamma GOF Test**					
1334	5% K-S Critical Value					0.286	Data Not Gamma Distributed at 5% Significance Level					
1335	**Data Not Gamma Distributed at 5% Significance Level**											
1336												
1337	**Gamma Statistics**											
1338	k hat (MLE)					0.357	k star (bias corrected MLE)					0.316
1339	Theta hat (MLE)					332.1	Theta star (bias corrected MLE)					374.5
1340	nu hat (MLE)					7.134	nu star (bias corrected)					6.327
1341	MLE Mean (bias corrected)					118.5	MLE Sd (bias corrected)					210.6
1342							Approximate Chi Square Value (0.05)					1.809
1343	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					1.422
1344												
1345	**Assuming Gamma Distribution**											
1346	95% Approximate Gamma UCL (use when n>=50))					414.3	95% Adjusted Gamma UCL (use when n<50)					527.2
1347												
1348	**Lognormal GOF Test**											
1349	Shapiro Wilk Test Statistic					0.818	**Shapiro Wilk Lognormal GOF Test**					
1350	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
1351	Lilliefors Test Statistic					0.291	**Lilliefors Lognormal GOF Test**					
1352	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
1353	Data Not Lognormal at 5% Significance Level											
1354												
1355	Lognormal Statistics											
1356					Minimum of Logged Data	0.642				Mean of logged Data		2.895
1357					Maximum of Logged Data	6.957				SD of logged Data		1.658
1358												
1359	Assuming Lognormal Distribution											
1360					95% H-UCL	895				90% Chebyshev (MVUE) UCL		147.7
1361					95% Chebyshev (MVUE) UCL	189.3				97.5% Chebyshev (MVUE) UCL		247.2
1362					99% Chebyshev (MVUE) UCL	360.8						
1363												
1364	Nonparametric Distribution Free UCL Statistics											
1365	Data do not follow a Discernible Distribution (0.05)											
1366												
1367	Nonparametric Distribution Free UCLs											
1368					95% CLT UCL	288.8				95% Jackknife UCL		308.3
1369					95% Standard Bootstrap UCL	280.3				95% Bootstrap-t UCL		5269
1370					95% Hall's Bootstrap UCL	2745				95% Percentile Bootstrap UCL		323.9
1371					95% BCA Bootstrap UCL	429						
1372					90% Chebyshev(Mean, Sd) UCL	429.1				95% Chebyshev(Mean, Sd) UCL		569.8
1373					97.5% Chebyshev(Mean, Sd) UCL	765.1				99% Chebyshev(Mean, Sd) UCL		1149
1374												
1375	Suggested UCL to Use											
1376					99% Chebyshev (Mean, Sd) UCL	1149						
1377												
1378	Recommended UCL exceeds the maximum observation											
1379												
1380	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1381	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1382	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1383	For additional insight the user may want to consult a statistician.											
1384												
1385												
1386	Uranium-234											
1387												
1388	General Statistics											
1389					Total Number of Observations	10				Number of Distinct Observations		7
1390										Number of Missing Observations		0
1391					Minimum	0.51				Mean		5.261
1392					Maximum	27.5				Median		3.145
1393					SD	8.122				Std. Error of Mean		2.568
1394					Coefficient of Variation	1.544				Skewness		2.737
1395												
1396	Normal GOF Test											
1397					Shapiro Wilk Test Statistic	0.584				Shapiro Wilk GOF Test		
1398					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
1399					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
1400					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
1401	Data Not Normal at 5% Significance Level											
1402												
1403	Assuming Normal Distribution											
1404	95% Normal UCL						95% UCLs (Adjusted for Skewness)					

	A	B	C	D	E	F	G	H	I	J	K	L
1405					95% Student's-t UCL	9.969				95% Adjusted-CLT UCL (Chen-1995)		11.86
1406										95% Modified-t UCL (Johnson-1978)		10.34
1407												
1408						Gamma GOF Test						
1409					A-D Test Statistic	0.85				Anderson-Darling Gamma GOF Test		
1410					5% A-D Critical Value	0.757				Data Not Gamma Distributed at 5% Significance Level		
1411					K-S Test Statistic	0.261				Kolmogrov-Smirnoff Gamma GOF Test		
1412					5% K-S Critical Value	0.276				Detected data appear Gamma Distributed at 5% Significance Level		
1413					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
1414												
1415						Gamma Statistics						
1416					k hat (MLE)	0.763				k star (bias corrected MLE)		0.6
1417					Theta hat (MLE)	6.898				Theta star (bias corrected MLE)		8.761
1418					nu hat (MLE)	15.25				nu star (bias corrected)		12.01
1419					MLE Mean (bias corrected)	5.261				MLE Sd (bias corrected)		6.789
1420										Approximate Chi Square Value (0.05)		5.233
1421					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		4.481
1422												
1423						Assuming Gamma Distribution						
1424					95% Approximate Gamma UCL (use when n>=50)	12.07				95% Adjusted Gamma UCL (use when n<50)		14.1
1425												
1426						Lognormal GOF Test						
1427					Shapiro Wilk Test Statistic	0.873				Shapiro Wilk Lognormal GOF Test		
1428					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
1429					Lilliefors Test Statistic	0.245				Lilliefors Lognormal GOF Test		
1430					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
1431						Data appear Lognormal at 5% Significance Level						
1432												
1433						Lognormal Statistics						
1434					Minimum of Logged Data	-0.673				Mean of logged Data		0.877
1435					Maximum of Logged Data	3.314				SD of logged Data		1.287
1436												
1437						Assuming Lognormal Distribution						
1438					95% H-UCL	27.19				90% Chebyshev (MVUE) UCL		11.11
1439					95% Chebyshev (MVUE) UCL	13.95				97.5% Chebyshev (MVUE) UCL		17.88
1440					99% Chebyshev (MVUE) UCL	25.61						
1441												
1442						Nonparametric Distribution Free UCL Statistics						
1443						Data appear to follow a Discernible Distribution at 5% Significance Level						
1444												
1445						Nonparametric Distribution Free UCLs						
1446					95% CLT UCL	9.485				95% Jackknife UCL		9.969
1447					95% Standard Bootstrap UCL	9.21				95% Bootstrap-t UCL		17.01
1448					95% Hall's Bootstrap UCL	24.86				95% Percentile Bootstrap UCL		9.717
1449					95% BCA Bootstrap UCL	11.5						
1450					90% Chebyshev(Mean, Sd) UCL	12.97				95% Chebyshev(Mean, Sd) UCL		16.46
1451					97.5% Chebyshev(Mean, Sd) UCL	21.3				99% Chebyshev(Mean, Sd) UCL		30.82
1452												
1453						Suggested UCL to Use						
1454					95% Adjusted Gamma UCL	14.1						
1455												
1456	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											

	A	B	C	D	E	F	G	H	I	J	K	L
1457	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1458	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1459	For additional insight the user may want to consult a statistician.											
1460												
1461												
1462	Uranium-235											
1463												
1464	General Statistics											
1465					Total Number of Observations	10			Number of Distinct Observations		7	
1466									Number of Missing Observations		0	
1467					Minimum	0.02			Mean		0.605	
1468					Maximum	3.3			Median		0.353	
1469					SD	0.984			Std. Error of Mean		0.311	
1470					Coefficient of Variation	1.626			Skewness		2.736	
1471												
1472	Normal GOF Test											
1473					Shapiro Wilk Test Statistic	0.587			Shapiro Wilk GOF Test			
1474					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
1475					Lilliefors Test Statistic	0.4			Lilliefors GOF Test			
1476					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
1477	Data Not Normal at 5% Significance Level											
1478												
1479	Assuming Normal Distribution											
1480				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
1481					95% Student's-t UCL	1.176			95% Adjusted-CLT UCL (Chen-1995)		1.405	
1482									95% Modified-t UCL (Johnson-1978)		1.221	
1483												
1484	Gamma GOF Test											
1485					A-D Test Statistic	0.68			Anderson-Darling Gamma GOF Test			
1486					5% A-D Critical Value	0.768			Detected data appear Gamma Distributed at 5% Significance Level			
1487					K-S Test Statistic	0.237			Kolmogrov-Smirnoff Gamma GOF Test			
1488					5% K-S Critical Value	0.279			Detected data appear Gamma Distributed at 5% Significance Level			
1489	Detected data appear Gamma Distributed at 5% Significance Level											
1490												
1491	Gamma Statistics											
1492					k hat (MLE)	0.615			k star (bias corrected MLE)		0.497	
1493					Theta hat (MLE)	0.984			Theta star (bias corrected MLE)		1.217	
1494					nu hat (MLE)	12.3			nu star (bias corrected)		9.946	
1495					MLE Mean (bias corrected)	0.605			MLE Sd (bias corrected)		0.858	
1496									Approximate Chi Square Value (0.05)		3.908	
1497					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value		3.277	
1498												
1499	Assuming Gamma Distribution											
1500					95% Approximate Gamma UCL (use when n>=50)	1.541			95% Adjusted Gamma UCL (use when n<50)		1.837	
1501												
1502	Lognormal GOF Test											
1503					Shapiro Wilk Test Statistic	0.918			Shapiro Wilk Lognormal GOF Test			
1504					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
1505					Lilliefors Test Statistic	0.24			Lilliefors Lognormal GOF Test			
1506					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
1507	Data appear Lognormal at 5% Significance Level											
1508												

	A	B	C	D	E	F	G	H	I	J	K	L
1509	Lognormal Statistics											
1510				Minimum of Logged Data		-3.912				Mean of logged Data		-1.503
1511				Maximum of Logged Data		1.194				SD of logged Data		1.559
1512												
1513	Assuming Lognormal Distribution											
1514				95% H-UCL		7.175				90% Chebyshev (MVUE) UCL		1.555
1515				95% Chebyshev (MVUE) UCL		1.984				97.5% Chebyshev (MVUE) UCL		2.58
1516				99% Chebyshev (MVUE) UCL		3.75						
1517												
1518	Nonparametric Distribution Free UCL Statistics											
1519	Data appear to follow a Discernible Distribution at 5% Significance Level											
1520												
1521	Nonparametric Distribution Free UCLs											
1522				95% CLT UCL		1.117				95% Jackknife UCL		1.176
1523				95% Standard Bootstrap UCL		1.102				95% Bootstrap-t UCL		2.028
1524				95% Hall's Bootstrap UCL		2.982				95% Percentile Bootstrap UCL		1.196
1525				95% BCA Bootstrap UCL		1.418						
1526				90% Chebyshev(Mean, Sd) UCL		1.539				95% Chebyshev(Mean, Sd) UCL		1.962
1527				97.5% Chebyshev(Mean, Sd) UCL		2.549				99% Chebyshev(Mean, Sd) UCL		3.702
1528												
1529	Suggested UCL to Use											
1530				95% Adjusted Gamma UCL		1.837						
1531												
1532	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1533	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1534	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1535	For additional insight the user may want to consult a statistician.											
1536												
1537												
1538	Uranium-238											
1539												
1540	General Statistics											
1541				Total Number of Observations		10				Number of Distinct Observations		7
1542										Number of Missing Observations		0
1543				Minimum		0.82				Mean		12.67
1544				Maximum		70				Median		7.421
1545				SD		20.94				Std. Error of Mean		6.621
1546				Coefficient of Variation		1.652				Skewness		2.737
1547												
1548	Normal GOF Test											
1549				Shapiro Wilk Test Statistic		0.582				Shapiro Wilk GOF Test		
1550				5% Shapiro Wilk Critical Value		0.842				Data Not Normal at 5% Significance Level		
1551				Lilliefors Test Statistic		0.4				Lilliefors GOF Test		
1552				5% Lilliefors Critical Value		0.28				Data Not Normal at 5% Significance Level		
1553	Data Not Normal at 5% Significance Level											
1554												
1555	Assuming Normal Distribution											
1556				95% Normal UCL						95% UCLs (Adjusted for Skewness)		
1557				95% Student's-t UCL		24.81				95% Adjusted-CLT UCL (Chen-1995)		29.68
1558										95% Modified-t UCL (Johnson-1978)		25.76
1559												
1560	Gamma GOF Test											

	A	B	C	D	E	F	G	H	I	J	K	L
1561					A-D Test Statistic	0.828	Anderson-Darling Gamma GOF Test					
1562					5% A-D Critical Value	0.769	Data Not Gamma Distributed at 5% Significance Level					
1563					K-S Test Statistic	0.231	Kolmogrov-Smirnoff Gamma GOF Test					
1564					5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level					
1565	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
1566												
1567	Gamma Statistics											
1568					k hat (MLE)	0.596			k star (bias corrected MLE)			0.484
1569					Theta hat (MLE)	21.26			Theta star (bias corrected MLE)			26.19
1570					nu hat (MLE)	11.92			nu star (bias corrected)			9.676
1571					MLE Mean (bias corrected)	12.67			MLE Sd (bias corrected)			18.22
1572									Approximate Chi Square Value (0.05)			3.741
1573					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			3.126
1574												
1575	Assuming Gamma Distribution											
1576					95% Approximate Gamma UCL (use when n>=50)	32.78			95% Adjusted Gamma UCL (use when n<50)			39.22
1577												
1578	Lognormal GOF Test											
1579					Shapiro Wilk Test Statistic	0.852	Shapiro Wilk Lognormal GOF Test					
1580					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
1581					Lilliefors Test Statistic	0.247	Lilliefors Lognormal GOF Test					
1582					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
1583	Data appear Lognormal at 5% Significance Level											
1584												
1585	Lognormal Statistics											
1586					Minimum of Logged Data	-0.198			Mean of logged Data			1.502
1587					Maximum of Logged Data	4.248			SD of logged Data			1.562
1588												
1589	Assuming Lognormal Distribution											
1590					95% H-UCL	146.4			90% Chebyshev (MVUE) UCL			31.5
1591					95% Chebyshev (MVUE) UCL	40.2			97.5% Chebyshev (MVUE) UCL			52.27
1592					99% Chebyshev (MVUE) UCL	75.99						
1593												
1594	Nonparametric Distribution Free UCL Statistics											
1595	Data appear to follow a Discernible Distribution at 5% Significance Level											
1596												
1597	Nonparametric Distribution Free UCLs											
1598					95% CLT UCL	23.56			95% Jackknife UCL			24.81
1599					95% Standard Bootstrap UCL	22.92			95% Bootstrap-t UCL			42.95
1600					95% Hall's Bootstrap UCL	63.2			95% Percentile Bootstrap UCL			24.24
1601					95% BCA Bootstrap UCL	31.03						
1602					90% Chebyshev(Mean, Sd) UCL	32.53			95% Chebyshev(Mean, Sd) UCL			41.53
1603					97.5% Chebyshev(Mean, Sd) UCL	54.02			99% Chebyshev(Mean, Sd) UCL			78.55
1604												
1605	Suggested UCL to Use											
1606					95% Adjusted Gamma UCL	39.22						
1607												
1608	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1609	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1610	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1611	For additional insight the user may want to consult a statistician.											
1612												

	A	B	C	D	E	F	G	H	I	J	K	L
1613												
1614	Vanadium											
1615												
1616						General Statistics						
1617					Total Number of Observations	10				Number of Distinct Observations		7
1618										Number of Missing Observations		0
1619					Minimum	20				Mean		77.27
1620					Maximum	143				Median		70
1621					SD	44.29				Std. Error of Mean		14.01
1622					Coefficient of Variation	0.573				Skewness		0.417
1623												
1624						Normal GOF Test						
1625					Shapiro Wilk Test Statistic	0.89				Shapiro Wilk GOF Test		
1626					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
1627					Lilliefors Test Statistic	0.265				Lilliefors GOF Test		
1628					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
1629						Data appear Normal at 5% Significance Level						
1630												
1631						Assuming Normal Distribution						
1632					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1633					95% Student's-t UCL	102.9				95% Adjusted-CLT UCL (Chen-1995)		102.3
1634										95% Modified-t UCL (Johnson-1978)		103.3
1635												
1636						Gamma GOF Test						
1637					A-D Test Statistic	0.445				Anderson-Darling Gamma GOF Test		
1638					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
1639					K-S Test Statistic	0.211				Kolmogrov-Smirnoff Gamma GOF Test		
1640					5% K-S Critical Value	0.268				Detected data appear Gamma Distributed at 5% Significance Level		
1641						Detected data appear Gamma Distributed at 5% Significance Level						
1642												
1643						Gamma Statistics						
1644					k hat (MLE)	2.973				k star (bias corrected MLE)		2.148
1645					Theta hat (MLE)	25.99				Theta star (bias corrected MLE)		35.98
1646					nu hat (MLE)	59.46				nu star (bias corrected)		42.95
1647					MLE Mean (bias corrected)	77.27				MLE Sd (bias corrected)		52.73
1648										Approximate Chi Square Value (0.05)		28.93
1649					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		26.94
1650												
1651						Assuming Gamma Distribution						
1652					95% Approximate Gamma UCL (use when n>=50))	114.7				95% Adjusted Gamma UCL (use when n<50)		123.2
1653												
1654						Lognormal GOF Test						
1655					Shapiro Wilk Test Statistic	0.906				Shapiro Wilk Lognormal GOF Test		
1656					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
1657					Lilliefors Test Statistic	0.247				Lilliefors Lognormal GOF Test		
1658					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
1659						Data appear Lognormal at 5% Significance Level						
1660												
1661						Lognormal Statistics						
1662					Minimum of Logged Data	2.996				Mean of logged Data		4.17
1663					Maximum of Logged Data	4.963				SD of logged Data		0.668
1664												

	A	B	C	D	E	F	G	H	I	J	K	L
1665	**Assuming Lognormal Distribution**											
1666					95% H-UCL	140.4				90% Chebyshev (MVUE) UCL		130.2
1667				95% Chebyshev (MVUE) UCL		153.4				97.5% Chebyshev (MVUE) UCL		185.7
1668				99% Chebyshev (MVUE) UCL		249.2						
1669												
1670	**Nonparametric Distribution Free UCL Statistics**											
1671	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1672												
1673	**Nonparametric Distribution Free UCLs**											
1674					95% CLT UCL	100.3				95% Jackknife UCL		102.9
1675				95% Standard Bootstrap UCL		99.25				95% Bootstrap-t UCL		105.9
1676				95% Hall's Bootstrap UCL		100.5				95% Percentile Bootstrap UCL		98.76
1677				95% BCA Bootstrap UCL		101						
1678				90% Chebyshev(Mean, Sd) UCL		119.3				95% Chebyshev(Mean, Sd) UCL		138.3
1679				97.5% Chebyshev(Mean, Sd) UCL		164.7				99% Chebyshev(Mean, Sd) UCL		216.6
1680												
1681	**Suggested UCL to Use**											
1682				95% Student's-t UCL		102.9						
1683												
1684	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1685	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1686	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1687	For additional insight the user may want to consult a statistician.											
1688												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/20/2015 2:16:07 PM								
5	From File			EPC_026Sub_EU03.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Aluminum											
12												
13						General Statistics						
14					Total Number of Observations	10				Number of Distinct Observations		6
15										Number of Missing Observations		0
16					Minimum	4140				Mean		7970
17					Maximum	13500				Median		7970
18					SD	2291				Std. Error of Mean		724.5
19					Coefficient of Variation	0.287				Skewness		1.281
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.761				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.36				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
26						Data Not Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	9298				95% Adjusted-CLT UCL (Chen-1995)		9475
31										95% Modified-t UCL (Johnson-1978)		9347
32												
33						Gamma GOF Test						
34					A-D Test Statistic	1.18				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.725				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.322				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.266				Data Not Gamma Distributed at 5% Significance Level		
38						Data Not Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	14.11				k star (bias corrected MLE)		9.947
42					Theta hat (MLE)	564.7				Theta star (bias corrected MLE)		801.3
43					nu hat (MLE)	282.3				nu star (bias corrected)		198.9
44					MLE Mean (bias corrected)	7970				MLE Sd (bias corrected)		2527
45										Approximate Chi Square Value (0.05)		167.3
46					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		162.3
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	9477				95% Adjusted Gamma UCL (use when n<50)		9771
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.794				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.311				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	8.328				Mean of logged Data		8.948
60					Maximum of Logged Data	9.51				SD of logged Data		0.285
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62					Assuming Lognormal Distribution							
63					95% H-UCL	9646				90% Chebyshev (MVUE) UCL		10142
64				95% Chebyshev (MVUE) UCL		11124				97.5% Chebyshev (MVUE) UCL		12487
65				99% Chebyshev (MVUE) UCL		15164						
66												
67					Nonparametric Distribution Free UCL Statistics							
68					Data do not follow a Discernible Distribution (0.05)							
69												
70					Nonparametric Distribution Free UCLs							
71					95% CLT UCL	9162				95% Jackknife UCL		9298
72				95% Standard Bootstrap UCL		9111				95% Bootstrap-t UCL		9608
73				95% Hall's Bootstrap UCL		16577				95% Percentile Bootstrap UCL		9153
74				95% BCA Bootstrap UCL		9552						
75				90% Chebyshev(Mean, Sd) UCL		10144				95% Chebyshev(Mean, Sd) UCL		11128
76				97.5% Chebyshev(Mean, Sd) UCL		12495				99% Chebyshev(Mean, Sd) UCL		15179
77												
78					Suggested UCL to Use							
79				95% Student's-t UCL		9298				or 95% Modified-t UCL		9347
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												

	A	B	C	D	E	F	G	H	I	J	K	L
87	Antimony											
88												
89						General Statistics						
90					Total Number of Observations	10				Number of Distinct Observations		10
91										Number of Missing Observations		0
92					Minimum	1.4				Mean		52.9
93					Maximum	87.16				Median		53.32
94					SD	25.87				Std. Error of Mean		8.182
95					Coefficient of Variation	0.489				Skewness		-0.514
96												
97						Normal GOF Test						
98					Shapiro Wilk Test Statistic	0.944				Shapiro Wilk GOF Test		
99					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
100					Lilliefors Test Statistic	0.154				Lilliefors GOF Test		
101					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
102						Data appear Normal at 5% Significance Level						
103												
104						Assuming Normal Distribution						
105					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
106					95% Student's-t UCL	67.9				95% Adjusted-CLT UCL (Chen-1995)		64.94
107										95% Modified-t UCL (Johnson-1978)		67.68
108												
109						Gamma GOF Test						
110					A-D Test Statistic	1.083				Anderson-Darling Gamma GOF Test		
111					5% A-D Critical Value	0.738				Data Not Gamma Distributed at 5% Significance Level		
112					K-S Test Statistic	0.28				Kolmogrov-Smirnoff Gamma GOF Test		
113					5% K-S Critical Value	0.271				Data Not Gamma Distributed at 5% Significance Level		
114						Data Not Gamma Distributed at 5% Significance Level						
115												
116						Gamma Statistics						
117					k hat (MLE)	1.724				k star (bias corrected MLE)		1.273
118					Theta hat (MLE)	30.69				Theta star (bias corrected MLE)		41.54
119					nu hat (MLE)	34.48				nu star (bias corrected)		25.47
120					MLE Mean (bias corrected)	52.9				MLE Sd (bias corrected)		46.88
121										Approximate Chi Square Value (0.05)		14.97
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		13.59
123												
124						Assuming Gamma Distribution						
125					95% Approximate Gamma UCL (use when n>=50))	90				95% Adjusted Gamma UCL (use when n<50)		99.14
126												
127						Lognormal GOF Test						
128					Shapiro Wilk Test Statistic	0.62				Shapiro Wilk Lognormal GOF Test		
129					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
130					Lilliefors Test Statistic	0.323				Lilliefors Lognormal GOF Test		
131					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
132						Data Not Lognormal at 5% Significance Level						
133												
134						Lognormal Statistics						
135					Minimum of Logged Data	0.336				Mean of logged Data		3.651
136					Maximum of Logged Data	4.468				SD of logged Data		1.21
137												

	A	B	C	D	E	F	G	H	I	J	K	L
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	334.8				90% Chebyshev (MVUE) UCL		158.9
140				95% Chebyshev (MVUE) UCL		198.3				97.5% Chebyshev (MVUE) UCL		253.1
141				99% Chebyshev (MVUE) UCL		360.6						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	66.36				95% Jackknife UCL		67.9
148				95% Standard Bootstrap UCL		65.57				95% Bootstrap-t UCL		66.6
149				95% Hall's Bootstrap UCL		66.88				95% Percentile Bootstrap UCL		65.58
150				95% BCA Bootstrap UCL		63.93						
151				90% Chebyshev(Mean, Sd) UCL		77.45				95% Chebyshev(Mean, Sd) UCL		88.56
152				97.5% Chebyshev(Mean, Sd) UCL		104				99% Chebyshev(Mean, Sd) UCL		134.3
153												
154	**Suggested UCL to Use**											
155				95% Student's-t UCL		67.9						
156												
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
163	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Arsenic											
167												
168					General Statistics							
169					Total Number of Observations	10			Number of Distinct Observations			8
170									Number of Missing Observations			0
171					Minimum	4.66			Mean			22.04
172					Maximum	130.4			Median			9.62
173					SD	38.54			Std. Error of Mean			12.19
174					Coefficient of Variation	1.749			Skewness			3.025
175												
176					Normal GOF Test							
177					Shapiro Wilk Test Statistic	0.485			Shapiro Wilk GOF Test			
178					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
179					Lilliefors Test Statistic	0.413			Lilliefors GOF Test			
180					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
181					Data Not Normal at 5% Significance Level							
182												
183					Assuming Normal Distribution							
184					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
185					95% Student's-t UCL	44.38			95% Adjusted-CLT UCL (Chen-1995)			54.54
186									95% Modified-t UCL (Johnson-1978)			46.32
187												
188					Gamma GOF Test							
189					A-D Test Statistic	1.484			Anderson-Darling Gamma GOF Test			
190					5% A-D Critical Value	0.752			Data Not Gamma Distributed at 5% Significance Level			
191					K-S Test Statistic	0.386			Kolmogrov-Smirnoff Gamma GOF Test			
192					5% K-S Critical Value	0.275			Data Not Gamma Distributed at 5% Significance Level			
193					Data Not Gamma Distributed at 5% Significance Level							
194												
195					Gamma Statistics							
196					k hat (MLE)	0.893			k star (bias corrected MLE)			0.692
197					Theta hat (MLE)	24.68			Theta star (bias corrected MLE)			31.86
198					nu hat (MLE)	17.86			nu star (bias corrected)			13.84
199					MLE Mean (bias corrected)	22.04			MLE Sd (bias corrected)			26.5
200									Approximate Chi Square Value (0.05)			6.459
201					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			5.607
202												
203					Assuming Gamma Distribution							
204					95% Approximate Gamma UCL (use when n>=50))	47.21			95% Adjusted Gamma UCL (use when n<50)			54.39
205												
206					Lognormal GOF Test							
207					Shapiro Wilk Test Statistic	0.788			Shapiro Wilk Lognormal GOF Test			
208					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
209					Lilliefors Test Statistic	0.316			Lilliefors Lognormal GOF Test			
210					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
211					Data Not Lognormal at 5% Significance Level							
212												
213					Lognormal Statistics							
214					Minimum of Logged Data	1.539			Mean of logged Data			2.438
215					Maximum of Logged Data	4.87			SD of logged Data			0.985
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217	Assuming Lognormal Distribution											
218					95% H-UCL	50.97				90% Chebyshev (MVUE) UCL		34.5
219				95% Chebyshev (MVUE) UCL		42.23				97.5% Chebyshev (MVUE) UCL		52.96
220				99% Chebyshev (MVUE) UCL		74.03						
221												
222	Nonparametric Distribution Free UCL Statistics											
223	Data do not follow a Discernible Distribution (0.05)											
224												
225	Nonparametric Distribution Free UCLs											
226					95% CLT UCL	42.09				95% Jackknife UCL		44.38
227				95% Standard Bootstrap UCL		40.7				95% Bootstrap-t UCL		235.6
228				95% Hall's Bootstrap UCL		154.7				95% Percentile Bootstrap UCL		45.48
229				95% BCA Bootstrap UCL		58.71						
230				90% Chebyshev(Mean, Sd) UCL		58.6				95% Chebyshev(Mean, Sd) UCL		75.17
231				97.5% Chebyshev(Mean, Sd) UCL		98.15				99% Chebyshev(Mean, Sd) UCL		143.3
232												
233	Suggested UCL to Use											
234				95% Chebyshev (Mean, Sd) UCL		75.17						
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241												

	A	B	C	D	E	F	G	H	I	J	K	L
242	Cesium-137											
243												
244						General Statistics						
245					Total Number of Observations	10				Number of Distinct Observations		6
246										Number of Missing Observations		0
247					Minimum	-0.06				Mean		1.198
248					Maximum	5.43				Median		1.198
249					SD	1.582				Std. Error of Mean		0.5
250					Coefficient of Variation	1.32				Skewness		2.481
251												
252						Normal GOF Test						
253					Shapiro Wilk Test Statistic	0.658				Shapiro Wilk GOF Test		
254					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
255					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
256					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
257						Data Not Normal at 5% Significance Level						
258												
259						Assuming Normal Distribution						
260					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
261					95% Student's-t UCL	2.115				95% Adjusted-CLT UCL (Chen-1995)		2.44
262										95% Modified-t UCL (Johnson-1978)		2.18
263						Gamma Statistics Not Available						
264						Lognormal Statistics Not Available						
265												
266						Nonparametric Distribution Free UCL Statistics						
267						Data do not follow a Discernible Distribution (0.05)						
268												
269						Nonparametric Distribution Free UCLs						
270					95% CLT UCL	2.021				95% Jackknife UCL		2.115
271					95% Standard Bootstrap UCL	1.955				95% Bootstrap-t UCL		3
272					95% Hall's Bootstrap UCL	5.329				95% Percentile Bootstrap UCL		2.124
273					95% BCA Bootstrap UCL	2.368						
274					90% Chebyshev(Mean, Sd) UCL	2.698				95% Chebyshev(Mean, Sd) UCL		3.378
275					97.5% Chebyshev(Mean, Sd) UCL	4.321				99% Chebyshev(Mean, Sd) UCL		6.174
276												
277						Suggested UCL to Use						
278					95% Chebyshev (Mean, Sd) UCL	3.378						
279												
280						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
281						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
282						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
283						For additional insight the user may want to consult a statistician.						
284												
285												

	A	B	C	D	E	F	G	H	I	J	K	L
286	Chromium											
287												
288						General Statistics						
289					Total Number of Observations	10				Number of Distinct Observations		8
290										Number of Missing Observations		0
291					Minimum	12.7				Mean		47.11
292					Maximum	85				Median		36.15
293					SD	30.34				Std. Error of Mean		9.596
294					Coefficient of Variation	0.644				Skewness		0.31
295												
296						Normal GOF Test						
297					Shapiro Wilk Test Statistic	0.844				Shapiro Wilk GOF Test		
298					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
299					Lilliefors Test Statistic	0.205				Lilliefors GOF Test		
300					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
301						Data appear Normal at 5% Significance Level						
302												
303						Assuming Normal Distribution						
304					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
305					95% Student's-t UCL	64.7				95% Adjusted-CLT UCL (Chen-1995)		63.9
306										95% Modified-t UCL (Johnson-1978)		64.86
307												
308						Gamma GOF Test						
309					A-D Test Statistic	0.52				Anderson-Darling Gamma GOF Test		
310					5% A-D Critical Value	0.734				Detected data appear Gamma Distributed at 5% Significance Level		
311					K-S Test Statistic	0.187				Kolmogrov-Smirnoff Gamma GOF Test		
312					5% K-S Critical Value	0.269				Detected data appear Gamma Distributed at 5% Significance Level		
313						Detected data appear Gamma Distributed at 5% Significance Level						
314												
315						Gamma Statistics						
316					k hat (MLE)	2.344				k star (bias corrected MLE)		1.708
317					Theta hat (MLE)	20.1				Theta star (bias corrected MLE)		27.59
318					nu hat (MLE)	46.89				nu star (bias corrected)		34.15
319					MLE Mean (bias corrected)	47.11				MLE Sd (bias corrected)		36.05
320										Approximate Chi Square Value (0.05)		21.79
321					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		20.09
322												
323						Assuming Gamma Distribution						
324					95% Approximate Gamma UCL (use when n>=50))	73.85				95% Adjusted Gamma UCL (use when n<50)		80.11
325												
326						Lognormal GOF Test						
327					Shapiro Wilk Test Statistic	0.881				Shapiro Wilk Lognormal GOF Test		
328					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
329					Lilliefors Test Statistic	0.178				Lilliefors Lognormal GOF Test		
330					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
331						Data appear Lognormal at 5% Significance Level						
332												
333						Lognormal Statistics						
334					Minimum of Logged Data	2.542				Mean of logged Data		3.624
335					Maximum of Logged Data	4.443				SD of logged Data		0.751
336												

	A	B	C	D	E	F	G	H	I	J	K	L
337	**Assuming Lognormal Distribution**											
338					95% H-UCL	95.83				90% Chebyshev (MVUE) UCL		83.49
339					95% Chebyshev (MVUE) UCL	99.54				97.5% Chebyshev (MVUE) UCL		121.8
340					99% Chebyshev (MVUE) UCL	165.6						
341												
342	**Nonparametric Distribution Free UCL Statistics**											
343	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
344												
345	**Nonparametric Distribution Free UCLs**											
346					95% CLT UCL	62.89				95% Jackknife UCL		64.7
347					95% Standard Bootstrap UCL	61.98				95% Bootstrap-t UCL		67.32
348					95% Hall's Bootstrap UCL	60.4				95% Percentile Bootstrap UCL		62.79
349					95% BCA Bootstrap UCL	62.65						
350					90% Chebyshev(Mean, Sd) UCL	75.9				95% Chebyshev(Mean, Sd) UCL		88.94
351					97.5% Chebyshev(Mean, Sd) UCL	107				99% Chebyshev(Mean, Sd) UCL		142.6
352												
353	**Suggested UCL to Use**											
354					95% Student's-t UCL	64.7						
355												
356	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
357	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
358	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
359	For additional insight the user may want to consult a statistician.											
360												
361												

	A	B	C	D	E	F	G	H	I	J	K	L
362	Cobalt											
363												
364						General Statistics						
365					Total Number of Observations	10				Number of Distinct Observations		6
366										Number of Missing Observations		0
367					Minimum	4.6				Mean		7.482
368					Maximum	13				Median		7.482
369					SD	2.283				Std. Error of Mean		0.722
370					Coefficient of Variation	0.305				Skewness		1.457
371												
372						Normal GOF Test						
373					Shapiro Wilk Test Statistic	0.789				Shapiro Wilk GOF Test		
374					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
375					Lilliefors Test Statistic	0.3				Lilliefors GOF Test		
376					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
377						Data Not Normal at 5% Significance Level						
378												
379						Assuming Normal Distribution						
380					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
381					95% Student's-t UCL	8.805				95% Adjusted-CLT UCL (Chen-1995)		9.025
382										95% Modified-t UCL (Johnson-1978)		8.861
383												
384						Gamma GOF Test						
385					A-D Test Statistic	0.909				Anderson-Darling Gamma GOF Test		
386					5% A-D Critical Value	0.725				Data Not Gamma Distributed at 5% Significance Level		
387					K-S Test Statistic	0.264				Kolmogrov-Smirnoff Gamma GOF Test		
388					5% K-S Critical Value	0.266				Detected data appear Gamma Distributed at 5% Significance Level		
389						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
390												
391						Gamma Statistics						
392					k hat (MLE)	13.31				k star (bias corrected MLE)		9.384
393					Theta hat (MLE)	0.562				Theta star (bias corrected MLE)		0.797
394					nu hat (MLE)	266.2				nu star (bias corrected)		187.7
395					MLE Mean (bias corrected)	7.482				MLE Sd (bias corrected)		2.442
396										Approximate Chi Square Value (0.05)		157
397					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		152.1
398												
399						Assuming Gamma Distribution						
400					95% Approximate Gamma UCL (use when n>=50)	8.945				95% Adjusted Gamma UCL (use when n<50)		9.232
401												
402						Lognormal GOF Test						
403					Shapiro Wilk Test Statistic	0.847				Shapiro Wilk Lognormal GOF Test		
404					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
405					Lilliefors Test Statistic	0.253				Lilliefors Lognormal GOF Test		
406					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
407						Data appear Lognormal at 5% Significance Level						
408												
409						Lognormal Statistics						
410					Minimum of Logged Data	1.526				Mean of logged Data		1.974
411					Maximum of Logged Data	2.565				SD of logged Data		0.287
412												

	A	B	C	D	E	F	G	H	I	J	K	L
413	**Assuming Lognormal Distribution**											
414					95% H-UCL	9.057				90% Chebyshev (MVUE) UCL		9.522
415					95% Chebyshev (MVUE) UCL	10.45				97.5% Chebyshev (MVUE) UCL		11.74
416					99% Chebyshev (MVUE) UCL	14.27						
417												
418	**Nonparametric Distribution Free UCL Statistics**											
419	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
420												
421	**Nonparametric Distribution Free UCLs**											
422					95% CLT UCL	8.67				95% Jackknife UCL		8.805
423					95% Standard Bootstrap UCL	8.599				95% Bootstrap-t UCL		9.195
424					95% Hall's Bootstrap UCL	15.3				95% Percentile Bootstrap UCL		8.787
425					95% BCA Bootstrap UCL	8.993						
426					90% Chebyshev(Mean, Sd) UCL	9.648				95% Chebyshev(Mean, Sd) UCL		10.63
427					97.5% Chebyshev(Mean, Sd) UCL	11.99				99% Chebyshev(Mean, Sd) UCL		14.67
428												
429	**Suggested UCL to Use**											
430					95% Adjusted Gamma UCL	9.232						
431												
432	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
433	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
434	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
435	For additional insight the user may want to consult a statistician.											
436												
437												

	A	B	C	D	E	F	G	H	I	J	K	L
438	Iron											
439												
440					General Statistics							
441					Total Number of Observations	10				Number of Distinct Observations		10
442										Number of Missing Observations		0
443					Minimum	11874				Mean		29002
444					Maximum	44804				Median		25712
445					SD	9471				Std. Error of Mean		2995
446					Coefficient of Variation	0.327				Skewness		-0.0108
447												
448					Normal GOF Test							
449					Shapiro Wilk Test Statistic	0.947				Shapiro Wilk GOF Test		
450					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
451					Lilliefors Test Statistic	0.229				Lilliefors GOF Test		
452					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
453					Data appear Normal at 5% Significance Level							
454												
455					Assuming Normal Distribution							
456					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
457					95% Student's-t UCL	34492				95% Adjusted-CLT UCL (Chen-1995)		33917
458										95% Modified-t UCL (Johnson-1978)		34490
459												
460					Gamma GOF Test							
461					A-D Test Statistic	0.44				Anderson-Darling Gamma GOF Test		
462					5% A-D Critical Value	0.726				Detected data appear Gamma Distributed at 5% Significance Level		
463					K-S Test Statistic	0.189				Kolmogrov-Smirnoff Gamma GOF Test		
464					5% K-S Critical Value	0.267				Detected data appear Gamma Distributed at 5% Significance Level		
465					Detected data appear Gamma Distributed at 5% Significance Level							
466												
467					Gamma Statistics							
468					k hat (MLE)	9.091				k star (bias corrected MLE)		6.43
469					Theta hat (MLE)	3190				Theta star (bias corrected MLE)		4510
470					nu hat (MLE)	181.8				nu star (bias corrected)		128.6
471					MLE Mean (bias corrected)	29002				MLE Sd (bias corrected)		11437
472										Approximate Chi Square Value (0.05)		103.4
473					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		99.49
474												
475					Assuming Gamma Distribution							
476					95% Approximate Gamma UCL (use when n>=50))	36068				95% Adjusted Gamma UCL (use when n<50)		37490
477												
478					Lognormal GOF Test							
479					Shapiro Wilk Test Statistic	0.892				Shapiro Wilk Lognormal GOF Test		
480					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
481					Lilliefors Test Statistic	0.215				Lilliefors Lognormal GOF Test		
482					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
483					Data appear Lognormal at 5% Significance Level							
484												
485					Lognormal Statistics							
486					Minimum of Logged Data	9.382				Mean of logged Data		10.22
487					Maximum of Logged Data	10.71				SD of logged Data		0.372
488												

	A	B	C	D	E	F	G	H	I	J	K	L
489	**Assuming Lognormal Distribution**											
490					95% H-UCL	37911				90% Chebyshev (MVUE) UCL		39569
491					95% Chebyshev (MVUE) UCL	44279				97.5% Chebyshev (MVUE) UCL		50816
492					99% Chebyshev (MVUE) UCL	63657						
493												
494	**Nonparametric Distribution Free UCL Statistics**											
495	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
496												
497	**Nonparametric Distribution Free UCLs**											
498					95% CLT UCL	33928				95% Jackknife UCL		34492
499					95% Standard Bootstrap UCL	33599				95% Bootstrap-t UCL		34489
500					95% Hall's Bootstrap UCL	34529				95% Percentile Bootstrap UCL		33683
501					95% BCA Bootstrap UCL	33498						
502					90% Chebyshev(Mean, Sd) UCL	37986				95% Chebyshev(Mean, Sd) UCL		42056
503					97.5% Chebyshev(Mean, Sd) UCL	47705				99% Chebyshev(Mean, Sd) UCL		58800
504												
505	**Suggested UCL to Use**											
506					95% Student's-t UCL	34492						
507												
508	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
509	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
510	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
511	For additional insight the user may want to consult a statistician.											
512												
513	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
514	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
515												
516												

	A	B	C	D	E	F	G	H	I	J	K	L
517	Manganese											
518												
519					General Statistics							
520					Total Number of Observations	10				Number of Distinct Observations		10
521										Number of Missing Observations		0
522					Minimum	108				Mean		436.8
523					Maximum	935				Median		372.5
524					SD	236.9				Std. Error of Mean		74.92
525					Coefficient of Variation	0.542				Skewness		0.839
526												
527					Normal GOF Test							
528					Shapiro Wilk Test Statistic	0.945				Shapiro Wilk GOF Test		
529					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
530					Lilliefors Test Statistic	0.186				Lilliefors GOF Test		
531					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
532					Data appear Normal at 5% Significance Level							
533												
534					Assuming Normal Distribution							
535					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
536					95% Student's-t UCL	574.1				95% Adjusted-CLT UCL (Chen-1995)		581.2
537										95% Modified-t UCL (Johnson-1978)		577.4
538												
539					Gamma GOF Test							
540					A-D Test Statistic	0.219				Anderson-Darling Gamma GOF Test		
541					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
542					K-S Test Statistic	0.15				Kolmogrov-Smirnoff Gamma GOF Test		
543					5% K-S Critical Value	0.268				Detected data appear Gamma Distributed at 5% Significance Level		
544					Detected data appear Gamma Distributed at 5% Significance Level							
545												
546					Gamma Statistics							
547					k hat (MLE)	3.496				k star (bias corrected MLE)		2.514
548					Theta hat (MLE)	124.9				Theta star (bias corrected MLE)		173.7
549					nu hat (MLE)	69.92				nu star (bias corrected)		50.28
550					MLE Mean (bias corrected)	436.8				MLE Sd (bias corrected)		275.5
551										Approximate Chi Square Value (0.05)		35
552					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		32.79
553												
554					Assuming Gamma Distribution							
555					95% Approximate Gamma UCL (use when n>=50))	627.5				95% Adjusted Gamma UCL (use when n<50)		669.7
556												
557					Lognormal GOF Test							
558					Shapiro Wilk Test Statistic	0.953				Shapiro Wilk Lognormal GOF Test		
559					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
560					Lilliefors Test Statistic	0.19				Lilliefors Lognormal GOF Test		
561					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
562					Data appear Lognormal at 5% Significance Level							
563												
564					Lognormal Statistics							
565					Minimum of Logged Data	4.682				Mean of logged Data		5.93
566					Maximum of Logged Data	6.841				SD of logged Data		0.614
567												

	A	B	C	D	E	F	G	H	I	J	K	L
568	**Assuming Lognormal Distribution**											
569					95% H-UCL	739.9				90% Chebyshev (MVUE) UCL		709.4
570				95% Chebyshev (MVUE) UCL		829.5				97.5% Chebyshev (MVUE) UCL		996.2
571				99% Chebyshev (MVUE) UCL		1324						
572												
573	**Nonparametric Distribution Free UCL Statistics**											
574	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
575												
576	**Nonparametric Distribution Free UCLs**											
577					95% CLT UCL	560				95% Jackknife UCL		574.1
578				95% Standard Bootstrap UCL		554.9				95% Bootstrap-t UCL		610.3
579				95% Hall's Bootstrap UCL		644.8				95% Percentile Bootstrap UCL		550.9
580				95% BCA Bootstrap UCL		570.2						
581				90% Chebyshev(Mean, Sd) UCL		661.5				95% Chebyshev(Mean, Sd) UCL		763.3
582				97.5% Chebyshev(Mean, Sd) UCL		904.6				99% Chebyshev(Mean, Sd) UCL		1182
583												
584	**Suggested UCL to Use**											
585				95% Student's-t UCL		574.1						
586												
587	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
588	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
589	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
590	For additional insight the user may want to consult a statistician.											
591												
592												

	A	B	C	D	E	F	G	H	I	J	K	L
593	Mercury											
594												
595					General Statistics							
596					Total Number of Observations	10				Number of Distinct Observations		8
597										Number of Missing Observations		0
598					Minimum	0.0096				Mean		3.871
599					Maximum	10				Median		0.63
600					SD	4.764				Std. Error of Mean		1.507
601					Coefficient of Variation	1.231				Skewness		0.56
602												
603					Normal GOF Test							
604					Shapiro Wilk Test Statistic	0.711				Shapiro Wilk GOF Test		
605					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
606					Lilliefors Test Statistic	0.334				Lilliefors GOF Test		
607					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
608					Data Not Normal at 5% Significance Level							
609												
610					Assuming Normal Distribution							
611					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
612					95% Student's-t UCL	6.632				95% Adjusted-CLT UCL (Chen-1995)		6.634
613										95% Modified-t UCL (Johnson-1978)		6.677
614												
615					Gamma GOF Test							
616					A-D Test Statistic	0.729				Anderson-Darling Gamma GOF Test		
617					5% A-D Critical Value	0.806				Detected data appear Gamma Distributed at 5% Significance Level		
618					K-S Test Statistic	0.232				Kolmogrov-Smirnoff Gamma GOF Test		
619					5% K-S Critical Value	0.286				Detected data appear Gamma Distributed at 5% Significance Level		
620					Detected data appear Gamma Distributed at 5% Significance Level							
621												
622					Gamma Statistics							
623					k hat (MLE)	0.34				k star (bias corrected MLE)		0.305
624					Theta hat (MLE)	11.38				Theta star (bias corrected MLE)		12.7
625					nu hat (MLE)	6.804				nu star (bias corrected)		6.096
626					MLE Mean (bias corrected)	3.871				MLE Sd (bias corrected)		7.011
627										Approximate Chi Square Value (0.05)		1.689
628					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		1.319
629												
630					Assuming Gamma Distribution							
631					95% Approximate Gamma UCL (use when n>=50)	13.97				95% Adjusted Gamma UCL (use when n<50)		17.89
632												
633					Lognormal GOF Test							
634					Shapiro Wilk Test Statistic	0.869				Shapiro Wilk Lognormal GOF Test		
635					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
636					Lilliefors Test Statistic	0.228				Lilliefors Lognormal GOF Test		
637					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
638					Data appear Lognormal at 5% Significance Level							
639												
640					Lognormal Statistics							
641					Minimum of Logged Data	-4.646				Mean of logged Data		-0.632
642					Maximum of Logged Data	2.303				SD of logged Data		2.772
643												

	A	B	C	D	E	F	G	H	I	J	K	L
644	Assuming Lognormal Distribution											
645					95% H-UCL	20908				90% Chebyshev (MVUE) UCL		29.84
646				95% Chebyshev (MVUE) UCL		39.44				97.5% Chebyshev (MVUE) UCL		52.77
647				99% Chebyshev (MVUE) UCL		78.96						
648												
649	Nonparametric Distribution Free UCL Statistics											
650	Data appear to follow a Discernible Distribution at 5% Significance Level											
651												
652	Nonparametric Distribution Free UCLs											
653					95% CLT UCL	6.349				95% Jackknife UCL		6.632
654				95% Standard Bootstrap UCL		6.254				95% Bootstrap-t UCL		7.781
655				95% Hall's Bootstrap UCL		5.656				95% Percentile Bootstrap UCL		6.497
656				95% BCA Bootstrap UCL		6.472						
657				90% Chebyshev(Mean, Sd) UCL		8.39				95% Chebyshev(Mean, Sd) UCL		10.44
658				97.5% Chebyshev(Mean, Sd) UCL		13.28				99% Chebyshev(Mean, Sd) UCL		18.86
659												
660	Suggested UCL to Use											
661				95% Adjusted Gamma UCL		17.89						
662												
663	Recommended UCL exceeds the maximum observation											
664												
665	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
666	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
667	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
668	For additional insight the user may want to consult a statistician.											
669												
670												

	A	B	C	D	E	F	G	H	I	J	K	L
671	Molybdenum											
672												
673						General Statistics						
674					Total Number of Observations	10				Number of Distinct Observations		5
675										Number of Missing Observations		0
676					Minimum	0.87				Mean		19.47
677					Maximum	57				Median		15
678					SD	17.76				Std. Error of Mean		5.616
679					Coefficient of Variation	0.912				Skewness		1.414
680												
681						Normal GOF Test						
682					Shapiro Wilk Test Statistic	0.76				Shapiro Wilk GOF Test		
683					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
684					Lilliefors Test Statistic	0.399				Lilliefors GOF Test		
685					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
686						Data Not Normal at 5% Significance Level						
687												
688						Assuming Normal Distribution						
689					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
690					95% Student's-t UCL	29.76				95% Adjusted-CLT UCL (Chen-1995)		31.39
691										95% Modified-t UCL (Johnson-1978)		30.18
692												
693						Gamma GOF Test						
694					A-D Test Statistic	0.929				Anderson-Darling Gamma GOF Test		
695					5% A-D Critical Value	0.746				Data Not Gamma Distributed at 5% Significance Level		
696					K-S Test Statistic	0.325				Kolmogrov-Smirnoff Gamma GOF Test		
697					5% K-S Critical Value	0.273				Data Not Gamma Distributed at 5% Significance Level		
698						Data Not Gamma Distributed at 5% Significance Level						
699												
700						Gamma Statistics						
701					k hat (MLE)	1.11				k star (bias corrected MLE)		0.843
702					Theta hat (MLE)	17.54				Theta star (bias corrected MLE)		23.08
703					nu hat (MLE)	22.19				nu star (bias corrected)		16.87
704					MLE Mean (bias corrected)	19.47				MLE Sd (bias corrected)		21.2
705										Approximate Chi Square Value (0.05)		8.578
706					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		7.572
707												
708						Assuming Gamma Distribution						
709					95% Approximate Gamma UCL (use when n>=50))	38.28				95% Adjusted Gamma UCL (use when n<50)		43.37
710												
711						Lognormal GOF Test						
712					Shapiro Wilk Test Statistic	0.801				Shapiro Wilk Lognormal GOF Test		
713					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
714					Lilliefors Test Statistic	0.378				Lilliefors Lognormal GOF Test		
715					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
716						Data Not Lognormal at 5% Significance Level						
717												
718						Lognormal Statistics						
719					Minimum of Logged Data	-0.139				Mean of logged Data		2.455
720					Maximum of Logged Data	4.043				SD of logged Data		1.289
721												

	A	B	C	D	E	F	G	H	I	J	K	L
722	Assuming Lognormal Distribution											
723					95% H-UCL	132.4				90% Chebyshev (MVUE) UCL		53.92
724				95% Chebyshev (MVUE) UCL		67.69				97.5% Chebyshev (MVUE) UCL		86.81
725				99% Chebyshev (MVUE) UCL		124.4						
726												
727	Nonparametric Distribution Free UCL Statistics											
728	Data do not follow a Discernible Distribution (0.05)											
729												
730	Nonparametric Distribution Free UCLs											
731					95% CLT UCL	28.7				95% Jackknife UCL		29.76
732				95% Standard Bootstrap UCL		28.27				95% Bootstrap-t UCL		42.63
733				95% Hall's Bootstrap UCL		107.3				95% Percentile Bootstrap UCL		29.07
734				95% BCA Bootstrap UCL		29.88						
735				90% Chebyshev(Mean, Sd) UCL		36.31				95% Chebyshev(Mean, Sd) UCL		43.95
736				97.5% Chebyshev(Mean, Sd) UCL		54.54				99% Chebyshev(Mean, Sd) UCL		75.34
737												
738	Suggested UCL to Use											
739				95% Chebyshev (Mean, Sd) UCL		43.95						
740												
741	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
742	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
743	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
744	For additional insight the user may want to consult a statistician.											
745												
746												

	A	B	C	D	E	F	G	H	I	J	K	L
747	Neptunium-237											
748												
749					General Statistics							
750					Total Number of Observations	10			Number of Distinct Observations			4
751									Number of Missing Observations			0
752					Minimum	0.1			Mean			0.275
753					Maximum	0.524			Median			0.275
754					SD	0.104			Std. Error of Mean			0.033
755					Coefficient of Variation	0.38			Skewness			1.188
756												
757					Normal GOF Test							
758					Shapiro Wilk Test Statistic	0.731			Shapiro Wilk GOF Test			
759					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
760					Lilliefors Test Statistic	0.4			Lilliefors GOF Test			
761					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
762					Data Not Normal at 5% Significance Level							
763												
764					Assuming Normal Distribution							
765					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
766					95% Student's-t UCL	0.335			95% Adjusted-CLT UCL (Chen-1995)			0.342
767									95% Modified-t UCL (Johnson-1978)			0.337
768												
769					Gamma GOF Test							
770					A-D Test Statistic	1.428			Anderson-Darling Gamma GOF Test			
771					5% A-D Critical Value	0.727			Data Not Gamma Distributed at 5% Significance Level			
772					K-S Test Statistic	0.351			Kolmogrov-Smirnoff Gamma GOF Test			
773					5% K-S Critical Value	0.267			Data Not Gamma Distributed at 5% Significance Level			
774					Data Not Gamma Distributed at 5% Significance Level							
775												
776					Gamma Statistics							
777					k hat (MLE)	7.497			k star (bias corrected MLE)			5.315
778					Theta hat (MLE)	0.0366			Theta star (bias corrected MLE)			0.0517
779					nu hat (MLE)	149.9			nu star (bias corrected)			106.3
780					MLE Mean (bias corrected)	0.275			MLE Sd (bias corrected)			0.119
781									Approximate Chi Square Value (0.05)			83.5
782					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			80
783												
784					Assuming Gamma Distribution							
785					95% Approximate Gamma UCL (use when n>=50))	0.35			95% Adjusted Gamma UCL (use when n<50)			0.365
786												
787					Lognormal GOF Test							
788					Shapiro Wilk Test Statistic	0.746			Shapiro Wilk Lognormal GOF Test			
789					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
790					Lilliefors Test Statistic	0.366			Lilliefors Lognormal GOF Test			
791					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
792					Data Not Lognormal at 5% Significance Level							
793												
794					Lognormal Statistics							
795					Minimum of Logged Data	-2.303			Mean of logged Data			-1.36
796					Maximum of Logged Data	-0.646			SD of logged Data			0.407
797												

	A	B	C	D	E	F	G	H	I	J	K	L
798					Assuming Lognormal Distribution							
799					95% H-UCL	0.371				90% Chebyshev (MVUE) UCL		0.384
800				95% Chebyshev (MVUE) UCL		0.433				97.5% Chebyshev (MVUE) UCL		0.501
801				99% Chebyshev (MVUE) UCL		0.635						
802												
803					Nonparametric Distribution Free UCL Statistics							
804					Data do not follow a Discernible Distribution (0.05)							
805												
806					Nonparametric Distribution Free UCLs							
807					95% CLT UCL	0.329				95% Jackknife UCL		0.335
808				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
809				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
810				95% BCA Bootstrap UCL		N/A						
811				90% Chebyshev(Mean, Sd) UCL		0.374				95% Chebyshev(Mean, Sd) UCL		0.419
812				97.5% Chebyshev(Mean, Sd) UCL		0.481				99% Chebyshev(Mean, Sd) UCL		0.603
813												
814					Suggested UCL to Use							
815				95% Student's-t UCL		0.335				or 95% Modified-t UCL		0.337
816												
817	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
818	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
819	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
820	For additional insight the user may want to consult a statistician.											
821												
822												

	A	B	C	D	E	F	G	H	I	J	K	L
823	PAH, Total											
824												
825					General Statistics							
826					Total Number of Observations	10			Number of Distinct Observations			7
827									Number of Missing Observations			0
828					Minimum	0.0078			Mean			0.26
829					Maximum	0.48			Median			0.26
830					SD	0.15			Std. Error of Mean			0.0474
831					Coefficient of Variation	0.576			Skewness			-0.607
832												
833					Normal GOF Test							
834					Shapiro Wilk Test Statistic	0.886			Shapiro Wilk GOF Test			
835					5% Shapiro Wilk Critical Value	0.842			Data appear Normal at 5% Significance Level			
836					Lilliefors Test Statistic	0.3			Lilliefors GOF Test			
837					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
838					Data appear Approximate Normal at 5% Significance Level							
839												
840					Assuming Normal Distribution							
841					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
842					95% Student's-t UCL	0.347			95% Adjusted-CLT UCL (Chen-1995)			0.328
843									95% Modified-t UCL (Johnson-1978)			0.345
844												
845					Gamma GOF Test							
846					A-D Test Statistic	1.389			Anderson-Darling Gamma GOF Test			
847					5% A-D Critical Value	0.744			Data Not Gamma Distributed at 5% Significance Level			
848					K-S Test Statistic	0.419			Kolmogrov-Smirnoff Gamma GOF Test			
849					5% K-S Critical Value	0.273			Data Not Gamma Distributed at 5% Significance Level			
850					Data Not Gamma Distributed at 5% Significance Level							
851												
852					Gamma Statistics							
853					k hat (MLE)	1.235			k star (bias corrected MLE)			0.931
854					Theta hat (MLE)	0.21			Theta star (bias corrected MLE)			0.279
855					nu hat (MLE)	24.7			nu star (bias corrected)			18.63
856					MLE Mean (bias corrected)	0.26			MLE Sd (bias corrected)			0.269
857									Approximate Chi Square Value (0.05)			9.845
858					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			8.756
859												
860					Assuming Gamma Distribution							
861					95% Approximate Gamma UCL (use when n>=50))	0.491			95% Adjusted Gamma UCL (use when n<50)			0.553
862												
863					Lognormal GOF Test							
864					Shapiro Wilk Test Statistic	0.678			Shapiro Wilk Lognormal GOF Test			
865					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
866					Lilliefors Test Statistic	0.429			Lilliefors Lognormal GOF Test			
867					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
868					Data Not Lognormal at 5% Significance Level							
869												
870					Lognormal Statistics							
871					Minimum of Logged Data	-4.854			Mean of logged Data			-1.804
872					Maximum of Logged Data	-0.734			SD of logged Data			1.387
873												

	A	B	C	D	E	F	G	H	I	J	K	L
874	**Assuming Lognormal Distribution**											
875					95% H-UCL	2.673				90% Chebyshev (MVUE) UCL		0.883
876				95% Chebyshev (MVUE) UCL		1.116				97.5% Chebyshev (MVUE) UCL		1.439
877				99% Chebyshev (MVUE) UCL		2.073						
878												
879	**Nonparametric Distribution Free UCL Statistics**											
880	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
881												
882	**Nonparametric Distribution Free UCLs**											
883					95% CLT UCL	0.338				95% Jackknife UCL		0.347
884				95% Standard Bootstrap UCL		0.334				95% Bootstrap-t UCL		0.337
885				95% Hall's Bootstrap UCL		0.333				95% Percentile Bootstrap UCL		0.332
886				95% BCA Bootstrap UCL		0.326						
887				90% Chebyshev(Mean, Sd) UCL		0.402				95% Chebyshev(Mean, Sd) UCL		0.466
888				97.5% Chebyshev(Mean, Sd) UCL		0.555				99% Chebyshev(Mean, Sd) UCL		0.731
889												
890	**Suggested UCL to Use**											
891				95% Student's-t UCL		0.347						
892												
893	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
894	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
895	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
896	For additional insight the user may want to consult a statistician.											
897												
898	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
899	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
900												
901												

	A	B	C	D	E	F	G	H	I	J	K	L
902	PCB, Total											
903												
904						General Statistics						
905					Total Number of Observations	10				Number of Distinct Observations		8
906										Number of Missing Observations		0
907					Minimum	0.018				Mean		0.708
908					Maximum	5				Median		0.24
909					SD	1.525				Std. Error of Mean		0.482
910					Coefficient of Variation	2.154				Skewness		3.04
911												
912						Normal GOF Test						
913					Shapiro Wilk Test Statistic	0.483				Shapiro Wilk GOF Test		
914					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
915					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
916					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
917						Data Not Normal at 5% Significance Level						
918												
919						Assuming Normal Distribution						
920					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
921					95% Student's-t UCL	1.592				95% Adjusted-CLT UCL (Chen-1995)		1.996
922										95% Modified-t UCL (Johnson-1978)		1.669
923												
924						Gamma GOF Test						
925					A-D Test Statistic	0.845				Anderson-Darling Gamma GOF Test		
926					5% A-D Critical Value	0.779				Data Not Gamma Distributed at 5% Significance Level		
927					K-S Test Statistic	0.297				Kolmogrov-Smirnoff Gamma GOF Test		
928					5% K-S Critical Value	0.281				Data Not Gamma Distributed at 5% Significance Level		
929						Data Not Gamma Distributed at 5% Significance Level						
930												
931						Gamma Statistics						
932					k hat (MLE)	0.488				k star (bias corrected MLE)		0.408
933					Theta hat (MLE)	1.451				Theta star (bias corrected MLE)		1.735
934					nu hat (MLE)	9.754				nu star (bias corrected)		8.161
935					MLE Mean (bias corrected)	0.708				MLE Sd (bias corrected)		1.108
936										Approximate Chi Square Value (0.05)		2.829
937					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		2.312
938												
939						Assuming Gamma Distribution						
940					95% Approximate Gamma UCL (use when n>=50))	2.042				95% Adjusted Gamma UCL (use when n<50)		2.498
941												
942						Lognormal GOF Test						
943					Shapiro Wilk Test Statistic	0.937				Shapiro Wilk Lognormal GOF Test		
944					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
945					Lilliefors Test Statistic	0.178				Lilliefors Lognormal GOF Test		
946					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
947						Data appear Lognormal at 5% Significance Level						
948												
949						Lognormal Statistics						
950					Minimum of Logged Data	-4.017				Mean of logged Data		-1.653
951					Maximum of Logged Data	1.609				SD of logged Data		1.648
952												

	A	B	C	D	E	F	G	H	I	J	K	L
953	Assuming Lognormal Distribution											
954					95% H-UCL	9.07				90% Chebyshev (MVUE) UCL		1.539
955				95% Chebyshev (MVUE) UCL		1.973				97.5% Chebyshev (MVUE) UCL		2.574
956				99% Chebyshev (MVUE) UCL		3.756						
957												
958	Nonparametric Distribution Free UCL Statistics											
959	Data appear to follow a Discernible Distribution at 5% Significance Level											
960												
961	Nonparametric Distribution Free UCLs											
962					95% CLT UCL	1.501				95% Jackknife UCL		1.592
963				95% Standard Bootstrap UCL		1.481				95% Bootstrap-t UCL		8.516
964				95% Hall's Bootstrap UCL		6.084				95% Percentile Bootstrap UCL		1.618
965				95% BCA Bootstrap UCL		2.15						
966				90% Chebyshev(Mean, Sd) UCL		2.154				95% Chebyshev(Mean, Sd) UCL		2.81
967				97.5% Chebyshev(Mean, Sd) UCL		3.719				99% Chebyshev(Mean, Sd) UCL		5.506
968												
969	Suggested UCL to Use											
970				99% Chebyshev (Mean, Sd) UCL		5.506						
971												
972	Recommended UCL exceeds the maximum observation											
973												
974	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
975	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
976	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
977	For additional insight the user may want to consult a statistician.											
978												
979												

	A	B	C	D	E	F	G	H	I	J	K	L
980	Pentachlorophenol											
981												
982						General Statistics						
983					Total Number of Observations	10				Number of Distinct Observations		7
984										Number of Missing Observations		0
985					Minimum	0.709				Mean		1.332
986					Maximum	2.1				Median		1.332
987					SD	0.474				Std. Error of Mean		0.15
988					Coefficient of Variation	0.356				Skewness		0.163
989												
990						Normal GOF Test						
991					Shapiro Wilk Test Statistic	0.916				Shapiro Wilk GOF Test		
992					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
993					Lilliefors Test Statistic	0.2				Lilliefors GOF Test		
994					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
995						Data appear Normal at 5% Significance Level						
996												
997						Assuming Normal Distribution						
998					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
999					95% Student's-t UCL	1.607				95% Adjusted-CLT UCL (Chen-1995)		1.587
1000										95% Modified-t UCL (Johnson-1978)		1.608
1001												
1002						Gamma GOF Test						
1003					A-D Test Statistic	0.507				Anderson-Darling Gamma GOF Test		
1004					5% A-D Critical Value	0.727				Detected data appear Gamma Distributed at 5% Significance Level		
1005					K-S Test Statistic	0.246				Kolmogrov-Smirnoff Gamma GOF Test		
1006					5% K-S Critical Value	0.267				Detected data appear Gamma Distributed at 5% Significance Level		
1007						Detected data appear Gamma Distributed at 5% Significance Level						
1008												
1009						Gamma Statistics						
1010					k hat (MLE)	8.243				k star (bias corrected MLE)		5.837
1011					Theta hat (MLE)	0.162				Theta star (bias corrected MLE)		0.228
1012					nu hat (MLE)	164.9				nu star (bias corrected)		116.7
1013					MLE Mean (bias corrected)	1.332				MLE Sd (bias corrected)		0.551
1014										Approximate Chi Square Value (0.05)		92.79
1015					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		89.09
1016												
1017						Assuming Gamma Distribution						
1018					95% Approximate Gamma UCL (use when n>=50))	1.676				95% Adjusted Gamma UCL (use when n<50)		1.745
1019												
1020						Lognormal GOF Test						
1021					Shapiro Wilk Test Statistic	0.898				Shapiro Wilk Lognormal GOF Test		
1022					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
1023					Lilliefors Test Statistic	0.265				Lilliefors Lognormal GOF Test		
1024					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
1025						Data appear Lognormal at 5% Significance Level						
1026												
1027						Lognormal Statistics						
1028					Minimum of Logged Data	-0.344				Mean of logged Data		0.225
1029					Maximum of Logged Data	0.742				SD of logged Data		0.38
1030												

	A	B	C	D	E	F	G	H	I	J	K	L
1031	**Assuming Lognormal Distribution**											
1032					95% H-UCL	1.748				90% Chebyshev (MVUE) UCL		1.822
1033					95% Chebyshev (MVUE) UCL	2.043				97.5% Chebyshev (MVUE) UCL		2.349
1034					99% Chebyshev (MVUE) UCL	2.95						
1035												
1036	**Nonparametric Distribution Free UCL Statistics**											
1037	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1038												
1039	**Nonparametric Distribution Free UCLs**											
1040					95% CLT UCL	1.579				95% Jackknife UCL		1.607
1041					95% Standard Bootstrap UCL	1.57				95% Bootstrap-t UCL		1.66
1042					95% Hall's Bootstrap UCL	1.61				95% Percentile Bootstrap UCL		1.565
1043					95% BCA Bootstrap UCL	1.582						
1044					90% Chebyshev(Mean, Sd) UCL	1.782				95% Chebyshev(Mean, Sd) UCL		1.985
1045					97.5% Chebyshev(Mean, Sd) UCL	2.268				99% Chebyshev(Mean, Sd) UCL		2.823
1046												
1047	**Suggested UCL to Use**											
1048					95% Student's-t UCL	1.607						
1049												
1050	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1051	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1052	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1053	For additional insight the user may want to consult a statistician.											
1054												
1055												

	A	B	C	D	E	F	G	H	I	J	K	L
1056	Thallium											
1057												
1058						General Statistics						
1059					Total Number of Observations	10				Number of Distinct Observations		6
1060										Number of Missing Observations		0
1061					Minimum	0.12				Mean		1.15
1062					Maximum	5				Median		0.875
1063					SD	1.413				Std. Error of Mean		0.447
1064					Coefficient of Variation	1.229				Skewness		2.675
1065												
1066						Normal GOF Test						
1067					Shapiro Wilk Test Statistic	0.629				Shapiro Wilk GOF Test		
1068					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
1069					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
1070					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
1071						Data Not Normal at 5% Significance Level						
1072												
1073						Assuming Normal Distribution						
1074					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1075					95% Student's-t UCL	1.969				95% Adjusted-CLT UCL (Chen-1995)		2.289
1076										95% Modified-t UCL (Johnson-1978)		2.032
1077												
1078						Gamma GOF Test						
1079					A-D Test Statistic	0.556				Anderson-Darling Gamma GOF Test		
1080					5% A-D Critical Value	0.745				Detected data appear Gamma Distributed at 5% Significance Level		
1081					K-S Test Statistic	0.277				Kolmogrov-Smirnoff Gamma GOF Test		
1082					5% K-S Critical Value	0.273				Data Not Gamma Distributed at 5% Significance Level		
1083						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
1084												
1085						Gamma Statistics						
1086					k hat (MLE)	1.164				k star (bias corrected MLE)		0.881
1087					Theta hat (MLE)	0.988				Theta star (bias corrected MLE)		1.305
1088					nu hat (MLE)	23.27				nu star (bias corrected)		17.62
1089					MLE Mean (bias corrected)	1.15				MLE Sd (bias corrected)		1.225
1090										Approximate Chi Square Value (0.05)		9.119
1091					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		8.078
1092												
1093						Assuming Gamma Distribution						
1094					95% Approximate Gamma UCL (use when n>=50)	2.222				95% Adjusted Gamma UCL (use when n<50)		2.509
1095												
1096						Lognormal GOF Test						
1097					Shapiro Wilk Test Statistic	0.944				Shapiro Wilk Lognormal GOF Test		
1098					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
1099					Lilliefors Test Statistic	0.219				Lilliefors Lognormal GOF Test		
1100					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
1101						Data appear Lognormal at 5% Significance Level						
1102												
1103						Lognormal Statistics						
1104					Minimum of Logged Data	-2.12				Mean of logged Data		-0.348
1105					Maximum of Logged Data	1.609				SD of logged Data		1.037
1106												

	A	B	C	D	E	F	G	H	I	J	K	L
1107	Assuming Lognormal Distribution											
1108					95% H-UCL	3.627				90% Chebyshev (MVUE) UCL		2.284
1109				95% Chebyshev (MVUE) UCL		2.81				97.5% Chebyshev (MVUE) UCL		3.54
1110				99% Chebyshev (MVUE) UCL		4.973						
1111												
1112	Nonparametric Distribution Free UCL Statistics											
1113	Data appear to follow a Discernible Distribution at 5% Significance Level											
1114												
1115	Nonparametric Distribution Free UCLs											
1116					95% CLT UCL	1.885				95% Jackknife UCL		1.969
1117				95% Standard Bootstrap UCL		1.842				95% Bootstrap-t UCL		3.063
1118				95% Hall's Bootstrap UCL		4.743				95% Percentile Bootstrap UCL		1.956
1119				95% BCA Bootstrap UCL		2.408						
1120				90% Chebyshev(Mean, Sd) UCL		2.491				95% Chebyshev(Mean, Sd) UCL		3.098
1121				97.5% Chebyshev(Mean, Sd) UCL		3.941				99% Chebyshev(Mean, Sd) UCL		5.596
1122												
1123	Suggested UCL to Use											
1124				95% Adjusted Gamma UCL		2.509						
1125												
1126	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1127	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1128	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1129	For additional insight the user may want to consult a statistician.											
1130												
1131												

	A	B	C	D	E	F	G	H	I	J	K	L
1132	Uranium											
1133												
1134					General Statistics							
1135					Total Number of Observations	10			Number of Distinct Observations			8
1136									Number of Missing Observations			0
1137					Minimum	7.19			Mean			80.06
1138					Maximum	214			Median			20
1139					SD	90.36			Std. Error of Mean			28.57
1140					Coefficient of Variation	1.129			Skewness			0.802
1141												
1142					Normal GOF Test							
1143					Shapiro Wilk Test Statistic	0.738			Shapiro Wilk GOF Test			
1144					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
1145					Lilliefors Test Statistic	0.347			Lilliefors GOF Test			
1146					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
1147					Data Not Normal at 5% Significance Level							
1148												
1149					Assuming Normal Distribution							
1150					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1151					95% Student's-t UCL	132.4			95% Adjusted-CLT UCL (Chen-1995)			134.8
1152									95% Modified-t UCL (Johnson-1978)			133.6
1153												
1154					Gamma GOF Test							
1155					A-D Test Statistic	0.894			Anderson-Darling Gamma GOF Test			
1156					5% A-D Critical Value	0.756			Data Not Gamma Distributed at 5% Significance Level			
1157					K-S Test Statistic	0.32			Kolmogrov-Smirnoff Gamma GOF Test			
1158					5% K-S Critical Value	0.276			Data Not Gamma Distributed at 5% Significance Level			
1159					Data Not Gamma Distributed at 5% Significance Level							
1160												
1161					Gamma Statistics							
1162					k hat (MLE)	0.772			k star (bias corrected MLE)			0.607
1163					Theta hat (MLE)	103.7			Theta star (bias corrected MLE)			131.9
1164					nu hat (MLE)	15.44			nu star (bias corrected)			12.14
1165					MLE Mean (bias corrected)	80.06			MLE Sd (bias corrected)			102.8
1166									Approximate Chi Square Value (0.05)			5.319
1167					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			4.559
1168												
1169					Assuming Gamma Distribution							
1170					95% Approximate Gamma UCL (use when n>=50))	182.7			95% Adjusted Gamma UCL (use when n<50)			213.2
1171												
1172					Lognormal GOF Test							
1173					Shapiro Wilk Test Statistic	0.845			Shapiro Wilk Lognormal GOF Test			
1174					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
1175					Lilliefors Test Statistic	0.272			Lilliefors Lognormal GOF Test			
1176					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
1177					Data appear Lognormal at 5% Significance Level							
1178												
1179					Lognormal Statistics							
1180					Minimum of Logged Data	1.973			Mean of logged Data			3.61
1181					Maximum of Logged Data	5.366			SD of logged Data			1.378
1182												

	A	B	C	D	E	F	G	H	I	J	K	L
1183	Assuming Lognormal Distribution											
1184					95% H-UCL	580.5				90% Chebyshev (MVUE) UCL		195.7
1185				95% Chebyshev (MVUE) UCL		247.1				97.5% Chebyshev (MVUE) UCL		318.5
1186				99% Chebyshev (MVUE) UCL		458.7						
1187												
1188	Nonparametric Distribution Free UCL Statistics											
1189	Data appear to follow a Discernible Distribution at 5% Significance Level											
1190												
1191	Nonparametric Distribution Free UCLs											
1192					95% CLT UCL	127.1				95% Jackknife UCL		132.4
1193				95% Standard Bootstrap UCL		125.3				95% Bootstrap-t UCL		144.5
1194				95% Hall's Bootstrap UCL		113.2				95% Percentile Bootstrap UCL		128.6
1195				95% BCA Bootstrap UCL		133.6						
1196				90% Chebyshev(Mean, Sd) UCL		165.8				95% Chebyshev(Mean, Sd) UCL		204.6
1197				97.5% Chebyshev(Mean, Sd) UCL		258.5				99% Chebyshev(Mean, Sd) UCL		364.4
1198												
1199	Suggested UCL to Use											
1200				95% Chebyshev (Mean, Sd) UCL		204.6						
1201												
1202	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1203	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1204	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1205	For additional insight the user may want to consult a statistician.											
1206												
1207												

	A	B	C	D	E	F	G	H	I	J	K	L
1208	Uranium-234											
1209												
1210						General Statistics						
1211					Total Number of Observations	10				Number of Distinct Observations		6
1212										Number of Missing Observations		0
1213					Minimum	0.72				Mean		2.192
1214					Maximum	6.91				Median		2.192
1215					SD	1.779				Std. Error of Mean		0.562
1216					Coefficient of Variation	0.811				Skewness		2.38
1217												
1218						Normal GOF Test						
1219					Shapiro Wilk Test Statistic	0.671				Shapiro Wilk GOF Test		
1220					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
1221					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
1222					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
1223						Data Not Normal at 5% Significance Level						
1224												
1225						Assuming Normal Distribution						
1226					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1227					95% Student's-t UCL	3.223				95% Adjusted-CLT UCL (Chen-1995)		3.57
1228										95% Modified-t UCL (Johnson-1978)		3.294
1229												
1230						Gamma GOF Test						
1231					A-D Test Statistic	0.855				Anderson-Darling Gamma GOF Test		
1232					5% A-D Critical Value	0.734				Data Not Gamma Distributed at 5% Significance Level		
1233					K-S Test Statistic	0.314				Kolmogrov-Smirnoff Gamma GOF Test		
1234					5% K-S Critical Value	0.269				Data Not Gamma Distributed at 5% Significance Level		
1235						Data Not Gamma Distributed at 5% Significance Level						
1236												
1237						Gamma Statistics						
1238					k hat (MLE)	2.417				k star (bias corrected MLE)		1.759
1239					Theta hat (MLE)	0.907				Theta star (bias corrected MLE)		1.246
1240					nu hat (MLE)	48.34				nu star (bias corrected)		35.17
1241					MLE Mean (bias corrected)	2.192				MLE Sd (bias corrected)		1.653
1242										Approximate Chi Square Value (0.05)		22.6
1243					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		20.87
1244												
1245						Assuming Gamma Distribution						
1246					95% Approximate Gamma UCL (use when n>=50))	3.411				95% Adjusted Gamma UCL (use when n<50)		3.695
1247												
1248						Lognormal GOF Test						
1249					Shapiro Wilk Test Statistic	0.856				Shapiro Wilk Lognormal GOF Test		
1250					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
1251					Lilliefors Test Statistic	0.272				Lilliefors Lognormal GOF Test		
1252					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
1253						Data appear Lognormal at 5% Significance Level						
1254												
1255						Lognormal Statistics						
1256					Minimum of Logged Data	-0.329				Mean of logged Data		0.564
1257					Maximum of Logged Data	1.933				SD of logged Data		0.678
1258												

	A	B	C	D	E	F	G	H	I	J	K	L
1259	Assuming Lognormal Distribution											
1260					95% H-UCL	3.886				90% Chebyshev (MVUE) UCL		3.579
1261				95% Chebyshev (MVUE) UCL		4.225				97.5% Chebyshev (MVUE) UCL		5.121
1262				99% Chebyshev (MVUE) UCL		6.881						
1263												
1264	Nonparametric Distribution Free UCL Statistics											
1265	Data appear to follow a Discernible Distribution at 5% Significance Level											
1266												
1267	Nonparametric Distribution Free UCLs											
1268					95% CLT UCL	3.117				95% Jackknife UCL		3.223
1269				95% Standard Bootstrap UCL		3.075				95% Bootstrap-t UCL		4.083
1270				95% Hall's Bootstrap UCL		7.02				95% Percentile Bootstrap UCL		3.168
1271				95% BCA Bootstrap UCL		3.588						
1272				90% Chebyshev(Mean, Sd) UCL		3.879				95% Chebyshev(Mean, Sd) UCL		4.644
1273				97.5% Chebyshev(Mean, Sd) UCL		5.705				99% Chebyshev(Mean, Sd) UCL		7.789
1274												
1275	Suggested UCL to Use											
1276					95% H-UCL	3.886						
1277												
1278	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1279	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1280	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1281	For additional insight the user may want to consult a statistician.											
1282												
1283	ProUCL computes and outputs H-statistic based UCLs for historical reasons only.											
1284	H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.											
1285	It is therefore recommended to avoid the use of H-statistic based 95% UCLs.											
1286	Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.											
1287												
1288												

	A	B	C	D	E	F	G	H	I	J	K	L
1289	Uranium-235											
1290												
1291						General Statistics						
1292					Total Number of Observations	10				Number of Distinct Observations		6
1293										Number of Missing Observations		0
1294					Minimum	0.026				Mean		0.128
1295					Maximum	0.438				Median		0.128
1296					SD	0.117				Std. Error of Mean		0.0371
1297					Coefficient of Variation	0.92				Skewness		2.348
1298												
1299						Normal GOF Test						
1300					Shapiro Wilk Test Statistic	0.678				Shapiro Wilk GOF Test		
1301					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
1302					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
1303					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
1304						Data Not Normal at 5% Significance Level						
1305												
1306						Assuming Normal Distribution						
1307					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1308					95% Student's-t UCL	0.196				95% Adjusted-CLT UCL (Chen-1995)		0.218
1309										95% Modified-t UCL (Johnson-1978)		0.2
1310												
1311						Gamma GOF Test						
1312					A-D Test Statistic	0.799				Anderson-Darling Gamma GOF Test		
1313					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
1314					K-S Test Statistic	0.3				Kolmogrov-Smirnoff Gamma GOF Test		
1315					5% K-S Critical Value	0.27				Data Not Gamma Distributed at 5% Significance Level		
1316						Data Not Gamma Distributed at 5% Significance Level						
1317												
1318						Gamma Statistics						
1319					k hat (MLE)	1.753				k star (bias corrected MLE)		1.294
1320					Theta hat (MLE)	0.0728				Theta star (bias corrected MLE)		0.0986
1321					nu hat (MLE)	35.07				nu star (bias corrected)		25.88
1322					MLE Mean (bias corrected)	0.128				MLE Sd (bias corrected)		0.112
1323										Approximate Chi Square Value (0.05)		15.29
1324					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		13.89
1325												
1326						Assuming Gamma Distribution						
1327					95% Approximate Gamma UCL (use when n>=50))	0.216				95% Adjusted Gamma UCL (use when n<50)		0.238
1328												
1329						Lognormal GOF Test						
1330					Shapiro Wilk Test Statistic	0.87				Shapiro Wilk Lognormal GOF Test		
1331					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
1332					Lilliefors Test Statistic	0.256				Lilliefors Lognormal GOF Test		
1333					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
1334						Data appear Lognormal at 5% Significance Level						
1335												
1336						Lognormal Statistics						
1337					Minimum of Logged Data	-3.65				Mean of logged Data		-2.371
1338					Maximum of Logged Data	-0.826				SD of logged Data		0.842
1339												

	A	B	C	D	E	F	G	H	I	J	K	L
1340	**Assuming Lognormal Distribution**											
1341					95% H-UCL	0.291				90% Chebyshev (MVUE) UCL		0.233
1342				95% Chebyshev (MVUE) UCL		0.281				97.5% Chebyshev (MVUE) UCL		0.348
1343				99% Chebyshev (MVUE) UCL		0.478						
1344												
1345	**Nonparametric Distribution Free UCL Statistics**											
1346	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1347												
1348	**Nonparametric Distribution Free UCLs**											
1349					95% CLT UCL	0.189				95% Jackknife UCL		0.196
1350				95% Standard Bootstrap UCL		0.185				95% Bootstrap-t UCL		0.25
1351				95% Hall's Bootstrap UCL		0.449				95% Percentile Bootstrap UCL		0.194
1352				95% BCA Bootstrap UCL		0.219						
1353				90% Chebyshev(Mean, Sd) UCL		0.239				95% Chebyshev(Mean, Sd) UCL		0.289
1354				97.5% Chebyshev(Mean, Sd) UCL		0.359				99% Chebyshev(Mean, Sd) UCL		0.497
1355												
1356	**Suggested UCL to Use**											
1357					95% H-UCL	0.291						
1358												
1359	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1360	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1361	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1362	For additional insight the user may want to consult a statistician.											
1363												
1364	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
1365	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
1366	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
1367	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
1368												
1369												

	A	B	C	D	E	F	G	H	I	J	K	L
1370	Uranium-238											
1371												
1372						General Statistics						
1373					Total Number of Observations	10				Number of Distinct Observations		6
1374										Number of Missing Observations		0
1375					Minimum	0.81				Mean		3.108
1376					Maximum	9.45				Median		3.108
1377					SD	2.419				Std. Error of Mean		0.765
1378					Coefficient of Variation	0.778				Skewness		2.246
1379												
1380						Normal GOF Test						
1381					Shapiro Wilk Test Statistic	0.694				Shapiro Wilk GOF Test		
1382					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
1383					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
1384					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
1385						Data Not Normal at 5% Significance Level						
1386												
1387						Assuming Normal Distribution						
1388					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1389					95% Student's-t UCL	4.51				95% Adjusted-CLT UCL (Chen-1995)		4.947
1390										95% Modified-t UCL (Johnson-1978)		4.601
1391												
1392						Gamma GOF Test						
1393					A-D Test Statistic	0.853				Anderson-Darling Gamma GOF Test		
1394					5% A-D Critical Value	0.734				Data Not Gamma Distributed at 5% Significance Level		
1395					K-S Test Statistic	0.314				Kolmogrov-Smirnoff Gamma GOF Test		
1396					5% K-S Critical Value	0.269				Data Not Gamma Distributed at 5% Significance Level		
1397						Data Not Gamma Distributed at 5% Significance Level						
1398												
1399						Gamma Statistics						
1400					k hat (MLE)	2.376				k star (bias corrected MLE)		1.73
1401					Theta hat (MLE)	1.308				Theta star (bias corrected MLE)		1.797
1402					nu hat (MLE)	47.51				nu star (bias corrected)		34.59
1403					MLE Mean (bias corrected)	3.108				MLE Sd (bias corrected)		2.363
1404										Approximate Chi Square Value (0.05)		22.14
1405					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		20.42
1406												
1407						Assuming Gamma Distribution						
1408					95% Approximate Gamma UCL (use when n>=50))	4.856				95% Adjusted Gamma UCL (use when n<50)		5.264
1409												
1410						Lognormal GOF Test						
1411					Shapiro Wilk Test Statistic	0.857				Shapiro Wilk Lognormal GOF Test		
1412					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
1413					Lilliefors Test Statistic	0.276				Lilliefors Lognormal GOF Test		
1414					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
1415						Data appear Lognormal at 5% Significance Level						
1416												
1417						Lognormal Statistics						
1418					Minimum of Logged Data	-0.211				Mean of logged Data		0.909
1419					Maximum of Logged Data	2.246				SD of logged Data		0.712
1420												

	A	B	C	D	E	F	G	H	I	J	K	L
1421	Assuming Lognormal Distribution											
1422					95% H-UCL	5.858				90% Chebyshev (MVUE) UCL		5.265
1423				95% Chebyshev (MVUE) UCL		6.244				97.5% Chebyshev (MVUE) UCL		7.604
1424				99% Chebyshev (MVUE) UCL		10.27						
1425												
1426	Nonparametric Distribution Free UCL Statistics											
1427	Data appear to follow a Discernible Distribution at 5% Significance Level											
1428												
1429	Nonparametric Distribution Free UCLs											
1430					95% CLT UCL	4.366				95% Jackknife UCL		4.51
1431				95% Standard Bootstrap UCL		4.324				95% Bootstrap-t UCL		5.455
1432				95% Hall's Bootstrap UCL		10.01				95% Percentile Bootstrap UCL		4.417
1433				95% BCA Bootstrap UCL		4.831						
1434				90% Chebyshev(Mean, Sd) UCL		5.403				95% Chebyshev(Mean, Sd) UCL		6.442
1435				97.5% Chebyshev(Mean, Sd) UCL		7.884				99% Chebyshev(Mean, Sd) UCL		10.72
1436												
1437	Suggested UCL to Use											
1438					95% H-UCL	5.858						
1439												
1440	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1441	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1442	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1443	For additional insight the user may want to consult a statistician.											
1444												
1445	ProUCL computes and outputs H-statistic based UCLs for historical reasons only.											
1446	H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.											
1447	It is therefore recommended to avoid the use of H-statistic based 95% UCLs.											
1448	Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.											
1449												
1450												

	A	B	C	D	E	F	G	H	I	J	K	L
1451	Vanadium											
1452												
1453						General Statistics						
1454					Total Number of Observations	10				Number of Distinct Observations		10
1455										Number of Missing Observations		0
1456					Minimum	60				Mean		119.3
1457					Maximum	195				Median		114
1458					SD	40.16				Std. Error of Mean		12.7
1459					Coefficient of Variation	0.337				Skewness		0.335
1460												
1461						Normal GOF Test						
1462					Shapiro Wilk Test Statistic	0.973				Shapiro Wilk GOF Test		
1463					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
1464					Lilliefors Test Statistic	0.143				Lilliefors GOF Test		
1465					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
1466						Data appear Normal at 5% Significance Level						
1467												
1468						Assuming Normal Distribution						
1469					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1470					95% Student's-t UCL	142.6				95% Adjusted-CLT UCL (Chen-1995)		141.6
1471										95% Modified-t UCL (Johnson-1978)		142.8
1472												
1473						Gamma GOF Test						
1474					A-D Test Statistic	0.211				Anderson-Darling Gamma GOF Test		
1475					5% A-D Critical Value	0.726				Detected data appear Gamma Distributed at 5% Significance Level		
1476					K-S Test Statistic	0.147				Kolmogrov-Smirnoff Gamma GOF Test		
1477					5% K-S Critical Value	0.267				Detected data appear Gamma Distributed at 5% Significance Level		
1478						Detected data appear Gamma Distributed at 5% Significance Level						
1479												
1480						Gamma Statistics						
1481					k hat (MLE)	9.331				k star (bias corrected MLE)		6.598
1482					Theta hat (MLE)	12.79				Theta star (bias corrected MLE)		18.08
1483					nu hat (MLE)	186.6				nu star (bias corrected)		132
1484					MLE Mean (bias corrected)	119.3				MLE Sd (bias corrected)		46.44
1485										Approximate Chi Square Value (0.05)		106.4
1486					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		102.4
1487												
1488						Assuming Gamma Distribution						
1489					95% Approximate Gamma UCL (use when n>=50))	147.9				95% Adjusted Gamma UCL (use when n<50)		153.7
1490												
1491						Lognormal GOF Test						
1492					Shapiro Wilk Test Statistic	0.962				Shapiro Wilk Lognormal GOF Test		
1493					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
1494					Lilliefors Test Statistic	0.17				Lilliefors Lognormal GOF Test		
1495					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
1496						Data appear Lognormal at 5% Significance Level						
1497												
1498						Lognormal Statistics						
1499					Minimum of Logged Data	4.094				Mean of logged Data		4.727
1500					Maximum of Logged Data	5.273				SD of logged Data		0.357
1501												

	A	B	C	D	E	F	G	H	I	J	K	L
1502	**Assuming Lognormal Distribution**											
1503					95% H-UCL	153.4				90% Chebyshev (MVUE) UCL		160.5
1504				95% Chebyshev (MVUE) UCL		179				97.5% Chebyshev (MVUE) UCL		204.7
1505				99% Chebyshev (MVUE) UCL		255.2						
1506												
1507	**Nonparametric Distribution Free UCL Statistics**											
1508	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1509												
1510	**Nonparametric Distribution Free UCLs**											
1511					95% CLT UCL	140.2				95% Jackknife UCL		142.6
1512				95% Standard Bootstrap UCL		139.3				95% Bootstrap-t UCL		144.5
1513				95% Hall's Bootstrap UCL		145.2				95% Percentile Bootstrap UCL		139.3
1514				95% BCA Bootstrap UCL		139.2						
1515				90% Chebyshev(Mean, Sd) UCL		157.4				95% Chebyshev(Mean, Sd) UCL		174.7
1516				97.5% Chebyshev(Mean, Sd) UCL		198.6				99% Chebyshev(Mean, Sd) UCL		245.6
1517												
1518	**Suggested UCL to Use**											
1519				95% Student's-t UCL		142.6						
1520												
1521	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1522	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1523	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1524	For additional insight the user may want to consult a statistician.											
1525												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			2/20/2015 2:14:08 PM								
5	From File			EPC_026Sub_EU04.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Aluminum											
12												
13						General Statistics						
14					Total Number of Observations	16				Number of Distinct Observations		6
15										Number of Missing Observations		0
16					Minimum	5200				Mean		11124
17					Maximum	15700				Median		11124
18					SD	2071				Std. Error of Mean		517.7
19					Coefficient of Variation	0.186				Skewness		-0.941
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.726				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
26						Data Not Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	12032				95% Adjusted-CLT UCL (Chen-1995)		11845
31										95% Modified-t UCL (Johnson-1978)		12011
32												
33						Gamma GOF Test						
34					A-D Test Statistic	2.475				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.736				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.402				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.215				Data Not Gamma Distributed at 5% Significance Level		
38						Data Not Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	24.55				k star (bias corrected MLE)		19.99
42					Theta hat (MLE)	453.1				Theta star (bias corrected MLE)		556.5
43					nu hat (MLE)	785.6				nu star (bias corrected)		639.6
44					MLE Mean (bias corrected)	11124				MLE Sd (bias corrected)		2488
45										Approximate Chi Square Value (0.05)		581.9
46					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		575.7
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	12226				95% Adjusted Gamma UCL (use when n<50)		12359
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.638				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.411				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	8.556				Mean of logged Data		9.296
60					Maximum of Logged Data	9.661				SD of logged Data		0.225
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	12419				90% Chebyshev (MVUE) UCL		13052
64					95% Chebyshev (MVUE) UCL	13909				97.5% Chebyshev (MVUE) UCL		15100
65					99% Chebyshev (MVUE) UCL	17437						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	11976				95% Jackknife UCL		12032
72					95% Standard Bootstrap UCL	11925				95% Bootstrap-t UCL		11909
73					95% Hall's Bootstrap UCL	11994				95% Percentile Bootstrap UCL		11955
74					95% BCA Bootstrap UCL	11809						
75					90% Chebyshev(Mean, Sd) UCL	12677				95% Chebyshev(Mean, Sd) UCL		13381
76					97.5% Chebyshev(Mean, Sd) UCL	14357				99% Chebyshev(Mean, Sd) UCL		16276
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	12032				or 95% Modified-t UCL		12011
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												

	A	B	C	D	E	F	G	H	I	J	K	L
90	Antimony											
91												
92					General Statistics							
93					Total Number of Observations	16			Number of Distinct Observations			9
94									Number of Missing Observations			0
95					Minimum	0.18			Mean			47.33
96					Maximum	106.8			Median			47.33
97					SD	23.73			Std. Error of Mean			5.933
98					Coefficient of Variation	0.501			Skewness			0.366
99												
100					Normal GOF Test							
101					Shapiro Wilk Test Statistic	0.879			Shapiro Wilk GOF Test			
102					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
103					Lilliefors Test Statistic	0.25			Lilliefors GOF Test			
104					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
105					Data Not Normal at 5% Significance Level							
106												
107					Assuming Normal Distribution							
108					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
109					95% Student's-t UCL	57.73			95% Adjusted-CLT UCL (Chen-1995)			57.67
110									95% Modified-t UCL (Johnson-1978)			57.82
111												
112					Gamma GOF Test							
113					A-D Test Statistic	2.25			Anderson-Darling Gamma GOF Test			
114					5% A-D Critical Value	0.755			Data Not Gamma Distributed at 5% Significance Level			
115					K-S Test Statistic	0.36			Kolmogrov-Smirnoff Gamma GOF Test			
116					5% K-S Critical Value	0.219			Data Not Gamma Distributed at 5% Significance Level			
117					Data Not Gamma Distributed at 5% Significance Level							
118												
119					Gamma Statistics							
120					k hat (MLE)	1.465			k star (bias corrected MLE)			1.232
121					Theta hat (MLE)	32.31			Theta star (bias corrected MLE)			38.42
122					nu hat (MLE)	46.88			nu star (bias corrected)			39.42
123					MLE Mean (bias corrected)	47.33			MLE Sd (bias corrected)			42.64
124									Approximate Chi Square Value (0.05)			26.04
125					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			24.8
126												
127					Assuming Gamma Distribution							
128					95% Approximate Gamma UCL (use when n>=50))	71.66			95% Adjusted Gamma UCL (use when n<50)			75.22
129												
130					Lognormal GOF Test							
131					Shapiro Wilk Test Statistic	0.53			Shapiro Wilk Lognormal GOF Test			
132					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
133					Lilliefors Test Statistic	0.358			Lilliefors Lognormal GOF Test			
134					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
135					Data Not Lognormal at 5% Significance Level							
136												
137					Lognormal Statistics							
138					Minimum of Logged Data	-1.715			Mean of logged Data			3.479
139					Maximum of Logged Data	4.671			SD of logged Data			1.469
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141	Assuming Lognormal Distribution											
142					95% H-UCL	358.2				90% Chebyshev (MVUE) UCL		191.8
143				95% Chebyshev (MVUE) UCL		240.4				97.5% Chebyshev (MVUE) UCL		307.8
144				99% Chebyshev (MVUE) UCL		440.3						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data do not follow a Discernible Distribution (0.05)											
148												
149	Nonparametric Distribution Free UCLs											
150					95% CLT UCL	57.09				95% Jackknife UCL		57.73
151				95% Standard Bootstrap UCL		56.33				95% Bootstrap-t UCL		57.96
152				95% Hall's Bootstrap UCL		61.04				95% Percentile Bootstrap UCL		56.69
153				95% BCA Bootstrap UCL		57.63						
154				90% Chebyshev(Mean, Sd) UCL		65.13				95% Chebyshev(Mean, Sd) UCL		73.19
155				97.5% Chebyshev(Mean, Sd) UCL		84.38				99% Chebyshev(Mean, Sd) UCL		106.4
156												
157	Suggested UCL to Use											
158				95% Chebyshev (Mean, Sd) UCL		73.19						
159												
160	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
161	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
162	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
163	For additional insight the user may want to consult a statistician.											
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Arsenic											
167												
168					General Statistics							
169					Total Number of Observations	16				Number of Distinct Observations		7
170										Number of Missing Observations		0
171					Minimum	6.9				Mean		19.65
172					Maximum	160				Median		11
173					SD	37.46				Std. Error of Mean		9.365
174					Coefficient of Variation	1.907				Skewness		3.987
175												
176					Normal GOF Test							
177					Shapiro Wilk Test Statistic	0.306				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.512				Lilliefors GOF Test		
180					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
181					Data Not Normal at 5% Significance Level							
182												
183					Assuming Normal Distribution							
184					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
185					95% Student's-t UCL	36.07				95% Adjusted-CLT UCL (Chen-1995)		45.03
186										95% Modified-t UCL (Johnson-1978)		37.62
187												
188					Gamma GOF Test							
189					A-D Test Statistic	4.482				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.761				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.486				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.22				Data Not Gamma Distributed at 5% Significance Level		
193					Data Not Gamma Distributed at 5% Significance Level							
194												
195					Gamma Statistics							
196					k hat (MLE)	1.161				k star (bias corrected MLE)		0.985
197					Theta hat (MLE)	16.92				Theta star (bias corrected MLE)		19.94
198					nu hat (MLE)	37.17				nu star (bias corrected)		31.53
199					MLE Mean (bias corrected)	19.65				MLE Sd (bias corrected)		19.8
200										Approximate Chi Square Value (0.05)		19.7
201					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		18.64
202												
203					Assuming Gamma Distribution							
204					95% Approximate Gamma UCL (use when n>=50))	31.45				95% Adjusted Gamma UCL (use when n<50)		33.24
205												
206					Lognormal GOF Test							
207					Shapiro Wilk Test Statistic	0.469				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.426				Lilliefors Lognormal GOF Test		
210					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
211					Data Not Lognormal at 5% Significance Level							
212												
213					Lognormal Statistics							
214					Minimum of Logged Data	1.932				Mean of logged Data		2.489
215					Maximum of Logged Data	5.075				SD of logged Data		0.712
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217	Assuming Lognormal Distribution											
218					95% H-UCL	23.68				90% Chebyshev (MVUE) UCL		23.85
219				95% Chebyshev (MVUE) UCL		27.75				97.5% Chebyshev (MVUE) UCL		33.17
220				99% Chebyshev (MVUE) UCL		43.81						
221												
222	Nonparametric Distribution Free UCL Statistics											
223	Data do not follow a Discernible Distribution (0.05)											
224												
225	Nonparametric Distribution Free UCLs											
226					95% CLT UCL	35.05				95% Jackknife UCL		36.07
227				95% Standard Bootstrap UCL		34.72				95% Bootstrap-t UCL		295
228				95% Hall's Bootstrap UCL		278				95% Percentile Bootstrap UCL		38.23
229				95% BCA Bootstrap UCL		47.74						
230				90% Chebyshev(Mean, Sd) UCL		47.75				95% Chebyshev(Mean, Sd) UCL		60.47
231				97.5% Chebyshev(Mean, Sd) UCL		78.14				99% Chebyshev(Mean, Sd) UCL		112.8
232												
233	Suggested UCL to Use											
234				95% Chebyshev (Mean, Sd) UCL		60.47						
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241												

	A	B	C	D	E	F	G	H	I	J	K	L
242	Cadmium											
243												
244					General Statistics							
245					Total Number of Observations	16				Number of Distinct Observations		6
246										Number of Missing Observations		0
247					Minimum	0.14				Mean		7.205
248					Maximum	14.77				Median		7.205
249					SD	4.085				Std. Error of Mean		1.021
250					Coefficient of Variation	0.567				Skewness		0.044
251												
252					Normal GOF Test							
253					Shapiro Wilk Test Statistic	0.899				Shapiro Wilk GOF Test		
254					5% Shapiro Wilk Critical Value	0.887				Data appear Normal at 5% Significance Level		
255					Lilliefors Test Statistic	0.25				Lilliefors GOF Test		
256					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
257					Data appear Approximate Normal at 5% Significance Level							
258												
259					Assuming Normal Distribution							
260					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
261					95% Student's-t UCL	8.995				95% Adjusted-CLT UCL (Chen-1995)		8.897
262										95% Modified-t UCL (Johnson-1978)		8.997
263												
264					Gamma GOF Test							
265					A-D Test Statistic	1.331				Anderson-Darling Gamma GOF Test		
266					5% A-D Critical Value	0.753				Data Not Gamma Distributed at 5% Significance Level		
267					K-S Test Statistic	0.353				Kolmogrov-Smirnoff Gamma GOF Test		
268					5% K-S Critical Value	0.219				Data Not Gamma Distributed at 5% Significance Level		
269					Data Not Gamma Distributed at 5% Significance Level							
270												
271					Gamma Statistics							
272					k hat (MLE)	1.678				k star (bias corrected MLE)		1.405
273					Theta hat (MLE)	4.294				Theta star (bias corrected MLE)		5.128
274					nu hat (MLE)	53.7				nu star (bias corrected)		44.96
275					MLE Mean (bias corrected)	7.205				MLE Sd (bias corrected)		6.078
276										Approximate Chi Square Value (0.05)		30.58
277					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		29.23
278												
279					Assuming Gamma Distribution							
280					95% Approximate Gamma UCL (use when n>=50))	10.59				95% Adjusted Gamma UCL (use when n<50)		11.08
281												
282					Lognormal GOF Test							
283					Shapiro Wilk Test Statistic	0.701				Shapiro Wilk Lognormal GOF Test		
284					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
285					Lilliefors Test Statistic	0.363				Lilliefors Lognormal GOF Test		
286					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
287					Data Not Lognormal at 5% Significance Level							
288												
289					Lognormal Statistics							
290					Minimum of Logged Data	-1.966				Mean of logged Data		1.648
291					Maximum of Logged Data	2.693				SD of logged Data		1.136
292												

	A	B	C	D	E	F	G	H	I	J	K	L
293	**Assuming Lognormal Distribution**											
294					95% H-UCL	23.31				90% Chebyshev (MVUE) UCL		18.2
295				95% Chebyshev (MVUE) UCL		22.22				97.5% Chebyshev (MVUE) UCL		27.79
296				99% Chebyshev (MVUE) UCL		38.75						
297												
298	**Nonparametric Distribution Free UCL Statistics**											
299	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
300												
301	**Nonparametric Distribution Free UCLs**											
302					95% CLT UCL	8.885				95% Jackknife UCL		8.995
303				95% Standard Bootstrap UCL		8.812				95% Bootstrap-t UCL		9.054
304				95% Hall's Bootstrap UCL		8.89				95% Percentile Bootstrap UCL		8.77
305				95% BCA Bootstrap UCL		8.918						
306				90% Chebyshev(Mean, Sd) UCL		10.27				95% Chebyshev(Mean, Sd) UCL		11.66
307				97.5% Chebyshev(Mean, Sd) UCL		13.58				99% Chebyshev(Mean, Sd) UCL		17.37
308												
309	**Suggested UCL to Use**											
310				95% Student's-t UCL		8.995						
311												
312	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
313	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
314	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
315	For additional insight the user may want to consult a statistician.											
316												
317												

	A	B	C	D	E	F	G	H	I	J	K	L
318	Cesium-137											
319												
320						General Statistics						
321					Total Number of Observations	16				Number of Distinct Observations		9
322										Number of Missing Observations		0
323					Minimum	-0.0106				Mean		1.885
324					Maximum	11.1				Median		1.885
325					SD	2.572				Std. Error of Mean		0.643
326					Coefficient of Variation	1.365				Skewness		3.399
327												
328						Normal GOF Test						
329					Shapiro Wilk Test Statistic	0.52				Shapiro Wilk GOF Test		
330					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
331					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
332					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
333						Data Not Normal at 5% Significance Level						
334												
335						Assuming Normal Distribution						
336					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
337					95% Student's-t UCL	3.012				95% Adjusted-CLT UCL (Chen-1995)		3.526
338										95% Modified-t UCL (Johnson-1978)		3.103
339						Gamma Statistics Not Available						
340						Lognormal Statistics Not Available						
341												
342						Nonparametric Distribution Free UCL Statistics						
343						Data do not follow a Discernible Distribution (0.05)						
344												
345						Nonparametric Distribution Free UCLs						
346					95% CLT UCL	2.943				95% Jackknife UCL		3.012
347					95% Standard Bootstrap UCL	2.934				95% Bootstrap-t UCL		4.496
348					95% Hall's Bootstrap UCL	7.31				95% Percentile Bootstrap UCL		3.109
349					95% BCA Bootstrap UCL	3.678						
350					90% Chebyshev(Mean, Sd) UCL	3.814				95% Chebyshev(Mean, Sd) UCL		4.688
351					97.5% Chebyshev(Mean, Sd) UCL	5.901				99% Chebyshev(Mean, Sd) UCL		8.283
352												
353						Suggested UCL to Use						
354					95% Chebyshev (Mean, Sd) UCL	4.688						
355												
356						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
357						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
358						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
359						For additional insight the user may want to consult a statistician.						
360												
361												

	A	B	C	D	E	F	G	H	I	J	K	L
362	Chromium											
363												
364					General Statistics							
365					Total Number of Observations	16				Number of Distinct Observations		12
366										Number of Missing Observations		0
367					Minimum	10.9				Mean		77.51
368					Maximum	231				Median		85
369					SD	55.69				Std. Error of Mean		13.92
370					Coefficient of Variation	0.718				Skewness		1.306
371												
372					Normal GOF Test							
373					Shapiro Wilk Test Statistic	0.861				Shapiro Wilk GOF Test		
374					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
375					Lilliefors Test Statistic	0.217				Lilliefors GOF Test		
376					5% Lilliefors Critical Value	0.222				Data appear Normal at 5% Significance Level		
377					Data appear Approximate Normal at 5% Significance Level							
378												
379					Assuming Normal Distribution							
380					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
381					95% Student's-t UCL	101.9				95% Adjusted-CLT UCL (Chen-1995)		105.3
382										95% Modified-t UCL (Johnson-1978)		102.7
383												
384					Gamma GOF Test							
385					A-D Test Statistic	0.661				Anderson-Darling Gamma GOF Test		
386					5% A-D Critical Value	0.751				Detected data appear Gamma Distributed at 5% Significance Level		
387					K-S Test Statistic	0.27				Kolmogrov-Smirnoff Gamma GOF Test		
388					5% K-S Critical Value	0.218				Data Not Gamma Distributed at 5% Significance Level		
389					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
390												
391					Gamma Statistics							
392					k hat (MLE)	1.921				k star (bias corrected MLE)		1.602
393					Theta hat (MLE)	40.35				Theta star (bias corrected MLE)		48.38
394					nu hat (MLE)	61.46				nu star (bias corrected)		51.27
395					MLE Mean (bias corrected)	77.51				MLE Sd (bias corrected)		61.23
396										Approximate Chi Square Value (0.05)		35.83
397					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		34.36
398												
399					Assuming Gamma Distribution							
400					95% Approximate Gamma UCL (use when n>=50))	110.9				95% Adjusted Gamma UCL (use when n<50)		115.7
401												
402					Lognormal GOF Test							
403					Shapiro Wilk Test Statistic	0.913				Shapiro Wilk Lognormal GOF Test		
404					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
405					Lilliefors Test Statistic	0.296				Lilliefors Lognormal GOF Test		
406					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
407					Data appear Approximate Lognormal at 5% Significance Level							
408												
409					Lognormal Statistics							
410					Minimum of Logged Data	2.389				Mean of logged Data		4.068
411					Maximum of Logged Data	5.442				SD of logged Data		0.845
412												

	A	B	C	D	E	F	G	H	I	J	K	L
413	**Assuming Lognormal Distribution**											
414					95% H-UCL	143.4				90% Chebyshev (MVUE) UCL		136.6
415					95% Chebyshev (MVUE) UCL	161.8				97.5% Chebyshev (MVUE) UCL		196.6
416					99% Chebyshev (MVUE) UCL	265.1						
417												
418	**Nonparametric Distribution Free UCL Statistics**											
419	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
420												
421	**Nonparametric Distribution Free UCLs**											
422					95% CLT UCL	100.4				95% Jackknife UCL		101.9
423					95% Standard Bootstrap UCL	99.68				95% Bootstrap-t UCL		108.6
424					95% Hall's Bootstrap UCL	119.6				95% Percentile Bootstrap UCL		100.7
425					95% BCA Bootstrap UCL	101.8						
426					90% Chebyshev(Mean, Sd) UCL	119.3				95% Chebyshev(Mean, Sd) UCL		138.2
427					97.5% Chebyshev(Mean, Sd) UCL	164.5				99% Chebyshev(Mean, Sd) UCL		216
428												
429	**Suggested UCL to Use**											
430					95% Student's-t UCL	101.9						
431												
432	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
433	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
434	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
435	For additional insight the user may want to consult a statistician.											
436												
437												

	A	B	C	D	E	F	G	H	I	J	K	L
438	Cobalt											
439												
440					General Statistics							
441					Total Number of Observations	16				Number of Distinct Observations		4
442										Number of Missing Observations		0
443					Minimum	7.2				Mean		13.22
444					Maximum	23.6				Median		13.22
445					SD	3.296				Std. Error of Mean		0.824
446					Coefficient of Variation	0.249				Skewness		1.739
447												
448					Normal GOF Test							
449					Shapiro Wilk Test Statistic	0.58				Shapiro Wilk GOF Test		
450					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
451					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
452					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
453					Data Not Normal at 5% Significance Level							
454												
455					Assuming Normal Distribution							
456					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
457					95% Student's-t UCL	14.66				95% Adjusted-CLT UCL (Chen-1995)		14.96
458										95% Modified-t UCL (Johnson-1978)		14.72
459												
460					Gamma GOF Test							
461					A-D Test Statistic	3.304				Anderson-Darling Gamma GOF Test		
462					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
463					K-S Test Statistic	0.407				Kolmogrov-Smirnoff Gamma GOF Test		
464					5% K-S Critical Value	0.215				Data Not Gamma Distributed at 5% Significance Level		
465					Data Not Gamma Distributed at 5% Significance Level							
466												
467					Gamma Statistics							
468					k hat (MLE)	18.84				k star (bias corrected MLE)		15.35
469					Theta hat (MLE)	0.702				Theta star (bias corrected MLE)		0.861
470					nu hat (MLE)	603				nu star (bias corrected)		491.2
471					MLE Mean (bias corrected)	13.22				MLE Sd (bias corrected)		3.374
472										Approximate Chi Square Value (0.05)		440.9
473					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		435.4
474												
475					Assuming Gamma Distribution							
476					95% Approximate Gamma UCL (use when n>=50))	14.73				95% Adjusted Gamma UCL (use when n<50)		14.92
477												
478					Lognormal GOF Test							
479					Shapiro Wilk Test Statistic	0.627				Shapiro Wilk Lognormal GOF Test		
480					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
481					Lilliefors Test Statistic	0.42				Lilliefors Lognormal GOF Test		
482					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
483					Data Not Lognormal at 5% Significance Level							
484												
485					Lognormal Statistics							
486					Minimum of Logged Data	1.974				Mean of logged Data		2.555
487					Maximum of Logged Data	3.161				SD of logged Data		0.239
488												

	A	B	C	D	E	F	G	H	I	J	K	L
489					Assuming Lognormal Distribution							
490					95% H-UCL	14.82				90% Chebyshev (MVUE) UCL		15.6
491				95% Chebyshev (MVUE) UCL		16.68				97.5% Chebyshev (MVUE) UCL		18.18
492				99% Chebyshev (MVUE) UCL		21.12						
493												
494					Nonparametric Distribution Free UCL Statistics							
495					Data do not follow a Discernible Distribution (0.05)							
496												
497					Nonparametric Distribution Free UCLs							
498					95% CLT UCL	14.58				95% Jackknife UCL		14.66
499				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
500				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
501				95% BCA Bootstrap UCL		N/A						
502				90% Chebyshev(Mean, Sd) UCL		15.69				95% Chebyshev(Mean, Sd) UCL		16.81
503				97.5% Chebyshev(Mean, Sd) UCL		18.37				99% Chebyshev(Mean, Sd) UCL		21.42
504												
505					Suggested UCL to Use							
506					95% Student's-t UCL	14.66				or 95% Modified-t UCL		14.72
507												
508	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
509	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
510	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
511	For additional insight the user may want to consult a statistician.											
512												
513												

	A	B	C	D	E	F	G	H	I	J	K	L
514	Copper											
515												
516					General Statistics							
517					Total Number of Observations	16				Number of Distinct Observations		16
518										Number of Missing Observations		0
519					Minimum	9.79				Mean		665.4
520					Maximum	9520				Median		66
521					SD	2362				Std. Error of Mean		590.4
522					Coefficient of Variation	3.549				Skewness		3.998
523												
524					Normal GOF Test							
525					Shapiro Wilk Test Statistic	0.287				Shapiro Wilk GOF Test		
526					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
527					Lilliefors Test Statistic	0.518				Lilliefors GOF Test		
528					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
529					Data Not Normal at 5% Significance Level							
530												
531					Assuming Normal Distribution							
532					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
533					95% Student's-t UCL	1700				95% Adjusted-CLT UCL (Chen-1995)		2267
534										95% Modified-t UCL (Johnson-1978)		1799
535												
536					Gamma GOF Test							
537					A-D Test Statistic	3.936				Anderson-Darling Gamma GOF Test		
538					5% A-D Critical Value	0.831				Data Not Gamma Distributed at 5% Significance Level		
539					K-S Test Statistic	0.439				Kolmogrov-Smirnoff Gamma GOF Test		
540					5% K-S Critical Value	0.232				Data Not Gamma Distributed at 5% Significance Level		
541					Data Not Gamma Distributed at 5% Significance Level							
542												
543					Gamma Statistics							
544					k hat (MLE)	0.331				k star (bias corrected MLE)		0.311
545					Theta hat (MLE)	2009				Theta star (bias corrected MLE)		2141
546					nu hat (MLE)	10.6				nu star (bias corrected)		9.944
547					MLE Mean (bias corrected)	665.4				MLE Sd (bias corrected)		1194
548										Approximate Chi Square Value (0.05)		3.907
549					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		3.487
550												
551					Assuming Gamma Distribution							
552					95% Approximate Gamma UCL (use when n>=50))	1694				95% Adjusted Gamma UCL (use when n<50)		1898
553												
554					Lognormal GOF Test							
555					Shapiro Wilk Test Statistic	0.702				Shapiro Wilk Lognormal GOF Test		
556					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
557					Lilliefors Test Statistic	0.262				Lilliefors Lognormal GOF Test		
558					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
559					Data Not Lognormal at 5% Significance Level							
560												
561					Lognormal Statistics							
562					Minimum of Logged Data	2.281				Mean of logged Data		4.452
563					Maximum of Logged Data	9.161				SD of logged Data		1.419
564												

	A	B	C	D	E	F	G	H	I	J	K	L
565	Assuming Lognormal Distribution											
566					95% H-UCL	815.3				90% Chebyshev (MVUE) UCL		467.2
567				95% Chebyshev (MVUE) UCL		583.5				97.5% Chebyshev (MVUE) UCL		745
568				99% Chebyshev (MVUE) UCL		1062						
569												
570	Nonparametric Distribution Free UCL Statistics											
571	Data do not follow a Discernible Distribution (0.05)											
572												
573	Nonparametric Distribution Free UCLs											
574					95% CLT UCL	1637				95% Jackknife UCL		1700
575				95% Standard Bootstrap UCL		1616				95% Bootstrap-t UCL		48263
576				95% Hall's Bootstrap UCL		18815				95% Percentile Bootstrap UCL		1844
577				95% BCA Bootstrap UCL		2438						
578				90% Chebyshev(Mean, Sd) UCL		2437				95% Chebyshev(Mean, Sd) UCL		3239
579				97.5% Chebyshev(Mean, Sd) UCL		4352				99% Chebyshev(Mean, Sd) UCL		6540
580												
581	Suggested UCL to Use											
582				95% Chebyshev (Mean, Sd) UCL		3239						
583												
584	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
585	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
586	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
587	For additional insight the user may want to consult a statistician.											
588												
589												

	A	B	C	D	E	F	G	H	I	J	K	L
590	Iron											
591												
592					General Statistics							
593					Total Number of Observations	16				Number of Distinct Observations		16
594										Number of Missing Observations		0
595					Minimum	23163				Mean		29055
596					Maximum	51700				Median		27650
597					SD	6858				Std. Error of Mean		1714
598					Coefficient of Variation	0.236				Skewness		2.624
599												
600					Normal GOF Test							
601					Shapiro Wilk Test Statistic	0.711				Shapiro Wilk GOF Test		
602					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
603					Lilliefors Test Statistic	0.268				Lilliefors GOF Test		
604					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
605					Data Not Normal at 5% Significance Level							
606												
607					Assuming Normal Distribution							
608					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
609					95% Student's-t UCL	32061				95% Adjusted-CLT UCL (Chen-1995)		33077
610										95% Modified-t UCL (Johnson-1978)		32248
611												
612					Gamma GOF Test							
613					A-D Test Statistic	1.023				Anderson-Darling Gamma GOF Test		
614					5% A-D Critical Value	0.736				Data Not Gamma Distributed at 5% Significance Level		
615					K-S Test Statistic	0.245				Kolmogrov-Smirnoff Gamma GOF Test		
616					5% K-S Critical Value	0.215				Data Not Gamma Distributed at 5% Significance Level		
617					Data Not Gamma Distributed at 5% Significance Level							
618												
619					Gamma Statistics							
620					k hat (MLE)	24.72				k star (bias corrected MLE)		20.13
621					Theta hat (MLE)	1175				Theta star (bias corrected MLE)		1443
622					nu hat (MLE)	791.1				nu star (bias corrected)		644.1
623					MLE Mean (bias corrected)	29055				MLE Sd (bias corrected)		6476
624										Approximate Chi Square Value (0.05)		586.2
625					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		580
626												
627					Assuming Gamma Distribution							
628					95% Approximate Gamma UCL (use when n>=50))	31924				95% Adjusted Gamma UCL (use when n<50)		32270
629												
630					Lognormal GOF Test							
631					Shapiro Wilk Test Statistic	0.817				Shapiro Wilk Lognormal GOF Test		
632					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
633					Lilliefors Test Statistic	0.231				Lilliefors Lognormal GOF Test		
634					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
635					Data Not Lognormal at 5% Significance Level							
636												
637					Lognormal Statistics							
638					Minimum of Logged Data	10.05				Mean of logged Data		10.26
639					Maximum of Logged Data	10.85				SD of logged Data		0.197
640												

	A	B	C	D	E	F	G	H	I	J	K	L
641					Assuming Lognormal Distribution							
642					95% H-UCL	31802				90% Chebyshev (MVUE) UCL		33291
643					95% Chebyshev (MVUE) UCL	35238				97.5% Chebyshev (MVUE) UCL		37942
644					99% Chebyshev (MVUE) UCL	43252						
645												
646					Nonparametric Distribution Free UCL Statistics							
647					Data do not follow a Discernible Distribution (0.05)							
648												
649					Nonparametric Distribution Free UCLs							
650					95% CLT UCL	31875				95% Jackknife UCL		32061
651					95% Standard Bootstrap UCL	31815				95% Bootstrap-t UCL		35035
652					95% Hall's Bootstrap UCL	43933				95% Percentile Bootstrap UCL		32184
653					95% BCA Bootstrap UCL	33519						
654					90% Chebyshev(Mean, Sd) UCL	34199				95% Chebyshev(Mean, Sd) UCL		36529
655					97.5% Chebyshev(Mean, Sd) UCL	39762				99% Chebyshev(Mean, Sd) UCL		46114
656												
657					Suggested UCL to Use							
658					95% Student's-t UCL	32061				or 95% Modified-t UCL		32248
659												
660					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
661					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
662					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
663					For additional insight the user may want to consult a statistician.							
664												
665												

	A	B	C	D	E	F	G	H	I	J	K	L
666	Manganese											
667												
668					General Statistics							
669					Total Number of Observations	16				Number of Distinct Observations		15
670										Number of Missing Observations		0
671					Minimum	210				Mean		594.6
672					Maximum	1800				Median		488.5
673					SD	383.9				Std. Error of Mean		95.99
674					Coefficient of Variation	0.646				Skewness		2.34
675												
676					Normal GOF Test							
677					Shapiro Wilk Test Statistic	0.742				Shapiro Wilk GOF Test		
678					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
679					Lilliefors Test Statistic	0.284				Lilliefors GOF Test		
680					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
681					Data Not Normal at 5% Significance Level							
682												
683					Assuming Normal Distribution							
684					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
685					95% Student's-t UCL	762.9				95% Adjusted-CLT UCL (Chen-1995)		812.5
686										95% Modified-t UCL (Johnson-1978)		772.3
687												
688					Gamma GOF Test							
689					A-D Test Statistic	0.712				Anderson-Darling Gamma GOF Test		
690					5% A-D Critical Value	0.742				Detected data appear Gamma Distributed at 5% Significance Level		
691					K-S Test Statistic	0.21				Kolmogrov-Smirnoff Gamma GOF Test		
692					5% K-S Critical Value	0.216				Detected data appear Gamma Distributed at 5% Significance Level		
693					Detected data appear Gamma Distributed at 5% Significance Level							
694												
695					Gamma Statistics							
696					k hat (MLE)	3.758				k star (bias corrected MLE)		3.095
697					Theta hat (MLE)	158.2				Theta star (bias corrected MLE)		192.1
698					nu hat (MLE)	120.2				nu star (bias corrected)		99.03
699					MLE Mean (bias corrected)	594.6				MLE Sd (bias corrected)		338
700										Approximate Chi Square Value (0.05)		77.08
701					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		74.87
702												
703					Assuming Gamma Distribution							
704					95% Approximate Gamma UCL (use when n>=50)	764				95% Adjusted Gamma UCL (use when n<50)		786.5
705												
706					Lognormal GOF Test							
707					Shapiro Wilk Test Statistic	0.945				Shapiro Wilk Lognormal GOF Test		
708					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
709					Lilliefors Test Statistic	0.172				Lilliefors Lognormal GOF Test		
710					5% Lilliefors Critical Value	0.222				Data appear Lognormal at 5% Significance Level		
711					Data appear Lognormal at 5% Significance Level							
712												
713					Lognormal Statistics							
714					Minimum of Logged Data	5.347				Mean of logged Data		6.249
715					Maximum of Logged Data	7.496				SD of logged Data		0.513
716												

	A	B	C	D	E	F	G	H	I	J	K	L
717	Assuming Lognormal Distribution											
718					95% H-UCL	775.8				90% Chebyshev (MVUE) UCL		817.4
719				95% Chebyshev (MVUE) UCL		922.7				97.5% Chebyshev (MVUE) UCL		1069
720				99% Chebyshev (MVUE) UCL		1356						
721												
722	Nonparametric Distribution Free UCL Statistics											
723	Data appear to follow a Discernible Distribution at 5% Significance Level											
724												
725	Nonparametric Distribution Free UCLs											
726					95% CLT UCL	752.5				95% Jackknife UCL		762.9
727				95% Standard Bootstrap UCL		749.1				95% Bootstrap-t UCL		913.1
728				95% Hall's Bootstrap UCL		1444				95% Percentile Bootstrap UCL		770.6
729				95% BCA Bootstrap UCL		802.5						
730				90% Chebyshev(Mean, Sd) UCL		882.6				95% Chebyshev(Mean, Sd) UCL		1013
731				97.5% Chebyshev(Mean, Sd) UCL		1194				99% Chebyshev(Mean, Sd) UCL		1550
732												
733	Suggested UCL to Use											
734				95% Adjusted Gamma UCL		786.5						
735												
736	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
737	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
738	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
739	For additional insight the user may want to consult a statistician.											
740												
741												

	A	B	C	D	E	F	G	H	I	J	K	L
742	Mercury											
743												
744					General Statistics							
745					Total Number of Observations	16				Number of Distinct Observations		7
746										Number of Missing Observations		0
747					Minimum	0.0493				Mean		6.514
748					Maximum	12.4				Median		10
749					SD	5.005				Std. Error of Mean		1.251
750					Coefficient of Variation	0.768				Skewness		-0.52
751												
752					Normal GOF Test							
753					Shapiro Wilk Test Statistic	0.694				Shapiro Wilk GOF Test		
754					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
755					Lilliefors Test Statistic	0.382				Lilliefors GOF Test		
756					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
757					Data Not Normal at 5% Significance Level							
758												
759					Assuming Normal Distribution							
760					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
761					95% Student's-t UCL	8.707				95% Adjusted-CLT UCL (Chen-1995)		8.398
762										95% Modified-t UCL (Johnson-1978)		8.68
763												
764					Gamma GOF Test							
765					A-D Test Statistic	2.464				Anderson-Darling Gamma GOF Test		
766					5% A-D Critical Value	0.785				Data Not Gamma Distributed at 5% Significance Level		
767					K-S Test Statistic	0.407				Kolmogrov-Smirnoff Gamma GOF Test		
768					5% K-S Critical Value	0.225				Data Not Gamma Distributed at 5% Significance Level		
769					Data Not Gamma Distributed at 5% Significance Level							
770												
771					Gamma Statistics							
772					k hat (MLE)	0.633				k star (bias corrected MLE)		0.556
773					Theta hat (MLE)	10.29				Theta star (bias corrected MLE)		11.71
774					nu hat (MLE)	20.27				nu star (bias corrected)		17.8
775					MLE Mean (bias corrected)	6.514				MLE Sd (bias corrected)		8.734
776										Approximate Chi Square Value (0.05)		9.246
777					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		8.55
778												
779					Assuming Gamma Distribution							
780					95% Approximate Gamma UCL (use when n>=50))	12.54				95% Adjusted Gamma UCL (use when n<50)		13.56
781												
782					Lognormal GOF Test							
783					Shapiro Wilk Test Statistic	0.73				Shapiro Wilk Lognormal GOF Test		
784					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
785					Lilliefors Test Statistic	0.387				Lilliefors Lognormal GOF Test		
786					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
787					Data Not Lognormal at 5% Significance Level							
788												
789					Lognormal Statistics							
790					Minimum of Logged Data	-3.01				Mean of logged Data		0.906
791					Maximum of Logged Data	2.518				SD of logged Data		1.96
792												

	A	B	C	D	E	F	G	H	I	J	K	L
793					Assuming Lognormal Distribution							
794					95% H-UCL	155.9				90% Chebyshev (MVUE) UCL		34.9
795				95% Chebyshev (MVUE) UCL		44.89				97.5% Chebyshev (MVUE) UCL		58.76
796				99% Chebyshev (MVUE) UCL		86.01						
797												
798					Nonparametric Distribution Free UCL Statistics							
799					Data do not follow a Discernible Distribution (0.05)							
800												
801					Nonparametric Distribution Free UCLs							
802					95% CLT UCL	8.572				95% Jackknife UCL		8.707
803				95% Standard Bootstrap UCL		8.518				95% Bootstrap-t UCL		8.493
804				95% Hall's Bootstrap UCL		8.273				95% Percentile Bootstrap UCL		8.489
805				95% BCA Bootstrap UCL		8.458						
806				90% Chebyshev(Mean, Sd) UCL		10.27				95% Chebyshev(Mean, Sd) UCL		11.97
807				97.5% Chebyshev(Mean, Sd) UCL		14.33				99% Chebyshev(Mean, Sd) UCL		18.96
808												
809					Suggested UCL to Use							
810				99% Chebyshev (Mean, Sd) UCL		18.96						
811												
812					Recommended UCL exceeds the maximum observation							
813												
814	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
815	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
816	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
817	For additional insight the user may want to consult a statistician.											
818												
819	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
820	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
821												
822												

	A	B	C	D	E	F	G	H	I	J	K	L
823	Molybdenum											
824												
825					General Statistics							
826					Total Number of Observations	16				Number of Distinct Observations		5
827										Number of Missing Observations		0
828					Minimum	0.64				Mean		19.65
829					Maximum	78				Median		15
830					SD	19.38				Std. Error of Mean		4.844
831					Coefficient of Variation	0.986				Skewness		2.388
832												
833					Normal GOF Test							
834					Shapiro Wilk Test Statistic	0.576				Shapiro Wilk GOF Test		
835					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
836					Lilliefors Test Statistic	0.47				Lilliefors GOF Test		
837					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
838					Data Not Normal at 5% Significance Level							
839												
840					Assuming Normal Distribution							
841					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
842					95% Student's-t UCL	28.14				95% Adjusted-CLT UCL (Chen-1995)		30.71
843										95% Modified-t UCL (Johnson-1978)		28.62
844												
845					Gamma GOF Test							
846					A-D Test Statistic	2.637				Anderson-Darling Gamma GOF Test		
847					5% A-D Critical Value	0.76				Data Not Gamma Distributed at 5% Significance Level		
848					K-S Test Statistic	0.387				Kolmogrov-Smirnoff Gamma GOF Test		
849					5% K-S Critical Value	0.22				Data Not Gamma Distributed at 5% Significance Level		
850					Data Not Gamma Distributed at 5% Significance Level							
851												
852					Gamma Statistics							
853					k hat (MLE)	1.203				k star (bias corrected MLE)		1.019
854					Theta hat (MLE)	16.34				Theta star (bias corrected MLE)		19.28
855					nu hat (MLE)	38.49				nu star (bias corrected)		32.61
856					MLE Mean (bias corrected)	19.65				MLE Sd (bias corrected)		19.47
857										Approximate Chi Square Value (0.05)		20.55
858					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		19.47
859												
860					Assuming Gamma Distribution							
861					95% Approximate Gamma UCL (use when n>=50))	31.17				95% Adjusted Gamma UCL (use when n<50)		32.91
862												
863					Lognormal GOF Test							
864					Shapiro Wilk Test Statistic	0.65				Shapiro Wilk Lognormal GOF Test		
865					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
866					Lilliefors Test Statistic	0.44				Lilliefors Lognormal GOF Test		
867					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
868					Data Not Lognormal at 5% Significance Level							
869												
870					Lognormal Statistics							
871					Minimum of Logged Data	-0.446				Mean of logged Data		2.508
872					Maximum of Logged Data	4.357				SD of logged Data		1.23
873												

	A	B	C	D	E	F	G	H	I	J	K	L
874	Assuming Lognormal Distribution											
875					95% H-UCL	69.45				90% Chebyshev (MVUE) UCL		49.56
876				95% Chebyshev (MVUE) UCL		61.01				97.5% Chebyshev (MVUE) UCL		76.9
877				99% Chebyshev (MVUE) UCL		108.1						
878												
879	Nonparametric Distribution Free UCL Statistics											
880	Data do not follow a Discernible Distribution (0.05)											
881												
882	Nonparametric Distribution Free UCLs											
883					95% CLT UCL	27.62				95% Jackknife UCL		28.14
884				95% Standard Bootstrap UCL		27.17				95% Bootstrap-t UCL		45.18
885				95% Hall's Bootstrap UCL		90.59				95% Percentile Bootstrap UCL		28.42
886				95% BCA Bootstrap UCL		30.03						
887				90% Chebyshev(Mean, Sd) UCL		34.18				95% Chebyshev(Mean, Sd) UCL		40.77
888				97.5% Chebyshev(Mean, Sd) UCL		49.9				99% Chebyshev(Mean, Sd) UCL		67.85
889												
890	Suggested UCL to Use											
891				95% Chebyshev (Mean, Sd) UCL		40.77						
892												
893	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
894	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
895	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
896	For additional insight the user may want to consult a statistician.											
897												
898												

	A	B	C	D	E	F	G	H	I	J	K	L
899	Neptunium-237											
900												
901					General Statistics							
902					Total Number of Observations	16			Number of Distinct Observations			9
903									Number of Missing Observations			0
904					Minimum	0.00884			Mean			7.909
905					Maximum	52.6			Median			7.909
906					SD	12.38			Std. Error of Mean			3.095
907					Coefficient of Variation	1.565			Skewness			3.499
908												
909					Normal GOF Test							
910					Shapiro Wilk Test Statistic	0.502			Shapiro Wilk GOF Test			
911					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
912					Lilliefors Test Statistic	0.438			Lilliefors GOF Test			
913					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
914					Data Not Normal at 5% Significance Level							
915												
916					Assuming Normal Distribution							
917					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
918					95% Student's-t UCL	13.33			95% Adjusted-CLT UCL (Chen-1995)			15.89
919									95% Modified-t UCL (Johnson-1978)			13.79
920												
921					Gamma GOF Test							
922					A-D Test Statistic	1.048			Anderson-Darling Gamma GOF Test			
923					5% A-D Critical Value	0.789			Data Not Gamma Distributed at 5% Significance Level			
924					K-S Test Statistic	0.266			Kolmogrov-Smirnoff Gamma GOF Test			
925					5% K-S Critical Value	0.226			Data Not Gamma Distributed at 5% Significance Level			
926					Data Not Gamma Distributed at 5% Significance Level							
927												
928					Gamma Statistics							
929					k hat (MLE)	0.578			k star (bias corrected MLE)			0.512
930					Theta hat (MLE)	13.67			Theta star (bias corrected MLE)			15.46
931					nu hat (MLE)	18.51			nu star (bias corrected)			16.37
932					MLE Mean (bias corrected)	7.909			MLE Sd (bias corrected)			11.06
933									Approximate Chi Square Value (0.05)			8.225
934					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			7.575
935												
936					Assuming Gamma Distribution							
937					95% Approximate Gamma UCL (use when n>=50))	15.74			95% Adjusted Gamma UCL (use when n<50)			17.09
938												
939					Lognormal GOF Test							
940					Shapiro Wilk Test Statistic	0.808			Shapiro Wilk Lognormal GOF Test			
941					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
942					Lilliefors Test Statistic	0.26			Lilliefors Lognormal GOF Test			
943					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
944					Data Not Lognormal at 5% Significance Level							
945												
946					Lognormal Statistics							
947					Minimum of Logged Data	-4.728			Mean of logged Data			0.994
948					Maximum of Logged Data	3.963			SD of logged Data			2.079
949												

	A	B	C	D	E	F	G	H	I	J	K	L
950					Assuming Lognormal Distribution							
951					95% H-UCL	280.4				90% Chebyshev (MVUE) UCL		47.78
952				95% Chebyshev (MVUE) UCL		61.75				97.5% Chebyshev (MVUE) UCL		81.14
953				99% Chebyshev (MVUE) UCL		119.2						
954												
955					Nonparametric Distribution Free UCL Statistics							
956					Data do not follow a Discernible Distribution (0.05)							
957												
958					Nonparametric Distribution Free UCLs							
959					95% CLT UCL	13				95% Jackknife UCL		13.33
960				95% Standard Bootstrap UCL		12.85				95% Bootstrap-t UCL		21.98
961				95% Hall's Bootstrap UCL		33.53				95% Percentile Bootstrap UCL		13.44
962				95% BCA Bootstrap UCL		17.12						
963				90% Chebyshev(Mean, Sd) UCL		17.19				95% Chebyshev(Mean, Sd) UCL		21.4
964				97.5% Chebyshev(Mean, Sd) UCL		27.24				99% Chebyshev(Mean, Sd) UCL		38.7
965												
966					Suggested UCL to Use							
967				99% Chebyshev (Mean, Sd) UCL		38.7						
968												
969	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
970	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
971	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
972	For additional insight the user may want to consult a statistician.											
973												
974												

	A	B	C	D	E	F	G	H	I	J	K	L
975	Nickel											
976												
977					General Statistics							
978					Total Number of Observations	16				Number of Distinct Observations		16
979										Number of Missing Observations		0
980					Minimum	17				Mean		1154
981					Maximum	17600				Median		41.5
982					SD	4386				Std. Error of Mean		1096
983					Coefficient of Variation	3.801				Skewness		3.999
984												
985					Normal GOF Test							
986					Shapiro Wilk Test Statistic	0.281				Shapiro Wilk GOF Test		
987					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
988					Lilliefors Test Statistic	0.523				Lilliefors GOF Test		
989					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
990					Data Not Normal at 5% Significance Level							
991												
992					Assuming Normal Distribution							
993					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
994					95% Student's-t UCL	3076				95% Adjusted-CLT UCL (Chen-1995)		4129
995										95% Modified-t UCL (Johnson-1978)		3259
996												
997					Gamma GOF Test							
998					A-D Test Statistic	4.198				Anderson-Darling Gamma GOF Test		
999					5% A-D Critical Value	0.862				Data Not Gamma Distributed at 5% Significance Level		
1000					K-S Test Statistic	0.438				Kolmogrov-Smirnoff Gamma GOF Test		
1001					5% K-S Critical Value	0.236				Data Not Gamma Distributed at 5% Significance Level		
1002					Data Not Gamma Distributed at 5% Significance Level							
1003												
1004					Gamma Statistics							
1005					k hat (MLE)	0.247				k star (bias corrected MLE)		0.243
1006					Theta hat (MLE)	4666				Theta star (bias corrected MLE)		4756
1007					nu hat (MLE)	7.914				nu star (bias corrected)		7.764
1008					MLE Mean (bias corrected)	1154				MLE Sd (bias corrected)		2343
1009										Approximate Chi Square Value (0.05)		2.599
1010					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		2.271
1011												
1012					Assuming Gamma Distribution							
1013					95% Approximate Gamma UCL (use when n>=50))	3447				95% Adjusted Gamma UCL (use when n<50)		3945
1014												
1015					Lognormal GOF Test							
1016					Shapiro Wilk Test Statistic	0.655				Shapiro Wilk Lognormal GOF Test		
1017					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1018					Lilliefors Test Statistic	0.243				Lilliefors Lognormal GOF Test		
1019					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1020					Data Not Lognormal at 5% Significance Level							
1021												
1022					Lognormal Statistics							
1023					Minimum of Logged Data	2.833				Mean of logged Data		4.174
1024					Maximum of Logged Data	9.776				SD of logged Data		1.638
1025												

	A	B	C	D	E	F	G	H	I	J	K	L
1026	Assuming Lognormal Distribution											
1027					95% H-UCL	1236				90% Chebyshev (MVUE) UCL		512.5
1028				95% Chebyshev (MVUE) UCL		649				97.5% Chebyshev (MVUE) UCL		838.5
1029				99% Chebyshev (MVUE) UCL		1211						
1030												
1031	Nonparametric Distribution Free UCL Statistics											
1032	Data do not follow a Discernible Distribution (0.05)											
1033												
1034	Nonparametric Distribution Free UCLs											
1035					95% CLT UCL	2957				95% Jackknife UCL		3076
1036				95% Standard Bootstrap UCL		2907				95% Bootstrap-t UCL		174265
1037				95% Hall's Bootstrap UCL		90115				95% Percentile Bootstrap UCL		3344
1038				95% BCA Bootstrap UCL		4447						
1039				90% Chebyshev(Mean, Sd) UCL		4443				95% Chebyshev(Mean, Sd) UCL		5933
1040				97.5% Chebyshev(Mean, Sd) UCL		8001				99% Chebyshev(Mean, Sd) UCL		12064
1041												
1042	Suggested UCL to Use											
1043				99% Chebyshev (Mean, Sd) UCL		12064						
1044												
1045	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1046	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1047	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1048	For additional insight the user may want to consult a statistician.											
1049												
1050												

	A	B	C	D	E	F	G	H	I	J	K	L
1051	PAH, Total											
1052												
1053						General Statistics						
1054					Total Number of Observations	16				Number of Distinct Observations		7
1055										Number of Missing Observations		0
1056					Minimum	0.02				Mean		1.903
1057					Maximum	9.62				Median		1.903
1058					SD	2.185				Std. Error of Mean		0.546
1059					Coefficient of Variation	1.148				Skewness		3.217
1060												
1061						Normal GOF Test						
1062					Shapiro Wilk Test Statistic	0.537				Shapiro Wilk GOF Test		
1063					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1064					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
1065					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1066						Data Not Normal at 5% Significance Level						
1067												
1068						Assuming Normal Distribution						
1069					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1070					95% Student's-t UCL	2.86				95% Adjusted-CLT UCL (Chen-1995)		3.271
1071										95% Modified-t UCL (Johnson-1978)		2.933
1072												
1073						Gamma GOF Test						
1074					A-D Test Statistic	1.715				Anderson-Darling Gamma GOF Test		
1075					5% A-D Critical Value	0.762				Data Not Gamma Distributed at 5% Significance Level		
1076					K-S Test Statistic	0.317				Kolmogrov-Smirnoff Gamma GOF Test		
1077					5% K-S Critical Value	0.221				Data Not Gamma Distributed at 5% Significance Level		
1078						Data Not Gamma Distributed at 5% Significance Level						
1079												
1080						Gamma Statistics						
1081					k hat (MLE)	1.048				k star (bias corrected MLE)		0.893
1082					Theta hat (MLE)	1.815				Theta star (bias corrected MLE)		2.129
1083					nu hat (MLE)	33.55				nu star (bias corrected)		28.59
1084					MLE Mean (bias corrected)	1.903				MLE Sd (bias corrected)		2.013
1085										Approximate Chi Square Value (0.05)		17.39
1086					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		16.4
1087												
1088						Assuming Gamma Distribution						
1089					95% Approximate Gamma UCL (use when n>=50))	3.128				95% Adjusted Gamma UCL (use when n<50)		3.317
1090												
1091						Lognormal GOF Test						
1092					Shapiro Wilk Test Statistic	0.74				Shapiro Wilk Lognormal GOF Test		
1093					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1094					Lilliefors Test Statistic	0.346				Lilliefors Lognormal GOF Test		
1095					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1096						Data Not Lognormal at 5% Significance Level						
1097												
1098						Lognormal Statistics						
1099					Minimum of Logged Data	-3.912				Mean of logged Data		0.0956
1100					Maximum of Logged Data	2.264				SD of logged Data		1.344
1101												

	A	B	C	D	E	F	G	H	I	J	K	L
1102					Assuming Lognormal Distribution							
1103					95% H-UCL	8.431				90% Chebyshev (MVUE) UCL		5.307
1104				95% Chebyshev (MVUE) UCL		6.592				97.5% Chebyshev (MVUE) UCL		8.376
1105				99% Chebyshev (MVUE) UCL		11.88						
1106												
1107					Nonparametric Distribution Free UCL Statistics							
1108					Data do not follow a Discernible Distribution (0.05)							
1109												
1110					Nonparametric Distribution Free UCLs							
1111					95% CLT UCL	2.801				95% Jackknife UCL		2.86
1112				95% Standard Bootstrap UCL		2.775				95% Bootstrap-t UCL		3.753
1113				95% Hall's Bootstrap UCL		6.559				95% Percentile Bootstrap UCL		2.838
1114				95% BCA Bootstrap UCL		3.445						
1115				90% Chebyshev(Mean, Sd) UCL		3.541				95% Chebyshev(Mean, Sd) UCL		4.284
1116				97.5% Chebyshev(Mean, Sd) UCL		5.314				99% Chebyshev(Mean, Sd) UCL		7.338
1117												
1118					Suggested UCL to Use							
1119				95% Chebyshev (Mean, Sd) UCL		4.284						
1120												
1121	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1122	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1123	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1124	For additional insight the user may want to consult a statistician.											
1125												
1126												

	A	B	C	D	E	F	G	H	I	J	K	L
1127	PCB, Total											
1128												
1129						General Statistics						
1130					Total Number of Observations	16				Number of Distinct Observations		10
1131										Number of Missing Observations		0
1132					Minimum	0.019				Mean		2.111
1133					Maximum	5				Median		0.445
1134					SD	2.351				Std. Error of Mean		0.588
1135					Coefficient of Variation	1.114				Skewness		0.479
1136												
1137						Normal GOF Test						
1138					Shapiro Wilk Test Statistic	0.696				Shapiro Wilk GOF Test		
1139					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1140					Lilliefors Test Statistic	0.317				Lilliefors GOF Test		
1141					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1142						Data Not Normal at 5% Significance Level						
1143												
1144						Assuming Normal Distribution						
1145					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1146					95% Student's-t UCL	3.141				95% Adjusted-CLT UCL (Chen-1995)		3.153
1147										95% Modified-t UCL (Johnson-1978)		3.153
1148												
1149						Gamma GOF Test						
1150					A-D Test Statistic	1.238				Anderson-Darling Gamma GOF Test		
1151					5% A-D Critical Value	0.793				Data Not Gamma Distributed at 5% Significance Level		
1152					K-S Test Statistic	0.253				Kolmogrov-Smirnoff Gamma GOF Test		
1153					5% K-S Critical Value	0.227				Data Not Gamma Distributed at 5% Significance Level		
1154						Data Not Gamma Distributed at 5% Significance Level						
1155												
1156						Gamma Statistics						
1157					k hat (MLE)	0.534				k star (bias corrected MLE)		0.476
1158					Theta hat (MLE)	3.952				Theta star (bias corrected MLE)		4.438
1159					nu hat (MLE)	17.09				nu star (bias corrected)		15.22
1160					MLE Mean (bias corrected)	2.111				MLE Sd (bias corrected)		3.061
1161										Approximate Chi Square Value (0.05)		7.414
1162					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		6.801
1163												
1164						Assuming Gamma Distribution						
1165					95% Approximate Gamma UCL (use when n>=50))	4.333				95% Adjusted Gamma UCL (use when n<50)		4.723
1166												
1167						Lognormal GOF Test						
1168					Shapiro Wilk Test Statistic	0.871				Shapiro Wilk Lognormal GOF Test		
1169					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1170					Lilliefors Test Statistic	0.234				Lilliefors Lognormal GOF Test		
1171					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1172						Data Not Lognormal at 5% Significance Level						
1173												
1174						Lognormal Statistics						
1175					Minimum of Logged Data	-3.963				Mean of logged Data		-0.43
1176					Maximum of Logged Data	1.609				SD of logged Data		1.894
1177												

	A	B	C	D	E	F	G	H	I	J	K	L
1178	Assuming Lognormal Distribution											
1179					95% H-UCL	31.52				90% Chebyshev (MVUE) UCL		8.116
1180					95% Chebyshev (MVUE) UCL	10.41				97.5% Chebyshev (MVUE) UCL		13.6
1181					99% Chebyshev (MVUE) UCL	19.85						
1182												
1183	Nonparametric Distribution Free UCL Statistics											
1184	Data do not follow a Discernible Distribution (0.05)											
1185												
1186	Nonparametric Distribution Free UCLs											
1187					95% CLT UCL	3.078				95% Jackknife UCL		3.141
1188					95% Standard Bootstrap UCL	3.044				95% Bootstrap-t UCL		3.207
1189					95% Hall's Bootstrap UCL	2.982				95% Percentile Bootstrap UCL		3.022
1190					95% BCA Bootstrap UCL	3.037						
1191					90% Chebyshev(Mean, Sd) UCL	3.874				95% Chebyshev(Mean, Sd) UCL		4.673
1192					97.5% Chebyshev(Mean, Sd) UCL	5.781				99% Chebyshev(Mean, Sd) UCL		7.959
1193												
1194	Suggested UCL to Use											
1195					99% Chebyshev (Mean, Sd) UCL	7.959						
1196												
1197	Recommended UCL exceeds the maximum observation											
1198												
1199	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1200	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1201	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1202	For additional insight the user may want to consult a statistician.											
1203												
1204												

	A	B	C	D	E	F	G	H	I	J	K	L
1205	Plutonium-239/240											
1206												
1207						General Statistics						
1208					Total Number of Observations	16				Number of Distinct Observations		9
1209										Number of Missing Observations		0
1210					Minimum	0.0109				Mean		4.843
1211					Maximum	15.9				Median		4.843
1212					SD	4.138				Std. Error of Mean		1.034
1213					Coefficient of Variation	0.854				Skewness		1.302
1214												
1215						Normal GOF Test						
1216					Shapiro Wilk Test Statistic	0.816				Shapiro Wilk GOF Test		
1217					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1218					Lilliefors Test Statistic	0.313				Lilliefors GOF Test		
1219					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1220						Data Not Normal at 5% Significance Level						
1221												
1222						Assuming Normal Distribution						
1223					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1224					95% Student's-t UCL	6.657				95% Adjusted-CLT UCL (Chen-1995)		6.905
1225										95% Modified-t UCL (Johnson-1978)		6.713
1226												
1227						Gamma GOF Test						
1228					A-D Test Statistic	1.609				Anderson-Darling Gamma GOF Test		
1229					5% A-D Critical Value	0.778				Data Not Gamma Distributed at 5% Significance Level		
1230					K-S Test Statistic	0.343				Kolmogrov-Smirnoff Gamma GOF Test		
1231					5% K-S Critical Value	0.224				Data Not Gamma Distributed at 5% Significance Level		
1232						Data Not Gamma Distributed at 5% Significance Level						
1233												
1234						Gamma Statistics						
1235					k hat (MLE)	0.706				k star (bias corrected MLE)		0.616
1236					Theta hat (MLE)	6.855				Theta star (bias corrected MLE)		7.866
1237					nu hat (MLE)	22.61				nu star (bias corrected)		19.7
1238					MLE Mean (bias corrected)	4.843				MLE Sd (bias corrected)		6.172
1239										Approximate Chi Square Value (0.05)		10.63
1240					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		9.879
1241												
1242						Assuming Gamma Distribution						
1243					95% Approximate Gamma UCL (use when n>=50))	8.975				95% Adjusted Gamma UCL (use when n<50)		9.659
1244												
1245						Lognormal GOF Test						
1246					Shapiro Wilk Test Statistic	0.744				Shapiro Wilk Lognormal GOF Test		
1247					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1248					Lilliefors Test Statistic	0.368				Lilliefors Lognormal GOF Test		
1249					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1250						Data Not Lognormal at 5% Significance Level						
1251												
1252						Lognormal Statistics						
1253					Minimum of Logged Data	-4.519				Mean of logged Data		0.723
1254					Maximum of Logged Data	2.766				SD of logged Data		2.007
1255												

	A	B	C	D	E	F	G	H	I	J	K	L
1256					Assuming Lognormal Distribution							
1257					95% H-UCL	158				90% Chebyshev (MVUE) UCL		31.8
1258				95% Chebyshev (MVUE) UCL		40.98				97.5% Chebyshev (MVUE) UCL		53.73
1259				99% Chebyshev (MVUE) UCL		78.78						
1260												
1261					Nonparametric Distribution Free UCL Statistics							
1262					Data do not follow a Discernible Distribution (0.05)							
1263												
1264					Nonparametric Distribution Free UCLs							
1265					95% CLT UCL	6.545				95% Jackknife UCL		6.657
1266				95% Standard Bootstrap UCL		6.473				95% Bootstrap-t UCL		7.47
1267				95% Hall's Bootstrap UCL		9.573				95% Percentile Bootstrap UCL		6.591
1268				95% BCA Bootstrap UCL		6.754						
1269				90% Chebyshev(Mean, Sd) UCL		7.947				95% Chebyshev(Mean, Sd) UCL		9.353
1270				97.5% Chebyshev(Mean, Sd) UCL		11.3				99% Chebyshev(Mean, Sd) UCL		15.14
1271												
1272					Suggested UCL to Use							
1273				99% Chebyshev (Mean, Sd) UCL		15.14						
1274												
1275	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1276	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1277	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1278	For additional insight the user may want to consult a statistician.											
1279												
1280												

	A	B	C	D	E	F	G	H	I	J	K	L
1281	Protactinium-231											
1282												
1283						General Statistics						
1284					Total Number of Observations	16				Number of Distinct Observations		3
1285										Number of Missing Observations		0
1286					Minimum	2.46				Mean		16.19
1287					Maximum	29.92				Median		16.19
1288					SD	5.013				Std. Error of Mean		1.253
1289					Coefficient of Variation	0.31				Skewness		0
1290												
1291						Normal GOF Test						
1292					Shapiro Wilk Test Statistic	0.511				Shapiro Wilk GOF Test		
1293					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1294					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
1295					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1296						Data Not Normal at 5% Significance Level						
1297												
1298						Assuming Normal Distribution						
1299					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1300					95% Student's-t UCL	18.39				95% Adjusted-CLT UCL (Chen-1995)		18.25
1301										95% Modified-t UCL (Johnson-1978)		18.39
1302												
1303						Gamma GOF Test						
1304					A-D Test Statistic	4.367				Anderson-Darling Gamma GOF Test		
1305					5% A-D Critical Value	0.741				Data Not Gamma Distributed at 5% Significance Level		
1306					K-S Test Statistic	0.49				Kolmogrov-Smirnoff Gamma GOF Test		
1307					5% K-S Critical Value	0.216				Data Not Gamma Distributed at 5% Significance Level		
1308						Data Not Gamma Distributed at 5% Significance Level						
1309												
1310						Gamma Statistics						
1311					k hat (MLE)	6.461				k star (bias corrected MLE)		5.291
1312					Theta hat (MLE)	2.506				Theta star (bias corrected MLE)		3.06
1313					nu hat (MLE)	206.7				nu star (bias corrected)		169.3
1314					MLE Mean (bias corrected)	16.19				MLE Sd (bias corrected)		7.038
1315										Approximate Chi Square Value (0.05)		140.2
1316					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		137.2
1317												
1318						Assuming Gamma Distribution						
1319					95% Approximate Gamma UCL (use when n>=50))	19.55				95% Adjusted Gamma UCL (use when n<50)		19.98
1320												
1321						Lognormal GOF Test						
1322					Shapiro Wilk Test Statistic	0.417				Shapiro Wilk Lognormal GOF Test		
1323					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1324					Lilliefors Test Statistic	0.5				Lilliefors Lognormal GOF Test		
1325					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1326						Data Not Lognormal at 5% Significance Level						
1327												
1328						Lognormal Statistics						
1329					Minimum of Logged Data	0.9				Mean of logged Data		2.705
1330					Maximum of Logged Data	3.399				SD of logged Data		0.505
1331												

	A	B	C	D	E	F	G	H	I	J	K	L
1332	Assuming Lognormal Distribution											
1333					95% H-UCL	22.21				90% Chebyshev (MVUE) UCL		23.42
1334				95% Chebyshev (MVUE) UCL		26.41				97.5% Chebyshev (MVUE) UCL		30.55
1335				99% Chebyshev (MVUE) UCL		38.68						
1336												
1337	Nonparametric Distribution Free UCL Statistics											
1338	Data do not follow a Discernible Distribution (0.05)											
1339												
1340	Nonparametric Distribution Free UCLs											
1341					95% CLT UCL	18.25				95% Jackknife UCL		18.39
1342				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1343				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1344				95% BCA Bootstrap UCL		N/A						
1345				90% Chebyshev(Mean, Sd) UCL		19.95				95% Chebyshev(Mean, Sd) UCL		21.65
1346				97.5% Chebyshev(Mean, Sd) UCL		24.02				99% Chebyshev(Mean, Sd) UCL		28.66
1347												
1348	Suggested UCL to Use											
1349				95% Chebyshev (Mean, Sd) UCL		21.65						
1350												
1351	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1352	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1353	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1354	For additional insight the user may want to consult a statistician.											
1355												
1356												

	A	B	C	D	E	F	G	H	I	J	K	L
1357	Technetium-99											
1358												
1359						General Statistics						
1360					Total Number of Observations	16				Number of Distinct Observations		9
1361										Number of Missing Observations		0
1362					Minimum	4.05				Mean		881.1
1363					Maximum	4840				Median		881.1
1364					SD	1176				Std. Error of Mean		294.1
1365					Coefficient of Variation	1.335				Skewness		2.788
1366												
1367						Normal GOF Test						
1368					Shapiro Wilk Test Statistic	0.633				Shapiro Wilk GOF Test		
1369					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1370					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
1371					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1372						Data Not Normal at 5% Significance Level						
1373												
1374						Assuming Normal Distribution						
1375					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1376					95% Student's-t UCL	1397				95% Adjusted-CLT UCL (Chen-1995)		1584
1377										95% Modified-t UCL (Johnson-1978)		1431
1378												
1379						Gamma GOF Test						
1380					A-D Test Statistic	1.104				Anderson-Darling Gamma GOF Test		
1381					5% A-D Critical Value	0.795				Data Not Gamma Distributed at 5% Significance Level		
1382					K-S Test Statistic	0.305				Kolmogrov-Smirnoff Gamma GOF Test		
1383					5% K-S Critical Value	0.227				Data Not Gamma Distributed at 5% Significance Level		
1384						Data Not Gamma Distributed at 5% Significance Level						
1385												
1386						Gamma Statistics						
1387					k hat (MLE)	0.515				k star (bias corrected MLE)		0.46
1388					Theta hat (MLE)	1710				Theta star (bias corrected MLE)		1915
1389					nu hat (MLE)	16.48				nu star (bias corrected)		14.73
1390					MLE Mean (bias corrected)	881.1				MLE Sd (bias corrected)		1299
1391										Approximate Chi Square Value (0.05)		7.071
1392					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		6.475
1393												
1394						Assuming Gamma Distribution						
1395					95% Approximate Gamma UCL (use when n>=50))	1835				95% Adjusted Gamma UCL (use when n<50)		2004
1396												
1397						Lognormal GOF Test						
1398					Shapiro Wilk Test Statistic	0.822				Shapiro Wilk Lognormal GOF Test		
1399					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1400					Lilliefors Test Statistic	0.337				Lilliefors Lognormal GOF Test		
1401					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1402						Data Not Lognormal at 5% Significance Level						
1403												
1404						Lognormal Statistics						
1405					Minimum of Logged Data	1.399				Mean of logged Data		5.554
1406					Maximum of Logged Data	8.485				SD of logged Data		2.199
1407												

	A	B	C	D	E	F	G	H	I	J	K	L
1408					Assuming Lognormal Distribution							
1409					95% H-UCL	45508				90% Chebyshev (MVUE) UCL		5757
1410				95% Chebyshev (MVUE) UCL		7471				97.5% Chebyshev (MVUE) UCL		9850
1411				99% Chebyshev (MVUE) UCL		14524						
1412												
1413					Nonparametric Distribution Free UCL Statistics							
1414					Data do not follow a Discernible Distribution (0.05)							
1415												
1416					Nonparametric Distribution Free UCLs							
1417					95% CLT UCL	1365				95% Jackknife UCL		1397
1418				95% Standard Bootstrap UCL		1358				95% Bootstrap-t UCL		1882
1419				95% Hall's Bootstrap UCL		3651				95% Percentile Bootstrap UCL		1380
1420				95% BCA Bootstrap UCL		1597						
1421				90% Chebyshev(Mean, Sd) UCL		1763				95% Chebyshev(Mean, Sd) UCL		2163
1422				97.5% Chebyshev(Mean, Sd) UCL		2718				99% Chebyshev(Mean, Sd) UCL		3807
1423												
1424					Suggested UCL to Use							
1425				99% Chebyshev (Mean, Sd) UCL		3807						
1426												
1427	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1428	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1429	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1430	For additional insight the user may want to consult a statistician.											
1431												
1432												

	A	B	C	D	E	F	G	H	I	J	K	L
1433	Thallium											
1434												
1435					General Statistics							
1436					Total Number of Observations	16			Number of Distinct Observations			5
1437									Number of Missing Observations			0
1438					Minimum	0.1			Mean			1.008
1439					Maximum	2			Median			1.008
1440					SD	0.476			Std. Error of Mean			0.119
1441					Coefficient of Variation	0.473			Skewness			0.59
1442												
1443					Normal GOF Test							
1444					Shapiro Wilk Test Statistic	0.761			Shapiro Wilk GOF Test			
1445					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
1446					Lilliefors Test Statistic	0.375			Lilliefors GOF Test			
1447					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
1448					Data Not Normal at 5% Significance Level							
1449												
1450					Assuming Normal Distribution							
1451					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1452					95% Student's-t UCL	1.217			95% Adjusted-CLT UCL (Chen-1995)			1.223
1453									95% Modified-t UCL (Johnson-1978)			1.22
1454												
1455					Gamma GOF Test							
1456					A-D Test Statistic	2.156			Anderson-Darling Gamma GOF Test			
1457					5% A-D Critical Value	0.744			Data Not Gamma Distributed at 5% Significance Level			
1458					K-S Test Statistic	0.386			Kolmogrov-Smirnoff Gamma GOF Test			
1459					5% K-S Critical Value	0.217			Data Not Gamma Distributed at 5% Significance Level			
1460					Data Not Gamma Distributed at 5% Significance Level							
1461												
1462					Gamma Statistics							
1463					k hat (MLE)	3.3			k star (bias corrected MLE)			2.723
1464					Theta hat (MLE)	0.305			Theta star (bias corrected MLE)			0.37
1465					nu hat (MLE)	105.6			nu star (bias corrected)			87.13
1466					MLE Mean (bias corrected)	1.008			MLE Sd (bias corrected)			0.611
1467									Approximate Chi Square Value (0.05)			66.61
1468					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			64.57
1469												
1470					Assuming Gamma Distribution							
1471					95% Approximate Gamma UCL (use when n>=50))	1.318			95% Adjusted Gamma UCL (use when n<50)			1.36
1472												
1473					Lognormal GOF Test							
1474					Shapiro Wilk Test Statistic	0.678			Shapiro Wilk Lognormal GOF Test			
1475					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
1476					Lilliefors Test Statistic	0.403			Lilliefors Lognormal GOF Test			
1477					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
1478					Data Not Lognormal at 5% Significance Level							
1479												
1480					Lognormal Statistics							
1481					Minimum of Logged Data	-2.303			Mean of logged Data			-0.151
1482					Maximum of Logged Data	0.693			SD of logged Data			0.699
1483												

	A	B	C	D	E	F	G	H	I	J	K	L
1484	Assuming Lognormal Distribution											
1485					95% H-UCL	1.655				90% Chebyshev (MVUE) UCL		1.674
1486				95% Chebyshev (MVUE) UCL		1.945				97.5% Chebyshev (MVUE) UCL		2.32
1487				99% Chebyshev (MVUE) UCL		3.057						
1488												
1489	Nonparametric Distribution Free UCL Statistics											
1490	Data do not follow a Discernible Distribution (0.05)											
1491												
1492	Nonparametric Distribution Free UCLs											
1493					95% CLT UCL	1.204				95% Jackknife UCL		1.217
1494				95% Standard Bootstrap UCL		1.195				95% Bootstrap-t UCL		1.255
1495				95% Hall's Bootstrap UCL		1.414				95% Percentile Bootstrap UCL		1.199
1496				95% BCA Bootstrap UCL		1.199						
1497				90% Chebyshev(Mean, Sd) UCL		1.365				95% Chebyshev(Mean, Sd) UCL		1.527
1498				97.5% Chebyshev(Mean, Sd) UCL		1.752				99% Chebyshev(Mean, Sd) UCL		2.193
1499												
1500	Suggested UCL to Use											
1501				95% Chebyshev (Mean, Sd) UCL		1.527						
1502												
1503	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1504	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1505	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1506	For additional insight the user may want to consult a statistician.											
1507												
1508												

	A	B	C	D	E	F	G	H	I	J	K	L
1509	Thorium-230											
1510												
1511						General Statistics						
1512					Total Number of Observations	16				Number of Distinct Observations		9
1513										Number of Missing Observations		0
1514					Minimum	0.389				Mean		23.41
1515					Maximum	111				Median		23.41
1516					SD	25.46				Std. Error of Mean		6.365
1517					Coefficient of Variation	1.088				Skewness		2.896
1518												
1519						Normal GOF Test						
1520					Shapiro Wilk Test Statistic	0.592				Shapiro Wilk GOF Test		
1521					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1522					Lilliefors Test Statistic	0.366				Lilliefors GOF Test		
1523					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1524						Data Not Normal at 5% Significance Level						
1525												
1526						Assuming Normal Distribution						
1527					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1528					95% Student's-t UCL	34.57				95% Adjusted-CLT UCL (Chen-1995)		38.81
1529										95% Modified-t UCL (Johnson-1978)		35.34
1530												
1531						Gamma GOF Test						
1532					A-D Test Statistic	1.936				Anderson-Darling Gamma GOF Test		
1533					5% A-D Critical Value	0.771				Data Not Gamma Distributed at 5% Significance Level		
1534					K-S Test Statistic	0.332				Kolmogrov-Smirnoff Gamma GOF Test		
1535					5% K-S Critical Value	0.223				Data Not Gamma Distributed at 5% Significance Level		
1536						Data Not Gamma Distributed at 5% Significance Level						
1537												
1538						Gamma Statistics						
1539					k hat (MLE)	0.832				k star (bias corrected MLE)		0.717
1540					Theta hat (MLE)	28.15				Theta star (bias corrected MLE)		32.63
1541					nu hat (MLE)	26.61				nu star (bias corrected)		22.96
1542					MLE Mean (bias corrected)	23.41				MLE Sd (bias corrected)		27.64
1543										Approximate Chi Square Value (0.05)		13.06
1544					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		12.21
1545												
1546						Assuming Gamma Distribution						
1547					95% Approximate Gamma UCL (use when n>=50))	41.16				95% Adjusted Gamma UCL (use when n<50)		44
1548												
1549						Lognormal GOF Test						
1550					Shapiro Wilk Test Statistic	0.747				Shapiro Wilk Lognormal GOF Test		
1551					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1552					Lilliefors Test Statistic	0.372				Lilliefors Lognormal GOF Test		
1553					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1554						Data Not Lognormal at 5% Significance Level						
1555												
1556						Lognormal Statistics						
1557					Minimum of Logged Data	-0.944				Mean of logged Data		2.443
1558					Maximum of Logged Data	4.71				SD of logged Data		1.586
1559												

	A	B	C	D	E	F	G	H	I	J	K	L
1560	Assuming Lognormal Distribution											
1561					95% H-UCL	183.8				90% Chebyshev (MVUE) UCL		82.91
1562				95% Chebyshev (MVUE) UCL		104.7				97.5% Chebyshev (MVUE) UCL		134.9
1563				99% Chebyshev (MVUE) UCL		194.2						
1564												
1565	Nonparametric Distribution Free UCL Statistics											
1566	Data do not follow a Discernible Distribution (0.05)											
1567												
1568	Nonparametric Distribution Free UCLs											
1569					95% CLT UCL	33.88				95% Jackknife UCL		34.57
1570				95% Standard Bootstrap UCL		33.55				95% Bootstrap-t UCL		42.9
1571				95% Hall's Bootstrap UCL		80.73				95% Percentile Bootstrap UCL		35.45
1572				95% BCA Bootstrap UCL		40.05						
1573				90% Chebyshev(Mean, Sd) UCL		42.51				95% Chebyshev(Mean, Sd) UCL		51.16
1574				97.5% Chebyshev(Mean, Sd) UCL		63.16				99% Chebyshev(Mean, Sd) UCL		86.75
1575												
1576	Suggested UCL to Use											
1577				99% Chebyshev (Mean, Sd) UCL		86.75						
1578												
1579	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1580	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1581	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1582	For additional insight the user may want to consult a statistician.											
1583												
1584												

	A	B	C	D	E	F	G	H	I	J	K	L
1585	Uranium											
1586												
1587						General Statistics						
1588					Total Number of Observations	16				Number of Distinct Observations		16
1589										Number of Missing Observations		0
1590					Minimum	11.37				Mean		698.4
1591					Maximum	3100				Median		258.5
1592					SD	822.7				Std. Error of Mean		205.7
1593					Coefficient of Variation	1.178				Skewness		1.82
1594												
1595						Normal GOF Test						
1596					Shapiro Wilk Test Statistic	0.773				Shapiro Wilk GOF Test		
1597					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1598					Lilliefors Test Statistic	0.251				Lilliefors GOF Test		
1599					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1600						Data Not Normal at 5% Significance Level						
1601												
1602						Assuming Normal Distribution						
1603					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1604					95% Student's-t UCL	1059				95% Adjusted-CLT UCL (Chen-1995)		1137
1605										95% Modified-t UCL (Johnson-1978)		1075
1606												
1607						Gamma GOF Test						
1608					A-D Test Statistic	0.533				Anderson-Darling Gamma GOF Test		
1609					5% A-D Critical Value	0.773				Detected data appear Gamma Distributed at 5% Significance Level		
1610					K-S Test Statistic	0.172				Kolmogrov-Smirnoff Gamma GOF Test		
1611					5% K-S Critical Value	0.223				Detected data appear Gamma Distributed at 5% Significance Level		
1612						Detected data appear Gamma Distributed at 5% Significance Level						
1613												
1614						Gamma Statistics						
1615					k hat (MLE)	0.783				k star (bias corrected MLE)		0.678
1616					Theta hat (MLE)	892.1				Theta star (bias corrected MLE)		1030
1617					nu hat (MLE)	25.05				nu star (bias corrected)		21.69
1618					MLE Mean (bias corrected)	698.4				MLE Sd (bias corrected)		848.3
1619										Approximate Chi Square Value (0.05)		12.1
1620					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		11.29
1621												
1622						Assuming Gamma Distribution						
1623					95% Approximate Gamma UCL (use when n>=50)	1251				95% Adjusted Gamma UCL (use when n<50)		1341
1624												
1625						Lognormal GOF Test						
1626					Shapiro Wilk Test Statistic	0.932				Shapiro Wilk Lognormal GOF Test		
1627					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
1628					Lilliefors Test Statistic	0.156				Lilliefors Lognormal GOF Test		
1629					5% Lilliefors Critical Value	0.222				Data appear Lognormal at 5% Significance Level		
1630						Data appear Lognormal at 5% Significance Level						
1631												
1632						Lognormal Statistics						
1633					Minimum of Logged Data	2.431				Mean of logged Data		5.788
1634					Maximum of Logged Data	8.039				SD of logged Data		1.441
1635												

	A	B	C	D	E	F	G	H	I	J	K	L
1636	Assuming Lognormal Distribution											
1637					95% H-UCL	3319				90% Chebyshev (MVUE) UCL		1846
1638				95% Chebyshev (MVUE) UCL		2309				97.5% Chebyshev (MVUE) UCL		2952
1639				99% Chebyshev (MVUE) UCL		4215						
1640												
1641	Nonparametric Distribution Free UCL Statistics											
1642	Data appear to follow a Discernible Distribution at 5% Significance Level											
1643												
1644	Nonparametric Distribution Free UCLs											
1645					95% CLT UCL	1037				95% Jackknife UCL		1059
1646				95% Standard Bootstrap UCL		1024				95% Bootstrap-t UCL		1231
1647				95% Hall's Bootstrap UCL		1320				95% Percentile Bootstrap UCL		1070
1648				95% BCA Bootstrap UCL		1148						
1649				90% Chebyshev(Mean, Sd) UCL		1315				95% Chebyshev(Mean, Sd) UCL		1595
1650				97.5% Chebyshev(Mean, Sd) UCL		1983				99% Chebyshev(Mean, Sd) UCL		2745
1651												
1652	Suggested UCL to Use											
1653				95% Adjusted Gamma UCL		1341						
1654												
1655	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1656	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1657	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1658	For additional insight the user may want to consult a statistician.											
1659												
1660												

	A	B	C	D	E	F	G	H	I	J	K	L
1661	Uranium-234											
1662												
1663						General Statistics						
1664					Total Number of Observations	16				Number of Distinct Observations		9
1665										Number of Missing Observations		0
1666					Minimum	1.95				Mean		94.72
1667					Maximum	437				Median		94.72
1668					SD	101				Std. Error of Mean		25.25
1669					Coefficient of Variation	1.066				Skewness		2.748
1670												
1671						Normal GOF Test						
1672					Shapiro Wilk Test Statistic	0.632				Shapiro Wilk GOF Test		
1673					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1674					Lilliefors Test Statistic	0.346				Lilliefors GOF Test		
1675					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1676						Data Not Normal at 5% Significance Level						
1677												
1678						Assuming Normal Distribution						
1679					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1680					95% Student's-t UCL	139				95% Adjusted-CLT UCL (Chen-1995)		154.8
1681										95% Modified-t UCL (Johnson-1978)		141.9
1682												
1683						Gamma GOF Test						
1684					A-D Test Statistic	1.739				Anderson-Darling Gamma GOF Test		
1685					5% A-D Critical Value	0.771				Data Not Gamma Distributed at 5% Significance Level		
1686					K-S Test Statistic	0.333				Kolmogrov-Smirnoff Gamma GOF Test		
1687					5% K-S Critical Value	0.223				Data Not Gamma Distributed at 5% Significance Level		
1688						Data Not Gamma Distributed at 5% Significance Level						
1689												
1690						Gamma Statistics						
1691					k hat (MLE)	0.82				k star (bias corrected MLE)		0.708
1692					Theta hat (MLE)	115.5				Theta star (bias corrected MLE)		133.8
1693					nu hat (MLE)	26.24				nu star (bias corrected)		22.65
1694					MLE Mean (bias corrected)	94.72				MLE Sd (bias corrected)		112.6
1695										Approximate Chi Square Value (0.05)		12.83
1696					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		11.99
1697												
1698						Assuming Gamma Distribution						
1699					95% Approximate Gamma UCL (use when n>=50))	167.3				95% Adjusted Gamma UCL (use when n<50)		178.9
1700												
1701						Lognormal GOF Test						
1702					Shapiro Wilk Test Statistic	0.756				Shapiro Wilk Lognormal GOF Test		
1703					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1704					Lilliefors Test Statistic	0.361				Lilliefors Lognormal GOF Test		
1705					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1706						Data Not Lognormal at 5% Significance Level						
1707												
1708						Lognormal Statistics						
1709					Minimum of Logged Data	0.668				Mean of logged Data		3.829
1710					Maximum of Logged Data	6.08				SD of logged Data		1.6
1711												

	A	B	C	D	E	F	G	H	I	J	K	L
1712					Assuming Lognormal Distribution							
1713					95% H-UCL	771.5				90% Chebyshev (MVUE) UCL		340
1714				95% Chebyshev (MVUE) UCL		429.7				97.5% Chebyshev (MVUE) UCL		554.1
1715				99% Chebyshev (MVUE) UCL		798.5						
1716												
1717					Nonparametric Distribution Free UCL Statistics							
1718					Data do not follow a Discernible Distribution (0.05)							
1719												
1720					Nonparametric Distribution Free UCLs							
1721					95% CLT UCL	136.3				95% Jackknife UCL		139
1722				95% Standard Bootstrap UCL		135.4				95% Bootstrap-t UCL		170.4
1723				95% Hall's Bootstrap UCL		328.5				95% Percentile Bootstrap UCL		138.3
1724				95% BCA Bootstrap UCL		152.9						
1725				90% Chebyshev(Mean, Sd) UCL		170.5				95% Chebyshev(Mean, Sd) UCL		204.8
1726				97.5% Chebyshev(Mean, Sd) UCL		252.4				99% Chebyshev(Mean, Sd) UCL		346
1727												
1728					Suggested UCL to Use							
1729				99% Chebyshev (Mean, Sd) UCL		346						
1730												
1731	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1732	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1733	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1734	For additional insight the user may want to consult a statistician.											
1735												
1736												

	A	B	C	D	E	F	G	H	I	J	K	L
1737	Uranium-235											
1738												
1739						General Statistics						
1740					Total Number of Observations	16				Number of Distinct Observations		9
1741										Number of Missing Observations		0
1742					Minimum	0.116				Mean		6.091
1743					Maximum	31.9				Median		6.091
1744					SD	7.425				Std. Error of Mean		1.856
1745					Coefficient of Variation	1.219				Skewness		3.043
1746												
1747						Normal GOF Test						
1748					Shapiro Wilk Test Statistic	0.594				Shapiro Wilk GOF Test		
1749					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1750					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
1751					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1752						Data Not Normal at 5% Significance Level						
1753												
1754						Assuming Normal Distribution						
1755					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1756					95% Student's-t UCL	9.345				95% Adjusted-CLT UCL (Chen-1995)		10.65
1757										95% Modified-t UCL (Johnson-1978)		9.58
1758												
1759						Gamma GOF Test						
1760					A-D Test Statistic	1.392				Anderson-Darling Gamma GOF Test		
1761					5% A-D Critical Value	0.774				Data Not Gamma Distributed at 5% Significance Level		
1762					K-S Test Statistic	0.275				Kolmogrov-Smirnoff Gamma GOF Test		
1763					5% K-S Critical Value	0.223				Data Not Gamma Distributed at 5% Significance Level		
1764						Data Not Gamma Distributed at 5% Significance Level						
1765												
1766						Gamma Statistics						
1767					k hat (MLE)	0.765				k star (bias corrected MLE)		0.663
1768					Theta hat (MLE)	7.962				Theta star (bias corrected MLE)		9.184
1769					nu hat (MLE)	24.48				nu star (bias corrected)		21.22
1770					MLE Mean (bias corrected)	6.091				MLE Sd (bias corrected)		7.479
1771										Approximate Chi Square Value (0.05)		11.76
1772					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		10.96
1773												
1774						Assuming Gamma Distribution						
1775					95% Approximate Gamma UCL (use when n>=50))	10.99				95% Adjusted Gamma UCL (use when n<50)		11.79
1776												
1777						Lognormal GOF Test						
1778					Shapiro Wilk Test Statistic	0.798				Shapiro Wilk Lognormal GOF Test		
1779					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1780					Lilliefors Test Statistic	0.324				Lilliefors Lognormal GOF Test		
1781					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1782						Data Not Lognormal at 5% Significance Level						
1783												
1784						Lognormal Statistics						
1785					Minimum of Logged Data	-2.154				Mean of logged Data		1.026
1786					Maximum of Logged Data	3.463				SD of logged Data		1.615
1787												

	A	B	C	D	E	F	G	H	I	J	K	L
1788					Assuming Lognormal Distribution							
1789					95% H-UCL	49.16				90% Chebyshev (MVUE) UCL		21.15
1790				95% Chebyshev (MVUE) UCL		26.75				97.5% Chebyshev (MVUE) UCL		34.52
1791				99% Chebyshev (MVUE) UCL		49.79						
1792												
1793					Nonparametric Distribution Free UCL Statistics							
1794					Data do not follow a Discernible Distribution (0.05)							
1795												
1796					Nonparametric Distribution Free UCLs							
1797					95% CLT UCL	9.144				95% Jackknife UCL		9.345
1798				95% Standard Bootstrap UCL		9.054				95% Bootstrap-t UCL		12.38
1799				95% Hall's Bootstrap UCL		22.53				95% Percentile Bootstrap UCL		9.498
1800				95% BCA Bootstrap UCL		11.01						
1801				90% Chebyshev(Mean, Sd) UCL		11.66				95% Chebyshev(Mean, Sd) UCL		14.18
1802				97.5% Chebyshev(Mean, Sd) UCL		17.68				99% Chebyshev(Mean, Sd) UCL		24.56
1803												
1804					Suggested UCL to Use							
1805				99% Chebyshev (Mean, Sd) UCL		24.56						
1806												
1807	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1808	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1809	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1810	For additional insight the user may want to consult a statistician.											
1811												
1812												

	A	B	C	D	E	F	G	H	I	J	K	L
1813	Uranium-238											
1814												
1815						General Statistics						
1816					Total Number of Observations	16				Number of Distinct Observations		9
1817										Number of Missing Observations		0
1818					Minimum	1.95				Mean		213.3
1819					Maximum	1040				Median		213.3
1820					SD	245.5				Std. Error of Mean		61.38
1821					Coefficient of Variation	1.151				Skewness		2.747
1822												
1823						Normal GOF Test						
1824					Shapiro Wilk Test Statistic	0.65				Shapiro Wilk GOF Test		
1825					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1826					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
1827					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1828						Data Not Normal at 5% Significance Level						
1829												
1830						Assuming Normal Distribution						
1831					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1832					95% Student's-t UCL	320.9				95% Adjusted-CLT UCL (Chen-1995)		359.3
1833										95% Modified-t UCL (Johnson-1978)		327.9
1834												
1835						Gamma GOF Test						
1836					A-D Test Statistic	1.381				Anderson-Darling Gamma GOF Test		
1837					5% A-D Critical Value	0.78				Data Not Gamma Distributed at 5% Significance Level		
1838					K-S Test Statistic	0.283				Kolmogrov-Smirnoff Gamma GOF Test		
1839					5% K-S Critical Value	0.224				Data Not Gamma Distributed at 5% Significance Level		
1840						Data Not Gamma Distributed at 5% Significance Level						
1841												
1842						Gamma Statistics						
1843					k hat (MLE)	0.689				k star (bias corrected MLE)		0.601
1844					Theta hat (MLE)	309.6				Theta star (bias corrected MLE)		354.7
1845					nu hat (MLE)	22.04				nu star (bias corrected)		19.24
1846					MLE Mean (bias corrected)	213.3				MLE Sd (bias corrected)		275.1
1847										Approximate Chi Square Value (0.05)		10.29
1848					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		9.556
1849												
1850						Assuming Gamma Distribution						
1851					95% Approximate Gamma UCL (use when n>=50))	398.7				95% Adjusted Gamma UCL (use when n<50)		429.5
1852												
1853						Lognormal GOF Test						
1854					Shapiro Wilk Test Statistic	0.784				Shapiro Wilk Lognormal GOF Test		
1855					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1856					Lilliefors Test Statistic	0.309				Lilliefors Lognormal GOF Test		
1857					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1858						Data Not Lognormal at 5% Significance Level						
1859												
1860						Lognormal Statistics						
1861					Minimum of Logged Data	0.668				Mean of logged Data		4.483
1862					Maximum of Logged Data	6.947				SD of logged Data		1.832
1863												

	A	B	C	D	E	F	G	H	I	J	K	L
1864	Assuming Lognormal Distribution											
1865					95% H-UCL	3382				90% Chebyshev (MVUE) UCL		986.6
1866				95% Chebyshev (MVUE) UCL		1262				97.5% Chebyshev (MVUE) UCL		1644
1867				99% Chebyshev (MVUE) UCL		2395						
1868												
1869	Nonparametric Distribution Free UCL Statistics											
1870	Data do not follow a Discernible Distribution (0.05)											
1871												
1872	Nonparametric Distribution Free UCLs											
1873					95% CLT UCL	314.3				95% Jackknife UCL		320.9
1874				95% Standard Bootstrap UCL		310.7				95% Bootstrap-t UCL		411.9
1875				95% Hall's Bootstrap UCL		797.7				95% Percentile Bootstrap UCL		320.8
1876				95% BCA Bootstrap UCL		359.9						
1877				90% Chebyshev(Mean, Sd) UCL		397.4				95% Chebyshev(Mean, Sd) UCL		480.8
1878				97.5% Chebyshev(Mean, Sd) UCL		596.6				99% Chebyshev(Mean, Sd) UCL		824
1879												
1880	Suggested UCL to Use											
1881				99% Chebyshev (Mean, Sd) UCL		824						
1882												
1883	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1884	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1885	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1886	For additional insight the user may want to consult a statistician.											
1887												
1888												

	A	B	C	D	E	F	G	H	I	J	K	L
1889	Vanadium											
1890												
1891					General Statistics							
1892					Total Number of Observations	16				Number of Distinct Observations		14
1893										Number of Missing Observations		0
1894					Minimum	98				Mean		134.6
1895					Maximum	161				Median		138
1896					SD	16.51				Std. Error of Mean		4.128
1897					Coefficient of Variation	0.123				Skewness		-0.783
1898												
1899					Normal GOF Test							
1900					Shapiro Wilk Test Statistic	0.947				Shapiro Wilk GOF Test		
1901					5% Shapiro Wilk Critical Value	0.887				Data appear Normal at 5% Significance Level		
1902					Lilliefors Test Statistic	0.163				Lilliefors GOF Test		
1903					5% Lilliefors Critical Value	0.222				Data appear Normal at 5% Significance Level		
1904					Data appear Normal at 5% Significance Level							
1905												
1906					Assuming Normal Distribution							
1907					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1908					95% Student's-t UCL	141.9				95% Adjusted-CLT UCL (Chen-1995)		140.6
1909										95% Modified-t UCL (Johnson-1978)		141.7
1910												
1911					Gamma GOF Test							
1912					A-D Test Statistic	0.52				Anderson-Darling Gamma GOF Test		
1913					5% A-D Critical Value	0.736				Detected data appear Gamma Distributed at 5% Significance Level		
1914					K-S Test Statistic	0.179				Kolmogrov-Smirnoff Gamma GOF Test		
1915					5% K-S Critical Value	0.214				Detected data appear Gamma Distributed at 5% Significance Level		
1916					Detected data appear Gamma Distributed at 5% Significance Level							
1917												
1918					Gamma Statistics							
1919					k hat (MLE)	65.74				k star (bias corrected MLE)		53.46
1920					Theta hat (MLE)	2.048				Theta star (bias corrected MLE)		2.518
1921					nu hat (MLE)	2104				nu star (bias corrected)		1711
1922					MLE Mean (bias corrected)	134.6				MLE Sd (bias corrected)		18.41
1923										Approximate Chi Square Value (0.05)		1616
1924					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		1605
1925												
1926					Assuming Gamma Distribution							
1927					95% Approximate Gamma UCL (use when n>=50))	142.5				95% Adjusted Gamma UCL (use when n<50)		143.5
1928												
1929					Lognormal GOF Test							
1930					Shapiro Wilk Test Statistic	0.915				Shapiro Wilk Lognormal GOF Test		
1931					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
1932					Lilliefors Test Statistic	0.19				Lilliefors Lognormal GOF Test		
1933					5% Lilliefors Critical Value	0.222				Data appear Lognormal at 5% Significance Level		
1934					Data appear Lognormal at 5% Significance Level							
1935												
1936					Lognormal Statistics							
1937					Minimum of Logged Data	4.585				Mean of logged Data		4.895
1938					Maximum of Logged Data	5.081				SD of logged Data		0.13
1939												

	A	B	C	D	E	F	G	H	I	J	K	L
1940	**Assuming Lognormal Distribution**											
1941					95% H-UCL	142.9				90% Chebyshev (MVUE) UCL		147.9
1942				95% Chebyshev (MVUE) UCL		153.8				97.5% Chebyshev (MVUE) UCL		162.1
1943				99% Chebyshev (MVUE) UCL		178.4						
1944												
1945	**Nonparametric Distribution Free UCL Statistics**											
1946	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1947												
1948	**Nonparametric Distribution Free UCLs**											
1949					95% CLT UCL	141.4				95% Jackknife UCL		141.9
1950				95% Standard Bootstrap UCL		141.1				95% Bootstrap-t UCL		141.1
1951				95% Hall's Bootstrap UCL		140.5				95% Percentile Bootstrap UCL		141.1
1952				95% BCA Bootstrap UCL		140.2						
1953				90% Chebyshev(Mean, Sd) UCL		147				95% Chebyshev(Mean, Sd) UCL		152.6
1954				97.5% Chebyshev(Mean, Sd) UCL		160.4				99% Chebyshev(Mean, Sd) UCL		175.7
1955												
1956	**Suggested UCL to Use**											
1957				95% Student's-t UCL		141.9						
1958												
1959	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1960	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1961	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1962	For additional insight the user may want to consult a statistician.											
1963												
1964	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1965	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1966												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/10/2015 11:11:01 AM								
5	From File			EPC_026SurfR2.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Chromium**											
12												
13	**General Statistics**											
14	Total Number of Observations					13	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					5.13	Mean					13.47
17	Maximum					34	Median					12
18	SD					6.577	Std. Error of Mean					1.824
19	Coefficient of Variation					0.488	Skewness					2.789
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.544	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.866	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.435	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.246	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					16.72	95% Adjusted-CLT UCL (Chen-1995)					17.98
31							95% Modified-t UCL (Johnson-1978)					16.96
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					2.526	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.735	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.409	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.237	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					6.507	k star (bias corrected MLE)					5.057
42	Theta hat (MLE)					2.07	Theta star (bias corrected MLE)					2.664
43	nu hat (MLE)					169.2	nu star (bias corrected)					131.5
44	MLE Mean (bias corrected)					13.47	MLE Sd (bias corrected)					5.991
45							Approximate Chi Square Value (0.05)					106
46	Adjusted Level of Significance					0.0301	Adjusted Chi Square Value					102.7
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					16.71	95% Adjusted Gamma UCL (use when n<50)					17.24
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.657	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.866		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.386		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.246		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	1.635				Mean of logged Data		2.522
60					Maximum of Logged Data	3.526				SD of logged Data		0.395
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	16.9				90% Chebyshev (MVUE) UCL		17.84
64					95% Chebyshev (MVUE) UCL	19.87				97.5% Chebyshev (MVUE) UCL		22.68
65					99% Chebyshev (MVUE) UCL	28.2						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	16.47				95% Jackknife UCL		16.72
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	18.94				95% Chebyshev(Mean, Sd) UCL		21.42
76					97.5% Chebyshev(Mean, Sd) UCL	24.86				99% Chebyshev(Mean, Sd) UCL		31.62
77												
78					**Suggested UCL to Use**							
79					95% Student's-t UCL	16.72				or 95% Modified-t UCL		16.96
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	Iron											
88												
89					**General Statistics**							
90					Total Number of Observations	13				Number of Distinct Observations		13
91										Number of Missing Observations		0
92					Minimum	6836				Mean		25057
93					Maximum	37876				Median		26008
94					SD	7531				Std. Error of Mean		2089
95					Coefficient of Variation	0.301				Skewness		-0.687
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.914		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.866		Data appear Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.175		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.246		Data appear Normal at 5% Significance Level				
102					**Data appear Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	28779				95% Adjusted-CLT UCL (Chen-1995)		28067
107										95% Modified-t UCL (Johnson-1978)		28713
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.92	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.234	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level					
114	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	8.26				k star (bias corrected MLE)		6.405
118					Theta hat (MLE)	3034				Theta star (bias corrected MLE)		3912
119					nu hat (MLE)	214.8				nu star (bias corrected)		166.5
120					MLE Mean (bias corrected)	25057				MLE Sd (bias corrected)		9901
121										Approximate Chi Square Value (0.05)		137.7
122					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		134
123												
124	**Assuming Gamma Distribution**											
125					95% Approximate Gamma UCL (use when n>=50))	30305				95% Adjusted Gamma UCL (use when n<50)		31150
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.74	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.269	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
132	**Data Not Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	8.83				Mean of logged Data		10.07
136					Maximum of Logged Data	10.54				SD of logged Data		0.415
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	32684				90% Chebyshev (MVUE) UCL		34446
140					95% Chebyshev (MVUE) UCL	38503				97.5% Chebyshev (MVUE) UCL		44134
141					99% Chebyshev (MVUE) UCL	55194						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	28492				95% Jackknife UCL		28779
148					95% Standard Bootstrap UCL	28375				95% Bootstrap-t UCL		28339
149					95% Hall's Bootstrap UCL	28486				95% Percentile Bootstrap UCL		28251
150					95% BCA Bootstrap UCL	28122						
151					90% Chebyshev(Mean, Sd) UCL	31323				95% Chebyshev(Mean, Sd) UCL		34161
152					97.5% Chebyshev(Mean, Sd) UCL	38101				99% Chebyshev(Mean, Sd) UCL		45840
153												
154	**Suggested UCL to Use**											
155					95% Student's-t UCL	28779						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
163	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
164												
165												
166	**PAH, Total**											
167												
168	**General Statistics**											
169	Total Number of Observations					13	Number of Distinct Observations					3
170							Number of Missing Observations					0
171	Minimum					0.109	Mean					0.182
172	Maximum					0.255	Median					0.182
173	SD					0.0299	Std. Error of Mean					0.00828
174	Coefficient of Variation					0.164	Skewness					-8.03E-16
175												
176	**Normal GOF Test**											
177	Shapiro Wilk Test Statistic					0.574	**Shapiro Wilk GOF Test**					
178	5% Shapiro Wilk Critical Value					0.866	Data Not Normal at 5% Significance Level					
179	Lilliefors Test Statistic					0.423	**Lilliefors GOF Test**					
180	5% Lilliefors Critical Value					0.246	Data Not Normal at 5% Significance Level					
181	**Data Not Normal at 5% Significance Level**											
182												
183	**Assuming Normal Distribution**											
184	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
185	95% Student's-t UCL					0.197	95% Adjusted-CLT UCL (Chen-1995)					0.195
186							95% Modified-t UCL (Johnson-1978)					0.197
187												
188	**Gamma GOF Test**											
189	A-D Test Statistic					3.1	**Anderson-Darling Gamma GOF Test**					
190	5% A-D Critical Value					0.733	Data Not Gamma Distributed at 5% Significance Level					
191	K-S Test Statistic					0.445	**Kolmogrov-Smirnoff Gamma GOF Test**					
192	5% K-S Critical Value					0.236	Data Not Gamma Distributed at 5% Significance Level					
193	**Data Not Gamma Distributed at 5% Significance Level**											
194												
195	**Gamma Statistics**											
196	k hat (MLE)					37	k star (bias corrected MLE)					28.52
197	Theta hat (MLE)					0.00491	Theta star (bias corrected MLE)					0.00638
198	nu hat (MLE)					962.1	nu star (bias corrected)					741.4
199	MLE Mean (bias corrected)					0.182	MLE Sd (bias corrected)					0.0341
200							Approximate Chi Square Value (0.05)					679.2
201	Adjusted Level of Significance					0.0301	Adjusted Chi Square Value					670.8
202												
203	**Assuming Gamma Distribution**											
204	95% Approximate Gamma UCL (use when n>=50))					0.198	95% Adjusted Gamma UCL (use when n<50)					0.201
205												
206	**Lognormal GOF Test**											
207	Shapiro Wilk Test Statistic					0.554	**Shapiro Wilk Lognormal GOF Test**					
208	5% Shapiro Wilk Critical Value					0.866	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.454	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	-2.219				Mean of logged Data		-1.718
215					Maximum of Logged Data	-1.367				SD of logged Data		0.177
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	0.2				90% Chebyshev (MVUE) UCL		0.209
219					95% Chebyshev (MVUE) UCL	0.221				97.5% Chebyshev (MVUE) UCL		0.238
220					99% Chebyshev (MVUE) UCL	0.271						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	0.195				95% Jackknife UCL		0.197
227					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
228					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
229					95% BCA Bootstrap UCL	N/A						
230					90% Chebyshev(Mean, Sd) UCL	0.207				95% Chebyshev(Mean, Sd) UCL		0.218
231					97.5% Chebyshev(Mean, Sd) UCL	0.234				99% Chebyshev(Mean, Sd) UCL		0.264
232												
233	**Suggested UCL to Use**											
234					95% Student's-t UCL	0.197				or 95% Modified-t UCL		0.197
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
242	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
243												
244												
245	**PCB, Total**											
246												
247	**General Statistics**											
248					Total Number of Observations	13				Number of Distinct Observations		4
249										Number of Missing Observations		0
250					Minimum	0.031				Mean		3.971
251					Maximum	5				Median		5
252					SD	1.967				Std. Error of Mean		0.546
253					Coefficient of Variation	0.495				Skewness		-1.497
254												
255	**Normal GOF Test**											
256					Shapiro Wilk Test Statistic	0.56	**Shapiro Wilk GOF Test**					
257					5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level					
258					Lilliefors Test Statistic	0.469	**Lilliefors GOF Test**					
259					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
260	**Data Not Normal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
261												
262						Assuming Normal Distribution						
263				95% Normal UCL						95% UCLs (Adjusted for Skewness)		
264					95% Student's-t UCL	4.943				95% Adjusted-CLT UCL (Chen-1995)		4.626
265										95% Modified-t UCL (Johnson-1978)		4.905
266												
267						Gamma GOF Test						
268					A-D Test Statistic	2.935				Anderson-Darling Gamma GOF Test		
269					5% A-D Critical Value	0.754				Data Not Gamma Distributed at 5% Significance Level		
270					K-S Test Statistic	0.483				Kolmogrov-Smirnoff Gamma GOF Test		
271					5% K-S Critical Value	0.242				Data Not Gamma Distributed at 5% Significance Level		
272						Data Not Gamma Distributed at 5% Significance Level						
273												
274						Gamma Statistics						
275					k hat (MLE)	1.245				k star (bias corrected MLE)		1.009
276					Theta hat (MLE)	3.189				Theta star (bias corrected MLE)		3.935
277					nu hat (MLE)	32.37				nu star (bias corrected)		26.24
278					MLE Mean (bias corrected)	3.971				MLE Sd (bias corrected)		3.953
279										Approximate Chi Square Value (0.05)		15.56
280					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		14.4
281												
282						Assuming Gamma Distribution						
283					95% Approximate Gamma UCL (use when n>=50))	6.695				95% Adjusted Gamma UCL (use when n<50)		7.235
284												
285						Lognormal GOF Test						
286					Shapiro Wilk Test Statistic	0.543				Shapiro Wilk Lognormal GOF Test		
287					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
288					Lilliefors Test Statistic	0.444				Lilliefors Lognormal GOF Test		
289					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
290						Data Not Lognormal at 5% Significance Level						
291												
292						Lognormal Statistics						
293					Minimum of Logged Data	-3.474				Mean of logged Data		0.926
294					Maximum of Logged Data	1.609				SD of logged Data		1.506
295												
296						Assuming Lognormal Distribution						
297					95% H-UCL	40.88				90% Chebyshev (MVUE) UCL		16.1
298					95% Chebyshev (MVUE) UCL	20.35				97.5% Chebyshev (MVUE) UCL		26.25
299					99% Chebyshev (MVUE) UCL	37.83						
300												
301						Nonparametric Distribution Free UCL Statistics						
302						Data do not follow a Discernible Distribution (0.05)						
303												
304						Nonparametric Distribution Free UCLs						
305					95% CLT UCL	4.868				95% Jackknife UCL		4.943
306					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
307					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
308					95% BCA Bootstrap UCL	N/A						
309					90% Chebyshev(Mean, Sd) UCL	5.607				95% Chebyshev(Mean, Sd) UCL		6.349
310					97.5% Chebyshev(Mean, Sd) UCL	7.378				99% Chebyshev(Mean, Sd) UCL		9.399
311												
312						Suggested UCL to Use						

	A	B	C	D	E	F	G	H	I	J	K	L
313					99% Chebyshev (Mean, Sd) UCL	9.399						
314												
315					**Recommended UCL exceeds the maximum observation**							
316												
317					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
318					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
319					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
320					For additional insight the user may want to consult a statistician.							
321												
322					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
323					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
324												
325												
326	**Uranium**											
327												
328					**General Statistics**							
329					Total Number of Observations	13			Number of Distinct Observations			7
330									Number of Missing Observations			0
331					Minimum	9.4			Mean			131.7
332					Maximum	473			Median			10
333					SD	179.8			Std. Error of Mean			49.87
334					Coefficient of Variation	1.365			Skewness			1.079
335												
336					**Normal GOF Test**							
337					Shapiro Wilk Test Statistic	0.706			**Shapiro Wilk GOF Test**			
338					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			
339					Lilliefors Test Statistic	0.366			**Lilliefors GOF Test**			
340					5% Lilliefors Critical Value	0.246			Data Not Normal at 5% Significance Level			
341					**Data Not Normal at 5% Significance Level**							
342												
343					**Assuming Normal Distribution**							
344					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
345					95% Student's-t UCL	220.6			95% Adjusted-CLT UCL (Chen-1995)			229.7
346									95% Modified-t UCL (Johnson-1978)			223.1
347												
348					**Gamma GOF Test**							
349					A-D Test Statistic	1.865			**Anderson-Darling Gamma GOF Test**			
350					5% A-D Critical Value	0.791			Data Not Gamma Distributed at 5% Significance Level			
351					K-S Test Statistic	0.396			**Kolmogrov-Smirnoff Gamma GOF Test**			
352					5% K-S Critical Value	0.25			Data Not Gamma Distributed at 5% Significance Level			
353					**Data Not Gamma Distributed at 5% Significance Level**							
354												
355					**Gamma Statistics**							
356					k hat (MLE)	0.496			k star (bias corrected MLE)			0.433
357					Theta hat (MLE)	265.5			Theta star (bias corrected MLE)			304.2
358					nu hat (MLE)	12.9			nu star (bias corrected)			11.26
359					MLE Mean (bias corrected)	131.7			MLE Sd (bias corrected)			200.2
360									Approximate Chi Square Value (0.05)			4.742
361					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			4.156
362												
363					**Assuming Gamma Distribution**							
364					95% Approximate Gamma UCL (use when n>=50))	312.7			95% Adjusted Gamma UCL (use when n<50)			356.8

	A	B	C	D	E	F	G	H	I	J	K	L
365												
366						Lognormal GOF Test						
367					Shapiro Wilk Test Statistic	0.693			Shapiro Wilk Lognormal GOF Test			
368					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
369					Lilliefors Test Statistic	0.386			Lilliefors Lognormal GOF Test			
370					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
371						Data Not Lognormal at 5% Significance Level						
372												
373						Lognormal Statistics						
374					Minimum of Logged Data	2.241			Mean of logged Data			3.599
375					Maximum of Logged Data	6.159			SD of logged Data			1.746
376												
377						Assuming Lognormal Distribution						
378					95% H-UCL	1412			90% Chebyshev (MVUE) UCL			348.6
379					95% Chebyshev (MVUE) UCL	446.3			97.5% Chebyshev (MVUE) UCL			581.8
380					99% Chebyshev (MVUE) UCL	848						
381												
382						Nonparametric Distribution Free UCL Statistics						
383						Data do not follow a Discernible Distribution (0.05)						
384												
385						Nonparametric Distribution Free UCLs						
386					95% CLT UCL	213.8			95% Jackknife UCL			220.6
387					95% Standard Bootstrap UCL	209.5			95% Bootstrap-t UCL			246.1
388					95% Hall's Bootstrap UCL	200.4			95% Percentile Bootstrap UCL			214.3
389					95% BCA Bootstrap UCL	228.8						
390					90% Chebyshev(Mean, Sd) UCL	281.3			95% Chebyshev(Mean, Sd) UCL			349.1
391					97.5% Chebyshev(Mean, Sd) UCL	443.2			99% Chebyshev(Mean, Sd) UCL			628
392												
393						Suggested UCL to Use						
394					99% Chebyshev (Mean, Sd) UCL	628						
395												
396						Recommended UCL exceeds the maximum observation						
397												
398						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
399						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
400						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
401						For additional insight the user may want to consult a statistician.						
402												
403												
404	Uranium-234											
405												
406						General Statistics						
407					Total Number of Observations	13			Number of Distinct Observations			4
408									Number of Missing Observations			0
409					Minimum	0.299			Mean			4.475
410					Maximum	12.2			Median			4.475
411					SD	2.734			Std. Error of Mean			0.758
412					Coefficient of Variation	0.611			Skewness			1.655
413												
414						Normal GOF Test						
415					Shapiro Wilk Test Statistic	0.637			Shapiro Wilk GOF Test			
416					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
417					Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**					
418					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
419	**Data Not Normal at 5% Significance Level**											
420												
421	**Assuming Normal Distribution**											
422	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
423					95% Student's-t UCL	5.827	95% Adjusted-CLT UCL (Chen-1995)					6.095
424							95% Modified-t UCL (Johnson-1978)					5.885
425												
426	**Gamma GOF Test**											
427					A-D Test Statistic	2.416	**Anderson-Darling Gamma GOF Test**					
428					5% A-D Critical Value	0.743	Data Not Gamma Distributed at 5% Significance Level					
429					K-S Test Statistic	0.437	**Kolmogrov-Smirnoff Gamma GOF Test**					
430					5% K-S Critical Value	0.239	Data Not Gamma Distributed at 5% Significance Level					
431	**Data Not Gamma Distributed at 5% Significance Level**											
432												
433	**Gamma Statistics**											
434					k hat (MLE)	2.135	k star (bias corrected MLE)					1.694
435					Theta hat (MLE)	2.096	Theta star (bias corrected MLE)					2.643
436					nu hat (MLE)	55.51	nu star (bias corrected)					44.03
437					MLE Mean (bias corrected)	4.475	MLE Sd (bias corrected)					3.439
438							Approximate Chi Square Value (0.05)					29.81
439					Adjusted Level of Significance	0.0301	Adjusted Chi Square Value					28.16
440												
441	**Assuming Gamma Distribution**											
442					95% Approximate Gamma UCL (use when n>=50))	6.61	95% Adjusted Gamma UCL (use when n<50)					6.999
443												
444	**Lognormal GOF Test**											
445					Shapiro Wilk Test Statistic	0.632	**Shapiro Wilk Lognormal GOF Test**					
446					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
447					Lilliefors Test Statistic	0.455	**Lilliefors Lognormal GOF Test**					
448					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
449	**Data Not Lognormal at 5% Significance Level**											
450												
451	**Lognormal Statistics**											
452					Minimum of Logged Data	-1.207	Mean of logged Data					1.246
453					Maximum of Logged Data	2.501	SD of logged Data					0.912
454												
455	**Assuming Lognormal Distribution**											
456					95% H-UCL	10.73	90% Chebyshev (MVUE) UCL					9.156
457					95% Chebyshev (MVUE) UCL	11.01	97.5% Chebyshev (MVUE) UCL					13.59
458					99% Chebyshev (MVUE) UCL	18.66						
459												
460	**Nonparametric Distribution Free UCL Statistics**											
461	**Data do not follow a Discernible Distribution (0.05)**											
462												
463	**Nonparametric Distribution Free UCLs**											
464					95% CLT UCL	5.723	95% Jackknife UCL					5.827
465					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
466					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
467					95% BCA Bootstrap UCL	N/A						
468					90% Chebyshev(Mean, Sd) UCL	6.75	95% Chebyshev(Mean, Sd) UCL					7.781

	A	B	C	D	E	F	G	H	I	J	K	L
469					97.5% Chebyshev(Mean, Sd) UCL	9.211				99% Chebyshev(Mean, Sd) UCL		12.02
470												
471						Suggested UCL to Use						
472					95% Chebyshev (Mean, Sd) UCL	7.781						
473												
474					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
475					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
476					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
477					For additional insight the user may want to consult a statistician.							
478												
479												
480	Uranium-235											
481												
482						General Statistics						
483					Total Number of Observations	13				Number of Distinct Observations		4
484										Number of Missing Observations		0
485					Minimum	0.0335				Mean		0.687
486					Maximum	1.96				Median		0.687
487					SD	0.45				Std. Error of Mean		0.125
488					Coefficient of Variation	0.656				Skewness		1.67
489												
490						Normal GOF Test						
491					Shapiro Wilk Test Statistic	0.631				Shapiro Wilk GOF Test		
492					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
493					Lilliefors Test Statistic	0.423				Lilliefors GOF Test		
494					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
495						Data Not Normal at 5% Significance Level						
496												
497						Assuming Normal Distribution						
498					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
499					95% Student's-t UCL	0.909				95% Adjusted-CLT UCL (Chen-1995)		0.954
500										95% Modified-t UCL (Johnson-1978)		0.919
501												
502						Gamma GOF Test						
503					A-D Test Statistic	2.546				Anderson-Darling Gamma GOF Test		
504					5% A-D Critical Value	0.748				Data Not Gamma Distributed at 5% Significance Level		
505					K-S Test Statistic	0.449				Kolmogrov-Smirnoff Gamma GOF Test		
506					5% K-S Critical Value	0.24				Data Not Gamma Distributed at 5% Significance Level		
507						Data Not Gamma Distributed at 5% Significance Level						
508												
509						Gamma Statistics						
510					k hat (MLE)	1.657				k star (bias corrected MLE)		1.326
511					Theta hat (MLE)	0.415				Theta star (bias corrected MLE)		0.518
512					nu hat (MLE)	43.07				nu star (bias corrected)		34.46
513					MLE Mean (bias corrected)	0.687				MLE Sd (bias corrected)		0.596
514										Approximate Chi Square Value (0.05)		22.04
515					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		20.63
516												
517						Assuming Gamma Distribution						
518					95% Approximate Gamma UCL (use when n>=50))	1.074				95% Adjusted Gamma UCL (use when n<50)		1.147
519												
520						Lognormal GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
521					Shapiro Wilk Test Statistic	0.614	**Shapiro Wilk Lognormal GOF Test**					
522					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
523					Lilliefors Test Statistic	0.466	**Lilliefors Lognormal GOF Test**					
524					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
525	**Data Not Lognormal at 5% Significance Level**											
526												
527	**Lognormal Statistics**											
528					Minimum of Logged Data	-3.396	Mean of logged Data					-0.707
529					Maximum of Logged Data	0.673	SD of logged Data					1.09
530												
531	**Assuming Lognormal Distribution**											
532					95% H-UCL	2.297	90% Chebyshev (MVUE) UCL					1.66
533					95% Chebyshev (MVUE) UCL	2.033	97.5% Chebyshev (MVUE) UCL					2.551
534					99% Chebyshev (MVUE) UCL	3.568						
535												
536	**Nonparametric Distribution Free UCL Statistics**											
537	**Data do not follow a Discernible Distribution (0.05)**											
538												
539	**Nonparametric Distribution Free UCLs**											
540					95% CLT UCL	0.892	95% Jackknife UCL					0.909
541					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
542					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
543					95% BCA Bootstrap UCL	N/A						
544					90% Chebyshev(Mean, Sd) UCL	1.061	95% Chebyshev(Mean, Sd) UCL					1.231
545					97.5% Chebyshev(Mean, Sd) UCL	1.467	99% Chebyshev(Mean, Sd) UCL					1.929
546												
547	**Suggested UCL to Use**											
548					95% Chebyshev (Mean, Sd) UCL	1.231						
549												
550	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
551	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
552	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
553	For additional insight the user may want to consult a statistician.											
554												
555												
556	**Uranium-238**											
557												
558	**General Statistics**											
559					Total Number of Observations	13	Number of Distinct Observations					4
560							Number of Missing Observations					0
561					Minimum	1.68	Mean					37.31
562					Maximum	108	Median					37.31
563					SD	24.99	Std. Error of Mean					6.932
564					Coefficient of Variation	0.67	Skewness					1.671
565												
566	**Normal GOF Test**											
567					Shapiro Wilk Test Statistic	0.628	**Shapiro Wilk GOF Test**					
568					5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level					
569					Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**					
570					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
571	**Data Not Normal at 5% Significance Level**											
572												

	A	B	C	D	E	F	G	H	I	J	K	L
573						Assuming Normal Distribution						
574				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
575					95% Student's-t UCL	49.66				95% Adjusted-CLT UCL (Chen-1995)		52.14
576										95% Modified-t UCL (Johnson-1978)		50.2
577												
578						Gamma GOF Test						
579					A-D Test Statistic	2.633			Anderson-Darling Gamma GOF Test			
580					5% A-D Critical Value	0.751			Data Not Gamma Distributed at 5% Significance Level			
581					K-S Test Statistic	0.455			Kolmogrov-Smirnoff Gamma GOF Test			
582					5% K-S Critical Value	0.241			Data Not Gamma Distributed at 5% Significance Level			
583						Data Not Gamma Distributed at 5% Significance Level						
584												
585						Gamma Statistics						
586					k hat (MLE)	1.485			k star (bias corrected MLE)			1.193
587					Theta hat (MLE)	25.13			Theta star (bias corrected MLE)			31.26
588					nu hat (MLE)	38.61			nu star (bias corrected)			31.03
589					MLE Mean (bias corrected)	37.31			MLE Sd (bias corrected)			34.15
590									Approximate Chi Square Value (0.05)			19.3
591					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			18
592												
593						Assuming Gamma Distribution						
594					95% Approximate Gamma UCL (use when n>=50))	59.97			95% Adjusted Gamma UCL (use when n<50)			64.33
595												
596						Lognormal GOF Test						
597					Shapiro Wilk Test Statistic	0.595			Shapiro Wilk Lognormal GOF Test			
598					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
599					Lilliefors Test Statistic	0.47			Lilliefors Lognormal GOF Test			
600					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
601						Data Not Lognormal at 5% Significance Level						
602												
603						Lognormal Statistics						
604					Minimum of Logged Data	0.519			Mean of logged Data			3.246
605					Maximum of Logged Data	4.682			SD of logged Data			1.185
606												
607						Assuming Lognormal Distribution						
608					95% H-UCL	153.7			90% Chebyshev (MVUE) UCL			99.35
609					95% Chebyshev (MVUE) UCL	122.7			97.5% Chebyshev (MVUE) UCL			155.1
610					99% Chebyshev (MVUE) UCL	218.8						
611												
612						Nonparametric Distribution Free UCL Statistics						
613						Data do not follow a Discernible Distribution (0.05)						
614												
615						Nonparametric Distribution Free UCLs						
616					95% CLT UCL	48.71			95% Jackknife UCL			49.66
617					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
618					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
619					95% BCA Bootstrap UCL	N/A						
620					90% Chebyshev(Mean, Sd) UCL	58.1			95% Chebyshev(Mean, Sd) UCL			67.52
621					97.5% Chebyshev(Mean, Sd) UCL	80.6			99% Chebyshev(Mean, Sd) UCL			106.3
622												
623						Suggested UCL to Use						
624					95% Chebyshev (Mean, Sd) UCL	67.52						

	A	B	C	D	E	F	G	H	I	J	K	L
625												
626	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
627	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
628	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
629	For additional insight the user may want to consult a statistician.											
630												
631												
632	**Vanadium**											
633												
634	**General Statistics**											
635	Total Number of Observations					13	Number of Distinct Observations					13
636							Number of Missing Observations					0
637	Minimum					5	Mean					113.3
638	Maximum					184	Median					119
639	SD					39.41	Std. Error of Mean					10.93
640	Coefficient of Variation					0.348	Skewness					-1.481
641												
642	**Normal GOF Test**											
643	Shapiro Wilk Test Statistic					0.793	**Shapiro Wilk GOF Test**					
644	5% Shapiro Wilk Critical Value					0.866	Data Not Normal at 5% Significance Level					
645	Lilliefors Test Statistic					0.266	**Lilliefors GOF Test**					
646	5% Lilliefors Critical Value					0.246	Data Not Normal at 5% Significance Level					
647	**Data Not Normal at 5% Significance Level**											
648												
649	**Assuming Normal Distribution**											
650	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
651	95% Student's-t UCL					132.8	95% Adjusted-CLT UCL (Chen-1995)					126.5
652							95% Modified-t UCL (Johnson-1978)					132
653												
654	**Gamma GOF Test**											
655	A-D Test Statistic					2.452	**Anderson-Darling Gamma GOF Test**					
656	5% A-D Critical Value					0.74	Data Not Gamma Distributed at 5% Significance Level					
657	K-S Test Statistic					0.346	**Kolmogrov-Smirnoff Gamma GOF Test**					
658	5% K-S Critical Value					0.238	Data Not Gamma Distributed at 5% Significance Level					
659	**Data Not Gamma Distributed at 5% Significance Level**											
660												
661	**Gamma Statistics**											
662	k hat (MLE)					2.887	k star (bias corrected MLE)					2.272
663	Theta hat (MLE)					39.25	Theta star (bias corrected MLE)					49.88
664	nu hat (MLE)					75.05	nu star (bias corrected)					59.07
665	MLE Mean (bias corrected)					113.3	MLE Sd (bias corrected)					75.18
666							Approximate Chi Square Value (0.05)					42.4
667	Adjusted Level of Significance					0.0301	Adjusted Chi Square Value					40.39
668												
669	**Assuming Gamma Distribution**											
670	95% Approximate Gamma UCL (use when n>=50))					157.9	95% Adjusted Gamma UCL (use when n<50)					165.7
671												
672	**Lognormal GOF Test**											
673	Shapiro Wilk Test Statistic					0.482	**Shapiro Wilk Lognormal GOF Test**					
674	5% Shapiro Wilk Critical Value					0.866	Data Not Lognormal at 5% Significance Level					
675	Lilliefors Test Statistic					0.387	**Lilliefors Lognormal GOF Test**					
676	5% Lilliefors Critical Value					0.246	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
677	Data Not Lognormal at 5% Significance Level											
678												
679	Lognormal Statistics											
680					Minimum of Logged Data	1.609				Mean of logged Data		4.547
681					Maximum of Logged Data	5.215				SD of logged Data		0.899
682												
683	Assuming Lognormal Distribution											
684					95% H-UCL	283				90% Chebyshev (MVUE) UCL		244.1
685					95% Chebyshev (MVUE) UCL	293.1				97.5% Chebyshev (MVUE) UCL		361.3
686					99% Chebyshev (MVUE) UCL	495.1						
687												
688	Nonparametric Distribution Free UCL Statistics											
689	Data do not follow a Discernible Distribution (0.05)											
690												
691	Nonparametric Distribution Free UCLs											
692					95% CLT UCL	131.3				95% Jackknife UCL		132.8
693					95% Standard Bootstrap UCL	130.3				95% Bootstrap-t UCL		128.9
694					95% Hall's Bootstrap UCL	128.3				95% Percentile Bootstrap UCL		129.4
695					95% BCA Bootstrap UCL	126.5						
696					90% Chebyshev(Mean, Sd) UCL	146.1				95% Chebyshev(Mean, Sd) UCL		161
697					97.5% Chebyshev(Mean, Sd) UCL	181.6				99% Chebyshev(Mean, Sd) UCL		222.1
698												
699	Suggested UCL to Use											
700					95% Chebyshev (Mean, Sd) UCL	161						
701												
702	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
703	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
704	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
705	For additional insight the user may want to consult a statistician.											
706												
707	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
708	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
709												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/1/2015 12:57:37 PM								
5	From File			EPC_026SurfR1_a.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Aluminum											
12												
13	General Statistics											
14	Total Number of Observations					10	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					4300	Mean					15107
17	Maximum					34600	Median					15107
18	SD					7974	Std. Error of Mean					2522
19	Coefficient of Variation					0.528	Skewness					1.504
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.716	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.4	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					19729	95% Adjusted-CLT UCL (Chen-1995)					20536
31							95% Modified-t UCL (Johnson-1978)					19929
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.369	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.729	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.366	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.268	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					4.055	k star (bias corrected MLE)					2.905
42	Theta hat (MLE)					3726	Theta star (bias corrected MLE)					5200
43	nu hat (MLE)					81.09	nu star (bias corrected)					58.1
44	MLE Mean (bias corrected)					15107	MLE Sd (bias corrected)					8863
45							Approximate Chi Square Value (0.05)					41.58
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					39.16
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					21110	95% Adjusted Gamma UCL (use when n<50)					22414
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.771	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.39	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	8.366	Mean of logged Data					9.495
60					Maximum of Logged Data	10.45	SD of logged Data					0.561
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	23948	90% Chebyshev (MVUE) UCL					23593
64					95% Chebyshev (MVUE) UCL	27358	97.5% Chebyshev (MVUE) UCL					32583
65					99% Chebyshev (MVUE) UCL	42848						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	19254	95% Jackknife UCL					19729
72					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
73					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	22671	95% Chebyshev(Mean, Sd) UCL					26098
76					97.5% Chebyshev(Mean, Sd) UCL	30854	99% Chebyshev(Mean, Sd) UCL					40196
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	26098						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Arsenic**											
88												
89	**General Statistics**											
90					Total Number of Observations	10	Number of Distinct Observations					5
91							Number of Missing Observations					0
92					Minimum	4.2	Mean					22.51
93					Maximum	81.4	Median					22.51
94					SD	22.01	Std. Error of Mean					6.959
95					Coefficient of Variation	0.978	Skewness					2.482
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.66	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	35.27				95% Adjusted-CLT UCL (Chen-1995)		39.79
107										95% Modified-t UCL (Johnson-1978)		36.18
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.73	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.299	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.271	Data Not Gamma Distributed at 5% Significance Level					
114	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	1.714	k star (bias corrected MLE)					1.267
118					Theta hat (MLE)	13.13	Theta star (bias corrected MLE)					17.77
119					nu hat (MLE)	34.29	nu star (bias corrected)					25.34
120					MLE Mean (bias corrected)	22.51	MLE Sd (bias corrected)					20
121							Approximate Chi Square Value (0.05)					14.87
122					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					13.49
123												
124	**Assuming Gamma Distribution**											
125					95% Approximate Gamma UCL (use when n>=50)	38.36	95% Adjusted Gamma UCL (use when n<50)					42.27
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.25	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	1.435	Mean of logged Data					2.795
136					Maximum of Logged Data	4.399	SD of logged Data					0.827
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	49.25	90% Chebyshev (MVUE) UCL					40.05
140					95% Chebyshev (MVUE) UCL	48.2	97.5% Chebyshev (MVUE) UCL					59.51
141					99% Chebyshev (MVUE) UCL	81.72						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	33.96	95% Jackknife UCL					35.27
148					95% Standard Bootstrap UCL	33.34	95% Bootstrap-t UCL					47.38
149					95% Hall's Bootstrap UCL	79.96	95% Percentile Bootstrap UCL					34.59
150					95% BCA Bootstrap UCL	37.68						
151					90% Chebyshev(Mean, Sd) UCL	43.39	95% Chebyshev(Mean, Sd) UCL					52.84
152					97.5% Chebyshev(Mean, Sd) UCL	65.97	99% Chebyshev(Mean, Sd) UCL					91.75
153												
154	**Suggested UCL to Use**											
155					95% Adjusted Gamma UCL	42.27						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Beryllium**											
164												
165	**General Statistics**											
166	Total Number of Observations					10	Number of Distinct Observations				4	
167							Number of Missing Observations				0	
168	Minimum					0.37	Mean				5.527	
169	Maximum					15.7	Median				5.527	
170	SD					4.153	Std. Error of Mean				1.313	
171	Coefficient of Variation					0.751	Skewness				1.53	
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.703	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					7.935	95% Adjusted-CLT UCL (Chen-1995)				8.367	
183							95% Modified-t UCL (Johnson-1978)				8.041	
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					1.57	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.741	Data Not Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.413	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.272	Data Not Gamma Distributed at 5% Significance Level					
190	**Data Not Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					1.381	k star (bias corrected MLE)				1.033	
194	Theta hat (MLE)					4.003	Theta star (bias corrected MLE)				5.35	
195	nu hat (MLE)					27.62	nu star (bias corrected)				20.66	
196	MLE Mean (bias corrected)					5.527	MLE Sd (bias corrected)				5.438	
197							Approximate Chi Square Value (0.05)				11.34	
198	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value				10.16	
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					10.07	95% Adjusted Gamma UCL (use when n<50)				11.24	
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.692	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.434	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					
208	**Data Not Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	-0.994				Mean of logged Data		1.306
212					Maximum of Logged Data	2.754				SD of logged Data		1.175
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	28.71				90% Chebyshev (MVUE) UCL		14.49
216					95% Chebyshev (MVUE) UCL	18.04				97.5% Chebyshev (MVUE) UCL		22.97
217					99% Chebyshev (MVUE) UCL	32.64						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data do not follow a Discernible Distribution (0.05)						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	7.688				95% Jackknife UCL		7.935
224					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
225					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
226					95% BCA Bootstrap UCL	N/A						
227					90% Chebyshev(Mean, Sd) UCL	9.467				95% Chebyshev(Mean, Sd) UCL		11.25
228					97.5% Chebyshev(Mean, Sd) UCL	13.73				99% Chebyshev(Mean, Sd) UCL		18.59
229												
230						Suggested UCL to Use						
231					95% Chebyshev (Mean, Sd) UCL	11.25						
232												
233					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
234					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
235					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
236					For additional insight the user may want to consult a statistician.							
237												
238												
239	Cesium-137											
240												
241						General Statistics						
242					Total Number of Observations	10				Number of Distinct Observations		4
243										Number of Missing Observations		0
244					Minimum	-0.00934				Mean		5.867
245					Maximum	11.2				Median		5.867
246					SD	2.651				Std. Error of Mean		0.838
247					Coefficient of Variation	0.452				Skewness		-0.381
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.691				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
254						Data Not Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	7.404				95% Adjusted-CLT UCL (Chen-1995)		7.138
259										95% Modified-t UCL (Johnson-1978)		7.387
260						Gamma Statistics Not Available						

	A	B	C	D	E	F	G	H	I	J	K	L
261	Lognormal Statistics Not Available											
262												
263	Nonparametric Distribution Free UCL Statistics											
264	Data do not follow a Discernible Distribution (0.05)											
265												
266	Nonparametric Distribution Free UCLs											
267					95% CLT UCL	7.246				95% Jackknife UCL		7.404
268					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
269					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
270					95% BCA Bootstrap UCL	N/A						
271					90% Chebyshev(Mean, Sd) UCL	8.382				95% Chebyshev(Mean, Sd) UCL		9.522
272					97.5% Chebyshev(Mean, Sd) UCL	11.1				99% Chebyshev(Mean, Sd) UCL		14.21
273												
274	Suggested UCL to Use											
275					95% Chebyshev (Mean, Sd) UCL	9.522						
276												
277	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
278	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
279	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
280	For additional insight the user may want to consult a statistician.											
281												
282	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
283	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
284												
285												
286	Chromium											
287												
288	General Statistics											
289					Total Number of Observations	10				Number of Distinct Observations		5
290										Number of Missing Observations		0
291					Minimum	8.2				Mean		21.3
292					Maximum	59.9				Median		21.3
293					SD	14.46				Std. Error of Mean		4.573
294					Coefficient of Variation	0.679				Skewness		2.449
295												
296	Normal GOF Test											
297					Shapiro Wilk Test Statistic	0.672				Shapiro Wilk GOF Test		
298					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
299					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
300					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
301	Data Not Normal at 5% Significance Level											
302												
303	Assuming Normal Distribution											
304					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
305					95% Student's-t UCL	29.68				95% Adjusted-CLT UCL (Chen-1995)		32.61
306										95% Modified-t UCL (Johnson-1978)		30.27
307												
308	Gamma GOF Test											
309					A-D Test Statistic	0.855				Anderson-Darling Gamma GOF Test		
310					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
311					K-S Test Statistic	0.33				Kolmogrov-Smirnoff Gamma GOF Test		
312					5% K-S Critical Value	0.268				Data Not Gamma Distributed at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
313	**Data Not Gamma Distributed at 5% Significance Level**											
314												
315	**Gamma Statistics**											
316					k hat (MLE)	3.584				k star (bias corrected MLE)		2.575
317					Theta hat (MLE)	5.944				Theta star (bias corrected MLE)		8.271
318					nu hat (MLE)	71.67				nu star (bias corrected)		51.5
319					MLE Mean (bias corrected)	21.3				MLE Sd (bias corrected)		13.27
320										Approximate Chi Square Value (0.05)		36.02
321					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		33.78
322												
323	**Assuming Gamma Distribution**											
324				95% Approximate Gamma UCL (use when n>=50))		30.46				95% Adjusted Gamma UCL (use when n<50)		32.47
325												
326	**Lognormal GOF Test**											
327					Shapiro Wilk Test Statistic	0.873				**Shapiro Wilk Lognormal GOF Test**		
328					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
329					Lilliefors Test Statistic	0.293				**Lilliefors Lognormal GOF Test**		
330					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
331	**Data appear Approximate Lognormal at 5% Significance Level**											
332												
333	**Lognormal Statistics**											
334					Minimum of Logged Data	2.104				Mean of logged Data		2.913
335					Maximum of Logged Data	4.093				SD of logged Data		0.535
336												
337	**Assuming Lognormal Distribution**											
338					95% H-UCL	31.85				90% Chebyshev (MVUE) UCL		31.74
339					95% Chebyshev (MVUE) UCL	36.65				97.5% Chebyshev (MVUE) UCL		43.46
340					99% Chebyshev (MVUE) UCL	56.84						
341												
342	**Nonparametric Distribution Free UCL Statistics**											
343	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
344												
345	**Nonparametric Distribution Free UCLs**											
346					95% CLT UCL	28.82				95% Jackknife UCL		29.68
347					95% Standard Bootstrap UCL	28.41				95% Bootstrap-t UCL		37.53
348					95% Hall's Bootstrap UCL	59.97				95% Percentile Bootstrap UCL		28.78
349					95% BCA Bootstrap UCL	32.88						
350					90% Chebyshev(Mean, Sd) UCL	35.02				95% Chebyshev(Mean, Sd) UCL		41.23
351					97.5% Chebyshev(Mean, Sd) UCL	49.86				99% Chebyshev(Mean, Sd) UCL		66.8
352												
353	**Suggested UCL to Use**											
354					95% Chebyshev (Mean, Sd) UCL	41.23						
355												
356	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
357	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
358	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
359	For additional insight the user may want to consult a statistician.											
360												
361												
362	**Cobalt**											
363												
364	**General Statistics**											

	A–E	F	G–K	L
365	Total Number of Observations	10	Number of Distinct Observations	4
366			Number of Missing Observations	0
367	Minimum	5.5	Mean	34.21
368	Maximum	90.5	Median	34.21
369	SD	22.98	Std. Error of Mean	7.267
370	Coefficient of Variation	0.672	Skewness	1.53
371				
372	**Normal GOF Test**			
373	Shapiro Wilk Test Statistic	0.704	**Shapiro Wilk GOF Test**	
374	5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level	
375	Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**	
376	5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level	
377	**Data Not Normal at 5% Significance Level**			
378				
379	**Assuming Normal Distribution**			
380	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
381	95% Student's-t UCL	47.53	95% Adjusted-CLT UCL (Chen-1995)	49.92
382			95% Modified-t UCL (Johnson-1978)	48.12
383				
384	**Gamma GOF Test**			
385	A-D Test Statistic	1.483	**Anderson-Darling Gamma GOF Test**	
386	5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level	
387	K-S Test Statistic	0.391	**Kolmogrov-Smirnoff Gamma GOF Test**	
388	5% K-S Critical Value	0.27	Data Not Gamma Distributed at 5% Significance Level	
389	**Data Not Gamma Distributed at 5% Significance Level**			
390				
391	**Gamma Statistics**			
392	k hat (MLE)	2.156	k star (bias corrected MLE)	1.576
393	Theta hat (MLE)	15.87	Theta star (bias corrected MLE)	21.71
394	nu hat (MLE)	43.12	nu star (bias corrected)	31.52
395	MLE Mean (bias corrected)	34.21	MLE Sd (bias corrected)	27.25
396			Approximate Chi Square Value (0.05)	19.69
397	Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	18.08
398				
399	**Assuming Gamma Distribution**			
400	95% Approximate Gamma UCL (use when n>=50))	54.76	95% Adjusted Gamma UCL (use when n<50)	59.64
401				
402	**Lognormal GOF Test**			
403	Shapiro Wilk Test Statistic	0.725	**Shapiro Wilk Lognormal GOF Test**	
404	5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level	
405	Lilliefors Test Statistic	0.417	**Lilliefors Lognormal GOF Test**	
406	5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level	
407	**Data Not Lognormal at 5% Significance Level**			
408				
409	**Lognormal Statistics**			
410	Minimum of Logged Data	1.705	Mean of logged Data	3.283
411	Maximum of Logged Data	4.505	SD of logged Data	0.84
412				
413	**Assuming Lognormal Distribution**			
414	95% H-UCL	82.78	90% Chebyshev (MVUE) UCL	66.41
415	95% Chebyshev (MVUE) UCL	80.04	97.5% Chebyshev (MVUE) UCL	98.97
416	99% Chebyshev (MVUE) UCL	136.1		

	A	B	C	D	E	F	G	H	I	J	K	L
417												
418	**Nonparametric Distribution Free UCL Statistics**											
419	**Data do not follow a Discernible Distribution (0.05)**											
420												
421	**Nonparametric Distribution Free UCLs**											
422					95% CLT UCL	46.17				95% Jackknife UCL		47.53
423					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
424					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
425					95% BCA Bootstrap UCL	N/A						
426					90% Chebyshev(Mean, Sd) UCL	56.01				95% Chebyshev(Mean, Sd) UCL		65.89
427					97.5% Chebyshev(Mean, Sd) UCL	79.6				99% Chebyshev(Mean, Sd) UCL		106.5
428												
429	**Suggested UCL to Use**											
430					95% Chebyshev (Mean, Sd) UCL	65.89						
431												
432	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
433	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
434	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
435	For additional insight the user may want to consult a statistician.											
436												
437												
438	**Iron**											
439												
440	**General Statistics**											
441					Total Number of Observations	10				Number of Distinct Observations		6
442										Number of Missing Observations		0
443					Minimum	15600				Mean		35612
444					Maximum	85100				Median		35612
445					SD	19771				Std. Error of Mean		6252
446					Coefficient of Variation	0.555				Skewness		1.836
447												
448	**Normal GOF Test**											
449					Shapiro Wilk Test Statistic	0.757				**Shapiro Wilk GOF Test**		
450					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
451					Lilliefors Test Statistic	0.3				**Lilliefors GOF Test**		
452					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
453	**Data Not Normal at 5% Significance Level**											
454												
455	**Assuming Normal Distribution**											
456	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
457					95% Student's-t UCL	47073				95% Adjusted-CLT UCL (Chen-1995)		49774
458										95% Modified-t UCL (Johnson-1978)		47678
459												
460	**Gamma GOF Test**											
461					A-D Test Statistic	0.815				**Anderson-Darling Gamma GOF Test**		
462					5% A-D Critical Value	0.729				Data Not Gamma Distributed at 5% Significance Level		
463					K-S Test Statistic	0.263				**Kolmogrov-Smirnoff Gamma GOF Test**		
464					5% K-S Critical Value	0.268				Detected data appear Gamma Distributed at 5% Significance Level		
465	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
466												
467	**Gamma Statistics**											
468					k hat (MLE)	4.396				k star (bias corrected MLE)		3.144

469					Theta hat (MLE)	8101					Theta star (bias corrected MLE)	11327
470					nu hat (MLE)	87.92					nu star (bias corrected)	62.88
471					MLE Mean (bias corrected)	35612					MLE Sd (bias corrected)	20085
472											Approximate Chi Square Value (0.05)	45.64
473					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	43.1
474												
475					**Assuming Gamma Distribution**							
476					95% Approximate Gamma UCL (use when n>=50)	49065					95% Adjusted Gamma UCL (use when n<50)	51960
477												
478					**Lognormal GOF Test**							
479					Shapiro Wilk Test Statistic	0.865					**Shapiro Wilk Lognormal GOF Test**	
480					5% Shapiro Wilk Critical Value	0.842					Data appear Lognormal at 5% Significance Level	
481					Lilliefors Test Statistic	0.293					**Lilliefors Lognormal GOF Test**	
482					5% Lilliefors Critical Value	0.28					Data Not Lognormal at 5% Significance Level	
483					**Data appear Approximate Lognormal at 5% Significance Level**							
484												
485					**Lognormal Statistics**							
486					Minimum of Logged Data	9.655					Mean of logged Data	10.36
487					Maximum of Logged Data	11.35					SD of logged Data	0.504
488												
489					**Assuming Lognormal Distribution**							
490					95% H-UCL	52214					90% Chebyshev (MVUE) UCL	52682
491					95% Chebyshev (MVUE) UCL	60494					97.5% Chebyshev (MVUE) UCL	71337
492					99% Chebyshev (MVUE) UCL	92635						
493												
494					**Nonparametric Distribution Free UCL Statistics**							
495					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
496												
497					**Nonparametric Distribution Free UCLs**							
498					95% CLT UCL	45896					95% Jackknife UCL	47073
499					95% Standard Bootstrap UCL	45392					95% Bootstrap-t UCL	51853
500					95% Hall's Bootstrap UCL	96328					95% Percentile Bootstrap UCL	46412
501					95% BCA Bootstrap UCL	50423						
502					90% Chebyshev(Mean, Sd) UCL	54368					95% Chebyshev(Mean, Sd) UCL	62864
503					97.5% Chebyshev(Mean, Sd) UCL	74656					99% Chebyshev(Mean, Sd) UCL	97819
504												
505					**Suggested UCL to Use**							
506					95% Adjusted Gamma UCL	51960						
507												
508					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
509					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
510					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
511					For additional insight the user may want to consult a statistician.							
512												
513												
514	**Neptunium-237**											
515												
516					**General Statistics**							
517					Total Number of Observations	10					Number of Distinct Observations	4
518											Number of Missing Observations	0
519					Minimum	0.00303					Mean	0.131
520					Maximum	0.26					Median	0.131

	A	B	C	D	E	F	G	H	I	J	K	L
521					SD	0.0606					Std. Error of Mean	0.0192
522					Coefficient of Variation	0.461					Skewness	0.0106
523												
524					Normal GOF Test							
525					Shapiro Wilk Test Statistic	0.66	Shapiro Wilk GOF Test					
526					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
527					Lilliefors Test Statistic	0.4	Lilliefors GOF Test					
528					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
529					Data Not Normal at 5% Significance Level							
530												
531					Assuming Normal Distribution							
532				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
533					95% Student's-t UCL	0.166					95% Adjusted-CLT UCL (Chen-1995)	0.163
534											95% Modified-t UCL (Johnson-1978)	0.166
535												
536					Gamma GOF Test							
537					A-D Test Statistic	2.467	Anderson-Darling Gamma GOF Test					
538					5% A-D Critical Value	0.737	Data Not Gamma Distributed at 5% Significance Level					
539					K-S Test Statistic	0.499	Kolmogrov-Smirnoff Gamma GOF Test					
540					5% K-S Critical Value	0.27	Data Not Gamma Distributed at 5% Significance Level					
541					Data Not Gamma Distributed at 5% Significance Level							
542												
543					Gamma Statistics							
544					k hat (MLE)	1.767					k star (bias corrected MLE)	1.304
545					Theta hat (MLE)	0.0743					Theta star (bias corrected MLE)	0.101
546					nu hat (MLE)	35.34					nu star (bias corrected)	26.07
547					MLE Mean (bias corrected)	0.131					MLE Sd (bias corrected)	0.115
548											Approximate Chi Square Value (0.05)	15.43
549					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	14.03
550												
551					Assuming Gamma Distribution							
552					95% Approximate Gamma UCL (use when n>=50))	0.222					95% Adjusted Gamma UCL (use when n<50)	0.244
553												
554					Lognormal GOF Test							
555					Shapiro Wilk Test Statistic	0.476	Shapiro Wilk Lognormal GOF Test					
556					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
557					Lilliefors Test Statistic	0.498	Lilliefors Lognormal GOF Test					
558					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
559					Data Not Lognormal at 5% Significance Level							
560												
561					Lognormal Statistics							
562					Minimum of Logged Data	-5.799					Mean of logged Data	-2.339
563					Maximum of Logged Data	-1.347					SD of logged Data	1.235
564												
565					Assuming Lognormal Distribution							
566					95% H-UCL	0.911					90% Chebyshev (MVUE) UCL	0.413
567					95% Chebyshev (MVUE) UCL	0.516					97.5% Chebyshev (MVUE) UCL	0.659
568					99% Chebyshev (MVUE) UCL	0.941						
569												
570					Nonparametric Distribution Free UCL Statistics							
571					Data do not follow a Discernible Distribution (0.05)							
572												

	A	B	C	D	E	F	G	H	I	J	K	L
573	**Nonparametric Distribution Free UCLs**											
574					95% CLT UCL	0.163				95% Jackknife UCL		0.166
575					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
576					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
577					95% BCA Bootstrap UCL	N/A						
578					90% Chebyshev(Mean, Sd) UCL	0.189				95% Chebyshev(Mean, Sd) UCL		0.215
579					97.5% Chebyshev(Mean, Sd) UCL	0.251				99% Chebyshev(Mean, Sd) UCL		0.322
580												
581	**Suggested UCL to Use**											
582					95% Chebyshev (Mean, Sd) UCL	0.215						
583												
584	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
585	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
586	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
587	For additional insight the user may want to consult a statistician.											
588												
589												
590	**Nickel**											
591												
592	**General Statistics**											
593					Total Number of Observations	10				Number of Distinct Observations		6
594										Number of Missing Observations		0
595					Minimum	4				Mean		51
596					Maximum	188				Median		51
597					SD	51.32				Std. Error of Mean		16.23
598					Coefficient of Variation	1.006				Skewness		2.45
599												
600	**Normal GOF Test**											
601					Shapiro Wilk Test Statistic	0.673				**Shapiro Wilk GOF Test**		
602					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
603					Lilliefors Test Statistic	0.4				**Lilliefors GOF Test**		
604					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
605	**Data Not Normal at 5% Significance Level**											
606												
607	**Assuming Normal Distribution**											
608				**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**		
609					95% Student's-t UCL	80.75				95% Adjusted-CLT UCL (Chen-1995)		91.13
610										95% Modified-t UCL (Johnson-1978)		82.84
611												
612	**Gamma GOF Test**											
613					A-D Test Statistic	0.673				**Anderson-Darling Gamma GOF Test**		
614					5% A-D Critical Value	0.741				Detected data appear Gamma Distributed at 5% Significance Level		
615					K-S Test Statistic	0.288				**Kolmogrov-Smirnoff Gamma GOF Test**		
616					5% K-S Critical Value	0.272				Data Not Gamma Distributed at 5% Significance Level		
617	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
618												
619	**Gamma Statistics**											
620					k hat (MLE)	1.415				k star (bias corrected MLE)		1.057
621					Theta hat (MLE)	36.03				Theta star (bias corrected MLE)		48.23
622					nu hat (MLE)	28.31				nu star (bias corrected)		21.15
623					MLE Mean (bias corrected)	51				MLE Sd (bias corrected)		49.6
624										Approximate Chi Square Value (0.05)		11.7

	A	B	C	D	E	F	G	H	I	J	K	L
625					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	10.5
626												
627					Assuming Gamma Distribution							
628				95% Approximate Gamma UCL (use when n>=50)		92.17					95% Adjusted Gamma UCL (use when n<50)	102.7
629												
630					Lognormal GOF Test							
631					Shapiro Wilk Test Statistic	0.886			Shapiro Wilk Lognormal GOF Test			
632					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
633					Lilliefors Test Statistic	0.252			Lilliefors Lognormal GOF Test			
634					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
635					Data appear Lognormal at 5% Significance Level							
636												
637					Lognormal Statistics							
638					Minimum of Logged Data	1.386					Mean of logged Data	3.539
639					Maximum of Logged Data	5.236					SD of logged Data	1.006
640												
641					Assuming Lognormal Distribution							
642					95% H-UCL	162.2					90% Chebyshev (MVUE) UCL	106.7
643					95% Chebyshev (MVUE) UCL	130.9					97.5% Chebyshev (MVUE) UCL	164.5
644					99% Chebyshev (MVUE) UCL	230.4						
645												
646					Nonparametric Distribution Free UCL Statistics							
647					Data appear to follow a Discernible Distribution at 5% Significance Level							
648												
649					Nonparametric Distribution Free UCLs							
650					95% CLT UCL	77.69					95% Jackknife UCL	80.75
651					95% Standard Bootstrap UCL	76.76					95% Bootstrap-t UCL	109.9
652					95% Hall's Bootstrap UCL	187.9					95% Percentile Bootstrap UCL	80.8
653					95% BCA Bootstrap UCL	86.4						
654					90% Chebyshev(Mean, Sd) UCL	99.69					95% Chebyshev(Mean, Sd) UCL	121.7
655					97.5% Chebyshev(Mean, Sd) UCL	152.3					99% Chebyshev(Mean, Sd) UCL	212.5
656												
657					Suggested UCL to Use							
658					95% Adjusted Gamma UCL	102.7						
659												
660					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
661					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
662					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
663					For additional insight the user may want to consult a statistician.							
664												
665												
666	PCB, Total											
667												
668					General Statistics							
669					Total Number of Observations	10					Number of Distinct Observations	5
670											Number of Missing Observations	0
671					Minimum	0.05					Mean	2.29
672					Maximum	5					Median	2.29
673					SD	1.66					Std. Error of Mean	0.525
674					Coefficient of Variation	0.725					Skewness	0.62
675												
676					Normal GOF Test							

	A	B	C	D	E	F	G	H	I	J	K	L
677					Shapiro Wilk Test Statistic	0.857	**Shapiro Wilk GOF Test**					
678					5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level					
679					Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**					
680					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
681	**Data appear Approximate Normal at 5% Significance Level**											
682												
683	**Assuming Normal Distribution**											
684	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
685					95% Student's-t UCL	3.252	95% Adjusted-CLT UCL (Chen-1995)					3.263
686							95% Modified-t UCL (Johnson-1978)					3.269
687												
688	**Gamma GOF Test**											
689					A-D Test Statistic	0.737	**Anderson-Darling Gamma GOF Test**					
690					5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level					
691					K-S Test Statistic	0.32	**Kolmogrov-Smirnoff Gamma GOF Test**					
692					5% K-S Critical Value	0.273	Data Not Gamma Distributed at 5% Significance Level					
693	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
694												
695	**Gamma Statistics**											
696					k hat (MLE)	1.213	k star (bias corrected MLE)					0.916
697					Theta hat (MLE)	1.888	Theta star (bias corrected MLE)					2.501
698					nu hat (MLE)	24.26	nu star (bias corrected)					18.31
699					MLE Mean (bias corrected)	2.29	MLE Sd (bias corrected)					2.393
700							Approximate Chi Square Value (0.05)					9.619
701					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					8.544
702												
703	**Assuming Gamma Distribution**											
704					95% Approximate Gamma UCL (use when n>=50))	4.36	95% Adjusted Gamma UCL (use when n<50)					4.909
705												
706	**Lognormal GOF Test**											
707					Shapiro Wilk Test Statistic	0.767	**Shapiro Wilk Lognormal GOF Test**					
708					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
709					Lilliefors Test Statistic	0.334	**Lilliefors Lognormal GOF Test**					
710					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
711	**Data Not Lognormal at 5% Significance Level**											
712												
713	**Lognormal Statistics**											
714					Minimum of Logged Data	-2.996	Mean of logged Data					0.363
715					Maximum of Logged Data	1.609	SD of logged Data					1.358
716												
717	**Assuming Lognormal Distribution**											
718					95% H-UCL	20.92	90% Chebyshev (MVUE) UCL					7.377
719					95% Chebyshev (MVUE) UCL	9.303	97.5% Chebyshev (MVUE) UCL					11.98
720					99% Chebyshev (MVUE) UCL	17.23						
721												
722	**Nonparametric Distribution Free UCL Statistics**											
723	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
724												
725	**Nonparametric Distribution Free UCLs**											
726					95% CLT UCL	3.153	95% Jackknife UCL					3.252
727					95% Standard Bootstrap UCL	3.125	95% Bootstrap-t UCL					3.55
728					95% Hall's Bootstrap UCL	4.193	95% Percentile Bootstrap UCL					3.103

	A	B	C	D	E	F	G	H	I	J	K	L
729					95% BCA Bootstrap UCL	3.226						
730					90% Chebyshev(Mean, Sd) UCL	3.864					95% Chebyshev(Mean, Sd) UCL	4.577
731					97.5% Chebyshev(Mean, Sd) UCL	5.567					99% Chebyshev(Mean, Sd) UCL	7.512
732												
733					**Suggested UCL to Use**							
734					95% Student's-t UCL	3.252						
735												
736	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
737	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
738	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
739	For additional insight the user may want to consult a statistician.											
740												
741												
742	**Radium-228**											
743												
744					**General Statistics**							
745					Total Number of Observations	10					Number of Distinct Observations	1
746											Number of Missing Observations	0
747					Minimum	1.69					Mean	1.69
748					Maximum	1.69					Median	1.69
749												
750	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
751	**ProUCL (or any other software) should not be used on such a data set!**											
752	**The data set for variable Radium-228 was not processed!**											
753												
754	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
755	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
756												
757												
758												
759	**Thallium**											
760												
761					**General Statistics**							
762					Total Number of Observations	10					Number of Distinct Observations	4
763											Number of Missing Observations	0
764					Minimum	0.095					Mean	10.37
765					Maximum	17.1					Median	10.37
766					SD	4.26					Std. Error of Mean	1.347
767					Coefficient of Variation	0.411					Skewness	-1.318
768												
769					**Normal GOF Test**							
770					Shapiro Wilk Test Statistic	0.73			**Shapiro Wilk GOF Test**			
771					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
772					Lilliefors Test Statistic	0.4			**Lilliefors GOF Test**			
773					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
774					**Data Not Normal at 5% Significance Level**							
775												
776					**Assuming Normal Distribution**							
777					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
778					95% Student's-t UCL	12.83			95% Adjusted-CLT UCL (Chen-1995)			11.98
779									95% Modified-t UCL (Johnson-1978)			12.74
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781						Gamma GOF Test						
782					A-D Test Statistic	2.482	Anderson-Darling Gamma GOF Test					
783					5% A-D Critical Value	0.741	Data Not Gamma Distributed at 5% Significance Level					
784					K-S Test Statistic	0.511	Kolmogrov-Smirnoff Gamma GOF Test					
785					5% K-S Critical Value	0.272	Data Not Gamma Distributed at 5% Significance Level					
786						Data Not Gamma Distributed at 5% Significance Level						
787												
788						Gamma Statistics						
789					k hat (MLE)	1.426				k star (bias corrected MLE)		1.065
790					Theta hat (MLE)	7.267				Theta star (bias corrected MLE)		9.731
791					nu hat (MLE)	28.53				nu star (bias corrected)		21.3
792					MLE Mean (bias corrected)	10.37				MLE Sd (bias corrected)		10.04
793										Approximate Chi Square Value (0.05)		11.82
794					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		10.61
795												
796						Assuming Gamma Distribution						
797					95% Approximate Gamma UCL (use when n>=50))	18.69				95% Adjusted Gamma UCL (use when n<50)		20.81
798												
799						Lognormal GOF Test						
800					Shapiro Wilk Test Statistic	0.454	Shapiro Wilk Lognormal GOF Test					
801					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
802					Lilliefors Test Statistic	0.501	Lilliefors Lognormal GOF Test					
803					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
804						Data Not Lognormal at 5% Significance Level						
805												
806						Lognormal Statistics						
807					Minimum of Logged Data	-2.354				Mean of logged Data		1.949
808					Maximum of Logged Data	2.839				SD of logged Data		1.522
809												
810						Assuming Lognormal Distribution						
811					95% H-UCL	193.5				90% Chebyshev (MVUE) UCL		46.25
812					95% Chebyshev (MVUE) UCL	58.9				97.5% Chebyshev (MVUE) UCL		76.45
813					99% Chebyshev (MVUE) UCL	110.9						
814												
815						Nonparametric Distribution Free UCL Statistics						
816						Data do not follow a Discernible Distribution (0.05)						
817												
818						Nonparametric Distribution Free UCLs						
819					95% CLT UCL	12.58				95% Jackknife UCL		12.83
820					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
821					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
822					95% BCA Bootstrap UCL	N/A						
823					90% Chebyshev(Mean, Sd) UCL	14.41				95% Chebyshev(Mean, Sd) UCL		16.24
824					97.5% Chebyshev(Mean, Sd) UCL	18.78				99% Chebyshev(Mean, Sd) UCL		23.77
825												
826						Suggested UCL to Use						
827					99% Chebyshev (Mean, Sd) UCL	23.77						
828												
829						Recommended UCL exceeds the maximum observation						
830												
831	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
832	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											

	A	B	C	D	E	F	G	H	I	J	K	L
833	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
834	For additional insight the user may want to consult a statistician.											
835												
836	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
837	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
838												
839												
840	**Thorium-230**											
841												
842	**General Statistics**											
843					Total Number of Observations	10			Number of Distinct Observations		4	
844									Number of Missing Observations		0	
845					Minimum	1.14			Mean		2.993	
846					Maximum	5.42			Median		2.993	
847					SD	1.036			Std. Error of Mean		0.327	
848					Coefficient of Variation	0.346			Skewness		0.967	
849												
850	**Normal GOF Test**											
851					Shapiro Wilk Test Statistic	0.725			**Shapiro Wilk GOF Test**			
852					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
853					Lilliefors Test Statistic	0.4			**Lilliefors GOF Test**			
854					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
855	**Data Not Normal at 5% Significance Level**											
856												
857	**Assuming Normal Distribution**											
858	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
859					95% Student's-t UCL	3.594			95% Adjusted-CLT UCL (Chen-1995)		3.639	
860									95% Modified-t UCL (Johnson-1978)		3.61	
861												
862	**Gamma GOF Test**											
863					A-D Test Statistic	1.53			**Anderson-Darling Gamma GOF Test**			
864					5% A-D Critical Value	0.726			Data Not Gamma Distributed at 5% Significance Level			
865					K-S Test Statistic	0.355			**Kolmogrov-Smirnoff Gamma GOF Test**			
866					5% K-S Critical Value	0.267			Data Not Gamma Distributed at 5% Significance Level			
867	**Data Not Gamma Distributed at 5% Significance Level**											
868												
869	**Gamma Statistics**											
870					k hat (MLE)	8.721			k star (bias corrected MLE)		6.171	
871					Theta hat (MLE)	0.343			Theta star (bias corrected MLE)		0.485	
872					nu hat (MLE)	174.4			nu star (bias corrected)		123.4	
873					MLE Mean (bias corrected)	2.993			MLE Sd (bias corrected)		1.205	
874									Approximate Chi Square Value (0.05)		98.77	
875					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value		94.94	
876												
877	**Assuming Gamma Distribution**											
878					95% Approximate Gamma UCL (use when n>=50))	3.741			95% Adjusted Gamma UCL (use when n<50)		3.891	
879												
880	**Lognormal GOF Test**											
881					Shapiro Wilk Test Statistic	0.718			**Shapiro Wilk Lognormal GOF Test**			
882					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
883					Lilliefors Test Statistic	0.361			**Lilliefors Lognormal GOF Test**			
884					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
885	Data Not Lognormal at 5% Significance Level											
886												
887	Lognormal Statistics											
888					Minimum of Logged Data	0.131				Mean of logged Data		1.038
889					Maximum of Logged Data	1.69				SD of logged Data		0.379
890												
891	Assuming Lognormal Distribution											
892					95% H-UCL	3.939				90% Chebyshev (MVUE) UCL		4.107
893					95% Chebyshev (MVUE) UCL	4.603				97.5% Chebyshev (MVUE) UCL		5.292
894					99% Chebyshev (MVUE) UCL	6.645						
895												
896	Nonparametric Distribution Free UCL Statistics											
897	Data do not follow a Discernible Distribution (0.05)											
898												
899	Nonparametric Distribution Free UCLs											
900					95% CLT UCL	3.532				95% Jackknife UCL		3.594
901					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
902					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
903					95% BCA Bootstrap UCL	N/A						
904					90% Chebyshev(Mean, Sd) UCL	3.976				95% Chebyshev(Mean, Sd) UCL		4.421
905					97.5% Chebyshev(Mean, Sd) UCL	5.038				99% Chebyshev(Mean, Sd) UCL		6.252
906												
907	Suggested UCL to Use											
908					95% Student's-t UCL	3.594				or 95% Modified-t UCL		3.61
909												
910	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
911	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
912	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
913	For additional insight the user may want to consult a statistician.											
914												
915												
916	Uranium											
917												
918	General Statistics											
919					Total Number of Observations	10				Number of Distinct Observations		5
920										Number of Missing Observations		0
921					Minimum	1.9				Mean		220.1
922					Maximum	1050				Median		220.1
923					SD	309.4				Std. Error of Mean		97.83
924					Coefficient of Variation	1.406				Skewness		2.513
925												
926	Normal GOF Test											
927					Shapiro Wilk Test Statistic	0.634				Shapiro Wilk GOF Test		
928					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
929					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
930					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
931	Data Not Normal at 5% Significance Level											
932												
933	Assuming Normal Distribution											
934					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
935					95% Student's-t UCL	399.4				95% Adjusted-CLT UCL (Chen-1995)		464.1
936										95% Modified-t UCL (Johnson-1978)		412.4

	A	B	C	D	E	F	G	H	I	J	K	L
937												
938						Gamma GOF Test						
939					A-D Test Statistic	0.682	Anderson-Darling Gamma GOF Test					
940					5% A-D Critical Value	0.773	Detected data appear Gamma Distributed at 5% Significance Level					
941					K-S Test Statistic	0.275	Kolmogrov-Smirnoff Gamma GOF Test					
942					5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level					
943						Detected data appear Gamma Distributed at 5% Significance Level						
944												
945						Gamma Statistics						
946					k hat (MLE)	0.549	k star (bias corrected MLE)					0.451
947					Theta hat (MLE)	401.2	Theta star (bias corrected MLE)					488.3
948					nu hat (MLE)	10.97	nu star (bias corrected)					9.014
949					MLE Mean (bias corrected)	220.1	MLE Sd (bias corrected)					327.8
950							Approximate Chi Square Value (0.05)					3.336
951					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					2.763
952												
953						Assuming Gamma Distribution						
954					95% Approximate Gamma UCL (use when n>=50)	594.8	95% Adjusted Gamma UCL (use when n<50)					718
955												
956						Lognormal GOF Test						
957					Shapiro Wilk Test Statistic	0.874	Shapiro Wilk Lognormal GOF Test					
958					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
959					Lilliefors Test Statistic	0.318	Lilliefors Lognormal GOF Test					
960					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
961						Data appear Approximate Lognormal at 5% Significance Level						
962												
963						Lognormal Statistics						
964					Minimum of Logged Data	0.642	Mean of logged Data					4.253
965					Maximum of Logged Data	6.957	SD of logged Data					1.98
966												
967						Assuming Lognormal Distribution						
968					95% H-UCL	17006	90% Chebyshev (MVUE) UCL					973.7
969					95% Chebyshev (MVUE) UCL	1264	97.5% Chebyshev (MVUE) UCL					1668
970					99% Chebyshev (MVUE) UCL	2460						
971												
972						Nonparametric Distribution Free UCL Statistics						
973						Data appear to follow a Discernible Distribution at 5% Significance Level						
974												
975						Nonparametric Distribution Free UCLs						
976					95% CLT UCL	381	95% Jackknife UCL					399.4
977					95% Standard Bootstrap UCL	372.7	95% Bootstrap-t UCL					578.9
978					95% Hall's Bootstrap UCL	1012	95% Percentile Bootstrap UCL					404.4
979					95% BCA Bootstrap UCL	448.1						
980					90% Chebyshev(Mean, Sd) UCL	513.6	95% Chebyshev(Mean, Sd) UCL					646.5
981					97.5% Chebyshev(Mean, Sd) UCL	831	99% Chebyshev(Mean, Sd) UCL					1193
982												
983						Suggested UCL to Use						
984					95% Adjusted Gamma UCL	718						
985												
986						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
987						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
988						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						

	A	B	C	D	E	F	G	H	I	J	K	L
989	For additional insight the user may want to consult a statistician.											
990												
991												
992	Uranium-234											
993												
994	General Statistics											
995					Total Number of Observations	10			Number of Distinct Observations			4
996									Number of Missing Observations			0
997					Minimum	0.924			Mean			9.818
998					Maximum	27.5			Median			9.818
999					SD	7.219			Std. Error of Mean			2.283
1000					Coefficient of Variation	0.735			Skewness			1.531
1001												
1002	Normal GOF Test											
1003					Shapiro Wilk Test Statistic	0.702			Shapiro Wilk GOF Test			
1004					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
1005					Lilliefors Test Statistic	0.4			Lilliefors GOF Test			
1006					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
1007	Data Not Normal at 5% Significance Level											
1008												
1009	Assuming Normal Distribution											
1010					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1011					95% Student's-t UCL	14			95% Adjusted-CLT UCL (Chen-1995)			14.75
1012									95% Modified-t UCL (Johnson-1978)			14.19
1013												
1014	Gamma GOF Test											
1015					A-D Test Statistic	1.567			Anderson-Darling Gamma GOF Test			
1016					5% A-D Critical Value	0.739			Data Not Gamma Distributed at 5% Significance Level			
1017					K-S Test Statistic	0.407			Kolmogrov-Smirnoff Gamma GOF Test			
1018					5% K-S Critical Value	0.271			Data Not Gamma Distributed at 5% Significance Level			
1019	Data Not Gamma Distributed at 5% Significance Level											
1020												
1021	Gamma Statistics											
1022					k hat (MLE)	1.539			k star (bias corrected MLE)			1.144
1023					Theta hat (MLE)	6.379			Theta star (bias corrected MLE)			8.582
1024					nu hat (MLE)	30.78			nu star (bias corrected)			22.88
1025					MLE Mean (bias corrected)	9.818			MLE Sd (bias corrected)			9.179
1026									Approximate Chi Square Value (0.05)			13
1027					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			11.72
1028												
1029	Assuming Gamma Distribution											
1030					95% Approximate Gamma UCL (use when n>=50))	17.28			95% Adjusted Gamma UCL (use when n<50)			19.16
1031												
1032	Lognormal GOF Test											
1033					Shapiro Wilk Test Statistic	0.693			Shapiro Wilk Lognormal GOF Test			
1034					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
1035					Lilliefors Test Statistic	0.43			Lilliefors Lognormal GOF Test			
1036					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
1037	Data Not Lognormal at 5% Significance Level											
1038												
1039	Lognormal Statistics											
1040					Minimum of Logged Data	-0.079			Mean of logged Data			1.925

	A	B	C	D	E	F	G	H	I	J	K	L
1041					Maximum of Logged Data	3.314					SD of logged Data	1.077
1042												
1043					Assuming Lognormal Distribution							
1044					95% H-UCL	39.54					90% Chebyshev (MVUE) UCL	23.45
1045					95% Chebyshev (MVUE) UCL	28.96					97.5% Chebyshev (MVUE) UCL	36.59
1046					99% Chebyshev (MVUE) UCL	51.6						
1047												
1048					Nonparametric Distribution Free UCL Statistics							
1049					Data do not follow a Discernible Distribution (0.05)							
1050												
1051					Nonparametric Distribution Free UCLs							
1052					95% CLT UCL	13.57					95% Jackknife UCL	14
1053					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
1054					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
1055					95% BCA Bootstrap UCL	N/A						
1056					90% Chebyshev(Mean, Sd) UCL	16.67					95% Chebyshev(Mean, Sd) UCL	19.77
1057					97.5% Chebyshev(Mean, Sd) UCL	24.07					99% Chebyshev(Mean, Sd) UCL	32.53
1058												
1059					Suggested UCL to Use							
1060					95% Chebyshev (Mean, Sd) UCL	19.77						
1061												
1062					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1063					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1064					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1065					For additional insight the user may want to consult a statistician.							
1066												
1067												
1068	Uranium-235											
1069												
1070					General Statistics							
1071					Total Number of Observations	10					Number of Distinct Observations	4
1072											Number of Missing Observations	0
1073					Minimum	0.0615					Mean	1.15
1074					Maximum	3.3					Median	1.15
1075					SD	0.878					Std. Error of Mean	0.278
1076					Coefficient of Variation	0.763					Skewness	1.531
1077												
1078					Normal GOF Test							
1079					Shapiro Wilk Test Statistic	0.703					Shapiro Wilk GOF Test	
1080					5% Shapiro Wilk Critical Value	0.842					Data Not Normal at 5% Significance Level	
1081					Lilliefors Test Statistic	0.4					Lilliefors GOF Test	
1082					5% Lilliefors Critical Value	0.28					Data Not Normal at 5% Significance Level	
1083					Data Not Normal at 5% Significance Level							
1084												
1085					Assuming Normal Distribution							
1086					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
1087					95% Student's-t UCL	1.659					95% Adjusted-CLT UCL (Chen-1995)	1.75
1088											95% Modified-t UCL (Johnson-1978)	1.681
1089												
1090					Gamma GOF Test							
1091					A-D Test Statistic	1.592					Anderson-Darling Gamma GOF Test	
1092					5% A-D Critical Value	0.743					Data Not Gamma Distributed at 5% Significance Level	

1093					K-S Test Statistic	0.418	**Kolmogrov-Smirnoff Gamma GOF Test**					
1094					5% K-S Critical Value	0.272	Data Not Gamma Distributed at 5% Significance Level					
1095	**Data Not Gamma Distributed at 5% Significance Level**											
1096												
1097	**Gamma Statistics**											
1098					k hat (MLE)	1.27	k star (bias corrected MLE)					0.956
1099					Theta hat (MLE)	0.906	Theta star (bias corrected MLE)					1.204
1100					nu hat (MLE)	25.4	nu star (bias corrected)					19.11
1101					MLE Mean (bias corrected)	1.15	MLE Sd (bias corrected)					1.177
1102							Approximate Chi Square Value (0.05)					10.2
1103					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					9.09
1104												
1105	**Assuming Gamma Distribution**											
1106					95% Approximate Gamma UCL (use when n>=50))	2.156	95% Adjusted Gamma UCL (use when n<50)					2.419
1107												
1108	**Lognormal GOF Test**											
1109					Shapiro Wilk Test Statistic	0.686	**Shapiro Wilk Lognormal GOF Test**					
1110					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
1111					Lilliefors Test Statistic	0.438	**Lilliefors Lognormal GOF Test**					
1112					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
1113	**Data Not Lognormal at 5% Significance Level**											
1114												
1115	**Lognormal Statistics**											
1116					Minimum of Logged Data	-2.789	Mean of logged Data					-0.303
1117					Maximum of Logged Data	1.194	SD of logged Data					1.258
1118												
1119	**Assuming Lognormal Distribution**											
1120					95% H-UCL	7.554	90% Chebyshev (MVUE) UCL					3.271
1121					95% Chebyshev (MVUE) UCL	4.097	97.5% Chebyshev (MVUE) UCL					5.244
1122					99% Chebyshev (MVUE) UCL	7.497						
1123												
1124	**Nonparametric Distribution Free UCL Statistics**											
1125	**Data do not follow a Discernible Distribution (0.05)**											
1126												
1127	**Nonparametric Distribution Free UCLs**											
1128					95% CLT UCL	1.607	95% Jackknife UCL					1.659
1129					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
1130					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
1131					95% BCA Bootstrap UCL	N/A						
1132					90% Chebyshev(Mean, Sd) UCL	1.983	95% Chebyshev(Mean, Sd) UCL					2.36
1133					97.5% Chebyshev(Mean, Sd) UCL	2.884	99% Chebyshev(Mean, Sd) UCL					3.912
1134												
1135	**Suggested UCL to Use**											
1136					95% Chebyshev (Mean, Sd) UCL	2.36						
1137												
1138	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1139	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1140	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1141	For additional insight the user may want to consult a statistician.											
1142												
1143												
1144	**Uranium-238**											

	A	B	C	D	E	F	G	H	I	J	K	L
1145												
1146						General Statistics						
1147					Total Number of Observations	10				Number of Distinct Observations		4
1148										Number of Missing Observations		0
1149					Minimum	0.921				Mean		24.36
1150					Maximum	70				Median		24.36
1151					SD	18.63				Std. Error of Mean		5.892
1152					Coefficient of Variation	0.765				Skewness		1.529
1153												
1154						Normal GOF Test						
1155					Shapiro Wilk Test Statistic	0.705				Shapiro Wilk GOF Test		
1156					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
1157					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
1158					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
1159						Data Not Normal at 5% Significance Level						
1160												
1161						Assuming Normal Distribution						
1162					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1163					95% Student's-t UCL	35.17				95% Adjusted-CLT UCL (Chen-1995)		37.1
1164										95% Modified-t UCL (Johnson-1978)		35.64
1165												
1166						Gamma GOF Test						
1167					A-D Test Statistic	1.562				Anderson-Darling Gamma GOF Test		
1168					5% A-D Critical Value	0.744				Data Not Gamma Distributed at 5% Significance Level		
1169					K-S Test Statistic	0.42				Kolmogrov-Smirnoff Gamma GOF Test		
1170					5% K-S Critical Value	0.273				Data Not Gamma Distributed at 5% Significance Level		
1171						Data Not Gamma Distributed at 5% Significance Level						
1172												
1173						Gamma Statistics						
1174					k hat (MLE)	1.218				k star (bias corrected MLE)		0.919
1175					Theta hat (MLE)	20.01				Theta star (bias corrected MLE)		26.51
1176					nu hat (MLE)	24.35				nu star (bias corrected)		18.38
1177					MLE Mean (bias corrected)	24.36				MLE Sd (bias corrected)		25.41
1178										Approximate Chi Square Value (0.05)		9.666
1179					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		8.589
1180												
1181						Assuming Gamma Distribution						
1182					95% Approximate Gamma UCL (use when n>=50))	46.33				95% Adjusted Gamma UCL (use when n<50)		52.14
1183												
1184						Lognormal GOF Test						
1185					Shapiro Wilk Test Statistic	0.693				Shapiro Wilk Lognormal GOF Test		
1186					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
1187					Lilliefors Test Statistic	0.438				Lilliefors Lognormal GOF Test		
1188					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
1189						Data Not Lognormal at 5% Significance Level						
1190												
1191						Lognormal Statistics						
1192					Minimum of Logged Data	-0.0823				Mean of logged Data		2.729
1193					Maximum of Logged Data	4.248				SD of logged Data		1.314
1194												
1195						Assuming Lognormal Distribution						
1196					95% H-UCL	190.3				90% Chebyshev (MVUE) UCL		73.65

1197				95% Chebyshev (MVUE) UCL		92.62				97.5% Chebyshev (MVUE) UCL		119
1198				99% Chebyshev (MVUE) UCL		170.7						
1199												
1200						**Nonparametric Distribution Free UCL Statistics**						
1201						**Data do not follow a Discernible Distribution (0.05)**						
1202												
1203						**Nonparametric Distribution Free UCLs**						
1204				95% CLT UCL		34.06				95% Jackknife UCL		35.17
1205				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1206				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1207				95% BCA Bootstrap UCL		N/A						
1208				90% Chebyshev(Mean, Sd) UCL		42.04				95% Chebyshev(Mean, Sd) UCL		50.05
1209				97.5% Chebyshev(Mean, Sd) UCL		61.16				99% Chebyshev(Mean, Sd) UCL		82.99
1210												
1211						**Suggested UCL to Use**						
1212				95% Chebyshev (Mean, Sd) UCL		50.05						
1213												
1214						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
1215						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
1216						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
1217						For additional insight the user may want to consult a statistician.						
1218												
1219												
1220	**Vanadium**											
1221												
1222						**General Statistics**						
1223				Total Number of Observations		10				Number of Distinct Observations		6
1224										Number of Missing Observations		0
1225				Minimum		20				Mean		93.16
1226				Maximum		143				Median		93.16
1227				SD		38.93				Std. Error of Mean		12.31
1228				Coefficient of Variation		0.418				Skewness		-0.66
1229												
1230						**Normal GOF Test**						
1231				Shapiro Wilk Test Statistic		0.879				**Shapiro Wilk GOF Test**		
1232				5% Shapiro Wilk Critical Value		0.842				Data appear Normal at 5% Significance Level		
1233				Lilliefors Test Statistic		0.3				**Lilliefors GOF Test**		
1234				5% Lilliefors Critical Value		0.28				Data Not Normal at 5% Significance Level		
1235						**Data appear Approximate Normal at 5% Significance Level**						
1236												
1237						**Assuming Normal Distribution**						
1238				**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**		
1239				95% Student's-t UCL		115.7				95% Adjusted-CLT UCL (Chen-1995)		110.7
1240										95% Modified-t UCL (Johnson-1978)		115.3
1241												
1242						**Gamma GOF Test**						
1243				A-D Test Statistic		0.95				**Anderson-Darling Gamma GOF Test**		
1244				5% A-D Critical Value		0.729				Data Not Gamma Distributed at 5% Significance Level		
1245				K-S Test Statistic		0.365				**Kolmogrov-Smirnoff Gamma GOF Test**		
1246				5% K-S Critical Value		0.268				Data Not Gamma Distributed at 5% Significance Level		
1247						**Data Not Gamma Distributed at 5% Significance Level**						
1248												

	A	B	C	D	E	F	G	H	I	J	K	L
1249	**Gamma Statistics**											
1250					k hat (MLE)	4.128					k star (bias corrected MLE)	2.956
1251					Theta hat (MLE)	22.57					Theta star (bias corrected MLE)	31.51
1252					nu hat (MLE)	82.57					nu star (bias corrected)	59.13
1253					MLE Mean (bias corrected)	93.16					MLE Sd (bias corrected)	54.18
1254											Approximate Chi Square Value (0.05)	42.45
1255					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	40
1256												
1257	**Assuming Gamma Distribution**											
1258				95% Approximate Gamma UCL (use when n>=50))		129.8					95% Adjusted Gamma UCL (use when n<50)	137.7
1259												
1260	**Lognormal GOF Test**											
1261					Shapiro Wilk Test Statistic	0.766			**Shapiro Wilk Lognormal GOF Test**			
1262					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
1263					Lilliefors Test Statistic	0.382			**Lilliefors Lognormal GOF Test**			
1264					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
1265	**Data Not Lognormal at 5% Significance Level**											
1266												
1267	**Lognormal Statistics**											
1268					Minimum of Logged Data	2.996					Mean of logged Data	4.408
1269					Maximum of Logged Data	4.963					SD of logged Data	0.607
1270												
1271	**Assuming Lognormal Distribution**											
1272					95% H-UCL	159.7					90% Chebyshev (MVUE) UCL	153.7
1273					95% Chebyshev (MVUE) UCL	179.6					97.5% Chebyshev (MVUE) UCL	215.5
1274					99% Chebyshev (MVUE) UCL	285.9						
1275												
1276	**Nonparametric Distribution Free UCL Statistics**											
1277	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1278												
1279	**Nonparametric Distribution Free UCLs**											
1280					95% CLT UCL	113.4					95% Jackknife UCL	115.7
1281					95% Standard Bootstrap UCL	112.4					95% Bootstrap-t UCL	112.6
1282					95% Hall's Bootstrap UCL	112.6					95% Percentile Bootstrap UCL	111
1283					95% BCA Bootstrap UCL	110.5						
1284					90% Chebyshev(Mean, Sd) UCL	130.1					95% Chebyshev(Mean, Sd) UCL	146.8
1285					97.5% Chebyshev(Mean, Sd) UCL	170					99% Chebyshev(Mean, Sd) UCL	215.7
1286												
1287	**Suggested UCL to Use**											
1288					95% Student's-t UCL	115.7						
1289												
1290	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1291	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1292	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1293	For additional insight the user may want to consult a statistician.											
1294												
1295	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1296	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1297												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/1/2015 12:56:25 PM								
5	From File			EPC_026SurfR1_EU03.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Arsenic											
12												
13	General Statistics											
14	Total Number of Observations					10	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					4.66	Mean					23.09
17	Maximum					130.4	Median					10
18	SD					38.08	Std. Error of Mean					12.04
19	Coefficient of Variation					1.65	Skewness					3.049
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.458	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.434	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					45.16	95% Adjusted-CLT UCL (Chen-1995)					55.3
31							95% Modified-t UCL (Johnson-1978)					47.1
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.085	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.748	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.453	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.274	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					1.025	k star (bias corrected MLE)					0.784
42	Theta hat (MLE)					22.51	Theta star (bias corrected MLE)					29.43
43	nu hat (MLE)					20.51	nu star (bias corrected)					15.69
44	MLE Mean (bias corrected)					23.09	MLE Sd (bias corrected)					26.07
45							Approximate Chi Square Value (0.05)					7.743
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					6.795
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					46.78	95% Adjusted Gamma UCL (use when n<50)					53.3
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.676	Shapiro Wilk Lognormal GOF Test					

53	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.42	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					1.539	Mean of logged Data					2.578
60	Maximum of Logged Data					4.87	SD of logged Data					0.902
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					47.37	90% Chebyshev (MVUE) UCL					35.54
64	95% Chebyshev (MVUE) UCL					43.13	97.5% Chebyshev (MVUE) UCL					53.67
65	99% Chebyshev (MVUE) UCL					74.37						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					42.9	95% Jackknife UCL					45.16
72	95% Standard Bootstrap UCL					N/A	95% Bootstrap-t UCL					N/A
73	95% Hall's Bootstrap UCL					N/A	95% Percentile Bootstrap UCL					N/A
74	95% BCA Bootstrap UCL					N/A						
75	90% Chebyshev(Mean, Sd) UCL					59.22	95% Chebyshev(Mean, Sd) UCL					75.58
76	97.5% Chebyshev(Mean, Sd) UCL					98.3	99% Chebyshev(Mean, Sd) UCL					142.9
77												
78	**Suggested UCL to Use**											
79	95% Chebyshev (Mean, Sd) UCL					75.58						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Cesium-137**											
88												
89	**General Statistics**											
90	Total Number of Observations					10	Number of Distinct Observations					3
91							Number of Missing Observations					0
92	Minimum					0.2	Mean					2.815
93	Maximum					5.43	Median					2.815
94	SD					1.233	Std. Error of Mean					0.39
95	Coefficient of Variation					0.438	Skewness					-1.32E-15
96												
97	**Normal GOF Test**											
98	Shapiro Wilk Test Statistic					0.659	**Shapiro Wilk GOF Test**					
99	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
100	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
101	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	3.53				95% Adjusted-CLT UCL (Chen-1995)		3.456
107										95% Modified-t UCL (Johnson-1978)		3.53
108												
109	Gamma GOF Test											
110					A-D Test Statistic	2.319	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.733	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.481	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.269	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	2.671				k star (bias corrected MLE)		1.936
118					Theta hat (MLE)	1.054				Theta star (bias corrected MLE)		1.454
119					nu hat (MLE)	53.41				nu star (bias corrected)		38.72
120					MLE Mean (bias corrected)	2.815				MLE Sd (bias corrected)		2.023
121										Approximate Chi Square Value (0.05)		25.47
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		23.62
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	4.28				95% Adjusted Gamma UCL (use when n<50)		4.616
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.511	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.489	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-1.609				Mean of logged Data		0.836
136					Maximum of Logged Data	1.692				SD of logged Data		0.884
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	7.942				90% Chebyshev (MVUE) UCL		6.082
140					95% Chebyshev (MVUE) UCL	7.367				97.5% Chebyshev (MVUE) UCL		9.15
141					99% Chebyshev (MVUE) UCL	12.65						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	3.456				95% Jackknife UCL		3.53
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	3.984				95% Chebyshev(Mean, Sd) UCL		4.514
152					97.5% Chebyshev(Mean, Sd) UCL	5.249				99% Chebyshev(Mean, Sd) UCL		6.694
153												
154	Suggested UCL to Use											
155					95% Chebyshev (Mean, Sd) UCL	4.514						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
163	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
164												
165												
166	**Chromium**											
167												
168	**General Statistics**											
169	Total Number of Observations					10	Number of Distinct Observations					4
170							Number of Missing Observations					0
171	Minimum					12	Mean					20.24
172	Maximum					66.62	Median					12
173	SD					18.37	Std. Error of Mean					5.809
174	Coefficient of Variation					0.908	Skewness					2.287
175												
176	**Normal GOF Test**											
177	Shapiro Wilk Test Statistic					0.537	**Shapiro Wilk GOF Test**					
178	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
179	Lilliefors Test Statistic					0.459	**Lilliefors GOF Test**					
180	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
181	**Data Not Normal at 5% Significance Level**											
182												
183	**Assuming Normal Distribution**											
184	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
185	95% Student's-t UCL					30.89	95% Adjusted-CLT UCL (Chen-1995)					34.28
186							95% Modified-t UCL (Johnson-1978)					31.59
187												
188	**Gamma GOF Test**											
189	A-D Test Statistic					2.382	**Anderson-Darling Gamma GOF Test**					
190	5% A-D Critical Value					0.734	Data Not Gamma Distributed at 5% Significance Level					
191	K-S Test Statistic					0.469	**Kolmogrov-Smirnoff Gamma GOF Test**					
192	5% K-S Critical Value					0.269	Data Not Gamma Distributed at 5% Significance Level					
193	**Data Not Gamma Distributed at 5% Significance Level**											
194												
195	**Gamma Statistics**											
196	k hat (MLE)					2.35	k star (bias corrected MLE)					1.712
197	Theta hat (MLE)					8.61	Theta star (bias corrected MLE)					11.82
198	nu hat (MLE)					47.01	nu star (bias corrected)					34.24
199	MLE Mean (bias corrected)					20.24	MLE Sd (bias corrected)					15.47
200							Approximate Chi Square Value (0.05)					21.86
201	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					20.15
202												
203	**Assuming Gamma Distribution**											
204	95% Approximate Gamma UCL (use when n>=50))					31.7	95% Adjusted Gamma UCL (use when n<50)					34.39
205												
206	**Lognormal GOF Test**											
207	Shapiro Wilk Test Statistic					0.553	**Shapiro Wilk Lognormal GOF Test**					
208	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.45	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	2.485				Mean of logged Data		2.78
215					Maximum of Logged Data	4.199				SD of logged Data		0.62
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	32.09				90% Chebyshev (MVUE) UCL		30.66
219					95% Chebyshev (MVUE) UCL	35.88				97.5% Chebyshev (MVUE) UCL		43.14
220					99% Chebyshev (MVUE) UCL	57.39						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	29.79				95% Jackknife UCL		30.89
227					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
228					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
229					95% BCA Bootstrap UCL	N/A						
230					90% Chebyshev(Mean, Sd) UCL	37.67				95% Chebyshev(Mean, Sd) UCL		45.56
231					97.5% Chebyshev(Mean, Sd) UCL	56.52				99% Chebyshev(Mean, Sd) UCL		78.04
232												
233	**Suggested UCL to Use**											
234					95% Chebyshev (Mean, Sd) UCL	45.56						
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241												
242	**Iron**											
243												
244	**General Statistics**											
245					Total Number of Observations	10				Number of Distinct Observations		10
246										Number of Missing Observations		0
247					Minimum	22920				Mean		30178
248					Maximum	44804				Median		25712
249					SD	7665				Std. Error of Mean		2424
250					Coefficient of Variation	0.254				Skewness		0.901
251												
252	**Normal GOF Test**											
253					Shapiro Wilk Test Statistic	0.84	**Shapiro Wilk GOF Test**					
254					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
255					Lilliefors Test Statistic	0.312	**Lilliefors GOF Test**					
256					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
257	**Data Not Normal at 5% Significance Level**											
258												
259	**Assuming Normal Distribution**											
260	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					95% Student's-t UCL	34622				95% Adjusted-CLT UCL (Chen-1995)		34903
262										95% Modified-t UCL (Johnson-1978)		34737
263												
264					Gamma GOF Test							
265					A-D Test Statistic	0.779			Anderson-Darling Gamma GOF Test			
266					5% A-D Critical Value	0.725			Data Not Gamma Distributed at 5% Significance Level			
267					K-S Test Statistic	0.316			Kolmogrov-Smirnoff Gamma GOF Test			
268					5% K-S Critical Value	0.266			Data Not Gamma Distributed at 5% Significance Level			
269					Data Not Gamma Distributed at 5% Significance Level							
270												
271					Gamma Statistics							
272					k hat (MLE)	18.74			k star (bias corrected MLE)			13.18
273					Theta hat (MLE)	1610			Theta star (bias corrected MLE)			2289
274					nu hat (MLE)	374.8			nu star (bias corrected)			263.7
275					MLE Mean (bias corrected)	30178			MLE Sd (bias corrected)			8311
276									Approximate Chi Square Value (0.05)			227.1
277					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			221.2
278												
279					Assuming Gamma Distribution							
280					95% Approximate Gamma UCL (use when n>=50))	35042			95% Adjusted Gamma UCL (use when n<50)			35978
281												
282					Lognormal GOF Test							
283					Shapiro Wilk Test Statistic	0.856			Shapiro Wilk Lognormal GOF Test			
284					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
285					Lilliefors Test Statistic	0.301			Lilliefors Lognormal GOF Test			
286					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
287					Data appear Approximate Lognormal at 5% Significance Level							
288												
289					Lognormal Statistics							
290					Minimum of Logged Data	10.04			Mean of logged Data			10.29
291					Maximum of Logged Data	10.71			SD of logged Data			0.24
292												
293					Assuming Lognormal Distribution							
294					95% H-UCL	35245			90% Chebyshev (MVUE) UCL			37039
295					95% Chebyshev (MVUE) UCL	40162			97.5% Chebyshev (MVUE) UCL			44496
296					99% Chebyshev (MVUE) UCL	53009						
297												
298					Nonparametric Distribution Free UCL Statistics							
299					Data appear to follow a Discernible Distribution at 5% Significance Level							
300												
301					Nonparametric Distribution Free UCLs							
302					95% CLT UCL	34165			95% Jackknife UCL			34622
303					95% Standard Bootstrap UCL	33918			95% Bootstrap-t UCL			36337
304					95% Hall's Bootstrap UCL	34100			95% Percentile Bootstrap UCL			34136
305					95% BCA Bootstrap UCL	34579						
306					90% Chebyshev(Mean, Sd) UCL	37450			95% Chebyshev(Mean, Sd) UCL			40744
307					97.5% Chebyshev(Mean, Sd) UCL	45316			99% Chebyshev(Mean, Sd) UCL			54297
308												
309					Suggested UCL to Use							
310					95% Student's-t UCL	34622				or 95% Modified-t UCL		34737
311												
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). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

Molybdenum

General Statistics

Total Number of Observations	10	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	1.8	Mean	12.48
Maximum	57	Median	3
SD	20.5	Std. Error of Mean	6.483
Coefficient of Variation	1.643	Skewness	1.861

Normal GOF Test

Shapiro Wilk Test Statistic	0.547	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.478	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	24.36	95% Adjusted-CLT UCL (Chen-1995)	27.22
		95% Modified-t UCL (Johnson-1978)	25

Gamma GOF Test

A-D Test Statistic	2.33	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.764	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.493	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.278	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.668	k star (bias corrected MLE)	0.534
Theta hat (MLE)	18.69	Theta star (bias corrected MLE)	23.37
nu hat (MLE)	13.35	nu star (bias corrected)	10.68
MLE Mean (bias corrected)	12.48	MLE Sd (bias corrected)	17.08
		Approximate Chi Square Value (0.05)	4.371
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	3.696

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	30.49	95% Adjusted Gamma UCL (use when n<50)	36.06

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.607	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.462	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

	A	B	C	D	E	F	G	H	I	J	K	L
365						Lognormal Statistics						
366					Minimum of Logged Data	0.588					Mean of logged Data	1.613
367					Maximum of Logged Data	4.043					SD of logged Data	1.23
368												
369						Assuming Lognormal Distribution						
370					95% H-UCL	46.69					90% Chebyshev (MVUE) UCL	21.33
371					95% Chebyshev (MVUE) UCL	26.66					97.5% Chebyshev (MVUE) UCL	34.06
372					99% Chebyshev (MVUE) UCL	48.6						
373												
374						Nonparametric Distribution Free UCL Statistics						
375						Data do not follow a Discernible Distribution (0.05)						
376												
377						Nonparametric Distribution Free UCLs						
378					95% CLT UCL	23.14					95% Jackknife UCL	24.36
379					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
380					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
381					95% BCA Bootstrap UCL	N/A						
382					90% Chebyshev(Mean, Sd) UCL	31.93					95% Chebyshev(Mean, Sd) UCL	40.74
383					97.5% Chebyshev(Mean, Sd) UCL	52.97					99% Chebyshev(Mean, Sd) UCL	76.99
384												
385						Suggested UCL to Use						
386					95% Chebyshev (Mean, Sd) UCL	40.74						
387												
388					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
389					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
390					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
391					For additional insight the user may want to consult a statistician.							
392												
393												
394	Neptunium-237											
395												
396						General Statistics						
397					Total Number of Observations	10					Number of Distinct Observations	3
398											Number of Missing Observations	0
399					Minimum	0.1					Mean	0.312
400					Maximum	0.524					Median	0.312
401					SD	0.0999					Std. Error of Mean	0.0316
402					Coefficient of Variation	0.32					Skewness	2.655E-15
403												
404						Normal GOF Test						
405					Shapiro Wilk Test Statistic	0.659					Shapiro Wilk GOF Test	
406					5% Shapiro Wilk Critical Value	0.842					Data Not Normal at 5% Significance Level	
407					Lilliefors Test Statistic	0.4					Lilliefors GOF Test	
408					5% Lilliefors Critical Value	0.28					Data Not Normal at 5% Significance Level	
409						Data Not Normal at 5% Significance Level						
410												
411						Assuming Normal Distribution						
412					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
413					95% Student's-t UCL	0.37					95% Adjusted-CLT UCL (Chen-1995)	0.364
414											95% Modified-t UCL (Johnson-1978)	0.37
415												
416						Gamma GOF Test						

417					A-D Test Statistic	2.11	Anderson-Darling Gamma GOF Test					
418					5% A-D Critical Value	0.727	Data Not Gamma Distributed at 5% Significance Level					
419					K-S Test Statistic	0.446	Kolmogrov-Smirnoff Gamma GOF Test					
420					5% K-S Critical Value	0.267	Data Not Gamma Distributed at 5% Significance Level					
421	Data Not Gamma Distributed at 5% Significance Level											
422												
423	Gamma Statistics											
424					k hat (MLE)	8.236	k star (bias corrected MLE)					5.832
425					Theta hat (MLE)	0.0379	Theta star (bias corrected MLE)					0.0535
426					nu hat (MLE)	164.7	nu star (bias corrected)					116.6
427					MLE Mean (bias corrected)	0.312	MLE Sd (bias corrected)					0.129
428							Approximate Chi Square Value (0.05)					92.7
429					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					89
430												
431	Assuming Gamma Distribution											
432					95% Approximate Gamma UCL (use when n>=50))	0.393	95% Adjusted Gamma UCL (use when n<50)					0.409
433												
434	Lognormal GOF Test											
435					Shapiro Wilk Test Statistic	0.592	Shapiro Wilk Lognormal GOF Test					
436					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
437					Lilliefors Test Statistic	0.46	Lilliefors Lognormal GOF Test					
438					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
439	Data Not Lognormal at 5% Significance Level											
440												
441	Lognormal Statistics											
442					Minimum of Logged Data	-2.303	Mean of logged Data					-1.227
443					Maximum of Logged Data	-0.646	SD of logged Data					0.412
444												
445	Assuming Lognormal Distribution											
446					95% H-UCL	0.426	90% Chebyshev (MVUE) UCL					0.441
447					95% Chebyshev (MVUE) UCL	0.498	97.5% Chebyshev (MVUE) UCL					0.577
448					99% Chebyshev (MVUE) UCL	0.731						
449												
450	Nonparametric Distribution Free UCL Statistics											
451	Data do not follow a Discernible Distribution (0.05)											
452												
453	Nonparametric Distribution Free UCLs											
454					95% CLT UCL	0.364	95% Jackknife UCL					0.37
455					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
456					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
457					95% BCA Bootstrap UCL	N/A						
458					90% Chebyshev(Mean, Sd) UCL	0.407	95% Chebyshev(Mean, Sd) UCL					0.45
459					97.5% Chebyshev(Mean, Sd) UCL	0.509	99% Chebyshev(Mean, Sd) UCL					0.626
460												
461	Suggested UCL to Use											
462					95% Student's-t UCL	0.37	or 95% Modified-t UCL					0.37
463												
464	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
465	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
466	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
467	For additional insight the user may want to consult a statistician.											
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470	PAH, Total											
471												
472						General Statistics						
473					Total Number of Observations	10				Number of Distinct Observations		3
474										Number of Missing Observations		0
475					Minimum	0.283				Mean		0.32
476					Maximum	0.357				Median		0.32
477					SD	0.0175				Std. Error of Mean		0.00553
478					Coefficient of Variation	0.0547				Skewness		0
479												
480						Normal GOF Test						
481					Shapiro Wilk Test Statistic	0.659				Shapiro Wilk GOF Test		
482					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
483					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
484					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
485						Data Not Normal at 5% Significance Level						
486												
487						Assuming Normal Distribution						
488					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
489					95% Student's-t UCL	0.33				95% Adjusted-CLT UCL (Chen-1995)		0.329
490										95% Modified-t UCL (Johnson-1978)		0.33
491												
492						Gamma GOF Test						
493					A-D Test Statistic	2.015				Anderson-Darling Gamma GOF Test		
494					5% A-D Critical Value	0.724				Data Not Gamma Distributed at 5% Significance Level		
495					K-S Test Statistic	0.407				Kolmogrov-Smirnoff Gamma GOF Test		
496					5% K-S Critical Value	0.266				Data Not Gamma Distributed at 5% Significance Level		
497						Data Not Gamma Distributed at 5% Significance Level						
498												
499						Gamma Statistics						
500					k hat (MLE)	369.7				k star (bias corrected MLE)		258.8
501					Theta hat (MLE)	8.6603E-4				Theta star (bias corrected MLE)		0.00124
502					nu hat (MLE)	7393				nu star (bias corrected)		5177
503					MLE Mean (bias corrected)	0.32				MLE Sd (bias corrected)		0.0199
504										Approximate Chi Square Value (0.05)		5010
505					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		4982
506												
507						Assuming Gamma Distribution						
508					95% Approximate Gamma UCL (use when n>=50))	0.331				95% Adjusted Gamma UCL (use when n<50)		0.333
509												
510						Lognormal GOF Test						
511					Shapiro Wilk Test Statistic	0.657				Shapiro Wilk Lognormal GOF Test		
512					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
513					Lilliefors Test Statistic	0.41				Lilliefors Lognormal GOF Test		
514					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
515						Data Not Lognormal at 5% Significance Level						
516												
517						Lognormal Statistics						
518					Minimum of Logged Data	-1.262				Mean of logged Data		-1.14
519					Maximum of Logged Data	-1.029				SD of logged Data		0.055
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521					Assuming Lognormal Distribution							
522					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		0.337
523					95% Chebyshev (MVUE) UCL	0.344				97.5% Chebyshev (MVUE) UCL		0.355
524					99% Chebyshev (MVUE) UCL	0.376						
525												
526					Nonparametric Distribution Free UCL Statistics							
527					Data do not follow a Discernible Distribution (0.05)							
528												
529					Nonparametric Distribution Free UCLs							
530					95% CLT UCL	0.329				95% Jackknife UCL		0.33
531					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
532					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
533					95% BCA Bootstrap UCL	N/A						
534					90% Chebyshev(Mean, Sd) UCL	0.337				95% Chebyshev(Mean, Sd) UCL		0.344
535					97.5% Chebyshev(Mean, Sd) UCL	0.355				99% Chebyshev(Mean, Sd) UCL		0.375
536												
537					Suggested UCL to Use							
538					95% Student's-t UCL	0.33				or 95% Modified-t UCL		0.33
539												
540					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
541					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
542					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
543					For additional insight the user may want to consult a statistician.							
544												
545												
546	PCB, Total											
547												
548					General Statistics							
549					Total Number of Observations	10				Number of Distinct Observations		5
550										Number of Missing Observations		0
551					Minimum	0.018				Mean		1.688
552					Maximum	5				Median		0.24
553					SD	2.295				Std. Error of Mean		0.726
554					Coefficient of Variation	1.36				Skewness		1.006
555												
556					Normal GOF Test							
557					Shapiro Wilk Test Statistic	0.652				Shapiro Wilk GOF Test		
558					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
559					Lilliefors Test Statistic	0.351				Lilliefors GOF Test		
560					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
561					Data Not Normal at 5% Significance Level							
562												
563					Assuming Normal Distribution							
564					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
565					95% Student's-t UCL	3.018				95% Adjusted-CLT UCL (Chen-1995)		3.128
566										95% Modified-t UCL (Johnson-1978)		3.057
567												
568					Gamma GOF Test							
569					A-D Test Statistic	0.91				Anderson-Darling Gamma GOF Test		
570					5% A-D Critical Value	0.777				Data Not Gamma Distributed at 5% Significance Level		
571					K-S Test Statistic	0.307				Kolmogrov-Smirnoff Gamma GOF Test		
572					5% K-S Critical Value	0.281				Data Not Gamma Distributed at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
573	**Data Not Gamma Distributed at 5% Significance Level**											
574												
575	**Gamma Statistics**											
576					k hat (MLE)	0.502				k star (bias corrected MLE)		0.418
577					Theta hat (MLE)	3.365				Theta star (bias corrected MLE)		4.04
578					nu hat (MLE)	10.03				nu star (bias corrected)		8.355
579					MLE Mean (bias corrected)	1.688				MLE Sd (bias corrected)		2.611
580										Approximate Chi Square Value (0.05)		2.943
581					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		2.413
582												
583	**Assuming Gamma Distribution**											
584				95% Approximate Gamma UCL (use when n>=50))		4.793				95% Adjusted Gamma UCL (use when n<50)		5.844
585												
586	**Lognormal GOF Test**											
587					Shapiro Wilk Test Statistic	0.885				**Shapiro Wilk Lognormal GOF Test**		
588					5% Shapiro Wilk Critical Value	0.842				Data appear Lognormal at 5% Significance Level		
589					Lilliefors Test Statistic	0.242				**Lilliefors Lognormal GOF Test**		
590					5% Lilliefors Critical Value	0.28				Data appear Lognormal at 5% Significance Level		
591	**Data appear Lognormal at 5% Significance Level**											
592												
593	**Lognormal Statistics**											
594					Minimum of Logged Data	-4.017				Mean of logged Data		-0.742
595					Maximum of Logged Data	1.609				SD of logged Data		1.883
596												
597	**Assuming Lognormal Distribution**											
598					95% H-UCL	69.26				90% Chebyshev (MVUE) UCL		5.605
599					95% Chebyshev (MVUE) UCL	7.254				97.5% Chebyshev (MVUE) UCL		9.543
600					99% Chebyshev (MVUE) UCL	14.04						
601												
602	**Nonparametric Distribution Free UCL Statistics**											
603	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
604												
605	**Nonparametric Distribution Free UCLs**											
606					95% CLT UCL	2.881				95% Jackknife UCL		3.018
607					95% Standard Bootstrap UCL	2.798				95% Bootstrap-t UCL		3.21
608					95% Hall's Bootstrap UCL	2.406				95% Percentile Bootstrap UCL		2.718
609					95% BCA Bootstrap UCL	3.082						
610					90% Chebyshev(Mean, Sd) UCL	3.865				95% Chebyshev(Mean, Sd) UCL		4.851
611					97.5% Chebyshev(Mean, Sd) UCL	6.22				99% Chebyshev(Mean, Sd) UCL		8.908
612												
613	**Suggested UCL to Use**											
614					99% Chebyshev (Mean, Sd) UCL	8.908						
615												
616	**Recommended UCL exceeds the maximum observation**											
617												
618	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
619	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
620	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
621	For additional insight the user may want to consult a statistician.											
622												
623												
624	**Thallium**											

	A	B	C	D	E	F	G	H	I	J	K	L
625												
626						General Statistics						
627					Total Number of Observations	10				Number of Distinct Observations		4
628										Number of Missing Observations		0
629					Minimum	0.34				Mean		1.98
630					Maximum	5				Median		1.98
631					SD	1.234				Std. Error of Mean		0.39
632					Coefficient of Variation	0.623				Skewness		1.514
633												
634						Normal GOF Test						
635					Shapiro Wilk Test Statistic	0.714				Shapiro Wilk GOF Test		
636					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
637					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
638					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
639						Data Not Normal at 5% Significance Level						
640												
641						Assuming Normal Distribution						
642					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
643					95% Student's-t UCL	2.696				95% Adjusted-CLT UCL (Chen-1995)		2.822
644										95% Modified-t UCL (Johnson-1978)		2.727
645												
646						Gamma GOF Test						
647					A-D Test Statistic	1.396				Anderson-Darling Gamma GOF Test		
648					5% A-D Critical Value	0.733				Data Not Gamma Distributed at 5% Significance Level		
649					K-S Test Statistic	0.382				Kolmogrov-Smirnoff Gamma GOF Test		
650					5% K-S Critical Value	0.269				Data Not Gamma Distributed at 5% Significance Level		
651						Data Not Gamma Distributed at 5% Significance Level						
652												
653						Gamma Statistics						
654					k hat (MLE)	2.618				k star (bias corrected MLE)		1.9
655					Theta hat (MLE)	0.756				Theta star (bias corrected MLE)		1.042
656					nu hat (MLE)	52.37				nu star (bias corrected)		37.99
657					MLE Mean (bias corrected)	1.98				MLE Sd (bias corrected)		1.437
658										Approximate Chi Square Value (0.05)		24.88
659					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		23.05
660												
661						Assuming Gamma Distribution						
662					95% Approximate Gamma UCL (use when n>=50))	3.024				95% Adjusted Gamma UCL (use when n<50)		3.264
663												
664						Lognormal GOF Test						
665					Shapiro Wilk Test Statistic	0.753				Shapiro Wilk Lognormal GOF Test		
666					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
667					Lilliefors Test Statistic	0.408				Lilliefors Lognormal GOF Test		
668					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
669						Data Not Lognormal at 5% Significance Level						
670												
671						Lognormal Statistics						
672					Minimum of Logged Data	-1.079				Mean of logged Data		0.48
673					Maximum of Logged Data	1.609				SD of logged Data		0.744
674												
675						Assuming Lognormal Distribution						
676					95% H-UCL	4.067				90% Chebyshev (MVUE) UCL		3.565

	A	B	C	D	E	F	G	H	I	J	K	L
677					95% Chebyshev (MVUE) UCL	4.247				97.5% Chebyshev (MVUE) UCL		5.192
678					99% Chebyshev (MVUE) UCL	7.049						
679												
680					Nonparametric Distribution Free UCL Statistics							
681					Data do not follow a Discernible Distribution (0.05)							
682												
683					Nonparametric Distribution Free UCLs							
684					95% CLT UCL	2.622				95% Jackknife UCL		2.696
685					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
686					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
687					95% BCA Bootstrap UCL	N/A						
688					90% Chebyshev(Mean, Sd) UCL	3.151				95% Chebyshev(Mean, Sd) UCL		3.682
689					97.5% Chebyshev(Mean, Sd) UCL	4.418				99% Chebyshev(Mean, Sd) UCL		5.864
690												
691					Suggested UCL to Use							
692					95% Chebyshev (Mean, Sd) UCL	3.682						
693												
694					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
695					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
696					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
697					For additional insight the user may want to consult a statistician.							
698												
699												
700	Uranium											
701												
702					General Statistics							
703					Total Number of Observations	10				Number of Distinct Observations		5
704										Number of Missing Observations		0
705					Minimum	10				Mean		77.3
706					Maximum	214				Median		10
707					SD	92.47				Std. Error of Mean		29.24
708					Coefficient of Variation	1.196				Skewness		0.8
709												
710					Normal GOF Test							
711					Shapiro Wilk Test Statistic	0.701				Shapiro Wilk GOF Test		
712					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
713					Lilliefors Test Statistic	0.367				Lilliefors GOF Test		
714					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
715					Data Not Normal at 5% Significance Level							
716												
717					Assuming Normal Distribution							
718					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
719					95% Student's-t UCL	130.9				95% Adjusted-CLT UCL (Chen-1995)		133.3
720										95% Modified-t UCL (Johnson-1978)		132.1
721												
722					Gamma GOF Test							
723					A-D Test Statistic	1.53				Anderson-Darling Gamma GOF Test		
724					5% A-D Critical Value	0.764				Data Not Gamma Distributed at 5% Significance Level		
725					K-S Test Statistic	0.391				Kolmogrov-Smirnoff Gamma GOF Test		
726					5% K-S Critical Value	0.278				Data Not Gamma Distributed at 5% Significance Level		
727					Data Not Gamma Distributed at 5% Significance Level							
728												

	A	B	C	D	E	F	G	H	I	J	K	L
729						Gamma Statistics						
730					k hat (MLE)	0.667					k star (bias corrected MLE)	0.534
731					Theta hat (MLE)	115.8					Theta star (bias corrected MLE)	144.8
732					nu hat (MLE)	13.35					nu star (bias corrected)	10.68
733					MLE Mean (bias corrected)	77.3					MLE Sd (bias corrected)	105.8
734											Approximate Chi Square Value (0.05)	4.37
735					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	3.695
736												
737						Assuming Gamma Distribution						
738					95% Approximate Gamma UCL (use when n>=50))	188.9					95% Adjusted Gamma UCL (use when n<50)	223.4
739												
740						Lognormal GOF Test						
741					Shapiro Wilk Test Statistic	0.684					Shapiro Wilk Lognormal GOF Test	
742					5% Shapiro Wilk Critical Value	0.842					Data Not Lognormal at 5% Significance Level	
743					Lilliefors Test Statistic	0.378					Lilliefors Lognormal GOF Test	
744					5% Lilliefors Critical Value	0.28					Data Not Lognormal at 5% Significance Level	
745						Data Not Lognormal at 5% Significance Level						
746												
747						Lognormal Statistics						
748					Minimum of Logged Data	2.303					Mean of logged Data	3.436
749					Maximum of Logged Data	5.366					SD of logged Data	1.48
750												
751						Assuming Lognormal Distribution						
752					95% H-UCL	721.9					90% Chebyshev (MVUE) UCL	191.8
753					95% Chebyshev (MVUE) UCL	243.7					97.5% Chebyshev (MVUE) UCL	315.8
754					99% Chebyshev (MVUE) UCL	457.2						
755												
756						Nonparametric Distribution Free UCL Statistics						
757						Data do not follow a Discernible Distribution (0.05)						
758												
759						Nonparametric Distribution Free UCLs						
760					95% CLT UCL	125.4					95% Jackknife UCL	130.9
761					95% Standard Bootstrap UCL	122.3					95% Bootstrap-t UCL	144.5
762					95% Hall's Bootstrap UCL	110.8					95% Percentile Bootstrap UCL	126
763					95% BCA Bootstrap UCL	127.6						
764					90% Chebyshev(Mean, Sd) UCL	165					95% Chebyshev(Mean, Sd) UCL	204.8
765					97.5% Chebyshev(Mean, Sd) UCL	259.9					99% Chebyshev(Mean, Sd) UCL	368.2
766												
767						Suggested UCL to Use						
768					95% Chebyshev (Mean, Sd) UCL	204.8						
769												
770						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
771						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
772						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
773						For additional insight the user may want to consult a statistician.						
774												
775												
776	Uranium-234											
777												
778						General Statistics						
779					Total Number of Observations	10					Number of Distinct Observations	3
780											Number of Missing Observations	0

	A	B	C	D	E	F	G	H	I	J	K	L
781					Minimum	1.7					Mean	4.305
782					Maximum	6.91					Median	4.305
783					SD	1.228					Std. Error of Mean	0.388
784					Coefficient of Variation	0.285					Skewness	1.332E-15
785												
786					Normal GOF Test							
787					Shapiro Wilk Test Statistic	0.659	Shapiro Wilk GOF Test					
788					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
789					Lilliefors Test Statistic	0.4	Lilliefors GOF Test					
790					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
791					Data Not Normal at 5% Significance Level							
792												
793					Assuming Normal Distribution							
794				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
795					95% Student's-t UCL	5.017					95% Adjusted-CLT UCL (Chen-1995)	4.944
796											95% Modified-t UCL (Johnson-1978)	5.017
797												
798					Gamma GOF Test							
799					A-D Test Statistic	2.084	Anderson-Darling Gamma GOF Test					
800					5% A-D Critical Value	0.725	Data Not Gamma Distributed at 5% Significance Level					
801					K-S Test Statistic	0.44	Kolmogrov-Smirnoff Gamma GOF Test					
802					5% K-S Critical Value	0.267	Data Not Gamma Distributed at 5% Significance Level					
803					Data Not Gamma Distributed at 5% Significance Level							
804												
805					Gamma Statistics							
806					k hat (MLE)	11.13					k star (bias corrected MLE)	7.858
807					Theta hat (MLE)	0.387					Theta star (bias corrected MLE)	0.548
808					nu hat (MLE)	222.6					nu star (bias corrected)	157.2
809					MLE Mean (bias corrected)	4.305					MLE Sd (bias corrected)	1.536
810											Approximate Chi Square Value (0.05)	129.2
811					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	124.8
812												
813					Assuming Gamma Distribution							
814					95% Approximate Gamma UCL (use when n>=50))	5.238					95% Adjusted Gamma UCL (use when n<50)	5.423
815												
816					Lognormal GOF Test							
817					Shapiro Wilk Test Statistic	0.607	Shapiro Wilk Lognormal GOF Test					
818					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
819					Lilliefors Test Statistic	0.453	Lilliefors Lognormal GOF Test					
820					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
821					Data Not Lognormal at 5% Significance Level							
822												
823					Lognormal Statistics							
824					Minimum of Logged Data	0.531					Mean of logged Data	1.414
825					Maximum of Logged Data	1.933					SD of logged Data	0.344
826												
827					Assuming Lognormal Distribution							
828					95% H-UCL	5.505					90% Chebyshev (MVUE) UCL	5.767
829					95% Chebyshev (MVUE) UCL	6.414					97.5% Chebyshev (MVUE) UCL	7.313
830					99% Chebyshev (MVUE) UCL	9.078						
831												
832					Nonparametric Distribution Free UCL Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
833	Data do not follow a Discernible Distribution (0.05)											
834												
835	Nonparametric Distribution Free UCLs											
836					95% CLT UCL	4.944				95% Jackknife UCL		5.017
837					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
838					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
839					95% BCA Bootstrap UCL	N/A						
840					90% Chebyshev(Mean, Sd) UCL	5.47				95% Chebyshev(Mean, Sd) UCL		5.998
841					97.5% Chebyshev(Mean, Sd) UCL	6.73				99% Chebyshev(Mean, Sd) UCL		8.169
842												
843	Suggested UCL to Use											
844					95% Student's-t UCL	5.017				or 95% Modified-t UCL		5.017
845												
846	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
847	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
848	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
849	For additional insight the user may want to consult a statistician.											
850												
851												
852	Uranium-235											
853												
854	General Statistics											
855					Total Number of Observations	10				Number of Distinct Observations		3
856										Number of Missing Observations		0
857					Minimum	0.1				Mean		0.269
858					Maximum	0.438				Median		0.269
859					SD	0.0797				Std. Error of Mean		0.0252
860					Coefficient of Variation	0.296				Skewness		-3.34E-15
861												
862	Normal GOF Test											
863					Shapiro Wilk Test Statistic	0.659				Shapiro Wilk GOF Test		
864					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
865					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
866					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
867	Data Not Normal at 5% Significance Level											
868												
869	Assuming Normal Distribution											
870			95% Normal UCL							95% UCLs (Adjusted for Skewness)		
871					95% Student's-t UCL	0.315				95% Adjusted-CLT UCL (Chen-1995)		0.31
872										95% Modified-t UCL (Johnson-1978)		0.315
873												
874	Gamma GOF Test											
875					A-D Test Statistic	2.092				Anderson-Darling Gamma GOF Test		
876					5% A-D Critical Value	0.725				Data Not Gamma Distributed at 5% Significance Level		
877					K-S Test Statistic	0.442				Kolmogrov-Smirnoff Gamma GOF Test		
878					5% K-S Critical Value	0.267				Data Not Gamma Distributed at 5% Significance Level		
879	Data Not Gamma Distributed at 5% Significance Level											
880												
881	Gamma Statistics											
882					k hat (MLE)	10.12				k star (bias corrected MLE)		7.153
883					Theta hat (MLE)	0.0266				Theta star (bias corrected MLE)		0.0376
884					nu hat (MLE)	202.5				nu star (bias corrected)		143.1

	A	B	C	D	E	F	G	H	I	J	K	L
885					MLE Mean (bias corrected)	0.269					MLE Sd (bias corrected)	0.101
886											Approximate Chi Square Value (0.05)	116.4
887					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	112.2
888												
889					Assuming Gamma Distribution							
890				95% Approximate Gamma UCL (use when n>=50))		0.331					95% Adjusted Gamma UCL (use when n<50)	0.343
891												
892					Lognormal GOF Test							
893					Shapiro Wilk Test Statistic	0.603			Shapiro Wilk Lognormal GOF Test			
894					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
895					Lilliefors Test Statistic	0.455			Lilliefors Lognormal GOF Test			
896					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
897					Data Not Lognormal at 5% Significance Level							
898												
899					Lognormal Statistics							
900					Minimum of Logged Data	-2.303					Mean of logged Data	-1.363
901					Maximum of Logged Data	-0.826					SD of logged Data	0.364
902												
903					Assuming Lognormal Distribution							
904					95% H-UCL	0.35					90% Chebyshev (MVUE) UCL	0.366
905					95% Chebyshev (MVUE) UCL	0.409					97.5% Chebyshev (MVUE) UCL	0.468
906					99% Chebyshev (MVUE) UCL	0.585						
907												
908					Nonparametric Distribution Free UCL Statistics							
909					Data do not follow a Discernible Distribution (0.05)							
910												
911					Nonparametric Distribution Free UCLs							
912					95% CLT UCL	0.31					95% Jackknife UCL	0.315
913					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
914					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
915					95% BCA Bootstrap UCL	N/A						
916					90% Chebyshev(Mean, Sd) UCL	0.345					95% Chebyshev(Mean, Sd) UCL	0.379
917					97.5% Chebyshev(Mean, Sd) UCL	0.426					99% Chebyshev(Mean, Sd) UCL	0.52
918												
919					Suggested UCL to Use							
920					95% Student's-t UCL	0.315					or 95% Modified-t UCL	0.315
921												
922					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
923					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
924					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
925					For additional insight the user may want to consult a statistician.							
926												
927					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
928					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
929												
930												
931	Uranium-238											
932												
933					General Statistics							
934					Total Number of Observations	10					Number of Distinct Observations	3
935											Number of Missing Observations	0
936					Minimum	2.7					Mean	6.075

	A	B	C	D	E	F	G	H	I	J	K	L
937					Maximum	9.45					Median	6.075
938					SD	1.591					Std. Error of Mean	0.503
939					Coefficient of Variation	0.262					Skewness	-3.19E-15
940												
941					Normal GOF Test							
942					Shapiro Wilk Test Statistic	0.659	Shapiro Wilk GOF Test					
943					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
944					Lilliefors Test Statistic	0.4	Lilliefors GOF Test					
945					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
946					Data Not Normal at 5% Significance Level							
947												
948					Assuming Normal Distribution							
949				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
950					95% Student's-t UCL	6.997					95% Adjusted-CLT UCL (Chen-1995)	6.903
951											95% Modified-t UCL (Johnson-1978)	6.997
952												
953					Gamma GOF Test							
954					A-D Test Statistic	2.071	Anderson-Darling Gamma GOF Test					
955					5% A-D Critical Value	0.725	Data Not Gamma Distributed at 5% Significance Level					
956					K-S Test Statistic	0.436	Kolmogrov-Smirnoff Gamma GOF Test					
957					5% K-S Critical Value	0.266	Data Not Gamma Distributed at 5% Significance Level					
958					Data Not Gamma Distributed at 5% Significance Level							
959												
960					Gamma Statistics							
961					k hat (MLE)	13.71					k star (bias corrected MLE)	9.664
962					Theta hat (MLE)	0.443					Theta star (bias corrected MLE)	0.629
963					nu hat (MLE)	274.2					nu star (bias corrected)	193.3
964					MLE Mean (bias corrected)	6.075					MLE Sd (bias corrected)	1.954
965											Approximate Chi Square Value (0.05)	162.1
966					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	157.2
967												
968					Assuming Gamma Distribution							
969					95% Approximate Gamma UCL (use when n>=50))	7.243					95% Adjusted Gamma UCL (use when n<50)	7.471
970												
971					Lognormal GOF Test							
972					Shapiro Wilk Test Statistic	0.616	Shapiro Wilk Lognormal GOF Test					
973					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
974					Lilliefors Test Statistic	0.448	Lilliefors Lognormal GOF Test					
975					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
976					Data Not Lognormal at 5% Significance Level							
977												
978					Lognormal Statistics							
979					Minimum of Logged Data	0.993					Mean of logged Data	1.767
980					Maximum of Logged Data	2.246					SD of logged Data	0.305
981												
982					Assuming Lognormal Distribution							
983					95% H-UCL	7.506					90% Chebyshev (MVUE) UCL	7.886
984					95% Chebyshev (MVUE) UCL	8.693					97.5% Chebyshev (MVUE) UCL	9.813
985					99% Chebyshev (MVUE) UCL	12.01						
986												
987					Nonparametric Distribution Free UCL Statistics							
988					Data do not follow a Discernible Distribution (0.05)							

	A	B	C	D	E	F	G	H	I	J	K	L
989												
990					Nonparametric Distribution Free UCLs							
991					95% CLT UCL	6.903				95% Jackknife UCL		6.997
992					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
993					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
994					95% BCA Bootstrap UCL	N/A						
995					90% Chebyshev(Mean, Sd) UCL	7.584				95% Chebyshev(Mean, Sd) UCL		8.268
996					97.5% Chebyshev(Mean, Sd) UCL	9.217				99% Chebyshev(Mean, Sd) UCL		11.08
997												
998					Suggested UCL to Use							
999					95% Student's-t UCL	6.997				or 95% Modified-t UCL		6.997
1000												
1001					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1002					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1003					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1004					For additional insight the user may want to consult a statistician.							
1005												
1006					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
1007					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
1008												
1009												
1010	**Vanadium**											
1011												
1012					General Statistics							
1013					Total Number of Observations	10				Number of Distinct Observations		10
1014										Number of Missing Observations		0
1015					Minimum	60				Mean		122.4
1016					Maximum	195				Median		114
1017					SD	37				Std. Error of Mean		11.7
1018					Coefficient of Variation	0.302				Skewness		0.425
1019												
1020					Normal GOF Test							
1021					Shapiro Wilk Test Statistic	0.968				**Shapiro Wilk GOF Test**		
1022					5% Shapiro Wilk Critical Value	0.842				Data appear Normal at 5% Significance Level		
1023					Lilliefors Test Statistic	0.179				**Lilliefors GOF Test**		
1024					5% Lilliefors Critical Value	0.28				Data appear Normal at 5% Significance Level		
1025					**Data appear Normal at 5% Significance Level**							
1026												
1027					Assuming Normal Distribution							
1028					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1029					95% Student's-t UCL	143.8				95% Adjusted-CLT UCL (Chen-1995)		143.3
1030										95% Modified-t UCL (Johnson-1978)		144.1
1031												
1032					Gamma GOF Test							
1033					A-D Test Statistic	0.242				**Anderson-Darling Gamma GOF Test**		
1034					5% A-D Critical Value	0.725				Detected data appear Gamma Distributed at 5% Significance Level		
1035					K-S Test Statistic	0.145				**Kolmogrov-Smirnoff Gamma GOF Test**		
1036					5% K-S Critical Value	0.267				Detected data appear Gamma Distributed at 5% Significance Level		
1037					**Detected data appear Gamma Distributed at 5% Significance Level**							
1038												
1039					Gamma Statistics							
1040					k hat (MLE)	11.65				k star (bias corrected MLE)		8.221

	A	B	C	D	E	F	G	H	I	J	K	L
1041					Theta hat (MLE)	10.51					Theta star (bias corrected MLE)	14.89
1042					nu hat (MLE)	233					nu star (bias corrected)	164.4
1043					MLE Mean (bias corrected)	122.4					MLE Sd (bias corrected)	42.69
1044											Approximate Chi Square Value (0.05)	135.8
1045					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	131.3
1046												
1047					**Assuming Gamma Distribution**							
1048					95% Approximate Gamma UCL (use when n>=50))	148.2					95% Adjusted Gamma UCL (use when n<50)	153.3
1049												
1050					**Lognormal GOF Test**							
1051					Shapiro Wilk Test Statistic	0.955			**Shapiro Wilk Lognormal GOF Test**			
1052					5% Shapiro Wilk Critical Value	0.842			Data appear Lognormal at 5% Significance Level			
1053					Lilliefors Test Statistic	0.166			**Lilliefors Lognormal GOF Test**			
1054					5% Lilliefors Critical Value	0.28			Data appear Lognormal at 5% Significance Level			
1055					**Data appear Lognormal at 5% Significance Level**							
1056												
1057					**Lognormal Statistics**							
1058					Minimum of Logged Data	4.094					Mean of logged Data	4.764
1059					Maximum of Logged Data	5.273					SD of logged Data	0.319
1060												
1061					**Assuming Lognormal Distribution**							
1062					95% H-UCL	152.5					90% Chebyshev (MVUE) UCL	160.1
1063					95% Chebyshev (MVUE) UCL	177					97.5% Chebyshev (MVUE) UCL	200.6
1064					99% Chebyshev (MVUE) UCL	246.8						
1065												
1066					**Nonparametric Distribution Free UCL Statistics**							
1067					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
1068												
1069					**Nonparametric Distribution Free UCLs**							
1070					95% CLT UCL	141.6					95% Jackknife UCL	143.8
1071					95% Standard Bootstrap UCL	140.8					95% Bootstrap-t UCL	146.9
1072					95% Hall's Bootstrap UCL	149.8					95% Percentile Bootstrap UCL	141.8
1073					95% BCA Bootstrap UCL	143						
1074					90% Chebyshev(Mean, Sd) UCL	157.5					95% Chebyshev(Mean, Sd) UCL	173.4
1075					97.5% Chebyshev(Mean, Sd) UCL	195.5					99% Chebyshev(Mean, Sd) UCL	238.8
1076												
1077					**Suggested UCL to Use**							
1078					95% Student's-t UCL	143.8						
1079												
1080	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1081	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1082	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1083	For additional insight the user may want to consult a statistician.											
1084												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/1/2015 12:54:55 PM								
5	From File			EPC_026SurfR1_EU04.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Aluminum**											
12												
13	**General Statistics**											
14	Total Number of Observations					16	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					5200	Mean					10400
17	Maximum					13100	Median					10400
18	SD					1645	Std. Error of Mean					411.2
19	Coefficient of Variation					0.158	Skewness					-1.803
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.572	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.887	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.438	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.222	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					11121	95% Adjusted-CLT UCL (Chen-1995)					10878
31							95% Modified-t UCL (Johnson-1978)					11090
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					3.583	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.736	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.461	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.215	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					32.57	k star (bias corrected MLE)					26.5
42	Theta hat (MLE)					319.4	Theta star (bias corrected MLE)					392.4
43	nu hat (MLE)					1042	nu star (bias corrected)					848
44	MLE Mean (bias corrected)					10400	MLE Sd (bias corrected)					2020
45							Approximate Chi Square Value (0.05)					781.4
46	Adjusted Level of Significance					0.0335	Adjusted Chi Square Value					774.2
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					11286	95% Adjusted Gamma UCL (use when n<50)					11392
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.502	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53				5% Shapiro Wilk Critical Value		0.887	Data Not Lognormal at 5% Significance Level					
54				Lilliefors Test Statistic		0.469	**Lilliefors Lognormal GOF Test**					
55				5% Lilliefors Critical Value		0.222	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59				Minimum of Logged Data		8.556	Mean of logged Data					9.234
60				Maximum of Logged Data		9.48	SD of logged Data					0.196
61												
62	**Assuming Lognormal Distribution**											
63				95% H-UCL		11434	90% Chebyshev (MVUE) UCL					11967
64				95% Chebyshev (MVUE) UCL		12665	97.5% Chebyshev (MVUE) UCL					13634
65				99% Chebyshev (MVUE) UCL		15537						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71				95% CLT UCL		11076	95% Jackknife UCL					11121
72				95% Standard Bootstrap UCL		N/A	95% Bootstrap-t UCL					N/A
73				95% Hall's Bootstrap UCL		N/A	95% Percentile Bootstrap UCL					N/A
74				95% BCA Bootstrap UCL		N/A						
75				90% Chebyshev(Mean, Sd) UCL		11634	95% Chebyshev(Mean, Sd) UCL					12192
76				97.5% Chebyshev(Mean, Sd) UCL		12968	99% Chebyshev(Mean, Sd) UCL					14491
77												
78	**Suggested UCL to Use**											
79				95% Student's-t UCL		11121	or 95% Modified-t UCL					11090
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												
90	**Arsenic**											
91												
92	**General Statistics**											
93				Total Number of Observations		16	Number of Distinct Observations					4
94							Number of Missing Observations					0
95				Minimum		6.9	Mean					19.19
96				Maximum		160	Median					10
97				SD		37.56	Std. Error of Mean					9.39
98				Coefficient of Variation		1.957	Skewness					3.997
99												
100	**Normal GOF Test**											
101				Shapiro Wilk Test Statistic		0.283	**Shapiro Wilk GOF Test**					
102				5% Shapiro Wilk Critical Value		0.887	Data Not Normal at 5% Significance Level					
103				Lilliefors Test Statistic		0.533	**Lilliefors GOF Test**					
104				5% Lilliefors Critical Value		0.222	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
105	Data Not Normal at 5% Significance Level											
106												
107	Assuming Normal Distribution											
108	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
109					95% Student's-t UCL	35.65			95% Adjusted-CLT UCL (Chen-1995)			44.66
110									95% Modified-t UCL (Johnson-1978)			37.21
111												
112	Gamma GOF Test											
113					A-D Test Statistic	5.454	Anderson-Darling Gamma GOF Test					
114					5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level					
115					K-S Test Statistic	0.551	Kolmogrov-Smirnoff Gamma GOF Test					
116					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
117	Data Not Gamma Distributed at 5% Significance Level											
118												
119	Gamma Statistics											
120					k hat (MLE)	1.136			k star (bias corrected MLE)			0.964
121					Theta hat (MLE)	16.89			Theta star (bias corrected MLE)			19.89
122					nu hat (MLE)	36.34			nu star (bias corrected)			30.86
123					MLE Mean (bias corrected)	19.19			MLE Sd (bias corrected)			19.54
124									Approximate Chi Square Value (0.05)			19.17
125					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			18.13
126												
127	Assuming Gamma Distribution											
128				95% Approximate Gamma UCL (use when n>=50))		30.89			95% Adjusted Gamma UCL (use when n<50)			32.67
129												
130	Lognormal GOF Test											
131					Shapiro Wilk Test Statistic	0.34	Shapiro Wilk Lognormal GOF Test					
132					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
133					Lilliefors Test Statistic	0.517	Lilliefors Lognormal GOF Test					
134					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
135	Data Not Lognormal at 5% Significance Level											
136												
137	Lognormal Statistics											
138					Minimum of Logged Data	1.932			Mean of logged Data			2.453
139					Maximum of Logged Data	5.075			SD of logged Data			0.705
140												
141	Assuming Lognormal Distribution											
142					95% H-UCL	22.61			90% Chebyshev (MVUE) UCL			22.82
143					95% Chebyshev (MVUE) UCL	26.53			97.5% Chebyshev (MVUE) UCL			31.68
144					99% Chebyshev (MVUE) UCL	41.79						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data do not follow a Discernible Distribution (0.05)											
148												
149	Nonparametric Distribution Free UCLs											
150					95% CLT UCL	34.63			95% Jackknife UCL			35.65
151					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
152					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
153					95% BCA Bootstrap UCL	N/A						
154					90% Chebyshev(Mean, Sd) UCL	47.36			95% Chebyshev(Mean, Sd) UCL			60.12
155					97.5% Chebyshev(Mean, Sd) UCL	77.82			99% Chebyshev(Mean, Sd) UCL			112.6
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157						Suggested UCL to Use						
158					95% Chebyshev (Mean, Sd) UCL	60.12						
159												
160					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
161					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
162					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
163					For additional insight the user may want to consult a statistician.							
164												
165												
166	Cesium-137											
167												
168						General Statistics						
169					Total Number of Observations	16			Number of Distinct Observations			7
170									Number of Missing Observations			0
171					Minimum	0.136			Mean			0.626
172					Maximum	1.69			Median			0.626
173					SD	0.364			Std. Error of Mean			0.091
174					Coefficient of Variation	0.582			Skewness			1.661
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.758			Shapiro Wilk GOF Test			
178					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
179					Lilliefors Test Statistic	0.375			Lilliefors GOF Test			
180					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
181						Data Not Normal at 5% Significance Level						
182												
183						Assuming Normal Distribution						
184					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
185					95% Student's-t UCL	0.786			95% Adjusted-CLT UCL (Chen-1995)			0.816
186									95% Modified-t UCL (Johnson-1978)			0.792
187												
188						Gamma GOF Test						
189					A-D Test Statistic	1.499			Anderson-Darling Gamma GOF Test			
190					5% A-D Critical Value	0.744			Data Not Gamma Distributed at 5% Significance Level			
191					K-S Test Statistic	0.323			Kolmogrov-Smirnoff Gamma GOF Test			
192					5% K-S Critical Value	0.216			Data Not Gamma Distributed at 5% Significance Level			
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	3.318			k star (bias corrected MLE)			2.738
197					Theta hat (MLE)	0.189			Theta star (bias corrected MLE)			0.229
198					nu hat (MLE)	106.2			nu star (bias corrected)			87.6
199					MLE Mean (bias corrected)	0.626			MLE Sd (bias corrected)			0.378
200									Approximate Chi Square Value (0.05)			67.03
201					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			64.98
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	0.818			95% Adjusted Gamma UCL (use when n<50)			0.844
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.834			Shapiro Wilk Lognormal GOF Test			
208					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.352	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	-1.995				Mean of logged Data		-0.626
215					Maximum of Logged Data	0.525				SD of logged Data		0.612
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	0.909				90% Chebyshev (MVUE) UCL		0.941
219					95% Chebyshev (MVUE) UCL	1.08				97.5% Chebyshev (MVUE) UCL		1.272
220					99% Chebyshev (MVUE) UCL	1.649						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	0.776				95% Jackknife UCL		0.786
227					95% Standard Bootstrap UCL	0.767				95% Bootstrap-t UCL		0.858
228					95% Hall's Bootstrap UCL	1.751				95% Percentile Bootstrap UCL		0.783
229					95% BCA Bootstrap UCL	0.819						
230					90% Chebyshev(Mean, Sd) UCL	0.899				95% Chebyshev(Mean, Sd) UCL		1.023
231					97.5% Chebyshev(Mean, Sd) UCL	1.195				99% Chebyshev(Mean, Sd) UCL		1.532
232												
233	**Suggested UCL to Use**											
234					95% Chebyshev (Mean, Sd) UCL	1.023						
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
239	For additional insight the user may want to consult a statistician.											
240												
241												
242	**Chromium**											
243												
244	**General Statistics**											
245					Total Number of Observations	16				Number of Distinct Observations		9
246										Number of Missing Observations		0
247					Minimum	12				Mean		48.95
248					Maximum	231				Median		16
249					SD	59.93				Std. Error of Mean		14.98
250					Coefficient of Variation	1.224				Skewness		2.131
251												
252	**Normal GOF Test**											
253					Shapiro Wilk Test Statistic	0.684	**Shapiro Wilk GOF Test**					
254					5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level					
255					Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**					
256					5% Lilliefors Critical Value	0.222	Data Not Normal at 5% Significance Level					
257	**Data Not Normal at 5% Significance Level**											
258												
259	**Assuming Normal Distribution**											
260	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					95% Student's-t UCL	75.22				95% Adjusted-CLT UCL (Chen-1995)		82.12
262										95% Modified-t UCL (Johnson-1978)		76.55
263												
264					**Gamma GOF Test**							
265					A-D Test Statistic	1.559			**Anderson-Darling Gamma GOF Test**			
266					5% A-D Critical Value	0.763			Data Not Gamma Distributed at 5% Significance Level			
267					K-S Test Statistic	0.289			**Kolmogrov-Smirnoff Gamma GOF Test**			
268					5% K-S Critical Value	0.221			Data Not Gamma Distributed at 5% Significance Level			
269					**Data Not Gamma Distributed at 5% Significance Level**							
270												
271					**Gamma Statistics**							
272					k hat (MLE)	1.031			k star (bias corrected MLE)			0.88
273					Theta hat (MLE)	47.47			Theta star (bias corrected MLE)			55.65
274					nu hat (MLE)	33			nu star (bias corrected)			28.15
275					MLE Mean (bias corrected)	48.95			MLE Sd (bias corrected)			52.19
276									Approximate Chi Square Value (0.05)			17.04
277					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			16.06
278												
279					**Assuming Gamma Distribution**							
280					95% Approximate Gamma UCL (use when n>=50))	80.85			95% Adjusted Gamma UCL (use when n<50)			85.77
281												
282					**Lognormal GOF Test**							
283					Shapiro Wilk Test Statistic	0.793			**Shapiro Wilk Lognormal GOF Test**			
284					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
285					Lilliefors Test Statistic	0.293			**Lilliefors Lognormal GOF Test**			
286					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
287					**Data Not Lognormal at 5% Significance Level**							
288												
289					**Lognormal Statistics**							
290					Minimum of Logged Data	2.485			Mean of logged Data			3.333
291					Maximum of Logged Data	5.442			SD of logged Data			1.037
292												
293					**Assuming Lognormal Distribution**							
294					95% H-UCL	100.5			90% Chebyshev (MVUE) UCL			85.05
295					95% Chebyshev (MVUE) UCL	102.9			97.5% Chebyshev (MVUE) UCL			127.6
296					99% Chebyshev (MVUE) UCL	176.1						
297												
298					**Nonparametric Distribution Free UCL Statistics**							
299					**Data do not follow a Discernible Distribution (0.05)**							
300												
301					**Nonparametric Distribution Free UCLs**							
302					95% CLT UCL	73.59			95% Jackknife UCL			75.22
303					95% Standard Bootstrap UCL	73.38			95% Bootstrap-t UCL			95
304					95% Hall's Bootstrap UCL	97.79			95% Percentile Bootstrap UCL			75.21
305					95% BCA Bootstrap UCL	84.13						
306					90% Chebyshev(Mean, Sd) UCL	93.9			95% Chebyshev(Mean, Sd) UCL			114.3
307					97.5% Chebyshev(Mean, Sd) UCL	142.5			99% Chebyshev(Mean, Sd) UCL			198
308												
309					**Suggested UCL to Use**							
310					95% Chebyshev (Mean, Sd) UCL	114.3						
311												
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). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

Iron

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	22125	Mean	26687
Maximum	33738	Median	26121
SD	3296	Std. Error of Mean	823.9
Coefficient of Variation	0.123	Skewness	0.799

Normal GOF Test

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.222	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	28131	95% Adjusted-CLT UCL (Chen-1995)	28218
		95% Modified-t UCL (Johnson-1978)	28158

Gamma GOF Test

A-D Test Statistic	0.375	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.15	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	73.02	k star (bias corrected MLE)	59.37
Theta hat (MLE)	365.4	Theta star (bias corrected MLE)	449.5
nu hat (MLE)	2337	nu star (bias corrected)	1900
MLE Mean (bias corrected)	26687	MLE Sd (bias corrected)	3463
		Approximate Chi Square Value (0.05)	1800
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1789

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	28173	95% Adjusted Gamma UCL (use when n<50)	28348

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.222	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

	A	B	C	D	E	F	G	H	I	J	K	L
365						Lognormal Statistics						
366					Minimum of Logged Data	10					Mean of logged Data	10.19
367					Maximum of Logged Data	10.43					SD of logged Data	0.12
368												
369						Assuming Lognormal Distribution						
370					95% H-UCL	28184					90% Chebyshev (MVUE) UCL	29087
371					95% Chebyshev (MVUE) UCL	30175					97.5% Chebyshev (MVUE) UCL	31686
372					99% Chebyshev (MVUE) UCL	34655						
373												
374						Nonparametric Distribution Free UCL Statistics						
375						Data appear to follow a Discernible Distribution at 5% Significance Level						
376												
377						Nonparametric Distribution Free UCLs						
378					95% CLT UCL	28042					95% Jackknife UCL	28131
379					95% Standard Bootstrap UCL	27995					95% Bootstrap-t UCL	28612
380					95% Hall's Bootstrap UCL	28277					95% Percentile Bootstrap UCL	28036
381					95% BCA Bootstrap UCL	28223						
382					90% Chebyshev(Mean, Sd) UCL	29158					95% Chebyshev(Mean, Sd) UCL	30278
383					97.5% Chebyshev(Mean, Sd) UCL	31832					99% Chebyshev(Mean, Sd) UCL	34884
384												
385						Suggested UCL to Use						
386					95% Student's-t UCL	28131						
387												
388					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
389					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
390					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
391					For additional insight the user may want to consult a statistician.							
392												
393												
394	Mercury											
395												
396						General Statistics						
397					Total Number of Observations	16					Number of Distinct Observations	6
398											Number of Missing Observations	0
399					Minimum	0.0493					Mean	28.35
400					Maximum	40					Median	40
401					SD	18.07					Std. Error of Mean	4.517
402					Coefficient of Variation	0.637					Skewness	-0.969
403												
404						Normal GOF Test						
405					Shapiro Wilk Test Statistic	0.616			Shapiro Wilk GOF Test			
406					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
407					Lilliefors Test Statistic	0.428			Lilliefors GOF Test			
408					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
409						Data Not Normal at 5% Significance Level						
410												
411						Assuming Normal Distribution						
412					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
413					95% Student's-t UCL	36.27					95% Adjusted-CLT UCL (Chen-1995)	34.61
414											95% Modified-t UCL (Johnson-1978)	36.08
415												
416						Gamma GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
417					A-D Test Statistic	3.258	Anderson-Darling Gamma GOF Test					
418					5% A-D Critical Value	0.788	Data Not Gamma Distributed at 5% Significance Level					
419					K-S Test Statistic	0.448	Kolmogrov-Smirnoff Gamma GOF Test					
420					5% K-S Critical Value	0.226	Data Not Gamma Distributed at 5% Significance Level					
421	Data Not Gamma Distributed at 5% Significance Level											
422												
423	Gamma Statistics											
424					k hat (MLE)	0.591				k star (bias corrected MLE)		0.522
425					Theta hat (MLE)	47.98				Theta star (bias corrected MLE)		54.34
426					nu hat (MLE)	18.91				nu star (bias corrected)		16.69
427					MLE Mean (bias corrected)	28.35				MLE Sd (bias corrected)		39.25
428										Approximate Chi Square Value (0.05)		8.454
429					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		7.794
430												
431	Assuming Gamma Distribution											
432					95% Approximate Gamma UCL (use when n>=50))	55.98				95% Adjusted Gamma UCL (use when n<50)		60.72
433												
434	Lognormal GOF Test											
435					Shapiro Wilk Test Statistic	0.635	Shapiro Wilk Lognormal GOF Test					
436					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
437					Lilliefors Test Statistic	0.408	Lilliefors Lognormal GOF Test					
438					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
439	Data Not Lognormal at 5% Significance Level											
440												
441	Lognormal Statistics											
442					Minimum of Logged Data	-3.01				Mean of logged Data		2.296
443					Maximum of Logged Data	3.689				SD of logged Data		2.382
444												
445	Assuming Lognormal Distribution											
446					95% H-UCL	4172				90% Chebyshev (MVUE) UCL		318.9
447					95% Chebyshev (MVUE) UCL	416.1				97.5% Chebyshev (MVUE) UCL		551
448					99% Chebyshev (MVUE) UCL	816.1						
449												
450	Nonparametric Distribution Free UCL Statistics											
451	Data do not follow a Discernible Distribution (0.05)											
452												
453	Nonparametric Distribution Free UCLs											
454					95% CLT UCL	35.78				95% Jackknife UCL		36.27
455					95% Standard Bootstrap UCL	35.54				95% Bootstrap-t UCL		35.11
456					95% Hall's Bootstrap UCL	34.3				95% Percentile Bootstrap UCL		35.05
457					95% BCA Bootstrap UCL	35.02						
458					90% Chebyshev(Mean, Sd) UCL	41.9				95% Chebyshev(Mean, Sd) UCL		48.04
459					97.5% Chebyshev(Mean, Sd) UCL	56.56				99% Chebyshev(Mean, Sd) UCL		73.29
460												
461	Suggested UCL to Use											
462					99% Chebyshev (Mean, Sd) UCL	73.29						
463												
464	Recommended UCL exceeds the maximum observation											
465												
466	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
467	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
468	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											

	A	B	C	D	E	F	G	H	I	J	K	L
469	For additional insight the user may want to consult a statistician.											
470												
471	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
472	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
473												
474												
475	**Molybdenum**											
476												
477	**General Statistics**											
478					Total Number of Observations	16			Number of Distinct Observations		4	
479									Number of Missing Observations		0	
480					Minimum	0.64			Mean		10.79	
481					Maximum	78			Median		3	
482					SD	22.16			Std. Error of Mean		5.539	
483					Coefficient of Variation	2.053			Skewness		2.682	
484												
485	**Normal GOF Test**											
486					Shapiro Wilk Test Statistic	0.429			**Shapiro Wilk GOF Test**			
487					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
488					Lilliefors Test Statistic	0.512			**Lilliefors GOF Test**			
489					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
490	**Data Not Normal at 5% Significance Level**											
491												
492	**Assuming Normal Distribution**											
493	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
494					95% Student's-t UCL	20.5			95% Adjusted-CLT UCL (Chen-1995)		23.87	
495									95% Modified-t UCL (Johnson-1978)		21.12	
496												
497	**Gamma GOF Test**											
498					A-D Test Statistic	4.285			**Anderson-Darling Gamma GOF Test**			
499					5% A-D Critical Value	0.786			Data Not Gamma Distributed at 5% Significance Level			
500					K-S Test Statistic	0.523			**Kolmogrov-Smirnoff Gamma GOF Test**			
501					5% K-S Critical Value	0.225			Data Not Gamma Distributed at 5% Significance Level			
502	**Data Not Gamma Distributed at 5% Significance Level**											
503												
504	**Gamma Statistics**											
505					k hat (MLE)	0.62			k star (bias corrected MLE)		0.546	
506					Theta hat (MLE)	17.39			Theta star (bias corrected MLE)		19.77	
507					nu hat (MLE)	19.85			nu star (bias corrected)		17.46	
508					MLE Mean (bias corrected)	10.79			MLE Sd (bias corrected)		14.61	
509									Approximate Chi Square Value (0.05)		9.004	
510					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value		8.319	
511												
512	**Assuming Gamma Distribution**											
513					95% Approximate Gamma UCL (use when n>=50))	20.93			95% Adjusted Gamma UCL (use when n<50)		22.65	
514												
515	**Lognormal GOF Test**											
516					Shapiro Wilk Test Statistic	0.569			**Shapiro Wilk Lognormal GOF Test**			
517					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
518					Lilliefors Test Statistic	0.473			**Lilliefors Lognormal GOF Test**			
519					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
520	**Data Not Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
521												
522						Lognormal Statistics						
523					Minimum of Logged Data	-0.446				Mean of logged Data		1.387
524					Maximum of Logged Data	4.357				SD of logged Data		1.158
525												
526						Assuming Lognormal Distribution						
527					95% H-UCL	18.96				90% Chebyshev (MVUE) UCL		14.5
528					95% Chebyshev (MVUE) UCL	17.74				97.5% Chebyshev (MVUE) UCL		22.24
529					99% Chebyshev (MVUE) UCL	31.07						
530												
531						Nonparametric Distribution Free UCL Statistics						
532						Data do not follow a Discernible Distribution (0.05)						
533												
534						Nonparametric Distribution Free UCLs						
535					95% CLT UCL	19.9				95% Jackknife UCL		20.5
536					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
537					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
538					95% BCA Bootstrap UCL	N/A						
539					90% Chebyshev(Mean, Sd) UCL	27.41				95% Chebyshev(Mean, Sd) UCL		34.93
540					97.5% Chebyshev(Mean, Sd) UCL	45.38				99% Chebyshev(Mean, Sd) UCL		65.9
541												
542						Suggested UCL to Use						
543					95% Chebyshev (Mean, Sd) UCL	34.93						
544												
545					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
546					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
547					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
548					For additional insight the user may want to consult a statistician.							
549												
550												
551	Neptunium-237											
552												
553						General Statistics						
554					Total Number of Observations	16				Number of Distinct Observations		7
555										Number of Missing Observations		0
556					Minimum	0.052				Mean		1.712
557					Maximum	4.1				Median		1.712
558					SD	0.993				Std. Error of Mean		0.248
559					Coefficient of Variation	0.58				Skewness		0.622
560												
561						Normal GOF Test						
562					Shapiro Wilk Test Statistic	0.806				Shapiro Wilk GOF Test		
563					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
564					Lilliefors Test Statistic	0.313				Lilliefors GOF Test		
565					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
566						Data Not Normal at 5% Significance Level						
567												
568						Assuming Normal Distribution						
569					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
570					95% Student's-t UCL	2.148				95% Adjusted-CLT UCL (Chen-1995)		2.162
571										95% Modified-t UCL (Johnson-1978)		2.154
572												

	A	B	C	D	E	F	G	H	I	J	K	L
573						Gamma GOF Test						
574					A-D Test Statistic	2.163	Anderson-Darling Gamma GOF Test					
575					5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level					
576					K-S Test Statistic	0.415	Kolmogrov-Smirnoff Gamma GOF Test					
577					5% K-S Critical Value	0.219	Data Not Gamma Distributed at 5% Significance Level					
578						Data Not Gamma Distributed at 5% Significance Level						
579												
580						Gamma Statistics						
581					k hat (MLE)	1.675				k star (bias corrected MLE)		1.403
582					Theta hat (MLE)	1.022				Theta star (bias corrected MLE)		1.221
583					nu hat (MLE)	53.61				nu star (bias corrected)		44.89
584					MLE Mean (bias corrected)	1.712				MLE Sd (bias corrected)		1.446
585										Approximate Chi Square Value (0.05)		30.52
586					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		29.18
587												
588						Assuming Gamma Distribution						
589					95% Approximate Gamma UCL (use when n>=50))	2.518				95% Adjusted Gamma UCL (use when n<50)		2.635
590												
591						Lognormal GOF Test						
592					Shapiro Wilk Test Statistic	0.668	Shapiro Wilk Lognormal GOF Test					
593					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
594					Lilliefors Test Statistic	0.428	Lilliefors Lognormal GOF Test					
595					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
596						Data Not Lognormal at 5% Significance Level						
597												
598						Lognormal Statistics						
599					Minimum of Logged Data	-2.957				Mean of logged Data		0.211
600					Maximum of Logged Data	1.411				SD of logged Data		1.114
601												
602						Assuming Lognormal Distribution						
603					95% H-UCL	5.267				90% Chebyshev (MVUE) UCL		4.189
604					95% Chebyshev (MVUE) UCL	5.104				97.5% Chebyshev (MVUE) UCL		6.374
605					99% Chebyshev (MVUE) UCL	8.868						
606												
607						Nonparametric Distribution Free UCL Statistics						
608						Data do not follow a Discernible Distribution (0.05)						
609												
610						Nonparametric Distribution Free UCLs						
611					95% CLT UCL	2.121				95% Jackknife UCL		2.148
612					95% Standard Bootstrap UCL	2.102				95% Bootstrap-t UCL		2.21
613					95% Hall's Bootstrap UCL	2.455				95% Percentile Bootstrap UCL		2.135
614					95% BCA Bootstrap UCL	2.128						
615					90% Chebyshev(Mean, Sd) UCL	2.457				95% Chebyshev(Mean, Sd) UCL		2.795
616					97.5% Chebyshev(Mean, Sd) UCL	3.263				99% Chebyshev(Mean, Sd) UCL		4.183
617												
618						Suggested UCL to Use						
619					95% Chebyshev (Mean, Sd) UCL	2.795						
620												
621						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
622						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
623						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
624						For additional insight the user may want to consult a statistician.						

	A	B	C	D	E	F	G	H	I	J	K	L
625												
626												
627	**Nickel**											
628												
629	**General Statistics**											
630					Total Number of Observations	16			Number of Distinct Observations			15
631									Number of Missing Observations			0
632					Minimum	17			Mean			55.75
633					Maximum	203			Median			36
634					SD	47.89			Std. Error of Mean			11.97
635					Coefficient of Variation	0.859			Skewness			2.221
636												
637	**Normal GOF Test**											
638					Shapiro Wilk Test Statistic	0.738			**Shapiro Wilk GOF Test**			
639					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
640					Lilliefors Test Statistic	0.23			**Lilliefors GOF Test**			
641					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
642	**Data Not Normal at 5% Significance Level**											
643												
644	**Assuming Normal Distribution**											
645				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
646					95% Student's-t UCL	76.74			95% Adjusted-CLT UCL (Chen-1995)			82.54
647									95% Modified-t UCL (Johnson-1978)			77.84
648												
649	**Gamma GOF Test**											
650					A-D Test Statistic	0.71			**Anderson-Darling Gamma GOF Test**			
651					5% A-D Critical Value	0.749			Detected data appear Gamma Distributed at 5% Significance Level			
652					K-S Test Statistic	0.197			**Kolmogrov-Smirnoff Gamma GOF Test**			
653					5% K-S Critical Value	0.218			Detected data appear Gamma Distributed at 5% Significance Level			
654	**Detected data appear Gamma Distributed at 5% Significance Level**											
655												
656	**Gamma Statistics**											
657					k hat (MLE)	2.185			k star (bias corrected MLE)			1.817
658					Theta hat (MLE)	25.52			Theta star (bias corrected MLE)			30.69
659					nu hat (MLE)	69.91			nu star (bias corrected)			58.13
660					MLE Mean (bias corrected)	55.75			MLE Sd (bias corrected)			41.36
661									Approximate Chi Square Value (0.05)			41.6
662					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			40.01
663												
664	**Assuming Gamma Distribution**											
665					95% Approximate Gamma UCL (use when n>=50)	77.9			95% Adjusted Gamma UCL (use when n<50)			80.99
666												
667	**Lognormal GOF Test**											
668					Shapiro Wilk Test Statistic	0.937			**Shapiro Wilk Lognormal GOF Test**			
669					5% Shapiro Wilk Critical Value	0.887			Data appear Lognormal at 5% Significance Level			
670					Lilliefors Test Statistic	0.176			**Lilliefors Lognormal GOF Test**			
671					5% Lilliefors Critical Value	0.222			Data appear Lognormal at 5% Significance Level			
672	**Data appear Lognormal at 5% Significance Level**											
673												
674	**Lognormal Statistics**											
675					Minimum of Logged Data	2.833			Mean of logged Data			3.775
676					Maximum of Logged Data	5.313			SD of logged Data			0.679

	A	B	C	D	E	F	G	H	I	J	K	L
677												
678					Assuming Lognormal Distribution							
679					95% H-UCL	81.49			90% Chebyshev (MVUE) UCL			82.93
680				95% Chebyshev (MVUE) UCL		96.06			97.5% Chebyshev (MVUE) UCL			114.3
681				99% Chebyshev (MVUE) UCL		150						
682												
683					Nonparametric Distribution Free UCL Statistics							
684					Data appear to follow a Discernible Distribution at 5% Significance Level							
685												
686					Nonparametric Distribution Free UCLs							
687					95% CLT UCL	75.44			95% Jackknife UCL			76.74
688				95% Standard Bootstrap UCL		74.83			95% Bootstrap-t UCL			92.91
689				95% Hall's Bootstrap UCL		152.4			95% Percentile Bootstrap UCL			77.06
690				95% BCA Bootstrap UCL		81						
691				90% Chebyshev(Mean, Sd) UCL		91.66			95% Chebyshev(Mean, Sd) UCL			107.9
692				97.5% Chebyshev(Mean, Sd) UCL		130.5			99% Chebyshev(Mean, Sd) UCL			174.9
693												
694					Suggested UCL to Use							
695				95% Adjusted Gamma UCL		80.99						
696												
697					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
698					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
699					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
700					For additional insight the user may want to consult a statistician.							
701												
702												
703	PAH, Total											
704												
705					General Statistics							
706				Total Number of Observations		16			Number of Distinct Observations			4
707									Number of Missing Observations			0
708				Minimum		0.02			Mean			3.373
709				Maximum		9.62			Median			3.373
710				SD		1.977			Std. Error of Mean			0.494
711				Coefficient of Variation		0.586			Skewness			1.792
712												
713					Normal GOF Test							
714				Shapiro Wilk Test Statistic		0.575			Shapiro Wilk GOF Test			
715				5% Shapiro Wilk Critical Value		0.887			Data Not Normal at 5% Significance Level			
716				Lilliefors Test Statistic		0.438			Lilliefors GOF Test			
717				5% Lilliefors Critical Value		0.222			Data Not Normal at 5% Significance Level			
718					Data Not Normal at 5% Significance Level							
719												
720					Assuming Normal Distribution							
721				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
722				95% Student's-t UCL		4.24			95% Adjusted-CLT UCL (Chen-1995)			4.423
723									95% Modified-t UCL (Johnson-1978)			4.277
724												
725					Gamma GOF Test							
726				A-D Test Statistic		3.663			Anderson-Darling Gamma GOF Test			
727				5% A-D Critical Value		0.755			Data Not Gamma Distributed at 5% Significance Level			
728				K-S Test Statistic		0.484			Kolmogrov-Smirnoff Gamma GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
729					5% K-S Critical Value	0.219	Data Not Gamma Distributed at 5% Significance Level					
730	**Data Not Gamma Distributed at 5% Significance Level**											
731												
732	**Gamma Statistics**											
733					k hat (MLE)	1.471				k star (bias corrected MLE)		1.237
734					Theta hat (MLE)	2.293				Theta star (bias corrected MLE)		2.727
735					nu hat (MLE)	47.08				nu star (bias corrected)		39.58
736					MLE Mean (bias corrected)	3.373				MLE Sd (bias corrected)		3.033
737										Approximate Chi Square Value (0.05)		26.17
738					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		24.93
739												
740	**Assuming Gamma Distribution**											
741				95% Approximate Gamma UCL (use when n>=50))		5.102				95% Adjusted Gamma UCL (use when n<50)		5.356
742												
743	**Lognormal GOF Test**											
744					Shapiro Wilk Test Statistic	0.49	**Shapiro Wilk Lognormal GOF Test**					
745					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
746					Lilliefors Test Statistic	0.482	**Lilliefors Lognormal GOF Test**					
747					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
748	**Data Not Lognormal at 5% Significance Level**											
749												
750	**Lognormal Statistics**											
751					Minimum of Logged Data	-3.912				Mean of logged Data		0.839
752					Maximum of Logged Data	2.264				SD of logged Data		1.389
753												
754	**Assuming Lognormal Distribution**											
755					95% H-UCL	20.15				90% Chebyshev (MVUE) UCL		12
756					95% Chebyshev (MVUE) UCL	14.96				97.5% Chebyshev (MVUE) UCL		19.06
757					99% Chebyshev (MVUE) UCL	27.12						
758												
759	**Nonparametric Distribution Free UCL Statistics**											
760	**Data do not follow a Discernible Distribution (0.05)**											
761												
762	**Nonparametric Distribution Free UCLs**											
763					95% CLT UCL	4.186				95% Jackknife UCL		4.24
764					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
765					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
766					95% BCA Bootstrap UCL	N/A						
767					90% Chebyshev(Mean, Sd) UCL	4.856				95% Chebyshev(Mean, Sd) UCL		5.528
768					97.5% Chebyshev(Mean, Sd) UCL	6.46				99% Chebyshev(Mean, Sd) UCL		8.292
769												
770	**Suggested UCL to Use**											
771					95% Chebyshev (Mean, Sd) UCL	5.528						
772												
773	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
774	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
775	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
776	For additional insight the user may want to consult a statistician.											
777												
778												
779	**PCB, Total**											
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781	General Statistics											
782	Total Number of Observations					16	Number of Distinct Observations					8
783							Number of Missing Observations					0
784	Minimum					0.019	Mean					2.117
785	Maximum					5	Median					0.445
786	SD					2.345	Std. Error of Mean					0.586
787	Coefficient of Variation					1.107	Skewness					0.48
788												
789	Normal GOF Test											
790	Shapiro Wilk Test Statistic					0.695	Shapiro Wilk GOF Test					
791	5% Shapiro Wilk Critical Value					0.887	Data Not Normal at 5% Significance Level					
792	Lilliefors Test Statistic					0.319	Lilliefors GOF Test					
793	5% Lilliefors Critical Value					0.222	Data Not Normal at 5% Significance Level					
794	Data Not Normal at 5% Significance Level											
795												
796	Assuming Normal Distribution											
797	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
798	95% Student's-t UCL					3.145	95% Adjusted-CLT UCL (Chen-1995)					3.157
799							95% Modified-t UCL (Johnson-1978)					3.157
800												
801	Gamma GOF Test											
802	A-D Test Statistic					1.29	Anderson-Darling Gamma GOF Test					
803	5% A-D Critical Value					0.792	Data Not Gamma Distributed at 5% Significance Level					
804	K-S Test Statistic					0.254	Kolmogrov-Smirnoff Gamma GOF Test					
805	5% K-S Critical Value					0.226	Data Not Gamma Distributed at 5% Significance Level					
806	Data Not Gamma Distributed at 5% Significance Level											
807												
808	Gamma Statistics											
809	k hat (MLE)					0.553	k star (bias corrected MLE)					0.491
810	Theta hat (MLE)					3.826	Theta star (bias corrected MLE)					4.31
811	nu hat (MLE)					17.71	nu star (bias corrected)					15.72
812	MLE Mean (bias corrected)					2.117	MLE Sd (bias corrected)					3.021
813							Approximate Chi Square Value (0.05)					7.766
814	Adjusted Level of Significance					0.0335	Adjusted Chi Square Value					7.137
815												
816	Assuming Gamma Distribution											
817	95% Approximate Gamma UCL (use when n>=50))					4.286	95% Adjusted Gamma UCL (use when n<50)					4.664
818												
819	Lognormal GOF Test											
820	Shapiro Wilk Test Statistic					0.865	Shapiro Wilk Lognormal GOF Test					
821	5% Shapiro Wilk Critical Value					0.887	Data Not Lognormal at 5% Significance Level					
822	Lilliefors Test Statistic					0.235	Lilliefors Lognormal GOF Test					
823	5% Lilliefors Critical Value					0.222	Data Not Lognormal at 5% Significance Level					
824	Data Not Lognormal at 5% Significance Level											
825												
826	Lognormal Statistics											
827	Minimum of Logged Data					-3.963	Mean of logged Data					-0.38
828	Maximum of Logged Data					1.609	SD of logged Data					1.844
829												
830	Assuming Lognormal Distribution											
831	95% H-UCL					27.35	90% Chebyshev (MVUE) UCL					7.791
832	95% Chebyshev (MVUE) UCL					9.971	97.5% Chebyshev (MVUE) UCL					13

833					99% Chebyshev (MVUE) UCL	18.94						
834												
835					Nonparametric Distribution Free UCL Statistics							
836					Data do not follow a Discernible Distribution (0.05)							
837												
838					Nonparametric Distribution Free UCLs							
839					95% CLT UCL	3.082				95% Jackknife UCL		3.145
840					95% Standard Bootstrap UCL	3.044				95% Bootstrap-t UCL		3.233
841					95% Hall's Bootstrap UCL	2.996				95% Percentile Bootstrap UCL		3.025
842					95% BCA Bootstrap UCL	3.118						
843					90% Chebyshev(Mean, Sd) UCL	3.876				95% Chebyshev(Mean, Sd) UCL		4.673
844					97.5% Chebyshev(Mean, Sd) UCL	5.779				99% Chebyshev(Mean, Sd) UCL		7.951
845												
846					Suggested UCL to Use							
847					99% Chebyshev (Mean, Sd) UCL	7.951						
848												
849					Recommended UCL exceeds the maximum observation							
850												
851					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
852					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
853					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
854					For additional insight the user may want to consult a statistician.							
855												
856												
857	Plutonium-239/240											
858												
859					General Statistics							
860					Total Number of Observations	16				Number of Distinct Observations		7
861										Number of Missing Observations		0
862					Minimum	0.0205				Mean		4.565
863					Maximum	15.9				Median		4.565
864					SD	3.596				Std. Error of Mean		0.899
865					Coefficient of Variation	0.788				Skewness		1.997
866												
867					Normal GOF Test							
868					Shapiro Wilk Test Statistic	0.69				Shapiro Wilk GOF Test		
869					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
870					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
871					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
872					Data Not Normal at 5% Significance Level							
873												
874					Assuming Normal Distribution							
875					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
876					95% Student's-t UCL	6.141				95% Adjusted-CLT UCL (Chen-1995)		6.524
877										95% Modified-t UCL (Johnson-1978)		6.216
878												
879					Gamma GOF Test							
880					A-D Test Statistic	2.452				Anderson-Darling Gamma GOF Test		
881					5% A-D Critical Value	0.767				Data Not Gamma Distributed at 5% Significance Level		
882					K-S Test Statistic	0.387				Kolmogrov-Smirnoff Gamma GOF Test		
883					5% K-S Critical Value	0.222				Data Not Gamma Distributed at 5% Significance Level		
884					Data Not Gamma Distributed at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
885												
886						Gamma Statistics						
887					k hat (MLE)	0.921				k star (bias corrected MLE)		0.79
888					Theta hat (MLE)	4.958				Theta star (bias corrected MLE)		5.781
889					nu hat (MLE)	29.46				nu star (bias corrected)		25.27
890					MLE Mean (bias corrected)	4.565				MLE Sd (bias corrected)		5.137
891										Approximate Chi Square Value (0.05)		14.82
892					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		13.91
893												
894						Assuming Gamma Distribution						
895					95% Approximate Gamma UCL (use when n>=50))	7.785				95% Adjusted Gamma UCL (use when n<50)		8.292
896												
897						Lognormal GOF Test						
898					Shapiro Wilk Test Statistic	0.652				Shapiro Wilk Lognormal GOF Test		
899					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
900					Lilliefors Test Statistic	0.413				Lilliefors Lognormal GOF Test		
901					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
902						Data Not Lognormal at 5% Significance Level						
903												
904						Lognormal Statistics						
905					Minimum of Logged Data	-3.887				Mean of logged Data		0.885
906					Maximum of Logged Data	2.766				SD of logged Data		1.732
907												
908						Assuming Lognormal Distribution						
909					95% H-UCL	63.98				90% Chebyshev (MVUE) UCL		22.55
910					95% Chebyshev (MVUE) UCL	28.7				97.5% Chebyshev (MVUE) UCL		37.24
911					99% Chebyshev (MVUE) UCL	54.01						
912												
913						Nonparametric Distribution Free UCL Statistics						
914						Data do not follow a Discernible Distribution (0.05)						
915												
916						Nonparametric Distribution Free UCLs						
917					95% CLT UCL	6.044				95% Jackknife UCL		6.141
918					95% Standard Bootstrap UCL	6				95% Bootstrap-t UCL		6.738
919					95% Hall's Bootstrap UCL	14.21				95% Percentile Bootstrap UCL		6.1
920					95% BCA Bootstrap UCL	6.348						
921					90% Chebyshev(Mean, Sd) UCL	7.262				95% Chebyshev(Mean, Sd) UCL		8.484
922					97.5% Chebyshev(Mean, Sd) UCL	10.18				99% Chebyshev(Mean, Sd) UCL		13.51
923												
924						Suggested UCL to Use						
925					99% Chebyshev (Mean, Sd) UCL	13.51						
926												
927						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
928						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
929						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
930						For additional insight the user may want to consult a statistician.						
931												
932												
933	Protactinium-231											
934												
935						General Statistics						
936					Total Number of Observations	16				Number of Distinct Observations		3

937							Number of Missing Observations					0
938					Minimum	2.46	Mean					16.19
939					Maximum	29.92	Median					16.19
940					SD	5.013	Std. Error of Mean					1.253
941					Coefficient of Variation	0.31	Skewness					0
942												
943					Normal GOF Test							
944					Shapiro Wilk Test Statistic	0.511	Shapiro Wilk GOF Test					
945					5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level					
946					Lilliefors Test Statistic	0.438	Lilliefors GOF Test					
947					5% Lilliefors Critical Value	0.222	Data Not Normal at 5% Significance Level					
948					Data Not Normal at 5% Significance Level							
949												
950					Assuming Normal Distribution							
951					95% Normal UCL		95% UCLs (Adjusted for Skewness)					
952					95% Student's-t UCL	18.39	95% Adjusted-CLT UCL (Chen-1995)					18.25
953							95% Modified-t UCL (Johnson-1978)					18.39
954												
955					Gamma GOF Test							
956					A-D Test Statistic	4.367	Anderson-Darling Gamma GOF Test					
957					5% A-D Critical Value	0.741	Data Not Gamma Distributed at 5% Significance Level					
958					K-S Test Statistic	0.49	Kolmogrov-Smirnoff Gamma GOF Test					
959					5% K-S Critical Value	0.216	Data Not Gamma Distributed at 5% Significance Level					
960					Data Not Gamma Distributed at 5% Significance Level							
961												
962					Gamma Statistics							
963					k hat (MLE)	6.461	k star (bias corrected MLE)					5.291
964					Theta hat (MLE)	2.506	Theta star (bias corrected MLE)					3.06
965					nu hat (MLE)	206.7	nu star (bias corrected)					169.3
966					MLE Mean (bias corrected)	16.19	MLE Sd (bias corrected)					7.038
967							Approximate Chi Square Value (0.05)					140.2
968					Adjusted Level of Significance	0.0335	Adjusted Chi Square Value					137.2
969												
970					Assuming Gamma Distribution							
971					95% Approximate Gamma UCL (use when n>=50))	19.55	95% Adjusted Gamma UCL (use when n<50)					19.98
972												
973					Lognormal GOF Test							
974					Shapiro Wilk Test Statistic	0.417	Shapiro Wilk Lognormal GOF Test					
975					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
976					Lilliefors Test Statistic	0.5	Lilliefors Lognormal GOF Test					
977					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
978					Data Not Lognormal at 5% Significance Level							
979												
980					Lognormal Statistics							
981					Minimum of Logged Data	0.9	Mean of logged Data					2.705
982					Maximum of Logged Data	3.399	SD of logged Data					0.505
983												
984					Assuming Lognormal Distribution							
985					95% H-UCL	22.21	90% Chebyshev (MVUE) UCL					23.42
986					95% Chebyshev (MVUE) UCL	26.41	97.5% Chebyshev (MVUE) UCL					30.55
987					99% Chebyshev (MVUE) UCL	38.68						
988												

	A	B	C	D	E	F	G	H	I	J	K	L
989	Nonparametric Distribution Free UCL Statistics											
990	Data do not follow a Discernible Distribution (0.05)											
991												
992	Nonparametric Distribution Free UCLs											
993					95% CLT UCL	18.25			95% Jackknife UCL			18.39
994					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
995					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
996					95% BCA Bootstrap UCL	N/A						
997					90% Chebyshev(Mean, Sd) UCL	19.95			95% Chebyshev(Mean, Sd) UCL			21.65
998					97.5% Chebyshev(Mean, Sd) UCL	24.02			99% Chebyshev(Mean, Sd) UCL			28.66
999												
1000	Suggested UCL to Use											
1001					95% Chebyshev (Mean, Sd) UCL	21.65						
1002												
1003	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1004	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1005	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1006	For additional insight the user may want to consult a statistician.											
1007												
1008												
1009	Technetium-99											
1010												
1011	General Statistics											
1012					Total Number of Observations	16			Number of Distinct Observations			7
1013									Number of Missing Observations			0
1014					Minimum	7.52			Mean			372
1015					Maximum	1870			Median			372
1016					SD	425.5			Std. Error of Mean			106.4
1017					Coefficient of Variation	1.144			Skewness			3.172
1018												
1019	Normal GOF Test											
1020					Shapiro Wilk Test Statistic	0.548			Shapiro Wilk GOF Test			
1021					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
1022					Lilliefors Test Statistic	0.438			Lilliefors GOF Test			
1023					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
1024	Data Not Normal at 5% Significance Level											
1025												
1026	Assuming Normal Distribution											
1027					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
1028					95% Student's-t UCL	558.5			95% Adjusted-CLT UCL (Chen-1995)			637.1
1029									95% Modified-t UCL (Johnson-1978)			572.5
1030												
1031	Gamma GOF Test											
1032					A-D Test Statistic	1.704			Anderson-Darling Gamma GOF Test			
1033					5% A-D Critical Value	0.765			Data Not Gamma Distributed at 5% Significance Level			
1034					K-S Test Statistic	0.321			Kolmogrov-Smirnoff Gamma GOF Test			
1035					5% K-S Critical Value	0.221			Data Not Gamma Distributed at 5% Significance Level			
1036	Data Not Gamma Distributed at 5% Significance Level											
1037												
1038	Gamma Statistics											
1039					k hat (MLE)	0.973			k star (bias corrected MLE)			0.832
1040					Theta hat (MLE)	382.5			Theta star (bias corrected MLE)			447.2

	A	B	C	D	E	F	G	H	I	J	K	L
1041					nu hat (MLE)	31.12				nu star (bias corrected)		26.62
1042					MLE Mean (bias corrected)	372				MLE Sd (bias corrected)		407.9
1043										Approximate Chi Square Value (0.05)		15.86
1044					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		14.92
1045												
1046					Assuming Gamma Distribution							
1047				95% Approximate Gamma UCL (use when n>=50))		624.5				95% Adjusted Gamma UCL (use when n<50)		663.8
1048												
1049					Lognormal GOF Test							
1050					Shapiro Wilk Test Statistic	0.771				Shapiro Wilk Lognormal GOF Test		
1051					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1052					Lilliefors Test Statistic	0.354				Lilliefors Lognormal GOF Test		
1053					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1054					Data Not Lognormal at 5% Significance Level							
1055												
1056					Lognormal Statistics							
1057					Minimum of Logged Data	2.018				Mean of logged Data		5.323
1058					Maximum of Logged Data	7.534				SD of logged Data		1.384
1059												
1060					Assuming Lognormal Distribution							
1061					95% H-UCL	1762				90% Chebyshev (MVUE) UCL		1056
1062					95% Chebyshev (MVUE) UCL	1315				97.5% Chebyshev (MVUE) UCL		1675
1063					99% Chebyshev (MVUE) UCL	2383						
1064												
1065					Nonparametric Distribution Free UCL Statistics							
1066					Data do not follow a Discernible Distribution (0.05)							
1067												
1068					Nonparametric Distribution Free UCLs							
1069					95% CLT UCL	547				95% Jackknife UCL		558.5
1070					95% Standard Bootstrap UCL	538.9				95% Bootstrap-t UCL		732.7
1071					95% Hall's Bootstrap UCL	1292				95% Percentile Bootstrap UCL		557.3
1072					95% BCA Bootstrap UCL	656.1						
1073					90% Chebyshev(Mean, Sd) UCL	691.1				95% Chebyshev(Mean, Sd) UCL		835.7
1074					97.5% Chebyshev(Mean, Sd) UCL	1036				99% Chebyshev(Mean, Sd) UCL		1430
1075												
1076					Suggested UCL to Use							
1077					95% Chebyshev (Mean, Sd) UCL	835.7						
1078												
1079					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1080					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1081					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1082					For additional insight the user may want to consult a statistician.							
1083												
1084												
1085	Thorium-230											
1086												
1087					General Statistics							
1088					Total Number of Observations	16				Number of Distinct Observations		7
1089										Number of Missing Observations		0
1090					Minimum	0.581				Mean		27.99
1091					Maximum	111				Median		27.99
1092					SD	24.57				Std. Error of Mean		6.142

	A	B	C	D	E	F	G	H	I	J	K	L
1093					Coefficient of Variation	0.878					Skewness	2.643
1094												
1095					Normal GOF Test							
1096					Shapiro Wilk Test Statistic	0.578	Shapiro Wilk GOF Test					
1097					5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level					
1098					Lilliefors Test Statistic	0.418	Lilliefors GOF Test					
1099					5% Lilliefors Critical Value	0.222	Data Not Normal at 5% Significance Level					
1100					Data Not Normal at 5% Significance Level							
1101												
1102					Assuming Normal Distribution							
1103				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
1104					95% Student's-t UCL	38.76					95% Adjusted-CLT UCL (Chen-1995)	42.43
1105											95% Modified-t UCL (Johnson-1978)	39.43
1106												
1107					Gamma GOF Test							
1108					A-D Test Statistic	2.726	Anderson-Darling Gamma GOF Test					
1109					5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level					
1110					K-S Test Statistic	0.38	Kolmogrov-Smirnoff Gamma GOF Test					
1111					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
1112					Data Not Gamma Distributed at 5% Significance Level							
1113												
1114					Gamma Statistics							
1115					k hat (MLE)	1.094					k star (bias corrected MLE)	0.93
1116					Theta hat (MLE)	25.59					Theta star (bias corrected MLE)	30.09
1117					nu hat (MLE)	35					nu star (bias corrected)	29.77
1118					MLE Mean (bias corrected)	27.99					MLE Sd (bias corrected)	29.02
1119											Approximate Chi Square Value (0.05)	18.31
1120					Adjusted Level of Significance	0.0335					Adjusted Chi Square Value	17.29
1121												
1122					Assuming Gamma Distribution							
1123					95% Approximate Gamma UCL (use when n>=50))	45.5					95% Adjusted Gamma UCL (use when n<50)	48.18
1124												
1125					Lognormal GOF Test							
1126					Shapiro Wilk Test Statistic	0.657	Shapiro Wilk Lognormal GOF Test					
1127					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
1128					Lilliefors Test Statistic	0.417	Lilliefors Lognormal GOF Test					
1129					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
1130					Data Not Lognormal at 5% Significance Level							
1131												
1132					Lognormal Statistics							
1133					Minimum of Logged Data	-0.543					Mean of logged Data	2.809
1134					Maximum of Logged Data	4.71					SD of logged Data	1.393
1135												
1136					Assuming Lognormal Distribution							
1137					95% H-UCL	146.3					90% Chebyshev (MVUE) UCL	86.67
1138					95% Chebyshev (MVUE) UCL	108.1					97.5% Chebyshev (MVUE) UCL	137.7
1139					99% Chebyshev (MVUE) UCL	196						
1140												
1141					Nonparametric Distribution Free UCL Statistics							
1142					Data do not follow a Discernible Distribution (0.05)							
1143												
1144					Nonparametric Distribution Free UCLs							

	A	B	C	D	E	F	G	H	I	J	K	L
1145					95% CLT UCL	38.09					95% Jackknife UCL	38.76
1146					95% Standard Bootstrap UCL	37.91					95% Bootstrap-t UCL	44.45
1147					95% Hall's Bootstrap UCL	85.77					95% Percentile Bootstrap UCL	38.34
1148					95% BCA Bootstrap UCL	43.46						
1149					90% Chebyshev(Mean, Sd) UCL	46.42					95% Chebyshev(Mean, Sd) UCL	54.76
1150					97.5% Chebyshev(Mean, Sd) UCL	66.35					99% Chebyshev(Mean, Sd) UCL	89.1
1151												
1152					**Suggested UCL to Use**							
1153					95% Chebyshev (Mean, Sd) UCL	54.76						
1154												
1155	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1156	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1157	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1158	For additional insight the user may want to consult a statistician.											
1159												
1160												
1161	**Uranium**											
1162												
1163					**General Statistics**							
1164					Total Number of Observations	16					Number of Distinct Observations	14
1165											Number of Missing Observations	0
1166					Minimum	10					Mean	680.4
1167					Maximum	3100					Median	258.5
1168					SD	836.6					Std. Error of Mean	209.2
1169					Coefficient of Variation	1.23					Skewness	1.763
1170												
1171					**Normal GOF Test**							
1172					Shapiro Wilk Test Statistic	0.782			**Shapiro Wilk GOF Test**			
1173					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
1174					Lilliefors Test Statistic	0.241			**Lilliefors GOF Test**			
1175					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
1176					**Data Not Normal at 5% Significance Level**							
1177												
1178					**Assuming Normal Distribution**							
1179					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
1180					95% Student's-t UCL	1047			95% Adjusted-CLT UCL (Chen-1995)			1123
1181									95% Modified-t UCL (Johnson-1978)			1062
1182												
1183					**Gamma GOF Test**							
1184					A-D Test Statistic	0.405			**Anderson-Darling Gamma GOF Test**			
1185					5% A-D Critical Value	0.79			Detected data appear Gamma Distributed at 5% Significance Level			
1186					K-S Test Statistic	0.146			**Kolmogrov-Smirnoff Gamma GOF Test**			
1187					5% K-S Critical Value	0.226			Detected data appear Gamma Distributed at 5% Significance Level			
1188					**Detected data appear Gamma Distributed at 5% Significance Level**							
1189												
1190					**Gamma Statistics**							
1191					k hat (MLE)	0.577			k star (bias corrected MLE)			0.51
1192					Theta hat (MLE)	1179			Theta star (bias corrected MLE)			1333
1193					nu hat (MLE)	18.46			nu star (bias corrected)			16.34
1194					MLE Mean (bias corrected)	680.4			MLE Sd (bias corrected)			952.3
1195									Approximate Chi Square Value (0.05)			8.199
1196					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			7.55

	A	B	C	D	E	F	G	H	I	J	K	L
1197												
1198						Assuming Gamma Distribution						
1199					95% Approximate Gamma UCL (use when n>=50)	1356				95% Adjusted Gamma UCL (use when n<50)		1472
1200												
1201						Lognormal GOF Test						
1202					Shapiro Wilk Test Statistic	0.896				Shapiro Wilk Lognormal GOF Test		
1203					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
1204					Lilliefors Test Statistic	0.156				Lilliefors Lognormal GOF Test		
1205					5% Lilliefors Critical Value	0.222				Data appear Lognormal at 5% Significance Level		
1206						Data appear Lognormal at 5% Significance Level						
1207												
1208						Lognormal Statistics						
1209					Minimum of Logged Data	2.303				Mean of logged Data		5.446
1210					Maximum of Logged Data	8.039				SD of logged Data		1.879
1211												
1212						Assuming Lognormal Distribution						
1213					95% H-UCL	10600				90% Chebyshev (MVUE) UCL		2814
1214					95% Chebyshev (MVUE) UCL	3607				97.5% Chebyshev (MVUE) UCL		4709
1215					99% Chebyshev (MVUE) UCL	6872						
1216												
1217						Nonparametric Distribution Free UCL Statistics						
1218						Data appear to follow a Discernible Distribution at 5% Significance Level						
1219												
1220						Nonparametric Distribution Free UCLs						
1221					95% CLT UCL	1024				95% Jackknife UCL		1047
1222					95% Standard Bootstrap UCL	1010				95% Bootstrap-t UCL		1236
1223					95% Hall's Bootstrap UCL	1279				95% Percentile Bootstrap UCL		1053
1224					95% BCA Bootstrap UCL	1143						
1225					90% Chebyshev(Mean, Sd) UCL	1308				95% Chebyshev(Mean, Sd) UCL		1592
1226					97.5% Chebyshev(Mean, Sd) UCL	1987				99% Chebyshev(Mean, Sd) UCL		2761
1227												
1228						Suggested UCL to Use						
1229					95% Adjusted Gamma UCL	1472						
1230												
1231						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
1232						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
1233						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
1234						For additional insight the user may want to consult a statistician.						
1235												
1236												
1237	Uranium-234											
1238												
1239						General Statistics						
1240					Total Number of Observations	16				Number of Distinct Observations		7
1241										Number of Missing Observations		0
1242					Minimum	3.1				Mean		109
1243					Maximum	437				Median		109
1244					SD	97.7				Std. Error of Mean		24.43
1245					Coefficient of Variation	0.897				Skewness		2.6
1246												
1247						Normal GOF Test						
1248					Shapiro Wilk Test Statistic	0.622				Shapiro Wilk GOF Test		

	A	B	C	D	E	F	G	H	I	J	K	L
1249					5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level					
1250					Lilliefors Test Statistic	0.375	**Lilliefors GOF Test**					
1251					5% Lilliefors Critical Value	0.222	Data Not Normal at 5% Significance Level					
1252	**Data Not Normal at 5% Significance Level**											
1253												
1254	**Assuming Normal Distribution**											
1255	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1256					95% Student's-t UCL	151.8	95% Adjusted-CLT UCL (Chen-1995)					166.1
1257							95% Modified-t UCL (Johnson-1978)					154.4
1258												
1259	**Gamma GOF Test**											
1260					A-D Test Statistic	2.266	**Anderson-Darling Gamma GOF Test**					
1261					5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level					
1262					K-S Test Statistic	0.378	**Kolmogrov-Smirnoff Gamma GOF Test**					
1263					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
1264	**Data Not Gamma Distributed at 5% Significance Level**											
1265												
1266	**Gamma Statistics**											
1267					k hat (MLE)	1.065	k star (bias corrected MLE)					0.907
1268					Theta hat (MLE)	102.3	Theta star (bias corrected MLE)					120.1
1269					nu hat (MLE)	34.09	nu star (bias corrected)					29.04
1270					MLE Mean (bias corrected)	109	MLE Sd (bias corrected)					114.4
1271							Approximate Chi Square Value (0.05)					17.74
1272					Adjusted Level of Significance	0.0335	Adjusted Chi Square Value					16.74
1273												
1274	**Assuming Gamma Distribution**											
1275					95% Approximate Gamma UCL (use when n>=50))	178.4	95% Adjusted Gamma UCL (use when n<50)					189
1276												
1277	**Lognormal GOF Test**											
1278					Shapiro Wilk Test Statistic	0.687	**Shapiro Wilk Lognormal GOF Test**					
1279					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
1280					Lilliefors Test Statistic	0.399	**Lilliefors Lognormal GOF Test**					
1281					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
1282	**Data Not Lognormal at 5% Significance Level**											
1283												
1284	**Lognormal Statistics**											
1285					Minimum of Logged Data	1.131	Mean of logged Data					4.153
1286					Maximum of Logged Data	6.08	SD of logged Data					1.403
1287												
1288	**Assuming Lognormal Distribution**											
1289					95% H-UCL	577	90% Chebyshev (MVUE) UCL					337.6
1290					95% Chebyshev (MVUE) UCL	421.2	97.5% Chebyshev (MVUE) UCL					537.2
1291					99% Chebyshev (MVUE) UCL	765						
1292												
1293	**Nonparametric Distribution Free UCL Statistics**											
1294	**Data do not follow a Discernible Distribution (0.05)**											
1295												
1296	**Nonparametric Distribution Free UCLs**											
1297					95% CLT UCL	149.1	95% Jackknife UCL					151.8
1298					95% Standard Bootstrap UCL	148.1	95% Bootstrap-t UCL					173
1299					95% Hall's Bootstrap UCL	339.6	95% Percentile Bootstrap UCL					152.5
1300					95% BCA Bootstrap UCL	171.4						

	A	B	C	D	E	F	G	H	I	J	K	L
1301				90% Chebyshev(Mean, Sd) UCL		182.2				95% Chebyshev(Mean, Sd) UCL		215.4
1302				97.5% Chebyshev(Mean, Sd) UCL		261.5				99% Chebyshev(Mean, Sd) UCL		352
1303												
1304						**Suggested UCL to Use**						
1305				95% Chebyshev (Mean, Sd) UCL		215.4						
1306												
1307					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1308					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1309					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1310					For additional insight the user may want to consult a statistician.							
1311												
1312												
1313	**Uranium-235**											
1314												
1315						**General Statistics**						
1316					Total Number of Observations	16				Number of Distinct Observations		7
1317										Number of Missing Observations		0
1318					Minimum	0.2				Mean		7.287
1319					Maximum	31.9				Median		7.287
1320					SD	7.216				Std. Error of Mean		1.804
1321					Coefficient of Variation	0.99				Skewness		2.788
1322												
1323						**Normal GOF Test**						
1324					Shapiro Wilk Test Statistic	0.595				**Shapiro Wilk GOF Test**		
1325					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1326					Lilliefors Test Statistic	0.375				**Lilliefors GOF Test**		
1327					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1328						**Data Not Normal at 5% Significance Level**						
1329												
1330						**Assuming Normal Distribution**						
1331					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1332					95% Student's-t UCL	10.45				95% Adjusted-CLT UCL (Chen-1995)		11.6
1333										95% Modified-t UCL (Johnson-1978)		10.66
1334												
1335						**Gamma GOF Test**						
1336					A-D Test Statistic	2.083				**Anderson-Darling Gamma GOF Test**		
1337					5% A-D Critical Value	0.764				Data Not Gamma Distributed at 5% Significance Level		
1338					K-S Test Statistic	0.383				**Kolmogrov-Smirnoff Gamma GOF Test**		
1339					5% K-S Critical Value	0.221				Data Not Gamma Distributed at 5% Significance Level		
1340						**Data Not Gamma Distributed at 5% Significance Level**						
1341												
1342						**Gamma Statistics**						
1343					k hat (MLE)	0.992				k star (bias corrected MLE)		0.848
1344					Theta hat (MLE)	7.343				Theta star (bias corrected MLE)		8.594
1345					nu hat (MLE)	31.76				nu star (bias corrected)		27.13
1346					MLE Mean (bias corrected)	7.287				MLE Sd (bias corrected)		7.914
1347										Approximate Chi Square Value (0.05)		16.26
1348					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		15.3
1349												
1350						**Assuming Gamma Distribution**						
1351					95% Approximate Gamma UCL (use when n>=50))	12.16				95% Adjusted Gamma UCL (use when n<50)		12.92
1352												

	A	B	C	D	E	F	G	H	I	J	K	L
1353					Lognormal GOF Test							
1354				Shapiro Wilk Test Statistic		0.721	Shapiro Wilk Lognormal GOF Test					
1355				5% Shapiro Wilk Critical Value		0.887	Data Not Lognormal at 5% Significance Level					
1356				Lilliefors Test Statistic		0.409	Lilliefors Lognormal GOF Test					
1357				5% Lilliefors Critical Value		0.222	Data Not Lognormal at 5% Significance Level					
1358					Data Not Lognormal at 5% Significance Level							
1359												
1360					Lognormal Statistics							
1361				Minimum of Logged Data		-1.609	Mean of logged Data					1.404
1362				Maximum of Logged Data		3.463	SD of logged Data					1.424
1363												
1364					Assuming Lognormal Distribution							
1365				95% H-UCL		39.24	90% Chebyshev (MVUE) UCL					22.35
1366				95% Chebyshev (MVUE) UCL		27.92	97.5% Chebyshev (MVUE) UCL					35.66
1367				99% Chebyshev (MVUE) UCL		50.86						
1368												
1369					Nonparametric Distribution Free UCL Statistics							
1370					Data do not follow a Discernible Distribution (0.05)							
1371												
1372					Nonparametric Distribution Free UCLs							
1373				95% CLT UCL		10.25	95% Jackknife UCL					10.45
1374				95% Standard Bootstrap UCL		10.17	95% Bootstrap-t UCL					12.31
1375				95% Hall's Bootstrap UCL		23.56	95% Percentile Bootstrap UCL					10.46
1376				95% BCA Bootstrap UCL		12.15						
1377				90% Chebyshev(Mean, Sd) UCL		12.7	95% Chebyshev(Mean, Sd) UCL					15.15
1378				97.5% Chebyshev(Mean, Sd) UCL		18.55	99% Chebyshev(Mean, Sd) UCL					25.24
1379												
1380					Suggested UCL to Use							
1381				95% Chebyshev (Mean, Sd) UCL		15.15						
1382												
1383					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1384					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1385					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1386					For additional insight the user may want to consult a statistician.							
1387												
1388												
1389	Uranium-238											
1390												
1391					General Statistics							
1392				Total Number of Observations		16	Number of Distinct Observations					7
1393							Number of Missing Observations					0
1394				Minimum		3.93	Mean					260.2
1395				Maximum		1040	Median					260.2
1396				SD		236.9	Std. Error of Mean					59.22
1397				Coefficient of Variation		0.91	Skewness					2.431
1398												
1399					Normal GOF Test							
1400				Shapiro Wilk Test Statistic		0.657	Shapiro Wilk GOF Test					
1401				5% Shapiro Wilk Critical Value		0.887	Data Not Normal at 5% Significance Level					
1402				Lilliefors Test Statistic		0.375	Lilliefors GOF Test					
1403				5% Lilliefors Critical Value		0.222	Data Not Normal at 5% Significance Level					
1404					Data Not Normal at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
1405												
1406						Assuming Normal Distribution						
1407				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
1408					95% Student's-t UCL	364				95% Adjusted-CLT UCL (Chen-1995)		396.1
1409										95% Modified-t UCL (Johnson-1978)		370
1410												
1411						Gamma GOF Test						
1412					A-D Test Statistic	2.132			Anderson-Darling Gamma GOF Test			
1413					5% A-D Critical Value	0.768			Data Not Gamma Distributed at 5% Significance Level			
1414					K-S Test Statistic	0.389			Kolmogrov-Smirnoff Gamma GOF Test			
1415					5% K-S Critical Value	0.222			Data Not Gamma Distributed at 5% Significance Level			
1416						Data Not Gamma Distributed at 5% Significance Level						
1417												
1418						Gamma Statistics						
1419					k hat (MLE)	0.899			k star (bias corrected MLE)			0.772
1420					Theta hat (MLE)	289.4			Theta star (bias corrected MLE)			337
1421					nu hat (MLE)	28.77			nu star (bias corrected)			24.71
1422					MLE Mean (bias corrected)	260.2			MLE Sd (bias corrected)			296.1
1423									Approximate Chi Square Value (0.05)			14.39
1424					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			13.5
1425												
1426						Assuming Gamma Distribution						
1427					95% Approximate Gamma UCL (use when n>=50))	446.8			95% Adjusted Gamma UCL (use when n<50)			476.3
1428												
1429						Lognormal GOF Test						
1430					Shapiro Wilk Test Statistic	0.693			Shapiro Wilk Lognormal GOF Test			
1431					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
1432					Lilliefors Test Statistic	0.406			Lilliefors Lognormal GOF Test			
1433					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
1434						Data Not Lognormal at 5% Significance Level						
1435												
1436						Lognormal Statistics						
1437					Minimum of Logged Data	1.369			Mean of logged Data			4.911
1438					Maximum of Logged Data	6.947			SD of logged Data			1.623
1439												
1440						Assuming Lognormal Distribution						
1441					95% H-UCL	2460			90% Chebyshev (MVUE) UCL			1044
1442					95% Chebyshev (MVUE) UCL	1321			97.5% Chebyshev (MVUE) UCL			1706
1443					99% Chebyshev (MVUE) UCL	2462						
1444												
1445						Nonparametric Distribution Free UCL Statistics						
1446						Data do not follow a Discernible Distribution (0.05)						
1447												
1448						Nonparametric Distribution Free UCLs						
1449					95% CLT UCL	357.6			95% Jackknife UCL			364
1450					95% Standard Bootstrap UCL	352.9			95% Bootstrap-t UCL			427.7
1451					95% Hall's Bootstrap UCL	844.9			95% Percentile Bootstrap UCL			365
1452					95% BCA Bootstrap UCL	398.8						
1453					90% Chebyshev(Mean, Sd) UCL	437.9			95% Chebyshev(Mean, Sd) UCL			518.3
1454					97.5% Chebyshev(Mean, Sd) UCL	630			99% Chebyshev(Mean, Sd) UCL			849.4
1455												
1456						Suggested UCL to Use						

	A	B	C	D	E	F	G	H	I	J	K	L
1457				99% Chebyshev (Mean, Sd) UCL		849.4						
1458												
1459	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1460	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1461	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1462	For additional insight the user may want to consult a statistician.											
1463												
1464												
1465	**Vanadium**											
1466												
1467	**General Statistics**											
1468				Total Number of Observations		16				Number of Distinct Observations		14
1469										Number of Missing Observations		0
1470				Minimum		98				Mean		134.6
1471				Maximum		161				Median		138
1472				SD		16.51				Std. Error of Mean		4.128
1473				Coefficient of Variation		0.123				Skewness		-0.783
1474												
1475	**Normal GOF Test**											
1476				Shapiro Wilk Test Statistic		0.947				**Shapiro Wilk GOF Test**		
1477				5% Shapiro Wilk Critical Value		0.887				Data appear Normal at 5% Significance Level		
1478				Lilliefors Test Statistic		0.163				**Lilliefors GOF Test**		
1479				5% Lilliefors Critical Value		0.222				Data appear Normal at 5% Significance Level		
1480	**Data appear Normal at 5% Significance Level**											
1481												
1482	**Assuming Normal Distribution**											
1483				**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**		
1484				95% Student's-t UCL		141.9				95% Adjusted-CLT UCL (Chen-1995)		140.6
1485										95% Modified-t UCL (Johnson-1978)		141.7
1486												
1487	**Gamma GOF Test**											
1488				A-D Test Statistic		0.52				**Anderson-Darling Gamma GOF Test**		
1489				5% A-D Critical Value		0.736				Detected data appear Gamma Distributed at 5% Significance Level		
1490				K-S Test Statistic		0.179				**Kolmogrov-Smirnoff Gamma GOF Test**		
1491				5% K-S Critical Value		0.214				Detected data appear Gamma Distributed at 5% Significance Level		
1492	**Detected data appear Gamma Distributed at 5% Significance Level**											
1493												
1494	**Gamma Statistics**											
1495				k hat (MLE)		65.74				k star (bias corrected MLE)		53.46
1496				Theta hat (MLE)		2.048				Theta star (bias corrected MLE)		2.518
1497				nu hat (MLE)		2104				nu star (bias corrected)		1711
1498				MLE Mean (bias corrected)		134.6				MLE Sd (bias corrected)		18.41
1499										Approximate Chi Square Value (0.05)		1616
1500				Adjusted Level of Significance		0.0335				Adjusted Chi Square Value		1605
1501												
1502	**Assuming Gamma Distribution**											
1503				95% Approximate Gamma UCL (use when n>=50))		142.5				95% Adjusted Gamma UCL (use when n<50)		143.5
1504												
1505	**Lognormal GOF Test**											
1506				Shapiro Wilk Test Statistic		0.915				**Shapiro Wilk Lognormal GOF Test**		
1507				5% Shapiro Wilk Critical Value		0.887				Data appear Lognormal at 5% Significance Level		
1508				Lilliefors Test Statistic		0.19				**Lilliefors Lognormal GOF Test**		

	A	B	C	D	E	F	G	H	I	J	K	L
1509					5% Lilliefors Critical Value	0.222	Data appear Lognormal at 5% Significance Level					
1510	**Data appear Lognormal at 5% Significance Level**											
1511												
1512	**Lognormal Statistics**											
1513					Minimum of Logged Data	4.585				Mean of logged Data		4.895
1514					Maximum of Logged Data	5.081				SD of logged Data		0.13
1515												
1516	**Assuming Lognormal Distribution**											
1517					95% H-UCL	142.9				90% Chebyshev (MVUE) UCL		147.9
1518					95% Chebyshev (MVUE) UCL	153.8				97.5% Chebyshev (MVUE) UCL		162.1
1519					99% Chebyshev (MVUE) UCL	178.4						
1520												
1521	**Nonparametric Distribution Free UCL Statistics**											
1522	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1523												
1524	**Nonparametric Distribution Free UCLs**											
1525					95% CLT UCL	141.4				95% Jackknife UCL		141.9
1526					95% Standard Bootstrap UCL	141.3				95% Bootstrap-t UCL		140.9
1527					95% Hall's Bootstrap UCL	140.9				95% Percentile Bootstrap UCL		141
1528					95% BCA Bootstrap UCL	140.2						
1529					90% Chebyshev(Mean, Sd) UCL	147				95% Chebyshev(Mean, Sd) UCL		152.6
1530					97.5% Chebyshev(Mean, Sd) UCL	160.4				99% Chebyshev(Mean, Sd) UCL		175.7
1531												
1532	**Suggested UCL to Use**											
1533					95% Student's-t UCL	141.9						
1534												
1535	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1536	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1537	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1538	For additional insight the user may want to consult a statistician.											
1539												
1540	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1541	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1542												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/10/2015 11:17:32 AM								
5	From File			EPC_080SubR2.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Antimony											
12												
13	General Statistics											
14	Total Number of Observations					12	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					0.16	Mean					32.12
17	Maximum					96.01	Median					32.12
18	SD					23.59	Std. Error of Mean					6.81
19	Coefficient of Variation					0.734	Skewness					1.625
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.65	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.417	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					44.35	95% Adjusted-CLT UCL (Chen-1995)					46.74
31							95% Modified-t UCL (Johnson-1978)					44.89
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.634	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.765	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.483	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.255	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.771	k star (bias corrected MLE)					0.634
42	Theta hat (MLE)					41.68	Theta star (bias corrected MLE)					50.7
43	nu hat (MLE)					18.5	nu star (bias corrected)					15.21
44	MLE Mean (bias corrected)					32.12	MLE Sd (bias corrected)					40.36
45							Approximate Chi Square Value (0.05)					7.405
46	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					6.591
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					65.96	95% Adjusted Gamma UCL (use when n<50)					74.11
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.562	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.859		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.478		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.256		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	-1.833				Mean of logged Data		2.696
60					Maximum of Logged Data	4.564				SD of logged Data		2.087
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	3349				90% Chebyshev (MVUE) UCL		255.3
64					95% Chebyshev (MVUE) UCL	331.6				97.5% Chebyshev (MVUE) UCL		437.7
65					99% Chebyshev (MVUE) UCL	645.9						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	43.33				95% Jackknife UCL		44.35
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	52.55				95% Chebyshev(Mean, Sd) UCL		61.81
76					97.5% Chebyshev(Mean, Sd) UCL	74.65				99% Chebyshev(Mean, Sd) UCL		99.89
77												
78					**Suggested UCL to Use**							
79					99% Chebyshev (Mean, Sd) UCL	99.89						
80												
81					**Recommended UCL exceeds the maximum observation**							
82												
83					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
84					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
85					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
86					For additional insight the user may want to consult a statistician.							
87												
88												
89	**Arsenic**											
90												
91					**General Statistics**							
92					Total Number of Observations	12				Number of Distinct Observations		3
93										Number of Missing Observations		0
94					Minimum	7.9				Mean		9.988
95					Maximum	11.95				Median		10
96					SD	0.864				Std. Error of Mean		0.249
97					Coefficient of Variation	0.0865				Skewness		-0.26
98												
99					**Normal GOF Test**							
100					Shapiro Wilk Test Statistic	0.599		**Shapiro Wilk GOF Test**				
101					5% Shapiro Wilk Critical Value	0.859		Data Not Normal at 5% Significance Level				
102					Lilliefors Test Statistic	0.422		**Lilliefors GOF Test**				
103					5% Lilliefors Critical Value	0.256		Data Not Normal at 5% Significance Level				
104					**Data Not Normal at 5% Significance Level**							

	A	B	C	D	E	F	G	H	I	J	K	L
105												
106	**Assuming Normal Distribution**											
107	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
108					95% Student's-t UCL	10.44				95% Adjusted-CLT UCL (Chen-1995)		10.38
109										95% Modified-t UCL (Johnson-1978)		10.43
110												
111	**Gamma GOF Test**											
112					A-D Test Statistic	2.729	**Anderson-Darling Gamma GOF Test**					
113					5% A-D Critical Value	0.731	Data Not Gamma Distributed at 5% Significance Level					
114					K-S Test Statistic	0.434	**Kolmogrov-Smirnoff Gamma GOF Test**					
115					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
116	**Data Not Gamma Distributed at 5% Significance Level**											
117												
118	**Gamma Statistics**											
119					k hat (MLE)	141.1				k star (bias corrected MLE)		105.9
120					Theta hat (MLE)	0.0708				Theta star (bias corrected MLE)		0.0943
121					nu hat (MLE)	3387				nu star (bias corrected)		2542
122					MLE Mean (bias corrected)	9.988				MLE Sd (bias corrected)		0.971
123										Approximate Chi Square Value (0.05)		2425
124					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		2408
125												
126	**Assuming Gamma Distribution**											
127					95% Approximate Gamma UCL (use when n>=50))	10.47				95% Adjusted Gamma UCL (use when n<50)		10.54
128												
129	**Lognormal GOF Test**											
130					Shapiro Wilk Test Statistic	0.59	**Shapiro Wilk Lognormal GOF Test**					
131					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
132					Lilliefors Test Statistic	0.438	**Lilliefors Lognormal GOF Test**					
133					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
134	**Data Not Lognormal at 5% Significance Level**											
135												
136	**Lognormal Statistics**											
137					Minimum of Logged Data	2.067				Mean of logged Data		2.298
138					Maximum of Logged Data	2.481				SD of logged Data		0.0889
139												
140	**Assuming Lognormal Distribution**											
141					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		10.76
142					95% Chebyshev (MVUE) UCL	11.11				97.5% Chebyshev (MVUE) UCL		11.59
143					99% Chebyshev (MVUE) UCL	12.54						
144												
145	**Nonparametric Distribution Free UCL Statistics**											
146	**Data do not follow a Discernible Distribution (0.05)**											
147												
148	**Nonparametric Distribution Free UCLs**											
149					95% CLT UCL	10.4				95% Jackknife UCL		10.44
150					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
151					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
152					95% BCA Bootstrap UCL	N/A						
153					90% Chebyshev(Mean, Sd) UCL	10.74				95% Chebyshev(Mean, Sd) UCL		11.07
154					97.5% Chebyshev(Mean, Sd) UCL	11.55				99% Chebyshev(Mean, Sd) UCL		12.47
155												
156	**Suggested UCL to Use**											

	A	B	C	D	E	F	G	H	I	J	K	L
157					95% Student's-t UCL	10.44				or 95% Modified-t UCL		10.43
158												
159	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
160	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
161	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
162	For additional insight the user may want to consult a statistician.											
163												
164	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
165	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
166												
167												
168	**Cadmium**											
169												
170	**General Statistics**											
171	Total Number of Observations					12	Number of Distinct Observations					4
172							Number of Missing Observations					0
173	Minimum					0.022	Mean					5.961
174	Maximum					17.69	Median					5.961
175	SD					4.331	Std. Error of Mean					1.25
176	Coefficient of Variation					0.727	Skewness					1.624
177												
178	**Normal GOF Test**											
179	Shapiro Wilk Test Statistic					0.652	**Shapiro Wilk GOF Test**					
180	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
181	Lilliefors Test Statistic					0.417	**Lilliefors GOF Test**					
182	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
183	**Data Not Normal at 5% Significance Level**											
184												
185	**Assuming Normal Distribution**											
186	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
187	95% Student's-t UCL					8.206	95% Adjusted-CLT UCL (Chen-1995)					8.644
188							95% Modified-t UCL (Johnson-1978)					8.304
189												
190	**Gamma GOF Test**											
191	A-D Test Statistic					2.438	**Anderson-Darling Gamma GOF Test**					
192	5% A-D Critical Value					0.761	Data Not Gamma Distributed at 5% Significance Level					
193	K-S Test Statistic					0.474	**Kolmogrov-Smirnoff Gamma GOF Test**					
194	5% K-S Critical Value					0.254	Data Not Gamma Distributed at 5% Significance Level					
195	**Data Not Gamma Distributed at 5% Significance Level**											
196												
197	**Gamma Statistics**											
198	k hat (MLE)					0.873	k star (bias corrected MLE)					0.71
199	Theta hat (MLE)					6.831	Theta star (bias corrected MLE)					8.396
200	nu hat (MLE)					20.94	nu star (bias corrected)					17.04
201	MLE Mean (bias corrected)					5.961	MLE Sd (bias corrected)					7.074
202							Approximate Chi Square Value (0.05)					8.7
203	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					7.807
204												
205	**Assuming Gamma Distribution**											
206	95% Approximate Gamma UCL (use when n>=50))					11.67	95% Adjusted Gamma UCL (use when n<50)					13.01
207												
208	**Lognormal GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
209					Shapiro Wilk Test Statistic	0.59	**Shapiro Wilk Lognormal GOF Test**					
210					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
211					Lilliefors Test Statistic	0.472	**Lilliefors Lognormal GOF Test**					
212					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
213					**Data Not Lognormal at 5% Significance Level**							
214												
215					**Lognormal Statistics**							
216					Minimum of Logged Data	-3.817	Mean of logged Data					1.113
217					Maximum of Logged Data	2.873	SD of logged Data					1.902
218												
219					**Assuming Lognormal Distribution**							
220					95% H-UCL	282.6	90% Chebyshev (MVUE) UCL					37.78
221					95% Chebyshev (MVUE) UCL	48.76	97.5% Chebyshev (MVUE) UCL					64.01
222					99% Chebyshev (MVUE) UCL	93.96						
223												
224					**Nonparametric Distribution Free UCL Statistics**							
225					**Data do not follow a Discernible Distribution (0.05)**							
226												
227					**Nonparametric Distribution Free UCLs**							
228					95% CLT UCL	8.017	95% Jackknife UCL					8.206
229					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
230					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
231					95% BCA Bootstrap UCL	N/A						
232					90% Chebyshev(Mean, Sd) UCL	9.712	95% Chebyshev(Mean, Sd) UCL					11.41
233					97.5% Chebyshev(Mean, Sd) UCL	13.77	99% Chebyshev(Mean, Sd) UCL					18.4
234												
235					**Suggested UCL to Use**							
236					99% Chebyshev (Mean, Sd) UCL	18.4						
237												
238					**Recommended UCL exceeds the maximum observation**							
239												
240					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
241					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
242					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
243					For additional insight the user may want to consult a statistician.							
244												
245												
246	**Iron**											
247												
248					**General Statistics**							
249					Total Number of Observations	12	Number of Distinct Observations					12
250							Number of Missing Observations					0
251					Minimum	15151	Mean					30702
252					Maximum	41269	Median					31620
253					SD	6528	Std. Error of Mean					1884
254					Coefficient of Variation	0.213	Skewness					-0.918
255												
256					**Normal GOF Test**							
257					Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**					
258					5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level					
259					Lilliefors Test Statistic	0.193	**Lilliefors GOF Test**					
260					5% Lilliefors Critical Value	0.256	Data appear Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
261	Data appear Normal at 5% Significance Level											
262												
263	Assuming Normal Distribution											
264	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
265					95% Student's-t UCL	34086			95% Adjusted-CLT UCL (Chen-1995)			33268
266									95% Modified-t UCL (Johnson-1978)			34003
267												
268	Gamma GOF Test											
269					A-D Test Statistic	0.594	Anderson-Darling Gamma GOF Test					
270					5% A-D Critical Value	0.732	Detected data appear Gamma Distributed at 5% Significance Level					
271					K-S Test Statistic	0.222	Kolmogrov-Smirnoff Gamma GOF Test					
272					5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level					
273	Detected data appear Gamma Distributed at 5% Significance Level											
274												
275	Gamma Statistics											
276					k hat (MLE)	19.7			k star (bias corrected MLE)			14.83
277					Theta hat (MLE)	1559			Theta star (bias corrected MLE)			2070
278					nu hat (MLE)	472.8			nu star (bias corrected)			355.9
279					MLE Mean (bias corrected)	30702			MLE Sd (bias corrected)			7973
280									Approximate Chi Square Value (0.05)			313.2
281					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			307.1
282												
283	Assuming Gamma Distribution											
284					95% Approximate Gamma UCL (use when n>=50))	34890			95% Adjusted Gamma UCL (use when n<50)			35585
285												
286	Lognormal GOF Test											
287					Shapiro Wilk Test Statistic	0.829	Shapiro Wilk Lognormal GOF Test					
288					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
289					Lilliefors Test Statistic	0.248	Lilliefors Lognormal GOF Test					
290					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
291	Data appear Approximate Lognormal at 5% Significance Level											
292												
293	Lognormal Statistics											
294					Minimum of Logged Data	9.626			Mean of logged Data			10.31
295					Maximum of Logged Data	10.63			SD of logged Data			0.251
296												
297	Assuming Lognormal Distribution											
298					95% H-UCL	35627			90% Chebyshev (MVUE) UCL			37551
299					95% Chebyshev (MVUE) UCL	40608			97.5% Chebyshev (MVUE) UCL			44850
300					99% Chebyshev (MVUE) UCL	53184						
301												
302	Nonparametric Distribution Free UCL Statistics											
303	Data appear to follow a Discernible Distribution at 5% Significance Level											
304												
305	Nonparametric Distribution Free UCLs											
306					95% CLT UCL	33802			95% Jackknife UCL			34086
307					95% Standard Bootstrap UCL	33606			95% Bootstrap-t UCL			33593
308					95% Hall's Bootstrap UCL	33617			95% Percentile Bootstrap UCL			33511
309					95% BCA Bootstrap UCL	33217						
310					90% Chebyshev(Mean, Sd) UCL	36356			95% Chebyshev(Mean, Sd) UCL			38916
311					97.5% Chebyshev(Mean, Sd) UCL	42470			99% Chebyshev(Mean, Sd) UCL			49452
312												

	A	B	C	D	E	F	G	H	I	J	K	L
313						**Suggested UCL to Use**						
314					95% Student's-t UCL	34086						
315												
316					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
317					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
318					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
319					For additional insight the user may want to consult a statistician.							
320												
321					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
322					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
323												
324												
325	**Manganese**											
326												
327						**General Statistics**						
328					Total Number of Observations	12	Number of Distinct Observations					12
329							Number of Missing Observations					0
330					Minimum	349.9	Mean					743.9
331					Maximum	2066	Median					521
332					SD	496.2	Std. Error of Mean					143.2
333					Coefficient of Variation	0.667	Skewness					1.944
334												
335						**Normal GOF Test**						
336					Shapiro Wilk Test Statistic	0.772	**Shapiro Wilk GOF Test**					
337					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
338					Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**					
339					5% Lilliefors Critical Value	0.256	Data appear Normal at 5% Significance Level					
340						**Data appear Approximate Normal at 5% Significance Level**						
341												
342						**Assuming Normal Distribution**						
343					**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**					
344					95% Student's-t UCL	1001	95% Adjusted-CLT UCL (Chen-1995)					1065
345							95% Modified-t UCL (Johnson-1978)					1015
346												
347						**Gamma GOF Test**						
348					A-D Test Statistic	0.609	**Anderson-Darling Gamma GOF Test**					
349					5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level					
350					K-S Test Statistic	0.24	**Kolmogrov-Smirnoff Gamma GOF Test**					
351					5% K-S Critical Value	0.247	Detected data appear Gamma Distributed at 5% Significance Level					
352						**Detected data appear Gamma Distributed at 5% Significance Level**						
353												
354						**Gamma Statistics**						
355					k hat (MLE)	3.38	k star (bias corrected MLE)					2.591
356					Theta hat (MLE)	220.1	Theta star (bias corrected MLE)					287.1
357					nu hat (MLE)	81.13	nu star (bias corrected)					62.18
358					MLE Mean (bias corrected)	743.9	MLE Sd (bias corrected)					462.2
359							Approximate Chi Square Value (0.05)					45.04
360					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					42.82
361												
362						**Assuming Gamma Distribution**						
363					95% Approximate Gamma UCL (use when n>=50))	1027	95% Adjusted Gamma UCL (use when n<50)					1080
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365						Lognormal GOF Test						
366					Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Lognormal GOF Test					
367					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
368					Lilliefors Test Statistic	0.214	Lilliefors Lognormal GOF Test					
369					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
370					Data appear Lognormal at 5% Significance Level							
371												
372					Lognormal Statistics							
373					Minimum of Logged Data	5.858				Mean of logged Data		6.457
374					Maximum of Logged Data	7.633				SD of logged Data		0.549
375												
376					Assuming Lognormal Distribution							
377					95% H-UCL	1067				90% Chebyshev (MVUE) UCL		1088
378					95% Chebyshev (MVUE) UCL	1250				97.5% Chebyshev (MVUE) UCL		1474
379					99% Chebyshev (MVUE) UCL	1915						
380												
381					Nonparametric Distribution Free UCL Statistics							
382					Data appear to follow a Discernible Distribution at 5% Significance Level							
383												
384					Nonparametric Distribution Free UCLs							
385					95% CLT UCL	979.5				95% Jackknife UCL		1001
386					95% Standard Bootstrap UCL	967				95% Bootstrap-t UCL		1183
387					95% Hall's Bootstrap UCL	1846				95% Percentile Bootstrap UCL		988.7
388					95% BCA Bootstrap UCL	1046						
389					90% Chebyshev(Mean, Sd) UCL	1174				95% Chebyshev(Mean, Sd) UCL		1368
390					97.5% Chebyshev(Mean, Sd) UCL	1638				99% Chebyshev(Mean, Sd) UCL		2169
391												
392					Suggested UCL to Use							
393					95% Student's-t UCL	1001						
394												
395					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
396					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
397					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
398					For additional insight the user may want to consult a statistician.							
399												
400												
401	Mercury											
402												
403					General Statistics							
404					Total Number of Observations	12				Number of Distinct Observations		4
405										Number of Missing Observations		0
406					Minimum	0.033				Mean		30.58
407					Maximum	40				Median		40
408					SD	17.13				Std. Error of Mean		4.944
409					Coefficient of Variation	0.56				Skewness		-1.363
410												
411					Normal GOF Test							
412					Shapiro Wilk Test Statistic	0.572	Shapiro Wilk GOF Test					
413					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
414					Lilliefors Test Statistic	0.459	Lilliefors GOF Test					
415					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
416					Data Not Normal at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
417												
418						Assuming Normal Distribution						
419				95% Normal UCL						95% UCLs (Adjusted for Skewness)		
420					95% Student's-t UCL	39.46				95% Adjusted-CLT UCL (Chen-1995)		36.63
421										95% Modified-t UCL (Johnson-1978)		39.13
422												
423						Gamma GOF Test						
424					A-D Test Statistic	3.016				Anderson-Darling Gamma GOF Test		
425					5% A-D Critical Value	0.778				Data Not Gamma Distributed at 5% Significance Level		
426					K-S Test Statistic	0.491				Kolmogrov-Smirnoff Gamma GOF Test		
427					5% K-S Critical Value	0.257				Data Not Gamma Distributed at 5% Significance Level		
428						Data Not Gamma Distributed at 5% Significance Level						
429												
430						Gamma Statistics						
431					k hat (MLE)	0.594				k star (bias corrected MLE)		0.501
432					Theta hat (MLE)	51.47				Theta star (bias corrected MLE)		61.01
433					nu hat (MLE)	14.26				nu star (bias corrected)		12.03
434					MLE Mean (bias corrected)	30.58				MLE Sd (bias corrected)		43.19
435										Approximate Chi Square Value (0.05)		5.246
436					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		4.581
437												
438						Assuming Gamma Distribution						
439					95% Approximate Gamma UCL (use when n>=50))	70.12				95% Adjusted Gamma UCL (use when n<50)		80.3
440												
441						Lognormal GOF Test						
442					Shapiro Wilk Test Statistic	0.542				Shapiro Wilk Lognormal GOF Test		
443					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
444					Lilliefors Test Statistic	0.436				Lilliefors Lognormal GOF Test		
445					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
446						Data Not Lognormal at 5% Significance Level						
447												
448						Lognormal Statistics						
449					Minimum of Logged Data	-3.411				Mean of logged Data		2.379
450					Maximum of Logged Data	3.689				SD of logged Data		2.696
451												
452						Assuming Lognormal Distribution						
453					95% H-UCL	81019				90% Chebyshev (MVUE) UCL		580.9
454					95% Chebyshev (MVUE) UCL	765.8				97.5% Chebyshev (MVUE) UCL		1022
455					99% Chebyshev (MVUE) UCL	1527						
456												
457						Nonparametric Distribution Free UCL Statistics						
458						Data do not follow a Discernible Distribution (0.05)						
459												
460						Nonparametric Distribution Free UCLs						
461					95% CLT UCL	38.71				95% Jackknife UCL		39.46
462					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
463					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
464					95% BCA Bootstrap UCL	N/A						
465					90% Chebyshev(Mean, Sd) UCL	45.41				95% Chebyshev(Mean, Sd) UCL		52.13
466					97.5% Chebyshev(Mean, Sd) UCL	61.45				99% Chebyshev(Mean, Sd) UCL		79.77
467												
468						Suggested UCL to Use						

	A	B	C	D	E	F	G	H	I	J	K	L
469					99% Chebyshev (Mean, Sd) UCL	79.77						
470												
471					**Recommended UCL exceeds the maximum observation**							
472												
473					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
474					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
475					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
476					For additional insight the user may want to consult a statistician.							
477												
478					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
479					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
480												
481												
482	**Molybdenum**											
483												
484					**General Statistics**							
485					Total Number of Observations	12			Number of Distinct Observations			7
486									Number of Missing Observations			0
487					Minimum	0.67			Mean			14.72
488					Maximum	46			Median			3
489					SD	16.55			Std. Error of Mean			4.778
490					Coefficient of Variation	1.124			Skewness			0.93
491												
492					**Normal GOF Test**							
493					Shapiro Wilk Test Statistic	0.772			**Shapiro Wilk GOF Test**			
494					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
495					Lilliefors Test Statistic	0.344			**Lilliefors GOF Test**			
496					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
497					**Data Not Normal at 5% Significance Level**							
498												
499					**Assuming Normal Distribution**							
500					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
501					95% Student's-t UCL	23.3			95% Adjusted-CLT UCL (Chen-1995)			23.95
502									95% Modified-t UCL (Johnson-1978)			23.52
503												
504					**Gamma GOF Test**							
505					A-D Test Statistic	1.094			**Anderson-Darling Gamma GOF Test**			
506					5% A-D Critical Value	0.765			Data Not Gamma Distributed at 5% Significance Level			
507					K-S Test Statistic	0.343			**Kolmogrov-Smirnoff Gamma GOF Test**			
508					5% K-S Critical Value	0.255			Data Not Gamma Distributed at 5% Significance Level			
509					**Data Not Gamma Distributed at 5% Significance Level**							
510												
511					**Gamma Statistics**							
512					k hat (MLE)	0.78			k star (bias corrected MLE)			0.641
513					Theta hat (MLE)	18.87			Theta star (bias corrected MLE)			22.98
514					nu hat (MLE)	18.72			nu star (bias corrected)			15.38
515					MLE Mean (bias corrected)	14.72			MLE Sd (bias corrected)			18.39
516									Approximate Chi Square Value (0.05)			7.524
517					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			6.702
518												
519					**Assuming Gamma Distribution**							
520					95% Approximate Gamma UCL (use when n>=50))	30.09			95% Adjusted Gamma UCL (use when n<50)			33.78

	A	B	C	D	E	F	G	H	I	J	K	L
521												
522						Lognormal GOF Test						
523					Shapiro Wilk Test Statistic	0.848			Shapiro Wilk Lognormal GOF Test			
524					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
525					Lilliefors Test Statistic	0.309			Lilliefors Lognormal GOF Test			
526					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
527						Data Not Lognormal at 5% Significance Level						
528												
529						Lognormal Statistics						
530					Minimum of Logged Data	-0.4			Mean of logged Data			1.926
531					Maximum of Logged Data	3.829			SD of logged Data			1.379
532												
533						Assuming Lognormal Distribution						
534					95% H-UCL	80.88			90% Chebyshev (MVUE) UCL			35.93
535					95% Chebyshev (MVUE) UCL	45.14			97.5% Chebyshev (MVUE) UCL			57.93
536					99% Chebyshev (MVUE) UCL	83.05						
537												
538						Nonparametric Distribution Free UCL Statistics						
539						Data do not follow a Discernible Distribution (0.05)						
540												
541						Nonparametric Distribution Free UCLs						
542					95% CLT UCL	22.58			95% Jackknife UCL			23.3
543					95% Standard Bootstrap UCL	22.09			95% Bootstrap-t UCL			25.9
544					95% Hall's Bootstrap UCL	21.72			95% Percentile Bootstrap UCL			22.64
545					95% BCA Bootstrap UCL	22.97						
546					90% Chebyshev(Mean, Sd) UCL	29.06			95% Chebyshev(Mean, Sd) UCL			35.55
547					97.5% Chebyshev(Mean, Sd) UCL	44.56			99% Chebyshev(Mean, Sd) UCL			62.26
548												
549						Suggested UCL to Use						
550					95% Chebyshev (Mean, Sd) UCL	35.55						
551												
552						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
553						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
554						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
555						For additional insight the user may want to consult a statistician.						
556												
557												
558	PAH, Total											
559												
560						General Statistics						
561					Total Number of Observations	12			Number of Distinct Observations			3
562									Number of Missing Observations			0
563					Minimum	0.00495			Mean			0.292
564					Maximum	0.579			Median			0.292
565					SD	0.122			Std. Error of Mean			0.0354
566					Coefficient of Variation	0.419			Skewness			-1.65E-15
567												
568						Normal GOF Test						
569					Shapiro Wilk Test Statistic	0.6			Shapiro Wilk GOF Test			
570					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
571					Lilliefors Test Statistic	0.417			Lilliefors GOF Test			
572					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
573	Data Not Normal at 5% Significance Level											
574												
575	Assuming Normal Distribution											
576	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
577					95% Student's-t UCL	0.356			95% Adjusted-CLT UCL (Chen-1995)			0.35
578									95% Modified-t UCL (Johnson-1978)			0.356
579												
580	Gamma GOF Test											
581					A-D Test Statistic	3.231	Anderson-Darling Gamma GOF Test					
582					5% A-D Critical Value	0.742	Data Not Gamma Distributed at 5% Significance Level					
583					K-S Test Statistic	0.513	Kolmogrov-Smirnoff Gamma GOF Test					
584					5% K-S Critical Value	0.249	Data Not Gamma Distributed at 5% Significance Level					
585	Data Not Gamma Distributed at 5% Significance Level											
586												
587	Gamma Statistics											
588					k hat (MLE)	1.918			k star (bias corrected MLE)			1.494
589					Theta hat (MLE)	0.152			Theta star (bias corrected MLE)			0.196
590					nu hat (MLE)	46.03			nu star (bias corrected)			35.86
591					MLE Mean (bias corrected)	0.292			MLE Sd (bias corrected)			0.239
592									Approximate Chi Square Value (0.05)			23.15
593					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			21.61
594												
595	Assuming Gamma Distribution											
596				95% Approximate Gamma UCL (use when n>=50))		0.453			95% Adjusted Gamma UCL (use when n<50)			0.485
597												
598	Lognormal GOF Test											
599					Shapiro Wilk Test Statistic	0.421	Shapiro Wilk Lognormal GOF Test					
600					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
601					Lilliefors Test Statistic	0.509	Lilliefors Lognormal GOF Test					
602					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
603	Data Not Lognormal at 5% Significance Level											
604												
605	Lognormal Statistics											
606					Minimum of Logged Data	-5.308			Mean of logged Data			-1.513
607					Maximum of Logged Data	-0.546			SD of logged Data			1.211
608												
609	Assuming Lognormal Distribution											
610					95% H-UCL	1.538			90% Chebyshev (MVUE) UCL			0.894
611					95% Chebyshev (MVUE) UCL	1.11			97.5% Chebyshev (MVUE) UCL			1.409
612					99% Chebyshev (MVUE) UCL	1.996						
613												
614	Nonparametric Distribution Free UCL Statistics											
615	Data do not follow a Discernible Distribution (0.05)											
616												
617	Nonparametric Distribution Free UCLs											
618					95% CLT UCL	0.35			95% Jackknife UCL			0.356
619					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
620					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
621					95% BCA Bootstrap UCL	N/A						
622					90% Chebyshev(Mean, Sd) UCL	0.398			95% Chebyshev(Mean, Sd) UCL			0.446
623					97.5% Chebyshev(Mean, Sd) UCL	0.513			99% Chebyshev(Mean, Sd) UCL			0.644
624												

	A	B	C	D	E	F	G	H	I	J	K	L
625						**Suggested UCL to Use**						
626					95% Chebyshev (Mean, Sd) UCL	0.446						
627												
628					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
629					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
630					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
631					For additional insight the user may want to consult a statistician.							
632												
633					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
634					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
635												
636												
637	**PCB, Total**											
638												
639						**General Statistics**						
640					Total Number of Observations	12	Number of Distinct Observations					10
641							Number of Missing Observations					0
642					Minimum	0.019	Mean					46.65
643					Maximum	475	Median					5
644					SD	135.6	Std. Error of Mean					39.14
645					Coefficient of Variation	2.907	Skewness					3.403
646												
647						**Normal GOF Test**						
648					Shapiro Wilk Test Statistic	0.39	**Shapiro Wilk GOF Test**					
649					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
650					Lilliefors Test Statistic	0.44	**Lilliefors GOF Test**					
651					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
652						**Data Not Normal at 5% Significance Level**						
653												
654						**Assuming Normal Distribution**						
655					**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**					
656					95% Student's-t UCL	117	95% Adjusted-CLT UCL (Chen-1995)					152.1
657							95% Modified-t UCL (Johnson-1978)					123.4
658												
659						**Gamma GOF Test**						
660					A-D Test Statistic	0.883	**Anderson-Darling Gamma GOF Test**					
661					5% A-D Critical Value	0.862	Data Not Gamma Distributed at 5% Significance Level					
662					K-S Test Statistic	0.28	**Kolmogrov-Smirnoff Gamma GOF Test**					
663					5% K-S Critical Value	0.271	Data Not Gamma Distributed at 5% Significance Level					
664						**Data Not Gamma Distributed at 5% Significance Level**						
665												
666						**Gamma Statistics**						
667					k hat (MLE)	0.221	k star (bias corrected MLE)					0.221
668					Theta hat (MLE)	211.2	Theta star (bias corrected MLE)					210.9
669					nu hat (MLE)	5.302	nu star (bias corrected)					5.31
670					MLE Mean (bias corrected)	46.65	MLE Sd (bias corrected)					99.19
671							Approximate Chi Square Value (0.05)					1.298
672					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					1.023
673												
674						**Assuming Gamma Distribution**						
675					95% Approximate Gamma UCL (use when n>=50))	190.9	95% Adjusted Gamma UCL (use when n<50)					242.2
676												

	A	B	C	D	E	F	G	H	I	J	K	L
677						Lognormal GOF Test						
678					Shapiro Wilk Test Statistic	0.942	Shapiro Wilk Lognormal GOF Test					
679					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
680					Lilliefors Test Statistic	0.216	Lilliefors Lognormal GOF Test					
681					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
682						Data appear Lognormal at 5% Significance Level						
683												
684						Lognormal Statistics						
685					Minimum of Logged Data	-3.963				Mean of logged Data		0.563
686					Maximum of Logged Data	6.163				SD of logged Data		3.08
687												
688						Assuming Lognormal Distribution						
689					95% H-UCL	190007				90% Chebyshev (MVUE) UCL		202.5
690					95% Chebyshev (MVUE) UCL	268.4				97.5% Chebyshev (MVUE) UCL		359.8
691					99% Chebyshev (MVUE) UCL	539.5						
692												
693						Nonparametric Distribution Free UCL Statistics						
694						Data appear to follow a Discernible Distribution at 5% Significance Level						
695												
696						Nonparametric Distribution Free UCLs						
697					95% CLT UCL	111				95% Jackknife UCL		117
698					95% Standard Bootstrap UCL	109.4				95% Bootstrap-t UCL		1618
699					95% Hall's Bootstrap UCL	567.9				95% Percentile Bootstrap UCL		122.1
700					95% BCA Bootstrap UCL	166.1						
701					90% Chebyshev(Mean, Sd) UCL	164.1				95% Chebyshev(Mean, Sd) UCL		217.3
702					97.5% Chebyshev(Mean, Sd) UCL	291.1				99% Chebyshev(Mean, Sd) UCL		436.1
703												
704						Suggested UCL to Use						
705					95% Hall's Bootstrap UCL	567.9						
706												
707						Recommended UCL exceeds the maximum observation						
708												
709						In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL						
710												
711						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
712						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
713						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
714						For additional insight the user may want to consult a statistician.						
715												
716												
717	Uranium											
718												
719						General Statistics						
720					Total Number of Observations	12				Number of Distinct Observations		5
721										Number of Missing Observations		0
722					Minimum	4.5				Mean		25.69
723					Maximum	108				Median		10
724					SD	37.79				Std. Error of Mean		10.91
725					Coefficient of Variation	1.471				Skewness		2.048
726												
727						Normal GOF Test						
728					Shapiro Wilk Test Statistic	0.498	Shapiro Wilk GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
729					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
730					Lilliefors Test Statistic	0.487	**Lilliefors GOF Test**					
731					5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level					
732	**Data Not Normal at 5% Significance Level**											
733												
734	**Assuming Normal Distribution**											
735	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
736					95% Student's-t UCL	45.28	95% Adjusted-CLT UCL (Chen-1995)					50.52
737							95% Modified-t UCL (Johnson-1978)					46.35
738												
739	**Gamma GOF Test**											
740					A-D Test Statistic	2.856	**Anderson-Darling Gamma GOF Test**					
741					5% A-D Critical Value	0.758	Data Not Gamma Distributed at 5% Significance Level					
742					K-S Test Statistic	0.48	**Kolmogrov-Smirnoff Gamma GOF Test**					
743					5% K-S Critical Value	0.253	Data Not Gamma Distributed at 5% Significance Level					
744	**Data Not Gamma Distributed at 5% Significance Level**											
745												
746	**Gamma Statistics**											
747					k hat (MLE)	0.953	k star (bias corrected MLE)					0.77
748					Theta hat (MLE)	26.97	Theta star (bias corrected MLE)					33.37
749					nu hat (MLE)	22.86	nu star (bias corrected)					18.48
750					MLE Mean (bias corrected)	25.69	MLE Sd (bias corrected)					29.28
751							Approximate Chi Square Value (0.05)					9.738
752					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					8.784
753												
754	**Assuming Gamma Distribution**											
755					95% Approximate Gamma UCL (use when n>=50))	48.75	95% Adjusted Gamma UCL (use when n<50)					54.04
756												
757	**Lognormal GOF Test**											
758					Shapiro Wilk Test Statistic	0.615	**Shapiro Wilk Lognormal GOF Test**					
759					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
760					Lilliefors Test Statistic	0.437	**Lilliefors Lognormal GOF Test**					
761					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
762	**Data Not Lognormal at 5% Significance Level**											
763												
764	**Lognormal Statistics**											
765					Minimum of Logged Data	1.504	Mean of logged Data					2.637
766					Maximum of Logged Data	4.682	SD of logged Data					0.977
767												
768	**Assuming Lognormal Distribution**											
769					95% H-UCL	52.45	90% Chebyshev (MVUE) UCL					40.6
770					95% Chebyshev (MVUE) UCL	49.32	97.5% Chebyshev (MVUE) UCL					61.43
771					99% Chebyshev (MVUE) UCL	85.22						
772												
773	**Nonparametric Distribution Free UCL Statistics**											
774	**Data do not follow a Discernible Distribution (0.05)**											
775												
776	**Nonparametric Distribution Free UCLs**											
777					95% CLT UCL	43.63	95% Jackknife UCL					45.28
778					95% Standard Bootstrap UCL	42.36	95% Bootstrap-t UCL					399.8
779					95% Hall's Bootstrap UCL	624.4	95% Percentile Bootstrap UCL					42.43
780					95% BCA Bootstrap UCL	49.63						

	A	B	C	D	E	F	G	H	I	J	K	L
781					90% Chebyshev(Mean, Sd) UCL	58.41				95% Chebyshev(Mean, Sd) UCL		73.24
782					97.5% Chebyshev(Mean, Sd) UCL	93.81				99% Chebyshev(Mean, Sd) UCL		134.2
783												
784					Suggested UCL to Use							
785					95% Chebyshev (Mean, Sd) UCL	73.24						
786												
787	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
788	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
789	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
790	For additional insight the user may want to consult a statistician.											
791												
792												
793	Uranium-238											
794												
795					General Statistics							
796					Total Number of Observations	12				Number of Distinct Observations		3
797										Number of Missing Observations		0
798					Minimum	1.59				Mean		2.67
799					Maximum	3.75				Median		2.67
800					SD	0.461				Std. Error of Mean		0.133
801					Coefficient of Variation	0.172				Skewness		-2.73E-15
802												
803					Normal GOF Test							
804					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
805					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
806					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
807					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
808					Data Not Normal at 5% Significance Level							
809												
810					Assuming Normal Distribution							
811					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
812					95% Student's-t UCL	2.909				95% Adjusted-CLT UCL (Chen-1995)		2.889
813										95% Modified-t UCL (Johnson-1978)		2.909
814												
815					Gamma GOF Test							
816					A-D Test Statistic	2.741				Anderson-Darling Gamma GOF Test		
817					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
818					K-S Test Statistic	0.44				Kolmogrov-Smirnoff Gamma GOF Test		
819					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
820					Data Not Gamma Distributed at 5% Significance Level							
821												
822					Gamma Statistics							
823					k hat (MLE)	33.75				k star (bias corrected MLE)		25.37
824					Theta hat (MLE)	0.0791				Theta star (bias corrected MLE)		0.105
825					nu hat (MLE)	809.9				nu star (bias corrected)		608.8
826					MLE Mean (bias corrected)	2.67				MLE Sd (bias corrected)		0.53
827										Approximate Chi Square Value (0.05)		552.6
828					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		544.4
829												
830					Assuming Gamma Distribution							
831					95% Approximate Gamma UCL (use when n>=50))	2.942				95% Adjusted Gamma UCL (use when n<50)		2.986
832												

	A	B	C	D	E	F	G	H	I	J	K	L
833						Lognormal GOF Test						
834					Shapiro Wilk Test Statistic	0.579	Shapiro Wilk Lognormal GOF Test					
835					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
836					Lilliefors Test Statistic	0.449	Lilliefors Lognormal GOF Test					
837					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
838						Data Not Lognormal at 5% Significance Level						
839												
840						Lognormal Statistics						
841					Minimum of Logged Data	0.464				Mean of logged Data		0.967
842					Maximum of Logged Data	1.322				SD of logged Data		0.186
843												
844						Assuming Lognormal Distribution						
845					95% H-UCL	2.967				90% Chebyshev (MVUE) UCL		3.105
846					95% Chebyshev (MVUE) UCL	3.301				97.5% Chebyshev (MVUE) UCL		3.573
847					99% Chebyshev (MVUE) UCL	4.107						
848												
849						Nonparametric Distribution Free UCL Statistics						
850						Data do not follow a Discernible Distribution (0.05)						
851												
852						Nonparametric Distribution Free UCLs						
853					95% CLT UCL	2.889				95% Jackknife UCL		2.909
854					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
855					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
856					95% BCA Bootstrap UCL	N/A						
857					90% Chebyshev(Mean, Sd) UCL	3.069				95% Chebyshev(Mean, Sd) UCL		3.249
858					97.5% Chebyshev(Mean, Sd) UCL	3.5				99% Chebyshev(Mean, Sd) UCL		3.993
859												
860						Suggested UCL to Use						
861					95% Student's-t UCL	2.909				or 95% Modified-t UCL		2.909
862												
863						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
864						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
865						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
866						For additional insight the user may want to consult a statistician.						
867												
868						Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be						
869						reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.						
870												
871												
872	Vanadium											
873												
874						General Statistics						
875					Total Number of Observations	12				Number of Distinct Observations		11
876										Number of Missing Observations		0
877					Minimum	70				Mean		116.8
878					Maximum	138				Median		120
879					SD	19.13				Std. Error of Mean		5.521
880					Coefficient of Variation	0.164				Skewness		-1.394
881												
882						Normal GOF Test						
883					Shapiro Wilk Test Statistic	0.876	Shapiro Wilk GOF Test					
884					5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
885					Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**					
886					5% Lilliefors Critical Value	0.256	Data appear Normal at 5% Significance Level					
887	**Data appear Normal at 5% Significance Level**											
888												
889	**Assuming Normal Distribution**											
890	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
891					95% Student's-t UCL	126.7	95% Adjusted-CLT UCL (Chen-1995)					123.5
892							95% Modified-t UCL (Johnson-1978)					126.3
893												
894	**Gamma GOF Test**											
895					A-D Test Statistic	0.762	**Anderson-Darling Gamma GOF Test**					
896					5% A-D Critical Value	0.731	Data Not Gamma Distributed at 5% Significance Level					
897					K-S Test Statistic	0.258	**Kolmogrov-Smirnoff Gamma GOF Test**					
898					5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level					
899	**Data Not Gamma Distributed at 5% Significance Level**											
900												
901	**Gamma Statistics**											
902					k hat (MLE)	34.12	k star (bias corrected MLE)					25.65
903					Theta hat (MLE)	3.422	Theta star (bias corrected MLE)					4.552
904					nu hat (MLE)	818.9	nu star (bias corrected)					615.5
905					MLE Mean (bias corrected)	116.8	MLE Sd (bias corrected)					23.05
906							Approximate Chi Square Value (0.05)					559
907					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					550.7
908												
909	**Assuming Gamma Distribution**											
910					95% Approximate Gamma UCL (use when n>=50))	128.6	95% Adjusted Gamma UCL (use when n<50)					130.5
911												
912	**Lognormal GOF Test**											
913					Shapiro Wilk Test Statistic	0.81	**Shapiro Wilk Lognormal GOF Test**					
914					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
915					Lilliefors Test Statistic	0.268	**Lilliefors Lognormal GOF Test**					
916					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
917	**Data Not Lognormal at 5% Significance Level**											
918												
919	**Lognormal Statistics**											
920					Minimum of Logged Data	4.248	Mean of logged Data					4.745
921					Maximum of Logged Data	4.927	SD of logged Data					0.188
922												
923	**Assuming Lognormal Distribution**											
924					95% H-UCL	129.9	90% Chebyshev (MVUE) UCL					136
925					95% Chebyshev (MVUE) UCL	144.7	97.5% Chebyshev (MVUE) UCL					156.7
926					99% Chebyshev (MVUE) UCL	180.3						
927												
928	**Nonparametric Distribution Free UCL Statistics**											
929	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
930												
931	**Nonparametric Distribution Free UCLs**											
932					95% CLT UCL	125.8	95% Jackknife UCL					126.7
933					95% Standard Bootstrap UCL	125.4	95% Bootstrap-t UCL					125.1
934					95% Hall's Bootstrap UCL	123.9	95% Percentile Bootstrap UCL					124.8
935					95% BCA Bootstrap UCL	124						
936					90% Chebyshev(Mean, Sd) UCL	133.3	95% Chebyshev(Mean, Sd) UCL					140.8

	A	B	C	D	E	F	G	H	I	J	K	L
937				97.5% Chebyshev(Mean, Sd) UCL		151.2				99% Chebyshev(Mean, Sd) UCL		171.7
938												
939					**Suggested UCL to Use**							
940				95% Student's-t UCL		126.7						
941												
942	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
943	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
944	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
945	For additional insight the user may want to consult a statistician.											
946												
947	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
948	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
949												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/10/2015 11:12:12 AM								
5	From File			EPC_080SurfR2.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Chromium											
12												
13	General Statistics											
14	Total Number of Observations					12	Number of Distinct Observations					3
15							Number of Missing Observations					0
16	Minimum					12	Mean					14.31
17	Maximum					37.7	Median					12
18	SD					7.389	Std. Error of Mean					2.133
19	Coefficient of Variation					0.516	Skewness					3.428
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.362	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.456	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					18.14	95% Adjusted-CLT UCL (Chen-1995)					20.07
31							95% Modified-t UCL (Johnson-1978)					18.49
32												
33	Gamma GOF Test											
34	A-D Test Statistic					3.645	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.469	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.246	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					7.549	k star (bias corrected MLE)					5.717
42	Theta hat (MLE)					1.895	Theta star (bias corrected MLE)					2.503
43	nu hat (MLE)					181.2	nu star (bias corrected)					137.2
44	MLE Mean (bias corrected)					14.31	MLE Sd (bias corrected)					5.984
45							Approximate Chi Square Value (0.05)					111.2
46	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					107.6
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					17.66	95% Adjusted Gamma UCL (use when n<50)					18.25
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.385	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.859		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.462		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.256		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	2.485				Mean of logged Data		2.593
60					Maximum of Logged Data	3.63				SD of logged Data		0.329
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	17.14				90% Chebyshev (MVUE) UCL		18.1
64					95% Chebyshev (MVUE) UCL	19.94				97.5% Chebyshev (MVUE) UCL		22.49
65					99% Chebyshev (MVUE) UCL	27.49						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	17.82				95% Jackknife UCL		18.14
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	20.71				95% Chebyshev(Mean, Sd) UCL		23.61
76					97.5% Chebyshev(Mean, Sd) UCL	27.63				99% Chebyshev(Mean, Sd) UCL		35.53
77												
78					**Suggested UCL to Use**							
79					95% Student's-t UCL	18.14				or 95% Modified-t UCL		18.49
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	Iron											
88												
89					**General Statistics**							
90					Total Number of Observations	12				Number of Distinct Observations		12
91										Number of Missing Observations		0
92					Minimum	15151				Mean		27146
93					Maximum	41269				Median		26944
94					SD	6451				Std. Error of Mean		1862
95					Coefficient of Variation	0.238				Skewness		0.539
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.922		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.859		Data appear Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.254		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.256		Data appear Normal at 5% Significance Level				
102					**Data appear Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	30490				95% Adjusted-CLT UCL (Chen-1995)		30519
107										95% Modified-t UCL (Johnson-1978)		30539
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	0.523	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.732	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.223	**Kolmogrov-Smirnoff Gamma GOF Test**					
113					5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level					
114	**Detected data appear Gamma Distributed at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	19.01				k star (bias corrected MLE)		14.31
118					Theta hat (MLE)	1428				Theta star (bias corrected MLE)		1897
119					nu hat (MLE)	456.2				nu star (bias corrected)		343.5
120					MLE Mean (bias corrected)	27146				MLE Sd (bias corrected)		7176
121										Approximate Chi Square Value (0.05)		301.5
122					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		295.5
123												
124	**Assuming Gamma Distribution**											
125					95% Approximate Gamma UCL (use when n>=50))	30922				95% Adjusted Gamma UCL (use when n<50)		31550
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.216	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	9.626				Mean of logged Data		10.18
136					Maximum of Logged Data	10.63				SD of logged Data		0.245
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	31284				90% Chebyshev (MVUE) UCL		32958
140					95% Chebyshev (MVUE) UCL	35580				97.5% Chebyshev (MVUE) UCL		39220
141					99% Chebyshev (MVUE) UCL	46370						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	30209				95% Jackknife UCL		30490
148					95% Standard Bootstrap UCL	29972				95% Bootstrap-t UCL		30997
149					95% Hall's Bootstrap UCL	33436				95% Percentile Bootstrap UCL		30271
150					95% BCA Bootstrap UCL	30278						
151					90% Chebyshev(Mean, Sd) UCL	32733				95% Chebyshev(Mean, Sd) UCL		35263
152					97.5% Chebyshev(Mean, Sd) UCL	38776				99% Chebyshev(Mean, Sd) UCL		45676
153												
154	**Suggested UCL to Use**											
155					95% Student's-t UCL	30490						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Manganese**											
164												
165	**General Statistics**											
166	Total Number of Observations					12	Number of Distinct Observations					12
167							Number of Missing Observations					0
168	Minimum					198.4	Mean					641.7
169	Maximum					2066	Median					502.5
170	SD					480.3	Std. Error of Mean					138.7
171	Coefficient of Variation					0.749	Skewness					2.707
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.67	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.287	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.256	Data Not Normal at 5% Significance Level					
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					890.7	95% Adjusted-CLT UCL (Chen-1995)					985.6
183							95% Modified-t UCL (Johnson-1978)					908.8
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					0.736	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.739	Detected data appear Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.221	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.247	Detected data appear Gamma Distributed at 5% Significance Level					
190	**Detected data appear Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					3.141	k star (bias corrected MLE)					2.412
194	Theta hat (MLE)					204.3	Theta star (bias corrected MLE)					266.1
195	nu hat (MLE)					75.39	nu star (bias corrected)					57.88
196	MLE Mean (bias corrected)					641.7	MLE Sd (bias corrected)					413.2
197							Approximate Chi Square Value (0.05)					41.39
198	Adjusted Level of Significance					0.029	Adjusted Chi Square Value					39.27
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50)					897.4	95% Adjusted Gamma UCL (use when n<50)					945.8
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.92	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.859	Data appear Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.183	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.256	Data appear Lognormal at 5% Significance Level					
208	**Data appear Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	5.29				Mean of logged Data		6.297
212					Maximum of Logged Data	7.633				SD of logged Data		0.563
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	927.2				90% Chebyshev (MVUE) UCL		941
216					95% Chebyshev (MVUE) UCL	1083				97.5% Chebyshev (MVUE) UCL		1281
217					99% Chebyshev (MVUE) UCL	1669						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	869.8				95% Jackknife UCL		890.7
224					95% Standard Bootstrap UCL	858.1				95% Bootstrap-t UCL		1236
225					95% Hall's Bootstrap UCL	1817				95% Percentile Bootstrap UCL		882.1
226					95% BCA Bootstrap UCL	1016						
227					90% Chebyshev(Mean, Sd) UCL	1058				95% Chebyshev(Mean, Sd) UCL		1246
228					97.5% Chebyshev(Mean, Sd) UCL	1508				99% Chebyshev(Mean, Sd) UCL		2021
229												
230						Suggested UCL to Use						
231					95% Adjusted Gamma UCL	945.8						
232												
233					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
234					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
235					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
236					For additional insight the user may want to consult a statistician.							
237												
238												
239	Molybdenum											
240												
241						General Statistics						
242					Total Number of Observations	12				Number of Distinct Observations		4
243										Number of Missing Observations		0
244					Minimum	0.55				Mean		7.379
245					Maximum	46				Median		3
246					SD	12.68				Std. Error of Mean		3.661
247					Coefficient of Variation	1.718				Skewness		3.048
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.471				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.468				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
254						Data Not Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	13.95				95% Adjusted-CLT UCL (Chen-1995)		16.84
259										95% Modified-t UCL (Johnson-1978)		14.49
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	Gamma GOF Test											
262					A-D Test Statistic	2.376	Anderson-Darling Gamma GOF Test					
263					5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.469	Kolmogrov-Smirnoff Gamma GOF Test					
265					5% K-S Critical Value	0.254	Data Not Gamma Distributed at 5% Significance Level					
266	Data Not Gamma Distributed at 5% Significance Level											
267												
268	Gamma Statistics											
269					k hat (MLE)	0.864	k star (bias corrected MLE)					0.704
270					Theta hat (MLE)	8.537	Theta star (bias corrected MLE)					10.48
271					nu hat (MLE)	20.74	nu star (bias corrected)					16.89
272					MLE Mean (bias corrected)	7.379	MLE Sd (bias corrected)					8.796
273							Approximate Chi Square Value (0.05)					8.595
274					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					7.707
275												
276	Assuming Gamma Distribution											
277					95% Approximate Gamma UCL (use when n>=50))	14.5	95% Adjusted Gamma UCL (use when n<50)					16.17
278												
279	Lognormal GOF Test											
280					Shapiro Wilk Test Statistic	0.709	Shapiro Wilk Lognormal GOF Test					
281					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.416	Lilliefors Lognormal GOF Test					
283					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
284	Data Not Lognormal at 5% Significance Level											
285												
286	Lognormal Statistics											
287					Minimum of Logged Data	-0.598	Mean of logged Data					1.319
288					Maximum of Logged Data	3.829	SD of logged Data					1.059
289												
290	Assuming Lognormal Distribution											
291					95% H-UCL	17.2	90% Chebyshev (MVUE) UCL					12.18
292					95% Chebyshev (MVUE) UCL	14.92	97.5% Chebyshev (MVUE) UCL					18.72
293					99% Chebyshev (MVUE) UCL	26.19						
294												
295	Nonparametric Distribution Free UCL Statistics											
296	Data do not follow a Discernible Distribution (0.05)											
297												
298	Nonparametric Distribution Free UCLs											
299					95% CLT UCL	13.4	95% Jackknife UCL					13.95
300					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
301					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
302					95% BCA Bootstrap UCL	N/A						
303					90% Chebyshev(Mean, Sd) UCL	18.36	95% Chebyshev(Mean, Sd) UCL					23.34
304					97.5% Chebyshev(Mean, Sd) UCL	30.24	99% Chebyshev(Mean, Sd) UCL					43.8
305												
306	Suggested UCL to Use											
307					95% Chebyshev (Mean, Sd) UCL	23.34						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314												
315	PCB, Total											
316												
317	General Statistics											
318					Total Number of Observations	12			Number of Distinct Observations			10
319									Number of Missing Observations			0
320					Minimum	0.019			Mean			46.65
321					Maximum	475			Median			5
322					SD	135.6			Std. Error of Mean			39.14
323					Coefficient of Variation	2.907			Skewness			3.403
324												
325	Normal GOF Test											
326					Shapiro Wilk Test Statistic	0.39			Shapiro Wilk GOF Test			
327					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
328					Lilliefors Test Statistic	0.44			Lilliefors GOF Test			
329					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
330	Data Not Normal at 5% Significance Level											
331												
332	Assuming Normal Distribution											
333			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
334					95% Student's-t UCL	117			95% Adjusted-CLT UCL (Chen-1995)			152.1
335									95% Modified-t UCL (Johnson-1978)			123.4
336												
337	Gamma GOF Test											
338					A-D Test Statistic	0.883			Anderson-Darling Gamma GOF Test			
339					5% A-D Critical Value	0.862			Data Not Gamma Distributed at 5% Significance Level			
340					K-S Test Statistic	0.28			Kolmogrov-Smirnoff Gamma GOF Test			
341					5% K-S Critical Value	0.271			Data Not Gamma Distributed at 5% Significance Level			
342	Data Not Gamma Distributed at 5% Significance Level											
343												
344	Gamma Statistics											
345					k hat (MLE)	0.221			k star (bias corrected MLE)			0.221
346					Theta hat (MLE)	211.2			Theta star (bias corrected MLE)			210.9
347					nu hat (MLE)	5.302			nu star (bias corrected)			5.31
348					MLE Mean (bias corrected)	46.65			MLE Sd (bias corrected)			99.19
349									Approximate Chi Square Value (0.05)			1.298
350					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			1.023
351												
352	Assuming Gamma Distribution											
353					95% Approximate Gamma UCL (use when n>=50))	190.9			95% Adjusted Gamma UCL (use when n<50)			242.2
354												
355	Lognormal GOF Test											
356					Shapiro Wilk Test Statistic	0.942			Shapiro Wilk Lognormal GOF Test			
357					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
358					Lilliefors Test Statistic	0.216			Lilliefors Lognormal GOF Test			
359					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
360	Data appear Lognormal at 5% Significance Level											
361												
362	Lognormal Statistics											
363					Minimum of Logged Data	-3.963			Mean of logged Data			0.563
364					Maximum of Logged Data	6.163			SD of logged Data			3.08

	A	B	C	D	E	F	G	H	I	J	K	L
365												
366					Assuming Lognormal Distribution							
367					95% H-UCL	190007			90% Chebyshev (MVUE) UCL			202.5
368				95% Chebyshev (MVUE) UCL		268.4			97.5% Chebyshev (MVUE) UCL			359.8
369				99% Chebyshev (MVUE) UCL		539.5						
370												
371					Nonparametric Distribution Free UCL Statistics							
372					Data appear to follow a Discernible Distribution at 5% Significance Level							
373												
374					Nonparametric Distribution Free UCLs							
375					95% CLT UCL	111			95% Jackknife UCL			117
376				95% Standard Bootstrap UCL		108.2			95% Bootstrap-t UCL			1633
377				95% Hall's Bootstrap UCL		566			95% Percentile Bootstrap UCL			123.8
378				95% BCA Bootstrap UCL		164.9						
379				90% Chebyshev(Mean, Sd) UCL		164.1			95% Chebyshev(Mean, Sd) UCL			217.3
380				97.5% Chebyshev(Mean, Sd) UCL		291.1			99% Chebyshev(Mean, Sd) UCL			436.1
381												
382					Suggested UCL to Use							
383				95% Hall's Bootstrap UCL		566						
384												
385					Recommended UCL exceeds the maximum observation							
386												
387					In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL							
388												
389					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
390					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
391					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
392					For additional insight the user may want to consult a statistician.							
393												
394												
395	Uranium											
396												
397					General Statistics							
398				Total Number of Observations		12			Number of Distinct Observations			5
399									Number of Missing Observations			0
400				Minimum		4.5			Mean			25.6
401				Maximum		108			Median			10
402				SD		37.83			Std. Error of Mean			10.92
403				Coefficient of Variation		1.478			Skewness			2.048
404												
405					Normal GOF Test							
406				Shapiro Wilk Test Statistic		0.496			Shapiro Wilk GOF Test			
407				5% Shapiro Wilk Critical Value		0.859			Data Not Normal at 5% Significance Level			
408				Lilliefors Test Statistic		0.493			Lilliefors GOF Test			
409				5% Lilliefors Critical Value		0.256			Data Not Normal at 5% Significance Level			
410					Data Not Normal at 5% Significance Level							
411												
412					Assuming Normal Distribution							
413				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
414				95% Student's-t UCL		45.21			95% Adjusted-CLT UCL (Chen-1995)			50.46
415									95% Modified-t UCL (Johnson-1978)			46.28
416												

	A	B	C	D	E	F	G	H	I	J	K	L
417	Gamma GOF Test											
418					A-D Test Statistic	2.897	Anderson-Darling Gamma GOF Test					
419					5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level					
420					K-S Test Statistic	0.498	Kolmogrov-Smirnoff Gamma GOF Test					
421					5% K-S Critical Value	0.253	Data Not Gamma Distributed at 5% Significance Level					
422	Data Not Gamma Distributed at 5% Significance Level											
423												
424	Gamma Statistics											
425					k hat (MLE)	0.945	k star (bias corrected MLE)					0.764
426					Theta hat (MLE)	27.09	Theta star (bias corrected MLE)					33.5
427					nu hat (MLE)	22.68	nu star (bias corrected)					18.34
428					MLE Mean (bias corrected)	25.6	MLE Sd (bias corrected)					29.28
429							Approximate Chi Square Value (0.05)					9.637
430					Adjusted Level of Significance	0.029	Adjusted Chi Square Value					8.69
431												
432	Assuming Gamma Distribution											
433				95% Approximate Gamma UCL (use when n>=50))		48.71	95% Adjusted Gamma UCL (use when n<50)					54.03
434												
435	Lognormal GOF Test											
436					Shapiro Wilk Test Statistic	0.608	Shapiro Wilk Lognormal GOF Test					
437					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
438					Lilliefors Test Statistic	0.463	Lilliefors Lognormal GOF Test					
439					5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level					
440	Data Not Lognormal at 5% Significance Level											
441												
442	Lognormal Statistics											
443					Minimum of Logged Data	1.504	Mean of logged Data					2.627
444					Maximum of Logged Data	4.682	SD of logged Data					0.98
445												
446	Assuming Lognormal Distribution											
447					95% H-UCL	52.36	90% Chebyshev (MVUE) UCL					40.4
448					95% Chebyshev (MVUE) UCL	49.1	97.5% Chebyshev (MVUE) UCL					61.17
449					99% Chebyshev (MVUE) UCL	84.89						
450												
451	Nonparametric Distribution Free UCL Statistics											
452	Data do not follow a Discernible Distribution (0.05)											
453												
454	Nonparametric Distribution Free UCLs											
455					95% CLT UCL	43.56	95% Jackknife UCL					45.21
456					95% Standard Bootstrap UCL	42.68	95% Bootstrap-t UCL					410.2
457					95% Hall's Bootstrap UCL	670.9	95% Percentile Bootstrap UCL					42.18
458					95% BCA Bootstrap UCL	49.63						
459					90% Chebyshev(Mean, Sd) UCL	58.36	95% Chebyshev(Mean, Sd) UCL					73.2
460					97.5% Chebyshev(Mean, Sd) UCL	93.79	99% Chebyshev(Mean, Sd) UCL					134.2
461												
462	Suggested UCL to Use											
463					95% Chebyshev (Mean, Sd) UCL	73.2						
464												
465	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
466	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
467	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
468	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470												
471	Uranium-238											
472												
473						General Statistics						
474					Total Number of Observations	12				Number of Distinct Observations		1
475										Number of Missing Observations		0
476					Minimum	1.59				Mean		1.59
477					Maximum	1.59				Median		1.59
478												
479						Warning: There is only one distinct observation value in this data set - resulting in '0' variance!						
480						ProUCL (or any other software) should not be used on such a data set!						
481						The data set for variable Uranium-238 was not processed!						
482												
483						If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.						
484						The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).						
485												
486												
487												
488	Vanadium											
489												
490						General Statistics						
491					Total Number of Observations	12				Number of Distinct Observations		12
492										Number of Missing Observations		0
493					Minimum	70				Mean		109.8
494					Maximum	138				Median		117
495					SD	21.18				Std. Error of Mean		6.114
496					Coefficient of Variation	0.193				Skewness		-0.492
497												
498						Normal GOF Test						
499					Shapiro Wilk Test Statistic	0.948				Shapiro Wilk GOF Test		
500					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
501					Lilliefors Test Statistic	0.199				Lilliefors GOF Test		
502					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
503						Data appear Normal at 5% Significance Level						
504												
505						Assuming Normal Distribution						
506					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
507					95% Student's-t UCL	120.7				95% Adjusted-CLT UCL (Chen-1995)		118.9
508										95% Modified-t UCL (Johnson-1978)		120.6
509												
510						Gamma GOF Test						
511					A-D Test Statistic	0.383				Anderson-Darling Gamma GOF Test		
512					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
513					K-S Test Statistic	0.222				Kolmogrov-Smirnoff Gamma GOF Test		
514					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
515						Detected data appear Gamma Distributed at 5% Significance Level						
516												
517						Gamma Statistics						
518					k hat (MLE)	26.82				k star (bias corrected MLE)		20.17
519					Theta hat (MLE)	4.092				Theta star (bias corrected MLE)		5.441
520					nu hat (MLE)	643.8				nu star (bias corrected)		484.1

	A	B	C	D	E	F	G	H	I	J	K	L
521					MLE Mean (bias corrected)	109.8				MLE Sd (bias corrected)		24.44
522										Approximate Chi Square Value (0.05)		434.1
523					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		426.9
524												
525					**Assuming Gamma Distribution**							
526				95% Approximate Gamma UCL (use when n>=50))		122.4				95% Adjusted Gamma UCL (use when n<50)		124.5
527												
528					**Lognormal GOF Test**							
529					Shapiro Wilk Test Statistic	0.923			**Shapiro Wilk Lognormal GOF Test**			
530					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
531					Lilliefors Test Statistic	0.223			**Lilliefors Lognormal GOF Test**			
532					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
533					**Data appear Lognormal at 5% Significance Level**							
534												
535					**Lognormal Statistics**							
536					Minimum of Logged Data	4.248				Mean of logged Data		4.679
537					Maximum of Logged Data	4.927				SD of logged Data		0.208
538												
539					**Assuming Lognormal Distribution**							
540					95% H-UCL	123.6				90% Chebyshev (MVUE) UCL		129.7
541					95% Chebyshev (MVUE) UCL	138.7				97.5% Chebyshev (MVUE) UCL		151.1
542					99% Chebyshev (MVUE) UCL	175.6						
543												
544					**Nonparametric Distribution Free UCL Statistics**							
545					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
546												
547					**Nonparametric Distribution Free UCLs**							
548					95% CLT UCL	119.8				95% Jackknife UCL		120.7
549					95% Standard Bootstrap UCL	119.6				95% Bootstrap-t UCL		119.7
550					95% Hall's Bootstrap UCL	118.8				95% Percentile Bootstrap UCL		119.6
551					95% BCA Bootstrap UCL	118.3						
552					90% Chebyshev(Mean, Sd) UCL	128.1				95% Chebyshev(Mean, Sd) UCL		136.4
553					97.5% Chebyshev(Mean, Sd) UCL	147.9				99% Chebyshev(Mean, Sd) UCL		170.6
554												
555					**Suggested UCL to Use**							
556					95% Student's-t UCL	120.7						
557												
558	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
559	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
560	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
561	For additional insight the user may want to consult a statistician.											
562												
563	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
564	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
565												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			2/20/2015 1:49:09 PM								
5	From File			EPC_204Sub_EU01.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Aluminum											
12												
13						General Statistics						
14					Total Number of Observations	11				Number of Distinct Observations		5
15										Number of Missing Observations		0
16					Minimum	7900				Mean		11050
17					Maximum	13700				Median		11050
18					SD	1313				Std. Error of Mean		396
19					Coefficient of Variation	0.119				Skewness		-0.673
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.689				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.85				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.394				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.267				Data Not Normal at 5% Significance Level		
26						Data Not Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	11768				95% Adjusted-CLT UCL (Chen-1995)		11615
31										95% Modified-t UCL (Johnson-1978)		11754
32												
33						Gamma GOF Test						
34					A-D Test Statistic	1.975				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.727				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.409				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.255				Data Not Gamma Distributed at 5% Significance Level		
38						Data Not Gamma Distributed at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	72				k star (bias corrected MLE)		52.43
42					Theta hat (MLE)	153.5				Theta star (bias corrected MLE)		210.8
43					nu hat (MLE)	1584				nu star (bias corrected)		1153
44					MLE Mean (bias corrected)	11050				MLE Sd (bias corrected)		1526
45										Approximate Chi Square Value (0.05)		1076
46					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		1063
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	11850				95% Adjusted Gamma UCL (use when n<50)		11987
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.661				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.85				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.417				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.267				Data Not Lognormal at 5% Significance Level		
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	8.975				Mean of logged Data		9.303
60					Maximum of Logged Data	9.525				SD of logged Data		0.127
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	11892				90% Chebyshev (MVUE) UCL		12323
64					95% Chebyshev (MVUE) UCL	12898				97.5% Chebyshev (MVUE) UCL		13696
65					99% Chebyshev (MVUE) UCL	15263						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	11701				95% Jackknife UCL		11768
72					95% Standard Bootstrap UCL	11665				95% Bootstrap-t UCL		11646
73					95% Hall's Bootstrap UCL	11762				95% Percentile Bootstrap UCL		11627
74					95% BCA Bootstrap UCL	11582						
75					90% Chebyshev(Mean, Sd) UCL	12238				95% Chebyshev(Mean, Sd) UCL		12776
76					97.5% Chebyshev(Mean, Sd) UCL	13523				99% Chebyshev(Mean, Sd) UCL		14990
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	11768				or 95% Modified-t UCL		11754
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												

	A	B	C	D	E	F	G	H	I	J	K	L
90	Manganese											
91												
92					General Statistics							
93					Total Number of Observations	11				Number of Distinct Observations		11
94										Number of Missing Observations		0
95					Minimum	454				Mean		606.5
96					Maximum	828				Median		586
97					SD	133.7				Std. Error of Mean		40.31
98					Coefficient of Variation	0.22				Skewness		0.56
99												
100					Normal GOF Test							
101					Shapiro Wilk Test Statistic	0.906				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.85				Data appear Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.155				Lilliefors GOF Test		
104					5% Lilliefors Critical Value	0.267				Data appear Normal at 5% Significance Level		
105					Data appear Normal at 5% Significance Level							
106												
107					Assuming Normal Distribution							
108					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
109					95% Student's-t UCL	679.5				95% Adjusted-CLT UCL (Chen-1995)		680
110										95% Modified-t UCL (Johnson-1978)		680.7
111												
112					Gamma GOF Test							
113					A-D Test Statistic	0.38				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.729				Detected data appear Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.167				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.255				Detected data appear Gamma Distributed at 5% Significance Level		
117					Detected data appear Gamma Distributed at 5% Significance Level							
118												
119					Gamma Statistics							
120					k hat (MLE)	23.47				k star (bias corrected MLE)		17.13
121					Theta hat (MLE)	25.84				Theta star (bias corrected MLE)		35.41
122					nu hat (MLE)	516.3				nu star (bias corrected)		376.8
123					MLE Mean (bias corrected)	606.5				MLE Sd (bias corrected)		146.5
124										Approximate Chi Square Value (0.05)		332.8
125					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		326.1
126												
127					Assuming Gamma Distribution							
128					95% Approximate Gamma UCL (use when n>=50))	686.6				95% Adjusted Gamma UCL (use when n<50)		700.8
129												
130					Lognormal GOF Test							
131					Shapiro Wilk Test Statistic	0.921				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.85				Data appear Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.156				Lilliefors Lognormal GOF Test		
134					5% Lilliefors Critical Value	0.267				Data appear Lognormal at 5% Significance Level		
135					Data appear Lognormal at 5% Significance Level							
136												
137					Lognormal Statistics							
138					Minimum of Logged Data	6.118				Mean of logged Data		6.386
139					Maximum of Logged Data	6.719				SD of logged Data		0.216
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141	**Assuming Lognormal Distribution**											
142					95% H-UCL	690.4				90% Chebyshev (MVUE) UCL		725.1
143					95% Chebyshev (MVUE) UCL	779				97.5% Chebyshev (MVUE) UCL		853.7
144					99% Chebyshev (MVUE) UCL	1001						
145												
146	**Nonparametric Distribution Free UCL Statistics**											
147	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
148												
149	**Nonparametric Distribution Free UCLs**											
150					95% CLT UCL	672.8				95% Jackknife UCL		679.5
151					95% Standard Bootstrap UCL	668.7				95% Bootstrap-t UCL		687.5
152					95% Hall's Bootstrap UCL	685				95% Percentile Bootstrap UCL		670.6
153					95% BCA Bootstrap UCL	675						
154					90% Chebyshev(Mean, Sd) UCL	727.4				95% Chebyshev(Mean, Sd) UCL		782.2
155					97.5% Chebyshev(Mean, Sd) UCL	858.2				99% Chebyshev(Mean, Sd) UCL		1008
156												
157	**Suggested UCL to Use**											
158					95% Student's-t UCL	679.5						
159												
160	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
161	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
162	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
163	For additional insight the user may want to consult a statistician.											
164												
165												

	A	B	C	D	E	F	G	H	I	J	K	L
166	PAH, Total											
167												
168						General Statistics						
169					Total Number of Observations	11				Number of Distinct Observations		3
170										Number of Missing Observations		0
171					Minimum	0.00806				Mean		0.329
172					Maximum	0.49				Median		0.329
173					SD	0.124				Std. Error of Mean		0.0375
174					Coefficient of Variation	0.378				Skewness		-1.578
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.675				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.85				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.409				Lilliefors GOF Test		
180					5% Lilliefors Critical Value	0.267				Data Not Normal at 5% Significance Level		
181						Data Not Normal at 5% Significance Level						
182												
183						Assuming Normal Distribution						
184					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
185					95% Student's-t UCL	0.397				95% Adjusted-CLT UCL (Chen-1995)		0.372
186										95% Modified-t UCL (Johnson-1978)		0.394
187												
188						Gamma GOF Test						
189					A-D Test Statistic	2.675				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.739				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.502				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.258				Data Not Gamma Distributed at 5% Significance Level		
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	2.037				k star (bias corrected MLE)		1.542
197					Theta hat (MLE)	0.162				Theta star (bias corrected MLE)		0.214
198					nu hat (MLE)	44.82				nu star (bias corrected)		33.93
199					MLE Mean (bias corrected)	0.329				MLE Sd (bias corrected)		0.265
200										Approximate Chi Square Value (0.05)		21.61
201					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		20.02
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	0.517				95% Adjusted Gamma UCL (use when n<50)		0.558
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.445				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.85				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.5				Lilliefors Lognormal GOF Test		
210					5% Lilliefors Critical Value	0.267				Data Not Lognormal at 5% Significance Level		
211						Data Not Lognormal at 5% Significance Level						
212												
213						Lognormal Statistics						
214					Minimum of Logged Data	-4.821				Mean of logged Data		-1.376
215					Maximum of Logged Data	-0.713				SD of logged Data		1.154
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217					Assuming Lognormal Distribution							
218					95% H-UCL	1.639			90% Chebyshev (MVUE) UCL			0.952
219				95% Chebyshev (MVUE) UCL		1.179			97.5% Chebyshev (MVUE) UCL			1.495
220				99% Chebyshev (MVUE) UCL		2.115						
221												
222					Nonparametric Distribution Free UCL Statistics							
223					Data do not follow a Discernible Distribution (0.05)							
224												
225					Nonparametric Distribution Free UCLs							
226					95% CLT UCL	0.391			95% Jackknife UCL			0.397
227				95% Standard Bootstrap UCL		N/A			95% Bootstrap-t UCL			N/A
228				95% Hall's Bootstrap UCL		N/A			95% Percentile Bootstrap UCL			N/A
229				95% BCA Bootstrap UCL		N/A						
230				90% Chebyshev(Mean, Sd) UCL		0.442			95% Chebyshev(Mean, Sd) UCL			0.493
231				97.5% Chebyshev(Mean, Sd) UCL		0.564			99% Chebyshev(Mean, Sd) UCL			0.703
232												
233					Suggested UCL to Use							
234				95% Chebyshev (Mean, Sd) UCL		0.493						
235												
236					Recommended UCL exceeds the maximum observation							
237												
238					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
239					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
240					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
241					For additional insight the user may want to consult a statistician.							
242												
243					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
244					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
245												
246												

	A	B	C	D	E	F	G	H	I	J	K	L
247	Uranium-238											
248												
249						General Statistics						
250					Total Number of Observations	11				Number of Distinct Observations		5
251										Number of Missing Observations		0
252					Minimum	0.168				Mean		0.843
253					Maximum	1.76				Median		0.843
254					SD	0.398				Std. Error of Mean		0.12
255					Coefficient of Variation	0.472				Skewness		0.713
256												
257						Normal GOF Test						
258					Shapiro Wilk Test Statistic	0.806				Shapiro Wilk GOF Test		
259					5% Shapiro Wilk Critical Value	0.85				Data Not Normal at 5% Significance Level		
260					Lilliefors Test Statistic	0.318				Lilliefors GOF Test		
261					5% Lilliefors Critical Value	0.267				Data Not Normal at 5% Significance Level		
262						Data Not Normal at 5% Significance Level						
263												
264						Assuming Normal Distribution						
265					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
266					95% Student's-t UCL	1.06				95% Adjusted-CLT UCL (Chen-1995)		1.068
267										95% Modified-t UCL (Johnson-1978)		1.065
268												
269						Gamma GOF Test						
270					A-D Test Statistic	1.328				Anderson-Darling Gamma GOF Test		
271					5% A-D Critical Value	0.733				Data Not Gamma Distributed at 5% Significance Level		
272					K-S Test Statistic	0.386				Kolmogrov-Smirnoff Gamma GOF Test		
273					5% K-S Critical Value	0.257				Data Not Gamma Distributed at 5% Significance Level		
274						Data Not Gamma Distributed at 5% Significance Level						
275												
276						Gamma Statistics						
277					k hat (MLE)	3.903				k star (bias corrected MLE)		2.899
278					Theta hat (MLE)	0.216				Theta star (bias corrected MLE)		0.291
279					nu hat (MLE)	85.87				nu star (bias corrected)		63.78
280					MLE Mean (bias corrected)	0.843				MLE Sd (bias corrected)		0.495
281										Approximate Chi Square Value (0.05)		46.41
282					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		44
283												
284						Assuming Gamma Distribution						
285					95% Approximate Gamma UCL (use when n>=50))	1.159				95% Adjusted Gamma UCL (use when n<50)		1.222
286												
287						Lognormal GOF Test						
288					Shapiro Wilk Test Statistic	0.757				Shapiro Wilk Lognormal GOF Test		
289					5% Shapiro Wilk Critical Value	0.85				Data Not Lognormal at 5% Significance Level		
290					Lilliefors Test Statistic	0.405				Lilliefors Lognormal GOF Test		
291					5% Lilliefors Critical Value	0.267				Data Not Lognormal at 5% Significance Level		
292						Data Not Lognormal at 5% Significance Level						
293												
294						Lognormal Statistics						
295					Minimum of Logged Data	-1.784				Mean of logged Data		-0.304
296					Maximum of Logged Data	0.565				SD of logged Data		0.609
297												

	A	B	C	D	E	F	G	H	I	J	K	L
298	Assuming Lognormal Distribution											
299					95% H-UCL	1.391				90% Chebyshev (MVUE) UCL		1.366
300					95% Chebyshev (MVUE) UCL	1.59				97.5% Chebyshev (MVUE) UCL		1.901
301					99% Chebyshev (MVUE) UCL	2.511						
302												
303	Nonparametric Distribution Free UCL Statistics											
304	Data do not follow a Discernible Distribution (0.05)											
305												
306	Nonparametric Distribution Free UCLs											
307					95% CLT UCL	1.04				95% Jackknife UCL		1.06
308					95% Standard Bootstrap UCL	1.027				95% Bootstrap-t UCL		1.072
309					95% Hall's Bootstrap UCL	1.224				95% Percentile Bootstrap UCL		1.05
310					95% BCA Bootstrap UCL	1.053						
311					90% Chebyshev(Mean, Sd) UCL	1.203				95% Chebyshev(Mean, Sd) UCL		1.366
312					97.5% Chebyshev(Mean, Sd) UCL	1.592				99% Chebyshev(Mean, Sd) UCL		2.036
313												
314	Suggested UCL to Use											
315					95% Chebyshev (Mean, Sd) UCL	1.366						
316												
317	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
318	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
319	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
320	For additional insight the user may want to consult a statistician.											
321												
322												

	A	B	C	D	E	F	G	H	I	J	K	L
323	Vanadium											
324												
325					General Statistics							
326					Total Number of Observations	11				Number of Distinct Observations		10
327										Number of Missing Observations		0
328					Minimum	90				Mean		113.8
329					Maximum	131				Median		114
330					SD	12.5				Std. Error of Mean		3.77
331					Coefficient of Variation	0.11				Skewness		-0.476
332												
333					Normal GOF Test							
334					Shapiro Wilk Test Statistic	0.964				Shapiro Wilk GOF Test		
335					5% Shapiro Wilk Critical Value	0.85				Data appear Normal at 5% Significance Level		
336					Lilliefors Test Statistic	0.142				Lilliefors GOF Test		
337					5% Lilliefors Critical Value	0.267				Data appear Normal at 5% Significance Level		
338					Data appear Normal at 5% Significance Level							
339												
340					Assuming Normal Distribution							
341					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
342					95% Student's-t UCL	120.7				95% Adjusted-CLT UCL (Chen-1995)		119.4
343										95% Modified-t UCL (Johnson-1978)		120.6
344												
345					Gamma GOF Test							
346					A-D Test Statistic	0.249				Anderson-Darling Gamma GOF Test		
347					5% A-D Critical Value	0.726				Detected data appear Gamma Distributed at 5% Significance Level		
348					K-S Test Statistic	0.157				Kolmogrov-Smirnoff Gamma GOF Test		
349					5% K-S Critical Value	0.254				Detected data appear Gamma Distributed at 5% Significance Level		
350					Detected data appear Gamma Distributed at 5% Significance Level							
351												
352					Gamma Statistics							
353					k hat (MLE)	87.58				k star (bias corrected MLE)		63.75
354					Theta hat (MLE)	1.3				Theta star (bias corrected MLE)		1.785
355					nu hat (MLE)	1927				nu star (bias corrected)		1403
356					MLE Mean (bias corrected)	113.8				MLE Sd (bias corrected)		14.25
357										Approximate Chi Square Value (0.05)		1317
358					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		1303
359												
360					Assuming Gamma Distribution							
361					95% Approximate Gamma UCL (use when n>=50))	121.2				95% Adjusted Gamma UCL (use when n<50)		122.5
362												
363					Lognormal GOF Test							
364					Shapiro Wilk Test Statistic	0.95				Shapiro Wilk Lognormal GOF Test		
365					5% Shapiro Wilk Critical Value	0.85				Data appear Lognormal at 5% Significance Level		
366					Lilliefors Test Statistic	0.162				Lilliefors Lognormal GOF Test		
367					5% Lilliefors Critical Value	0.267				Data appear Lognormal at 5% Significance Level		
368					Data appear Lognormal at 5% Significance Level							
369												
370					Lognormal Statistics							
371					Minimum of Logged Data	4.5				Mean of logged Data		4.729
372					Maximum of Logged Data	4.875				SD of logged Data		0.113
373												

	A	B	C	D	E	F	G	H	I	J	K	L
374					Assuming Lognormal Distribution							
375					95% H-UCL	121.5				90% Chebyshev (MVUE) UCL		125.5
376					95% Chebyshev (MVUE) UCL	130.8				97.5% Chebyshev (MVUE) UCL		138.2
377					99% Chebyshev (MVUE) UCL	152.6						
378												
379					Nonparametric Distribution Free UCL Statistics							
380					Data appear to follow a Discernible Distribution at 5% Significance Level							
381												
382					Nonparametric Distribution Free UCLs							
383					95% CLT UCL	120				95% Jackknife UCL		120.7
384					95% Standard Bootstrap UCL	119.6				95% Bootstrap-t UCL		119.8
385					95% Hall's Bootstrap UCL	119.6				95% Percentile Bootstrap UCL		119.6
386					95% BCA Bootstrap UCL	119.4						
387					90% Chebyshev(Mean, Sd) UCL	125.1				95% Chebyshev(Mean, Sd) UCL		130.3
388					97.5% Chebyshev(Mean, Sd) UCL	137.4				99% Chebyshev(Mean, Sd) UCL		151.3
389												
390					Suggested UCL to Use							
391					95% Student's-t UCL	120.7						
392												
393	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
394	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
395	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
396	For additional insight the user may want to consult a statistician.											
397												
398	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
399	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
400												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/1/2015 12:53:32 PM								
5	From File			EPC_204SubR1_EU02.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Arsenic											
12												
13	General Statistics											
14	Total Number of Observations					11	Number of Distinct Observations					3
15							Number of Missing Observations					0
16	Minimum					6.7	Mean					16.43
17	Maximum					84	Median					10
18	SD					22.43	Std. Error of Mean					6.764
19	Coefficient of Variation					1.366	Skewness					3.305
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.372	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.522	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					28.69	95% Adjusted-CLT UCL (Chen-1995)					34.75
31							95% Modified-t UCL (Johnson-1978)					29.81
32												
33	Gamma GOF Test											
34	A-D Test Statistic					3.295	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.741	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.531	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.259	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					1.62	k star (bias corrected MLE)					1.239
42	Theta hat (MLE)					10.14	Theta star (bias corrected MLE)					13.26
43	nu hat (MLE)					35.65	nu star (bias corrected)					27.26
44	MLE Mean (bias corrected)					16.43	MLE Sd (bias corrected)					14.76
45							Approximate Chi Square Value (0.05)					16.35
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					14.99
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					27.38	95% Adjusted Gamma UCL (use when n<50)					29.87
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.454	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.502		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.267		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	1.902				Mean of logged Data		2.46
60					Maximum of Logged Data	4.431				SD of logged Data		0.665
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	24.22				90% Chebyshev (MVUE) UCL		23.12
64					95% Chebyshev (MVUE) UCL	27.13				97.5% Chebyshev (MVUE) UCL		32.71
65					99% Chebyshev (MVUE) UCL	43.65						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	27.55				95% Jackknife UCL		28.69
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	36.72				95% Chebyshev(Mean, Sd) UCL		45.91
76					97.5% Chebyshev(Mean, Sd) UCL	58.67				99% Chebyshev(Mean, Sd) UCL		83.73
77												
78					**Suggested UCL to Use**							
79					95% Chebyshev (Mean, Sd) UCL	45.91						
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	Iron											
88												
89					**General Statistics**							
90					Total Number of Observations	11				Number of Distinct Observations		11
91										Number of Missing Observations		0
92					Minimum	22361				Mean		25657
93					Maximum	29419				Median		26460
94					SD	2198				Std. Error of Mean		662.9
95					Coefficient of Variation	0.0857				Skewness		0.0399
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.953		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.85		Data appear Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.188		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.267		Data appear Normal at 5% Significance Level				
102					**Data appear Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	26859				95% Adjusted-CLT UCL (Chen-1995)		26756
107										95% Modified-t UCL (Johnson-1978)		26860
108												
109	Gamma GOF Test											
110					A-D Test Statistic	0.339	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.203	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.254	Detected data appear Gamma Distributed at 5% Significance Level					
114	Detected data appear Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	149.3				k star (bias corrected MLE)		108.6
118					Theta hat (MLE)	171.9				Theta star (bias corrected MLE)		236.2
119					nu hat (MLE)	3284				nu star (bias corrected)		2390
120					MLE Mean (bias corrected)	25657				MLE Sd (bias corrected)		2462
121										Approximate Chi Square Value (0.05)		2277
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		2259
123												
124	Assuming Gamma Distribution											
125				95% Approximate Gamma UCL (use when n>=50))		26925				95% Adjusted Gamma UCL (use when n<50)		27139
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.95	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.2	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
132	Data appear Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	10.02				Mean of logged Data		10.15
136					Maximum of Logged Data	10.29				SD of logged Data		0.086
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		27655
140					95% Chebyshev (MVUE) UCL	28560				97.5% Chebyshev (MVUE) UCL		29816
141					99% Chebyshev (MVUE) UCL	32283						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	26747				95% Jackknife UCL		26859
148					95% Standard Bootstrap UCL	26689				95% Bootstrap-t UCL		26853
149					95% Hall's Bootstrap UCL	26746				95% Percentile Bootstrap UCL		26719
150					95% BCA Bootstrap UCL	26645						
151					90% Chebyshev(Mean, Sd) UCL	27646				95% Chebyshev(Mean, Sd) UCL		28546
152					97.5% Chebyshev(Mean, Sd) UCL	29797				99% Chebyshev(Mean, Sd) UCL		32253
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	26859						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Manganese**											
164												
165	**General Statistics**											
166	Total Number of Observations					11	Number of Distinct Observations					11
167							Number of Missing Observations					0
168	Minimum					417	Mean					719.1
169	Maximum					1173	Median					660
170	SD					210.2	Std. Error of Mean					63.37
171	Coefficient of Variation					0.292	Skewness					0.836
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.942	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.157	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.267	Data appear Normal at 5% Significance Level					
178	**Data appear Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					833.9	95% Adjusted-CLT UCL (Chen-1995)					840.4
183							95% Modified-t UCL (Johnson-1978)					836.6
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					0.235	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.729	Detected data appear Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.132	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.255	Detected data appear Gamma Distributed at 5% Significance Level					
190	**Detected data appear Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					13.52	k star (bias corrected MLE)					9.89
194	Theta hat (MLE)					53.21	Theta star (bias corrected MLE)					72.71
195	nu hat (MLE)					297.3	nu star (bias corrected)					217.6
196	MLE Mean (bias corrected)					719.1	MLE Sd (bias corrected)					228.7
197							Approximate Chi Square Value (0.05)					184.4
198	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					179.5
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					848.3	95% Adjusted Gamma UCL (use when n<50)					871.8
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.979	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.125	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.267	Data appear Lognormal at 5% Significance Level					
208	**Data appear Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	6.033				Mean of logged Data		6.541
212					Maximum of Logged Data	7.067				SD of logged Data		0.286
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	859.9				90% Chebyshev (MVUE) UCL		906.4
216					95% Chebyshev (MVUE) UCL	991.4				97.5% Chebyshev (MVUE) UCL		1109
217					99% Chebyshev (MVUE) UCL	1341						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	823.3				95% Jackknife UCL		833.9
224					95% Standard Bootstrap UCL	817.6				95% Bootstrap-t UCL		873
225					95% Hall's Bootstrap UCL	870				95% Percentile Bootstrap UCL		824.4
226					95% BCA Bootstrap UCL	842.4						
227					90% Chebyshev(Mean, Sd) UCL	909.2				95% Chebyshev(Mean, Sd) UCL		995.3
228					97.5% Chebyshev(Mean, Sd) UCL	1115				99% Chebyshev(Mean, Sd) UCL		1350
229												
230						Suggested UCL to Use						
231					95% Student's-t UCL	833.9						
232												
233						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
234						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
235						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
236						For additional insight the user may want to consult a statistician.						
237												
238												
239	PAH, Total											
240												
241						General Statistics						
242					Total Number of Observations	11				Number of Distinct Observations		3
243										Number of Missing Observations		0
244					Minimum	2.7000E-4				Mean		0.0311
245					Maximum	0.062				Median		0.0311
246					SD	0.0138				Std. Error of Mean		0.00416
247					Coefficient of Variation	0.443				Skewness		-9.45E-16
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.627				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.85				Data Not Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.409				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.267				Data Not Normal at 5% Significance Level		
254						Data Not Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	0.0387				95% Adjusted-CLT UCL (Chen-1995)		0.038
259										95% Modified-t UCL (Johnson-1978)		0.0387
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Gamma GOF Test**											
262					A-D Test Statistic	2.958	**Anderson-Darling Gamma GOF Test**					
263					5% A-D Critical Value	0.742	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.517	**Kolmogrov-Smirnoff Gamma GOF Test**					
265					5% K-S Critical Value	0.26	Data Not Gamma Distributed at 5% Significance Level					
266	**Data Not Gamma Distributed at 5% Significance Level**											
267												
268	**Gamma Statistics**											
269					k hat (MLE)	1.5			k star (bias corrected MLE)			1.151
270					Theta hat (MLE)	0.0208			Theta star (bias corrected MLE)			0.027
271					nu hat (MLE)	33			nu star (bias corrected)			25.33
272					MLE Mean (bias corrected)	0.0311			MLE Sd (bias corrected)			0.029
273									Approximate Chi Square Value (0.05)			14.87
274					Adjusted Level of Significance	0.0278			Adjusted Chi Square Value			13.57
275												
276	**Assuming Gamma Distribution**											
277					95% Approximate Gamma UCL (use when n>=50))	0.0531			95% Adjusted Gamma UCL (use when n<50)			0.0581
278												
279	**Lognormal GOF Test**											
280					Shapiro Wilk Test Statistic	0.431	**Shapiro Wilk Lognormal GOF Test**					
281					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.508	**Lilliefors Lognormal GOF Test**					
283					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
284	**Data Not Lognormal at 5% Significance Level**											
285												
286	**Lognormal Statistics**											
287					Minimum of Logged Data	-8.217			Mean of logged Data			-3.838
288					Maximum of Logged Data	-2.781			SD of logged Data			1.467
289												
290	**Assuming Lognormal Distribution**											
291					95% H-UCL	0.396			90% Chebyshev (MVUE) UCL			0.13
292					95% Chebyshev (MVUE) UCL	0.165			97.5% Chebyshev (MVUE) UCL			0.213
293					99% Chebyshev (MVUE) UCL	0.307						
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Data do not follow a Discernible Distribution (0.05)**											
297												
298	**Nonparametric Distribution Free UCLs**											
299					95% CLT UCL	0.038			95% Jackknife UCL			0.0387
300					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
301					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
302					95% BCA Bootstrap UCL	N/A						
303					90% Chebyshev(Mean, Sd) UCL	0.0436			95% Chebyshev(Mean, Sd) UCL			0.0493
304					97.5% Chebyshev(Mean, Sd) UCL	0.0571			99% Chebyshev(Mean, Sd) UCL			0.0725
305												
306	**Suggested UCL to Use**											
307					95% Chebyshev (Mean, Sd) UCL	0.0493						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
315	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
316												
317												
318	Uranium-238											
319												
320	General Statistics											
321					Total Number of Observations	11			Number of Distinct Observations		3	
322									Number of Missing Observations		0	
323					Minimum	1.08			Mean		2.5	
324					Maximum	3.92			Median		2.5	
325					SD	0.635			Std. Error of Mean		0.191	
326					Coefficient of Variation	0.254			Skewness		0	
327												
328	Normal GOF Test											
329					Shapiro Wilk Test Statistic	0.627			Shapiro Wilk GOF Test			
330					5% Shapiro Wilk Critical Value	0.85			Data Not Normal at 5% Significance Level			
331					Lilliefors Test Statistic	0.409			Lilliefors GOF Test			
332					5% Lilliefors Critical Value	0.267			Data Not Normal at 5% Significance Level			
333	Data Not Normal at 5% Significance Level											
334												
335	Assuming Normal Distribution											
336	95% Normal UCL								95% UCLs (Adjusted for Skewness)			
337					95% Student's-t UCL	2.847			95% Adjusted-CLT UCL (Chen-1995)		2.815	
338									95% Modified-t UCL (Johnson-1978)		2.847	
339												
340	Gamma GOF Test											
341					A-D Test Statistic	2.421			Anderson-Darling Gamma GOF Test			
342					5% A-D Critical Value	0.729			Data Not Gamma Distributed at 5% Significance Level			
343					K-S Test Statistic	0.444			Kolmogrov-Smirnoff Gamma GOF Test			
344					5% K-S Critical Value	0.255			Data Not Gamma Distributed at 5% Significance Level			
345	Data Not Gamma Distributed at 5% Significance Level											
346												
347	Gamma Statistics											
348					k hat (MLE)	14.28			k star (bias corrected MLE)		10.45	
349					Theta hat (MLE)	0.175			Theta star (bias corrected MLE)		0.239	
350					nu hat (MLE)	314.3			nu star (bias corrected)		229.9	
351					MLE Mean (bias corrected)	2.5			MLE Sd (bias corrected)		0.773	
352									Approximate Chi Square Value (0.05)		195.8	
353					Adjusted Level of Significance	0.0278			Adjusted Chi Square Value		190.7	
354												
355	Assuming Gamma Distribution											
356					95% Approximate Gamma UCL (use when n>=50))	2.935			95% Adjusted Gamma UCL (use when n<50)		3.014	
357												
358	Lognormal GOF Test											
359					Shapiro Wilk Test Statistic	0.584			Shapiro Wilk Lognormal GOF Test			
360					5% Shapiro Wilk Critical Value	0.85			Data Not Lognormal at 5% Significance Level			
361					Lilliefors Test Statistic	0.456			Lilliefors Lognormal GOF Test			
362					5% Lilliefors Critical Value	0.267			Data Not Lognormal at 5% Significance Level			
363	Data Not Lognormal at 5% Significance Level											
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365						Lognormal Statistics						
366					Minimum of Logged Data	0.077					Mean of logged Data	0.881
367					Maximum of Logged Data	1.366					SD of logged Data	0.299
368												
369						Assuming Lognormal Distribution						
370					95% H-UCL	3.033					90% Chebyshev (MVUE) UCL	3.197
371					95% Chebyshev (MVUE) UCL	3.507					97.5% Chebyshev (MVUE) UCL	3.938
372					99% Chebyshev (MVUE) UCL	4.783						
373												
374						Nonparametric Distribution Free UCL Statistics						
375						Data do not follow a Discernible Distribution (0.05)						
376												
377						Nonparametric Distribution Free UCLs						
378					95% CLT UCL	2.815					95% Jackknife UCL	2.847
379					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
380					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
381					95% BCA Bootstrap UCL	N/A						
382					90% Chebyshev(Mean, Sd) UCL	3.074					95% Chebyshev(Mean, Sd) UCL	3.335
383					97.5% Chebyshev(Mean, Sd) UCL	3.696					99% Chebyshev(Mean, Sd) UCL	4.405
384												
385						Suggested UCL to Use						
386					95% Student's-t UCL	2.847					or 95% Modified-t UCL	2.847
387												
388					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
389					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
390					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
391					For additional insight the user may want to consult a statistician.							
392												
393												
394	Vanadium											
395												
396						General Statistics						
397					Total Number of Observations	11					Number of Distinct Observations	10
398											Number of Missing Observations	0
399					Minimum	90					Mean	114.1
400					Maximum	132					Median	117
401					SD	12.9					Std. Error of Mean	3.888
402					Coefficient of Variation	0.113					Skewness	-0.649
403												
404						Normal GOF Test						
405					Shapiro Wilk Test Statistic	0.945					Shapiro Wilk GOF Test	
406					5% Shapiro Wilk Critical Value	0.85					Data appear Normal at 5% Significance Level	
407					Lilliefors Test Statistic	0.195					Lilliefors GOF Test	
408					5% Lilliefors Critical Value	0.267					Data appear Normal at 5% Significance Level	
409						Data appear Normal at 5% Significance Level						
410												
411						Assuming Normal Distribution						
412					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
413					95% Student's-t UCL	121.1					95% Adjusted-CLT UCL (Chen-1995)	119.7
414											95% Modified-t UCL (Johnson-1978)	121
415												
416						Gamma GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
417					A-D Test Statistic	0.383	**Anderson-Darling Gamma GOF Test**					
418					5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level					
419					K-S Test Statistic	0.211	**Kolmogrov-Smirnoff Gamma GOF Test**					
420					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
421	**Detected data appear Gamma Distributed at 5% Significance Level**											
422												
423	**Gamma Statistics**											
424					k hat (MLE)	81.75	k star (bias corrected MLE)					59.52
425					Theta hat (MLE)	1.396	Theta star (bias corrected MLE)					1.917
426					nu hat (MLE)	1799	nu star (bias corrected)					1309
427					MLE Mean (bias corrected)	114.1	MLE Sd (bias corrected)					14.79
428							Approximate Chi Square Value (0.05)					1226
429					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					1213
430												
431	**Assuming Gamma Distribution**											
432					95% Approximate Gamma UCL (use when n>=50))	121.8	95% Adjusted Gamma UCL (use when n<50)					123.1
433												
434	**Lognormal GOF Test**											
435					Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**					
436					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
437					Lilliefors Test Statistic	0.213	**Lilliefors Lognormal GOF Test**					
438					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
439	**Data appear Lognormal at 5% Significance Level**											
440												
441	**Lognormal Statistics**											
442					Minimum of Logged Data	4.5	Mean of logged Data					4.731
443					Maximum of Logged Data	4.883	SD of logged Data					0.118
444												
445	**Assuming Lognormal Distribution**											
446					95% H-UCL	122.1	90% Chebyshev (MVUE) UCL					126.3
447					95% Chebyshev (MVUE) UCL	131.8	97.5% Chebyshev (MVUE) UCL					139.4
448					99% Chebyshev (MVUE) UCL	154.5						
449												
450	**Nonparametric Distribution Free UCL Statistics**											
451	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
452												
453	**Nonparametric Distribution Free UCLs**											
454					95% CLT UCL	120.5	95% Jackknife UCL					121.1
455					95% Standard Bootstrap UCL	120.1	95% Bootstrap-t UCL					120.5
456					95% Hall's Bootstrap UCL	119.9	95% Percentile Bootstrap UCL					120.3
457					95% BCA Bootstrap UCL	119.5						
458					90% Chebyshev(Mean, Sd) UCL	125.8	95% Chebyshev(Mean, Sd) UCL					131
459					97.5% Chebyshev(Mean, Sd) UCL	138.4	99% Chebyshev(Mean, Sd) UCL					152.8
460												
461	**Suggested UCL to Use**											
462					95% Student's-t UCL	121.1						
463												
464	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
465	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
466	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
467	For additional insight the user may want to consult a statistician.											
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
470	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
471												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/3/2015 9:03:35 AM								
5	From File			EPC_204SubEU5.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Arsenic											
12												
13	General Statistics											
14	Total Number of Observations					11	Number of Distinct Observations					5
15							Number of Missing Observations					0
16	Minimum					3	Mean					17.56
17	Maximum					107	Median					10
18	SD					29.78	Std. Error of Mean					8.979
19	Coefficient of Variation					1.696	Skewness					3.268
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.412	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.509	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					33.84	95% Adjusted-CLT UCL (Chen-1995)					41.79
31							95% Modified-t UCL (Johnson-1978)					35.31
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.31	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.751	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.482	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.262	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					1.04	k star (bias corrected MLE)					0.817
42	Theta hat (MLE)					16.88	Theta star (bias corrected MLE)					21.49
43	nu hat (MLE)					22.89	nu star (bias corrected)					17.98
44	MLE Mean (bias corrected)					17.56	MLE Sd (bias corrected)					19.43
45							Approximate Chi Square Value (0.05)					9.376
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					8.381
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					33.68	95% Adjusted Gamma UCL (use when n<50)					37.68
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.681	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.414	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	1.099	Mean of logged Data					2.314
60					Maximum of Logged Data	4.673	SD of logged Data					0.898
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	33.54	90% Chebyshev (MVUE) UCL					26.76
64					95% Chebyshev (MVUE) UCL	32.35	97.5% Chebyshev (MVUE) UCL					40.1
65					99% Chebyshev (MVUE) UCL	55.33						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	32.33	95% Jackknife UCL					33.84
72					95% Standard Bootstrap UCL	32.15	95% Bootstrap-t UCL					146.5
73					95% Hall's Bootstrap UCL	201	95% Percentile Bootstrap UCL					35.26
74					95% BCA Bootstrap UCL	43.49						
75					90% Chebyshev(Mean, Sd) UCL	44.5	95% Chebyshev(Mean, Sd) UCL					56.7
76					97.5% Chebyshev(Mean, Sd) UCL	73.64	99% Chebyshev(Mean, Sd) UCL					106.9
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	56.7						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**Cobalt**											
88												
89	**General Statistics**											
90					Total Number of Observations	11	Number of Distinct Observations					4
91							Number of Missing Observations					0
92					Minimum	3.9	Mean					8.633
93					Maximum	17	Median					8.633
94					SD	3.25	Std. Error of Mean					0.98
95					Coefficient of Variation	0.376	Skewness					1.537
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.691	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.409	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	10.41				95% Adjusted-CLT UCL (Chen-1995)		10.73
107										95% Modified-t UCL (Johnson-1978)		10.48
108												
109	Gamma GOF Test											
110					A-D Test Statistic	1.661	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.73	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.364	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.256	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	8.456				k star (bias corrected MLE)		6.21
118					Theta hat (MLE)	1.021				Theta star (bias corrected MLE)		1.39
119					nu hat (MLE)	186				nu star (bias corrected)		136.6
120					MLE Mean (bias corrected)	8.633				MLE Sd (bias corrected)		3.464
121										Approximate Chi Square Value (0.05)		110.6
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		106.8
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	10.66				95% Adjusted Gamma UCL (use when n<50)		11.04
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.75	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.383	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	1.361				Mean of logged Data		2.095
136					Maximum of Logged Data	2.833				SD of logged Data		0.367
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	10.99				90% Chebyshev (MVUE) UCL		11.54
140					95% Chebyshev (MVUE) UCL	12.86				97.5% Chebyshev (MVUE) UCL		14.69
141					99% Chebyshev (MVUE) UCL	18.27						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	10.25				95% Jackknife UCL		10.41
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	11.57				95% Chebyshev(Mean, Sd) UCL		12.9
152					97.5% Chebyshev(Mean, Sd) UCL	14.75				99% Chebyshev(Mean, Sd) UCL		18.38
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	10.41				or 95% Modified-t UCL		10.48
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Manganese**											
164												
165	**General Statistics**											
166	Total Number of Observations					11	Number of Distinct Observations					11
167							Number of Missing Observations					0
168	Minimum					575	Mean					835.7
169	Maximum					1500	Median					821
170	SD					254.5	Std. Error of Mean					76.72
171	Coefficient of Variation					0.304	Skewness					1.931
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.811	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.241	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.267	Data appear Normal at 5% Significance Level					
178	**Data appear Approximate Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					974.8	95% Adjusted-CLT UCL (Chen-1995)					1010
183							95% Modified-t UCL (Johnson-1978)					982.2
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					0.492	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.729	Detected data appear Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.197	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.255	Detected data appear Gamma Distributed at 5% Significance Level					
190	**Detected data appear Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					14.57	k star (bias corrected MLE)					10.66
194	Theta hat (MLE)					57.36	Theta star (bias corrected MLE)					78.42
195	nu hat (MLE)					320.5	nu star (bias corrected)					234.4
196	MLE Mean (bias corrected)					835.7	MLE Sd (bias corrected)					256
197							Approximate Chi Square Value (0.05)					200
198	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					194.8
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					979.7	95% Adjusted Gamma UCL (use when n<50)					1006
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.911	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.182	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.267	Data appear Lognormal at 5% Significance Level					
208	**Data appear Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	6.354				Mean of logged Data		6.694
212					Maximum of Logged Data	7.313				SD of logged Data		0.265
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	981.5				90% Chebyshev (MVUE) UCL		1034
216					95% Chebyshev (MVUE) UCL	1125				97.5% Chebyshev (MVUE) UCL		1251
217					99% Chebyshev (MVUE) UCL	1500						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	961.9				95% Jackknife UCL		974.8
224					95% Standard Bootstrap UCL	954.4				95% Bootstrap-t UCL		1070
225					95% Hall's Bootstrap UCL	1569				95% Percentile Bootstrap UCL		969.5
226					95% BCA Bootstrap UCL	1024						
227					90% Chebyshev(Mean, Sd) UCL	1066				95% Chebyshev(Mean, Sd) UCL		1170
228					97.5% Chebyshev(Mean, Sd) UCL	1315				99% Chebyshev(Mean, Sd) UCL		1599
229												
230						Suggested UCL to Use						
231					95% Student's-t UCL	974.8						
232												
233					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
234					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
235					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
236					For additional insight the user may want to consult a statistician.							
237												
238												
239	PAH, Total											
240												
241						General Statistics						
242					Total Number of Observations	11				Number of Distinct Observations		3
243										Number of Missing Observations		0
244					Minimum	0.00184				Mean		0.0111
245					Maximum	0.0204				Median		0.0111
246					SD	0.00414				Std. Error of Mean		0.00125
247					Coefficient of Variation	0.373				Skewness		-2.36E-15
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.627				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.85				Data Not Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.409				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.267				Data Not Normal at 5% Significance Level		
254						Data Not Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	0.0134				95% Adjusted-CLT UCL (Chen-1995)		0.0132
259										95% Modified-t UCL (Johnson-1978)		0.0134
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	Gamma GOF Test											
262					A-D Test Statistic	2.548	Anderson-Darling Gamma GOF Test					
263					5% A-D Critical Value	0.732	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.47	Kolmogrov-Smirnoff Gamma GOF Test					
265					5% K-S Critical Value	0.256	Data Not Gamma Distributed at 5% Significance Level					
266	Data Not Gamma Distributed at 5% Significance Level											
267												
268	Gamma Statistics											
269					k hat (MLE)	4.778	k star (bias corrected MLE)					3.536
270					Theta hat (MLE)	0.00232	Theta star (bias corrected MLE)					0.00314
271					nu hat (MLE)	105.1	nu star (bias corrected)					77.79
272					MLE Mean (bias corrected)	0.0111	MLE Sd (bias corrected)					0.00591
273							Approximate Chi Square Value (0.05)					58.47
274					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					55.75
275												
276	Assuming Gamma Distribution											
277					95% Approximate Gamma UCL (use when n>=50))	0.0148	95% Adjusted Gamma UCL (use when n<50)					0.0155
278												
279	Lognormal GOF Test											
280					Shapiro Wilk Test Statistic	0.523	Shapiro Wilk Lognormal GOF Test					
281					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.482	Lilliefors Lognormal GOF Test					
283					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
284	Data Not Lognormal at 5% Significance Level											
285												
286	Lognormal Statistics											
287					Minimum of Logged Data	-6.298	Mean of logged Data					-4.609
288					Maximum of Logged Data	-3.894	SD of logged Data					0.589
289												
290	Assuming Lognormal Distribution											
291					95% H-UCL	0.0182	90% Chebyshev (MVUE) UCL					0.018
292					95% Chebyshev (MVUE) UCL	0.0209	97.5% Chebyshev (MVUE) UCL					0.0249
293					99% Chebyshev (MVUE) UCL	0.0328						
294												
295	Nonparametric Distribution Free UCL Statistics											
296	Data do not follow a Discernible Distribution (0.05)											
297												
298	Nonparametric Distribution Free UCLs											
299					95% CLT UCL	0.0132	95% Jackknife UCL					0.0134
300					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
301					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
302					95% BCA Bootstrap UCL	N/A						
303					90% Chebyshev(Mean, Sd) UCL	0.0149	95% Chebyshev(Mean, Sd) UCL					0.0166
304					97.5% Chebyshev(Mean, Sd) UCL	0.0189	99% Chebyshev(Mean, Sd) UCL					0.0235
305												
306	Suggested UCL to Use											
307					95% Chebyshev (Mean, Sd) UCL	0.0166						
308												
309	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
310	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
311	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
312	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
315	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
316												
317												
318	Uranium-238											
319												
320	General Statistics											
321					Total Number of Observations	11			Number of Distinct Observations		5	
322									Number of Missing Observations		0	
323					Minimum	0.957			Mean		3.648	
324					Maximum	9.723			Median		3.648	
325					SD	2.243			Std. Error of Mean		0.676	
326					Coefficient of Variation	0.615			Skewness		2.091	
327												
328	Normal GOF Test											
329					Shapiro Wilk Test Statistic	0.692			Shapiro Wilk GOF Test			
330					5% Shapiro Wilk Critical Value	0.85			Data Not Normal at 5% Significance Level			
331					Lilliefors Test Statistic	0.409			Lilliefors GOF Test			
332					5% Lilliefors Critical Value	0.267			Data Not Normal at 5% Significance Level			
333	Data Not Normal at 5% Significance Level											
334												
335	Assuming Normal Distribution											
336	95% Normal UCL								95% UCLs (Adjusted for Skewness)			
337					95% Student's-t UCL	4.873			95% Adjusted-CLT UCL (Chen-1995)		5.215	
338									95% Modified-t UCL (Johnson-1978)		4.944	
339												
340	Gamma GOF Test											
341					A-D Test Statistic	1.2			Anderson-Darling Gamma GOF Test			
342					5% A-D Critical Value	0.733			Data Not Gamma Distributed at 5% Significance Level			
343					K-S Test Statistic	0.338			Kolmogrov-Smirnoff Gamma GOF Test			
344					5% K-S Critical Value	0.257			Data Not Gamma Distributed at 5% Significance Level			
345	Data Not Gamma Distributed at 5% Significance Level											
346												
347	Gamma Statistics											
348					k hat (MLE)	3.47			k star (bias corrected MLE)		2.584	
349					Theta hat (MLE)	1.051			Theta star (bias corrected MLE)		1.411	
350					nu hat (MLE)	76.34			nu star (bias corrected)		56.85	
351					MLE Mean (bias corrected)	3.648			MLE Sd (bias corrected)		2.269	
352									Approximate Chi Square Value (0.05)		40.52	
353					Adjusted Level of Significance	0.0278			Adjusted Chi Square Value		38.28	
354												
355	Assuming Gamma Distribution											
356					95% Approximate Gamma UCL (use when n>=50))	5.118			95% Adjusted Gamma UCL (use when n<50)		5.417	
357												
358	Lognormal GOF Test											
359					Shapiro Wilk Test Statistic	0.822			Shapiro Wilk Lognormal GOF Test			
360					5% Shapiro Wilk Critical Value	0.85			Data Not Lognormal at 5% Significance Level			
361					Lilliefors Test Statistic	0.329			Lilliefors Lognormal GOF Test			
362					5% Lilliefors Critical Value	0.267			Data Not Lognormal at 5% Significance Level			
363	Data Not Lognormal at 5% Significance Level											
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365	**Lognormal Statistics**											
366					Minimum of Logged Data	-0.044				Mean of logged Data		1.143
367					Maximum of Logged Data	2.274				SD of logged Data		0.588
368												
369	**Assuming Lognormal Distribution**											
370					95% H-UCL	5.718				90% Chebyshev (MVUE) UCL		5.668
371					95% Chebyshev (MVUE) UCL	6.576				97.5% Chebyshev (MVUE) UCL		7.836
372					99% Chebyshev (MVUE) UCL	10.31						
373												
374	**Nonparametric Distribution Free UCL Statistics**											
375	**Data do not follow a Discernible Distribution (0.05)**											
376												
377	**Nonparametric Distribution Free UCLs**											
378					95% CLT UCL	4.76				95% Jackknife UCL		4.873
379					95% Standard Bootstrap UCL	4.709				95% Bootstrap-t UCL		5.455
380					95% Hall's Bootstrap UCL	10.14				95% Percentile Bootstrap UCL		4.815
381					95% BCA Bootstrap UCL	5.109						
382					90% Chebyshev(Mean, Sd) UCL	5.676				95% Chebyshev(Mean, Sd) UCL		6.595
383					97.5% Chebyshev(Mean, Sd) UCL	7.87				99% Chebyshev(Mean, Sd) UCL		10.38
384												
385	**Suggested UCL to Use**											
386					95% Chebyshev (Mean, Sd) UCL	6.595						
387												
388	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
389	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
390	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
391	For additional insight the user may want to consult a statistician.											
392												
393												
394	**Vanadium**											
395												
396	**General Statistics**											
397					Total Number of Observations	11				Number of Distinct Observations		9
398										Number of Missing Observations		0
399					Minimum	95				Mean		114.5
400					Maximum	132				Median		118
401					SD	12.36				Std. Error of Mean		3.725
402					Coefficient of Variation	0.108				Skewness		-0.331
403												
404	**Normal GOF Test**											
405					Shapiro Wilk Test Statistic	0.93				**Shapiro Wilk GOF Test**		
406					5% Shapiro Wilk Critical Value	0.85				Data appear Normal at 5% Significance Level		
407					Lilliefors Test Statistic	0.183				**Lilliefors GOF Test**		
408					5% Lilliefors Critical Value	0.267				Data appear Normal at 5% Significance Level		
409	**Data appear Normal at 5% Significance Level**											
410												
411	**Assuming Normal Distribution**											
412	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
413					95% Student's-t UCL	121.3				95% Adjusted-CLT UCL (Chen-1995)		120.3
414										95% Modified-t UCL (Johnson-1978)		121.2
415												
416	**Gamma GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
417					A-D Test Statistic	0.438	**Anderson-Darling Gamma GOF Test**					
418					5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level					
419					K-S Test Statistic	0.198	**Kolmogrov-Smirnoff Gamma GOF Test**					
420					5% K-S Critical Value	0.254	Detected data appear Gamma Distributed at 5% Significance Level					
421	**Detected data appear Gamma Distributed at 5% Significance Level**											
422												
423	**Gamma Statistics**											
424					k hat (MLE)	91.96	k star (bias corrected MLE)					66.94
425					Theta hat (MLE)	1.246	Theta star (bias corrected MLE)					1.711
426					nu hat (MLE)	2023	nu star (bias corrected)					1473
427					MLE Mean (bias corrected)	114.5	MLE Sd (bias corrected)					14
428							Approximate Chi Square Value (0.05)					1385
429					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					1371
430												
431	**Assuming Gamma Distribution**											
432					95% Approximate Gamma UCL (use when n>=50))	121.8	95% Adjusted Gamma UCL (use when n<50)					123.1
433												
434	**Lognormal GOF Test**											
435					Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**					
436					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
437					Lilliefors Test Statistic	0.201	**Lilliefors Lognormal GOF Test**					
438					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
439	**Data appear Lognormal at 5% Significance Level**											
440												
441	**Lognormal Statistics**											
442					Minimum of Logged Data	4.554	Mean of logged Data					4.736
443					Maximum of Logged Data	4.883	SD of logged Data					0.11
444												
445	**Assuming Lognormal Distribution**											
446					95% H-UCL	122	90% Chebyshev (MVUE) UCL					126
447					95% Chebyshev (MVUE) UCL	131.2	97.5% Chebyshev (MVUE) UCL					138.4
448					99% Chebyshev (MVUE) UCL	152.5						
449												
450	**Nonparametric Distribution Free UCL Statistics**											
451	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
452												
453	**Nonparametric Distribution Free UCLs**											
454					95% CLT UCL	120.7	95% Jackknife UCL					121.3
455					95% Standard Bootstrap UCL	120.3	95% Bootstrap-t UCL					121.2
456					95% Hall's Bootstrap UCL	119.9	95% Percentile Bootstrap UCL					120.4
457					95% BCA Bootstrap UCL	120.1						
458					90% Chebyshev(Mean, Sd) UCL	125.7	95% Chebyshev(Mean, Sd) UCL					130.8
459					97.5% Chebyshev(Mean, Sd) UCL	137.8	99% Chebyshev(Mean, Sd) UCL					151.6
460												
461	**Suggested UCL to Use**											
462					95% Student's-t UCL	121.3						
463												
464	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
465	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
466	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
467	For additional insight the user may want to consult a statistician.											
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
470	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
471												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/1/2015 12:51:53 PM								
5	From File			EPC_204Surf.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Aluminum**											
12												
13	**General Statistics**											
14	Total Number of Observations					11	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					7900	Mean					11067
17	Maximum					13700	Median					11067
18	SD					1313	Std. Error of Mean					396
19	Coefficient of Variation					0.119	Skewness					-0.72
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.68	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.409	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					11784	95% Adjusted-CLT UCL (Chen-1995)					11626
31							95% Modified-t UCL (Johnson-1978)					11770
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					2.03	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.727	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.425	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.255	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					72.02	k star (bias corrected MLE)					52.44
42	Theta hat (MLE)					153.7	Theta star (bias corrected MLE)					211.1
43	nu hat (MLE)					1584	nu star (bias corrected)					1154
44	MLE Mean (bias corrected)					11067	MLE Sd (bias corrected)					1528
45							Approximate Chi Square Value (0.05)					1076
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					1063
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					11868	95% Adjusted Gamma UCL (use when n<50)					12005
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.652	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.431	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	8.975				Mean of logged Data		9.305
60					Maximum of Logged Data	9.525				SD of logged Data		0.127
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	11910				90% Chebyshev (MVUE) UCL		12343
64					95% Chebyshev (MVUE) UCL	12919				97.5% Chebyshev (MVUE) UCL		13718
65					99% Chebyshev (MVUE) UCL	15289						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	11718				95% Jackknife UCL		11784
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	12255				95% Chebyshev(Mean, Sd) UCL		12793
76					97.5% Chebyshev(Mean, Sd) UCL	13539				99% Chebyshev(Mean, Sd) UCL		15006
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	11784				or 95% Modified-t UCL		11770
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												
90	**Chromium**											
91												
92	**General Statistics**											
93					Total Number of Observations	11				Number of Distinct Observations		4
94										Number of Missing Observations		0
95					Minimum	12				Mean		13.03
96					Maximum	18				Median		12
97					SD	2.095				Std. Error of Mean		0.632
98					Coefficient of Variation	0.161				Skewness		1.986
99												
100	**Normal GOF Test**											
101					Shapiro Wilk Test Statistic	0.572	**Shapiro Wilk GOF Test**					
102					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
103					Lilliefors Test Statistic	0.415	**Lilliefors GOF Test**					
104					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
105	Data Not Normal at 5% Significance Level											
106												
107	Assuming Normal Distribution											
108	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
109					95% Student's-t UCL	14.17			95% Adjusted-CLT UCL (Chen-1995)			14.47
110									95% Modified-t UCL (Johnson-1978)			14.24
111												
112	Gamma GOF Test											
113					A-D Test Statistic	2.373	Anderson-Darling Gamma GOF Test					
114					5% A-D Critical Value	0.728	Data Not Gamma Distributed at 5% Significance Level					
115					K-S Test Statistic	0.426	Kolmogrov-Smirnoff Gamma GOF Test					
116					5% K-S Critical Value	0.255	Data Not Gamma Distributed at 5% Significance Level					
117	Data Not Gamma Distributed at 5% Significance Level											
118												
119	Gamma Statistics											
120					k hat (MLE)	49.38			k star (bias corrected MLE)			35.97
121					Theta hat (MLE)	0.264			Theta star (bias corrected MLE)			0.362
122					nu hat (MLE)	1086			nu star (bias corrected)			791.4
123					MLE Mean (bias corrected)	13.03			MLE Sd (bias corrected)			2.172
124									Approximate Chi Square Value (0.05)			727.1
125					Adjusted Level of Significance	0.0278			Adjusted Chi Square Value			717.1
126												
127	Assuming Gamma Distribution											
128				95% Approximate Gamma UCL (use when n>=50))		14.18			95% Adjusted Gamma UCL (use when n<50)			14.38
129												
130	Lognormal GOF Test											
131					Shapiro Wilk Test Statistic	0.579	Shapiro Wilk Lognormal GOF Test					
132					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
133					Lilliefors Test Statistic	0.419	Lilliefors Lognormal GOF Test					
134					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
135	Data Not Lognormal at 5% Significance Level											
136												
137	Lognormal Statistics											
138					Minimum of Logged Data	2.485			Mean of logged Data			2.557
139					Maximum of Logged Data	2.89			SD of logged Data			0.144
140												
141	Assuming Lognormal Distribution											
142					95% H-UCL	14.15			90% Chebyshev (MVUE) UCL			14.72
143					95% Chebyshev (MVUE) UCL	15.49			97.5% Chebyshev (MVUE) UCL			16.56
144					99% Chebyshev (MVUE) UCL	18.66						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data do not follow a Discernible Distribution (0.05)											
148												
149	Nonparametric Distribution Free UCLs											
150					95% CLT UCL	14.07			95% Jackknife UCL			14.17
151					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
152					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
153					95% BCA Bootstrap UCL	N/A						
154					90% Chebyshev(Mean, Sd) UCL	14.92			95% Chebyshev(Mean, Sd) UCL			15.78
155					97.5% Chebyshev(Mean, Sd) UCL	16.97			99% Chebyshev(Mean, Sd) UCL			19.31
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157						Suggested UCL to Use						
158					95% Student's-t UCL	14.17				or 95% Modified-t UCL		14.24
159												
160					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
161					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
162					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
163					For additional insight the user may want to consult a statistician.							
164												
165												
166	PAH, Total											
167												
168						General Statistics						
169					Total Number of Observations	11				Number of Distinct Observations		3
170										Number of Missing Observations		0
171					Minimum	0.00806				Mean		0.329
172					Maximum	0.49				Median		0.329
173					SD	0.124				Std. Error of Mean		0.0375
174					Coefficient of Variation	0.378				Skewness		-1.578
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.675				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.85				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.409				Lilliefors GOF Test		
180					5% Lilliefors Critical Value	0.267				Data Not Normal at 5% Significance Level		
181						Data Not Normal at 5% Significance Level						
182												
183						Assuming Normal Distribution						
184					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
185					95% Student's-t UCL	0.397				95% Adjusted-CLT UCL (Chen-1995)		0.372
186										95% Modified-t UCL (Johnson-1978)		0.394
187												
188						Gamma GOF Test						
189					A-D Test Statistic	2.675				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.739				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.502				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.258				Data Not Gamma Distributed at 5% Significance Level		
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	2.037				k star (bias corrected MLE)		1.542
197					Theta hat (MLE)	0.162				Theta star (bias corrected MLE)		0.214
198					nu hat (MLE)	44.82				nu star (bias corrected)		33.93
199					MLE Mean (bias corrected)	0.329				MLE Sd (bias corrected)		0.265
200										Approximate Chi Square Value (0.05)		21.61
201					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		20.02
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	0.517				95% Adjusted Gamma UCL (use when n<50)		0.558
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.445				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.85				Data Not Lognormal at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.5	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	-4.821				Mean of logged Data		-1.376
215					Maximum of Logged Data	-0.713				SD of logged Data		1.154
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	1.639				90% Chebyshev (MVUE) UCL		0.952
219					95% Chebyshev (MVUE) UCL	1.179				97.5% Chebyshev (MVUE) UCL		1.495
220					99% Chebyshev (MVUE) UCL	2.115						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	0.391				95% Jackknife UCL		0.397
227					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
228					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
229					95% BCA Bootstrap UCL	N/A						
230					90% Chebyshev(Mean, Sd) UCL	0.442				95% Chebyshev(Mean, Sd) UCL		0.493
231					97.5% Chebyshev(Mean, Sd) UCL	0.564				99% Chebyshev(Mean, Sd) UCL		0.703
232												
233	**Suggested UCL to Use**											
234					95% Chebyshev (Mean, Sd) UCL	0.493						
235												
236	**Recommended UCL exceeds the maximum observation**											
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
240	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
241	For additional insight the user may want to consult a statistician.											
242												
243	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
244	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
245												
246												
247	**Uranium-238**											
248												
249	**General Statistics**											
250					Total Number of Observations	11				Number of Distinct Observations		4
251										Number of Missing Observations		0
252					Minimum	0.168				Mean		0.764
253					Maximum	1.76				Median		0.764
254					SD	0.388				Std. Error of Mean		0.117
255					Coefficient of Variation	0.508				Skewness		1.488
256												
257	**Normal GOF Test**											
258					Shapiro Wilk Test Statistic	0.696	**Shapiro Wilk GOF Test**					
259					5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level					
260					Lilliefors Test Statistic	0.409	**Lilliefors GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					5% Lilliefors Critical Value	0.267	Data Not Normal at 5% Significance Level					
262	**Data Not Normal at 5% Significance Level**											
263												
264	**Assuming Normal Distribution**											
265	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
266					95% Student's-t UCL	0.976				95% Adjusted-CLT UCL (Chen-1995)		1.013
267										95% Modified-t UCL (Johnson-1978)		0.985
268												
269	**Gamma GOF Test**											
270					A-D Test Statistic	1.66	**Anderson-Darling Gamma GOF Test**					
271					5% A-D Critical Value	0.733	Data Not Gamma Distributed at 5% Significance Level					
272					K-S Test Statistic	0.384	**Kolmogrov-Smirnoff Gamma GOF Test**					
273					5% K-S Critical Value	0.256	Data Not Gamma Distributed at 5% Significance Level					
274	**Data Not Gamma Distributed at 5% Significance Level**											
275												
276	**Gamma Statistics**											
277					k hat (MLE)	4.028				k star (bias corrected MLE)		2.99
278					Theta hat (MLE)	0.19				Theta star (bias corrected MLE)		0.255
279					nu hat (MLE)	88.62				nu star (bias corrected)		65.79
280					MLE Mean (bias corrected)	0.764				MLE Sd (bias corrected)		0.442
281										Approximate Chi Square Value (0.05)		48.12
282					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		45.67
283												
284	**Assuming Gamma Distribution**											
285					95% Approximate Gamma UCL (use when n>=50))	1.044				95% Adjusted Gamma UCL (use when n<50)		1.101
286												
287	**Lognormal GOF Test**											
288					Shapiro Wilk Test Statistic	0.726	**Shapiro Wilk Lognormal GOF Test**					
289					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
290					Lilliefors Test Statistic	0.406	**Lilliefors Lognormal GOF Test**					
291					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
292	**Data Not Lognormal at 5% Significance Level**											
293												
294	**Lognormal Statistics**											
295					Minimum of Logged Data	-1.784				Mean of logged Data		-0.398
296					Maximum of Logged Data	0.565				SD of logged Data		0.579
297												
298	**Assuming Lognormal Distribution**											
299					95% H-UCL	1.207				90% Chebyshev (MVUE) UCL		1.201
300					95% Chebyshev (MVUE) UCL	1.391				97.5% Chebyshev (MVUE) UCL		1.655
301					99% Chebyshev (MVUE) UCL	2.174						
302												
303	**Nonparametric Distribution Free UCL Statistics**											
304	**Data do not follow a Discernible Distribution (0.05)**											
305												
306	**Nonparametric Distribution Free UCLs**											
307					95% CLT UCL	0.957				95% Jackknife UCL		0.976
308					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
309					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
310					95% BCA Bootstrap UCL	N/A						
311					90% Chebyshev(Mean, Sd) UCL	1.115				95% Chebyshev(Mean, Sd) UCL		1.274
312					97.5% Chebyshev(Mean, Sd) UCL	1.495				99% Chebyshev(Mean, Sd) UCL		1.929

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314						**Suggested UCL to Use**						
315					95% Chebyshev (Mean, Sd) UCL	1.274						
316												
317					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
318					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
319					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
320					For additional insight the user may want to consult a statistician.							
321												
322												
323	**Vanadium**											
324												
325						**General Statistics**						
326					Total Number of Observations	11	Number of Distinct Observations					10
327							Number of Missing Observations					0
328					Minimum	90	Mean					112.4
329					Maximum	131	Median					114
330					SD	13.87	Std. Error of Mean					4.183
331					Coefficient of Variation	0.123	Skewness					-0.433
332												
333						**Normal GOF Test**						
334					Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**					
335					5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level					
336					Lilliefors Test Statistic	0.16	**Lilliefors GOF Test**					
337					5% Lilliefors Critical Value	0.267	Data appear Normal at 5% Significance Level					
338						**Data appear Normal at 5% Significance Level**						
339												
340						**Assuming Normal Distribution**						
341					**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**					
342					95% Student's-t UCL	119.9	95% Adjusted-CLT UCL (Chen-1995)					118.7
343							95% Modified-t UCL (Johnson-1978)					119.9
344												
345						**Gamma GOF Test**						
346					A-D Test Statistic	0.362	**Anderson-Darling Gamma GOF Test**					
347					5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level					
348					K-S Test Statistic	0.173	**Kolmogrov-Smirnoff Gamma GOF Test**					
349					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
350						**Detected data appear Gamma Distributed at 5% Significance Level**						
351												
352						**Gamma Statistics**						
353					k hat (MLE)	69.25	k star (bias corrected MLE)					50.42
354					Theta hat (MLE)	1.623	Theta star (bias corrected MLE)					2.228
355					nu hat (MLE)	1523	nu star (bias corrected)					1109
356					MLE Mean (bias corrected)	112.4	MLE Sd (bias corrected)					15.82
357							Approximate Chi Square Value (0.05)					1033
358					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					1021
359												
360						**Assuming Gamma Distribution**						
361					95% Approximate Gamma UCL (use when n>=50))	120.7	95% Adjusted Gamma UCL (use when n<50)					122.1
362												
363						**Lognormal GOF Test**						
364					Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
365					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
366					Lilliefors Test Statistic	0.184	**Lilliefors Lognormal GOF Test**					
367					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
368	**Data appear Lognormal at 5% Significance Level**											
369												
370	**Lognormal Statistics**											
371					Minimum of Logged Data	4.5				Mean of logged Data		4.715
372					Maximum of Logged Data	4.875				SD of logged Data		0.128
373												
374	**Assuming Lognormal Distribution**											
375					95% H-UCL	121				90% Chebyshev (MVUE) UCL		125.4
376					95% Chebyshev (MVUE) UCL	131.3				97.5% Chebyshev (MVUE) UCL		139.4
377					99% Chebyshev (MVUE) UCL	155.5						
378												
379	**Nonparametric Distribution Free UCL Statistics**											
380	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
381												
382	**Nonparametric Distribution Free UCLs**											
383					95% CLT UCL	119.2				95% Jackknife UCL		119.9
384					95% Standard Bootstrap UCL	118.9				95% Bootstrap-t UCL		119.1
385					95% Hall's Bootstrap UCL	118.4				95% Percentile Bootstrap UCL		118.9
386					95% BCA Bootstrap UCL	118.2						
387					90% Chebyshev(Mean, Sd) UCL	124.9				95% Chebyshev(Mean, Sd) UCL		130.6
388					97.5% Chebyshev(Mean, Sd) UCL	138.5				99% Chebyshev(Mean, Sd) UCL		154
389												
390	**Suggested UCL to Use**											
391					95% Student's-t UCL	119.9						
392												
393	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
394	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
395	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
396	For additional insight the user may want to consult a statistician.											
397												
398	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
399	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
400												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/1/2015 12:51:07 PM								
5	From File			EPC_204Surf_EU02.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Arsenic											
12												
13	General Statistics											
14	Total Number of Observations					11	Number of Distinct Observations					3
15							Number of Missing Observations					0
16	Minimum					6.7	Mean					16.43
17	Maximum					84	Median					10
18	SD					22.43	Std. Error of Mean					6.764
19	Coefficient of Variation					1.366	Skewness					3.305
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.372	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.522	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					28.69	95% Adjusted-CLT UCL (Chen-1995)					34.75
31							95% Modified-t UCL (Johnson-1978)					29.81
32												
33	Gamma GOF Test											
34	A-D Test Statistic					3.295	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.741	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.531	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.259	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					1.62	k star (bias corrected MLE)					1.239
42	Theta hat (MLE)					10.14	Theta star (bias corrected MLE)					13.26
43	nu hat (MLE)					35.65	nu star (bias corrected)					27.26
44	MLE Mean (bias corrected)					16.43	MLE Sd (bias corrected)					14.76
45							Approximate Chi Square Value (0.05)					16.35
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					14.99
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					27.38	95% Adjusted Gamma UCL (use when n<50)					29.87
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.454	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.502		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.267		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	1.902				Mean of logged Data		2.46
60					Maximum of Logged Data	4.431				SD of logged Data		0.665
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	24.22				90% Chebyshev (MVUE) UCL		23.12
64					95% Chebyshev (MVUE) UCL	27.13				97.5% Chebyshev (MVUE) UCL		32.71
65					99% Chebyshev (MVUE) UCL	43.65						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	27.55				95% Jackknife UCL		28.69
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	36.72				95% Chebyshev(Mean, Sd) UCL		45.91
76					97.5% Chebyshev(Mean, Sd) UCL	58.67				99% Chebyshev(Mean, Sd) UCL		83.73
77												
78					**Suggested UCL to Use**							
79					95% Chebyshev (Mean, Sd) UCL	45.91						
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	**Chromium**											
88												
89					**General Statistics**							
90					Total Number of Observations	11				Number of Distinct Observations		2
91										Number of Missing Observations		0
92					Minimum	12				Mean		14.27
93					Maximum	37				Median		12
94					SD	7.538				Std. Error of Mean		2.273
95					Coefficient of Variation	0.528				Skewness		3.317
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.345		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.85		Data Not Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.528		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.267		Data Not Normal at 5% Significance Level				
102					**Data Not Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	18.39				95% Adjusted-CLT UCL (Chen-1995)		20.44
107										95% Modified-t UCL (Johnson-1978)		18.77
108												
109	Gamma GOF Test											
110					A-D Test Statistic	3.71	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.731	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.537	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.256	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	7.197				k star (bias corrected MLE)		5.295
118					Theta hat (MLE)	1.983				Theta star (bias corrected MLE)		2.696
119					nu hat (MLE)	158.3				nu star (bias corrected)		116.5
120					MLE Mean (bias corrected)	14.27				MLE Sd (bias corrected)		6.203
121										Approximate Chi Square Value (0.05)		92.57
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		89.09
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	17.96				95% Adjusted Gamma UCL (use when n<50)		18.66
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.345	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.528	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	2.485				Mean of logged Data		2.587
136					Maximum of Logged Data	3.611				SD of logged Data		0.34
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	17.43				90% Chebyshev (MVUE) UCL		18.35
140					95% Chebyshev (MVUE) UCL	20.32				97.5% Chebyshev (MVUE) UCL		23.05
141					99% Chebyshev (MVUE) UCL	28.42						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	18.01				95% Jackknife UCL		N/A
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	21.09				95% Chebyshev(Mean, Sd) UCL		24.18
152					97.5% Chebyshev(Mean, Sd) UCL	28.47				99% Chebyshev(Mean, Sd) UCL		36.89
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	18.39				or 95% Modified-t UCL		18.77
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	PAH, Total											
164												
165	General Statistics											
166	Total Number of Observations					11	Number of Distinct Observations					1
167							Number of Missing Observations					0
168	Minimum					0.062	Mean					0.062
169	Maximum					0.062	Median					0.062
170												
171	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
172	ProUCL (or any other software) should not be used on such a data set!											
173	The data set for variable PAH, Total was not processed!											
174												
175	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
176	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
177												
178												
179												
180	Uranium-238											
181												
182	General Statistics											
183	Total Number of Observations					11	Number of Distinct Observations					1
184							Number of Missing Observations					0
185	Minimum					3.92	Mean					3.92
186	Maximum					3.92	Median					3.92
187												
188	Warning: There is only one distinct observation value in this data set - resulting in '0' variance!											
189	ProUCL (or any other software) should not be used on such a data set!											
190	The data set for variable Uranium-238 was not processed!											
191												
192	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.											
193	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
194												
195												
196												
197	Vanadium											
198												
199	General Statistics											
200	Total Number of Observations					11	Number of Distinct Observations					10
201							Number of Missing Observations					0
202	Minimum					90	Mean					113.2
203	Maximum					132	Median					116
204	SD					12.87	Std. Error of Mean					3.88
205	Coefficient of Variation					0.114	Skewness					-0.408
206												
207	Normal GOF Test											
208	Shapiro Wilk Test Statistic					0.966	Shapiro Wilk GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
209					5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level					
210					Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**					
211					5% Lilliefors Critical Value	0.267	Data appear Normal at 5% Significance Level					
212	**Data appear Normal at 5% Significance Level**											
213												
214	**Assuming Normal Distribution**											
215	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
216					95% Student's-t UCL	120.2	95% Adjusted-CLT UCL (Chen-1995)					119.1
217							95% Modified-t UCL (Johnson-1978)					120.1
218												
219	**Gamma GOF Test**											
220					A-D Test Statistic	0.252	**Anderson-Darling Gamma GOF Test**					
221					5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level					
222					K-S Test Statistic	0.148	**Kolmogrov-Smirnoff Gamma GOF Test**					
223					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
224	**Detected data appear Gamma Distributed at 5% Significance Level**											
225												
226	**Gamma Statistics**											
227					k hat (MLE)	82.02	k star (bias corrected MLE)					59.71
228					Theta hat (MLE)	1.38	Theta star (bias corrected MLE)					1.895
229					nu hat (MLE)	1805	nu star (bias corrected)					1314
230					MLE Mean (bias corrected)	113.2	MLE Sd (bias corrected)					14.65
231							Approximate Chi Square Value (0.05)					1231
232					Adjusted Level of Significance	0.0278	Adjusted Chi Square Value					1217
233												
234	**Assuming Gamma Distribution**											
235					95% Approximate Gamma UCL (use when n>=50))	120.8	95% Adjusted Gamma UCL (use when n<50)					122.1
236												
237	**Lognormal GOF Test**											
238					Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk Lognormal GOF Test**					
239					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
240					Lilliefors Test Statistic	0.149	**Lilliefors Lognormal GOF Test**					
241					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
242	**Data appear Lognormal at 5% Significance Level**											
243												
244	**Lognormal Statistics**											
245					Minimum of Logged Data	4.5	Mean of logged Data					4.723
246					Maximum of Logged Data	4.883	SD of logged Data					0.117
247												
248	**Assuming Lognormal Distribution**											
249					95% H-UCL	121.1	90% Chebyshev (MVUE) UCL					125.2
250					95% Chebyshev (MVUE) UCL	130.6	97.5% Chebyshev (MVUE) UCL					138.2
251					99% Chebyshev (MVUE) UCL	153						
252												
253	**Nonparametric Distribution Free UCL Statistics**											
254	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
255												
256	**Nonparametric Distribution Free UCLs**											
257					95% CLT UCL	119.6	95% Jackknife UCL					120.2
258					95% Standard Bootstrap UCL	119.2	95% Bootstrap-t UCL					119.5
259					95% Hall's Bootstrap UCL	119.4	95% Percentile Bootstrap UCL					118.9
260					95% BCA Bootstrap UCL	118.8						

	A	B	C	D	E	F	G	H	I	J	K	L
261					90% Chebyshev(Mean, Sd) UCL	124.8				95% Chebyshev(Mean, Sd) UCL		130.1
262					97.5% Chebyshev(Mean, Sd) UCL	137.4				99% Chebyshev(Mean, Sd) UCL		151.8
263												
264					**Suggested UCL to Use**							
265					95% Student's-t UCL	120.2						
266												
267	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
268	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
269	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
270	For additional insight the user may want to consult a statistician.											
271												
272	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
273	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
274												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/3/2015 9:02:29 AM								
5	From File			EPC_204SurfEU5.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Arsenic											
12												
13	General Statistics											
14	Total Number of Observations					11	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					3	Mean					17.61
17	Maximum					107	Median					10
18	SD					29.77	Std. Error of Mean					8.975
19	Coefficient of Variation					1.69	Skewness					3.267
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.411	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.51	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					33.88	95% Adjusted-CLT UCL (Chen-1995)					41.82
31							95% Modified-t UCL (Johnson-1978)					35.35
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.345	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.751	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.483	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.262	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					1.044	k star (bias corrected MLE)					0.82
42	Theta hat (MLE)					16.87	Theta star (bias corrected MLE)					21.48
43	nu hat (MLE)					22.97	nu star (bias corrected)					18.04
44	MLE Mean (bias corrected)					17.61	MLE Sd (bias corrected)					19.45
45							Approximate Chi Square Value (0.05)					9.417
46	Adjusted Level of Significance					0.0278	Adjusted Chi Square Value					8.419
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					33.73	95% Adjusted Gamma UCL (use when n<50)					37.72
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.675	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.85		Data Not Lognormal at 5% Significance Level				
54					Lilliefors Test Statistic	0.416		**Lilliefors Lognormal GOF Test**				
55					5% Lilliefors Critical Value	0.267		Data Not Lognormal at 5% Significance Level				
56					**Data Not Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59					Minimum of Logged Data	1.099				Mean of logged Data		2.318
60					Maximum of Logged Data	4.673				SD of logged Data		0.897
61												
62					**Assuming Lognormal Distribution**							
63					95% H-UCL	33.68				90% Chebyshev (MVUE) UCL		26.88
64					95% Chebyshev (MVUE) UCL	32.49				97.5% Chebyshev (MVUE) UCL		40.27
65					99% Chebyshev (MVUE) UCL	55.57						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data do not follow a Discernible Distribution (0.05)**							
69												
70					**Nonparametric Distribution Free UCLs**							
71					95% CLT UCL	32.37				95% Jackknife UCL		33.88
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	44.53				95% Chebyshev(Mean, Sd) UCL		56.73
76					97.5% Chebyshev(Mean, Sd) UCL	73.66				99% Chebyshev(Mean, Sd) UCL		106.9
77												
78					**Suggested UCL to Use**							
79					95% Chebyshev (Mean, Sd) UCL	56.73						
80												
81					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
82					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
83					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
84					For additional insight the user may want to consult a statistician.							
85												
86												
87	**Chromium**											
88												
89					**General Statistics**							
90					Total Number of Observations	11				Number of Distinct Observations		3
91										Number of Missing Observations		0
92					Minimum	7.3				Mean		13.11
93					Maximum	28.9				Median		12
94					SD	5.424				Std. Error of Mean		1.635
95					Coefficient of Variation	0.414				Skewness		2.857
96												
97					**Normal GOF Test**							
98					Shapiro Wilk Test Statistic	0.498		**Shapiro Wilk GOF Test**				
99					5% Shapiro Wilk Critical Value	0.85		Data Not Normal at 5% Significance Level				
100					Lilliefors Test Statistic	0.49		**Lilliefors GOF Test**				
101					5% Lilliefors Critical Value	0.267		Data Not Normal at 5% Significance Level				
102					**Data Not Normal at 5% Significance Level**							
103												
104					**Assuming Normal Distribution**							

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	16.07				95% Adjusted-CLT UCL (Chen-1995)		17.3
107										95% Modified-t UCL (Johnson-1978)		16.31
108												
109	Gamma GOF Test											
110					A-D Test Statistic	2.572	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.73	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.472	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.255	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	9.478				k star (bias corrected MLE)		6.954
118					Theta hat (MLE)	1.383				Theta star (bias corrected MLE)		1.885
119					nu hat (MLE)	208.5				nu star (bias corrected)		153
120					MLE Mean (bias corrected)	13.11				MLE Sd (bias corrected)		4.971
121										Approximate Chi Square Value (0.05)		125.4
122					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		121.3
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	15.99				95% Adjusted Gamma UCL (use when n<50)		16.53
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.59	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.453	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.267	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	1.988				Mean of logged Data		2.52
136					Maximum of Logged Data	3.364				SD of logged Data		0.317
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	15.91				90% Chebyshev (MVUE) UCL		16.77
140					95% Chebyshev (MVUE) UCL	18.47				97.5% Chebyshev (MVUE) UCL		20.84
141					99% Chebyshev (MVUE) UCL	25.49						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	15.8				95% Jackknife UCL		16.07
148					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
149					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
150					95% BCA Bootstrap UCL	N/A						
151					90% Chebyshev(Mean, Sd) UCL	18.02				95% Chebyshev(Mean, Sd) UCL		20.24
152					97.5% Chebyshev(Mean, Sd) UCL	23.32				99% Chebyshev(Mean, Sd) UCL		29.38
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	16.07				or 95% Modified-t UCL		16.31
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**PAH, Total**											
164												
165	**General Statistics**											
166	Total Number of Observations					11	Number of Distinct Observations				1	
167							Number of Missing Observations				0	
168	Minimum					0.0204	Mean				0.0204	
169	Maximum					0.0204	Median				0.0204	
170												
171	**Warning: There is only one distinct observation value in this data set - resulting in '0' variance!**											
172	**ProUCL (or any other software) should not be used on such a data set!**											
173	**The data set for variable PAH, Total was not processed!**											
174												
175	**If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.**											
176	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
177												
178												
179												
180	**Uranium-238**											
181												
182	**General Statistics**											
183	Total Number of Observations					11	Number of Distinct Observations				4	
184							Number of Missing Observations				0	
185	Minimum					1.5	Mean				4.544	
186	Maximum					9.723	Median				4.544	
187	SD					2.016	Std. Error of Mean				0.608	
188	Coefficient of Variation					0.444	Skewness				1.506	
189												
190	**Normal GOF Test**											
191	Shapiro Wilk Test Statistic					0.695	**Shapiro Wilk GOF Test**					
192	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
193	Lilliefors Test Statistic					0.409	**Lilliefors GOF Test**					
194	5% Lilliefors Critical Value					0.267	Data Not Normal at 5% Significance Level					
195	**Data Not Normal at 5% Significance Level**											
196												
197	**Assuming Normal Distribution**											
198	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
199	95% Student's-t UCL					5.646	95% Adjusted-CLT UCL (Chen-1995)				5.839	
200							95% Modified-t UCL (Johnson-1978)				5.692	
201												
202	**Gamma GOF Test**											
203	A-D Test Statistic					1.65	**Anderson-Darling Gamma GOF Test**					
204	5% A-D Critical Value					0.731	Data Not Gamma Distributed at 5% Significance Level					
205	K-S Test Statistic					0.374	**Kolmogrov-Smirnoff Gamma GOF Test**					
206	5% K-S Critical Value					0.256	Data Not Gamma Distributed at 5% Significance Level					
207	**Data Not Gamma Distributed at 5% Significance Level**											
208												

	A	B	C	D	E	F	G	H	I	J	K	L
209						Gamma Statistics						
210					k hat (MLE)	5.762				k star (bias corrected MLE)		4.251
211					Theta hat (MLE)	0.789				Theta star (bias corrected MLE)		1.069
212					nu hat (MLE)	126.8				nu star (bias corrected)		93.53
213					MLE Mean (bias corrected)	4.544				MLE Sd (bias corrected)		2.204
214										Approximate Chi Square Value (0.05)		72.22
215					Adjusted Level of Significance	0.0278				Adjusted Chi Square Value		69.18
216												
217						Assuming Gamma Distribution						
218				95% Approximate Gamma UCL (use when n>=50))		5.885				95% Adjusted Gamma UCL (use when n<50)		6.144
219												
220						Lognormal GOF Test						
221					Shapiro Wilk Test Statistic	0.745				Shapiro Wilk Lognormal GOF Test		
222					5% Shapiro Wilk Critical Value	0.85				Data Not Lognormal at 5% Significance Level		
223					Lilliefors Test Statistic	0.395				Lilliefors Lognormal GOF Test		
224					5% Lilliefors Critical Value	0.267				Data Not Lognormal at 5% Significance Level		
225						Data Not Lognormal at 5% Significance Level						
226												
227						Lognormal Statistics						
228					Minimum of Logged Data	0.405				Mean of logged Data		1.425
229					Maximum of Logged Data	2.274				SD of logged Data		0.461
230												
231						Assuming Lognormal Distribution						
232					95% H-UCL	6.299				90% Chebyshev (MVUE) UCL		6.514
233					95% Chebyshev (MVUE) UCL	7.392				97.5% Chebyshev (MVUE) UCL		8.612
234					99% Chebyshev (MVUE) UCL	11.01						
235												
236						Nonparametric Distribution Free UCL Statistics						
237						Data do not follow a Discernible Distribution (0.05)						
238												
239						Nonparametric Distribution Free UCLs						
240					95% CLT UCL	5.544				95% Jackknife UCL		5.646
241					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
242					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
243					95% BCA Bootstrap UCL	N/A						
244					90% Chebyshev(Mean, Sd) UCL	6.368				95% Chebyshev(Mean, Sd) UCL		7.194
245					97.5% Chebyshev(Mean, Sd) UCL	8.34				99% Chebyshev(Mean, Sd) UCL		10.59
246												
247						Suggested UCL to Use						
248					95% Student's-t UCL	5.646				or 95% Modified-t UCL		5.692
249												
250					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
251					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
252					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
253					For additional insight the user may want to consult a statistician.							
254												
255												
256	Vanadium											
257												
258						General Statistics						
259					Total Number of Observations	11				Number of Distinct Observations		8
260										Number of Missing Observations		0

	A	B	C	D	E	F	G	H	I	J	K	L
261					Minimum	95					Mean	114.1
262					Maximum	132					Median	118
263					SD	13.02					Std. Error of Mean	3.925
264					Coefficient of Variation	0.114					Skewness	-0.398
265												
266					Normal GOF Test							
267					Shapiro Wilk Test Statistic	0.908	Shapiro Wilk GOF Test					
268					5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level					
269					Lilliefors Test Statistic	0.195	Lilliefors GOF Test					
270					5% Lilliefors Critical Value	0.267	Data appear Normal at 5% Significance Level					
271					Data appear Normal at 5% Significance Level							
272												
273					Assuming Normal Distribution							
274			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
275					95% Student's-t UCL	121.2					95% Adjusted-CLT UCL (Chen-1995)	120
276											95% Modified-t UCL (Johnson-1978)	121.1
277												
278					Gamma GOF Test							
279					A-D Test Statistic	0.525	Anderson-Darling Gamma GOF Test					
280					5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level					
281					K-S Test Statistic	0.211	Kolmogrov-Smirnoff Gamma GOF Test					
282					5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level					
283					Detected data appear Gamma Distributed at 5% Significance Level							
284												
285					Gamma Statistics							
286					k hat (MLE)	81.68					k star (bias corrected MLE)	59.47
287					Theta hat (MLE)	1.397					Theta star (bias corrected MLE)	1.919
288					nu hat (MLE)	1797					nu star (bias corrected)	1308
289					MLE Mean (bias corrected)	114.1					MLE Sd (bias corrected)	14.8
290											Approximate Chi Square Value (0.05)	1225
291					Adjusted Level of Significance	0.0278					Adjusted Chi Square Value	1212
292												
293					Assuming Gamma Distribution							
294					95% Approximate Gamma UCL (use when n>=50))	121.8					95% Adjusted Gamma UCL (use when n<50)	123.1
295												
296					Lognormal GOF Test							
297					Shapiro Wilk Test Statistic	0.894	Shapiro Wilk Lognormal GOF Test					
298					5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level					
299					Lilliefors Test Statistic	0.213	Lilliefors Lognormal GOF Test					
300					5% Lilliefors Critical Value	0.267	Data appear Lognormal at 5% Significance Level					
301					Data appear Lognormal at 5% Significance Level							
302												
303					Lognormal Statistics							
304					Minimum of Logged Data	4.554					Mean of logged Data	4.731
305					Maximum of Logged Data	4.883					SD of logged Data	0.117
306												
307					Assuming Lognormal Distribution							
308					95% H-UCL	122					90% Chebyshev (MVUE) UCL	126.2
309					95% Chebyshev (MVUE) UCL	131.7					97.5% Chebyshev (MVUE) UCL	139.3
310					99% Chebyshev (MVUE) UCL	154.3						
311												
312					Nonparametric Distribution Free UCL Statistics							

	A	B	C	D	E	F	G	H	I	J	K	L
313	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
314												
315	**Nonparametric Distribution Free UCLs**											
316					95% CLT UCL	120.5				95% Jackknife UCL		121.2
317					95% Standard Bootstrap UCL	120.3				95% Bootstrap-t UCL		120.4
318					95% Hall's Bootstrap UCL	119.6				95% Percentile Bootstrap UCL		120.4
319					95% BCA Bootstrap UCL	119.8						
320					90% Chebyshev(Mean, Sd) UCL	125.9				95% Chebyshev(Mean, Sd) UCL		131.2
321					97.5% Chebyshev(Mean, Sd) UCL	138.6				99% Chebyshev(Mean, Sd) UCL		153.1
322												
323	**Suggested UCL to Use**											
324					95% Student's-t UCL	121.2						
325												
326	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
327	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
328	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
329	For additional insight the user may want to consult a statistician.											
330												
331	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
332	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
333												