	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												