

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	e/Time of Computation			8/13/2015 3:04:32 PM								
5	From File			ProUCLinput_C-36-003_0-1.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	f Bootstrap Operations			2000								
9												
10	Aroclor-1254											
11												
12	General Statistics											
13	Total Number of Observations				8		Number of Distinct Observations				8	
14	Number of Detects				5		Number of Non-Detects				3	
15	Number of Distinct Detects				5		Number of Distinct Non-Detects				3	
16	Minimum Detect				0.004		Minimum Non-Detect				0.004	
17	Maximum Detect				1.03		Maximum Non-Detect				0.005	
18	Variance Detects				0.19		Percent Non-Detects				37.5	
19	Mean Detects				0.25		SD Detects				0.43	
20	Median Detects				0.06		CV Detects				1.71	
21	Skewness Detects				2.16		Kurtosis Detects				4.73	
22	Mean of Logged Detects				-2.70		SD of Logged Detects				1.99	
23												
24	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
25	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
26	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
27	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
28												
29	Normal GOF Test on Detects Only											
30	Shapiro Wilk Test Statistic				0.65		Shapiro Wilk GOF Test					
31	5% Shapiro Wilk Critical Value				0.76		Detected Data Not Normal at 5% Significance Level					
32	Lilliefors Test Statistic				0.40		Lilliefors GOF Test					
33	5% Lilliefors Critical Value				0.39		Detected Data Not Normal at 5% Significance Level					
34	Detected Data Not Normal at 5% Significance Level											
35												
36	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
37	Mean				0.16		Standard Error of Mean				0.13	
38	SD				0.33		95% KM (BCA) UCL				0.39	
39	95% KM (t) UCL				0.40		95% KM (Percentile Bootstrap) UCL				0.40	
40	95% KM (z) UCL				0.37		95% KM Bootstrap t UCL				1.84	
41	90% KM Chebyshev UCL				0.55		95% KM Chebyshev UCL				0.73	
42	97.5% KM Chebyshev UCL				0.97		99% KM Chebyshev UCL				1.46	
43												
44	Gamma GOF Tests on Detected Observations Only											
45	A-D Test Statistic				0.32		Anderson-Darling GOF Test					
46	5% A-D Critical Value				0.71		data appear Gamma Distributed at 5% Significance Level					
47	K-S Test Statistic				0.25		Kolmogrov-Smirnov GOF					
48	5% K-S Critical Value				0.37		data appear Gamma Distributed at 5% Significance Level					
49	Detected data appear Gamma Distributed at 5% Significance Level											
50												
51	Gamma Statistics on Detected Data Only											
52	k hat (MLE)				0.47		k star (bias corrected MLE)				0.32	
53	Theta hat (MLE)				0.53		Theta star (bias corrected MLE)				0.78	
54	nu hat (MLE)				4.78		nu star (bias corrected)				3.24	
55	MLE Mean (bias corrected)				0.25		MLE Sd (bias corrected)				0.44	
56												
57	Gamma Kaplan-Meier (KM) Statistics											
58	k hat (KM)				0.23		nu hat (KM)				3.75	
59	Approximate Chi Square Value (3.75, α)				0.62		Adjusted Chi Square Value (3.75, β)				0.37	
60	Approximate KM-UCL (use when n>=50)				0.96		Gamma Adjusted KM-UCL (use when n<50)				1.60	
61												
62	Gamma ROS Statistics using Imputed Non-Detects											
63	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
64	GROS may not be used when kstar of detected data is small such as < 0.1											
65	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
66	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimate											
67	Minimum				0.004		Mean				0.16	
68	Maximum				1.03		Median				0.02	
69	SD				0.35		CV				2.17	
70	k hat (MLE)				0.40		k star (bias corrected MLE)				0.33	
71	Theta hat (MLE)				0.39		Theta star (bias corrected MLE)				0.47	
72	nu hat (MLE)				6.55		nu star (bias corrected)				5.42	
73	MLE Mean (bias corrected)				0.16		MLE Sd (bias corrected)				0.27	
74							Adjusted Level of Significance (β)				0.01	
75	Approximate Chi Square Value (5.43, α)				1.35		Adjusted Chi Square Value (5.43, β)				0.90	
76	Gamma Approximate UCL (use when n>=50)				0.65		Gamma Adjusted UCL (use when n<50)				0.97	
77												
78	Lognormal GOF Test on Detected Observations Only											
79	Shapiro Wilk Test Statistic				0.99		Shapiro Wilk GOF Test					
80	5% Shapiro Wilk Critical Value				0.76		Detected Data appear Lognormal at 5% Significance Level					
81	Lilliefors Test Statistic				0.16		Lilliefors GOF Test					
82	5% Lilliefors Critical Value				0.39		Detected Data appear Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
83	Detected Data appear Lognormal at 5% Significance Level											
84												
85	Lognormal ROS Statistics Using Imputed Non-Detects											
86	Mean in Original Scale					0.16	Mean in Log Scale					-3.82
87	SD in Original Scale					0.35	SD in Log Scale					2.16
88	95% t UCL (assumes normality of ROS data)					0.39	95% Percentile Bootstrap UCL					0.4
89	95% BCA Bootstrap UCL					0.51	95% Bootstrap t UCL					2.34
90	95% H-UCL (Log ROS)					49.61						
91												
92	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
93	KM Mean (logged)					-3.72	95% H-UCL (KM -Log)					11.74
94	KM SD (logged)					1.92	95% Critical H Value (KM-Log)					5.93
95	KM Standard Error of Mean (logged)					0.76						
96												
97	DL/2 Statistics											
98	DL/2 Normal						DL/2 Log-Transformed					
99	Mean in Original Scale					0.16	Mean in Log Scale					-3.93
100	SD in Original Scale					0.35	SD in Log Scale					2.27
101	95% t UCL (Assumes normality)					0.39	95% H-Stat UCL					99.5
102	DL/2 is not a recommended method, provided for comparisons and historical reasons											
103												
104	Nonparametric Distribution Free UCL Statistics											
105	Detected Data appear Gamma Distributed at 5% Significance Level											
106												
107	Suggested UCL to Use											
108	95% KM (BCA) UCL					0.39	95% GROS Adjusted Gamma UCL					0.97
109	95% Adjusted Gamma KM-UCL					1.60						
110	Warning: Recommended UCL exceeds the maximum observation											
111												
112	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
113	Recommendations are based upon data size, data distribution, and skewness.											
114	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
115	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult											
116												
117												
118	Calcium											
119												
120	General Statistics											
121	Total Number of Observations					8	Number of Distinct Observations					8
122							Number of Missing Observations					0
123	Minimum					2430	Mean					4856
124	Maximum					11700	Median					4100
125	SD					2948	Std. Error of Mean					1042
126	Coefficient of Variation					0.60	Skewness					2.18
127												
128	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
129	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
130	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
131	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
132												
133	Normal GOF Test											
134	Shapiro Wilk Test Statistic					0.74	Shapiro Wilk GOF Test					
135	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level					
136	Lilliefors Test Statistic					0.29	Lilliefors GOF Test					
137	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level					
138	Data appear Approximate Normal at 5% Significance Level											
139												
140	Assuming Normal Distribution											
141	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
142	95% Student's-t UCL					6831	95% Adjusted-CLT UCL (Chen-1995)					7429
143							95% Modified-t UCL (Johnson-1978)					6965
144												
145	Gamma GOF Test											
146	A-D Test Statistic					0.48	Anderson-Darling Gamma GOF Test					
147	5% A-D Critical Value					0.71	Data appear Gamma Distributed at 5% Significance Level					
148	K-S Test Statistic					0.22	Kolmogrov-Smirnoff Gamma GOF Test					
149	5% K-S Critical Value					0.29	Data appear Gamma Distributed at 5% Significance Level					
150	Detected data appear Gamma Distributed at 5% Significance Level											
151												
152	Gamma Statistics											
153	k hat (MLE)					4.38	k star (bias corrected MLE)					2.82
154	Theta hat (MLE)					1109	Theta star (bias corrected MLE)					1722
155	nu hat (MLE)					70.08	nu star (bias corrected)					45.13
156	MLE Mean (bias corrected)					4856	MLE Sd (bias corrected)					2891
157							Approximate Chi Square Value (0.05)					30.72
158	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					27.74
159												
160	Assuming Gamma Distribution											
161	Approximate Gamma UCL (use when n>=50)					7134	Adjusted Gamma UCL (use when n<50)					7899
162												
163	Lognormal GOF Test											
164	Shapiro Wilk Test Statistic					0.91	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
165	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level						
166	Lilliefors Test Statistic					0.19	Lilliefors Lognormal GOF Test						
167	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level						
168	Data appear Lognormal at 5% Significance Level												
169													
170	Lognormal Statistics												
171	Minimum of Logged Data					7.79	Mean of logged Data					8.37	
172	Maximum of Logged Data					9.36	SD of logged Data					0.48	
173													
174	Assuming Lognormal Distribution												
175	95% H-UCL					7456	90% Chebyshev (MVUE) UCL					7270	
176	95% Chebyshev (MVUE) UCL					8398	97.5% Chebyshev (MVUE) UCL					9963	
177	99% Chebyshev (MVUE) UCL					13039							
178													
179	Nonparametric Distribution Free UCL Statistics												
180	Data appear to follow a Discernible Distribution at 5% Significance Level												
181													
182	Nonparametric Distribution Free UCLs												
183	95% CLT UCL					6570	95% Jackknife UCL					6831	
184	95% Standard Bootstrap UCL					6489	95% Bootstrap-t UCL					9140	
185	95% Hall's Bootstrap UCL					13778	95% Percentile Bootstrap UCL					6653	
186	95% BCA Bootstrap UCL					7126							
187	90% Chebyshev(Mean, Sd) UCL					7983	95% Chebyshev(Mean, Sd) UCL					9399	
188	97.5% Chebyshev(Mean, Sd) UCL					11364	99% Chebyshev(Mean, Sd) UCL					15225	
189													
190	Suggested UCL to Use												
191	95% Student's-t UCL					6831							
192													
193	Conditions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
194	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
195	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
196	For additional insight the user may want to consult a statistician.												
197													
198													
199	Cesium-137												
200													
201	General Statistics												
202	Total Number of Observations					8	Number of Distinct Observations					8	
203							Number of Missing Observations					0	
204	Minimum					0.33	Mean					0.78	
205	Maximum					2.02	Median					0.64	
206	SD					0.51	Std. Error of Mean					0.18	
207	Coefficient of Variation					0.66	Skewness					2.42	
208													
209	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
210	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
211	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
212	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
213													
214	Normal GOF Test												
215	Shapiro Wilk Test Statistic					0.67	Shapiro Wilk GOF Test						
216	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level						
217	Lilliefors Test Statistic					0.38	Lilliefors GOF Test						
218	5% Lilliefors Critical Value					0.31	Data Not Normal at 5% Significance Level						
219	Data Not Normal at 5% Significance Level												
220													
221	Assuming Normal Distribution												
222	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
223	95% Student's-t UCL					1.13	95% Adjusted-CLT UCL (Chen-1995)					1.25	
224							95% Modified-t UCL (Johnson-1978)					1.15	
225													
226	Gamma GOF Test												
227	A-D Test Statistic					0.77	Anderson-Darling Gamma GOF Test						
228	5% A-D Critical Value					0.71	Data Not Gamma Distributed at 5% Significance Level						
229	K-S Test Statistic					0.32	Kolmogrov-Smirnoff Gamma GOF Test						
230	5% K-S Critical Value					0.29	Data Not Gamma Distributed at 5% Significance Level						
231	Data Not Gamma Distributed at 5% Significance Level												
232													
233	Gamma Statistics												
234	k hat (MLE)					3.93	k star (bias corrected MLE)					2.54	
235	Theta hat (MLE)					0.19	Theta star (bias corrected MLE)					0.30	
236	nu hat (MLE)					62.96	nu star (bias corrected)					40.64	
237	MLE Mean (bias corrected)					0.78	MLE Sd (bias corrected)					0.49	
238							Approximate Chi Square Value (0.05)					27.0	
239	Adjusted Level of Significance					0.015	Adjusted Chi Square Value					24.2	
240													
241	Assuming Gamma Distribution												
242	Approximate Gamma UCL (use when n>=50)					1.17	Adjusted Gamma UCL (use when n<50)					1.31	
243													
244	Lognormal GOF Test												
245	Shapiro Wilk Test Statistic					0.87	Shapiro Wilk Lognormal GOF Test						
246	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level						

	A	B	C	D	E	F	G	H	I	J	K	L							
247	Lilliefors Test Statistic					0.28	Lilliefors Lognormal GOF Test												
248	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level												
249	Data appear Lognormal at 5% Significance Level																		
250																			
251	Lognormal Statistics																		
252	Minimum of Logged Data					-1.09	Mean of logged Data					-0.37							
253	Maximum of Logged Data					0.70	SD of logged Data					0.50							
254																			
255	Assuming Lognormal Distribution																		
256	95% H-UCL					1.23	90% Chebyshev (MVUE) UCL					1.18							
257	95% Chebyshev (MVUE) UCL					1.37	97.5% Chebyshev (MVUE) UCL					1.63							
258	99% Chebyshev (MVUE) UCL					2.15													
259																			
260	Nonparametric Distribution Free UCL Statistics																		
261	Data appear to follow a Discernible Distribution at 5% Significance Level																		
262																			
263	Nonparametric Distribution Free UCLs																		
264	95% CLT UCL					1.08	95% Jackknife UCL					1.13							
265	95% Standard Bootstrap UCL					1.06	95% Bootstrap-t UCL					1.66							
266	95% Hall's Bootstrap UCL					2.47	95% Percentile Bootstrap UCL					1.12							
267	95% BCA Bootstrap UCL					1.21													
268	90% Chebyshev(Mean, Sd) UCL					1.33	95% Chebyshev(Mean, Sd) UCL					1.58							
269	97.5% Chebyshev(Mean, Sd) UCL					1.92	99% Chebyshev(Mean, Sd) UCL					2.60							
270																			
271	Suggested UCL to Use																		
272	95% H-UCL					1.23													
273																			
274	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate																		
275	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh																		
276	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets																		
277	For additional insight the user may want to consult a statistician.																		
278																			
279	ProUCL computes and outputs H-statistic based UCLs for historical reasons only.																		
280	often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Manual.																		
281	It is therefore recommended to avoid the use of H-statistic based 95% UCLs.																		
282	Nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.																		
283																			
284																			
285	Chromium																		
286																			
287	General Statistics																		
288	Total Number of Observations					8	Number of Distinct Observations					8							
289							Number of Missing Observations					0							
290	Minimum					9.5	Mean					62.4							
291	Maximum					192	Median					28.1							
292	SD					65.2	Std. Error of Mean					23.0							
293	Coefficient of Variation					1.04	Skewness					1.29							
294																			
295	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use																		
296	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.																		
297	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).																		
298	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0																		
299																			
300	Normal GOF Test																		
301	Shapiro Wilk Test Statistic					0.80	Shapiro Wilk GOF Test												
302	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level												
303	Lilliefors Test Statistic					0.32	Lilliefors GOF Test												
304	5% Lilliefors Critical Value					0.31	Data Not Normal at 5% Significance Level												
305	Data Not Normal at 5% Significance Level																		
306																			
307	Assuming Normal Distribution																		
308	95% Normal UCL						95% UCLs (Adjusted for Skewness)												
309	95% Student's-t UCL					106.1	95% Adjusted-CLT UCL (Chen-1995)					111.7							
310							95% Modified-t UCL (Johnson-1978)					107.9							
311																			
312	Gamma GOF Test																		
313	A-D Test Statistic					0.48	Anderson-Darling Gamma GOF Test												
314	5% A-D Critical Value					0.73	Data appear Gamma Distributed at 5% Significance Level												
315	K-S Test Statistic					0.27	Kolmogrov-Smirnoff Gamma GOF Test												
316	5% K-S Critical Value					0.30	Data appear Gamma Distributed at 5% Significance Level												
317	Detected data appear Gamma Distributed at 5% Significance Level																		
318																			
319	Gamma Statistics																		
320	k hat (MLE)					1.10	k star (bias corrected MLE)					0.77							
321	Theta hat (MLE)					56.2	Theta star (bias corrected MLE)					80.3							
322	nu hat (MLE)					17.7	nu star (bias corrected)					12.4							
323	MLE Mean (bias corrected)					62.4	MLE Sd (bias corrected)					70.8							
324							Approximate Chi Square Value (0.05)					5.51							
325	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					4.40							
326																			
327	Assuming Gamma Distribution																		
328	Approximate Gamma UCL (use when n>=50)					140.7	Adjusted Gamma UCL (use when n<50)					176.2							

	A	B	C	D	E	F	G	H	I	J	K	L
329												
330	Lognormal GOF Test											
331	Shapiro Wilk Test Statistic					0.91	Shapiro Wilk Lognormal GOF Test					
332	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level					
333	Lilliefors Test Statistic					0.22	Lilliefors Lognormal GOF Test					
334	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level					
335	Data appear Lognormal at 5% Significance Level											
336												
337	Lognormal Statistics											
338	Minimum of Logged Data					2.25	Mean of logged Data					3.61
339	Maximum of Logged Data					5.25	SD of logged Data					1.10
340												
341	Assuming Lognormal Distribution											
342	95% H-UCL					323.7	90% Chebyshev (MVUE) UCL					136.4
343	95% Chebyshev (MVUE) UCL					170.1	97.5% Chebyshev (MVUE) UCL					216.9
344	99% Chebyshev (MVUE) UCL					308.7						
345												
346	Nonparametric Distribution Free UCL Statistics											
347	Data appear to follow a Discernible Distribution at 5% Significance Level											
348												
349	Nonparametric Distribution Free UCLs											
350	95% CLT UCL					100.4	95% Jackknife UCL					106.1
351	95% Standard Bootstrap UCL					98.5	95% Bootstrap-t UCL					133.4
352	95% Hall's Bootstrap UCL					100.2	95% Percentile Bootstrap UCL					97.6
353	95% BCA Bootstrap UCL					107.8						
354	90% Chebyshev(Mean, Sd) UCL					131.6	95% Chebyshev(Mean, Sd) UCL					163
355	97.5% Chebyshev(Mean, Sd) UCL					206.5	99% Chebyshev(Mean, Sd) UCL					292
356												
357	Suggested UCL to Use											
358	95% Adjusted Gamma UCL					176.2						
359												
360	ations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
361	mmendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh											
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												
365												
366	Copper											
367												
368	General Statistics											
369	Total Number of Observations					8	Number of Distinct Observations					8
370							Number of Missing Observations					0
371	Minimum					4.75	Mean					349.2
372	Maximum					2720	Median					10.7
373	SD					958	Std. Error of Mean					338.7
374	Coefficient of Variation					2.74	Skewness					2.82
375												
376	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
377	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
378	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
379	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
380												
381	Normal GOF Test											
382	Shapiro Wilk Test Statistic					0.42	Shapiro Wilk GOF Test					
383	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level					
384	Lilliefors Test Statistic					0.51	Lilliefors GOF Test					
385	5% Lilliefors Critical Value					0.31	Data Not Normal at 5% Significance Level					
386	Data Not Normal at 5% Significance Level											
387												
388	Assuming Normal Distribution											
389	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
390	95% Student's-t UCL					990.9	95% Adjusted-CLT UCL (Chen-1995)					1268
391							95% Modified-t UCL (Johnson-1978)					1047
392												
393	Gamma GOF Test											
394	A-D Test Statistic					1.97	Anderson-Darling Gamma GOF Test					
395	5% A-D Critical Value					0.81	Data Not Gamma Distributed at 5% Significance Level					
396	K-S Test Statistic					0.49	Kolmogrov-Smirnov Gamma GOF Test					
397	5% K-S Critical Value					0.32	Data Not Gamma Distributed at 5% Significance Level					
398	Data Not Gamma Distributed at 5% Significance Level											
399												
400	Gamma Statistics											
401	k hat (MLE)					0.24	k star (bias corrected MLE)					0.23
402	Theta hat (MLE)					1426	Theta star (bias corrected MLE)					1477
403	nu hat (MLE)					3.91	nu star (bias corrected)					3.78
404	MLE Mean (bias corrected)					349.2	MLE Sd (bias corrected)					718.2
405							Approximate Chi Square Value (0.05)					0.63
406	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					0.38
407												
408	Assuming Gamma Distribution											
409	Approximate Gamma UCL (use when n>=50)					2071	Adjusted Gamma UCL (use when n<50)					3437
410												

	A	B	C	D	E	F	G	H	I	J	K	L
411	Lognormal GOF Test											
412	Shapiro Wilk Test Statistic					0.64	Shapiro Wilk Lognormal GOF Test					
413	5% Shapiro Wilk Critical Value					0.81	Data Not Lognormal at 5% Significance Level					
414	Lilliefors Test Statistic					0.38	Lilliefors Lognormal GOF Test					
415	5% Lilliefors Critical Value					0.31	Data Not Lognormal at 5% Significance Level					
416	Data Not Lognormal at 5% Significance Level											
417												
418	Lognormal Statistics											
419	Minimum of Logged Data					1.55	Mean of logged Data					2.94
420	Maximum of Logged Data					7.90	SD of logged Data					2.06
421												
422	Assuming Lognormal Distribution											
423	95% H-UCL					22079	90% Chebyshev (MVUE) UCL					288.2
424	95% Chebyshev (MVUE) UCL					376.5	97.5% Chebyshev (MVUE) UCL					498.9
425	99% Chebyshev (MVUE) UCL					739.5						
426												
427	Nonparametric Distribution Free UCL Statistics											
428	Data do not follow a Discernible Distribution (0.05)											
429												
430	Nonparametric Distribution Free UCLs											
431	95% CLT UCL					906.3	95% Jackknife UCL					990.9
432	95% Standard Bootstrap UCL					863.6	95% Bootstrap-t UCL					85547
433	95% Hall's Bootstrap UCL					39618	95% Percentile Bootstrap UCL					1026
434	95% BCA Bootstrap UCL					1365						
435	90% Chebyshev(Mean, Sd) UCL					1365	95% Chebyshev(Mean, Sd) UCL					1826
436	97.5% Chebyshev(Mean, Sd) UCL					2464	99% Chebyshev(Mean, Sd) UCL					3719
437												
438	Suggested UCL to Use											
439	95% Hall's Bootstrap UCL					39618						
440												
441	Recommended UCL exceeds the maximum observation											
442												
443	t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (M											
444												
445	ommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropri											
446	mmendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
447	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
448	For additional insight the user may want to consult a statistician.											
449												
450												
451	Cyanide (Total)											
452												
453	General Statistics											
454	Total Number of Observations					8	Number of Distinct Observations					8
455							Number of Missing Observations					0
456	Minimum					0.36	Mean					1.00
457	Maximum					2.18	Median					0.66
458	SD					0.69	Std. Error of Mean					0.24
459	Coefficient of Variation					0.69	Skewness					0.76
460												
461	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
462	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
463	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
464	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
465												
466	Normal GOF Test											
467	Shapiro Wilk Test Statistic					0.83	Shapiro Wilk GOF Test					
468	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level					
469	Lilliefors Test Statistic					0.26	Lilliefors GOF Test					
470	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level					
471	Data appear Normal at 5% Significance Level											
472												
473	Assuming Normal Distribution											
474	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
475	95% Student's-t UCL					1.46	95% Adjusted-CLT UCL (Chen-1995)					1.47
476							95% Modified-t UCL (Johnson-1978)					1.48
477												
478	Gamma GOF Test											
479	A-D Test Statistic					0.59	Anderson-Darling Gamma GOF Test					
480	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significar					
481	K-S Test Statistic					0.27	Kolmogrov-Smirnoff Gamma GOF Test					
482	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significar					
483	Detected data appear Gamma Distributed at 5% Significance Level											
484												
485	Gamma Statistics											
486	k hat (MLE)					2.45	k star (bias corrected MLE)					1.61
487	Theta hat (MLE)					0.40	Theta star (bias corrected MLE)					0.62
488	nu hat (MLE)					39.2	nu star (bias corrected)					25.8
489	MLE Mean (bias corrected)					1.00	MLE Sd (bias corrected)					0.78
490							Approximate Chi Square Value (0.05)					15.2
491	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					13.2
492												

	A	B	C	D	E	F	G	H	I	J	K	L	
493	Assuming Gamma Distribution												
494	Approximate Gamma UCL (use when n>=50)						1.69 Adjusted Gamma UCL (use when n<50)				1.95		
495													
496	Lognormal GOF Test												
497	Shapiro Wilk Test Statistic					0.87		Shapiro Wilk Lognormal GOF Test					
498	5% Shapiro Wilk Critical Value					0.81		Data appear Lognormal at 5% Significance Level					
499	Lilliefors Test Statistic					0.25		Lilliefors Lognormal GOF Test					
500	5% Lilliefors Critical Value					0.31		Data appear Lognormal at 5% Significance Level					
501	Data appear Lognormal at 5% Significance Level												
502													
503	Lognormal Statistics												
504	Minimum of Logged Data					-1.01		Mean of logged Data				-0.21	
505	Maximum of Logged Data					0.77		SD of logged Data				0.70	
506													
507	Assuming Lognormal Distribution												
508	95% H-UCL					2.14		90% Chebyshev (MVUE) UCL				1.75	
509	95% Chebyshev (MVUE) UCL					2.09		97.5% Chebyshev (MVUE) UCL				2.57	
510	99% Chebyshev (MVUE) UCL					3.50							
511													
512	Nonparametric Distribution Free UCL Statistics												
513	Data appear to follow a Discernible Distribution at 5% Significance Level												
514													
515	Nonparametric Distribution Free UCLs												
516	95% CLT UCL					1.40		95% Jackknife UCL				1.46	
517	95% Standard Bootstrap UCL					1.37		95% Bootstrap-t UCL				1.62	
518	95% Hall's Bootstrap UCL					1.32		95% Percentile Bootstrap UCL				1.39	
519	95% BCA Bootstrap UCL					1.45							
520	90% Chebyshev(Mean, Sd) UCL					1.74		95% Chebyshev(Mean, Sd) UCL				2.07	
521	97.5% Chebyshev(Mean, Sd) UCL					2.54		99% Chebyshev(Mean, Sd) UCL				3.46	
522													
523	Suggested UCL to Use												
524	95% Student's-t UCL					1.46							
525													
526	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
527	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
528	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
529	For additional insight the user may want to consult a statistician.												
530													
531	Fluoranthene												
532													
533	General Statistics												
534	Total Number of Observations					8		Number of Distinct Observations				8	
535	Number of Detects					5		Number of Non-Detects				3	
536	Number of Distinct Detects					5		Number of Distinct Non-Detects				3	
537	Minimum Detect					0.018		Minimum Non-Detect				0.049	
538	Maximum Detect					7.63		Maximum Non-Detect				0.22	
539	Variance Detects					8.43		Percent Non-Detects				37.5%	
540	Mean Detects					2.99		SD Detects				2.90	
541	Median Detects					2.77		CV Detects				0.97	
542	Skewness Detects					1.15		Kurtosis Detects				1.68	
543	Mean of Logged Detects					0.08		SD of Logged Detects				2.37	
544													
545	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
546	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
547	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
548	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
549													
550	Normal GOF Test on Detects Only												
551	Shapiro Wilk Test Statistic					0.92		Shapiro Wilk GOF Test					
552	5% Shapiro Wilk Critical Value					0.76		Detected Data appear Normal at 5% Significance Level					
553	Lilliefors Test Statistic					0.25		Lilliefors GOF Test					
554	5% Lilliefors Critical Value					0.39		Detected Data appear Normal at 5% Significance Level					
555	Detected Data appear Normal at 5% Significance Level												
556													
557	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs												
558	Mean					1.87		Standard Error of Mean				0.99	
559	SD					2.50		95% KM (BCA) UCL				3.58	
560	95% KM (t) UCL					3.75		95% KM (Percentile Bootstrap) UCL				3.55	
561	95% KM (z) UCL					3.50		95% KM Bootstrap t UCL				4.47	
562	90% KM Chebyshev UCL					4.85		95% KM Chebyshev UCL				6.19	
563	97.5% KM Chebyshev UCL					8.06		99% KM Chebyshev UCL				11.74	
564													
565	Gamma GOF Tests on Detected Observations Only												
566	A-D Test Statistic					0.37		Anderson-Darling GOF Test					
567	5% A-D Critical Value					0.70		Data appear Gamma Distributed at 5% Significance Level					
568	K-S Test Statistic					0.24		Kolmogrov-Smirnoff GOF					
569	5% K-S Critical Value					0.36		Data appear Gamma Distributed at 5% Significance Level					
570	Detected data appear Gamma Distributed at 5% Significance Level												
571													
572	Gamma Statistics on Detected Data Only												
573	k hat (MLE)					0.61		k star (bias corrected MLE)				0.37	
574	Theta hat (MLE)					4.89		Theta star (bias corrected MLE)				7.91	

	A	B	C	D	E	F	G	H	I	J	K	L
575	nu hat (MLE)					6.11	nu star (bias corrected)					3.77
576	MLE Mean (bias corrected)					2.99	MLE Sd (bias corrected)					4.86
577												
578	Gamma Kaplan-Meier (KM) Statistics											
579	k hat (KM)					0.56	nu hat (KM)					8.96
580	Approximate Chi Square Value (8.96, α)					3.30	Adjusted Chi Square Value (8.96, β)					2.49
581	Approximate KM-UCL (use when $n \geq 50$)					5.09	Gamma Adjusted KM-UCL (use when $n < 50$)					6.73
582												
583	Gamma ROS Statistics using Imputed Non-Detects											
584	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
585	GROS may not be used when kstar of detected data is small such as < 0.1											
586	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
587	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimate											
588	Minimum					0.01	Mean					1.87
589	Maximum					7.63	Median					0.60
590	SD					2.68	CV					1.43
591	k hat (MLE)					0.3	k star (bias corrected MLE)					0.27
592	Theta hat (MLE)					6.24	Theta star (bias corrected MLE)					6.92
593	nu hat (MLE)					4.79	nu star (bias corrected)					4.33
594	MLE Mean (bias corrected)					1.87	MLE Sd (bias corrected)					3.60
595							Adjusted Level of Significance (β)					0.019
596	Approximate Chi Square Value (4.33, α)					0.85	Adjusted Chi Square Value (4.33, β)					0.53
597	Gamma Approximate UCL (use when $n \geq 50$)					9.47	Gamma Adjusted UCL (use when $n < 50$)					15.09
598												
599	Lognormal GOF Test on Detected Observations Only											
600	Shapiro Wilk Test Statistic					0.80	Shapiro Wilk GOF Test					
601	5% Shapiro Wilk Critical Value					0.76	Detected Data appear Lognormal at 5% Significance Level					
602	Lilliefors Test Statistic					0.31	Lilliefors GOF Test					
603	5% Lilliefors Critical Value					0.39	Detected Data appear Lognormal at 5% Significance Level					
604	Detected Data appear Lognormal at 5% Significance Level											
605												
606	Lognormal ROS Statistics Using Imputed Non-Detects											
607	Mean in Original Scale					1.88	Mean in Log Scale					-1.21
608	SD in Original Scale					2.67	SD in Log Scale					2.54
609	95% t UCL (assumes normality of ROS data)					3.67	95% Percentile Bootstrap UCL					3.44
610	95% BCA Bootstrap UCL					3.85	95% Bootstrap t UCL					5.13
611	95% H-UCL (Log ROS)					12496						
612												
613	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
614	KM Mean (logged)					-1.44	95% H-UCL (KM -Log)					15156
615	KM SD (logged)					2.59	95% Critical H Value (KM-Log)					7.84
616	KM Standard Error of Mean (logged)					1.02						
617												
618	DL/2 Statistics											
619	DL/2 Normal						DL/2 Log-Transformed					
620	Mean in Original Scale					1.89	Mean in Log Scale					-0.98
621	SD in Original Scale					2.66	SD in Log Scale					2.36
622	95% t UCL (Assumes normality)					3.68	95% H-Stat UCL					3828
623	DL/2 is not a recommended method, provided for comparisons and historical reasons											
624												
625	Nonparametric Distribution Free UCL Statistics											
626	Detected Data appear Normal Distributed at 5% Significance Level											
627												
628	Suggested UCL to Use											
629	95% KM (t) UCL					3.75	95% KM (Percentile Bootstrap) UCL					3.55
630												
631	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
632	Recommendations are based upon data size, data distribution, and skewness.											
633	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
634	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
635												
636	Isopropyltoluene[4-]											
637												
638	General Statistics											
639	Total Number of Observations					8	Number of Distinct Observations					8
640	Number of Detects					6	Number of Non-Detects					2
641	Number of Distinct Detects					6	Number of Distinct Non-Detects					2
642	Minimum Detect					4.5300E	Minimum Non-Detect					0.001
643	Maximum Detect					0.01	Maximum Non-Detect					0.001
644	Variance Detects					2.3330E	Percent Non-Detects					25%
645	Mean Detects					0.005	SD Detects					0.004
646	Median Detects					0.004	CV Detects					0.82
647	Skewness Detects					0.33	Kurtosis Detects					-1.96
648	Mean of Logged Detects					-5.61	SD of Logged Detects					1.24
649												
650	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
651	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
652	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
653	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
654												
655	Normal GOF Test on Detects Only											
656	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
657	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Normal at 5% Significance Level						
658	Lilliefors Test Statistic					0.26	Lilliefors GOF Test						
659	5% Lilliefors Critical Value					0.36	Detected Data appear Normal at 5% Significance Level						
660	Detected Data appear Normal at 5% Significance Level												
661													
662	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs												
663	Mean					0.004	Standard Error of Mean					0.001	
664	SD					0.004	95% KM (BCA) UCL					0.007	
665	95% KM (t) UCL					0.007	95% KM (Percentile Bootstrap) UCL					0.007	
666	95% KM (z) UCL					0.007	95% KM Bootstrap t UCL					0.007	
667	90% KM Chebyshev UCL					0.009	95% KM Chebyshev UCL					0.011	
668	97.5% KM Chebyshev UCL					0.014	99% KM Chebyshev UCL					0.021	
669													
670	Gamma GOF Tests on Detected Observations Only												
671	A-D Test Statistic					0.33	Anderson-Darling GOF Test						
672	5% A-D Critical Value					0.71	data appear Gamma Distributed at 5% Significance Level						
673	K-S Test Statistic					0.21	Kolmogrov-Smirnoff GOF						
674	5% K-S Critical Value					0.34	data appear Gamma Distributed at 5% Significance Level						
675	Detected data appear Gamma Distributed at 5% Significance Level												
676													
677	Gamma Statistics on Detected Data Only												
678	k hat (MLE)					1.19	k star (bias corrected MLE)					0.71	
679	Theta hat (MLE)					0.004	Theta star (bias corrected MLE)					0.008	
680	nu hat (MLE)					14.36	nu star (bias corrected)					8.51	
681	MLE Mean (bias corrected)					0.005	MLE Sd (bias corrected)					0.006	
682													
683	Gamma Kaplan-Meier (KM) Statistics												
684	k hat (KM)					1.00	nu hat (KM)					16.09	
685	Approximate Chi Square Value (16.09, α)					8.02	Adjusted Chi Square Value (16.09, β)					6.63	
686	Approximate KM-UCL (use when $n \geq 50$)					0.008	Gamma Adjusted KM-UCL (use when $n < 50$)					0.011	
687													
688	Gamma ROS Statistics using Imputed Non-Detects												
689	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												
690	GROS may not be used when kstar of detected data is small such as < 0.1												
691	For such situations, GROS method tends to yield inflated values of UCLs and BTVs												
692	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates												
693	Minimum					4.53008	Mean					0.006	
694	Maximum					0.012	Median					0.008	
695	SD					0.004	CV					0.65	
696	k hat (MLE)					1.44	k star (bias corrected MLE)					0.98	
697	Theta hat (MLE)					0.004	Theta star (bias corrected MLE)					0.006	
698	nu hat (MLE)					23.13	nu star (bias corrected)					15.71	
699	MLE Mean (bias corrected)					0.006	MLE Sd (bias corrected)					0.006	
700							Adjusted Level of Significance (β)					0.011	
701	Approximate Chi Square Value (15.79, α)					7.81	Adjusted Chi Square Value (15.79, β)					6.44	
702	Gamma Approximate UCL (use when $n \geq 50$)					0.013	Gamma Adjusted UCL (use when $n < 50$)					0.011	
703													
704	Lognormal GOF Test on Detected Observations Only												
705	Shapiro Wilk Test Statistic					0.89	Shapiro Wilk GOF Test						
706	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Lognormal at 5% Significance Level						
707	Lilliefors Test Statistic					0.21	Lilliefors GOF Test						
708	5% Lilliefors Critical Value					0.36	Detected Data appear Lognormal at 5% Significance Level						
709	Detected Data appear Lognormal at 5% Significance Level												
710													
711	Lognormal ROS Statistics Using Imputed Non-Detects												
712	Mean in Original Scale					0.004	Mean in Log Scale					-6.10	
713	SD in Original Scale					0.004	SD in Log Scale					1.38	
714	95% t UCL (assumes normality of ROS data)					0.007	95% Percentile Bootstrap UCL					0.007	
715	95% BCA Bootstrap UCL					0.007	95% Bootstrap t UCL					0.009	
716	95% H-UCL (Log ROS)					0.059							
717													
718	DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed												
719	KM Mean (logged)					-6.13	95% H-UCL (KM -Log)					0.04	
720	KM SD (logged)					1.33	95% Critical H Value (KM-Log)					4.29	
721	KM Standard Error of Mean (logged)					0.51							
722													
723	DL/2 Statistics												
724	DL/2 Normal						DL/2 Log-Transformed						
725	Mean in Original Scale					0.004	Mean in Log Scale					-6.06	
726	SD in Original Scale					0.004	SD in Log Scale					1.33	
727	95% t UCL (Assumes normality)					0.007	95% H-Stat UCL					0.059	
728	DL/2 is not a recommended method, provided for comparisons and historical reasons												
729													
730	Nonparametric Distribution Free UCL Statistics												
731	Detected Data appear Normal Distributed at 5% Significance Level												
732													
733	Suggested UCL to Use												
734	95% KM (t) UCL					0.007	95% KM (Percentile Bootstrap) UCL					0.007	
735													
736	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL.												
737	Recommendations are based upon data size, data distribution, and skewness.												
738	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and												

A	B	C	D	E	F	G	H	I	J	K	L
739	ations results will not cover all Real World data sets; for additional insight the user may want to cons										
740											
741											
742	Lead										
743											
744	General Statistics										
745	Total Number of Observations				8	Number of Distinct Observations				8	
746						Number of Missing Observations				0	
747	Minimum				9.31	Mean				29.9	
748	Maximum				144	Median				14.2	
749	SD				46.1	Std. Error of Mean				16.3	
750	Coefficient of Variation				1.54	Skewness				2.80	
751											
752	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use										
753	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.										
754	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).										
755	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0										
756											
757	Normal GOF Test										
758	Shapiro Wilk Test Statistic				0.48	Shapiro Wilk GOF Test					
759	5% Shapiro Wilk Critical Value				0.81	Data Not Normal at 5% Significance Level					
760	Lilliefors Test Statistic				0.46	Lilliefors GOF Test					
761	5% Lilliefors Critical Value				0.31	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				60.8	95% Adjusted-CLT UCL (Chen-1995)				74.1	
767						95% Modified-t UCL (Johnson-1978)				63.5	
768											
769	Gamma GOF Test										
770	A-D Test Statistic				1.65	Anderson-Darling Gamma GOF Test					
771	5% A-D Critical Value				0.73	Data Not Gamma Distributed at 5% Significance Level					
772	K-S Test Statistic				0.41	Kolmogrov-Smirnoff Gamma GOF Test					
773	5% K-S Critical Value				0.30	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)				1.10	k star (bias corrected MLE)				0.77	
778	Theta hat (MLE)				27.0	Theta star (bias corrected MLE)				38.5	
779	nu hat (MLE)				17.7	nu star (bias corrected)				12.4	
780	MLE Mean (bias corrected)				29.9	MLE Sd (bias corrected)				33.9	
781						Approximate Chi Square Value (0.05)				5.50	
782	Adjusted Level of Significance				0.01	Adjusted Chi Square Value				4.39	
783											
784	Assuming Gamma Distribution										
785	Approximate Gamma UCL (use when n>=50)				67.5	Adjusted Gamma UCL (use when n<50)				84.5	
786											
787	Lognormal GOF Test										
788	Shapiro Wilk Test Statistic				0.66	Shapiro Wilk Lognormal GOF Test					
789	5% Shapiro Wilk Critical Value				0.81	Data Not Lognormal at 5% Significance Level					
790	Lilliefors Test Statistic				0.33	Lilliefors Lognormal GOF Test					
791	5% Lilliefors Critical Value				0.31	Data Not Lognormal at 5% Significance Level					
792	Data Not Lognormal at 5% Significance Level										
793											
794	Lognormal Statistics										
795	Minimum of Logged Data				2.23	Mean of logged Data				2.88	
796	Maximum of Logged Data				4.97	SD of logged Data				0.87	
797											
798	Assuming Lognormal Distribution										
799	95% H-UCL				73.6	90% Chebyshev (MVUE) UCL				48.1	
800	95% Chebyshev (MVUE) UCL				58.7	97.5% Chebyshev (MVUE) UCL				73.4	
801	99% Chebyshev (MVUE) UCL				102.3						
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				56.8	95% Jackknife UCL				60.8	
808	95% Standard Bootstrap UCL				55.2	95% Bootstrap-t UCL				390.2	
809	95% Hall's Bootstrap UCL				346.3	95% Percentile Bootstrap UCL				61.9	
810	95% BCA Bootstrap UCL				78.6						
811	90% Chebyshev(Mean, Sd) UCL				78.9	95% Chebyshev(Mean, Sd) UCL				101.1	
812	97.5% Chebyshev(Mean, Sd) UCL				131.9	99% Chebyshev(Mean, Sd) UCL				192.4	
813											
814	Suggested UCL to Use										
815	95% Chebyshev (Mean, Sd) UCL				101.1						
816											
817	ations regarding the selection of a 95% UCL are provided to help the user to select the most appropri										
818	ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and										
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.										

	A	B	C	D	E	F	G	H	I	J	K	L
821												
822												
823	Manganese											
824												
825	General Statistics											
826	Total Number of Observations				8		Number of Distinct Observations				8	
827							Number of Missing Observations				0	
828	Minimum				88.4		Mean				426.6	
829	Maximum				860		Median				421.5	
830	SD				256.8		Std. Error of Mean				90.7	
831	Coefficient of Variation				0.60		Skewness				0.22	
832												
833	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
834	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
835	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
836	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
837												
838	Normal GOF Test											
839	Shapiro Wilk Test Statistic				0.95		Shapiro Wilk GOF Test					
840	5% Shapiro Wilk Critical Value				0.81		Data appear Normal at 5% Significance Level					
841	Lilliefors Test Statistic				0.14		Lilliefors GOF Test					
842	5% Lilliefors Critical Value				0.31		Data appear Normal at 5% Significance Level					
843	Data appear Normal at 5% Significance Level											
844												
845	Assuming Normal Distribution											
846	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
847	95% Student's-t UCL				598.6		95% Adjusted-CLT UCL (Chen-1995)				583.6	
848							95% Modified-t UCL (Johnson-1978)				599.8	
849												
850	Gamma GOF Test											
851	A-D Test Statistic				0.38		Anderson-Darling Gamma GOF Test					
852	5% A-D Critical Value				0.72		data appear Gamma Distributed at 5% Significance Level					
853	K-S Test Statistic				0.20		Kolmogorov-Smirnov Gamma GOF Test					
854	5% K-S Critical Value				0.29		data appear Gamma Distributed at 5% Significance Level					
855	Detected data appear Gamma Distributed at 5% Significance Level											
856												
857	Gamma Statistics											
858	k hat (MLE)				2.35		k star (bias corrected MLE)				1.55	
859	Theta hat (MLE)				180.8		Theta star (bias corrected MLE)				273.8	
860	nu hat (MLE)				37.7		nu star (bias corrected)				24.9	
861	MLE Mean (bias corrected)				426.6		MLE Sd (bias corrected)				341.7	
862							Approximate Chi Square Value (0.05)				14.5	
863	Adjusted Level of Significance				0.01		Adjusted Chi Square Value				12.6	
864												
865	Assuming Gamma Distribution											
866	Approximate Gamma UCL (use when n>=50)				730.5		Adjusted Gamma UCL (use when n<50)				844.1	
867												
868	Lognormal GOF Test											
869	Shapiro Wilk Test Statistic				0.88		Shapiro Wilk Lognormal GOF Test					
870	5% Shapiro Wilk Critical Value				0.81		Data appear Lognormal at 5% Significance Level					
871	Lilliefors Test Statistic				0.25		Lilliefors Lognormal GOF Test					
872	5% Lilliefors Critical Value				0.31		Data appear Lognormal at 5% Significance Level					
873	Data appear Lognormal at 5% Significance Level											
874												
875	Lognormal Statistics											
876	Minimum of Logged Data				4.48		Mean of logged Data				5.82	
877	Maximum of Logged Data				6.75		SD of logged Data				0.80	
878												
879	Assuming Lognormal Distribution											
880	95% H-UCL				1149		90% Chebyshev (MVUE) UCL				834.1	
881	95% Chebyshev (MVUE) UCL				1010		97.5% Chebyshev (MVUE) UCL				1253	
882	99% Chebyshev (MVUE) UCL				1731							
883												
884	Nonparametric Distribution Free UCL Statistics											
885	Data appear to follow a Discernible Distribution at 5% Significance Level											
886												
887	Nonparametric Distribution Free UCLs											
888	95% CLT UCL				575.9		95% Jackknife UCL				598.6	
889	95% Standard Bootstrap UCL				570.6		95% Bootstrap-t UCL				609.1	
890	95% Hall's Bootstrap UCL				605.6		95% Percentile Bootstrap UCL				566.4	
891	95% BCA Bootstrap UCL				568.5							
892	90% Chebyshev(Mean, Sd) UCL				698.9		95% Chebyshev(Mean, Sd) UCL				822.3	
893	97.5% Chebyshev(Mean, Sd) UCL				993.6		99% Chebyshev(Mean, Sd) UCL				1330	
894												
895	Suggested UCL to Use											
896	95% Student's-t UCL				598.6							
897												
898	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
899	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh											
900	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
901	For additional insight the user may want											

	A	B	C	D	E	F	G	H	I	J	K	L
903												
904		Mercury										
905												
906		General Statistics										
907		Total Number of Observations				8	Number of Distinct Observations				8	
908							Number of Missing Observations				0	
909		Minimum				0.05	Mean				0.28	
910		Maximum				0.58	Median				0.26	
911		SD				0.18	Std. Error of Mean				0.06	
912		Coefficient of Variation				0.65	Skewness				0.45	
913												
914		Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use										
915		guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.										
916		For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).										
917		Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0										
918												
919		Normal GOF Test										
920		Shapiro Wilk Test Statistic				0.96	Shapiro Wilk GOF Test					
921		5% Shapiro Wilk Critical Value				0.81	Data appear Normal at 5% Significance Level					
922		Lilliefors Test Statistic				0.15	Lilliefors GOF Test					
923		5% Lilliefors Critical Value				0.31	Data appear Normal at 5% Significance Level					
924		Data appear Normal at 5% Significance Level										
925												
926		Assuming Normal Distribution										
927		95% Normal UCL					95% UCLs (Adjusted for Skewness)					
928		95% Student's-t UCL				0.40	95% Adjusted-CLT UCL (Chen-1995)				0.39	
929							95% Modified-t UCL (Johnson-1978)				0.40	
930												
931		Gamma GOF Test										
932		A-D Test Statistic				0.17	Anderson-Darling Gamma GOF Test					
933		5% A-D Critical Value				0.72	data appear Gamma Distributed at 5% Significance Level					
934		K-S Test Statistic				0.13	Kolmogrov-Smirnoff Gamma GOF Test					
935		5% K-S Critical Value				0.29	data appear Gamma Distributed at 5% Significance Level					
936		Detected data appear Gamma Distributed at 5% Significance Level										
937												
938		Gamma Statistics										
939		k hat (MLE)				2.22	k star (bias corrected MLE)				1.47	
940		Theta hat (MLE)				0.12	Theta star (bias corrected MLE)				0.19	
941		nu hat (MLE)				35.5	nu star (bias corrected)				23.5	
942		MLE Mean (bias corrected)				0.28	MLE Sd (bias corrected)				0.23	
943							Approximate Chi Square Value (0.05)				13.5	
944		Adjusted Level of Significance				0.01	Adjusted Chi Square Value				11.6	
945												
946		Assuming Gamma Distribution										
947		Approximate Gamma UCL (use when n>=50)				0.48	Adjusted Gamma UCL (use when n<50)				0.56	
948												
949		Lognormal GOF Test										
950		Shapiro Wilk Test Statistic				0.95	Shapiro Wilk Lognormal GOF Test					
951		5% Shapiro Wilk Critical Value				0.81	Data appear Lognormal at 5% Significance Level					
952		Lilliefors Test Statistic				0.15	Lilliefors Lognormal GOF Test					
953		5% Lilliefors Critical Value				0.31	Data appear Lognormal at 5% Significance Level					
954		Data appear Lognormal at 5% Significance Level										
955												
956		Lognormal Statistics										
957		Minimum of Logged Data				-2.93	Mean of logged Data				-1.51	
958		Maximum of Logged Data				-0.54	SD of logged Data				0.80	
959												
960		Assuming Lognormal Distribution										
961		95% H-UCL				0.75	90% Chebyshev (MVUE) UCL				0.54	
962		95% Chebyshev (MVUE) UCL				0.65	97.5% Chebyshev (MVUE) UCL				0.81	
963		99% Chebyshev (MVUE) UCL				1.13						
964												
965		Nonparametric Distribution Free UCL Statistics										
966		Data appear to follow a Discernible Distribution at 5% Significance Level										
967												
968		Nonparametric Distribution Free UCLs										
969		95% CLT UCL				0.38	95% Jackknife UCL				0.40	
970		95% Standard Bootstrap UCL				0.37	95% Bootstrap-t UCL				0.42	
971		95% Hall's Bootstrap UCL				0.41	95% Percentile Bootstrap UCL				0.38	
972		95% BCA Bootstrap UCL				0.39						
973		90% Chebyshev(Mean, Sd) UCL				0.47	95% Chebyshev(Mean, Sd) UCL				0.56	
974		97.5% Chebyshev(Mean, Sd) UCL				0.68	99% Chebyshev(Mean, Sd) UCL				0.92	
975												
976		Suggested UCL to Use										
977		95% Student's-t UCL				0.40						
978												
979		Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
980		recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and										
981		Singh and Singh (2003). However, simulation results will not cover all Real World data sets										
982		For additional insight the user may want to consult a statistician.										
983												
984												

	A	B	C	D	E	F	G	H	I	J	K	L	
985	Nickel												
986													
987	General Statistics												
988	Total Number of Observations					8		Number of Distinct Observations					8
989								Number of Missing Observations					0
990	Minimum					3.36		Mean					10.9
991	Maximum					53		Median					5.65
992	SD					17.0		Std. Error of Mean					6.01
993	Coefficient of Variation					1.55		Skewness					2.80
994													
995	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
996	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
997	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
998	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
999													
1000	Normal GOF Test												
1001	Shapiro Wilk Test Statistic					0.47		Shapiro Wilk GOF Test					
1002	5% Shapiro Wilk Critical Value					0.81		Data Not Normal at 5% Significance Level					
1003	Lilliefors Test Statistic					0.48		Lilliefors GOF Test					
1004	5% Lilliefors Critical Value					0.31		Data Not Normal at 5% Significance Level					
1005	Data Not Normal at 5% Significance Level												
1006													
1007	Assuming Normal Distribution												
1008	95% Normal UCL							95% UCLs (Adjusted for Skewness)					
1009	95% Student's-t UCL					22.3		95% Adjusted-CLT UCL (Chen-1995)					27.2
1010								95% Modified-t UCL (Johnson-1978)					23.3
1011													
1012	Gamma GOF Test												
1013	A-D Test Statistic					1.68		Anderson-Darling Gamma GOF Test					
1014	5% A-D Critical Value					0.73		Data Not Gamma Distributed at 5% Significance Level					
1015	K-S Test Statistic					0.46		Kolmogrov-Smirnov Gamma GOF Test					
1016	5% K-S Critical Value					0.30		Data Not Gamma Distributed at 5% Significance Level					
1017	Data Not Gamma Distributed at 5% Significance Level												
1018													
1019	Gamma Statistics												
1020	k hat (MLE)					1.09		k star (bias corrected MLE)					0.76
1021	Theta hat (MLE)					9.99		Theta star (bias corrected MLE)					14.2
1022	nu hat (MLE)					17.5		nu star (bias corrected)					12.2
1023	MLE Mean (bias corrected)					10.9		MLE Sd (bias corrected)					12.4
1024								Approximate Chi Square Value (0.05)					5.41
1025	Adjusted Level of Significance					0.01		Adjusted Chi Square Value					4.32
1026													
1027	Assuming Gamma Distribution												
1028	Approximate Gamma UCL (use when n>=50))					24.8		Adjusted Gamma UCL (use when n<50)					31.1
1029													
1030	Lognormal GOF Test												
1031	Shapiro Wilk Test Statistic					0.66		Shapiro Wilk Lognormal GOF Test					
1032	5% Shapiro Wilk Critical Value					0.81		Data Not Lognormal at 5% Significance Level					
1033	Lilliefors Test Statistic					0.40		Lilliefors Lognormal GOF Test					
1034	5% Lilliefors Critical Value					0.31		Data Not Lognormal at 5% Significance Level					
1035	Data Not Lognormal at 5% Significance Level												
1036													
1037	Lognormal Statistics												
1038	Minimum of Logged Data					1.21		Mean of logged Data					1.87
1039	Maximum of Logged Data					3.97		SD of logged Data					0.87
1040													
1041	Assuming Lognormal Distribution												
1042	95% H-UCL					27.0		90% Chebyshev (MVUE) UCL					17.5
1043	95% Chebyshev (MVUE) UCL					21.4		97.5% Chebyshev (MVUE) UCL					26.8
1044	99% Chebyshev (MVUE) UCL					37.3							
1045													
1046	Nonparametric Distribution Free UCL Statistics												
1047	Data do not follow a Discernible Distribution (0.05)												
1048													
1049	Nonparametric Distribution Free UCLs												
1050	95% CLT UCL					20.8		95% Jackknife UCL					22.3
1051	95% Standard Bootstrap UCL					20.2		95% Bootstrap-t UCL					123
1052	95% Hall's Bootstrap UCL					119.2		95% Percentile Bootstrap UCL					22.7
1053	95% BCA Bootstrap UCL					28.7							
1054	90% Chebyshev(Mean, Sd) UCL					29		95% Chebyshev(Mean, Sd) UCL					37.1
1055	97.5% Chebyshev(Mean, Sd) UCL					48.5		99% Chebyshev(Mean, Sd) UCL					70.8
1056													
1057	Suggested UCL to Use												
1058	95% Chebyshev (Mean, Sd) UCL					37.1							
1059													
1060	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
1061	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
1062	Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
1063	For additional insight the user may want to consult a statistician.												
1064													
1065	Plutonium-239/240												
1066													

	A	B	C	D	E	F	G	H	I	J	K	L
1067	General Statistics											
1068	Total Number of Observations				8	Number of Distinct Observations				8		
1069	Number of Detects				7	Number of Non-Detects				1		
1070	Number of Distinct Detects				7	Number of Distinct Non-Detects				1		
1071	Minimum Detect				0.036	Minimum Non-Detect				0.014		
1072	Maximum Detect				0.076	Maximum Non-Detect				0.014		
1073	Variance Detects				2.2481E-04	Percent Non-Detects				12.5%		
1074	Mean Detects				0.043	SD Detects				0.014		
1075	Median Detects				0.036	CV Detects				0.33		
1076	Skewness Detects				1.83	Kurtosis Detects				3.94		
1077	Mean of Logged Detects				-3.14	SD of Logged Detects				0.29		
1078												
1079	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
1080	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
1081	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
1082	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
1083												
1084	Normal GOF Test on Detects Only											
1085	Shapiro Wilk Test Statistic				0.81	Shapiro Wilk GOF Test						
1086	5% Shapiro Wilk Critical Value				0.80	Detected Data appear Normal at 5% Significance Level						
1087	Lilliefors Test Statistic				0.24	Lilliefors GOF Test						
1088	5% Lilliefors Critical Value				0.33	Detected Data appear Normal at 5% Significance Level						
1089	Detected Data appear Normal at 5% Significance Level											
1090												
1091	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
1092	Mean				0.04	Standard Error of Mean				0.006		
1093	SD				0.016	95% KM (BCA) UCL				0.05		
1094	95% KM (t) UCL				0.05	95% KM (Percentile Bootstrap) UCL				0.05		
1095	95% KM (z) UCL				0.05	95% KM Bootstrap t UCL				0.05		
1096	90% KM Chebyshev UCL				0.05	95% KM Chebyshev UCL				0.06		
1097	97.5% KM Chebyshev UCL				0.07	99% KM Chebyshev UCL				0.10		
1098												
1099	Gamma GOF Tests on Detected Observations Only											
1100	A-D Test Statistic				0.47	Anderson-Darling GOF Test						
1101	5% A-D Critical Value				0.70	Detected data appear Gamma Distributed at 5% Significance Level						
1102	K-S Test Statistic				0.21	Kolmogrov-Smirnoff GOF						
1103	5% K-S Critical Value				0.31	Detected data appear Gamma Distributed at 5% Significance Level						
1104	Detected data appear Gamma Distributed at 5% Significance Level											
1105												
1106	Gamma Statistics on Detected Data Only											
1107	k hat (MLE)				12.7	k star (bias corrected MLE)				7.35		
1108	Theta hat (MLE)				0.003	Theta star (bias corrected MLE)				0.006		
1109	nu hat (MLE)				177.9	nu star (bias corrected)				103		
1110	MLE Mean (bias corrected)				0.04	MLE Sd (bias corrected)				0.01		
1111												
1112	Gamma Kaplan-Meier (KM) Statistics											
1113	k hat (KM)				6.67	nu hat (KM)				106.9		
1114	Approximate Chi Square Value (106.87, α)				84.0	Adjusted Chi Square Value (106.87, β)				78.9		
1115	Approximate KM-UCL (use when n>=50)				0.05	Gamma Adjusted KM-UCL (use when n<50)				0.05		
1116												
1117	Gamma ROS Statistics using Imputed Non-Detects											
1118	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1119	GROS may not be used when kstar of detected data is small such as < 0.1											
1120	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
1121	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1122	Minimum				0.01	Mean				0.04		
1123	Maximum				0.07	Median				0.03		
1124	SD				0.01	CV				0.42		
1125	k hat (MLE)				5.98	k star (bias corrected MLE)				3.82		
1126	Theta hat (MLE)				0.006	Theta star (bias corrected MLE)				0.01		
1127	nu hat (MLE)				95.8	nu star (bias corrected)				61.2		
1128	MLE Mean (bias corrected)				0.04	MLE Sd (bias corrected)				0.02		
1129						Adjusted Level of Significance (β)				0.01		
1130	Approximate Chi Square Value (61.21, α)				44.2	Adjusted Chi Square Value (61.21, β)				40.5		
1131	Gamma Approximate UCL (use when n>=50)				0.05	Gamma Adjusted UCL (use when n<50)				0.06		
1132												
1133	Lognormal GOF Test on Detected Observations Only											
1134	Shapiro Wilk Test Statistic				0.90	Shapiro Wilk GOF Test						
1135	5% Shapiro Wilk Critical Value				0.80	Detected Data appear Lognormal at 5% Significance Level						
1136	Lilliefors Test Statistic				0.19	Lilliefors GOF Test						
1137	5% Lilliefors Critical Value				0.33	Detected Data appear Lognormal at 5% Significance Level						
1138	Detected Data appear Lognormal at 5% Significance Level											
1139												
1140	Lognormal ROS Statistics Using Imputed Non-Detects											
1141	Mean in Original Scale				0.04	Mean in Log Scale				-3.23		
1142	SD in Original Scale				0.01	SD in Log Scale				0.36		
1143	95% t UCL (assumes normality of ROS data)				0.05	95% Percentile Bootstrap UCL				0.05		
1144	95% BCA Bootstrap UCL				0.05	95% Bootstrap t UCL				0.05		
1145	95% H-UCL (Log ROS)				0.05							
1146												
1147	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
1148	KM Mean (logged)				-3.26	95% H-UCL (KM -Log)				0.05		

A	B	C	D	E	F	G	H	I	J	K	L
1149	KM SD (logged)				0.40	95% Critical H Value (KM-Log)					2.20
1150	KM Standard Error of Mean (logged)				0.15						
1151											
1152	DL/2 Statistics										
1153	DL/2 Normal				DL/2 Log-Transformed						
1154	Mean in Original Scale				0.04	Mean in Log Scale				-3.34	
1155	SD in Original Scale				0.019	SD in Log Scale				0.64	
1156	95% t UCL (Assumes normality)				0.052	95% H-Stat UCL				0.08	
1157	DL/2 is not a recommended method, provided for comparisons and historical reasons										
1158											
1159	Nonparametric Distribution Free UCL Statistics										
1160	Detected Data appear Normal Distributed at 5% Significance Level										
1161											
1162	Suggested UCL to Use										
1163	95% KM (t) UCL				0.052	95% KM (Percentile Bootstrap) UCL				0.05	
1164											
1165	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
1166	Recommendations are based upon data size, data distribution, and skewness.										
1167	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and										
1168	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult										
1169											
1170	Pyrene										
1171											
1172	General Statistics										
1173	Total Number of Observations				8	Number of Distinct Observations				8	
1174	Number of Detects				5	Number of Non-Detects				3	
1175	Number of Distinct Detects				5	Number of Distinct Non-Detects				3	
1176	Minimum Detect				0.019	Minimum Non-Detect				0.04	
1177	Maximum Detect				9.03	Maximum Non-Detect				0.22	
1178	Variance Detects				11.82	Percent Non-Detects				37.5	
1179	Mean Detects				3.32	SD Detects				3.43	
1180	Median Detects				2.83	CV Detects				1.03	
1181	Skewness Detects				1.46	Kurtosis Detects				2.65	
1182	Mean of Logged Detects				0.12	SD of Logged Detects				2.48	
1183											
1184	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use										
1185	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.										
1186	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).										
1187	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0										
1188											
1189	Normal GOF Test on Detects Only										
1190	Shapiro Wilk Test Statistic				0.87	Shapiro Wilk GOF Test					
1191	5% Shapiro Wilk Critical Value				0.76	Detected Data appear Normal at 5% Significance Level					
1192	Lilliefors Test Statistic				0.30	Lilliefors GOF Test					
1193	5% Lilliefors Critical Value				0.39	Detected Data appear Normal at 5% Significance Level					
1194	Detected Data appear Normal at 5% Significance Level										
1195											
1196	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs										
1197	Mean				2.08	Standard Error of Mean				1.15	
1198	SD				2.91	95% KM (BCA) UCL				3.97	
1199	95% KM (t) UCL				4.26	95% KM (Percentile Bootstrap) UCL				3.80	
1200	95% KM (z) UCL				3.97	95% KM Bootstrap t UCL				5.33	
1201	90% KM Chebyshev UCL				5.53	95% KM Chebyshev UCL				7.10	
1202	97.5% KM Chebyshev UCL				9.27	99% KM Chebyshev UCL				13.5	
1203											
1204	Gamma GOF Tests on Detected Observations Only										
1205	A-D Test Statistic				0.38	Anderson-Darling GOF Test					
1206	5% A-D Critical Value				0.70	Detected data appear Gamma Distributed at 5% Significance Level					
1207	K-S Test Statistic				0.26	Kolmogorov-Smirnoff GOF					
1208	5% K-S Critical Value				0.37	Detected data appear Gamma Distributed at 5% Significance Level					
1209	Detected data appear Gamma Distributed at 5% Significance Level										
1210											
1211	Gamma Statistics on Detected Data Only										
1212	k hat (MLE)				0.57	k star (bias corrected MLE)				0.36	
1213	Theta hat (MLE)				5.74	Theta star (bias corrected MLE)				9.11	
1214	nu hat (MLE)				5.78	nu star (bias corrected)				3.64	
1215	MLE Mean (bias corrected)				3.32	MLE Sd (bias corrected)				5.50	
1216											
1217	Gamma Kaplan-Meier (KM) Statistics										
1218	k hat (KM)				0.51	nu hat (KM)				8.19	
1219	Approximate Chi Square Value (8.20, α)				2.84	Adjusted Chi Square Value (8.20, β)				2.11	
1220	Approximate KM-UCL (use when n>=50)				5.99	Gamma Adjusted KM-UCL (use when n<50)				8.07	
1221											
1222	Gamma ROS Statistics using Imputed Non-Detects										
1223	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1224	GROS may not be used when kstar of detected data is small such as < 0.1										
1225	For such situations, GROS method tends to yield inflated values of UCLs and BTVs										
1226	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM e										
1227	Minimum				0.01	Mean				2.08	
1228	Maximum				9.03	Median				0.72	
1229	SD				3.11	CV				1.49	
1230	k hat (MLE)				0.29	k star (bias corrected MLE)				0.26	

	A	B	C	D	E	F	G	H	I	J	K	L
1231	Theta hat (MLE)					7.15	Theta star (bias corrected MLE)					7.84
1232	nu hat (MLE)					4.65	nu star (bias corrected)					4.24
1233	MLE Mean (bias corrected)					2.08	MLE Sd (bias corrected)					4.04
1234							Adjusted Level of Significance (β)					0.011
1235	Approximate Chi Square Value (4.24, α)					0.82	Adjusted Chi Square Value (4.24, β)					0.51
1236	Gamma Approximate UCL (use when n>=50)					10.75	Gamma Adjusted UCL (use when n<50)					17.2
1237												
1238	Lognormal GOF Test on Detected Observations Only											
1239	Shapiro Wilk Test Statistic					0.79	Shapiro Wilk GOF Test					
1240	5% Shapiro Wilk Critical Value					0.76	Detected Data appear Lognormal at 5% Significance Level					
1241	Lilliefors Test Statistic					0.33	Lilliefors GOF Test					
1242	5% Lilliefors Critical Value					0.39	Detected Data appear Lognormal at 5% Significance Level					
1243	Detected Data appear Lognormal at 5% Significance Level											
1244												
1245	Lognormal ROS Statistics Using Imputed Non-Detects											
1246	Mean in Original Scale					2.08	Mean in Log Scale					-1.23
1247	SD in Original Scale					3.10	SD in Log Scale					2.65
1248	95% t UCL (assumes normality of ROS data)					4.17	95% Percentile Bootstrap UCL					3.92
1249	95% BCA Bootstrap UCL					4.28	95% Bootstrap t UCL					6.51
1250	95% H-UCL (Log ROS)					31389						
1251												
1252	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
1253	KM Mean (logged)					-1.48	95% H-UCL (KM -Log)					42165
1254	KM SD (logged)					2.72	95% Critical H Value (KM-Log)					8.19
1255	KM Standard Error of Mean (logged)					1.07						
1256												
1257	DL/2 Statistics											
1258	DL/2 Normal						DL/2 Log-Transformed					
1259	Mean in Original Scale					2.10	Mean in Log Scale					-0.95
1260	SD in Original Scale					3.09	SD in Log Scale					2.44
1261	95% t UCL (Assumes normality)					4.18	95% H-Stat UCL					7047
1262	DL/2 is not a recommended method, provided for comparisons and historical reasons											
1263												
1264	Nonparametric Distribution Free UCL Statistics											
1265	Detected Data appear Normal Distributed at 5% Significance Level											
1266												
1267	Suggested UCL to Use											
1268	95% KM (t) UCL					4.26	95% KM (Percentile Bootstrap) UCL					3.80
1269												
1270	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1271	Recommendations are based upon data size, data distribution, and skewness.											
1272	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
1273	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
1274												
1275	Silver											
1276												
1277	General Statistics											
1278	Total Number of Observations					8	Number of Distinct Observations					8
1279	Number of Detects					6	Number of Non-Detects					2
1280	Number of Distinct Detects					6	Number of Distinct Non-Detects					2
1281	Minimum Detect					4.32	Minimum Non-Detect					0.60
1282	Maximum Detect					348	Maximum Non-Detect					0.66
1283	Variance Detects					19050	Percent Non-Detects					25%
1284	Mean Detects					118	SD Detects					138
1285	Median Detects					67.2	CV Detects					1.16
1286	Skewness Detects					1.09	Kurtosis Detects					0.04
1287	Mean of Logged Detects					3.77	SD of Logged Detects					1.82
1288												
1289	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
1290	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
1291	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
1292	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
1293												
1294	Normal GOF Test on Detects Only											
1295	Shapiro Wilk Test Statistic					0.85	Shapiro Wilk GOF Test					
1296	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Normal at 5% Significance Level					
1297	Lilliefors Test Statistic					0.23	Lilliefors GOF Test					
1298	5% Lilliefors Critical Value					0.36	Detected Data appear Normal at 5% Significance Level					
1299	Detected Data appear Normal at 5% Significance Level											
1300												
1301	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
1302	Mean					88.64	Standard Error of Mean					46.63
1303	SD					120.4	95% KM (BCA) UCL					171.8
1304	95% KM (t) UCL					177	95% KM (Percentile Bootstrap) UCL					162.9
1305	95% KM (z) UCL					165.4	95% KM Bootstrap t UCL					324.9
1306	90% KM Chebyshev UCL					228.5	95% KM Chebyshev UCL					291.9
1307	97.5% KM Chebyshev UCL					379.8	99% KM Chebyshev UCL					552.6
1308												
1309	Gamma GOF Tests on Detected Observations Only											
1310	A-D Test Statistic					0.27	Anderson-Darling GOF Test					
1311	5% A-D Critical Value					0.72	Detected data appear Gamma Distributed at 5% Significance Level					
1312	K-S Test Statistic					0.19	Kolmogorov-Smirnoff GOF					

A	B	C	D	E	F	G	H	I	J	K	L
1313	5% K-S Critical Value				0.34	data appear Gamma Distributed at 5% Significance Level					
1314	Detected data appear Gamma Distributed at 5% Significance Level										
1315											
1316	Gamma Statistics on Detected Data Only										
1317	k hat (MLE)				0.61	k star (bias corrected MLE)				0.42	
1318	Theta hat (MLE)				190.8	Theta star (bias corrected MLE)				280.8	
1319	nu hat (MLE)				7.42	nu star (bias corrected)				5.04	
1320	MLE Mean (bias corrected)				118	MLE Sd (bias corrected)				182	
1321											
1322	Gamma Kaplan-Meier (KM) Statistics										
1323	k hat (KM)				0.54	nu hat (KM)				8.68	
1324	Approximate Chi Square Value (8.68, α)				3.13	Adjusted Chi Square Value (8.68, β)				2.35	
1325	Approximate KM-UCL (use when $n \geq 50$)				245.5	Adjusted KM-UCL (use when $n < 50$)				326.9	
1326											
1327	Gamma ROS Statistics using Imputed Non-Detects										
1328	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1329	GROS may not be used when kstar of detected data is small such as < 0.1										
1330	For such situations, GROS method tends to yield inflated values of UCLs and BTVs										
1331	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1332	Minimum				0.01	Mean				88.5	
1333	Maximum				348	Median				19.4	
1334	SD				128.8	CV				1.45	
1335	k hat (MLE)				0.25	k star (bias corrected MLE)				0.24	
1336	Theta hat (MLE)				349.9	Theta star (bias corrected MLE)				366.7	
1337	nu hat (MLE)				4.04	nu star (bias corrected)				3.86	
1338	MLE Mean (bias corrected)				88.5	MLE Sd (bias corrected)				180.2	
1339						Adjusted Level of Significance (β)				0.01	
1340	Approximate Chi Square Value (3.86, α)				0.66	Adjusted Chi Square Value (3.86, β)				0.40	
1341	Gamma Approximate UCL (use when $n \geq 50$)				511.7	Gamma Adjusted UCL (use when $n < 50$)				844	
1342											
1343	Lognormal GOF Test on Detected Observations Only										
1344	Shapiro Wilk Test Statistic				0.91	Shapiro Wilk GOF Test					
1345	5% Shapiro Wilk Critical Value				0.78	Detected Data appear Lognormal at 5% Significance Level					
1346	Lilliefors Test Statistic				0.18	Lilliefors GOF Test					
1347	5% Lilliefors Critical Value				0.36	Detected Data appear Lognormal at 5% Significance Level					
1348	Detected Data appear Lognormal at 5% Significance Level										
1349											
1350	Lognormal ROS Statistics Using Imputed Non-Detects										
1351	Mean in Original Scale				88.6	Mean in Log Scale				2.63	
1352	SD in Original Scale				128.7	SD in Log Scale				2.61	
1353	95% t UCL (assumes normality of ROS data)				174.9	95% Percentile Bootstrap UCL				158.4	
1354	95% BCA Bootstrap UCL				176.6	95% Bootstrap t UCL				332.6	
1355	95% H-UCL (Log ROS)				101222						
1356											
1357	Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed										
1358	KM Mean (logged)				2.70	95% H-UCL (KM -Log)				129674	
1359	KM SD (logged)				2.34	95% Critical H Value (KM-Log)				7.12	
1360	KM Standard Error of Mean (logged)				0.90						
1361											
1362	DL/2 Statistics										
1363	DL/2 Normal					DL/2 Log-Transformed					
1364	Mean in Original Scale				88.6	Mean in Log Scale				2.54	
1365	SD in Original Scale				128.7	SD in Log Scale				2.75	
1366	95% t UCL (Assumes normality)				174.8	95% H-Stat UCL				311368	
1367	DL/2 is not a recommended method, provided for comparisons and historical reasons										
1368											
1369	Nonparametric Distribution Free UCL Statistics										
1370	Detected Data appear Normal Distributed at 5% Significance Level										
1371											
1372	Suggested UCL to Use										
1373	95% KM (t) UCL				177	95% KM (Percentile Bootstrap) UCL				162.9	
1374											
1375	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
1376	Recommendations are based upon data size, data distribution, and skewness.										
1377	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and										
1378	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult										
1379											
1380	Sodium										
1381											
1382	General Statistics										
1383	Total Number of Observations				8	Number of Distinct Observations				8	
1384	Number of Detects				7	Number of Non-Detects				1	
1385	Number of Distinct Detects				7	Number of Distinct Non-Detects				1	
1386	Minimum Detect				69.4	Minimum Non-Detect				59.1	
1387	Maximum Detect				1000	Maximum Non-Detect				59.1	
1388	Variance Detects				124351	Percent Non-Detects				12.5	
1389	Mean Detects				280.6	SD Detects				352.6	
1390	Median Detects				102	CV Detects				1.25	
1391	Skewness Detects				1.85	Kurtosis Detects				2.95	
1392	Mean of Logged Detects				5.09	SD of Logged Detects				1.04	
1393											
1394	Note: Sample size is small										

	A	B	C	D	E	F	G	H	I	J	K	L
1395	Guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
1396	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
1397	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
1398												
1399	Normal GOF Test on Detects Only											
1400	Shapiro Wilk Test Statistic					0.68	Shapiro Wilk GOF Test					
1401	5% Shapiro Wilk Critical Value					0.80	Detected Data Not Normal at 5% Significance Level					
1402	Lilliefors Test Statistic					0.39	Lilliefors GOF Test					
1403	5% Lilliefors Critical Value					0.33	Detected Data Not Normal at 5% Significance Level					
1404	Detected Data Not Normal at 5% Significance Level											
1405												
1406	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
1407	Mean					252.9	Standard Error of Mean					119.9
1408	SD					314.1	95% KM (BCA) UCL					468.7
1409	95% KM (t) UCL					480.1	95% KM (Percentile Bootstrap) UCL					437.7
1410	95% KM (z) UCL					450.2	95% KM Bootstrap t UCL					2941.7
1411	90% KM Chebyshev UCL					612.7	95% KM Chebyshev UCL					775.7
1412	97.5% KM Chebyshev UCL					1002	99% KM Chebyshev UCL					1446.7
1413												
1414	Gamma GOF Tests on Detected Observations Only											
1415	A-D Test Statistic					0.92	Anderson-Darling GOF Test					
1416	5% A-D Critical Value					0.72	Detected Data Not Gamma Distributed at 5% Significance Level					
1417	K-S Test Statistic					0.37	Kolmogorov-Smirnov GOF					
1418	5% K-S Critical Value					0.31	Detected Data Not Gamma Distributed at 5% Significance Level					
1419	Detected Data Not Gamma Distributed at 5% Significance Level											
1420												
1421	Gamma Statistics on Detected Data Only											
1422	k hat (MLE)					1.05	k star (bias corrected MLE)					0.69
1423	Theta hat (MLE)					265.9	Theta star (bias corrected MLE)					401.9
1424	nu hat (MLE)					14.7	nu star (bias corrected)					9.77
1425	MLE Mean (bias corrected)					280.6	MLE Sd (bias corrected)					335.8
1426												
1427	Gamma Kaplan-Meier (KM) Statistics											
1428	k hat (KM)					0.64	nu hat (KM)					10.3
1429	Approximate Chi Square Value (10.37, α)					4.17	Adjusted Chi Square Value (10.37, β)					3.24
1430	Approximate KM-UCL (use when $n \geq 50$)					628.1	Gamma Adjusted KM-UCL (use when $n < 50$)					809.2
1431												
1432	Gamma ROS Statistics using Imputed Non-Detects											
1433	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1434	GROS may not be used when kstar of detected data is small such as < 0.1											
1435	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
1436	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1437	Minimum					0.01	Mean					245.5
1438	Maximum					1000	Median					97.5
1439	SD					341.2	CV					1.39
1440	k hat (MLE)					0.40	k star (bias corrected MLE)					0.33
1441	Theta hat (MLE)					606.5	Theta star (bias corrected MLE)					729.9
1442	nu hat (MLE)					6.47	nu star (bias corrected)					5.38
1443	MLE Mean (bias corrected)					245.5	MLE Sd (bias corrected)					423.3
1444							Adjusted Level of Significance (β)					0.01
1445	Approximate Chi Square Value (5.38, α)					1.33	Adjusted Chi Square Value (5.38, β)					0.89
1446	Gamma Approximate UCL (use when $n \geq 50$)					991.6	Gamma Adjusted UCL (use when $n < 50$)					1482.7
1447												
1448	Lognormal GOF Test on Detected Observations Only											
1449	Shapiro Wilk Test Statistic					0.79	Shapiro Wilk GOF Test					
1450	5% Shapiro Wilk Critical Value					0.80	Detected Data Not Lognormal at 5% Significance Level					
1451	Lilliefors Test Statistic					0.33	Lilliefors GOF Test					
1452	5% Lilliefors Critical Value					0.33	Detected Data appear Lognormal at 5% Significance Level					
1453	Detected Data appear Approximate Lognormal at 5% Significance Level											
1454												
1455	Lognormal ROS Statistics Using Imputed Non-Detects											
1456	Mean in Original Scale					247.3	Mean in Log Scale					4.79
1457	SD in Original Scale					339.8	SD in Log Scale					1.28
1458	95% t UCL (assumes normality of ROS data)					474.9	95% Percentile Bootstrap UCL					439.7
1459	95% BCA Bootstrap UCL					523.8	95% Bootstrap t UCL					2047.7
1460	95% H-UCL (Log ROS)					2104						
1461												
1462	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
1463	KM Mean (logged)					4.96	95% H-UCL (KM -Log)					763.5
1464	KM SD (logged)					0.96	95% Critical H Value (KM-Log)					3.33
1465	KM Standard Error of Mean (logged)					0.36						
1466												
1467	DL/2 Statistics											
1468	DL/2 Normal						DL/2 Log-Transformed					
1469	Mean in Original Scale					249.2	Mean in Log Scale					4.88
1470	SD in Original Scale					338.3	SD in Log Scale					1.13
1471	95% t UCL (Assumes normality)					475.8	95% H-Stat UCL					1267.7
1472	DL/2 is not a recommended method, provided											

	A	B	C	D	E	F	G	H	I	J	K	L
1477	Suggested UCL to Use											
1478	97.5% KM (Chebyshev) UCL					1002						
1479	Warning: Recommended UCL exceeds the maximum observation											
1480												
1481	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1482	Recommendations are based upon data size, data distribution, and skewness.											
1483	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
1484	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult											
1485												
1486	Toluene											
1487												
1488	General Statistics											
1489	Total Number of Observations					8	Number of Distinct Observations					7
1490	Number of Detects					6	Number of Non-Detects					2
1491	Number of Distinct Detects					5	Number of Distinct Non-Detects					2
1492	Minimum Detect					3.3400E	Minimum Non-Detect					0.001
1493	Maximum Detect					0.001	Maximum Non-Detect					0.001
1494	Variance Detects					1.5585E	Percent Non-Detects					25%
1495	Mean Detects					9.1133E	SD Detects					3.9478E
1496	Median Detects					0.001	CV Detects					0.43
1497	Skewness Detects					-0.70	Kurtosis Detects					-1.19
1498	Mean of Logged Detects					-7.10	SD of Logged Detects					0.54
1499												
1500	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
1501	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
1502	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
1503	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
1504												
1505	Normal GOF Test on Detects Only											
1506	Shapiro Wilk Test Statistic					0.89	Shapiro Wilk GOF Test					
1507	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Normal at 5% Significance Level					
1508	Lilliefors Test Statistic					0.25	Lilliefors GOF Test					
1509	5% Lilliefors Critical Value					0.36	Detected Data appear Normal at 5% Significance Level					
1510	Detected Data appear Normal at 5% Significance Level											
1511												
1512	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
1513	Mean					8.9880E	Standard Error of Mean					1.5860E
1514	SD					3.5768E	95% KM (BCA) UCL					0.001
1515	95% KM (t) UCL					0.001	95% KM (Percentile Bootstrap) UCL					0.001
1516	95% KM (z) UCL					0.001	95% KM Bootstrap t UCL					0.001
1517	90% KM Chebyshev UCL					0.001	95% KM Chebyshev UCL					0.001
1518	97.5% KM Chebyshev UCL					0.001	99% KM Chebyshev UCL					0.002
1519												
1520	Gamma GOF Tests on Detected Observations Only											
1521	A-D Test Statistic					0.54	Anderson-Darling GOF Test					
1522	5% A-D Critical Value					0.69	Detected data appear Gamma Distributed at 5% Significance Level					
1523	K-S Test Statistic					0.30	Kolmogrov-Smirnov GOF					
1524	5% K-S Critical Value					0.33	Detected data appear Gamma Distributed at 5% Significance Level					
1525	Detected data appear Gamma Distributed at 5% Significance Level											
1526												
1527	Gamma Statistics on Detected Data Only											
1528	k hat (MLE)					4.83	k star (bias corrected MLE)					2.53
1529	Theta hat (MLE)					1.8834E	Theta star (bias corrected MLE)					3.6014E
1530	nu hat (MLE)					58.0	nu star (bias corrected)					30.3
1531	MLE Mean (bias corrected)					9.1133E	MLE Sd (bias corrected)					5.7289E
1532												
1533	Gamma Kaplan-Meier (KM) Statistics											
1534	k hat (KM)					6.31	nu hat (KM)					101
1535	Approximate Chi Square Value (101.03, α)					78.8	Adjusted Chi Square Value (101.03, β)					73.9
1536	Approximate KM-UCL (use when n>=50)					0.001	Gamma Adjusted KM-UCL (use when n<50)					0.001
1537												
1538	Gamma ROS Statistics using Imputed Non-Detects											
1539	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1540	GROS may not be used when kstar of detected data is small such as < 0.1											
1541	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
1542	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1543	Minimum					3.3400E	Mean					0.003
1544	Maximum					0.01	Median					0.001
1545	SD					0.004	CV					1.32
1546	k hat (MLE)					0.80	k star (bias corrected MLE)					0.58
1547	Theta hat (MLE)					0.003	Theta star (bias corrected MLE)					0.005
1548	nu hat (MLE)					12.9	nu star (bias corrected)					9.42
1549	MLE Mean (bias corrected)					0.003	MLE Sd (bias corrected)					0.004
1550							Adjusted Level of Significance (β)					0.01
1551	Approximate Chi Square Value (9.43, α)					3.58	Adjusted Chi Square Value (9.43, β)					2.73
1552	Gamma Approximate UCL (use when n>=50)					0.008	Gamma Adjusted UCL (use when n<50)					0.01
1553												
1554	Lognormal GOF Test on Detected Observations Only											
1555	Shapiro Wilk Test Statistic					0.84	Shapiro Wilk GOF Test					
1556	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Lognormal at 5% Significance Level					
1557	Lilliefors Test Statistic					0.30	Lilliefors GOF Test					
1558	5% Lilliefors Critical Value					0.36	Detected Data appear Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L		
1559	Detected Data appear Lognormal at 5% Significance Level													
1560														
1561	Lognormal ROS Statistics Using Imputed Non-Detects													
1562	Mean in Original Scale					8.7185E	Mean in Log Scale					-7.12		
1563	SD in Original Scale					3.4213E	SD in Log Scale					0.46		
1564	95% t UCL (assumes normality of ROS data)					0.001	95% Percentile Bootstrap UCL					0.001		
1565	95% BCA Bootstrap UCL					0.001	95% Bootstrap t UCL					0.001		
1566	95% H-UCL (Log ROS)					0.001								
1567														
1568	Data using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed													
1569	KM Mean (logged)					-7.12	95% H-UCL (KM -Log)					0.001		
1570	KM SD (logged)					0.5	95% Critical H Value (KM-Log)					2.35		
1571	KM Standard Error of Mean (logged)					0.22								
1572														
1573	DL/2 Statistics													
1574	DL/2 Normal						DL/2 Log-Transformed							
1575	Mean in Original Scale						8.5413E	Mean in Log Scale						-7.15
1576	SD in Original Scale						3.5013E	SD in Log Scale						0.47
1577	95% t UCL (Assumes normality)						0.001	95% H-Stat UCL						0.001
1578	DL/2 is not a recommended method, provided for comparisons and historical reasons													
1579														
1580	Nonparametric Distribution Free UCL Statistics													
1581	Detected Data appear Normal Distributed at 5% Significance Level													
1582														
1583	Suggested UCL to Use													
1584	95% KM (t) UCL					0.001	95% KM (Percentile Bootstrap) UCL					0.001		
1585														
1586	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate													
1587	Recommendations are based upon data size, data distribution, and skewness.													
1588	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and													
1589	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult													
1590														
1591														
1592	Uranium													
1593														
1594	General Statistics													
1595	Total Number of Observations					8	Number of Distinct Observations					8		
1596							Number of Missing Observations					0		
1597	Minimum					1.72	Mean					4.13		
1598	Maximum					10.4	Median					3.07		
1599	SD					2.88	Std. Error of Mean					1.01		
1600	Coefficient of Variation					0.69	Skewness					1.7		
1601														
1602	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use													
1603	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.													
1604	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).													
1605	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0													
1606														
1607	Normal GOF Test													
1608	Shapiro Wilk Test Statistic					0.79	Shapiro Wilk GOF Test							
1609	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level							
1610	Lilliefors Test Statistic					0.24	Lilliefors GOF Test							
1611	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level							
1612	Data appear Approximate Normal at 5% Significance Level													
1613														
1614	Assuming Normal Distribution													
1615	95% Normal UCL						95% UCLs (Adjusted for Skewness)							
1616	95% Student's-t UCL					6.06	95% Adjusted-CLT UCL (Chen-1995)					6.46		
1617							95% Modified-t UCL (Johnson-1978)					6.16		
1618														
1619	Gamma GOF Test													
1620	A-D Test Statistic					0.51	Anderson-Darling Gamma GOF Test							
1621	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level							
1622	K-S Test Statistic					0.27	Kolmogorov-Smirnov Gamma GOF Test							
1623	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significance Level							
1624	Detected data appear Gamma Distributed at 5% Significance Level													
1625														
1626	Gamma Statistics													
1627	k hat (MLE)					2.98	k star (bias corrected MLE)					1.95		
1628	Theta hat (MLE)					1.38	Theta star (bias corrected MLE)					2.11		
1629	nu hat (MLE)					47.8	nu star (bias corrected)					31.2		
1630	MLE Mean (bias corrected)					4.13	MLE Sd (bias corrected)					2.95		
1631							Approximate Chi Square Value (0.05)					19.4		
1632	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					17.1		
1633														
1634	Assuming Gamma Distribution													
1635	Approximate Gamma UCL (use when n>=50)					6.63	Adjusted Gamma UCL (use when n<50)					7.52		
1636														
1637	Lognormal GOF Test													
1638	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk Lognormal GOF Test							
1639	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level							
1640	Lilliefors Test Statistic					0.25	Lilliefors Lognormal GOF Test							

	A	B	C	D	E	F	G	H	I	J	K	L	
1641	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level						
1642	Data appear Lognormal at 5% Significance Level												
1643													
1644	Lognormal Statistics												
1645	Minimum of Logged Data					0.54	Mean of logged Data					1.24	
1646	Maximum of Logged Data					2.34	SD of logged Data					0.61	
1647													
1648	Assuming Lognormal Distribution												
1649	95% H-UCL					7.53	90% Chebyshev (MVUE) UCL					6.73	
1650	95% Chebyshev (MVUE) UCL					7.95	97.5% Chebyshev (MVUE) UCL					9.63	
1651	99% Chebyshev (MVUE) UCL					12.91							
1652													
1653	Nonparametric Distribution Free UCL Statistics												
1654	Data appear to follow a Discernible Distribution at 5% Significance Level												
1655													
1656	Nonparametric Distribution Free UCLs												
1657	95% CLT UCL					5.80	95% Jackknife UCL					6.06	
1658	95% Standard Bootstrap UCL					5.67	95% Bootstrap-t UCL					7.63	
1659	95% Hall's Bootstrap UCL					11.44	95% Percentile Bootstrap UCL					5.73	
1660	95% BCA Bootstrap UCL					6.38							
1661	90% Chebyshev(Mean, Sd) UCL					7.18	95% Chebyshev(Mean, Sd) UCL					8.57	
1662	97.5% Chebyshev(Mean, Sd) UCL					10.5	99% Chebyshev(Mean, Sd) UCL					14.2	
1663													
1664	Suggested UCL to Use												
1665	95% Student's-t UCL					6.06							
1666													
1667	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
1668	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh												
1669	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
1670	For additional insight the user may want to consult a statistician.												
1671													
1672													
1673	Uranium-234												
1674													
1675	General Statistics												
1676	Total Number of Observations					8	Number of Distinct Observations					8	
1677							Number of Missing Observations					0	
1678	Minimum					1.26	Mean					2.65	
1679	Maximum					6.1	Median					1.61	
1680	SD					1.81	Std. Error of Mean					0.64	
1681	Coefficient of Variation					0.68	Skewness					1.22	
1682													
1683	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
1684	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
1685	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
1686	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
1687													
1688	Normal GOF Test												
1689	Shapiro Wilk Test Statistic					0.78	Shapiro Wilk GOF Test						
1690	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level						
1691	Lilliefors Test Statistic					0.33	Lilliefors GOF Test						
1692	5% Lilliefors Critical Value					0.31	Data Not Normal at 5% Significance Level						
1693	Data Not Normal at 5% Significance Level												
1694													
1695	Assuming Normal Distribution												
1696	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
1697	95% Student's-t UCL					3.86	95% Adjusted-CLT UCL (Chen-1995)					4.00	
1698							95% Modified-t UCL (Johnson-1978)					3.91	
1699													
1700	Gamma GOF Test												
1701	A-D Test Statistic					0.77	Anderson-Darling Gamma GOF Test						
1702	5% A-D Critical Value					0.72	Data Not Gamma Distributed at 5% Significance Level						
1703	K-S Test Statistic					0.33	Kolmogrov-Smirnoff Gamma GOF Test						
1704	5% K-S Critical Value					0.29	Data Not Gamma Distributed at 5% Significance Level						
1705	Data Not Gamma Distributed at 5% Significance Level												
1706													
1707	Gamma Statistics												
1708	k hat (MLE)					2.95	k star (bias corrected MLE)					1.92	
1709	Theta hat (MLE)					0.89	Theta star (bias corrected MLE)					1.37	
1710	nu hat (MLE)					47.24	nu star (bias corrected)					30.80	
1711	MLE Mean (bias corrected)					2.65	MLE Sd (bias corrected)					1.91	
1712							Approximate Chi Square Value (0.05)					19.11	
1713	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					16.81	
1714													
1715	Assuming Gamma Distribution												
1716	Approximate Gamma UCL (use when n>=50)					4.27	Adjusted Gamma UCL (use when n<50)					4.85	
1717													
1718	Lognormal GOF Test												
1719	Shapiro Wilk Test Statistic					0.83	Shapiro Wilk Lognormal GOF Test						
1720	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level						
1721	Lilliefors Test Statistic					0.31	Lilliefors Lognormal GOF Test						
1722	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level						

	A	B	C	D	E	F	G	H	I	J	K	L
1723	Data appear Lognormal at 5% Significance Level											
1724												
1725	Lognormal Statistics											
1726	Minimum of Logged Data					0.23	Mean of logged Data					0.79
1727	Maximum of Logged Data					1.80	SD of logged Data					0.61
1728												
1729	Assuming Lognormal Distribution											
1730	95% H-UCL					4.86	90% Chebyshev (MVUE) UCL					4.33
1731	95% Chebyshev (MVUE) UCL					5.12	97.5% Chebyshev (MVUE) UCL					6.20
1732	99% Chebyshev (MVUE) UCL					8.34						
1733												
1734	Nonparametric Distribution Free UCL Statistics											
1735	Data appear to follow a Discernible Distribution at 5% Significance Level											
1736												
1737	Nonparametric Distribution Free UCLs											
1738	95% CLT UCL					3.70	95% Jackknife UCL					3.86
1739	95% Standard Bootstrap UCL					3.65	95% Bootstrap-t UCL					5.04
1740	95% Hall's Bootstrap UCL					3.86	95% Percentile Bootstrap UCL					3.73
1741	95% BCA Bootstrap UCL					3.97						
1742	90% Chebyshev(Mean, Sd) UCL					4.57	95% Chebyshev(Mean, Sd) UCL					5.44
1743	97.5% Chebyshev(Mean, Sd) UCL					6.65	99% Chebyshev(Mean, Sd) UCL					9.02
1744												
1745	Suggested UCL to Use											
1746	95% H-UCL					4.86						
1747												
1748	Conditions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1749	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
1750	Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1751	For additional insight the user may want to consult a statistician.											
1752												
1753	ProUCL computes and outputs H-statistic based UCLs for historical reasons only.											
1754	It often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Manual.											
1755	It is therefore recommended to avoid the use of H-statistic based 95% UCLs.											
1756	Nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.											
1757												
1758	Uranium-235/236											
1759												
1760	General Statistics											
1761	Total Number of Observations					8	Number of Distinct Observations					8
1762	Number of Detects					6	Number of Non-Detects					2
1763	Number of Distinct Detects					6	Number of Distinct Non-Detects					2
1764	Minimum Detect					0.09	Minimum Non-Detect					0.05
1765	Maximum Detect					0.27	Maximum Non-Detect					0.05
1766	Variance Detects					0.004	Percent Non-Detects					25%
1767	Mean Detects					0.15	SD Detects					0.06
1768	Median Detects					0.14	CV Detects					0.41
1769	Skewness Detects					1.81	Kurtosis Detects					3.77
1770	Mean of Logged Detects					-1.93	SD of Logged Detects					0.36
1771												
1772	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
1773	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
1774	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
1775	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
1776												
1777	Normal GOF Test on Detects Only											
1778	Shapiro Wilk Test Statistic					0.81	Shapiro Wilk GOF Test					
1779	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Normal at 5% Significance Level					
1780	Lilliefors Test Statistic					0.31	Lilliefors GOF Test					
1781	5% Lilliefors Critical Value					0.30	Detected Data appear Normal at 5% Significance Level					
1782	Detected Data appear Normal at 5% Significance Level											
1783												
1784	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
1785	Mean					0.12	Standard Error of Mean					0.02
1786	SD					0.06	95% KM (BCA) UCL					0.17
1787	95% KM (t) UCL					0.17	95% KM (Percentile Bootstrap) UCL					0.17
1788	95% KM (z) UCL					0.17	95% KM Bootstrap t UCL					0.18
1789	90% KM Chebyshev UCL					0.20	95% KM Chebyshev UCL					0.24
1790	97.5% KM Chebyshev UCL					0.29	99% KM Chebyshev UCL					0.38
1791												
1792	Gamma GOF Tests on Detected Observations Only											
1793	A-D Test Statistic					0.42	Anderson-Darling GOF Test					
1794	5% A-D Critical Value					0.69	Detected data appear Gamma Distributed at 5% Significance Level					
1795	K-S Test Statistic					0.26	Kolmogorov-Smirnoff GOF					
1796	5% K-S Critical Value					0.33	Detected data appear Gamma Distributed at 5% Significance Level					
1797	Detected data appear Gamma Distributed at 5% Significance Level											
1798												
1799	Gamma Statistics on Detected Data Only											
1800	k hat (MLE)					8.42	k star (bias corrected MLE)					4.32
1801	Theta hat (MLE)					0.01	Theta star (bias corrected MLE)					0.03
1802	nu hat (MLE)					101.1	nu star (bias corrected)					51.8
1803	MLE Mean (bias corrected)					0.15	MLE Sd (bias corrected)					0.07
1804												

A	B	C	D	E	F	G	H	I	J	K	L
1805	Gamma Kaplan-Meier (KM) Statistics										
1806	k hat (KM)				3.62	nu hat (KM)					58.0
1807	Approximate Chi Square Value (58.04, α)				41.5	Adjusted Chi Square Value (58.04, β)					38.0
1808	Approximate KM-UCL (use when $n \geq 50$)				0.18	Gamma Adjusted KM-UCL (use when $n < 50$)					0.19
1809											
1810	Gamma ROS Statistics using Imputed Non-Detects										
1811	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1812	GROS may not be used when kstar of detected data is small such as < 0.1										
1813	For such situations, GROS method tends to yield inflated values of UCLs and BTVs										
1814	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1815	Minimum				0.02	Mean					0.12
1816	Maximum				0.27	Median					0.12
1817	SD				0.08	CV					0.67
1818	k hat (MLE)				1.93	k star (bias corrected MLE)					1.29
1819	Theta hat (MLE)				0.06	Theta star (bias corrected MLE)					0.09
1820	nu hat (MLE)				31	nu star (bias corrected)					20.7
1821	MLE Mean (bias corrected)				0.12	MLE Sd (bias corrected)					0.10
1822						Adjusted Level of Significance (β)					0.01
1823	Approximate Chi Square Value (20.71, α)				11.3	Adjusted Chi Square Value (20.71, β)					9.67
1824	Gamma Approximate UCL (use when $n \geq 50$)				0.22	Gamma Adjusted UCL (use when $n < 50$)					0.26
1825											
1826	Lognormal GOF Test on Detected Observations Only										
1827	Shapiro Wilk Test Statistic				0.91	Shapiro Wilk GOF Test					
1828	5% Shapiro Wilk Critical Value				0.78	Detected Data appear Lognormal at 5% Significance Level					
1829	Lilliefors Test Statistic				0.24	Lilliefors GOF Test					
1830	5% Lilliefors Critical Value				0.36	Detected Data appear Lognormal at 5% Significance Level					
1831	Detected Data appear Lognormal at 5% Significance Level										
1832											
1833	Lognormal ROS Statistics Using Imputed Non-Detects										
1834	Mean in Original Scale				0.13	Mean in Log Scale					-2.15
1835	SD in Original Scale				0.07	SD in Log Scale					0.51
1836	95% t UCL (assumes normality of ROS data)			0.17	95% Percentile Bootstrap UCL				0.17		
1837	95% BCA Bootstrap UCL			0.18	95% Bootstrap t UCL				0.19		
1838	95% H-UCL (Log ROS)			0.21							
1839											
1840	DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed										
1841	KM Mean (logged)				-2.18	95% H-UCL (KM -Log)					0.20
1842	KM SD (logged)				0.52	95% Critical H Value (KM-Log)					2.40
1843	KM Standard Error of Mean (logged)				0.20						
1844											
1845	DL/2 Statistics										
1846	DL/2 Normal					DL/2 Log-Transformed					
1847	Mean in Original Scale				0.12	Mean in Log Scale					-2.34
1848	SD in Original Scale				0.08	SD in Log Scale					0.82
1849	95% t UCL (Assumes normality)				0.17	95% H-Stat UCL					0.34
1850	DL/2 is not a recommended method, provided for comparisons and historical reasons										
1851											
1852	Nonparametric Distribution Free UCL Statistics										
1853	Detected Data appear Normal Distributed at 5% Significance Level										
1854											
1855	Suggested UCL to Use										
1856	95% KM (t) UCL				0.17	95% KM (Percentile Bootstrap) UCL					0.17
1857											
1858	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
1859	Recommendations are based upon data size, data distribution, and skewness.										
1860	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and										
1861	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult										
1862											
1863											
1864	Uranium-238										
1865											
1866	General Statistics										
1867	Total Number of Observations				8	Number of Distinct Observations					8
1868						Number of Missing Observations					0
1869	Minimum				1.4	Mean					2.51
1870	Maximum				4.51	Median					2.06
1871	SD				1.16	Std. Error of Mean					0.41
1872	Coefficient of Variation				0.46	Skewness					0.82
1873											
1874	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use										
1875	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.										
1876	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).										
1877	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0										
1878											
1879	Normal GOF Test										
1880	Shapiro Wilk Test Statistic				0.87	Shapiro Wilk GOF Test					
1881	5% Shapiro Wilk Critical Value				0.81	Data appear Normal at 5% Significance Level					
1882	Lilliefors Test Statistic				0.26	Lilliefors GOF Test					
1883	5% Lilliefors Critical Value				0.31	Data appear Normal at 5% Significance Level					
1884	Data appear Normal at 5% Significance Level										
1885											
1886	Assuming Normal Distribution										

	A	B	C	D	E	F	G	H	I	J	K	L
1887	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1888	95% Student's-t UCL					3.29	95% Adjusted-CLT UCL (Chen-1995)					3.31
1889							95% Modified-t UCL (Johnson-1978)					3.31
1890												
1891	Gamma GOF Test											
1892	A-D Test Statistic					0.46	Anderson-Darling Gamma GOF Test					
1893	5% A-D Critical Value					0.71	data appear Gamma Distributed at 5% Significance Level					
1894	K-S Test Statistic					0.23	Kolmogrov-Smirnoff Gamma GOF Test					
1895	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significance Level					
1896	Detected data appear Gamma Distributed at 5% Significance Level											
1897												
1898	Gamma Statistics											
1899	k hat (MLE)					5.81	k star (bias corrected MLE)					3.71
1900	Theta hat (MLE)					0.43	Theta star (bias corrected MLE)					0.67
1901	nu hat (MLE)					92.9	nu star (bias corrected)					59.4
1902	MLE Mean (bias corrected)					2.51	MLE Sd (bias corrected)					1.30
1903							Approximate Chi Square Value (0.05)					42.7
1904	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					39.1
1905												
1906	Assuming Gamma Distribution											
1907	Approximate Gamma UCL (use when n>=50)					3.49	Adjusted Gamma UCL (use when n<50)					3.81
1908												
1909	Lognormal GOF Test											
1910	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk Lognormal GOF Test					
1911	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level					
1912	Lilliefors Test Statistic					0.20	Lilliefors Lognormal GOF Test					
1913	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level					
1914	Data appear Lognormal at 5% Significance Level											
1915												
1916	Lognormal Statistics											
1917	Minimum of Logged Data					0.33	Mean of logged Data					0.83
1918	Maximum of Logged Data					1.50	SD of logged Data					0.44
1919												
1920	Assuming Lognormal Distribution											
1921	95% H-UCL					3.70	90% Chebyshev (MVUE) UCL					3.69
1922	95% Chebyshev (MVUE) UCL					4.23	97.5% Chebyshev (MVUE) UCL					4.97
1923	99% Chebyshev (MVUE) UCL					6.44						
1924												
1925	Nonparametric Distribution Free UCL Statistics											
1926	Data appear to follow a Discernible Distribution at 5% Significance Level											
1927												
1928	Nonparametric Distribution Free UCLs											
1929	95% CLT UCL					3.18	95% Jackknife UCL					3.29
1930	95% Standard Bootstrap UCL					3.14	95% Bootstrap-t UCL					3.63
1931	95% Hall's Bootstrap UCL					3.16	95% Percentile Bootstrap UCL					3.16
1932	95% BCA Bootstrap UCL					3.19						
1933	90% Chebyshev(Mean, Sd) UCL					3.74	95% Chebyshev(Mean, Sd) UCL					4.30
1934	97.5% Chebyshev(Mean, Sd) UCL					5.07	99% Chebyshev(Mean, Sd) UCL					6.6
1935												
1936	Suggested UCL to Use											
1937	95% Student's-t UCL					3.29						
1938												
1939	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1940	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh											
1941	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1942	For additional insight the user may want to consult a statistician.											
1943												
1944												
1945	Zinc											
1946												
1947	General Statistics											
1948	Total Number of Observations					8	Number of Distinct Observations					8
1949							Number of Missing Observations					0
1950	Minimum					41.6	Mean					216.9
1951	Maximum					1320	Median					57.5
1952	SD					446	Std. Error of Mean					157.7
1953	Coefficient of Variation					2.05	Skewness					2.82
1954												
1955	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
1956	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
1957	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
1958	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
1959												
1960	Normal GOF Test											
1961	Shapiro Wilk Test Statistic					0.45	Shapiro Wilk GOF Test					
1962	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level					
1963	Lilliefors Test Statistic					0.48	Lilliefors GOF Test					
1964	5% Lilliefors Critical Value					0.31	Data Not Normal at 5% Significance Level					
1965	Data Not Normal at 5% Significance Level											
1966												
1967	Assuming Normal Distribution											
1968	95% Normal UCL						95% UCLs (Adjusted for Skewness)					

	A	B	C	D	E	F	G	H	I	J	K	L
1969	95% Student's-t UCL					515.7	95% Adjusted-CLT UCL (Chen-1995)					644.4
1970							95% Modified-t UCL (Johnson-1978)					541.9
1971												
1972	Gamma GOF Test											
1973	A-D Test Statistic					1.86	Anderson-Darling Gamma GOF Test					
1974	5% A-D Critical Value					0.75	Data Not Gamma Distributed at 5% Significance Level					
1975	K-S Test Statistic					0.44	Kolmogrov-Smirnoff Gamma GOF Test					
1976	5% K-S Critical Value					0.30	Data Not Gamma Distributed at 5% Significance Level					
1977	Data Not Gamma Distributed at 5% Significance Level											
1978												
1979	Gamma Statistics											
1980	k hat (MLE)					0.65	k star (bias corrected MLE)					0.49
1981	Theta hat (MLE)					333.1	Theta star (bias corrected MLE)					442.4
1982	nu hat (MLE)					10.4	nu star (bias corrected)					7.84
1983	MLE Mean (bias corrected)					216.9	MLE Sd (bias corrected)					309.8
1984							Approximate Chi Square Value (0.05)					2.64
1985	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					1.94
1986												
1987	Assuming Gamma Distribution											
1988	Approximate Gamma UCL (use when n>=50)					643.2	Adjusted Gamma UCL (use when n<50)					874.5
1989												
1990	Lognormal GOF Test											
1991	Shapiro Wilk Test Statistic					0.62	Shapiro Wilk Lognormal GOF Test					
1992	5% Shapiro Wilk Critical Value					0.81	Data Not Lognormal at 5% Significance Level					
1993	Lilliefors Test Statistic					0.35	Lilliefors Lognormal GOF Test					
1994	5% Lilliefors Critical Value					0.31	Data Not Lognormal at 5% Significance Level					
1995	Data Not Lognormal at 5% Significance Level											
1996												
1997	Lognormal Statistics											
1998	Minimum of Logged Data					3.72	Mean of logged Data					4.44
1999	Maximum of Logged Data					7.18	SD of logged Data					1.13
2000												
2001	Assuming Lognormal Distribution											
2002	95% H-UCL					819.8	90% Chebyshev (MVUE) UCL					323.3
2003	95% Chebyshev (MVUE) UCL					404	97.5% Chebyshev (MVUE) UCL					516.2
2004	99% Chebyshev (MVUE) UCL					736.4						
2005												
2006	Nonparametric Distribution Free UCL Statistics											
2007	Data do not follow a Discernible Distribution (0.05)											
2008												
2009	Nonparametric Distribution Free UCLs											
2010	95% CLT UCL					476.3	95% Jackknife UCL					515.7
2011	95% Standard Bootstrap UCL					460.1	95% Bootstrap-t UCL					7021
2012	95% Hall's Bootstrap UCL					3949	95% Percentile Bootstrap UCL					531.9
2013	95% BCA Bootstrap UCL					688.1						
2014	90% Chebyshev(Mean, Sd) UCL					690	95% Chebyshev(Mean, Sd) UCL					904.2
2015	97.5% Chebyshev(Mean, Sd) UCL					1202	99% Chebyshev(Mean, Sd) UCL					1786
2016												
2017	Suggested UCL to Use											
2018	95% Hall's Bootstrap UCL					3949						
2019												
2020	Recommended UCL exceeds the maximum observation											
2021												
2022	t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (M											
2023												
2024	tions regarding the selection of a 95% UCL are provided to help the user to select the most appropri											
2025	mmendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
2026	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
2027	For additional insight the user may want to consult a statistician.											
2028												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	e/Time of Computation			8/13/2015 3:10:13 PM								
5	From File			ProUCLinput_C-36-003_0-5.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	f Bootstrap Operations			2000								
9												
10	Acenaphthene											
11												
12	General Statistics											
13	Total Number of Observations				16		Number of Distinct Observations				16	
14	Number of Detects				5		Number of Non-Detects				11	
15	Number of Distinct Detects				5		Number of Distinct Non-Detects				11	
16	Minimum Detect				0.014		Minimum Non-Detect				0.039	
17	Maximum Detect				0.24		Maximum Non-Detect				1.81	
18	Variance Detects				0.007		Percent Non-Detects				68.7%	
19	Mean Detects				0.10		SD Detects				0.089	
20	Median Detects				0.09		CV Detects				0.81	
21	Skewness Detects				1.37		Kurtosis Detects				2.86	
22	Mean of Logged Detects				-2.6		SD of Logged Detects				1.02	
23												
24	Normal GOF Test on Detects Only											
25	Shapiro Wilk Test Statistic				0.87		Shapiro Wilk GOF Test					
26	5% Shapiro Wilk Critical Value				0.76		ected Data appear Normal at 5% Significance Level					
27	Lilliefors Test Statistic				0.33		Lilliefors GOF Test					
28	5% Lilliefors Critical Value				0.39		ected Data appear Normal at 5% Significance Level					
29	Detected Data appear Normal at 5% Significance Level											
30												
31	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
32	Mean				0.05		Standard Error of Mean				0.019	
33	SD				0.06		95% KM (BCA) UCL				0.10	
34	95% KM (t) UCL				0.08		95% KM (Percentile Bootstrap) UCL				0.089	
35	95% KM (z) UCL				0.084		95% KM Bootstrap t UCL				0.089	
36	90% KM Chebyshev UCL				0.11		95% KM Chebyshev UCL				0.13	
37	97.5% KM Chebyshev UCL				0.17		99% KM Chebyshev UCL				0.24	
38												
39	Gamma GOF Tests on Detected Observations Only											
40	A-D Test Statistic				0.34		Anderson-Darling GOF Test					
41	5% A-D Critical Value				0.68		data appear Gamma Distributed at 5% Significance Level					
42	K-S Test Statistic				0.23		Kolmogorov-Smirnov GOF Test					
43	5% K-S Critical Value				0.36		data appear Gamma Distributed at 5% Significance Level					
44	Detected data appear Gamma Distributed at 5% Significance Level											
45												
46	Gamma Statistics on Detected Data Only											
47	k hat (MLE)				1.64		k star (bias corrected MLE)				0.79	
48	Theta hat (MLE)				0.06		Theta star (bias corrected MLE)				0.13	
49	nu hat (MLE)				16.4		nu star (bias corrected)				7.90	
50	MLE Mean (bias corrected)				0.10		MLE Sd (bias corrected)				0.11	
51												
52	Gamma Kaplan-Meier (KM) Statistics											
53	k hat (KM)				0.76		nu hat (KM)				24.4	
54	Approximate Chi Square Value (24.40, α)				14.1		Adjusted Chi Square Value (24.40, β)				13.2	
55	Approximate KM-UCL (use when $n \geq 50$)				0.09		Gamma Adjusted KM-UCL (use when $n < 50$)				0.09	
56												
57	Gamma ROS Statistics using Imputed Non-Detects											
58	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
59	GROS may not be used when kstar of detected data is small such as < 0.1											
60	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
61	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
62	Minimum				0.01		Mean				0.049	
63	Maximum				0.24		Median				0.029	
64	SD				0.06		CV				1.31	
65	k hat (MLE)				1.10		k star (bias corrected MLE)				0.94	
66	Theta hat (MLE)				0.04		Theta star (bias corrected MLE)				0.049	
67	nu hat (MLE)				35.3		nu star (bias corrected)				30.0	
68	MLE Mean (bias corrected)				0.04		MLE Sd (bias corrected)				0.049	
69							Adjusted Level of Significance (β)				0.039	
70	Approximate Chi Square Value (30.07, α)				18.5		Adjusted Chi Square Value (30.07, β)				17.5	
71	Gamma Approximate UCL (use when $n \geq 50$)				0.07		Gamma Adjusted UCL (use when $n < 50$)				0.07	
72												
73	Lognormal GOF Test on Detected Observations Only											
74	Shapiro Wilk Test Statistic				0.90		Shapiro Wilk GOF Test					
75	5% Shapiro Wilk Critical Value				0.76		ected Data appear Lognormal at 5% Significance Level					
76	Lilliefors Test Statistic				0.29		Lilliefors GOF Test					
77	5% Lilliefors Critical Value				0.39		ected Data appear Lognormal at 5% Significance Level					
78	Detected Data appear Lognormal at 5% Significance Level											
79												
80	Lognormal ROS Statistics Using Imputed Non-Detects											
81	Mean in Original Scale				0.049		Mean in Log Scale				-	

	A	B	C	D	E	F	G	H	I	J	K	L
83	95% t UCL (assumes normality of ROS data)					0.074	95% Percentile Bootstrap UCL					0.074
84	95% BCA Bootstrap UCL					0.084	95% Bootstrap t UCL					0.114
85	95% H-UCL (Log ROS)					0.074						
86												
87	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
88	KM Mean (logged)					-3.46	95% H-UCL (KM -Log)					0.104
89	KM SD (logged)					0.98	95% Critical H Value (KM-Log)					2.68
90	KM Standard Error of Mean (logged)					0.34						
91												
92	DL/2 Statistics											
93	DL/2 Normal						DL/2 Log-Transformed					
94	Mean in Original Scale					0.12	Mean in Log Scale					-2.76
95	SD in Original Scale					0.21	SD in Log Scale					1.06
96	95% t UCL (Assumes normality)					0.21	95% H-Stat UCL					0.24
97	DL/2 is not a recommended method, provided for comparisons and historical reasons											
98												
99	Nonparametric Distribution Free UCL Statistics											
100	Detected Data appear Normal Distributed at 5% Significance Level											
101												
102	Suggested UCL to Use											
103	95% KM (t) UCL					0.08	95% KM (Percentile Bootstrap) UCL					0.084
104												
105	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
106	Recommendations are based upon data size, data distribution, and skewness.											
107	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
108	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult											
109												
110	Anthracene											
111												
112	General Statistics											
113	Total Number of Observations					16	Number of Distinct Observations					16
114	Number of Detects					6	Number of Non-Detects					10
115	Number of Distinct Detects					6	Number of Distinct Non-Detects					10
116	Minimum Detect					0.03	Minimum Non-Detect					0.03
117	Maximum Detect					0.78	Maximum Non-Detect					1.81
118	Variance Detects					0.06	Percent Non-Detects					62.5
119	Mean Detects					0.28	SD Detects					0.26
120	Median Detects					0.23	CV Detects					0.92
121	Skewness Detects					1.71	Kurtosis Detects					3.54
122	Mean of Logged Detects					-1.65	SD of Logged Detects					1.08
123												
124	Normal GOF Test on Detects Only											
125	Shapiro Wilk Test Statistic					0.83	Shapiro Wilk GOF Test					
126	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Normal at 5% Significance Level					
127	Lilliefors Test Statistic					0.32	Lilliefors GOF Test					
128	5% Lilliefors Critical Value					0.36	Detected Data appear Normal at 5% Significance Level					
129	Detected Data appear Normal at 5% Significance Level											
130												
131	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
132	Mean					0.13	Standard Error of Mean					0.05
133	SD					0.19	95% KM (BCA) UCL					0.23
134	95% KM (t) UCL					0.23	95% KM (Percentile Bootstrap) UCL					0.23
135	95% KM (z) UCL					0.22	95% KM Bootstrap t UCL					0.28
136	90% KM Chebyshev UCL					0.30	95% KM Chebyshev UCL					0.38
137	97.5% KM Chebyshev UCL					0.48	99% KM Chebyshev UCL					0.69
138												
139	Gamma GOF Tests on Detected Observations Only											
140	A-D Test Statistic					0.24	Anderson-Darling GOF Test					
141	5% A-D Critical Value					0.70	data appear Gamma Distributed at 5% Significance Level					
142	K-S Test Statistic					0.20	Kolmogrov-Smirnoff GOF					
143	5% K-S Critical Value					0.33	data appear Gamma Distributed at 5% Significance Level					
144	Detected data appear Gamma Distributed at 5% Significance Level											
145												
146	Gamma Statistics on Detected Data Only											
147	k hat (MLE)					1.39	k star (bias corrected MLE)					0.81
148	Theta hat (MLE)					0.20	Theta star (bias corrected MLE)					0.35
149	nu hat (MLE)					16.74	nu star (bias corrected)					9.72
150	MLE Mean (bias corrected)					0.28	MLE Sd (bias corrected)					0.31
151												
152	Gamma Kaplan-Meier (KM) Statistics											
153	k hat (KM)					0.49	nu hat (KM)					15.6
154	Approximate Chi Square Value (15.68, α)					7.73	Adjusted Chi Square Value (15.68, β)					7.10
155	Approximate KM-UCL (use when n>=50)					0.27	Gamma Adjusted KM-UCL (use when n<50)					0.30
156												
157	Gamma ROS Statistics using Imputed Non-Detects											
158	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
159	GROS may not be used when kstar of detected data is small such as < 0.1											
160	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
161	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
162	Minimum					0.01	Mean					0.11
163	Maximum					0.78	Median					0.01
164	SD					0.20	CV					1.79

	A	B	C	D	E	F	G	H	I	J	K	L
165						k hat (MLE)	0.50				k star (bias corrected MLE)	0.45
166						Theta hat (MLE)	0.22				Theta star (bias corrected MLE)	0.25
167						nu hat (MLE)	16.0				nu star (bias corrected)	14.3
168						MLE Mean (bias corrected)	0.11				MLE Sd (bias corrected)	0.17
169											Adjusted Level of Significance (β)	0.03
170						Approximate Chi Square Value (14.39, α)	6.84				Adjusted Chi Square Value (14.39, β)	6.25
171						Gamma Approximate UCL (use when $n \geq 50$)	0.24				Gamma Adjusted UCL (use when $n < 50$)	0.26
172												
173						Lognormal GOF Test on Detected Observations Only						
174						Shapiro Wilk Test Statistic	0.94				Shapiro Wilk GOF Test	
175						5% Shapiro Wilk Critical Value	0.78				Detected Data appear Lognormal at 5% Significance Level	
176						Lilliefors Test Statistic	0.20				Lilliefors GOF Test	
177						5% Lilliefors Critical Value	0.36				Detected Data appear Lognormal at 5% Significance Level	
178						Detected Data appear Lognormal at 5% Significance Level						
179												
180						Lognormal ROS Statistics Using Imputed Non-Detects						
181						Mean in Original Scale	0.13				Mean in Log Scale	-2.68
182						SD in Original Scale	0.19				SD in Log Scale	1.04
183						95% t UCL (assumes normality of ROS data)	0.21				95% Percentile Bootstrap UCL	0.22
184						95% BCA Bootstrap UCL	0.25				95% Bootstrap t UCL	0.32
185						95% H-UCL (Log ROS)	0.25					
186												
187						UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed						
188						KM Mean (logged)	-2.69				95% H-UCL (KM -Log)	0.27
189						KM SD (logged)	1.09				95% Critical H Value (KM-Log)	2.85
190						KM Standard Error of Mean (logged)	0.32					
191												
192						DL/2 Statistics						
193						DL/2 Normal					DL/2 Log-Transformed	
194						Mean in Original Scale	0.19				Mean in Log Scale	-2.40
195						SD in Original Scale	0.27				SD in Log Scale	1.26
196						95% t UCL (Assumes normality)	0.31				95% H-Stat UCL	0.55
197						DL/2 is not a recommended method, provided for comparisons and historical reasons						
198												
199						Nonparametric Distribution Free UCL Statistics						
200						Detected Data appear Normal Distributed at 5% Significance Level						
201												
202						Suggested UCL to Use						
203						95% KM (t) UCL	0.23				95% KM (Percentile Bootstrap) UCL	0.23
204												
205						Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL for the data.						
206						Recommendations are based upon data size, data distribution, and skewness.						
207						Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Singh (2004).						
208						Simulation results will not cover all Real World data sets; for additional insight the user may want to consult the literature.						
209												
210						Aroclor-1254						
211												
212						General Statistics						
213						Total Number of Observations	16				Number of Distinct Observations	16
214						Number of Detects	8				Number of Non-Detects	8
215						Number of Distinct Detects	8				Number of Distinct Non-Detects	8
216						Minimum Detect	0.004				Minimum Non-Detect	0.003
217						Maximum Detect	1.03				Maximum Non-Detect	0.005
218						Variance Detects	0.11				Percent Non-Detects	50%
219						Mean Detects	0.18				SD Detects	0.34
220						Median Detects	0.06				CV Detects	1.85
221						Skewness Detects	2.76				Kurtosis Detects	7.70
222						Mean of Logged Detects	-2.69				SD of Logged Detects	1.51
223												
224						Normal GOF Test on Detects Only						
225						Shapiro Wilk Test Statistic	0.52				Shapiro Wilk GOF Test	
226						5% Shapiro Wilk Critical Value	0.81				Detected Data Not Normal at 5% Significance Level	
227						Lilliefors Test Statistic	0.43				Lilliefors GOF Test	
228						5% Lilliefors Critical Value	0.31				Detected Data Not Normal at 5% Significance Level	
229						Detected Data Not Normal at 5% Significance Level						
230												
231						Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs						
232						Mean	0.09				Standard Error of Mean	0.06
233						SD	0.24				95% KM (BCA) UCL	0.21
234						95% KM (t) UCL	0.20				95% KM (Percentile Bootstrap) UCL	0.21
235						95% KM (z) UCL	0.20				95% KM Bootstrap t UCL	0.69
236						90% KM Chebyshev UCL	0.29				95% KM Chebyshev UCL	0.37
237						97.5% KM Chebyshev UCL	0.50				99% KM Chebyshev UCL	0.74
238												
239						Gamma GOF Tests on Detected Observations Only						
240						A-D Test Statistic	0.83				Anderson-Darling GOF Test	
241						5% A-D Critical Value	0.75				Detected Data Not Gamma Distributed at 5% Significance Level	
242						K-S Test Statistic	0.30				Kolmogorov-Smirnov GOF	
243						5% K-S Critical Value	0.30				Detected data appear Gamma Distributed at 5% Significance Level	
244						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
245												
246						Gamma Statistics on Detected Data Only						

	A	B	C	D	E	F	G	H	I	J	K	L	
247					k hat (MLE)	0.61				k star (bias corrected MLE)		0.46	
248					Theta hat (MLE)	0.30				Theta star (bias corrected MLE)		0.39	
249					nu hat (MLE)	9.81				nu star (bias corrected)		7.46	
250					MLE Mean (bias corrected)	0.18				MLE Sd (bias corrected)		0.27	
251													
252					Gamma Kaplan-Meier (KM) Statistics								
253					k hat (KM)	0.14				nu hat (KM)		4.75	
254					Approximate Chi Square Value (4.75, α)	1.03				Adjusted Chi Square Value (4.75, β)		0.85	
255					Approximate KM-UCL (use when n>=50)	0.43				Gamma Adjusted KM-UCL (use when n<50)		0.52	
256													
257					Gamma ROS Statistics using Imputed Non-Detects								
258					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
259					GROS may not be used when kstar of detected data is small such as < 0.1								
260					For such situations, GROS method tends to yield inflated values of UCLs and BTVs								
261					Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
262					Minimum	0.004				Mean		0.09	
263					Maximum	1.03				Median		0.01	
264					SD	0.25				CV		2.58	
265					k hat (MLE)	0.48				k star (bias corrected MLE)		0.43	
266					Theta hat (MLE)	0.20				Theta star (bias corrected MLE)		0.22	
267					nu hat (MLE)	15.4				nu star (bias corrected)		13.9	
268					MLE Mean (bias corrected)	0.09				MLE Sd (bias corrected)		0.14	
269										Adjusted Level of Significance (β)		0.03	
270					Approximate Chi Square Value (13.91, α)	6.50				Adjusted Chi Square Value (13.91, β)		5.93	
271					Gamma Approximate UCL (use when n>=50)	0.20				Gamma Adjusted UCL (use when n<50)		0.22	
272													
273					Lognormal GOF Test on Detected Observations Only								
274					Shapiro Wilk Test Statistic	0.90				Shapiro Wilk GOF Test			
275					5% Shapiro Wilk Critical Value	0.81				Detected Data appear Lognormal at 5% Significance Level			
276					Lilliefors Test Statistic	0.23				Lilliefors GOF Test			
277					5% Lilliefors Critical Value	0.31				Detected Data appear Lognormal at 5% Significance Level			
278					Detected Data appear Lognormal at 5% Significance Level								
279													
280					Lognormal ROS Statistics Using Imputed Non-Detects								
281					Mean in Original Scale	0.09				Mean in Log Scale		-4.62	
282					SD in Original Scale	0.25				SD in Log Scale		2.25	
283					95% t UCL (assumes normality of ROS data)	0.20				95% Percentile Bootstrap UCL		0.21	
284					95% BCA Bootstrap UCL	0.28				95% Bootstrap t UCL		0.69	
285					95% H-UCL (Log ROS)	2.19							
286													
287					ROS using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed								
288					KM Mean (logged)	-4.15				95% H-UCL (KM -Log)		0.48	
289					KM SD (logged)	1.77				95% Critical H Value (KM-Log)		4.04	
290					KM Standard Error of Mean (logged)	0.47							
291													
292					DL/2 Statistics								
293					DL/2 Normal					DL/2 Log-Transformed			
294					Mean in Original Scale	0.09				Mean in Log Scale		-4.43	
295					SD in Original Scale	0.25				SD in Log Scale		2.07	
296					95% t UCL (Assumes normality)	0.20				95% H-Stat UCL		1.21	
297					DL/2 is not a recommended method, provided for comparisons and historical reasons								
298													
299					Nonparametric Distribution Free UCL Statistics								
300					Detected Data appear Approximate Gamma Distributed at 5% Significance Level								
301													
302					Suggested UCL to Use								
303					95% KM (t) UCL	0.20				95% GROS Adjusted Gamma UCL		0.22	
304					95% Adjusted Gamma KM-UCL	0.52							
305													
306					Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate								
307					Recommendations are based upon data size, data distribution, and skewness.								
308					Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and								
309					Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult								
310													
311					Aroclor-1260								
312													
313					General Statistics								
314					Total Number of Observations	16				Number of Distinct Observations		16	
315					Number of Detects	7				Number of Non-Detects		9	
316					Number of Distinct Detects	7				Number of Distinct Non-Detects		9	
317					Minimum Detect	0.01				Minimum Non-Detect		0.003	
318					Maximum Detect	0.61				Maximum Non-Detect		0.005	
319					Variance Detects	0.04				Percent Non-Detects		56.2	
320					Mean Detects	0.13				SD Detects		0.21	
321					Median Detects	0.04				CV Detects		1.64	
322					Skewness Detects	2.57				Kurtosis Detects		6.68	
323					Mean of Logged Detects	-2.74				SD of Logged Detects		1.12	
324													
325					Normal GOF Test on Detects Only								
326					Shapiro Wilk Test Statistic	0.55				Shapiro Wilk GOF Test			
327					5% Shapiro Wilk Critical Value	0.80				Detected Data Not Normal at 5% Significance Level			
328					Lilliefors Test Statistic	0.41				Lilliefors GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L	
329	5% Lilliefors Critical Value					0.33	Detected Data Not Normal at 5% Significance Level						
330	Detected Data Not Normal at 5% Significance Level												
331													
332	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs												
333	Mean					0.05	Standard Error of Mean					0.03	
334	SD					0.14	95% KM (BCA) UCL					0.13	
335	95% KM (t) UCL					0.12	95% KM (Percentile Bootstrap) UCL					0.13	
336	95% KM (z) UCL					0.12	95% KM Bootstrap t UCL					0.37	
337	90% KM Chebyshev UCL					0.17	95% KM Chebyshev UCL					0.23	
338	97.5% KM Chebyshev UCL					0.30	99% KM Chebyshev UCL					0.45	
339													
340	Gamma GOF Tests on Detected Observations Only												
341	A-D Test Statistic					0.93	Anderson-Darling GOF Test						
342	5% A-D Critical Value					0.73	Detected Data Not Gamma Distributed at 5% Significance Level						
343	K-S Test Statistic					0.33	Kolmogorov-Smirnov GOF Test						
344	5% K-S Critical Value					0.32	Detected Data Not Gamma Distributed at 5% Significance Level						
345	Detected Data Not Gamma Distributed at 5% Significance Level												
346													
347	Gamma Statistics on Detected Data Only												
348	k hat (MLE)					0.82	k star (bias corrected MLE)					0.56	
349	Theta hat (MLE)					0.15	Theta star (bias corrected MLE)					0.23	
350	nu hat (MLE)					11.6	nu star (bias corrected)					7.96	
351	MLE Mean (bias corrected)					0.13	MLE Sd (bias corrected)					0.17	
352													
353	Gamma Kaplan-Meier (KM) Statistics												
354	k hat (KM)					0.16	nu hat (KM)					5.26	
355	Approximate Chi Square Value (5.26, α)					1.27	Adjusted Chi Square Value (5.26, β)					1.06	
356	Approximate KM-UCL (use when n>=50)					0.24	Gamma Adjusted KM-UCL (use when n<50)					0.29	
357													
358	Gamma ROS Statistics using Imputed Non-Detects												
359	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												
360	GROS may not be used when kstar of detected data is small such as < 0.1												
361	For such situations, GROS method tends to yield inflated values of UCLs and BTVs												
362	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates												
363	Minimum					0.01	Mean					0.06	
364	Maximum					0.61	Median					0.01	
365	SD					0.15	CV					2.37	
366	k hat (MLE)					0.60	k star (bias corrected MLE)					0.53	
367	Theta hat (MLE)					0.10	Theta star (bias corrected MLE)					0.11	
368	nu hat (MLE)					19.2	nu star (bias corrected)					16.9	
369	MLE Mean (bias corrected)					0.06	MLE Sd (bias corrected)					0.08	
370							Adjusted Level of Significance (β)					0.03	
371	Approximate Chi Square Value (16.98, α)					8.65	Adjusted Chi Square Value (16.98, β)					7.98	
372	Gamma Approximate UCL (use when n>=50)					0.12	Gamma Adjusted UCL (use when n<50)					0.13	
373													
374	Lognormal GOF Test on Detected Observations Only												
375	Shapiro Wilk Test Statistic					0.86	Shapiro Wilk GOF Test						
376	5% Shapiro Wilk Critical Value					0.80	Detected Data appear Lognormal at 5% Significance Level						
377	Lilliefors Test Statistic					0.26	Lilliefors GOF Test						
378	5% Lilliefors Critical Value					0.33	Detected Data appear Lognormal at 5% Significance Level						
379	Detected Data appear Lognormal at 5% Significance Level												
380													
381	Lognormal ROS Statistics Using Imputed Non-Detects												
382	Mean in Original Scale					0.05	Mean in Log Scale					-4.66	
383	SD in Original Scale					0.15	SD in Log Scale					1.89	
384	95% t UCL (assumes normality of ROS data)					0.12	95% Percentile Bootstrap UCL					0.13	
385	95% BCA Bootstrap UCL					0.17	95% Bootstrap t UCL					0.38	
386	95% H-UCL (Log ROS)					0.38							
387													
388	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed												
389	KM Mean (logged)					-4.37	95% H-UCL (KM -Log)					0.20	
390	KM SD (logged)					1.59	95% Critical H Value (KM-Log)					3.71	
391	KM Standard Error of Mean (logged)					0.43							
392													
393	DL/2 Statistics												
394	DL/2 Normal						DL/2 Log-Transformed						
395	Mean in Original Scale					0.05	Mean in Log Scale					-4.66	
396	SD in Original Scale					0.15	SD in Log Scale					1.89	
397	95% t UCL (Assumes normality)					0.12	95% H-Stat UCL					0.45	
398	DL/2 is not a recommended method, provided for comparisons and historical reasons												
399													
400	Nonparametric Distribution Free UCL Statistics												
401	Detected Data appear Lognormal Distributed at 5% Significance Level												
402													
403	Suggested UCL to Use												
404	95% KM (BCA) UCL					0.13							
405													
406	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL.												
407	Recommendations are based upon data size, data distribution, and skewness.												
408	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Singh (2006).												
409	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult the literature.												
410													

	A	B	C	D	E	F	G	H	I	J	K	L
411	Benzo(a)anthracene											
412												
413	General Statistics											
414	Total Number of Observations					16	Number of Distinct Observations					16
415	Number of Detects					6	Number of Non-Detects					10
416	Number of Distinct Detects					6	Number of Distinct Non-Detects					10
417	Minimum Detect					0.17	Minimum Non-Detect					0.03
418	Maximum Detect					4.68	Maximum Non-Detect					1.81
419	Variance Detects					2.47	Percent Non-Detects					62.5
420	Mean Detects					1.73	SD Detects					1.57
421	Median Detects					1.26	CV Detects					0.90
422	Skewness Detects					1.61	Kurtosis Detects					3.12
423	Mean of Logged Detects					0.14	SD of Logged Detects					1.10
424												
425	Normal GOF Test on Detects Only											
426	Shapiro Wilk Test Statistic					0.85	Shapiro Wilk GOF Test					
427	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Normal at 5% Significance Level					
428	Lilliefors Test Statistic					0.25	Lilliefors GOF Test					
429	5% Lilliefors Critical Value					0.36	Detected Data appear Normal at 5% Significance Level					
430	Detected Data appear Normal at 5% Significance Level											
431												
432	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
433	Mean					0.69	Standard Error of Mean					0.33
434	SD					1.20	95% KM (BCA) UCL					1.25
435	95% KM (t) UCL					1.27	95% KM (Percentile Bootstrap) UCL					1.20
436	95% KM (z) UCL					1.23	95% KM Bootstrap t UCL					1.47
437	90% KM Chebyshev UCL					1.68	95% KM Chebyshev UCL					2.13
438	97.5% KM Chebyshev UCL					2.75	99% KM Chebyshev UCL					3.98
439												
440	Gamma GOF Tests on Detected Observations Only											
441	A-D Test Statistic					0.25	Anderson-Darling GOF Test					
442	5% A-D Critical Value					0.70	Detected data appear Gamma Distributed at 5% Significance Level					
443	K-S Test Statistic					0.20	Kolmogorov-Smirnoff GOF					
444	5% K-S Critical Value					0.33	Detected data appear Gamma Distributed at 5% Significance Level					
445	Detected data appear Gamma Distributed at 5% Significance Level											
446												
447	Gamma Statistics on Detected Data Only											
448	k hat (MLE)					1.38	k star (bias corrected MLE)					0.80
449	Theta hat (MLE)					1.24	Theta star (bias corrected MLE)					2.15
450	nu hat (MLE)					16.6	nu star (bias corrected)					9.65
451	MLE Mean (bias corrected)					1.73	MLE Sd (bias corrected)					1.93
452												
453	Gamma Kaplan-Meier (KM) Statistics											
454	k hat (KM)					0.33	nu hat (KM)					10.5
455	Approximate Chi Square Value (10.58, α)					4.31	Adjusted Chi Square Value (10.58, β)					3.86
456	Approximate KM-UCL (use when $n \geq 50$)					1.69	Gamma Adjusted KM-UCL (use when $n < 50$)					1.89
457												
458	Gamma ROS Statistics using Imputed Non-Detects											
459	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
460	GROS may not be used when kstar of detected data is small such as < 0.1											
461	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
462	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
463	Minimum					0.01	Mean					0.65
464	Maximum					4.68	Median					0.01
465	SD					1.25	CV					1.90
466	k hat (MLE)					0.28	k star (bias corrected MLE)					0.27
467	Theta hat (MLE)					2.26	Theta star (bias corrected MLE)					2.37
468	nu hat (MLE)					9.24	nu star (bias corrected)					8.84
469	MLE Mean (bias corrected)					0.65	MLE Sd (bias corrected)					1.24
470							Adjusted Level of Significance (β)					0.03
471	Approximate Chi Square Value (8.85, α)					3.23	Adjusted Chi Square Value (8.85, β)					2.85
472	Gamma Approximate UCL (use when $n \geq 50$)					1.79	Gamma Adjusted UCL (use when $n < 50$)					2.02
473												
474	Lognormal GOF Test on Detected Observations Only											
475	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk GOF Test					
476	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Lognormal at 5% Significance Level					
477	Lilliefors Test Statistic					0.27	Lilliefors GOF Test					
478	5% Lilliefors Critical Value					0.36	Detected Data appear Lognormal at 5% Significance Level					
479	Detected Data appear Lognormal at 5% Significance Level											
480												
481	Lognormal ROS Statistics Using Imputed Non-Detects											
482	Mean in Original Scale					0.69	Mean in Log Scale					-1.58
483	SD in Original Scale					1.23	SD in Log Scale					1.53
484	5% t UCL (assumes normality of ROS data)					1.23	95% Percentile Bootstrap UCL					1.22
485	95% BCA Bootstrap UCL					1.42	95% Bootstrap t UCL					1.89
486	95% H-UCL (Log ROS)					2.79						
487												
488	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
489	KM Mean (logged)					-1.94	95% H-UCL (KM -Log)					4.75
490	KM SD (logged)					1.79	95% Critical H Value (KM-Log)					4.

	A	B	C	D	E	F	G	H	I	J	K	L
493	DL/2 Statistics											
494	DL/2 Normal						DL/2 Log-Transformed					
495	Mean in Original Scale					0.73	Mean in Log Scale					-1.73
496	SD in Original Scale					1.22	SD in Log Scale					1.87
497	95% t UCL (Assumes normality)					1.27	95% H-Stat UCL					7.88
498	DL/2 is not a recommended method, provided for comparisons and historical reasons											
499												
500	Nonparametric Distribution Free UCL Statistics											
501	Detected Data appear Normal Distributed at 5% Significance Level											
502												
503	Suggested UCL to Use											
504	95% KM (t) UCL					1.27	95% KM (Percentile Bootstrap) UCL					1.20
505												
506	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
507	Recommendations are based upon data size, data distribution, and skewness.											
508	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
509	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
510												
511	Benzo(a)pyrene											
512												
513	General Statistics											
514	Total Number of Observations					16	Number of Distinct Observations					16
515	Number of Detects					7	Number of Non-Detects					9
516	Number of Distinct Detects					7	Number of Distinct Non-Detects					9
517	Minimum Detect					0.22	Minimum Non-Detect					0.03
518	Maximum Detect					5.94	Maximum Non-Detect					0.22
519	Variance Detects					3.63	Percent Non-Detects					56.2
520	Mean Detects					1.85	SD Detects					1.90
521	Median Detects					1.15	CV Detects					1.02
522	Skewness Detects					2.07	Kurtosis Detects					4.73
523	Mean of Logged Detects					0.21	SD of Logged Detects					1.00
524												
525	Normal GOF Test on Detects Only											
526	Shapiro Wilk Test Statistic					0.76	Shapiro Wilk GOF Test					
527	5% Shapiro Wilk Critical Value					0.80	Detected Data Not Normal at 5% Significance Level					
528	Lilliefors Test Statistic					0.27	Lilliefors GOF Test					
529	5% Lilliefors Critical Value					0.33	Detected Data appear Normal at 5% Significance Level					
530	Detected Data appear Approximate Normal at 5% Significance Level											
531												
532	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
533	Mean					0.83	Standard Error of Mean					0.39
534	SD					1.47	95% KM (BCA) UCL					1.51
535	95% KM (t) UCL					1.53	95% KM (Percentile Bootstrap) UCL					1.53
536	95% KM (z) UCL					1.48	95% KM Bootstrap t UCL					2.17
537	90% KM Chebyshev UCL					2.02	95% KM Chebyshev UCL					2.57
538	97.5% KM Chebyshev UCL					3.32	99% KM Chebyshev UCL					4.79
539												
540	Gamma GOF Tests on Detected Observations Only											
541	A-D Test Statistic					0.30	Anderson-Darling GOF Test					
542	5% A-D Critical Value					0.72	Detected data appear Gamma Distributed at 5% Significance Level					
543	K-S Test Statistic					0.17	Kolmogorov-Smirnov GOF					
544	5% K-S Critical Value					0.31	Detected data appear Gamma Distributed at 5% Significance Level					
545	Detected data appear Gamma Distributed at 5% Significance Level											
546												
547	Gamma Statistics on Detected Data Only											
548	k hat (MLE)					1.38	k star (bias corrected MLE)					0.88
549	Theta hat (MLE)					1.34	Theta star (bias corrected MLE)					2.09
550	nu hat (MLE)					19.34	nu star (bias corrected)					12.4
551	MLE Mean (bias corrected)					1.85	MLE Sd (bias corrected)					1.97
552												
553	Gamma Kaplan-Meier (KM) Statistics											
554	k hat (KM)					0.31	nu hat (KM)					10.2
555	Approximate Chi Square Value (10.21, α)					4.07	Adjusted Chi Square Value (10.21, β)					3.64
556	Approximate KM-UCL (use when $n \geq 50$)					2.08	Gamma Adjusted KM-UCL (use when $n < 50$)					2.33
557												
558	Gamma ROS Statistics using Imputed Non-Detects											
559	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
560	GROS may not be used when kstar of detected data is small such as < 0.1											
561	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
562	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimate											
563	Minimum					0.01	Mean					0.81
564	Maximum					5.94	Median					0.01
565	SD					1.53	CV					1.87
566	k hat (MLE)					0.3	k star (bias corrected MLE)					0.28
567	Theta hat (MLE)					2.72	Theta star (bias corrected MLE)					2.86
568	nu hat (MLE)					9.61	nu star (bias corrected)					9.14
569	MLE Mean (bias corrected)					0.81	MLE Sd (bias corrected)					1.53
570							Adjusted Level of Significance (β)					0.03
571	Approximate Chi Square Value (9.14, α)					3.41	Adjusted Chi Square Value (9.14, β)					3.02
572	Gamma Approximate UCL (use when $n \geq 50$)					2.19	Gamma Adjusted UCL (use when $n < 50$)					2.47
573												
574	Lognormal GOF Test on Detected Observations Only											

	A	B	C	D	E	F	G	H	I	J	K	L	
575	Shapiro Wilk Test Statistic					0.96	Shapiro Wilk GOF Test						
576	5% Shapiro Wilk Critical Value					0.80	Detected Data appear Lognormal at 5% Significance Level						
577	Lilliefors Test Statistic					0.18	Lilliefors GOF Test						
578	5% Lilliefors Critical Value					0.33	Detected Data appear Lognormal at 5% Significance Level						
579	Detected Data appear Lognormal at 5% Significance Level												
580													
581	Lognormal ROS Statistics Using Imputed Non-Detects												
582	Mean in Original Scale					0.85	Mean in Log Scale					-1.42	
583	SD in Original Scale					1.51	SD in Log Scale					1.62	
584	95% t UCL (assumes normality of ROS data)					1.51	95% Percentile Bootstrap UCL					1.51	
585	95% BCA Bootstrap UCL					1.72	95% Bootstrap t UCL					2.41	
586	95% H-UCL (Log ROS)					4.35							
587													
588	PLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed												
589	KM Mean (logged)					-1.76	95% H-UCL (KM -Log)					7.29	
590	KM SD (logged)					1.86	95% Critical H Value (KM-Log)					4.20	
591	KM Standard Error of Mean (logged)					0.50							
592													
593	DL/2 Statistics												
594	DL/2 Normal						DL/2 Log-Transformed						
595	Mean in Original Scale					0.84	Mean in Log Scale					-1.68	
596	SD in Original Scale					1.51	SD in Log Scale					1.91	
597	95% t UCL (Assumes normality)					1.50	95% H-Stat UCL					9.92	
598	DL/2 is not a recommended method, provided for comparisons and historical reasons												
599													
600	Nonparametric Distribution Free UCL Statistics												
601	Detected Data appear Approximate Normal Distributed at 5% Significance Level												
602													
603	Suggested UCL to Use												
604	95% KM (t) UCL					1.53	95% KM (Percentile Bootstrap) UCL					1.53	
605													
606	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
607	Recommendations are based upon data size, data distribution, and skewness.												
608	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and												
609	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult												
610													
611	Benzo(b)fluoranthene												
612													
613	General Statistics												
614	Total Number of Observations					16	Number of Distinct Observations					16	
615	Number of Detects					7	Number of Non-Detects					9	
616	Number of Distinct Detects					7	Number of Distinct Non-Detects					9	
617	Minimum Detect					0.49	Minimum Non-Detect					0.03	
618	Maximum Detect					13	Maximum Non-Detect					0.22	
619	Variance Detects					17.7	Percent Non-Detects					56.2	
620	Mean Detects					3.80	SD Detects					4.21	
621	Median Detects					2.31	CV Detects					1.10	
622	Skewness Detects					2.25	Kurtosis Detects					5.44	
623	Mean of Logged Detects					0.91	SD of Logged Detects					0.99	
624													
625	Normal GOF Test on Detects Only												
626	Shapiro Wilk Test Statistic					0.71	Shapiro Wilk GOF Test						
627	5% Shapiro Wilk Critical Value					0.80	Detected Data Not Normal at 5% Significance Level						
628	Lilliefors Test Statistic					0.32	Lilliefors GOF Test						
629	5% Lilliefors Critical Value					0.33	Detected Data appear Normal at 5% Significance Level						
630	Detected Data appear Approximate Normal at 5% Significance Level												
631													
632	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs												
633	Mean					1.68	Standard Error of Mean					0.86	
634	SD					3.18	95% KM (BCA) UCL					3.15	
635	95% KM (t) UCL					3.19	95% KM (Percentile Bootstrap) UCL					3.28	
636	95% KM (z) UCL					3.09	95% KM Bootstrap t UCL					4.76	
637	90% KM Chebyshev UCL					4.26	95% KM Chebyshev UCL					5.43	
638	97.5% KM Chebyshev UCL					7.05	99% KM Chebyshev UCL					10.2	
639													
640	Gamma GOF Tests on Detected Observations Only												
641	A-D Test Statistic					0.40	Anderson-Darling GOF Test						
642	5% A-D Critical Value					0.72	Detected data appear Gamma Distributed at 5% Significance Level						
643	K-S Test Statistic					0.20	Kolmogrov-Smirnoff GOF						
644	5% K-S Critical Value					0.31	Detected data appear Gamma Distributed at 5% Significance Level						
645	Detected data appear Gamma Distributed at 5% Significance Level												
646													
647	Gamma Statistics on Detected Data Only												
648	k hat (MLE)					1.33	k star (bias corrected MLE)					0.85	
649	Theta hat (MLE)					2.85	Theta star (bias corrected MLE)					4.43	
650	nu hat (MLE)					18.6	nu star (bias corrected)					12.0	
651	MLE Mean (bias corrected)					3.80	MLE Sd (bias corrected)					4.10	
652													
653	Gamma Kaplan-Meier (KM) Statistics												
654	k hat (KM)					0.28	nu hat (KM)					8.95	
655	Approximate Chi Square Value (8.95, α)					3.29	Adjusted Chi Square Value (8.95, β)					2.91	
656	Approximate KM-UCL (use when n>=50)					4.57	Gamma Adjusted KM-UCL (use when n<50)					5.16	

	A	B	C	D	E	F	G	H	I	J	K	L
657												
658	Gamma ROS Statistics using Imputed Non-Detects											
659	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
660	GROS may not be used when kstar of detected data is small such as < 0.1											
661	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
662	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
663			Minimum	0.01			Mean	1.67				
664			Maximum	13			Median	0.01				
665			SD	3.29			CV	1.97				
666			k hat (MLE)	0.26			k star (bias corrected MLE)	0.25				
667			Theta hat (MLE)	6.39			Theta star (bias corrected MLE)	6.58				
668			nu hat (MLE)	8.35			nu star (bias corrected)	8.12				
669			MLE Mean (bias corrected)	1.67			MLE Sd (bias corrected)	3.31				
670							Adjusted Level of Significance (β)	0.03				
671			Approximate Chi Square Value (8.12, α)	2.80			Adjusted Chi Square Value (8.12, β)	2.46				
672			Gamma Approximate UCL (use when n>=50)	4.83			Gamma Adjusted UCL (use when n<50)	5.51				
673												
674	Lognormal GOF Test on Detected Observations Only											
675			Shapiro Wilk Test Statistic	0.95			Shapiro Wilk GOF Test					
676			5% Shapiro Wilk Critical Value	0.80			Detected Data appear Lognormal at 5% Significance Level					
677			Lilliefors Test Statistic	0.20			Lilliefors GOF Test					
678			5% Lilliefors Critical Value	0.33			Detected Data appear Lognormal at 5% Significance Level					
679	Detected Data appear Lognormal at 5% Significance Level											
680												
681	Lognormal ROS Statistics Using Imputed Non-Detects											
682			Mean in Original Scale	1.74			Mean in Log Scale	-0.72				
683			SD in Original Scale	3.26			SD in Log Scale	1.62				
684			95% t UCL (assumes normality of ROS data)	3.16			95% Percentile Bootstrap UCL	3.18				
685			95% BCA Bootstrap UCL	4.01			95% Bootstrap t UCL	5.25				
686			95% H-UCL (Log ROS)	8.70								
687												
688	Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
689			KM Mean (logged)	-1.47			95% H-UCL (KM -Log)	39.5				
690			KM SD (logged)	2.19			95% Critical H Value (KM-Log)	4.84				
691			KM Standard Error of Mean (logged)	0.59								
692												
693	DL/2 Statistics											
694			DL/2 Normal				DL/2 Log-Transformed					
695			Mean in Original Scale	1.69			Mean in Log Scale	-1.37				
696			SD in Original Scale	3.28			SD in Log Scale	2.24				
697			95% t UCL (Assumes normality)	3.13			95% H-Stat UCL	55.0				
698	DL/2 is not a recommended method, provided for comparisons and historical reasons											
699												
700	Nonparametric Distribution Free UCL Statistics											
701	Detected Data appear Approximate Normal Distributed at 5% Significance Level											
702												
703	Suggested UCL to Use											
704			95% KM (t) UCL	3.19			95% KM (Percentile Bootstrap) UCL	3.28				
705												
706	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL.											
707	Recommendations are based upon data size, data distribution, and skewness.											
708	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Singh.											
709	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult the literature.											
710												
711	Benzo(g,h,i)perylene											
712												
713	General Statistics											
714			Total Number of Observations	16			Number of Distinct Observations	16				
715			Number of Detects	6			Number of Non-Detects	10				
716			Number of Distinct Detects	6			Number of Distinct Non-Detects	10				
717			Minimum Detect	0.12			Minimum Non-Detect	0.03				
718			Maximum Detect	3.13			Maximum Non-Detect	1.81				
719			Variance Detects	1.15			Percent Non-Detects	62.5				
720			Mean Detects	1.07			SD Detects	1.07				
721			Median Detects	0.69			CV Detects	0.99				
722			Skewness Detects	1.82			Kurtosis Detects	3.62				
723			Mean of Logged Detects	-0.34			SD of Logged Detects	1.06				
724												
725	Normal GOF Test on Detects Only											
726			Shapiro Wilk Test Statistic	0.80			Shapiro Wilk GOF Test					
727			5% Shapiro Wilk Critical Value	0.78			Detected Data appear Normal at 5% Significance Level					
728			Lilliefors Test Statistic	0.30			Lilliefors GOF Test					
729			5% Lilliefors Critical Value	0.36			Detected Data appear Normal at 5% Significance Level					
730	Detected Data appear Normal at 5% Significance Level											
731												
732	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
733			Mean	0.44			Standard Error of Mean	0.21				
734			SD	0.78			95% KM (BCA) UCL	0.85				
735			95% KM (t) UCL	0.82			95% KM (Percentile Bootstrap) UCL	0.79				
736			95% KM (z) UCL	0.8			95% KM Bootstrap t UCL	1.08				
737			90% KM Chebyshev UCL	1.09			95% KM Chebyshev UCL	1.38				
738			97.5% KM Chebyshev UCL	1.79			99% KM Chebyshev UCL	2.59				

	A	B	C	D	E	F	G	H	I	J	K	L
739												
740	Gamma GOF Tests on Detected Observations Only											
741	A-D Test Statistic				0.29	Anderson-Darling GOF Test						
742	5% A-D Critical Value				0.71	data appear Gamma Distributed at 5% Significance Level						
743	K-S Test Statistic				0.22	Kolmogorov-Smirnov GOF Test						
744	5% K-S Critical Value				0.33	data appear Gamma Distributed at 5% Significance Level						
745	Detected data appear Gamma Distributed at 5% Significance Level											
746												
747	Gamma Statistics on Detected Data Only											
748	k hat (MLE)				1.34	k star (bias corrected MLE)						0.78
749	Theta hat (MLE)				0.8	Theta star (bias corrected MLE)						1.37
750	nu hat (MLE)				16.14	nu star (bias corrected)						9.41
751	MLE Mean (bias corrected)				1.07	MLE Sd (bias corrected)						1.21
752												
753	Gamma Kaplan-Meier (KM) Statistics											
754	k hat (KM)				0.32	nu hat (KM)						10.32
755	Approximate Chi Square Value (10.32, α)				4.14	Adjusted Chi Square Value (10.32, β)						3.70
756	Approximate KM-UCL (use when n>=50)				1.10	Gamma Adjusted KM-UCL (use when n<50)						1.23
757												
758	Gamma ROS Statistics using Imputed Non-Detects											
759	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
760	GROS may not be used when kstar of detected data is small such as < 0.1											
761	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
762	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
763	Minimum				0.01	Mean						0.41
764	Maximum				3.13	Median						0.01
765	SD				0.81	CV						1.99
766	k hat (MLE)				0.32	k star (bias corrected MLE)						0.30
767	Theta hat (MLE)				1.27	Theta star (bias corrected MLE)						1.35
768	nu hat (MLE)				10.32	nu star (bias corrected)						9.71
769	MLE Mean (bias corrected)				0.41	MLE Sd (bias corrected)						0.74
770						Adjusted Level of Significance (β)						0.03
771	Approximate Chi Square Value (9.71, α)				3.76	Adjusted Chi Square Value (9.71, β)						3.35
772	Gamma Approximate UCL (use when n>=50)				1.05	Gamma Adjusted UCL (use when n<50)						1.18
773												
774	Lognormal GOF Test on Detected Observations Only											
775	Shapiro Wilk Test Statistic				0.95	Shapiro Wilk GOF Test						
776	5% Shapiro Wilk Critical Value				0.78	Detected Data appear Lognormal at 5% Significance Level						
777	Lilliefors Test Statistic				0.22	Lilliefors GOF Test						
778	5% Lilliefors Critical Value				0.36	Detected Data appear Lognormal at 5% Significance Level						
779	Detected Data appear Lognormal at 5% Significance Level											
780												
781	Lognormal ROS Statistics Using Imputed Non-Detects											
782	Mean in Original Scale				0.43	Mean in Log Scale						-1.97
783	SD in Original Scale				0.80	SD in Log Scale						1.46
784	95% t UCL (assumes normality of ROS data)				0.79	95% Percentile Bootstrap UCL						0.80
785	95% BCA Bootstrap UCL				0.94	95% Bootstrap t UCL						1.35
786	95% H-UCL (Log ROS)				1.49							
787												
788	DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
789	KM Mean (logged)				-2.09	95% H-UCL (KM -Log)						1.79
790	KM SD (logged)				1.55	95% Critical H Value (KM-Log)						3.64
791	KM Standard Error of Mean (logged)				0.44							
792												
793	DL/2 Statistics											
794	DL/2 Normal					DL/2 Log-Transformed						
795	Mean in Original Scale				0.49	Mean in Log Scale						-1.91
796	SD in Original Scale				0.80	SD in Log Scale						1.67
797	95% t UCL (Assumes normality)				0.84	95% H-Stat UCL						3.17
798	DL/2 is not a recommended method, provided for comparisons and historical reasons											
799												
800	Nonparametric Distribution Free UCL Statistics											
801	Detected Data appear Normal Distributed at 5% Significance Level											
802												
803	Suggested UCL to Use											
804	95% KM (t) UCL				0.82	95% KM (Percentile Bootstrap) UCL						0.79
805												
806	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
807	Recommendations are based upon data size, data distribution, and skewness.											
808	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
809	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
810												
811	Cadmium											
812												
813	General Statistics											
814	Total Number of Observations				16	Number of Distinct Observations						16
815	Number of Detects				8	Number of Non-Detects						8
816	Number of Distinct Detects				8	Number of Distinct Non-Detects						8
817	Minimum Detect				0.18	Minimum Non-Detect						0.47
818	Maximum Detect				3.35	Maximum Non-Detect						0.74
819	Variance Detects				1.05	Percent Non-Detects						50%
820	Mean Detects				1.08	SD Detects						1.02

	A	B	C	D	E	F	G	H	I	J	K	L
821	Median Detects					0.81	CV Detects					0.94
822	Skewness Detects					1.76	Kurtosis Detects					3.58
823	Mean of Logged Detects					-0.28	SD of Logged Detects					0.93
824												
825	Normal GOF Test on Detects Only											
826	Shapiro Wilk Test Statistic					0.80	Shapiro Wilk GOF Test					
827	5% Shapiro Wilk Critical Value					0.81	Detected Data Not Normal at 5% Significance Level					
828	Lilliefors Test Statistic					0.25	Lilliefors GOF Test					
829	5% Lilliefors Critical Value					0.31	Detected Data appear Normal at 5% Significance Level					
830	Detected Data appear Approximate Normal at 5% Significance Level											
831												
832	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
833	Mean					0.72	Standard Error of Mean					0.21
834	SD					0.77	95% KM (BCA) UCL					1.07
835	95% KM (t) UCL					1.09	95% KM (Percentile Bootstrap) UCL					1.09
836	95% KM (z) UCL					1.06	95% KM Bootstrap t UCL					1.38
837	90% KM Chebyshev UCL					1.35	95% KM Chebyshev UCL					1.64
838	97.5% KM Chebyshev UCL					2.04	99% KM Chebyshev UCL					2.83
839												
840	Gamma GOF Tests on Detected Observations Only											
841	A-D Test Statistic					0.26	Anderson-Darling GOF Test					
842	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
843	K-S Test Statistic					0.18	Kolmogorov-Smirnov GOF					
844	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significance Level					
845	Detected data appear Gamma Distributed at 5% Significance Level											
846												
847	Gamma Statistics on Detected Data Only											
848	k hat (MLE)					1.50	k star (bias corrected MLE)					1.02
849	Theta hat (MLE)					0.72	Theta star (bias corrected MLE)					1.06
850	nu hat (MLE)					24.0	nu star (bias corrected)					16.3
851	MLE Mean (bias corrected)					1.08	MLE Sd (bias corrected)					1.07
852												
853	Gamma Kaplan-Meier (KM) Statistics											
854	k hat (KM)					0.85	nu hat (KM)					27.4
855	Approximate Chi Square Value (27.46, α)					16.5	Adjusted Chi Square Value (27.46, β)					15.5
856	Approximate KM-UCL (use when $n \geq 50$)					1.19	Gamma Adjusted KM-UCL (use when $n < 50$)					1.27
857												
858	Gamma ROS Statistics using Imputed Non-Detects											
859	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
860	GROS may not be used when kstar of detected data is small such as < 0.1											
861	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
862	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
863	Minimum					0.12	Mean					0.64
864	Maximum					3.35	Median					0.23
865	SD					0.83	CV					1.29
866	k hat (MLE)					1.10	k star (bias corrected MLE)					0.94
867	Theta hat (MLE)					0.58	Theta star (bias corrected MLE)					0.68
868	nu hat (MLE)					35.4	nu star (bias corrected)					30.1
869	MLE Mean (bias corrected)					0.64	MLE Sd (bias corrected)					0.66
870							Adjusted Level of Significance (β)					0.03
871	Approximate Chi Square Value (30.12, α)					18.5	Adjusted Chi Square Value (30.12, β)					17.5
872	Gamma Approximate UCL (use when $n \geq 50$)					1.04	Gamma Adjusted UCL (use when $n < 50$)					1.10
873												
874	Lognormal GOF Test on Detected Observations Only											
875	Shapiro Wilk Test Statistic					0.97	Shapiro Wilk GOF Test					
876	5% Shapiro Wilk Critical Value					0.81	Detected Data appear Lognormal at 5% Significance Level					
877	Lilliefors Test Statistic					0.15	Lilliefors GOF Test					
878	5% Lilliefors Critical Value					0.31	Detected Data appear Lognormal at 5% Significance Level					
879	Detected Data appear Lognormal at 5% Significance Level											
880												
881	Lognormal ROS Statistics Using Imputed Non-Detects											
882	Mean in Original Scale					0.71	Mean in Log Scale					-0.69
883	SD in Original Scale					0.80	SD in Log Scale					0.77
884	95% t UCL (assumes normality of ROS data)					1.06	95% Percentile Bootstrap UCL					1.07
885	95% BCA Bootstrap UCL					1.20	95% Bootstrap t UCL					1.54
886	95% H-UCL (Log ROS)					1.07						
887												
888	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
889	KM Mean (logged)					-0.70	95% H-UCL (KM -Log)					1.12
890	KM SD (logged)					0.80	95% Critical H Value (KM-Log)					2.41
891	KM Standard Error of Mean (logged)					0.25						
892												
893	DL/2 Statistics											
894	DL/2 Normal						DL/2 Log-Transformed					
895	Mean in Original Scale					0.69	Mean in Log Scale					-0.74
896	SD in Original Scale					0.81	SD in Log Scale					0.80
897	95% t UCL (Assumes normality)					1.05	95% H-Stat UCL					1.08
898	DL/2 is not a recommended method, provided for comparisons and historical reasons											
899												
900	Nonparametric Distribution Free UCL Statistics											
901	Detected Data appear Approximate Normal Distributed at 5% Significance Level											
902												

	A	B	C	D	E	F	G	H	I	J	K	L
903	Suggested UCL to Use											
904	95% KM (t) UCL				1.09	95% KM (Percentile Bootstrap) UCL				1.09		
905												
906	ations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
907	Recommendations are based upon data size, data distribution, and skewness.											
908	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
909	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult											
910												
911												
912	Calcium											
913												
914	General Statistics											
915	Total Number of Observations				16	Number of Distinct Observations				16		
916						Number of Missing Observations				0		
917	Minimum				1290	Mean				3716		
918	Maximum				11700	Median				2760		
919	SD				2470	Std. Error of Mean				617.5		
920	Coefficient of Variation				0.66	Skewness				2.45		
921												
922	Normal GOF Test											
923	Shapiro Wilk Test Statistic				0.73	Shapiro Wilk GOF Test						
924	5% Shapiro Wilk Critical Value				0.88	Data Not Normal at 5% Significance Level						
925	Lilliefors Test Statistic				0.20	Lilliefors GOF Test						
926	5% Lilliefors Critical Value				0.22	Data appear Normal at 5% Significance Level						
927	Data appear Approximate Normal at 5% Significance Level											
928												
929	Assuming Normal Distribution											
930	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
931	95% Student's-t UCL				4799	95% Adjusted-CLT UCL (Chen-1995)				5136		
932						95% Modified-t UCL (Johnson-1978)				4862		
933												
934	Gamma GOF Test											
935	A-D Test Statistic				0.57	Anderson-Darling Gamma GOF Test						
936	5% A-D Critical Value				0.74	Data appear Gamma Distributed at 5% Significance Level						
937	K-S Test Statistic				0.18	Kolmogorov-Smirnov Gamma GOF Test						
938	5% K-S Critical Value				0.21	Data appear Gamma Distributed at 5% Significance Level						
939	Detected data appear Gamma Distributed at 5% Significance Level											
940												
941	Gamma Statistics											
942	k hat (MLE)				3.57	k star (bias corrected MLE)				2.94		
943	Theta hat (MLE)				1041	Theta star (bias corrected MLE)				1263		
944	nu hat (MLE)				114.3	nu star (bias corrected)				94.1		
945	MLE Mean (bias corrected)				3716	MLE Sd (bias corrected)				2166		
946						Approximate Chi Square Value (0.05)				72.8		
947	Adjusted Level of Significance				0.03	Adjusted Chi Square Value				70.6		
948												
949	Assuming Gamma Distribution											
950	Approximate Gamma UCL (use when n>=50)				4808	Adjusted Gamma UCL (use when n<50)				4953		
951												
952	Lognormal GOF Test											
953	Shapiro Wilk Test Statistic				0.95	Shapiro Wilk Lognormal GOF Test						
954	5% Shapiro Wilk Critical Value				0.88	Data appear Lognormal at 5% Significance Level						
955	Lilliefors Test Statistic				0.15	Lilliefors Lognormal GOF Test						
956	5% Lilliefors Critical Value				0.22	Data appear Lognormal at 5% Significance Level						
957	Data appear Lognormal at 5% Significance Level											
958												
959	Lognormal Statistics											
960	Minimum of Logged Data				7.16	Mean of logged Data				8.07		
961	Maximum of Logged Data				9.36	SD of logged Data				0.52		
962												
963	Assuming Lognormal Distribution											
964	95% H-UCL				4898	90% Chebyshev (MVUE) UCL				5151		
965	95% Chebyshev (MVUE) UCL				5829	97.5% Chebyshev (MVUE) UCL				6770		
966	99% Chebyshev (MVUE) UCL				8619							
967												
968	Nonparametric Distribution Free UCL Statistics											
969	Data appear to follow a Discernible Distribution at 5% Significance Level											
970												
971	Nonparametric Distribution Free UCLs											
972	95% CLT UCL				4732	95% Jackknife UCL				4799		
973	95% Standard Bootstrap UCL				4692	95% Bootstrap-t UCL				5630		
974	95% Hall's Bootstrap UCL				8958	95% Percentile Bootstrap UCL				4762		
975	95% BCA Bootstrap UCL				5143							
976	90% Chebyshev(Mean, Sd) UCL				5569	95% Chebyshev(Mean, Sd) UCL				6408		
977	97.5% Chebyshev(Mean, Sd) UCL				7573	99% Chebyshev(Mean, Sd) UCL				9860		
978												
979	Suggested UCL to Use											
980	95% Student's-t UCL				4799							
981												
982	ations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
983	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
984	Singh and Singh (2003). However, simulation results will not cover all Real World data sets.											

	A	B	C	D	E	F	G	H	I	J	K	L	
985	For additional insight the user may want to consult a statistician.												
986													
987	Cesium-137												
988													
989	General Statistics												
990	Total Number of Observations				16	Number of Distinct Observations				16			
991	Number of Detects				13	Number of Non-Detects				3			
992	Number of Distinct Detects				13	Number of Distinct Non-Detects				3			
993	Minimum Detect				0.14	Minimum Non-Detect				-0.005			
994	Maximum Detect				2.02	Maximum Non-Detect				0.07			
995	Variance Detects				0.22	Percent Non-Detects				18.7%			
996	Mean Detects				0.60	SD Detects				0.47			
997	Median Detects				0.58	CV Detects				0.77			
998	Skewness Detects				2.43	Kurtosis Detects				7.47			
999													
1000	Normal GOF Test on Detects Only												
1001	Shapiro Wilk Test Statistic				0.73	Shapiro Wilk GOF Test							
1002	5% Shapiro Wilk Critical Value				0.86	Detected Data Not Normal at 5% Significance Level							
1003	Lilliefors Test Statistic				0.29	Lilliefors GOF Test							
1004	5% Lilliefors Critical Value				0.24	Detected Data Not Normal at 5% Significance Level							
1005	Detected Data Not Normal at 5% Significance Level												
1006													
1007	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs												
1008	Mean				0.49	Standard Error of Mean				0.12			
1009	SD				0.47	95% KM (BCA) UCL				0.71			
1010	95% KM (t) UCL				0.70	95% KM (Percentile Bootstrap) UCL				0.69			
1011	95% KM (z) UCL				0.69	95% KM Bootstrap t UCL				0.81			
1012	90% KM Chebyshev UCL				0.86	95% KM Chebyshev UCL				1.02			
1013	97.5% KM Chebyshev UCL				1.26	99% KM Chebyshev UCL				1.71			
1014													
1015	Gamma GOF Tests on Detected Observations Only												
1016	A-D Test Statistic				0.48	Anderson-Darling GOF Test							
1017	5% A-D Critical Value				0.74	data appear Gamma Distributed at 5% Significance Level							
1018	K-S Test Statistic				0.20	Kolmogrov-Smirnoff GOF							
1019	5% K-S Critical Value				0.23	data appear Gamma Distributed at 5% Significance Level							
1020	Detected data appear Gamma Distributed at 5% Significance Level												
1021													
1022	Gamma Statistics on Detected Data Only												
1023	k hat (MLE)				2.43	k star (bias corrected MLE)				1.92			
1024	Theta hat (MLE)				0.24	Theta star (bias corrected MLE)				0.31			
1025	nu hat (MLE)				63.34	nu star (bias corrected)				50.00			
1026	MLE Mean (bias corrected)				0.60	MLE Sd (bias corrected)				0.43			
1027													
1028	Gamma Kaplan-Meier (KM) Statistics												
1029	k hat (KM)				1.08	nu hat (KM)				34.6%			
1030						Adjusted Level of Significance (β)				0.03			
1031	Approximate Chi Square Value (34.61, α)				22.15	Adjusted Chi Square Value (34.61, β)				21.00			
1032	Approximate KM-UCL (use when n>=50)				0.76	Gamma Adjusted KM-UCL (use when n<50)				0.81			
1033													
1034	DL/2 Statistics												
1035	Mean in Original Scale				0.49	SD in Original Scale				0.48			
1036	95% t UCL (Assumes normality)				0.70								
1037	DL/2 is not a recommended method, provided for comparisons and historical reasons												
1038													
1039	Nonparametric Distribution Free UCL Statistics												
1040	Detected Data appear Gamma Distributed at 5% Significance Level												
1041													
1042	Suggested UCL to Use												
1043	95% KM (BCA) UCL				0.71	95% GROS Adjusted Gamma UCL				N/A			
1044	95% Adjusted Gamma KM-UCL				0.81								
1045													
1046	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL for the data.												
1047	Recommendations are based upon data size, data distribution, and skewness.												
1048	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Singh (2013).												
1049	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												
1050													
1051													
1052	Chromium												
1053													
1054	General Statistics												
1055	Total Number of Observations				16	Number of Distinct Observations				15			
1056						Number of Missing Observations				0			
1057	Minimum				4.28	Mean				51.3%			
1058	Maximum				192	Median				28.1%			
1059	SD				53.34	Std. Error of Mean				13.3%			
1060	Coefficient of Variation				1.03	Skewness				1.36			
1061													
1062	Normal GOF Test												
1063	Shapiro Wilk Test Statistic				0.80	Shapiro Wilk GOF Test							
1064	5% Shapiro Wilk Critical Value				0.88	Data Not Normal at 5% Significance Level							
1065	Lilliefors Test Statistic				0.27	Lilliefors GOF Test							
1066	5% Lilliefors Critical Value				0.22	Data Not Normal at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
1067	Data Not Normal at 5% Significance Level											
1068												
1069	Assuming Normal Distribution											
1070	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1071	95% Student's-t UCL					74.7	95% Adjusted-CLT UCL (Chen-1995)					78.2
1072							95% Modified-t UCL (Johnson-1978)					75.5
1073												
1074	Gamma GOF Test											
1075	A-D Test Statistic					0.63	Anderson-Darling Gamma GOF Test					
1076	5% A-D Critical Value					0.76	data appear Gamma Distributed at 5% Significance Level					
1077	K-S Test Statistic					0.18	Kolmogrov-Smirnoff Gamma GOF Test					
1078	5% K-S Critical Value					0.22	data appear Gamma Distributed at 5% Significance Level					
1079	Detected data appear Gamma Distributed at 5% Significance Level											
1080												
1081	Gamma Statistics											
1082	k hat (MLE)					1.01	k star (bias corrected MLE)					0.86
1083	Theta hat (MLE)					50.5	Theta star (bias corrected MLE)					59.1
1084	nu hat (MLE)					32.5	nu star (bias corrected)					27.7
1085	MLE Mean (bias corrected)					51.3	MLE Sd (bias corrected)					55.1
1086							Approximate Chi Square Value (0.05)					16.7
1087	Adjusted Level of Significance					0.03	Adjusted Chi Square Value					15.7
1088												
1089	Assuming Gamma Distribution											
1090	Approximate Gamma UCL (use when n>=50)					85.1	Adjusted Gamma UCL (use when n<50)					90.4
1091												
1092	Lognormal GOF Test											
1093	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk Lognormal GOF Test					
1094	5% Shapiro Wilk Critical Value					0.88	Data appear Lognormal at 5% Significance Level					
1095	Lilliefors Test Statistic					0.16	Lilliefors Lognormal GOF Test					
1096	5% Lilliefors Critical Value					0.22	Data appear Lognormal at 5% Significance Level					
1097	Data appear Lognormal at 5% Significance Level											
1098												
1099	Lognormal Statistics											
1100	Minimum of Logged Data					1.45	Mean of logged Data					3.37
1101	Maximum of Logged Data					5.25	SD of logged Data					1.15
1102												
1103	Assuming Lognormal Distribution											
1104	95% H-UCL					137.2	90% Chebyshev (MVUE) UCL					105.2
1105	95% Chebyshev (MVUE) UCL					128.7	97.5% Chebyshev (MVUE) UCL					161.2
1106	99% Chebyshev (MVUE) UCL					225.2						
1107												
1108	Nonparametric Distribution Free UCL Statistics											
1109	Data appear to follow a Discernible Distribution at 5% Significance Level											
1110												
1111	Nonparametric Distribution Free UCLs											
1112	95% CLT UCL					73.3	95% Jackknife UCL					74.7
1113	95% Standard Bootstrap UCL					72.6	95% Bootstrap-t UCL					83.0
1114	95% Hall's Bootstrap UCL					81.6	95% Percentile Bootstrap UCL					72.4
1115	95% BCA Bootstrap UCL					78.0						
1116	90% Chebyshev(Mean, Sd) UCL					91.4	95% Chebyshev(Mean, Sd) UCL					109.5
1117	97.5% Chebyshev(Mean, Sd) UCL					134.7	99% Chebyshev(Mean, Sd) UCL					184.1
1118												
1119	Suggested UCL to Use											
1120	95% Adjusted Gamma UCL					90.4						
1121												
1122	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1123	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh (2003). However, simulation results will not cover all Real World data sets											
1124	and Singh and Singh (2003). However, simulation results will not cover all Real World data sets											
1125	For additional insight the user may want to consult a statistician.											
1126												
1127	Chrysene											
1128												
1129	General Statistics											
1130	Total Number of Observations					16	Number of Distinct Observations					16
1131	Number of Detects					7	Number of Non-Detects					9
1132	Number of Distinct Detects					7	Number of Distinct Non-Detects					9
1133	Minimum Detect					0.26	Minimum Non-Detect					0.03
1134	Maximum Detect					5.7	Maximum Non-Detect					0.22
1135	Variance Detects					3.20	Percent Non-Detects					56.2
1136	Mean Detects					1.86	SD Detects					1.79
1137	Median Detects					1.21	CV Detects					0.95
1138	Skewness Detects					2.06	Kurtosis Detects					4.75
1139	Mean of Logged Detects					0.27	SD of Logged Detects					0.92
1140												
1141	Normal GOF Test on Detects Only											
1142	Shapiro Wilk Test Statistic					0.76	Shapiro Wilk GOF Test					
1143	5% Shapiro Wilk Critical Value					0.80	Detected Data Not Normal at 5% Significance Level					
1144	Lilliefors Test Statistic					0.28	Lilliefors GOF Test					
1145	5% Lilliefors Critical Value					0.33	Detected Data appear Normal at 5% Significance Level					
1146	Detected Data appear Approximate Normal at 5% Significance Level											
1147												
1148	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											

	A	B	C	D	E	F	G	H	I	J	K	L
1149	Mean					0.83	Standard Error of Mean					0.38
1150	SD					1.42	95% KM (BCA) UCL					1.42
1151	95% KM (t) UCL					1.51	95% KM (Percentile Bootstrap) UCL					1.43
1152	95% KM (z) UCL					1.46	95% KM Bootstrap t UCL					2.05
1153	90% KM Chebyshev UCL					1.99	95% KM Chebyshev UCL					2.51
1154	97.5% KM Chebyshev UCL					3.23	99% KM Chebyshev UCL					4.66
1155												
1156	Gamma GOF Tests on Detected Observations Only											
1157	A-D Test Statistic					0.33	Anderson-Darling GOF Test					
1158	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
1159	K-S Test Statistic					0.17	Kolmogorov-Smirnov GOF					
1160	5% K-S Critical Value					0.31	data appear Gamma Distributed at 5% Significance Level					
1161	Detected data appear Gamma Distributed at 5% Significance Level											
1162												
1163	Gamma Statistics on Detected Data Only											
1164	k hat (MLE)					1.58	k star (bias corrected MLE)					1.00
1165	Theta hat (MLE)					1.17	Theta star (bias corrected MLE)					1.86
1166	nu hat (MLE)					22.24	nu star (bias corrected)					14.00
1167	MLE Mean (bias corrected)					1.86	MLE Sd (bias corrected)					1.86
1168												
1169	Gamma Kaplan-Meier (KM) Statistics											
1170	k hat (KM)					0.34	nu hat (KM)					11.00
1171	Approximate Chi Square Value (11.05, α)					4.60	Adjusted Chi Square Value (11.05, β)					4.14
1172	Approximate KM-UCL (use when $n \geq 50$)					2.00	Gamma Adjusted KM-UCL (use when $n < 50$)					2.23
1173												
1174	Gamma ROS Statistics using Imputed Non-Detects											
1175	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1176	GROS may not be used when kstar of detected data is small such as < 0.1											
1177	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
1178	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1179	Minimum					0.01	Mean					0.82
1180	Maximum					5.7	Median					0.01
1181	SD					1.47	CV					1.79
1182	k hat (MLE)					0.30	k star (bias corrected MLE)					0.28
1183	Theta hat (MLE)					2.71	Theta star (bias corrected MLE)					2.85
1184	nu hat (MLE)					9.69	nu star (bias corrected)					9.20
1185	MLE Mean (bias corrected)					0.82	MLE Sd (bias corrected)					1.53
1186							Adjusted Level of Significance (β)					0.03
1187	Approximate Chi Square Value (9.21, α)					3.45	Adjusted Chi Square Value (9.21, β)					3.06
1188	Gamma Approximate UCL (use when $n \geq 50$)					2.19	Gamma Adjusted UCL (use when $n < 50$)					2.47
1189												
1190	Lognormal GOF Test on Detected Observations Only											
1191	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk GOF Test					
1192	5% Shapiro Wilk Critical Value					0.80	Detected Data appear Lognormal at 5% Significance Level					
1193	Lilliefors Test Statistic					0.19	Lilliefors GOF Test					
1194	5% Lilliefors Critical Value					0.33	Detected Data appear Lognormal at 5% Significance Level					
1195	Detected Data appear Lognormal at 5% Significance Level											
1196												
1197	Lognormal ROS Statistics Using Imputed Non-Detects											
1198	Mean in Original Scale					0.86	Mean in Log Scale					-1.24
1199	SD in Original Scale					1.45	SD in Log Scale					1.50
1200	95% t UCL (assumes normality of ROS data)					1.50	95% Percentile Bootstrap UCL					1.50
1201	95% BCA Bootstrap UCL					1.75	95% Bootstrap t UCL					2.3
1202	95% H-UCL (Log ROS)					3.53						
1203												
1204	DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
1205	KM Mean (logged)					-1.75	95% H-UCL (KM -Log)					7.93
1206	KM SD (logged)					1.88	95% Critical H Value (KM-Log)					4.24
1207	KM Standard Error of Mean (logged)					0.50						
1208												
1209	DL/2 Statistics											
1210	DL/2 Normal						DL/2 Log-Transformed					
1211	Mean in Original Scale					0.84	Mean in Log Scale					-1.65
1212	SD in Original Scale					1.46	SD in Log Scale					1.93
1213	95% t UCL (Assumes normality)					1.48	95% H-Stat UCL					10.7
1214	DL/2 is not a recommended method, provided for comparisons and historical reasons											
1215												
1216	Nonparametric Distribution Free UCL Statistics											
1217	Detected Data appear Approximate Normal Distributed at 5% Significance Level											
1218												
1219	Suggested UCL to Use											
1220	95% KM (t) UCL					1.51	95% KM (Percentile Bootstrap) UCL					1.43
1221												
1222	Recommendations regarding the selection of a											

	A	B	C	D	E	F	G	H	I	J	K	L
1231	Total Number of Observations					16	Number of Distinct Observations					16
1232							Number of Missing Observations					0
1233	Minimum					3.67	Mean					198.9
1234	Maximum					2720	Median					8.84
1235	SD					676.4	Std. Error of Mean					169.1
1236	Coefficient of Variation					3.40	Skewness					3.92
1237												
1238	Normal GOF Test											
1239	Shapiro Wilk Test Statistic					0.32	Shapiro Wilk GOF Test					
1240	5% Shapiro Wilk Critical Value					0.88	Data Not Normal at 5% Significance Level					
1241	Lilliefors Test Statistic					0.47	Lilliefors GOF Test					
1242	5% Lilliefors Critical Value					0.22	Data Not Normal at 5% Significance Level					
1243	Data Not Normal at 5% Significance Level											
1244												
1245	Assuming Normal Distribution											
1246	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1247	95% Student's-t UCL					495.4	95% Adjusted-CLT UCL (Chen-1995)					654.2
1248							95% Modified-t UCL (Johnson-1978)					523
1249												
1250	Gamma GOF Test											
1251	A-D Test Statistic					3.32	Anderson-Darling Gamma GOF Test					
1252	5% A-D Critical Value					0.84	Data Not Gamma Distributed at 5% Significance Level					
1253	K-S Test Statistic					0.42	Kolmogrov-Smirnoff Gamma GOF Test					
1254	5% K-S Critical Value					0.23	Data Not Gamma Distributed at 5% Significance Level					
1255	Data Not Gamma Distributed at 5% Significance Level											
1256												
1257	Gamma Statistics											
1258	k hat (MLE)					0.27	k star (bias corrected MLE)					0.26
1259	Theta hat (MLE)					721.5	Theta star (bias corrected MLE)					748.8
1260	nu hat (MLE)					8.82	nu star (bias corrected)					8.50
1261	MLE Mean (bias corrected)					198.9	MLE Sd (bias corrected)					385.9
1262							Approximate Chi Square Value (0.05)					3.02
1263	Adjusted Level of Significance					0.03	Adjusted Chi Square Value					2.66
1264												
1265	Assuming Gamma Distribution											
1266	Approximate Gamma UCL (use when n>=50))					558.4	Adjusted Gamma UCL (use when n<50)					633.8
1267												
1268	Lognormal GOF Test											
1269	Shapiro Wilk Test Statistic					0.73	Shapiro Wilk Lognormal GOF Test					
1270	5% Shapiro Wilk Critical Value					0.88	Data Not Lognormal at 5% Significance Level					
1271	Lilliefors Test Statistic					0.24	Lilliefors Lognormal GOF Test					
1272	5% Lilliefors Critical Value					0.22	Data Not Lognormal at 5% Significance Level					
1273	Data Not Lognormal at 5% Significance Level											
1274												
1275	Lognormal Statistics											
1276	Minimum of Logged Data					1.3	Mean of logged Data					2.75
1277	Maximum of Logged Data					7.90	SD of logged Data					1.75
1278												
1279	Assuming Lognormal Distribution											
1280	95% H-UCL					446.6	90% Chebyshev (MVUE) UCL					151.8
1281	95% Chebyshev (MVUE) UCL					193.4	97.5% Chebyshev (MVUE) UCL					251.2
1282	99% Chebyshev (MVUE) UCL					364.7						
1283												
1284	Nonparametric Distribution Free UCL Statistics											
1285	Data do not follow a Discernible Distribution (0.05)											
1286												
1287	Nonparametric Distribution Free UCLs											
1288	95% CLT UCL					477.1	95% Jackknife UCL					495.4
1289	95% Standard Bootstrap UCL					470.1	95% Bootstrap-t UCL					16870
1290	95% Hall's Bootstrap UCL					787.1	95% Percentile Bootstrap UCL					521.9
1291	95% BCA Bootstrap UCL					708.5						
1292	90% Chebyshev(Mean, Sd) UCL					706.2	95% Chebyshev(Mean, Sd) UCL					936
1293	97.5% Chebyshev(Mean, Sd) UCL					1255	99% Chebyshev(Mean, Sd) UCL					1882
1294												
1295	Suggested UCL to Use											
1296	99% Chebyshev (Mean, Sd) UCL					1882						
1297												
1298	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1299	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
1300	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1301	For additional insight the user may want to consult a statistician.											
1302												
1303												
1304	Cyanide (Total)											
1305												
1306	General Statistics											
1307	Total Number of Observations					16	Number of Distinct Observations					16
1308							Number of Missing Observations					0
1309	Minimum					0.10	Mean					0.79
1310	Maximum					2.18	Median					0.51
1311	SD					0.61	Std. Error of Mean					0.15
1312	Coefficient of Variation					0.78	Skewness					0.95

A	B	C	D	E	F	G	H	I	J	K	L
1313											
1314	Normal GOF Test										
1315	Shapiro Wilk Test Statistic				0.89	Shapiro Wilk GOF Test					
1316	5% Shapiro Wilk Critical Value				0.88	Data appear Normal at 5% Significance Level					
1317	Lilliefors Test Statistic				0.22	Lilliefors GOF Test					
1318	5% Lilliefors Critical Value				0.22	Data Not Normal at 5% Significance Level					
1319	Data appear Approximate Normal at 5% Significance Level										
1320											
1321	Assuming Normal Distribution										
1322	95% Normal UCL					95% UCLs (Adjusted for Skewness)					
1323	95% Student's-t UCL				1.06	95% Adjusted-CLT UCL (Chen-1995)					1.08
1324						95% Modified-t UCL (Johnson-1978)					1.06
1325											
1326	Gamma GOF Test										
1327	A-D Test Statistic				0.25	Anderson-Darling Gamma GOF Test					
1328	5% A-D Critical Value				0.75	data appear Gamma Distributed at 5% Significance Level					
1329	K-S Test Statistic				0.15	Kolmogrov-Smirnoff Gamma GOF Test					
1330	5% K-S Critical Value				0.21	data appear Gamma Distributed at 5% Significance Level					
1331	Detected data appear Gamma Distributed at 5% Significance Level										
1332											
1333	Gamma Statistics										
1334	k hat (MLE)				1.69	k star (bias corrected MLE)					1.41
1335	Theta hat (MLE)				0.46	Theta star (bias corrected MLE)					0.55
1336	nu hat (MLE)				54.11	nu star (bias corrected)					45.33
1337	MLE Mean (bias corrected)				0.79	MLE Sd (bias corrected)					0.66
1338						Approximate Chi Square Value (0.05)					30.83
1339	Adjusted Level of Significance				0.03	Adjusted Chi Square Value					29.59
1340											
1341	Assuming Gamma Distribution										
1342	Approximate Gamma UCL (use when n>=50))				1.16	Adjusted Gamma UCL (use when n<50)					1.21
1343											
1344	Lognormal GOF Test										
1345	Shapiro Wilk Test Statistic				0.96	Shapiro Wilk Lognormal GOF Test					
1346	5% Shapiro Wilk Critical Value				0.88	Data appear Lognormal at 5% Significance Level					
1347	Lilliefors Test Statistic				0.09	Lilliefors Lognormal GOF Test					
1348	5% Lilliefors Critical Value				0.22	Data appear Lognormal at 5% Significance Level					
1349	Data appear Lognormal at 5% Significance Level										
1350											
1351	Lognormal Statistics										
1352	Minimum of Logged Data				-2.25	Mean of logged Data					-0.55
1353	Maximum of Logged Data				0.77	SD of logged Data					0.88
1354											
1355	Assuming Lognormal Distribution										
1356	95% H-UCL				1.49	90% Chebyshev (MVUE) UCL					1.40
1357	95% Chebyshev (MVUE) UCL				1.66	97.5% Chebyshev (MVUE) UCL					2.03
1358	99% Chebyshev (MVUE) UCL				2.75						
1359											
1360	Nonparametric Distribution Free UCL Statistics										
1361	Data appear to follow a Discernible Distribution at 5% Significance Level										
1362											
1363	Nonparametric Distribution Free UCLs										
1364	95% CLT UCL				1.04	95% Jackknife UCL					1.06
1365	95% Standard Bootstrap UCL				1.03	95% Bootstrap-t UCL					1.13
1366	95% Hall's Bootstrap UCL				1.08	95% Percentile Bootstrap UCL					1.04
1367	95% BCA Bootstrap UCL				1.06						
1368	90% Chebyshev(Mean, Sd) UCL				1.25	95% Chebyshev(Mean, Sd) UCL					1.46
1369	97.5% Chebyshev(Mean, Sd) UCL				1.75	99% Chebyshev(Mean, Sd) UCL					2.33
1370											
1371	Suggested UCL to Use										
1372	95% Student's-t UCL				1.06						
1373											
1374	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
1375	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh (2003). However, simulations results will not cover all Real World data sets										
1376	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets										
1377	For additional insight the user may want to consult a statistician.										
1378											
1379	Di-n-butylphthalate										
1380											
1381	General Statistics										
1382	Total Number of Observations				16	Number of Distinct Observations					16
1383	Number of Detects				6	Number of Non-Detects					10
1384	Number of Distinct Detects				6	Number of Distinct Non-Detects					10
1385	Minimum Detect				0.25	Minimum Non-Detect					0.35
1386	Maximum Detect				8.07	Maximum Non-Detect					2.22
1387	Variance Detects				9.30	Percent Non-Detects					62.5
1388	Mean Detects				1.88	SD Detects					3.05
1389	Median Detects				0.64	CV Detects					1.62
1390	Skewness Detects				2.38	Kurtosis Detects					5.74
1391	Mean of Logged Detects				-0.12	SD of Logged Detects					1.20
1392											
1393	Normal GOF Test on Detects Only										
1394	Shapiro Wilk Test Statistic				0.59	Shapiro Wilk GOF Test					

A	B	C	D	E	F	G	H	I	J	K	L
1395	5% Shapiro Wilk Critical Value				0.78	Detected Data Not Normal at 5% Significance Level					
1396	Lilliefors Test Statistic				0.41	Lilliefors GOF Test					
1397	5% Lilliefors Critical Value				0.36	Detected Data Not Normal at 5% Significance Level					
1398	Detected Data Not Normal at 5% Significance Level										
1399											
1400	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs										
1401	Mean				0.94	Standard Error of Mean				0.51	
1402	SD				1.86	95% KM (BCA) UCL				1.97	
1403	95% KM (t) UCL				1.84	95% KM (Percentile Bootstrap) UCL				1.88	
1404	95% KM (z) UCL				1.78	95% KM Bootstrap t UCL				5.86	
1405	90% KM Chebyshev UCL				2.48	95% KM Chebyshev UCL				3.18	
1406	97.5% KM Chebyshev UCL				4.15	99% KM Chebyshev UCL				6.05	
1407											
1408	Gamma GOF Tests on Detected Observations Only										
1409	A-D Test Statistic				0.75	Anderson-Darling GOF Test					
1410	5% A-D Critical Value				0.72	ed Data Not Gamma Distributed at 5% Significance Level					
1411	K-S Test Statistic				0.31	Kolmogrov-Smirnoff GOF					
1412	5% K-S Critical Value				0.34	data appear Gamma Distributed at 5% Significance Level					
1413	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
1414											
1415	Gamma Statistics on Detected Data Only										
1416	k hat (MLE)				0.78	k star (bias corrected MLE)				0.50	
1417	Theta hat (MLE)				2.40	Theta star (bias corrected MLE)				3.75	
1418	nu hat (MLE)				9.37	nu star (bias corrected)				6.02	
1419	MLE Mean (bias corrected)				1.88	MLE Sd (bias corrected)				2.65	
1420											
1421	Gamma Kaplan-Meier (KM) Statistics										
1422	k hat (KM)				0.25	nu hat (KM)				8.21	
1423	Approximate Chi Square Value (8.21, α)				2.85	Adjusted Chi Square Value (8.21, β)				2.51	
1424	Approximate KM-UCL (use when n>=50)				2.71	Gamma Adjusted KM-UCL (use when n<50)				3.08	
1425											
1426	Gamma ROS Statistics using Imputed Non-Detects										
1427	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1428	GROS may not be used when kstar of detected data is small such as < 0.1										
1429	For such situations, GROS method tends to yield inflated values of UCLs and BTVs										
1430	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1431	Minimum				0.01	Mean				0.71	
1432	Maximum				8.07	Median				0.01	
1433	SD				1.99	CV				2.8	
1434	k hat (MLE)				0.27	k star (bias corrected MLE)				0.26	
1435	Theta hat (MLE)				2.62	Theta star (bias corrected MLE)				2.72	
1436	nu hat (MLE)				8.67	nu star (bias corrected)				8.37	
1437	MLE Mean (bias corrected)				0.71	MLE Sd (bias corrected)				1.39	
1438						Adjusted Level of Significance (β)				0.03	
1439	Approximate Chi Square Value (8.38, α)				2.95	Adjusted Chi Square Value (8.38, β)				2.60	
1440	Gamma Approximate UCL (use when n>=50)				2.01	Gamma Adjusted UCL (use when n<50)				2.29	
1441											
1442	Lognormal GOF Test on Detected Observations Only										
1443	Shapiro Wilk Test Statistic				0.88	Shapiro Wilk GOF Test					
1444	5% Shapiro Wilk Critical Value				0.78	Detected Data appear Lognormal at 5% Significance Level					
1445	Lilliefors Test Statistic				0.22	Lilliefors GOF Test					
1446	5% Lilliefors Critical Value				0.36	Detected Data appear Lognormal at 5% Significance Level					
1447	Detected Data appear Lognormal at 5% Significance Level										
1448											
1449	Lognormal ROS Statistics Using Imputed Non-Detects										
1450	Mean in Original Scale				0.88	Mean in Log Scale				-0.87	
1451	SD in Original Scale				1.93	SD in Log Scale				0.95	
1452	95% t UCL (assumes normality of ROS data)				1.72	95% Percentile Bootstrap UCL				1.81	
1453	95% BCA Bootstrap UCL				2.33	95% Bootstrap t UCL				8.05	
1454	95% H-UCL (Log ROS)				1.25						
1455											
1456	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed										
1457	KM Mean (logged)				-0.72	95% H-UCL (KM -Log)				1.28	
1458	KM SD (logged)				0.88	95% Critical H Value (KM-Log)				2.53	
1459	KM Standard Error of Mean (logged)				0.26						
1460											
1461	DL/2 Statistics										
1462	DL/2 Normal					DL/2 Log-Transformed					
1463	Mean in Original Scale				1.05	Mean in Log Scale				-0.55	
1464	SD in Original Scale				1.90	SD in Log Scale				0.94	
1465	95% t UCL (Assumes normality)				1.88	95% H-Stat UCL				1.71	
1466	DL/2 is not a recommended method, provided for comparisons and historical reasons										
1467											
1468	Nonparametric Distribution Free UCL Statistics										
1469	Detected Data appear Approximate Gamma Distributed at 5% Significance Level										
1470											
1471	Suggested UCL to Use										
1472	95% KM (t) UCL				1.84	95% GROS Adjusted Gamma UCL				2.29	
1473	95% Adjusted Gamma KM-UCL				3.08						
1474											
1475	Questions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
1476	Recommendations are based upon data size, data distribution, and skewness.										

A	B	C	D	E	F	G	H	I	J	K	L
1477	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and										
1478	Recommendations results will not cover all Real World data sets; for additional insight the user may want to cons										
1479											
1480	Fluoranthene										
1481											
1482	General Statistics										
1483	Total Number of Observations		16	Number of Distinct Observations		16					
1484	Number of Detects		8	Number of Non-Detects		8					
1485	Number of Distinct Detects		8	Number of Distinct Non-Detects		8					
1486	Minimum Detect		0.01	Minimum Non-Detect		0.03					
1487	Maximum Detect		7.63	Maximum Non-Detect		0.22					
1488	Variance Detects		5.72	Percent Non-Detects		50%					
1489	Mean Detects		2.38	SD Detects		2.39					
1490	Median Detects		1.83	CV Detects		1.00					
1491	Skewness Detects		1.70	Kurtosis Detects		3.53					
1492	Mean of Logged Detects		0.09	SD of Logged Detects		1.85					
1493											
1494	Normal GOF Test on Detects Only										
1495	Shapiro Wilk Test Statistic		0.84	Shapiro Wilk GOF Test							
1496	5% Shapiro Wilk Critical Value		0.81	Detected Data appear Normal at 5% Significance Level							
1497	Lilliefors Test Statistic		0.21	Lilliefors GOF Test							
1498	5% Lilliefors Critical Value		0.31	Detected Data appear Normal at 5% Significance Level							
1499	Detected Data appear Normal at 5% Significance Level										
1500											
1501	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs										
1502	Mean		1.2	Standard Error of Mean		0.52					
1503	SD		1.97	95% KM (BCA) UCL		2.10					
1504	95% KM (t) UCL		2.12	95% KM (Percentile Bootstrap) UCL		2.10					
1505	95% KM (z) UCL		2.06	95% KM Bootstrap t UCL		2.86					
1506	90% KM Chebyshev UCL		2.78	95% KM Chebyshev UCL		3.50					
1507	97.5% KM Chebyshev UCL		4.49	99% KM Chebyshev UCL		6.45					
1508											
1509	Gamma GOF Tests on Detected Observations Only										
1510	A-D Test Statistic		0.28	Anderson-Darling GOF Test							
1511	5% A-D Critical Value		0.74	Detected data appear Gamma Distributed at 5% Significance Level							
1512	K-S Test Statistic		0.19	Kolmogrov-Smirnoff GOF							
1513	5% K-S Critical Value		0.30	Detected data appear Gamma Distributed at 5% Significance Level							
1514	Detected data appear Gamma Distributed at 5% Significance Level										
1515											
1516	Gamma Statistics on Detected Data Only										
1517	k hat (MLE)		0.77	k star (bias corrected MLE)		0.56					
1518	Theta hat (MLE)		3.07	Theta star (bias corrected MLE)		4.19					
1519	nu hat (MLE)		12.39	nu star (bias corrected)		9.07					
1520	MLE Mean (bias corrected)		2.38	MLE Sd (bias corrected)		3.16					
1521											
1522	Gamma Kaplan-Meier (KM) Statistics										
1523	k hat (KM)		0.36	nu hat (KM)		11.8					
1524	Approximate Chi Square Value (11.81, α)		5.09	Adjusted Chi Square Value (11.81, β)		4.60					
1525	Approximate KM-UCL (use when n>=50)		2.77	Gamma Adjusted KM-UCL (use when n<50)		3.07					
1526											
1527	Gamma ROS Statistics using Imputed Non-Detects										
1528	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1529	GROS may not be used when kstar of detected data is small such as < 0.1										
1530	For such situations, GROS method tends to yield inflated values of UCLs and BTVs										
1531	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM e										
1532	Minimum		0.01	Mean		1.19					
1533	Maximum		7.63	Median		0.01					
1534	SD		2.04	CV		1.70					
1535	k hat (MLE)		0.28	k star (bias corrected MLE)		0.27					
1536	Theta hat (MLE)		4.18	Theta star (bias corrected MLE)		4.36					
1537	nu hat (MLE)		9.14	nu star (bias corrected)		8.76					
1538	MLE Mean (bias corrected)		1.19	MLE Sd (bias corrected)		2.28					
1539				Adjusted Level of Significance (β)		0.03					
1540	Approximate Chi Square Value (8.76, α)		3.18	Adjusted Chi Square Value (8.76, β)		2.81					
1541	Gamma Approximate UCL (use when n>=50)		3.29	Gamma Adjusted UCL (use when n<50)		3.72					
1542											
1543	Lognormal GOF Test on Detected Observations Only										
1544	Shapiro Wilk Test Statistic		0.82	Shapiro Wilk GOF Test							
1545	5% Shapiro Wilk Critical Value		0.81	Detected Data appear Lognormal at 5% Significance Level							
1546	Lilliefors Test Statistic		0.26	Lilliefors GOF Test							
1547	5% Lilliefors Critical Value		0.31	Detected Data appear Lognormal at 5% Significance Level							
1548	Detected Data appear Lognormal at 5% Significance Level										
1549											
1550	Lognormal ROS Statistics Using Imputed Non-Detects										
1551	Mean in Original Scale		1.21	Mean in Log Scale		-1.58					
1552	SD in Original Scale		2.03	SD in Log Scale		2.15					
1553	95% t UCL (assumes normality of ROS data)		2.10	95% Percentile Bootstrap UCL		2.16					
1554	95% BCA Bootstrap UCL		2.38	95% Bootstrap t UCL		2.88					
1555	95% H-UCL (Log ROS)		29.01								
1556											
1557	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed										
1558	KM Mean (logged)		-1.95	95% H-UCL (KM -Log)		61.4					

A	B	C	D	E	F	G	H	I	J	K	L
1559	KM SD (logged)				2.38	95% Critical H Value (KM-Log)				5.21	
1560	KM Standard Error of Mean (logged)				0.63						
1561											
1562	DL/2 Statistics										
1563	DL/2 Normal				DL/2 Log-Transformed						
1564	Mean in Original Scale				1.21	Mean in Log Scale				-1.49	
1565	SD in Original Scale				2.02	SD in Log Scale				2.13	
1566	95% t UCL (Assumes normality)				2.10	95% H-Stat UCL				29.9	
1567	DL/2 is not a recommended method, provided for comparisons and historical reasons										
1568											
1569	Nonparametric Distribution Free UCL Statistics										
1570	Detected Data appear Normal Distributed at 5% Significance Level										
1571											
1572	Suggested UCL to Use										
1573	95% KM (t) UCL				2.12	95% KM (Percentile Bootstrap) UCL				2.10	
1574											
1575	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
1576	Recommendations are based upon data size, data distribution, and skewness.										
1577	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and										
1578	Simulation results will not cover all Real World data sets; for additional insight the user may want to consider										
1579											
1580	Fluorene										
1581											
1582	General Statistics										
1583	Total Number of Observations				16	Number of Distinct Observations				16	
1584	Number of Detects				5	Number of Non-Detects				11	
1585	Number of Distinct Detects				5	Number of Distinct Non-Detects				11	
1586	Minimum Detect				0.01	Minimum Non-Detect				0.03	
1587	Maximum Detect				0.25	Maximum Non-Detect				1.81	
1588	Variance Detects				0.007	Percent Non-Detects				68.7	
1589	Mean Detects				0.10	SD Detects				0.08	
1590	Median Detects				0.09	CV Detects				0.84	
1591	Skewness Detects				1.42	Kurtosis Detects				2.95	
1592	Mean of Logged Detects				-2.60	SD of Logged Detects				1.06	
1593											
1594	Normal GOF Test on Detects Only										
1595	Shapiro Wilk Test Statistic				0.86	Shapiro Wilk GOF Test					
1596	5% Shapiro Wilk Critical Value				0.76	Detected Data appear Normal at 5% Significance Level					
1597	Lilliefors Test Statistic				0.34	Lilliefors GOF Test					
1598	5% Lilliefors Critical Value				0.39	Detected Data appear Normal at 5% Significance Level					
1599	Detected Data appear Normal at 5% Significance Level										
1600											
1601	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs										
1602	Mean				0.05	Standard Error of Mean				0.01	
1603	SD				0.06	95% KM (BCA) UCL				0.09	
1604	95% KM (t) UCL				0.08	95% KM (Percentile Bootstrap) UCL				0.09	
1605	95% KM (z) UCL				0.08	95% KM Bootstrap t UCL				0.08	
1606	90% KM Chebyshev UCL				0.11	95% KM Chebyshev UCL				0.14	
1607	97.5% KM Chebyshev UCL				0.17	99% KM Chebyshev UCL				0.25	
1608											
1609	Gamma GOF Tests on Detected Observations Only										
1610	A-D Test Statistic				0.35	Anderson-Darling GOF Test					
1611	5% A-D Critical Value				0.68	Detected data appear Gamma Distributed at 5% Significance Level					
1612	K-S Test Statistic				0.23	Kolmogrov-Smirnoff GOF					
1613	5% K-S Critical Value				0.36	Detected data appear Gamma Distributed at 5% Significance Level					
1614	Detected data appear Gamma Distributed at 5% Significance Level										
1615											
1616	Gamma Statistics on Detected Data Only										
1617	k hat (MLE)				1.54	k star (bias corrected MLE)				0.75	
1618	Theta hat (MLE)				0.06	Theta star (bias corrected MLE)				0.14	
1619	nu hat (MLE)				15.4	nu star (bias corrected)				7.49	
1620	MLE Mean (bias corrected)				0.10	MLE Sd (bias corrected)				0.12	
1621											
1622	Gamma Kaplan-Meier (KM) Statistics										
1623	k hat (KM)				0.70	nu hat (KM)				22.5	
1624	Approximate Chi Square Value (22.59, α)				12.7	Adjusted Chi Square Value (22.59, β)				11.9	
1625	Approximate KM-UCL (use when n>=50)				0.09	Gamma Adjusted KM-UCL (use when n<50)				0.10	
1626											
1627	Gamma ROS Statistics using Imputed Non-Detects										
1628	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1629	GROS may not be used when kstar of detected data is small such as < 0.1										
1630	For such situations, GROS method tends to yield inflated values of UCLs and BTVs										
1631	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1632	Minimum				0.01	Mean				0.04	
1633	Maximum				0.25	Median				0.02	
1634	SD				0.06	CV				1.36	
1635	k hat (MLE)				1.05	k star (bias corrected MLE)				0.89	
1636	Theta hat (MLE)				0.04	Theta star (bias corrected MLE)				0.05	
1637	nu hat (MLE)				33.7	nu star (bias corrected)				28.7	
1638	MLE Mean (bias corrected)				0.04	MLE Sd (bias corrected)				0.04	
1639						Adjusted Level of Significance (β)				0.03	
1640	Approximate Chi Square Value (28.72, α)				17.4	Adjusted Chi Square Value (28.72, β)				16.4	

A	B	C	D	E	F	G	H	I	J	K	L
1641	Gamma Approximate UCL (use when n>=50)				0.074	Gamma Adjusted UCL (use when n<50)				0.074	
1642											
1643	Lognormal GOF Test on Detected Observations Only										
1644	Shapiro Wilk Test Statistic				0.89	Shapiro Wilk GOF Test					
1645	5% Shapiro Wilk Critical Value				0.76	Detected Data appear Lognormal at 5% Significance Level					
1646	Lilliefors Test Statistic				0.29	Lilliefors GOF Test					
1647	5% Lilliefors Critical Value				0.39	Detected Data appear Lognormal at 5% Significance Level					
1648	Detected Data appear Lognormal at 5% Significance Level										
1649											
1650	Lognormal ROS Statistics Using Imputed Non-Detects										
1651	Mean in Original Scale				0.044	Mean in Log Scale				-3.42	
1652	SD in Original Scale				0.060	SD in Log Scale				0.82	
1653	95% t UCL (assumes normality of ROS data)				0.074	95% Percentile Bootstrap UCL				0.074	
1654	95% BCA Bootstrap UCL				0.084	95% Bootstrap t UCL				0.11	
1655	95% H-UCL (Log ROS)				0.074						
1656											
1657	Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed										
1658	KM Mean (logged)				-3.50	95% H-UCL (KM -Log)				0.10	
1659	KM SD (logged)				1.03	95% Critical H Value (KM-Log)				2.75	
1660	KM Standard Error of Mean (logged)				0.35						
1661											
1662	DL/2 Statistics										
1663	DL/2 Normal					DL/2 Log-Transformed					
1664	Mean in Original Scale				0.12	Mean in Log Scale				-2.76	
1665	SD in Original Scale				0.21	SD in Log Scale				1.07	
1666	95% t UCL (Assumes normality)				0.21	95% H-Stat UCL				0.24	
1667	DL/2 is not a recommended method, provided for comparisons and historical reasons										
1668											
1669	Nonparametric Distribution Free UCL Statistics										
1670	Detected Data appear Normal Distributed at 5% Significance Level										
1671											
1672	Suggested UCL to Use										
1673	95% KM (t) UCL				0.084	95% KM (Percentile Bootstrap) UCL				0.094	
1674											
1675	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL.										
1676	Recommendations are based upon data size, data distribution, and skewness.										
1677	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Singh (2002).										
1678	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult the literature.										
1679											
1680	Indeno(1,2,3-cd)pyrene										
1681											
1682	General Statistics										
1683	Total Number of Observations				16	Number of Distinct Observations				16	
1684	Number of Detects				6	Number of Non-Detects				10	
1685	Number of Distinct Detects				6	Number of Distinct Non-Detects				10	
1686	Minimum Detect				0.11	Minimum Non-Detect				0.03	
1687	Maximum Detect				3.01	Maximum Non-Detect				1.81	
1688	Variance Detects				1.06	Percent Non-Detects				62.5	
1689	Mean Detects				1.02	SD Detects				1.03	
1690	Median Detects				0.66	CV Detects				1.00	
1691	Skewness Detects				1.84	Kurtosis Detects				3.72	
1692	Mean of Logged Detects				-0.40	SD of Logged Detects				1.08	
1693											
1694	Normal GOF Test on Detects Only										
1695	Shapiro Wilk Test Statistic				0.80	Shapiro Wilk GOF Test					
1696	5% Shapiro Wilk Critical Value				0.78	Detected Data appear Normal at 5% Significance Level					
1697	Lilliefors Test Statistic				0.29	Lilliefors GOF Test					
1698	5% Lilliefors Critical Value				0.36	Detected Data appear Normal at 5% Significance Level					
1699	Detected Data appear Normal at 5% Significance Level										
1700											
1701	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs										
1702	Mean				0.42	Standard Error of Mean				0.20	
1703	SD				0.75	95% KM (BCA) UCL				0.77	
1704	95% KM (t) UCL				0.78	95% KM (Percentile Bootstrap) UCL				0.77	
1705	95% KM (z) UCL				0.76	95% KM Bootstrap t UCL				1.01	
1706	90% KM Chebyshev UCL				1.04	95% KM Chebyshev UCL				1.32	
1707	97.5% KM Chebyshev UCL				1.71	99% KM Chebyshev UCL				2.48	
1708											
1709	Gamma GOF Tests on Detected Observations Only										
1710	A-D Test Statistic				0.28	Anderson-Darling GOF Test					
1711	5% A-D Critical Value				0.71	Detected Data appear Gamma Distributed at 5% Significance Level					
1712	K-S Test Statistic				0.21	Kolmogrov-Smirnoff GOF					
1713	5% K-S Critical Value				0.33	Detected Data appear Gamma Distributed at 5% Significance Level					
1714	Detected data appear Gamma Distributed at 5% Significance Level										
1715											
1716	Gamma Statistics on Detected Data Only										
1717	k hat (MLE)				1.30	k star (bias corrected MLE)				0.76	
1718	Theta hat (MLE)				0.78	Theta star (bias corrected MLE)				1.34	
1719	nu hat (MLE)				15.7	nu star (bias corrected)				9.18	
1720	MLE Mean (bias corrected)				1.02	MLE Sd (bias corrected)				1.17	
1721											
1722	Gamma Kaplan-Meier (KM) Statistics										

	A	B	C	D	E	F	G	H	I	J	K	L
1723	k hat (KM)					0.32	nu hat (KM)					10.2
1724	Approximate Chi Square Value (10.24, α)					4.09	Adjusted Chi Square Value (10.24, β)					3.66
1725	Approximate KM-UCL (use when $n \geq 50$)					1.06	Gamma Adjusted KM-UCL (use when $n < 50$)					1.18
1726												
1727	Gamma ROS Statistics using Imputed Non-Detects											
1728	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1729	GROS may not be used when kstar of detected data is small such as < 0.1											
1730	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
1731	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1732	Minimum					0.01	Mean					0.39
1733	Maximum					3.01	Median					0.01
1734	SD					0.78	CV					2.00
1735	k hat (MLE)					0.32	k star (bias corrected MLE)					0.30
1736	Theta hat (MLE)					1.20	Theta star (bias corrected MLE)					1.28
1737	nu hat (MLE)					10.4	nu star (bias corrected)					9.79
1738	MLE Mean (bias corrected)					0.39	MLE Sd (bias corrected)					0.70
1739							Adjusted Level of Significance (β)					0.03
1740	Approximate Chi Square Value (9.79, α)					3.81	Adjusted Chi Square Value (9.79, β)					3.39
1741	Gamma Approximate UCL (use when $n \geq 50$)					1.00	Gamma Adjusted UCL (use when $n < 50$)					1.12
1742												
1743	Lognormal GOF Test on Detected Observations Only											
1744	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk GOF Test					
1745	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Lognormal at 5% Significance Level					
1746	Lilliefors Test Statistic					0.22	Lilliefors GOF Test					
1747	5% Lilliefors Critical Value					0.36	Detected Data appear Lognormal at 5% Significance Level					
1748	Detected Data appear Lognormal at 5% Significance Level											
1749												
1750	Lognormal ROS Statistics Using Imputed Non-Detects											
1751	Mean in Original Scale					0.41	Mean in Log Scale					-2.06
1752	SD in Original Scale					0.77	SD in Log Scale					1.49
1753	95% t UCL (assumes normality of ROS data)					0.75	95% Percentile Bootstrap UCL					0.75
1754	95% BCA Bootstrap UCL					0.93	95% Bootstrap t UCL					1.32
1755	95% H-UCL (Log ROS)					1.50						
1756												
1757	Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
1758	KM Mean (logged)					-2.12	95% H-UCL (KM -Log)					1.63
1759	KM SD (logged)					1.53	95% Critical H Value (KM-Log)					3.61
1760	KM Standard Error of Mean (logged)					0.43						
1761												
1762	DL/2 Statistics											
1763	DL/2 Normal						DL/2 Log-Transformed					
1764	Mean in Original Scale					0.47	Mean in Log Scale					-1.93
1765	SD in Original Scale					0.77	SD in Log Scale					1.65
1766	95% t UCL (Assumes normality)					0.81	95% H-Stat UCL					2.93
1767	DL/2 is not a recommended method, provided for comparisons and historical reasons											
1768												
1769	Nonparametric Distribution Free UCL Statistics											
1770	Detected Data appear Normal Distributed at 5% Significance Level											
1771												
1772	Suggested UCL to Use											
1773	95% KM (t) UCL					0.78	95% KM (Percentile Bootstrap) UCL					0.77
1774												
1775	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1776	Recommendations are based upon data size, data distribution, and skewness.											
1777	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
1778	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
1779												
1780	Isopropyltoluene[4-]											
1781												
1782	General Statistics											
1783	Total Number of Observations					16	Number of Distinct Observations					13
1784	Number of Detects					8	Number of Non-Detects					8
1785	Number of Distinct Detects					7	Number of Distinct Non-Detects					6
1786	Minimum Detect					4.5300E	Minimum Non-Detect					0.001
1787	Maximum Detect					0.012	Maximum Non-Detect					0.001
1788	Variance Detects					2.2529E	Percent Non-Detects					50%
1789	Mean Detects					0.005	SD Detects					0.004
1790	Median Detects					0.004	CV Detects					0.82
1791	Skewness Detects					0.22	Kurtosis Detects					-2.05
1792	Mean of Logged Detects					-5.64	SD of Logged Detects					1.21
1793												
1794	Normal GOF Test on Detects Only											
1795	Shapiro Wilk Test Statistic					0.87	Shapiro Wilk GOF Test					
1796	5% Shapiro Wilk Critical Value					0.81	Detected Data appear Normal at 5% Significance Level					
1797	Lilliefors Test Statistic					0.26	Lilliefors GOF Test					
1798	5% Lilliefors Critical Value					0.31	Detected Data appear Normal at 5% Significance Level					
1799	Detected Data appear Normal at 5% Significance Level											
1800												
1801	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
1802	Mean					0.003	Standard Error of Mean					0.001
1803	SD					0.004	95% KM (BCA) UCL					0.005
1804	95% KM (t) UCL					0.005	95% KM (Percentile Bootstrap) UCL					0.004

	A	B	C	D	E	F	G	H	I	J	K	L
1805	95% KM (z) UCL					0.005	95% KM Bootstrap t UCL					0.005
1806	90% KM Chebyshev UCL					0.006	95% KM Chebyshev UCL					0.007
1807	97.5% KM Chebyshev UCL					0.01	99% KM Chebyshev UCL					0.014
1808												
1809	Gamma GOF Tests on Detected Observations Only											
1810	A-D Test Statistic					0.45	Anderson-Darling GOF Test					
1811	5% A-D Critical Value					0.73	data appear Gamma Distributed at 5% Significance Level					
1812	K-S Test Statistic					0.21	Kolmogrov-Smirnoff GOF					
1813	5% K-S Critical Value					0.30	data appear Gamma Distributed at 5% Significance Level					
1814	Detected data appear Gamma Distributed at 5% Significance Level											
1815												
1816	Gamma Statistics on Detected Data Only											
1817	k hat (MLE)					1.16	k star (bias corrected MLE)					0.80
1818	Theta hat (MLE)					0.004	Theta star (bias corrected MLE)					0.007
1819	nu hat (MLE)					18.5	nu star (bias corrected)					12.9
1820	MLE Mean (bias corrected)					0.005	MLE Sd (bias corrected)					0.006
1821												
1822	Gamma Kaplan-Meier (KM) Statistics											
1823	k hat (KM)					0.65	nu hat (KM)					20.9
1824	Approximate Chi Square Value (20.99, α)					11.5	Adjusted Chi Square Value (20.99, β)					10.8
1825	Approximate KM-UCL (use when n>=50)					0.005	Gamma Adjusted KM-UCL (use when n<50)					0.006
1826												
1827	Gamma ROS Statistics using Imputed Non-Detects											
1828	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1829	GROS may not be used when kstar of detected data is small such as < 0.1											
1830	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
1831	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1832	Minimum					4.5300E	Mean					0.007
1833	Maximum					0.01	Median					0.01
1834	SD					0.003	CV					0.49
1835	k hat (MLE)					1.92	k star (bias corrected MLE)					1.60
1836	Theta hat (MLE)					0.004	Theta star (bias corrected MLE)					0.004
1837	nu hat (MLE)					61.5	nu star (bias corrected)					51.3
1838	MLE Mean (bias corrected)					0.007	MLE Sd (bias corrected)					0.006
1839							Adjusted Level of Significance (β)					0.03
1840	Approximate Chi Square Value (51.33, α)					35.8	Adjusted Chi Square Value (51.33, β)					34.4
1841	Gamma Approximate UCL (use when n>=50)					0.01	Gamma Adjusted UCL (use when n<50)					0.01
1842												
1843	Lognormal GOF Test on Detected Observations Only											
1844	Shapiro Wilk Test Statistic					0.89	Shapiro Wilk GOF Test					
1845	5% Shapiro Wilk Critical Value					0.8	Detected Data appear Lognormal at 5% Significance Level					
1846	Lilliefors Test Statistic					0.22	Lilliefors GOF Test					
1847	5% Lilliefors Critical Value					0.31	Detected Data appear Lognormal at 5% Significance Level					
1848	Detected Data appear Lognormal at 5% Significance Level											
1849												
1850	Lognormal ROS Statistics Using Imputed Non-Detects											
1851	Mean in Original Scale					0.003	Mean in Log Scale					-6.45
1852	SD in Original Scale					0.004	SD in Log Scale					1.20
1853	95% t UCL (assumes normality of ROS data)					0.005	95% Percentile Bootstrap UCL					0.004
1854	95% BCA Bootstrap UCL					0.005	95% Bootstrap t UCL					0.005
1855	95% H-UCL (Log ROS)					0.008						
1856												
1857	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
1858	KM Mean (logged)					-6.46	95% H-UCL (KM -Log)					0.007
1859	KM SD (logged)					1.18	95% Critical H Value (KM-Log)					2.99
1860	KM Standard Error of Mean (logged)					0.36						
1861												
1862	DL/2 Statistics											
1863	DL/2 Normal						DL/2 Log-Transformed					
1864	Mean in Original Scale					0.003	Mean in Log Scale					-6.55
1865	SD in Original Scale					0.004	SD in Log Scale					1.25
1866	95% t UCL (Assumes normality)					0.005	95% H-Stat UCL					0.008
1867	DL/2 is not a recommended method, provided for comparisons and historical reasons											
1868												
1869	Nonparametric Distribution Free UCL Statistics											
1870	Detected Data appear Normal Distributed at 5% Significance Level											
1871												
1872	Suggested UCL to Use											
1873	95% KM (t) UCL					0.005	95% KM (Percentile Bootstrap) UCL					0.004
1874												
1875	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL.											
1876	Recommendations are based upon data size, data distribution, and skewness.											
1877	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Singh.											
1878	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult the literature.											
1879												
1880												
1881	Lead											
1882												
1883	General Statistics											
1884	Total Number of Observations					16	Number of Distinct Observations					16
1885							Number of Missing Observations					0
1886	Minimum					7.22	Mean					22.2

	A	B	C	D	E	F	G	H	I	J	K	L
1887	Maximum					144	Median					13.7
1888	SD					33.2	Std. Error of Mean					8.31
1889	Coefficient of Variation					1.49	Skewness					3.70
1890												
1891	Normal GOF Test											
1892	Shapiro Wilk Test Statistic					0.44	Shapiro Wilk GOF Test					
1893	5% Shapiro Wilk Critical Value					0.88	Data Not Normal at 5% Significance Level					
1894	Lilliefors Test Statistic					0.38	Lilliefors GOF Test					
1895	5% Lilliefors Critical Value					0.22	Data Not Normal at 5% Significance Level					
1896	Data Not Normal at 5% Significance Level											
1897												
1898	Assuming Normal Distribution											
1899	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1900	95% Student's-t UCL					36.8	95% Adjusted-CLT UCL (Chen-1995)					44.1
1901							95% Modified-t UCL (Johnson-1978)					38.1
1902												
1903	Gamma GOF Test											
1904	A-D Test Statistic					1.93	Anderson-Darling Gamma GOF Test					
1905	5% A-D Critical Value					0.75	Data Not Gamma Distributed at 5% Significance Level					
1906	K-S Test Statistic					0.27	Kolmogrov-Smirnoff Gamma GOF Test					
1907	5% K-S Critical Value					0.21	Data Not Gamma Distributed at 5% Significance Level					
1908	Data Not Gamma Distributed at 5% Significance Level											
1909												
1910	Gamma Statistics											
1911	k hat (MLE)					1.38	k star (bias corrected MLE)					1.16
1912	Theta hat (MLE)					16.1	Theta star (bias corrected MLE)					19.1
1913	nu hat (MLE)					44.2	nu star (bias corrected)					37.2
1914	MLE Mean (bias corrected)					22.2	MLE Sd (bias corrected)					20.6
1915							Approximate Chi Square Value (0.05)					24.2
1916	Adjusted Level of Significance					0.03	Adjusted Chi Square Value					23.1
1917												
1918	Assuming Gamma Distribution											
1919	Approximate Gamma UCL (use when n>=50))					34.1	Adjusted Gamma UCL (use when n<50)					35.9
1920												
1921	Lognormal GOF Test											
1922	Shapiro Wilk Test Statistic					0.79	Shapiro Wilk Lognormal GOF Test					
1923	5% Shapiro Wilk Critical Value					0.88	Data Not Lognormal at 5% Significance Level					
1924	Lilliefors Test Statistic					0.18	Lilliefors Lognormal GOF Test					
1925	5% Lilliefors Critical Value					0.22	Data appear Lognormal at 5% Significance Level					
1926	Data appear Approximate Lognormal at 5% Significance Level											
1927												
1928	Lognormal Statistics											
1929	Minimum of Logged Data					1.97	Mean of logged Data					2.7
1930	Maximum of Logged Data					4.97	SD of logged Data					0.74
1931												
1932	Assuming Lognormal Distribution											
1933	95% H-UCL					30.7	90% Chebyshev (MVUE) UCL					30.6
1934	95% Chebyshev (MVUE) UCL					35.7	97.5% Chebyshev (MVUE) UCL					42.9
1935	99% Chebyshev (MVUE) UCL					56.9						
1936												
1937	Nonparametric Distribution Free UCL Statistics											
1938	Data appear to follow a Discernible Distribution at 5% Significance Level											
1939												
1940	Nonparametric Distribution Free UCLs											
1941	95% CLT UCL					35.9	95% Jackknife UCL					36.8
1942	95% Standard Bootstrap UCL					35.5	95% Bootstrap-t UCL					95.0
1943	95% Hall's Bootstrap UCL					93.3	95% Percentile Bootstrap UCL					37.3
1944	95% BCA Bootstrap UCL					47.7						
1945	90% Chebyshev(Mean, Sd) UCL					47.2	95% Chebyshev(Mean, Sd) UCL					58.5
1946	97.5% Chebyshev(Mean, Sd) UCL					74.1	99% Chebyshev(Mean, Sd) UCL					105
1947												
1948	Suggested UCL to Use											
1949	95% Chebyshev (Mean, Sd) UCL					58.5						
1950												
1951	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1952	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh											
1953	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1954	For additional insight the user may want to consult a statistician.											
1955												
1956												
1957	Manganese											
1958												
1959	General Statistics											
1960	Total Number of Observations					16	Number of Distinct Observations					15
1961							Number of Missing Observations					0
1962	Minimum					78.1	Mean					355.2
1963	Maximum					860	Median					360.5
1964	SD					219.9	Std. Error of Mean					54.9
1965	Coefficient of Variation					0.61	Skewness					0.52
1966												
1967	Normal GOF Test											
1968	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
1969	5% Shapiro Wilk Critical Value					0.88	Data appear Normal at 5% Significance Level						
1970	Lilliefors Test Statistic					0.16	Lilliefors GOF Test						
1971	5% Lilliefors Critical Value					0.22	Data appear Normal at 5% Significance Level						
1972	Data appear Normal at 5% Significance Level												
1973													
1974	Assuming Normal Distribution												
1975	95% Normal UCL					95% UCLs (Adjusted for Skewness)							
1976	95% Student's-t UCL					451.6	95% Adjusted-CLT UCL (Chen-1995)					453.3	
1977							95% Modified-t UCL (Johnson-1978)					452.7	
1978													
1979	Gamma GOF Test												
1980	A-D Test Statistic					0.76	Anderson-Darling Gamma GOF Test						
1981	5% A-D Critical Value					0.74	Data Not Gamma Distributed at 5% Significance Level						
1982	K-S Test Statistic					0.24	Kolmogrov-Smirnoff Gamma GOF Test						
1983	5% K-S Critical Value					0.21	Data Not Gamma Distributed at 5% Significance Level						
1984	Data Not Gamma Distributed at 5% Significance Level												
1985													
1986	Gamma Statistics												
1987	k hat (MLE)					2.26	k star (bias corrected MLE)					1.88	
1988	Theta hat (MLE)					156.6	Theta star (bias corrected MLE)					188.4	
1989	nu hat (MLE)					72.5	nu star (bias corrected)					60.3	
1990	MLE Mean (bias corrected)					355.2	MLE Sd (bias corrected)					258.7	
1991							Approximate Chi Square Value (0.05)					43.4	
1992	Adjusted Level of Significance					0.03	Adjusted Chi Square Value					41.8	
1993													
1994	Assuming Gamma Distribution												
1995	Approximate Gamma UCL (use when n>=50))					493	Adjusted Gamma UCL (use when n<50)					512.1	
1996													
1997	Lognormal GOF Test												
1998	Shapiro Wilk Test Statistic					0.87	Shapiro Wilk Lognormal GOF Test						
1999	5% Shapiro Wilk Critical Value					0.88	Data Not Lognormal at 5% Significance Level						
2000	Lilliefors Test Statistic					0.27	Lilliefors Lognormal GOF Test						
2001	5% Lilliefors Critical Value					0.22	Data Not Lognormal at 5% Significance Level						
2002	Data Not Lognormal at 5% Significance Level												
2003													
2004	Lognormal Statistics												
2005	Minimum of Logged Data					4.35	Mean of logged Data					5.63	
2006	Maximum of Logged Data					6.75	SD of logged Data					0.77	
2007													
2008	Assuming Lognormal Distribution												
2009	95% H-UCL					609.2	90% Chebyshev (MVUE) UCL					599.3	
2010	95% Chebyshev (MVUE) UCL					703.3	97.5% Chebyshev (MVUE) UCL					847.5	
2011	99% Chebyshev (MVUE) UCL					1131							
2012													
2013	Nonparametric Distribution Free UCL Statistics												
2014	Data appear to follow a Discernible Distribution at 5% Significance Level												
2015													
2016	Nonparametric Distribution Free UCLs												
2017	95% CLT UCL					445.6	95% Jackknife UCL					451.6	
2018	95% Standard Bootstrap UCL					442.6	95% Bootstrap-t UCL					461.2	
2019	95% Hall's Bootstrap UCL					456.2	95% Percentile Bootstrap UCL					444.8	
2020	95% BCA Bootstrap UCL					449.9							
2021	90% Chebyshev(Mean, Sd) UCL					520.1	95% Chebyshev(Mean, Sd) UCL					594.8	
2022	97.5% Chebyshev(Mean, Sd) UCL					698.5	99% Chebyshev(Mean, Sd) UCL					902.2	
2023													
2024	Suggested UCL to Use												
2025	95% Student's-t UCL					451.6							
2026													
2027	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
2028	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
2029	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
2030	For additional insight the user may want to consult a statistician.												
2031													
2032	Mercury												
2033													
2034	General Statistics												
2035	Total Number of Observations					16	Number of Distinct Observations					16	
2036	Number of Detects					14	Number of Non-Detects					2	
2037	Number of Distinct Detects					14	Number of Distinct Non-Detects					2	
2038	Minimum Detect					0.03	Minimum Non-Detect					0.009	
2039	Maximum Detect					0.81	Maximum Non-Detect					0.03	
2040	Variance Detects					0.04	Percent Non-Detects					12.5	
2041	Mean Detects					0.27	SD Detects					0.22	
2042	Median Detects					0.24	CV Detects					0.80	
2043	Skewness Detects					1.21	Kurtosis Detects					1.29	
2044	Mean of Logged Detects					-1.63	SD of Logged Detects					0.91	
2045													
2046	Normal GOF Test on Detects Only												
2047	Shapiro Wilk Test Statistic					0.89	Shapiro Wilk GOF Test						
2048	5% Shapiro Wilk Critical Value					0.87	Detected Data appear Normal at 5% Significance Level						
2049	Lilliefors Test Statistic					0.15	Lilliefors GOF Test						
2050	5% Lilliefors Critical Value					0.23	Detected Data appear Normal at 5% Significance Level						

	A	B	C	D	E	F	G	H	I	J	K	L
2051	Detected Data appear Normal at 5% Significance Level											
2052												
2053	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
2054				Mean	0.24				Standard Error of Mean		0.05	
2055				SD	0.21				95% KM (BCA) UCL		0.34	
2056				95% KM (t) UCL	0.34			95% KM (Percentile Bootstrap) UCL		0.33		
2057				95% KM (z) UCL	0.33			95% KM Bootstrap t UCL		0.37		
2058				90% KM Chebyshev UCL	0.41			95% KM Chebyshev UCL		0.49		
2059				97.5% KM Chebyshev UCL	0.59			99% KM Chebyshev UCL		0.80		
2060												
2061	Gamma GOF Tests on Detected Observations Only											
2062				A-D Test Statistic	0.15				Anderson-Darling GOF Test			
2063				5% A-D Critical Value	0.75				data appear Gamma Distributed at 5% Significance Level			
2064				K-S Test Statistic	0.12				Kolmogrov-Smirnoff GOF			
2065				5% K-S Critical Value	0.23				data appear Gamma Distributed at 5% Significance Level			
2066	Detected data appear Gamma Distributed at 5% Significance Level											
2067												
2068	Gamma Statistics on Detected Data Only											
2069				k hat (MLE)	1.61				k star (bias corrected MLE)		1.31	
2070				Theta hat (MLE)	0.17				Theta star (bias corrected MLE)		0.20	
2071				nu hat (MLE)	45.14				nu star (bias corrected)		36.81	
2072				MLE Mean (bias corrected)	0.27				MLE Sd (bias corrected)		0.24	
2073												
2074	Gamma Kaplan-Meier (KM) Statistics											
2075				k hat (KM)	1.21				nu hat (KM)		38.99	
2076				Approximate Chi Square Value (38.99, α)	25.61				Adjusted Chi Square Value (38.99, β)		24.44	
2077				Approximate KM-UCL (use when $n \geq 50$)	0.36				Gamma Adjusted KM-UCL (use when $n < 50$)		0.38	
2078												
2079	Gamma ROS Statistics using Imputed Non-Detects											
2080	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2081	GROS may not be used when kstar of detected data is small such as < 0.1											
2082	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
2083	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2084				Minimum	0.01				Mean		0.24	
2085				Maximum	0.81				Median		0.18	
2086				SD	0.22				CV		0.93	
2087				k hat (MLE)	0.98				k star (bias corrected MLE)		0.84	
2088				Theta hat (MLE)	0.24				Theta star (bias corrected MLE)		0.28	
2089				nu hat (MLE)	31.64				nu star (bias corrected)		27.03	
2090				MLE Mean (bias corrected)	0.24				MLE Sd (bias corrected)		0.26	
2091									Adjusted Level of Significance (β)		0.03	
2092				Approximate Chi Square Value (27.05, α)	16.14				Adjusted Chi Square Value (27.05, β)		15.21	
2093				Gamma Approximate UCL (use when $n \geq 50$)	0.40				Gamma Adjusted UCL (use when $n < 50$)		0.43	
2094												
2095	Lognormal GOF Test on Detected Observations Only											
2096				Shapiro Wilk Test Statistic	0.97				Shapiro Wilk GOF Test			
2097				5% Shapiro Wilk Critical Value	0.87				Detected Data appear Lognormal at 5% Significance Level			
2098				Lilliefors Test Statistic	0.14				Lilliefors GOF Test			
2099				5% Lilliefors Critical Value	0.23				Detected Data appear Lognormal at 5% Significance Level			
2100	Detected Data appear Lognormal at 5% Significance Level											
2101												
2102	Lognormal ROS Statistics Using Imputed Non-Detects											
2103				Mean in Original Scale	0.24				Mean in Log Scale		-1.89	
2104				SD in Original Scale	0.22				SD in Log Scale		1.12	
2105				95% t UCL (assumes normality of ROS data)	0.34				95% Percentile Bootstrap UCL		0.33	
2106				95% BCA Bootstrap UCL	0.34				95% Bootstrap t UCL		0.37	
2107				95% H-UCL (Log ROS)	0.65							
2108												
2109	Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
2110				KM Mean (logged)	-2.01				95% H-UCL (KM -Log)		0.91	
2111				KM SD (logged)	1.30				95% Critical H Value (KM-Log)		3.19	
2112				KM Standard Error of Mean (logged)	0.33							
2113												
2114	DL/2 Statistics											
2115	DL/2 Normal					DL/2 Log-Transformed						
2116				Mean in Original Scale	0.24				Mean in Log Scale		-2.01	
2117				SD in Original Scale	0.22				SD in Log Scale		1.37	
2118				95% t UCL (Assumes normality)	0.34				95% H-Stat UCL		1.12	
2119	DL/2 is not a recommended method, provided for comparisons and historical reasons											
2120												
2121	Nonparametric Distribution Free UCL Statistics											
2122	Detected Data appear Normal Distributed at 5% Significance Level											
2123												
2124	Suggested UCL to Use											
2125				95% KM (t) UCL	0.34				95% KM (Percentile Bootstrap) UCL		0.33	
2126												
2127	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
2128	Recommendations are based upon data size, data distribution, and skewness.											
2129	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
2130	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
2131												
2132												
2133												

	A	B	C	D	E	F	G	H	I	J	K	L
2133	Nickel											
2134												
2135	General Statistics											
2136	Total Number of Observations					16	Number of Distinct Observations					16
2137							Number of Missing Observations					0
2138	Minimum					2.87	Mean					7.46
2139	Maximum					53	Median					4.33
2140	SD					12.19	Std. Error of Mean					3.04
2141	Coefficient of Variation					1.63	Skewness					3.94
2142												
2143	Normal GOF Test											
2144	Shapiro Wilk Test Statistic					0.34	Shapiro Wilk GOF Test					
2145	5% Shapiro Wilk Critical Value					0.88	Data Not Normal at 5% Significance Level					
2146	Lilliefors Test Statistic					0.48	Lilliefors GOF Test					
2147	5% Lilliefors Critical Value					0.22	Data Not Normal at 5% Significance Level					
2148	Data Not Normal at 5% Significance Level											
2149												
2150	Assuming Normal Distribution											
2151	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
2152	95% Student's-t UCL					12.8	95% Adjusted-CLT UCL (Chen-1995)					15.6
2153							95% Modified-t UCL (Johnson-1978)					13.3
2154												
2155	Gamma GOF Test											
2156	A-D Test Statistic					3.20	Anderson-Darling Gamma GOF Test					
2157	5% A-D Critical Value					0.75	Data Not Gamma Distributed at 5% Significance Level					
2158	K-S Test Statistic					0.41	Kolmogrov-Smirnoff Gamma GOF Test					
2159	5% K-S Critical Value					0.21	Data Not Gamma Distributed at 5% Significance Level					
2160	Data Not Gamma Distributed at 5% Significance Level											
2161												
2162	Gamma Statistics											
2163	k hat (MLE)					1.41	k star (bias corrected MLE)					1.18
2164	Theta hat (MLE)					5.28	Theta star (bias corrected MLE)					6.27
2165	nu hat (MLE)					45.18	nu star (bias corrected)					38.04
2166	MLE Mean (bias corrected)					7.46	MLE Sd (bias corrected)					6.84
2167							Approximate Chi Square Value (0.05)					24.9
2168	Adjusted Level of Significance					0.03	Adjusted Chi Square Value					23.7
2169												
2170	Assuming Gamma Distribution											
2171	Approximate Gamma UCL (use when n>=50))					11.35	Adjusted Gamma UCL (use when n<50)					11.9
2172												
2173	Lognormal GOF Test											
2174	Shapiro Wilk Test Statistic					0.61	Shapiro Wilk Lognormal GOF Test					
2175	5% Shapiro Wilk Critical Value					0.88	Data Not Lognormal at 5% Significance Level					
2176	Lilliefors Test Statistic					0.32	Lilliefors Lognormal GOF Test					
2177	5% Lilliefors Critical Value					0.22	Data Not Lognormal at 5% Significance Level					
2178	Data Not Lognormal at 5% Significance Level											
2179												
2180	Lognormal Statistics											
2181	Minimum of Logged Data					1.05	Mean of logged Data					1.61
2182	Maximum of Logged Data					3.97	SD of logged Data					0.67
2183												
2184	Assuming Lognormal Distribution											
2185	95% H-UCL					9.31	90% Chebyshev (MVUE) UCL					9.50
2186	95% Chebyshev (MVUE) UCL					10.99	97.5% Chebyshev (MVUE) UCL					13.0
2187	99% Chebyshev (MVUE) UCL					17.14						
2188												
2189	Nonparametric Distribution Free UCL Statistics											
2190	Data do not follow a Discernible Distribution (0.05)											
2191												
2192	Nonparametric Distribution Free UCLs											
2193	95% CLT UCL					12.4	95% Jackknife UCL					12.8
2194	95% Standard Bootstrap UCL					12.4	95% Bootstrap-t UCL					50.2
2195	95% Hall's Bootstrap UCL					37.5	95% Percentile Bootstrap UCL					13.4
2196	95% BCA Bootstrap UCL					16.7						
2197	90% Chebyshev(Mean, Sd) UCL					16.6	95% Chebyshev(Mean, Sd) UCL					20.7
2198	97.5% Chebyshev(Mean, Sd) UCL					26.4	99% Chebyshev(Mean, Sd) UCL					37.7
2199												
2200	Suggested UCL to Use											
2201	95% Chebyshev (Mean, Sd) UCL					20.7						
2202												
2203	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
2204	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh											
2205	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
2206	For additional insight the user may want to consult a statistician.											
2207												
2208	Phenanthrene											
2209												
2210	General Statistics											
2211	Total Number of Observations					16	Number of Distinct Observations					16
2212	Number of Detects					7	Number of Non-Detects					9
2213	Number of Distinct Detects					7	Number of Distinct Non-Detects					9
2214	Minimum Detect					0.21	Minimum Non-Detect					0.03

	A	B	C	D	E	F	G	H	I	J	K	L
2215					Maximum Detect	3.59				Maximum Non-Detect		0.22
2216					Variance Detects	1.19				Percent Non-Detects		56.2
2217					Mean Detects	1.28				SD Detects		1.09
2218					Median Detects	0.98				CV Detects		0.85
2219					Skewness Detects	1.91				Kurtosis Detects		4.38
2220					Mean of Logged Detects	-0.046				SD of Logged Detects		0.86
2221												
2222					Normal GOF Test on Detects Only							
2223					Shapiro Wilk Test Statistic	0.79				Shapiro Wilk GOF Test		
2224					5% Shapiro Wilk Critical Value	0.80				Detected Data Not Normal at 5% Significance Level		
2225					Lilliefors Test Statistic	0.33				Lilliefors GOF Test		
2226					5% Lilliefors Critical Value	0.33				Detected Data appear Normal at 5% Significance Level		
2227					Detected Data appear Approximate Normal at 5% Significance Level							
2228												
2229					Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs							
2230					Mean	0.58				Standard Error of Mean		0.24
2231					SD	0.91				95% KM (BCA) UCL		1.03
2232					95% KM (t) UCL	1.01				95% KM (Percentile Bootstrap) UCL		0.99
2233					95% KM (z) UCL	0.98				95% KM Bootstrap t UCL		1.22
2234					90% KM Chebyshev UCL	1.31				95% KM Chebyshev UCL		1.65
2235					97.5% KM Chebyshev UCL	2.11				99% KM Chebyshev UCL		3.02
2236												
2237					Gamma GOF Tests on Detected Observations Only							
2238					A-D Test Statistic	0.30				Anderson-Darling GOF Test		
2239					5% A-D Critical Value	0.71				Data appear Gamma Distributed at 5% Significance Level		
2240					K-S Test Statistic	0.23				Kolmogrov-Smirnoff GOF		
2241					5% K-S Critical Value	0.31				Data appear Gamma Distributed at 5% Significance Level		
2242					Detected data appear Gamma Distributed at 5% Significance Level							
2243												
2244					Gamma Statistics on Detected Data Only							
2245					k hat (MLE)	1.85				k star (bias corrected MLE)		1.15
2246					Theta hat (MLE)	0.69				Theta star (bias corrected MLE)		1.10
2247					nu hat (MLE)	25.9				nu star (bias corrected)		16.1
2248					MLE Mean (bias corrected)	1.28				MLE Sd (bias corrected)		1.19
2249												
2250					Gamma Kaplan-Meier (KM) Statistics							
2251					k hat (KM)	0.40				nu hat (KM)		13.0
2252					Approximate Chi Square Value (13.04, α)	5.91				Adjusted Chi Square Value (13.04, β)		5.38
2253					Approximate KM-UCL (use when n>=50)	1.28				Gamma Adjusted KM-UCL (use when n<50)		1.40
2254												
2255					Gamma ROS Statistics using Imputed Non-Detects							
2256					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
2257					GROS may not be used when kstar of detected data is small such as < 0.1							
2258					For such situations, GROS method tends to yield inflated values of UCLs and BTVs							
2259					Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
2260					Minimum	0.01				Mean		0.56
2261					Maximum	3.59				Median		0.01
2262					SD	0.95				CV		1.68
2263					k hat (MLE)	0.33				k star (bias corrected MLE)		0.31
2264					Theta hat (MLE)	1.70				Theta star (bias corrected MLE)		1.81
2265					nu hat (MLE)	10.6				nu star (bias corrected)		9.97
2266					MLE Mean (bias corrected)	0.56				MLE Sd (bias corrected)		1.01
2267										Adjusted Level of Significance (β)		0.03
2268										Adjusted Chi Square Value (9.97, β)		3.50
2269					Gamma Approximate UCL (use when n>=50)	1.43				Gamma Adjusted UCL (use when n<50)		1.61
2270												
2271					Lognormal GOF Test on Detected Observations Only							
2272					Shapiro Wilk Test Statistic	0.95				Shapiro Wilk GOF Test		
2273					5% Shapiro Wilk Critical Value	0.80				Detected Data appear Lognormal at 5% Significance Level		
2274					Lilliefors Test Statistic	0.20				Lilliefors GOF Test		
2275					5% Lilliefors Critical Value	0.33				Detected Data appear Lognormal at 5% Significance Level		
2276					Detected Data appear Lognormal at 5% Significance Level							
2277												
2278					Lognormal ROS Statistics Using Imputed Non-Detects							
2279					Mean in Original Scale	0.60				Mean in Log Scale		-1.43
2280					SD in Original Scale	0.92				SD in Log Scale		1.37
2281					95% t UCL (assumes normality of ROS data)	1.01				95% Percentile Bootstrap UCL		0.99
2282					95% BCA Bootstrap UCL	1.19				95% Bootstrap t UCL		1.38
2283					95% H-UCL (Log ROS)	1.99						
2284												
2285					Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed							
2286					KM Mean (logged)	-1.88				95% H-UCL (KM -Log)		3.72
2287					KM SD (logged)	1.71				95% Critical H Value (KM-Log)		3.92
2288					KM Standard Error of Mean (logged)	0.46						
2289												
2290					DL/2 Statistics							
2291					DL/2 Normal				DL/2 Log-Transformed			
2292					Mean in Original Scale	0.59				Mean in Log Scale		-1.8
2293					SD in Original Scale	0.93				SD in Log Scale		1.76
2294					95% t UCL (Assumes normality)	0.99				95% H-Stat UCL		4.98
2295					DL/2 is not a recommended method, provided for comparisons and historical reasons							
2296												

	A	B	C	D	E	F	G	H	I	J	K	L
2297	Nonparametric Distribution Free UCL Statistics											
2298	Detected Data appear Approximate Normal Distributed at 5% Significance Level											
2299												
2300	Suggested UCL to Use											
2301	95% KM (t) UCL				1.01	95% KM (Percentile Bootstrap) UCL				0.99		
2302												
2303	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
2304	Recommendations are based upon data size, data distribution, and skewness.											
2305	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
2306	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
2307												
2308	Plutonium-239/240											
2309												
2310	General Statistics											
2311	Total Number of Observations				16	Number of Distinct Observations				16		
2312	Number of Detects				7	Number of Non-Detects				9		
2313	Number of Distinct Detects				7	Number of Distinct Non-Detects				9		
2314	Minimum Detect				0.03	Minimum Non-Detect				-0.002		
2315	Maximum Detect				0.07	Maximum Non-Detect				0.02		
2316	Variance Detects				2.2481E	Percent Non-Detects				56.2%		
2317	Mean Detects				0.04	SD Detects				0.01		
2318	Median Detects				0.03	CV Detects				0.33		
2319	Skewness Detects				1.83	Kurtosis Detects				3.94		
2320												
2321	Normal GOF Test on Detects Only											
2322	Shapiro Wilk Test Statistic				0.81	Shapiro Wilk GOF Test						
2323	5% Shapiro Wilk Critical Value				0.80	Detected Data appear Normal at 5% Significance Level						
2324	Lilliefors Test Statistic				0.24	Lilliefors GOF Test						
2325	5% Lilliefors Critical Value				0.33	Detected Data appear Normal at 5% Significance Level						
2326	Detected Data appear Normal at 5% Significance Level											
2327												
2328	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
2329	Mean				0.01	Standard Error of Mean				0.006		
2330	SD				0.02	95% KM (BCA) UCL				0.03		
2331	95% KM (t) UCL				0.03	95% KM (Percentile Bootstrap) UCL				0.03		
2332	95% KM (z) UCL				0.02	95% KM Bootstrap t UCL				0.02		
2333	90% KM Chebyshev UCL				0.03	95% KM Chebyshev UCL				0.04		
2334	97.5% KM Chebyshev UCL				0.06	99% KM Chebyshev UCL				0.08		
2335												
2336	Gamma GOF Tests on Detected Observations Only											
2337	A-D Test Statistic				0.47	Anderson-Darling GOF Test						
2338	5% A-D Critical Value				0.70	Detected data appear Gamma Distributed at 5% Significance Level						
2339	K-S Test Statistic				0.21	Kolmogrov-Smirnoff GOF						
2340	5% K-S Critical Value				0.31	Detected data appear Gamma Distributed at 5% Significance Level						
2341	Detected data appear Gamma Distributed at 5% Significance Level											
2342												
2343	Gamma Statistics on Detected Data Only											
2344	k hat (MLE)				12.7	k star (bias corrected MLE)				7.35		
2345	Theta hat (MLE)				0.003	Theta star (bias corrected MLE)				0.006		
2346	nu hat (MLE)				177.9	nu star (bias corrected)				103		
2347	MLE Mean (bias corrected)				0.04	MLE Sd (bias corrected)				0.01		
2348												
2349	Gamma Kaplan-Meier (KM) Statistics											
2350	k hat (KM)				0.54	nu hat (KM)				17.3		
2351						Adjusted Level of Significance (β)				0.03		
2352	Approximate Chi Square Value (17.37, α)				8.94	Adjusted Chi Square Value (17.37, β)				8.25		
2353	Approximate KM-UCL (use when n>=50)				0.03	Gamma Adjusted KM-UCL (use when n<50)				0.03		
2354												
2355	DL/2 Statistics											
2356	Mean in Original Scale				0.02	SD in Original Scale				0.02		
2357	95% t UCL (Assumes normality)				0.03							
2358	DL/2 is not a recommended method, provided for comparisons and historical reasons											
2359												
2360	Nonparametric Distribution Free UCL Statistics											
2361	Detected Data appear Normal Distributed at 5% Significance Level											
2362												
2363	Suggested UCL to Use											
2364	95% KM (t) UCL				0.03	95% KM (Percentile Bootstrap) UCL				0.03		
2365												
2366	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
2367	Recommendations are based upon data size, data distribution, and skewness.											
2368	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
2369	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
2370												
2371	Pyrene											
2372												
2373	General Statistics											
2374	Total Number of Observations				16	Number of Distinct Observations				16		
2375	Number of Detects				8	Number of Non-Detects				8		
2376	Number of Distinct Detects				8	Number of Distinct Non-Detects				8		
2377	Minimum Detect				0.01	Minimum Non-Detect				0.03		
2378	Maximum Detect				9.03	Maximum Non-Detect				0.22		

	A	B	C	D	E	F	G	H	I	J	K	L
2379				Variance Detects		8.03				Percent Non-Detects		50%
2380				Mean Detects		2.56				SD Detects		2.83
2381				Median Detects		1.72				CV Detects		1.10
2382				Skewness Detects		2.02				Kurtosis Detects		4.74
2383				Mean of Logged Detects		0.10				SD of Logged Detects		1.92
2384												
2385				Normal GOF Test on Detects Only								
2386				Shapiro Wilk Test Statistic		0.78				Shapiro Wilk GOF Test		
2387				5% Shapiro Wilk Critical Value		0.81				Detected Data Not Normal at 5% Significance Level		
2388				Lilliefors Test Statistic		0.27				Lilliefors GOF Test		
2389				5% Lilliefors Critical Value		0.31				Detected Data appear Normal at 5% Significance Level		
2390				Detected Data appear Approximate Normal at 5% Significance Level								
2391												
2392				Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs								
2393				Mean		1.28				Standard Error of Mean		0.60
2394				SD		2.26				95% KM (BCA) UCL		2.27
2395				95% KM (t) UCL		2.35				95% KM (Percentile Bootstrap) UCL		2.29
2396				95% KM (z) UCL		2.28				95% KM Bootstrap t UCL		3.33
2397				90% KM Chebyshev UCL		3.10				95% KM Chebyshev UCL		3.92
2398				97.5% KM Chebyshev UCL		5.07				99% KM Chebyshev UCL		7.31
2399												
2400				Gamma GOF Tests on Detected Observations Only								
2401				A-D Test Statistic		0.33				Anderson-Darling GOF Test		
2402				5% A-D Critical Value		0.74				Data appear Gamma Distributed at 5% Significance Level		
2403				K-S Test Statistic		0.23				Kolmogorov-Smirnoff GOF		
2404				5% K-S Critical Value		0.30				Data appear Gamma Distributed at 5% Significance Level		
2405				Detected data appear Gamma Distributed at 5% Significance Level								
2406												
2407				Gamma Statistics on Detected Data Only								
2408				k hat (MLE)		0.72				k star (bias corrected MLE)		0.53
2409				Theta hat (MLE)		3.54				Theta star (bias corrected MLE)		4.78
2410				nu hat (MLE)		11.56				nu star (bias corrected)		8.56
2411				MLE Mean (bias corrected)		2.56				MLE Sd (bias corrected)		3.50
2412												
2413				Gamma Kaplan-Meier (KM) Statistics								
2414				k hat (KM)		0.32				nu hat (KM)		10.37
2415				Approximate Chi Square Value (10.35, α)		4.16				Adjusted Chi Square Value (10.35, β)		3.72
2416				Approximate KM-UCL (use when $n \geq 50$)		3.20				Gamma Adjusted KM-UCL (use when $n < 50$)		3.58
2417												
2418				Gamma ROS Statistics using Imputed Non-Detects								
2419				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
2420				GROS may not be used when kstar of detected data is small such as < 0.1								
2421				For such situations, GROS method tends to yield inflated values of UCLs and BTVs								
2422				Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
2423				Minimum		0.01				Mean		1.28
2424				Maximum		9.03				Median		0.01
2425				SD		2.34				CV		1.82
2426				k hat (MLE)		0.27				k star (bias corrected MLE)		0.26
2427				Theta hat (MLE)		4.60				Theta star (bias corrected MLE)		4.79
2428				nu hat (MLE)		8.93				nu star (bias corrected)		8.59
2429				MLE Mean (bias corrected)		1.28				MLE Sd (bias corrected)		2.48
2430										Adjusted Level of Significance (β)		0.03
2431				Approximate Chi Square Value (8.59, α)		3.08				Adjusted Chi Square Value (8.59, β)		2.71
2432				Gamma Approximate UCL (use when $n \geq 50$)		3.58				Gamma Adjusted UCL (use when $n < 50$)		4.06
2433												
2434				Lognormal GOF Test on Detected Observations Only								
2435				Shapiro Wilk Test Statistic		0.82				Shapiro Wilk GOF Test		
2436				5% Shapiro Wilk Critical Value		0.81				Detected Data appear Lognormal at 5% Significance Level		
2437				Lilliefors Test Statistic		0.30				Lilliefors GOF Test		
2438				5% Lilliefors Critical Value		0.31				Detected Data appear Lognormal at 5% Significance Level		
2439				Detected Data appear Lognormal at 5% Significance Level								
2440												
2441				Lognormal ROS Statistics Using Imputed Non-Detects								
2442				Mean in Original Scale		1.29				Mean in Log Scale		-1.63
2443				SD in Original Scale		2.33				SD in Log Scale		2.23
2444				95% t UCL (assumes normality of ROS data)		2.32				95% Percentile Bootstrap UCL		2.32
2445				95% BCA Bootstrap UCL		2.78				95% Bootstrap t UCL		3.43
2446				95% H-UCL (Log ROS)		40.14						
2447												
2448				DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed								
2449				KM Mean (logged)		-2.02				95% H-UCL (KM -Log)		93.54
2450				KM SD (logged)		2.48				95% Critical H Value (KM-Log)		5.40
2451				KM Standard Error of Mean (logged)		0.66						
2452												
2453				DL/2 Statistics								
2454				DL/2 Normal			DL/2 Log-Transformed					
2455				Mean in Original Scale		1.31				Mean in Log Scale		-1.49
2456				SD in Original Scale		2.32				SD in Log Scale		2.17
2457				95% t UCL (Assumes normality)		2.33				95% H-Stat UCL		35.11
2458				DL/2 is not a recommended method, provided for comparisons and historical reasons								
2459												
2460				Nonparametric Distribution Free UCL Statistics								

	A	B	C	D	E	F	G	H	I	J	K	L
2461	Detected Data appear Approximate Normal Distributed at 5% Significance Level											
2462												
2463	Suggested UCL to Use											
2464	95% KM (t) UCL				2.35	95% KM (Percentile Bootstrap) UCL				2.29		
2465												
2466	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
2467	Recommendations are based upon data size, data distribution, and skewness.											
2468	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
2469	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult											
2470												
2471	Silver											
2472												
2473	General Statistics											
2474	Total Number of Observations				16	Number of Distinct Observations				16		
2475	Number of Detects				12	Number of Non-Detects				4		
2476	Number of Distinct Detects				12	Number of Distinct Non-Detects				4		
2477	Minimum Detect				1.03	Minimum Non-Detect				0.22		
2478	Maximum Detect				348	Maximum Non-Detect				0.66		
2479	Variance Detects				18904	Percent Non-Detects				25%		
2480	Mean Detects				136.4	SD Detects				137.5		
2481	Median Detects				93.95	CV Detects				1.00		
2482	Skewness Detects				0.51	Kurtosis Detects				-1.46		
2483	Mean of Logged Detects				3.75	SD of Logged Detects				2.10		
2484												
2485	Normal GOF Test on Detects Only											
2486	Shapiro Wilk Test Statistic				0.84	Shapiro Wilk GOF Test						
2487	5% Shapiro Wilk Critical Value				0.85	Detected Data Not Normal at 5% Significance Level						
2488	Lilliefors Test Statistic				0.19	Lilliefors GOF Test						
2489	5% Lilliefors Critical Value				0.25	Detected Data appear Normal at 5% Significance Level						
2490	Detected Data appear Approximate Normal at 5% Significance Level											
2491												
2492	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
2493	Mean		102.4	Standard Error of Mean		33.53						
2494	SD		128.4	95% KM (BCA) UCL		158.2						
2495	95% KM (t) UCL		161.1	95% KM (Percentile Bootstrap) UCL		159.6						
2496	95% KM (z) UCL		157.5	95% KM Bootstrap t UCL		173.2						
2497	90% KM Chebyshev UCL		202.9	95% KM Chebyshev UCL		248.5						
2498	97.5% KM Chebyshev UCL		311.7	99% KM Chebyshev UCL		435.8						
2499												
2500	Gamma GOF Tests on Detected Observations Only											
2501	A-D Test Statistic				0.55	Anderson-Darling GOF Test						
2502	5% A-D Critical Value				0.78	Detected data appear Gamma Distributed at 5% Significance Level						
2503	K-S Test Statistic				0.18	Kolmogorov-Smirnov GOF						
2504	5% K-S Critical Value				0.25	Detected data appear Gamma Distributed at 5% Significance Level						
2505	Detected data appear Gamma Distributed at 5% Significance Level											
2506												
2507	Gamma Statistics on Detected Data Only											
2508	k hat (MLE)		0.54	k star (bias corrected MLE)		0.46						
2509	Theta hat (MLE)		252.4	Theta star (bias corrected MLE)		296						
2510	nu hat (MLE)		12.9	nu star (bias corrected)		11.0						
2511	MLE Mean (bias corrected)		136.4	MLE Sd (bias corrected)		200.9						
2512												
2513	Gamma Kaplan-Meier (KM) Statistics											
2514	k hat (KM)		0.63	nu hat (KM)		20.30						
2515	Approximate Chi Square Value (20.36, α)		11.1	Adjusted Chi Square Value (20.36, β)		10.3						
2516	Approximate KM-UCL (use when n>=50)		187.5	Gamma Adjusted KM-UCL (use when n<50)		201.5						
2517												
2518	Gamma ROS Statistics using Imputed Non-Detects											
2519	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2520	GROS may not be used when kstar of detected data is small such as < 0.1											
2521	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
2522	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimate											
2523	Minimum		0.01	Mean		102.3						
2524	Maximum		348	Median		19.4						
2525	SD		132.6	CV		1.29						
2526	k hat (MLE)		0.24	k star (bias corrected MLE)		0.23						
2527	Theta hat (MLE)		424.4	Theta star (bias corrected MLE)		430.7						
2528	nu hat (MLE)		7.71	nu star (bias corrected)		7.60						
2529	MLE Mean (bias corrected)		102.3	MLE Sd (bias corrected)		209.9						
2530				Adjusted Level of Significance (β)		0.03						
2531	Approximate Chi Square Value (7.60, α)		2.50	Adjusted Chi Square Value (7.60, β)		2.18						
2532	Gamma Approximate UCL (use when n>=50)		310.3	Gamma Adjusted UCL (use when n<50)		355.8						
2533												
2534	Lognormal GOF Test on Detected Observations Only											
2535	Shapiro Wilk Test Statistic				0.86	Shapiro Wilk GOF Test						
2536	5% Shapiro Wilk Critical Value				0.85	Detected Data appear Lognormal at 5% Significance Level						
2537	Lilliefors Test Statistic				0.21	Lilliefors GOF Test						
2538	5% Lilliefors Critical Value				0.25	Detected Data appear Lognormal at 5% Significance Level						
2539	Detected Data appear Lognormal at 5% Significance Level											
2540												
2541	Lognormal ROS Statistics Using Imputed Non-Detects											
2542	Mean in Original Scale		102.4	Mean in Log Scale		2.59						

	A	B	C	D	E	F	G	H	I	J	K	L	
2543	SD in Original Scale					132.5	SD in Log Scale					2.74	
2544	95% t UCL (assumes normality of ROS data)					160.5	95% Percentile Bootstrap UCL					155.3	
2545	95% BCA Bootstrap UCL					161.9	95% Bootstrap t UCL					172.2	
2546	95% H-UCL (Log ROS)					37885							
2547													
2548	DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed												
2549	KM Mean (logged)					2.43	95% H-UCL (KM -Log)					68117	
2550	KM SD (logged)					2.87	95% Critical H Value (KM-Log)					6.16	
2551	KM Standard Error of Mean (logged)					0.75							
2552													
2553	DL/2 Statistics												
2554	DL/2 Normal					DL/2 Log-Transformed							
2555	Mean in Original Scale					102.4	Mean in Log Scale					2.45	
2556	SD in Original Scale					132.6	SD in Log Scale					2.95	
2557	95% t UCL (Assumes normality)					160.5	95% H-Stat UCL					114281	
2558	DL/2 is not a recommended method, provided for comparisons and historical reasons												
2559													
2560	Nonparametric Distribution Free UCL Statistics												
2561	Detected Data appear Approximate Normal Distributed at 5% Significance Level												
2562													
2563	Suggested UCL to Use												
2564	95% KM (t) UCL					161.1	95% KM (Percentile Bootstrap) UCL					159.6	
2565													
2566	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
2567	Recommendations are based upon data size, data distribution, and skewness.												
2568	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and												
2569	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult												
2570													
2571	Sodium												
2572													
2573	General Statistics												
2574	Total Number of Observations					16	Number of Distinct Observations					16	
2575	Number of Detects					14	Number of Non-Detects					2	
2576	Number of Distinct Detects					14	Number of Distinct Non-Detects					2	
2577	Minimum Detect					60.3	Minimum Non-Detect					59.1	
2578	Maximum Detect					1000	Maximum Non-Detect					68.1	
2579	Variance Detects					67470	Percent Non-Detects					12.5	
2580	Mean Detects					216.3	SD Detects					259.7	
2581	Median Detects					97.5	CV Detects					1.20	
2582	Skewness Detects					2.47	Kurtosis Detects					6.57	
2583	Mean of Logged Detects					4.94	SD of Logged Detects					0.87	
2584													
2585	Normal GOF Test on Detects Only												
2586	Shapiro Wilk Test Statistic					0.64	Shapiro Wilk GOF Test						
2587	5% Shapiro Wilk Critical Value					0.87	Detected Data Not Normal at 5% Significance Level						
2588	Lilliefors Test Statistic					0.28	Lilliefors GOF Test						
2589	5% Lilliefors Critical Value					0.23	Detected Data Not Normal at 5% Significance Level						
2590	Detected Data Not Normal at 5% Significance Level												
2591													
2592	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs												
2593	Mean					196.7	Standard Error of Mean					62.2	
2594	SD					239.8	95% KM (BCA) UCL					306.1	
2595	95% KM (t) UCL					305.8	95% KM (Percentile Bootstrap) UCL					303.4	
2596	95% KM (z) UCL					299	95% KM Bootstrap t UCL					472.8	
2597	90% KM Chebyshev UCL					383.4	95% KM Chebyshev UCL					467.9	
2598	97.5% KM Chebyshev UCL					585.2	99% KM Chebyshev UCL					815.7	
2599													
2600	Gamma GOF Tests on Detected Observations Only												
2601	A-D Test Statistic					1.13	Anderson-Darling GOF Test						
2602	5% A-D Critical Value					0.75	Detected Data Not Gamma Distributed at 5% Significance Level						
2603	K-S Test Statistic					0.26	Kolmogrov-Smirnov GOF						
2604	5% K-S Critical Value					0.23	Detected Data Not Gamma Distributed at 5% Significance Level						
2605	Detected Data Not Gamma Distributed at 5% Significance Level												
2606													
2607	Gamma Statistics on Detected Data Only												
2608	k hat (MLE)					1.30	k star (bias corrected MLE)					1.07	
2609	Theta hat (MLE)					166	Theta star (bias corrected MLE)					201.8	
2610	nu hat (MLE)					36.5	nu star (bias corrected)					30.0	
2611	MLE Mean (bias corrected)					216.3	MLE Sd (bias corrected)					208.9	
2612													
2613	Gamma Kaplan-Meier (KM) Statistics												
2614	k hat (KM)					0.67	nu hat (KM)					21.5	
2615	Approximate Chi Square Value (21.53, α)					11.9	Adjusted Chi Square Value (21.53, β)					11.1	
2616	Approximate KM-UCL (use when n>=50)					353.3	Gamma Adjusted KM-UCL (use when n<50)					378.8	
2617													
2618	Gamma ROS Statistics using Imputed Non-Detects												
2619	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												
2620	GROS may not be used when kstar of detected data is small such as < 0.1												
2621	For such situations, GROS method tends to yield inflated values of UCLs and BTVs												
2622	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates												
2623	Minimum					0.01	Mean					189.3	
2624	Maximum					1000	Median					89.0	

	A	B	C	D	E	F	G	H	I	J	K	L
2625					SD	252.8					CV	1.33
2626					k hat (MLE)	0.43					k star (bias corrected MLE)	0.39
2627					Theta hat (MLE)	434.6					Theta star (bias corrected MLE)	478.6
2628					nu hat (MLE)	13.9					nu star (bias corrected)	12.6
2629					MLE Mean (bias corrected)	189.3					MLE Sd (bias corrected)	301
2630											Adjusted Level of Significance (β)	0.03
2631					Approximate Chi Square Value (12.66, α)	5.66					Adjusted Chi Square Value (12.66, β)	5.13
2632					Gamma Approximate UCL (use when n>=50)	423.1					Gamma Adjusted UCL (use when n<50)	466.2
2633												
2634					Lognormal GOF Test on Detected Observations Only							
2635					Shapiro Wilk Test Statistic	0.86					Shapiro Wilk GOF Test	
2636					5% Shapiro Wilk Critical Value	0.87					Detected Data Not Lognormal at 5% Significance Level	
2637					Lilliefors Test Statistic	0.21					Lilliefors GOF Test	
2638					5% Lilliefors Critical Value	0.23					Detected Data appear Lognormal at 5% Significance Level	
2639					Detected Data appear Approximate Lognormal at 5% Significance Level							
2640												
2641					Lognormal ROS Statistics Using Imputed Non-Detects							
2642					Mean in Original Scale	192.5					Mean in Log Scale	4.72
2643					SD in Original Scale	250.4					SD in Log Scale	1.01
2644					95% t UCL (assumes normality of ROS data)	302.2					95% Percentile Bootstrap UCL	299.6
2645					95% BCA Bootstrap UCL	352.9					95% Bootstrap t UCL	445
2646					95% H-UCL (Log ROS)	385.2						
2647												
2648					Tests using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed							
2649					KM Mean (logged)	4.83					95% H-UCL (KM -Log)	304.6
2650					KM SD (logged)	0.83					95% Critical H Value (KM-Log)	2.46
2651					KM Standard Error of Mean (logged)	0.21						
2652												
2653					DL/2 Statistics							
2654					DL/2 Normal				DL/2 Log-Transformed			
2655					Mean in Original Scale	193.2					Mean in Log Scale	4.76
2656					SD in Original Scale	249.9					SD in Log Scale	0.95
2657					95% t UCL (Assumes normality)	302.8					95% H-Stat UCL	355
2658					DL/2 is not a recommended method, provided for comparisons and historical reasons							
2659												
2660					Nonparametric Distribution Free UCL Statistics							
2661					Detected Data appear Approximate Lognormal Distributed at 5% Significance Level							
2662												
2663					Suggested UCL to Use							
2664					95% KM (Chebyshev) UCL	467.9						
2665												
2666					Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL.							
2667					Recommendations are based upon data size, data distribution, and skewness.							
2668					Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Singh (2007).							
2669					Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult with a statistician.							
2670												
2671					Toluene							
2672												
2673					General Statistics							
2674					Total Number of Observations	16					Number of Distinct Observations	15
2675					Number of Detects	11					Number of Non-Detects	5
2676					Number of Distinct Detects	10					Number of Distinct Non-Detects	5
2677					Minimum Detect	3.3100E					Minimum Non-Detect	0.001
2678					Maximum Detect	0.001					Maximum Non-Detect	0.001
2679					Variance Detects	1.4600E					Percent Non-Detects	31.2
2680					Mean Detects	6.8636E					SD Detects	3.8210E
2681					Median Detects	4.7600E					CV Detects	0.55
2682					Skewness Detects	0.74					Kurtosis Detects	-1.33
2683					Mean of Logged Detects	-7.41					SD of Logged Detects	0.53
2684												
2685					Normal GOF Test on Detects Only							
2686					Shapiro Wilk Test Statistic	0.81					Shapiro Wilk GOF Test	
2687					5% Shapiro Wilk Critical Value	0.85					Detected Data Not Normal at 5% Significance Level	
2688					Lilliefors Test Statistic	0.30					Lilliefors GOF Test	
2689					5% Lilliefors Critical Value	0.26					Detected Data Not Normal at 5% Significance Level	
2690					Detected Data Not Normal at 5% Significance Level							
2691												
2692					Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs							
2693					Mean	6.4883E					Standard Error of Mean	1.0230E
2694					SD	3.4558E					95% KM (BCA) UCL	8.1467E
2695					95% KM (t) UCL	8.2817E					95% KM (Percentile Bootstrap) UCL	8.2088E
2696					95% KM (z) UCL	8.1710E					95% KM Bootstrap t UCL	8.8902E
2697					90% KM Chebyshev UCL	9.5573E					95% KM Chebyshev UCL	0.001
2698					97.5% KM Chebyshev UCL	0.001					99% KM Chebyshev UCL	0.001
2699												
2700					Gamma GOF Tests on Detected Observations Only							
2701					A-D Test Statistic	0.88					Anderson-Darling GOF Test	
2702					5% A-D Critical Value	0.73					Detected Data Not Gamma Distributed at 5% Significance Level	
2703					K-S Test Statistic	0.26					Kolmogrov-Smirnoff GOF	
2704					5% K-S Critical Value	0.25					Detected Data Not Gamma Distributed at 5% Significance Level	
2705					Detected Data Not Gamma Distributed at 5% Significance Level							
2706												

	A	B	C	D	E	F	G	H	I	J	K	L
2707	Gamma Statistics on Detected Data Only											
2708	k hat (MLE)					3.88	k star (bias corrected MLE)					2.88
2709	Theta hat (MLE)					1.7689E	Theta star (bias corrected MLE)					2.3812E
2710	nu hat (MLE)					85.34	nu star (bias corrected)					63.4
2711	MLE Mean (bias corrected)					6.8636E	MLE Sd (bias corrected)					4.0427E
2712												
2713	Gamma Kaplan-Meier (KM) Statistics											
2714	k hat (KM)					3.52	nu hat (KM)					112.8
2715	Approximate Chi Square Value (112.80, α)					89.21	Adjusted Chi Square Value (112.80, β)					86.9
2716	Approximate KM-UCL (use when $n \geq 50$)					8.1974E	Gamma Adjusted KM-UCL (use when $n < 50$)					8.4219E
2717												
2718	Gamma ROS Statistics using Imputed Non-Detects											
2719	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2720	GROS may not be used when kstar of detected data is small such as < 0.1											
2721	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
2722	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2723	Minimum					3.3100E	Mean					0.003
2724	Maximum					0.01	Median					0.001
2725	SD					0.004	CV					1.24
2726	k hat (MLE)					0.66	k star (bias corrected MLE)					0.58
2727	Theta hat (MLE)					0.005	Theta star (bias corrected MLE)					0.006
2728	nu hat (MLE)					21.34	nu star (bias corrected)					18.6
2729	MLE Mean (bias corrected)					0.003	MLE Sd (bias corrected)					0.004
2730							Adjusted Level of Significance (β)					0.03
2731	Approximate Chi Square Value (18.69, α)					9.88	Adjusted Chi Square Value (18.69, β)					9.16
2732	Gamma Approximate UCL (use when $n \geq 50$)					0.006	Gamma Adjusted UCL (use when $n < 50$)					0.007
2733												
2734	Lognormal GOF Test on Detected Observations Only											
2735	Shapiro Wilk Test Statistic					0.85	Shapiro Wilk GOF Test					
2736	5% Shapiro Wilk Critical Value					0.85	Detected Data appear Lognormal at 5% Significance Level					
2737	Lilliefors Test Statistic					0.23	Lilliefors GOF Test					
2738	5% Lilliefors Critical Value					0.26	Detected Data appear Lognormal at 5% Significance Level					
2739	Detected Data appear Lognormal at 5% Significance Level											
2740												
2741	Lognormal ROS Statistics Using Imputed Non-Detects											
2742	Mean in Original Scale					6.3553E	Mean in Log Scale					-7.46
2743	SD in Original Scale					3.2208E	SD in Log Scale					0.44
2744	95% t UCL (assumes normality of ROS data)					7.7668E	95% Percentile Bootstrap UCL					7.7230E
2745	95% BCA Bootstrap UCL					7.9030E	95% Bootstrap t UCL					8.5225E
2746	95% H-UCL (Log ROS)					7.9626E						
2747												
2748	DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
2749	KM Mean (logged)					-7.46	95% H-UCL (KM -Log)					8.3326E
2750	KM SD (logged)					0.49	95% Critical H Value (KM-Log)					2.03
2751	KM Standard Error of Mean (logged)					0.14						
2752												
2753	DL/2 Statistics											
2754	DL/2 Normal						DL/2 Log-Transformed					
2755	Mean in Original Scale					6.6281E	Mean in Log Scale					-7.41
2756	SD in Original Scale					3.1598E	SD in Log Scale					0.44
2757	95% t UCL (Assumes normality)					8.0129E	95% H-Stat UCL					8.3239E
2758	DL/2 is not a recommended method, provided for comparisons and historical reasons											
2759												
2760	Nonparametric Distribution Free UCL Statistics											
2761	Detected Data appear Lognormal Distributed at 5% Significance Level											
2762												
2763	Suggested UCL to Use											
2764	95% KM (BCA) UCL					8.1467E						
2765												
2766	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
2767	Recommendations are based upon data size, data distribution, and skewness.											
2768	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
2769	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
2770												
2771	Tritium											
2772												
2773	General Statistics											
2774	Total Number of Observations					16	Number of Distinct Observations					16
2775	Number of Detects					5	Number of Non-Detects					11
2776	Number of Distinct Detects					5	Number of Distinct Non-Detects					11
2777	Minimum Detect					0.02	Minimum Non-Detect					-0.047
2778	Maximum Detect					0.15	Maximum Non-Detect					0.009
2779	Variance Detects					0.002	Percent Non-Detects					68.7
2780	Mean Detects					0.07	SD Detects					0.05
2781	Median Detects					0.08	CV Detects					0.70
2782	Skewness Detects					0.65	Kurtosis Detects					-0.23
2783												
2784	Normal GOF Test on Detects Only											
2785	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk GOF Test					
2786	5% Shapiro Wilk Critical Value					0.76	Detected Data appear Normal at 5% Significance Level					
2787	Lilliefors Test Statistic					0.21	Lilliefors GOF Test					
2788	5% Lilliefors Critical Value					0.39	Detected Data appear Normal at 5% Significance Level					

A	B	C	D	E	F	G	H	I	J	K	L
2789	Detected Data appear Normal at 5% Significance Level										
2790											
2791	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs										
2792		Mean	-0.009		Standard Error of Mean		0.01				
2793		SD	0.06		95% KM (BCA) UCL		0.03				
2794		95% KM (t) UCL	0.02		95% KM (Percentile Bootstrap) UCL		0.02				
2795		95% KM (z) UCL	0.02		95% KM Bootstrap t UCL		0.005				
2796		90% KM Chebyshev UCL	0.04		95% KM Chebyshev UCL		0.06				
2797		97.5% KM Chebyshev UCL	0.10		99% KM Chebyshev UCL		0.16				
2798											
2799	Gamma GOF Tests on Detected Observations Only										
2800		A-D Test Statistic	0.36		Anderson-Darling GOF Test						
2801		5% A-D Critical Value	0.68		data appear Gamma Distributed at 5% Significance Level						
2802		K-S Test Statistic	0.25		Kolmogrov-Smirnoff GOF						
2803		5% K-S Critical Value	0.36		data appear Gamma Distributed at 5% Significance Level						
2804	Detected data appear Gamma Distributed at 5% Significance Level										
2805											
2806	Gamma Statistics on Detected Data Only										
2807		k hat (MLE)	2.27		k star (bias corrected MLE)		1.04				
2808		Theta hat (MLE)	0.03		Theta star (bias corrected MLE)		0.07				
2809		nu hat (MLE)	22.7		nu star (bias corrected)		10.4				
2810		MLE Mean (bias corrected)	0.07		MLE Sd (bias corrected)		0.07				
2811											
2812	Gamma Kaplan-Meier (KM) Statistics										
2813		k hat (KM)	0.02		nu hat (KM)		0.65				
2814					Adjusted Level of Significance (β)		0.03				
2815		Approximate Chi Square Value (0.66, α)	0.26		Adjusted Chi Square Value (0.66, β)		0.2				
2816		Approximate KM-UCL (use when $n \geq 50$)	-0.022		Gamma Adjusted KM-UCL (use when $n < 50$)		-0.029				
2817	Gamma (KM) may not be used when k hat (KM) is < 0.1										
2818											
2819	DL/2 Statistics										
2820		Mean in Original Scale	0.02		SD in Original Scale		0.04				
2821		95% t UCL (Assumes normality)	0.04								
2822	DL/2 is not a recommended method, provided for comparisons and historical reasons										
2823											
2824	Nonparametric Distribution Free UCL Statistics										
2825	Detected Data appear Normal Distributed at 5% Significance Level										
2826											
2827	Suggested UCL to Use										
2828		95% KM (t) UCL	0.02		95% KM (Percentile Bootstrap) UCL		0.02				
2829											
2830	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
2831	Recommendations are based upon data size, data distribution, and skewness.										
2832	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and										
2833	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult										
2834											
2835											
2836	Uranium										
2837											
2838	General Statistics										
2839		Total Number of Observations	16		Number of Distinct Observations		16				
2840					Number of Missing Observations		0				
2841		Minimum	0.43		Mean		3.26				
2842		Maximum	10.4		Median		2.24				
2843		SD	2.64		Std. Error of Mean		0.66				
2844		Coefficient of Variation	0.81		Skewness		1.30				
2845											
2846	Normal GOF Test										
2847		Shapiro Wilk Test Statistic	0.87		Shapiro Wilk GOF Test						
2848		5% Shapiro Wilk Critical Value	0.88		Data Not Normal at 5% Significance Level						
2849		Lilliefors Test Statistic	0.21		Lilliefors GOF Test						
2850		5% Lilliefors Critical Value	0.22		Data appear Normal at 5% Significance Level						
2851	Data appear Approximate Normal at 5% Significance Level										
2852											
2853	Assuming Normal Distribution										
2854		95% Normal UCL			95% UCLs (Adjusted for Skewness)						
2855		95% Student's-t UCL	4.42		95% Adjusted-CLT UCL (Chen-1995)		4.58				
2856					95% Modified-t UCL (Johnson-1978)		4.46				
2857											
2858	Gamma GOF Test										
2859		A-D Test Statistic	0.29		Anderson-Darling Gamma GOF Test						
2860		5% A-D Critical Value	0.75		data appear Gamma Distributed at 5% Significance Level						
2861		K-S Test Statistic	0.12		Kolmogrov-Smirnoff Gamma GOF Test						
2862		5% K-S Critical Value	0.21		data appear Gamma Distributed at 5% Significance Level						
2863	Detected data appear Gamma Distributed at 5% Significance Level										
2864											
2865	Gamma Statistics										
2866		k hat (MLE)	1.57		k star (bias corrected MLE)		1.31				
2867		Theta hat (MLE)	2.07		Theta star (bias corrected MLE)		2.47				
2868		nu hat (MLE)	50.3		nu star (bias corrected)		42.2				
2869		MLE Mean (bias corrected)	3.26		MLE Sd (bias corrected)		2.84				
2870					Approximate Chi Square Value (0.05)		28.3				

A	B	C	D	E	F	G	H	I	J	K	L	
2871	Adjusted Level of Significance				0.03	Adjusted Chi Square Value				27.0		
2872												
2873	Assuming Gamma Distribution											
2874	Approximate Gamma UCL (use when n>=50))				4.86	Adjusted Gamma UCL (use when n<50)				5.1		
2875												
2876	Lognormal GOF Test											
2877	Shapiro Wilk Test Statistic				0.94	Shapiro Wilk Lognormal GOF Test						
2878	5% Shapiro Wilk Critical Value				0.88	Data appear Lognormal at 5% Significance Level						
2879	Lilliefors Test Statistic				0.15	Lilliefors Lognormal GOF Test						
2880	5% Lilliefors Critical Value				0.22	Data appear Lognormal at 5% Significance Level						
2881	Data appear Lognormal at 5% Significance Level											
2882												
2883	Lognormal Statistics											
2884	Minimum of Logged Data				-0.82	Mean of logged Data				0.83		
2885	Maximum of Logged Data				2.34	SD of logged Data				0.93		
2886												
2887	Assuming Lognormal Distribution											
2888	95% H-UCL				6.62	90% Chebyshev (MVUE) UCL				6.02		
2889	95% Chebyshev (MVUE) UCL				7.2	97.5% Chebyshev (MVUE) UCL				8.83		
2890	99% Chebyshev (MVUE) UCL				12.04							
2891												
2892	Nonparametric Distribution Free UCL Statistics											
2893	Data appear to follow a Discernible Distribution at 5% Significance Level											
2894												
2895	Nonparametric Distribution Free UCLs											
2896	95% CLT UCL				4.35	95% Jackknife UCL				4.42		
2897	95% Standard Bootstrap UCL				4.30	95% Bootstrap-t UCL				4.73		
2898	95% Hall's Bootstrap UCL				4.89	95% Percentile Bootstrap UCL				4.37		
2899	95% BCA Bootstrap UCL				4.6							
2900	90% Chebyshev(Mean, Sd) UCL				5.25	95% Chebyshev(Mean, Sd) UCL				6.15		
2901	97.5% Chebyshev(Mean, Sd) UCL				7.39	99% Chebyshev(Mean, Sd) UCL				9.85		
2902												
2903	Suggested UCL to Use											
2904	95% Student's-t UCL				4.42							
2905												
2906	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
2907	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh											
2908	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
2909	For additional insight the user may want to consult a statistician.											
2910												
2911												
2912	Uranium-234											
2913												
2914	General Statistics											
2915	Total Number of Observations				16	Number of Distinct Observations				16		
2916						Number of Missing Observations				0		
2917	Minimum				0.93	Mean				2.35		
2918	Maximum				6.1	Median				1.61		
2919	SD				1.51	Std. Error of Mean				0.38		
2920	Coefficient of Variation				0.64	Skewness				1.17		
2921												
2922	Normal GOF Test											
2923	Shapiro Wilk Test Statistic				0.83	Shapiro Wilk GOF Test						
2924	5% Shapiro Wilk Critical Value				0.88	Data Not Normal at 5% Significance Level						
2925	Lilliefors Test Statistic				0.26	Lilliefors GOF Test						
2926	5% Lilliefors Critical Value				0.22	Data Not Normal at 5% Significance Level						
2927	Data Not Normal at 5% Significance Level											
2928												
2929	Assuming Normal Distribution											
2930	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
2931	95% Student's-t UCL				3.02	95% Adjusted-CLT UCL (Chen-1995)				3.1		
2932						95% Modified-t UCL (Johnson-1978)				3.04		
2933												
2934	Gamma GOF Test											
2935	A-D Test Statistic				0.83	Anderson-Darling Gamma GOF Test						
2936	5% A-D Critical Value				0.74	Data Not Gamma Distributed at 5% Significance Level						
2937	K-S Test Statistic				0.21	Kolmogrov-Smirnoff Gamma GOF Test						
2938	5% K-S Critical Value				0.21	Data appear Gamma Distributed at 5% Significance Level						
2939	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
2940												
2941	Gamma Statistics											
2942	k hat (MLE)				3.00	k star (bias corrected MLE)				2.48		
2943	Theta hat (MLE)				0.78	Theta star (bias corrected MLE)				0.94		
2944	nu hat (MLE)				96.14	nu star (bias corrected)				79.44		
2945	MLE Mean (bias corrected)				2.35	MLE Sd (bias corrected)				1.49		
2946						Approximate Chi Square Value (0.05)				59.9		
2947	Adjusted Level of Significance				0.03	Adjusted Chi Square Value				58.0		
2948												
2949	Assuming Gamma Distribution											
2950	Approximate Gamma UCL (use when n>=50)				3.12	Adjusted Gamma UCL (use when n<50)				3.22		
2951												
2952	Lognormal GOF Test											

	A	B	C	D	E	F	G	H	I	J	K	L	
2953	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk Lognormal GOF Test						
2954	5% Shapiro Wilk Critical Value					0.88	Data appear Lognormal at 5% Significance Level						
2955	Lilliefors Test Statistic					0.18	Lilliefors Lognormal GOF Test						
2956	5% Lilliefors Critical Value					0.22	Data appear Lognormal at 5% Significance Level						
2957	Data appear Lognormal at 5% Significance Level												
2958													
2959	Lognormal Statistics												
2960	Minimum of Logged Data					-0.065	Mean of logged Data					0.68	
2961	Maximum of Logged Data					1.80	SD of logged Data					0.59	
2962													
2963	Assuming Lognormal Distribution												
2964	95% H-UCL					3.29	90% Chebyshev (MVUE) UCL					3.42	
2965	95% Chebyshev (MVUE) UCL					3.91	97.5% Chebyshev (MVUE) UCL					4.60	
2966	99% Chebyshev (MVUE) UCL					5.95							
2967													
2968	Nonparametric Distribution Free UCL Statistics												
2969	Data appear to follow a Discernible Distribution at 5% Significance Level												
2970													
2971	Nonparametric Distribution Free UCLs												
2972	95% CLT UCL					2.98	95% Jackknife UCL					3.02	
2973	95% Standard Bootstrap UCL					2.94	95% Bootstrap-t UCL					3.18	
2974	95% Hall's Bootstrap UCL					3.14	95% Percentile Bootstrap UCL					2.99	
2975	95% BCA Bootstrap UCL					3.07							
2976	90% Chebyshev(Mean, Sd) UCL					3.49	95% Chebyshev(Mean, Sd) UCL					4.01	
2977	97.5% Chebyshev(Mean, Sd) UCL					4.72	99% Chebyshev(Mean, Sd) UCL					6.13	
2978													
2979	Suggested UCL to Use												
2980	95% Adjusted Gamma UCL					3.22							
2981													
2982	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
2983	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
2984	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
2985	For additional insight the user may want to consult a statistician.												
2986													
2987	Uranium-235/236												
2988													
2989	General Statistics												
2990	Total Number of Observations					16	Number of Distinct Observations					16	
2991	Number of Detects					11	Number of Non-Detects					5	
2992	Number of Distinct Detects					11	Number of Distinct Non-Detects					5	
2993	Minimum Detect					0.08	Minimum Non-Detect					0.05	
2994	Maximum Detect					0.27	Maximum Non-Detect					0.06	
2995	Variance Detects					0.002	Percent Non-Detects					31.2	
2996	Mean Detects					0.14	SD Detects					0.05	
2997	Median Detects					0.13	CV Detects					0.36	
2998	Skewness Detects					1.67	Kurtosis Detects					3.84	
2999	Mean of Logged Detects					-1.97	SD of Logged Detects					0.32	
3000													
3001	Normal GOF Test on Detects Only												
3002	Shapiro Wilk Test Statistic					0.86	Shapiro Wilk GOF Test						
3003	5% Shapiro Wilk Critical Value					0.85	Detected Data appear Normal at 5% Significance Level						
3004	Lilliefors Test Statistic					0.17	Lilliefors GOF Test						
3005	5% Lilliefors Critical Value					0.26	Detected Data appear Normal at 5% Significance Level						
3006	Detected Data appear Normal at 5% Significance Level												
3007													
3008	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs												
3009	Mean					0.11	Standard Error of Mean					0.01	
3010	SD					0.06	95% KM (BCA) UCL					0.14	
3011	95% KM (t) UCL					0.14	95% KM (Percentile Bootstrap) UCL					0.14	
3012	95% KM (z) UCL					0.14	95% KM Bootstrap t UCL					0.14	
3013	90% KM Chebyshev UCL					0.16	95% KM Chebyshev UCL					0.18	
3014	97.5% KM Chebyshev UCL					0.21	99% KM Chebyshev UCL					0.27	
3015													
3016	Gamma GOF Tests on Detected Observations Only												
3017	A-D Test Statistic					0.28	Anderson-Darling GOF Test						
3018	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level						
3019	K-S Test Statistic					0.12	Kolmogrov-Smirnoff GOF						
3020	5% K-S Critical Value					0.25	data appear Gamma Distributed at 5% Significance Level						
3021	Detected data appear Gamma Distributed at 5% Significance Level												
3022													
3023	Gamma Statistics on Detected Data Only												
3024	k hat (MLE)					10.04	k star (bias corrected MLE)					7.37	
3025	Theta hat (MLE)					0.014	Theta star (bias corrected MLE)					0.01	
3026	nu hat (MLE)					221.3	nu star (bias corrected)					162.3	
3027	MLE Mean (bias corrected)					0.14	MLE Sd (bias corrected)					0.05	
3028													
3029	Gamma Kaplan-Meier (KM) Statistics												
3030	k hat (KM)					3.72	nu hat (KM)					119.2	
3031	Approximate Chi Square Value (119.17, α)					94.94	Adjusted Chi Square Value (119.17, β)					92.5	
3032	Approximate KM-UCL (use when n>=50)					0.14	Gamma Adjusted KM-UCL (use when n<50)					0.14	
3033													
3034	Gamma ROS Statistics using Imputed Non-Detects												

	A	B	C	D	E	F	G	H	I	J	K	L
3035	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3036	GROS may not be used when kstar of detected data is small such as < 0.1											
3037	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
3038	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3039	Minimum				0.034	Mean				0.11		
3040	Maximum				0.27	Median				0.11		
3041	SD				0.064	CV				0.59		
3042	k hat (MLE)				2.85	k star (bias corrected MLE)				2.36		
3043	Theta hat (MLE)				0.034	Theta star (bias corrected MLE)				0.04		
3044	nu hat (MLE)				91.44	nu star (bias corrected)				75.60		
3045	MLE Mean (bias corrected)				0.11	MLE Sd (bias corrected)				0.07		
3046						Adjusted Level of Significance (β)				0.03		
3047	Approximate Chi Square Value (75.66, α)				56.61	Adjusted Chi Square Value (75.66, β)				54.71		
3048	Gamma Approximate UCL (use when n>=50)				0.15	Gamma Adjusted UCL (use when n<50)				0.15		
3049												
3050	Lognormal GOF Test on Detected Observations Only											
3051	Shapiro Wilk Test Statistic				0.96	Shapiro Wilk GOF Test						
3052	5% Shapiro Wilk Critical Value				0.85	Detected Data appear Lognormal at 5% Significance Level						
3053	Lilliefors Test Statistic				0.12	Lilliefors GOF Test						
3054	5% Lilliefors Critical Value				0.26	Detected Data appear Lognormal at 5% Significance Level						
3055	Detected Data appear Lognormal at 5% Significance Level											
3056												
3057	Lognormal ROS Statistics Using Imputed Non-Detects											
3058	Mean in Original Scale				0.12	Mean in Log Scale				-2.22		
3059	SD in Original Scale				0.054	SD in Log Scale				0.45		
3060	95% t UCL (assumes normality of ROS data)				0.14	95% Percentile Bootstrap UCL				0.14		
3061	95% BCA Bootstrap UCL				0.14	95% Bootstrap t UCL				0.15		
3062	95% H-UCL (Log ROS)				0.15							
3063												
3064	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
3065	KM Mean (logged)				-2.28	95% H-UCL (KM -Log)				0.15		
3066	KM SD (logged)				0.52	95% Critical H Value (KM-Log)				2.07		
3067	KM Standard Error of Mean (logged)				0.13							
3068												
3069	DL/2 Statistics											
3070	DL/2 Normal					DL/2 Log-Transformed						
3071	Mean in Original Scale				0.10	Mean in Log Scale				-2.47		
3072	SD in Original Scale				0.070	SD in Log Scale				0.80		
3073	95% t UCL (Assumes normality)				0.14	95% H-Stat UCL				0.19		
3074	DL/2 is not a recommended method, provided for comparisons and historical reasons											
3075												
3076	Nonparametric Distribution Free UCL Statistics											
3077	Detected Data appear Normal Distributed at 5% Significance Level											
3078												
3079	Suggested UCL to Use											
3080	95% KM (t) UCL				0.14	95% KM (Percentile Bootstrap) UCL				0.14		
3081												
3082	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
3083	Recommendations are based upon data size, data distribution, and skewness.											
3084	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
3085	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult											
3086												
3087												
3088	Uranium-238											
3089												
3090	General Statistics											
3091	Total Number of Observations				16	Number of Distinct Observations				16		
3092						Number of Missing Observations				0		
3093	Minimum				0.85	Mean				2.16		
3094	Maximum				4.51	Median				1.90		
3095	SD				1.06	Std. Error of Mean				0.26		
3096	Coefficient of Variation				0.49	Skewness				0.74		
3097												
3098	Normal GOF Test											
3099	Shapiro Wilk Test Statistic				0.93	Shapiro Wilk GOF Test						
3100	5% Shapiro Wilk Critical Value				0.88	Data appear Normal at 5% Significance Level						
3101	Lilliefors Test Statistic				0.14	Lilliefors GOF Test						
3102	5% Lilliefors Critical Value				0.22	Data appear Normal at 5% Significance Level						
3103	Data appear Normal at 5% Significance Level											
3104												
3105	Assuming Normal Distribution											
3106	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
3107	95% Student's-t UCL				2.63	95% Adjusted-CLT UCL (Chen-1995)				2.65		
3108						95% Modified-t UCL (Johnson-1978)				2.64		
3109												
3110	Gamma GOF Test											
3111	A-D Test Statistic				0.24	Anderson-Darling Gamma GOF Test						
3112	5% A-D Critical Value				0.74	Data appear Gamma Distributed at 5% Significance Level						
3113	K-S Test Statistic				0.11	Kolmogorov-Smirnov Gamma GOF Test						
3114	5% K-S Critical Value				0.21	Data appear Gamma Distributed at 5% Significance Level						
3115	Detected data appear Gamma Distributed at 5% Significance Level											
3116												

	A	B	C	D	E	F	G	H	I	J	K	L	
3117	Gamma Statistics												
3118	k hat (MLE)					4.49	k star (bias corrected MLE)					3.69	
3119	Theta hat (MLE)					0.48	Theta star (bias corrected MLE)					0.58	
3120	nu hat (MLE)					143.9	nu star (bias corrected)					118.2	
3121	MLE Mean (bias corrected)					2.16	MLE Sd (bias corrected)					1.12	
3122							Approximate Chi Square Value (0.05)					94.14	
3123	Adjusted Level of Significance					0.03	Adjusted Chi Square Value					91.63	
3124													
3125	Assuming Gamma Distribution												
3126	Approximate Gamma UCL (use when n>=50))					2.71	Adjusted Gamma UCL (use when n<50)					2.79	
3127													
3128	Lognormal GOF Test												
3129	Shapiro Wilk Test Statistic					0.96	Shapiro Wilk Lognormal GOF Test						
3130	5% Shapiro Wilk Critical Value					0.88	Data appear Lognormal at 5% Significance Level						
3131	Lilliefors Test Statistic					0.10	Lilliefors Lognormal GOF Test						
3132	5% Lilliefors Critical Value					0.22	Data appear Lognormal at 5% Significance Level						
3133	Data appear Lognormal at 5% Significance Level												
3134													
3135	Lognormal Statistics												
3136	Minimum of Logged Data					-0.15	Mean of logged Data					0.65	
3137	Maximum of Logged Data					1.50	SD of logged Data					0.50	
3138													
3139	Assuming Lognormal Distribution												
3140	95% H-UCL					2.85	90% Chebyshev (MVUE) UCL					3.01	
3141	95% Chebyshev (MVUE) UCL					3.39	97.5% Chebyshev (MVUE) UCL					3.92	
3142	99% Chebyshev (MVUE) UCL					4.96							
3143													
3144	Nonparametric Distribution Free UCL Statistics												
3145	Data appear to follow a Discernible Distribution at 5% Significance Level												
3146													
3147	Nonparametric Distribution Free UCLs												
3148	95% CLT UCL					2.60	95% Jackknife UCL					2.63	
3149	95% Standard Bootstrap UCL					2.60	95% Bootstrap-t UCL					2.70	
3150	95% Hall's Bootstrap UCL					2.66	95% Percentile Bootstrap UCL					2.59	
3151	95% BCA Bootstrap UCL					2.65							
3152	90% Chebyshev(Mean, Sd) UCL					2.96	95% Chebyshev(Mean, Sd) UCL					3.32	
3153	97.5% Chebyshev(Mean, Sd) UCL					3.83	99% Chebyshev(Mean, Sd) UCL					4.82	
3154													
3155	Suggested UCL to Use												
3156	95% Student's-t UCL					2.63							
3157													
3158	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
3159	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
3160	Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
3161	For additional insight the user may want to consult a statistician.												
3162													
3163													
3164	Zinc												
3165													
3166	General Statistics												
3167	Total Number of Observations					16	Number of Distinct Observations					15	
3168							Number of Missing Observations					0	
3169	Minimum					39.8	Mean					144.5	
3170	Maximum					1320	Median					51.5	
3171	SD					317	Std. Error of Mean					79.2	
3172	Coefficient of Variation					2.19	Skewness					3.85	
3173													
3174	Normal GOF Test												
3175	Shapiro Wilk Test Statistic					0.36	Shapiro Wilk GOF Test						
3176	5% Shapiro Wilk Critical Value					0.88	Data Not Normal at 5% Significance Level						
3177	Lilliefors Test Statistic					0.44	Lilliefors GOF Test						
3178	5% Lilliefors Critical Value					0.22	Data Not Normal at 5% Significance Level						
3179	Data Not Normal at 5% Significance Level												
3180													
3181	Assuming Normal Distribution												
3182	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
3183	95% Student's-t UCL					283.5	95% Adjusted-CLT UCL (Chen-1995)					356.6	
3184							95% Modified-t UCL (Johnson-1978)					296.2	
3185													
3186	Gamma GOF Test												
3187	A-D Test Statistic					3.29	Anderson-Darling Gamma GOF Test						
3188	5% A-D Critical Value					0.77	Data Not Gamma Distributed at 5% Significance Level						
3189	K-S Test Statistic					0.38	Kolmogrov-Smirnoff Gamma GOF Test						
3190	5% K-S Critical Value					0.22	Data Not Gamma Distributed at 5% Significance Level						
3191	Data Not Gamma Distributed at 5% Significance Level												
3192													
3193	Gamma Statistics												
3194	k hat (MLE)					0.82	k star (bias corrected MLE)					0.70	
3195	Theta hat (MLE)					176	Theta star (bias corrected MLE)					203.9	
3196	nu hat (MLE)					26.2	nu star (bias corrected)					22.6	
3197	MLE Mean (bias corrected)					144.5	MLE Sd (bias corrected)					171.7	
3198							Approximate Chi Square Value (0.05)					12.8	

3234	tions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate
3235	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and
3236	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets
3237	For additional insight the user may want to consult a statistician.