Aluminum

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	627	Mean	3626
Maximum	9080	Median	2910
SD	2583	Std. Error of Mean	608.8
Coefficient of Variation	0.712	Skewness	0.73

Normal GOF Test

Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.202	Data Not Normal at 5% Significance Level	

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	4685	95% Adjusted-CLT UCL (Chen-1995)	4739
		95% Modified-t UCL (Johnson-1978)	4702

Gamma GOF Test

A-D Test Statistic	0.312	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.126	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.206	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.967	k star (bias corrected MLE)	1.676
Theta hat (MLE)	1844	Theta star (bias corrected MLE)	2163
nu hat (MLE)	70.8	nu star (bias corrected)	60.33
MLE Mean (bias corrected)	3626	MLE Sd (bias corrected)	2801
		Approximate Chi Square Value (0.05)	43.47
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	42.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5032	95% Adjusted Gamma UCL (use when n<50)	5196

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
53				5% Shapiro Wilk Critical Value		0.897		Data appear Lognormal at 5% Significance Level				
54				Lilliefors Test Statistic		0.12		**Lilliefors Lognormal GOF Test**				
55				5% Lilliefors Critical Value		0.202		Data appear Lognormal at 5% Significance Level				
56					**Data appear Lognormal at 5% Significance Level**							
57												
58					**Lognormal Statistics**							
59				Minimum of Logged Data		6.441				Mean of logged Data		7.921
60				Maximum of Logged Data		9.114				SD of logged Data		0.805
61												
62					**Assuming Lognormal Distribution**							
63				95% H-UCL		6040				90% Chebyshev (MVUE) UCL		6003
64				95% Chebyshev (MVUE) UCL		7037				97.5% Chebyshev (MVUE) UCL		8472
65				99% Chebyshev (MVUE) UCL		11292						
66												
67					**Nonparametric Distribution Free UCL Statistics**							
68					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
69												
70					**Nonparametric Distribution Free UCLs**							
71				95% CLT UCL		4627				95% Jackknife UCL		4685
72				95% Standard Bootstrap UCL		4586				95% Bootstrap-t UCL		4757
73				95% Hall's Bootstrap UCL		4725				95% Percentile Bootstrap UCL		4605
74				95% BCA Bootstrap UCL		4728						
75				90% Chebyshev(Mean, Sd) UCL		5452				95% Chebyshev(Mean, Sd) UCL		6279
76				97.5% Chebyshev(Mean, Sd) UCL		7428				99% Chebyshev(Mean, Sd) UCL		9683
77												
78					**Suggested UCL to Use**							
79				95% Student's-t UCL		4685						
80												
81				When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test								
82				When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL									
83												
84				Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.								
85				Recommendations are based upon data size, data distribution, and skewness.									
86				These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).								
87				However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.								
88												
89	**Arsenic**											
90												
91					**General Statistics**							
92				Total Number of Observations		18			Number of Distinct Observations			16
93				Number of Detects		8			Number of Non-Detects			10
94				Number of Distinct Detects		7			Number of Distinct Non-Detects			9
95				Minimum Detect		0.54			Minimum Non-Detect			0.93
96				Maximum Detect		3.2			Maximum Non-Detect			2
97				Variance Detects		0.879			Percent Non-Detects			55.56%
98				Mean Detects		1.643			SD Detects			0.938
99				Median Detects		1.85			CV Detects			0.571
100				Skewness Detects		0.281			Kurtosis Detects			-0.77
101				Mean of Logged Detects		0.322			SD of Logged Detects			0.667
102												
103					**Normal GOF Test on Detects Only**							
104				Shapiro Wilk Test Statistic		0.913		**Shapiro Wilk GOF Test**				

	A	B	C	D	E	F	G	H	I	J	K	L
105					5% Shapiro Wilk Critical Value	0.818		Detected Data appear Normal at 5% Significance Level				
106					Lilliefors Test Statistic	0.202		**Lilliefors GOF Test**				
107					5% Lilliefors Critical Value	0.283		Detected Data appear Normal at 5% Significance Level				
108				**Detected Data appear Normal at 5% Significance Level**								
109												
110				**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**								
111					KM Mean	1.103			KM Standard Error of Mean			0.2
112					KM SD	0.772			95% KM (BCA) UCL			1.442
113				95% KM (t) UCL		1.45		95% KM (Percentile Bootstrap) UCL				1.454
114				95% KM (z) UCL		1.431			95% KM Bootstrap t UCL			1.521
115				90% KM Chebyshev UCL		1.702			95% KM Chebyshev UCL			1.974
116				97.5% KM Chebyshev UCL		2.35			99% KM Chebyshev UCL			3.091
117												
118				**Gamma GOF Tests on Detected Observations Only**								
119					A-D Test Statistic	0.5		**Anderson-Darling GOF Test**				
120					5% A-D Critical Value	0.721		Detected data appear Gamma Distributed at 5% Significance Level				
121					K-S Test Statistic	0.263		**Kolmogorov-Smirnov GOF**				
122					5% K-S Critical Value	0.296		Detected data appear Gamma Distributed at 5% Significance Level				
123				**Detected data appear Gamma Distributed at 5% Significance Level**								
124												
125				**Gamma Statistics on Detected Data Only**								
126					k hat (MLE)	3.021			k star (bias corrected MLE)			1.971
127					Theta hat (MLE)	0.544			Theta star (bias corrected MLE)			0.833
128					nu hat (MLE)	48.33			nu star (bias corrected)			31.54
129					Mean (detects)	1.643						
130												
131				**Gamma ROS Statistics using Imputed Non-Detects**								
132			GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs									
133			GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)									
134			For such situations, GROS method may yield incorrect values of UCLs and BTVs									
135			This is especially true when the sample size is small.									
136			For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates									
137					Minimum	0.463			Mean			1.123
138					Maximum	3.2			Median			0.69
139					SD	0.773			CV			0.688
140					k hat (MLE)	3.047			k star (bias corrected MLE)			2.576
141					Theta hat (MLE)	0.369			Theta star (bias corrected MLE)			0.436
142					nu hat (MLE)	109.7			nu star (bias corrected)			92.75
143			Adjusted Level of Significance (β)			0.0357						
144			Approximate Chi Square Value (92.75, α)			71.54		Adjusted Chi Square Value (92.75, β)				69.75
145		95% Gamma Approximate UCL (use when n>=50)				1.456		95% Gamma Adjusted UCL (use when n<50)				1.494
146												
147				**Estimates of Gamma Parameters using KM Estimates**								
148					Mean (KM)	1.103			SD (KM)			0.772
149					Variance (KM)	0.596			SE of Mean (KM)			0.2
150					k hat (KM)	2.042			k star (KM)			1.739
151					nu hat (KM)	73.5			nu star (KM)			62.59
152					theta hat (KM)	0.54			theta star (KM)			0.634
153				80% gamma percentile (KM)		1.678			90% gamma percentile (KM)			2.217
154				95% gamma percentile (KM)		2.736			99% gamma percentile (KM)			3.897
155												
156				**Gamma Kaplan-Meier (KM) Statistics**								

	A	B	C	D	E	F	G	H	I	J	K	L
157	Approximate Chi Square Value (62.59, α)					45.39	Adjusted Chi Square Value (62.59, β)					43.98
158	95% Gamma Approximate KM-UCL (use when n>=50)					1.521	95% Gamma Adjusted KM-UCL (use when n<50)					1.569
159												
160	**Lognormal GOF Test on Detected Observations Only**											
161	Shapiro Wilk Test Statistic					0.882	**Shapiro Wilk GOF Test**					
162	5% Shapiro Wilk Critical Value					0.818	Detected Data appear Lognormal at 5% Significance Level					
163	Lilliefors Test Statistic					0.28	**Lilliefors GOF Test**					
164	5% Lilliefors Critical Value					0.283	Detected Data appear Lognormal at 5% Significance Level					
165	**Detected Data appear Lognormal at 5% Significance Level**											
166												
167	**Lognormal ROS Statistics Using Imputed Non-Detects**											
168	Mean in Original Scale					1.13	Mean in Log Scale					-0.0426
169	SD in Original Scale					0.767	SD in Log Scale					0.551
170	95% t UCL (assumes normality of ROS data)					1.445	95% Percentile Bootstrap UCL					1.42
171	95% BCA Bootstrap UCL					1.538	95% Bootstrap t UCL					1.557
172	95% H-UCL (Log ROS)					1.471						
173												
174	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
175	KM Mean (logged)					-0.0927	KM Geo Mean					0.911
176	KM SD (logged)					0.577	95% Critical H Value (KM-Log)					2.1
177	KM Standard Error of Mean (logged)					0.157	95% H-UCL (KM -Log)					1.445
178	KM SD (logged)					0.577	95% Critical H Value (KM-Log)					2.1
179	KM Standard Error of Mean (logged)					0.157						
180												
181	**DL/2 Statistics**											
182	**DL/2 Normal**						**DL/2 Log-Transformed**					
183	Mean in Original Scale					1.094	Mean in Log Scale					-0.109
184	SD in Original Scale					0.796	SD in Log Scale					0.613
185	95% t UCL (Assumes normality)					1.42	95% H-Stat UCL					1.486
186	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
187												
188	**Nonparametric Distribution Free UCL Statistics**											
189	**Detected Data appear Normal Distributed at 5% Significance Level**											
190												
191	**Suggested UCL to Use**											
192	95% KM (t) UCL					1.45						
193												
194	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
195	Recommendations are based upon data size, data distribution, and skewness.											
196	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
197	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
198												
199												
200	**Beryllium**											
201												
202	**General Statistics**											
203	Total Number of Observations					18	Number of Distinct Observations					17
204							Number of Missing Observations					0
205	Minimum					0.4	Mean					0.914
206	Maximum					3	Median					0.685
207	SD					0.668	Std. Error of Mean					0.158
208	Coefficient of Variation					0.731	Skewness					2.18

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210					Normal GOF Test							
211				Shapiro Wilk Test Statistic		0.73			Shapiro Wilk GOF Test			
212				5% Shapiro Wilk Critical Value		0.897			Data Not Normal at 5% Significance Level			
213				Lilliefors Test Statistic		0.268			Lilliefors GOF Test			
214				5% Lilliefors Critical Value		0.202			Data Not Normal at 5% Significance Level			
215					Data Not Normal at 5% Significance Level							
216												
217					Assuming Normal Distribution							
218			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
219				95% Student's-t UCL		1.188			95% Adjusted-CLT UCL (Chen-1995)			1.26
220									95% Modified-t UCL (Johnson-1978)			1.201
221												
222					Gamma GOF Test							
223				A-D Test Statistic		0.912			Anderson-Darling Gamma GOF Test			
224				5% A-D Critical Value		0.746			Data Not Gamma Distributed at 5% Significance Level			
225				K-S Test Statistic		0.189			Kolmogorov-Smirnov Gamma GOF Test			
226				5% K-S Critical Value		0.205			Detected data appear Gamma Distributed at 5% Significance Level			
227				Detected data follow Appr. Gamma Distribution at 5% Significance Level								
228												
229					Gamma Statistics							
230				k hat (MLE)		3.002			k star (bias corrected MLE)			2.539
231				Theta hat (MLE)		0.304			Theta star (bias corrected MLE)			0.36
232				nu hat (MLE)		108.1			nu star (bias corrected)			91.4
233				MLE Mean (bias corrected)		0.914			MLE Sd (bias corrected)			0.574
234									Approximate Chi Square Value (0.05)			70.35
235				Adjusted Level of Significance		0.0357			Adjusted Chi Square Value			68.58
236												
237					Assuming Gamma Distribution							
238		95% Approximate Gamma UCL (use when n>=50)				1.187			95% Adjusted Gamma UCL (use when n<50)			1.218
239												
240					Lognormal GOF Test							
241				Shapiro Wilk Test Statistic		0.908			Shapiro Wilk Lognormal GOF Test			
242				5% Shapiro Wilk Critical Value		0.897			Data appear Lognormal at 5% Significance Level			
243				Lilliefors Test Statistic		0.144			Lilliefors Lognormal GOF Test			
244				5% Lilliefors Critical Value		0.202			Data appear Lognormal at 5% Significance Level			
245				Data appear Lognormal at 5% Significance Level								
246												
247					Lognormal Statistics							
248			Minimum of Logged Data			-0.916			Mean of logged Data			-0.266
249			Maximum of Logged Data			1.099			SD of logged Data			0.565
250												
251					Assuming Lognormal Distribution							
252				95% H-UCL		1.197			90% Chebyshev (MVUE) UCL			1.261
253			95% Chebyshev (MVUE) UCL			1.429			97.5% Chebyshev (MVUE) UCL			1.663
254			99% Chebyshev (MVUE) UCL			2.121						
255												
256					Nonparametric Distribution Free UCL Statistics							
257				Data appear to follow a Discernible Distribution at 5% Significance Level								
258												
259					Nonparametric Distribution Free UCLs							
260				95% CLT UCL		1.173			95% Jackknife UCL			1.188

	A	B	C	D	E	F	G	H	I	J	K	L
261			95% Standard Bootstrap UCL			1.169			95% Bootstrap-t UCL			1.39
262			95% Hall's Bootstrap UCL			1.454			95% Percentile Bootstrap UCL			1.188
263			95% BCA Bootstrap UCL			1.247						
264			90% Chebyshev(Mean, Sd) UCL			1.387			95% Chebyshev(Mean, Sd) UCL			1.601
265			97.5% Chebyshev(Mean, Sd) UCL			1.898			99% Chebyshev(Mean, Sd) UCL			2.481
266												
267					Suggested UCL to Use							
268			95% Adjusted Gamma UCL			1.218						
269												
270			When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test									
271			When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL									
272												
273			Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.									
274			Recommendations are based upon data size, data distribution, and skewness.									
275			These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).									
276			However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.									
277												
278												
279	Calcium											
280												
281					General Statistics							
282			Total Number of Observations			18			Number of Distinct Observations			18
283									Number of Missing Observations			0
284			Minimum			234			Mean			1436
285			Maximum			8030			Median			702
286			SD			1867			Std. Error of Mean			440.2
287			Coefficient of Variation			1.301			Skewness			2.909
288												
289					Normal GOF Test							
290			Shapiro Wilk Test Statistic			0.624			Shapiro Wilk GOF Test			
291			5% Shapiro Wilk Critical Value			0.897			Data Not Normal at 5% Significance Level			
292			Lilliefors Test Statistic			0.275			Lilliefors GOF Test			
293			5% Lilliefors Critical Value			0.202			Data Not Normal at 5% Significance Level			
294					Data Not Normal at 5% Significance Level							
295												
296					Assuming Normal Distribution							
297			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
298			95% Student's-t UCL			2201			95% Adjusted-CLT UCL (Chen-1995)			2482
299									95% Modified-t UCL (Johnson-1978)			2252
300												
301					Gamma GOF Test							
302			A-D Test Statistic			0.969			Anderson-Darling Gamma GOF Test			
303			5% A-D Critical Value			0.763			Data Not Gamma Distributed at 5% Significance Level			
304			K-S Test Statistic			0.24			Kolmogorov-Smirnov Gamma GOF Test			
305			5% K-S Critical Value			0.209			Data Not Gamma Distributed at 5% Significance Level			
306					Data Not Gamma Distributed at 5% Significance Level							
307												
308					Gamma Statistics							
309			k hat (MLE)			1.166			k star (bias corrected MLE)			1.009
310			Theta hat (MLE)			1231			Theta star (bias corrected MLE)			1423
311			nu hat (MLE)			41.98			nu star (bias corrected)			36.32
312			MLE Mean (bias corrected)			1436			MLE Sd (bias corrected)			1429

	A	B	C	D	E	F	G	H	I	J	K	L
313										Approximate Chi Square Value (0.05)		23.53
314			Adjusted Level of Significance			0.0357			Adjusted Chi Square Value			22.54
315												
316						**Assuming Gamma Distribution**						
317		95% Approximate Gamma UCL (use when n>=50))				2216			95% Adjusted Gamma UCL (use when n<50)			2313
318												
319						**Lognormal GOF Test**						
320			Shapiro Wilk Test Statistic			0.937			**Shapiro Wilk Lognormal GOF Test**			
321			5% Shapiro Wilk Critical Value			0.897			Data appear Lognormal at 5% Significance Level			
322			Lilliefors Test Statistic			0.19			**Lilliefors Lognormal GOF Test**			
323			5% Lilliefors Critical Value			0.202			Data appear Lognormal at 5% Significance Level			
324					**Data appear Lognormal at 5% Significance Level**							
325												
326						**Lognormal Statistics**						
327			Minimum of Logged Data			5.455				Mean of logged Data		6.783
328			Maximum of Logged Data			8.991				SD of logged Data		0.933
329												
330						**Assuming Lognormal Distribution**						
331				95% H-UCL		2426				90% Chebyshev (MVUE) UCL		2279
332			95% Chebyshev (MVUE) UCL			2713				97.5% Chebyshev (MVUE) UCL		3315
333			99% Chebyshev (MVUE) UCL			4499						
334												
335					**Nonparametric Distribution Free UCL Statistics**							
336				**Data appear to follow a Discernible Distribution at 5% Significance Level**								
337												
338						**Nonparametric Distribution Free UCLs**						
339				95% CLT UCL		2160				95% Jackknife UCL		2201
340			95% Standard Bootstrap UCL			2142				95% Bootstrap-t UCL		3096
341			95% Hall's Bootstrap UCL			4883				95% Percentile Bootstrap UCL		2211
342			95% BCA Bootstrap UCL			2646						
343			90% Chebyshev(Mean, Sd) UCL			2756				95% Chebyshev(Mean, Sd) UCL		3354
344			97.5% Chebyshev(Mean, Sd) UCL			4185				99% Chebyshev(Mean, Sd) UCL		5815
345												
346						**Suggested UCL to Use**						
347				95% H-UCL		2426						
348												
349		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
350		Recommendations are based upon data size, data distribution, and skewness.										
351		These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).										
352		However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
353												
354				**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**								
355		**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**										
356				**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**								
357		**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**										
358												
359	**Chromium**											
360												
361						**General Statistics**						
362			Total Number of Observations			26				Number of Distinct Observations		25
363			Number of Detects			25				Number of Non-Detects		1
364			Number of Distinct Detects			24				Number of Distinct Non-Detects		1

	A	B	C	D	E	F	G	H	I	J	K	L
365					Minimum Detect	0.582					Minimum Non-Detect	2
366					Maximum Detect	49.5					Maximum Non-Detect	2
367					Variance Detects	127					Percent Non-Detects	3.846%
368					Mean Detects	8.524					SD Detects	11.27
369					Median Detects	6.1					CV Detects	1.322
370					Skewness Detects	2.576					Kurtosis Detects	7.164
371					Mean of Logged Detects	1.495					SD of Logged Detects	1.178
372												
373					**Normal GOF Test on Detects Only**							
374				Shapiro Wilk Test Statistic		0.661			**Shapiro Wilk GOF Test**			
375				5% Shapiro Wilk Critical Value		0.918			Detected Data Not Normal at 5% Significance Level			
376				Lilliefors Test Statistic		0.317			**Lilliefors GOF Test**			
377				5% Lilliefors Critical Value		0.173			Detected Data Not Normal at 5% Significance Level			
378					**Detected Data Not Normal at 5% Significance Level**							
379												
380				**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**								
381					KM Mean	8.241				KM Standard Error of Mean		2.185
382					KM SD	10.92				95% KM (BCA) UCL		12.37
383					95% KM (t) UCL	11.97			95% KM (Percentile Bootstrap) UCL			11.84
384					95% KM (z) UCL	11.84				95% KM Bootstrap t UCL		15
385					90% KM Chebyshev UCL	14.8				95% KM Chebyshev UCL		17.77
386					97.5% KM Chebyshev UCL	21.89				99% KM Chebyshev UCL		29.99
387												
388				**Gamma GOF Tests on Detected Observations Only**								
389					A-D Test Statistic	0.761			**Anderson-Darling GOF Test**			
390					5% A-D Critical Value	0.777			Detected data appear Gamma Distributed at 5% Significance Level			
391					K-S Test Statistic	0.176			**Kolmogorov-Smirnov GOF**			
392					5% K-S Critical Value	0.18			Detected data appear Gamma Distributed at 5% Significance Level			
393				**Detected data appear Gamma Distributed at 5% Significance Level**								
394												
395				**Gamma Statistics on Detected Data Only**								
396					k hat (MLE)	0.902				k star (bias corrected MLE)		0.82
397					Theta hat (MLE)	9.454				Theta star (bias corrected MLE)		10.39
398					nu hat (MLE)	45.08				nu star (bias corrected)		41
399					Mean (detects)	8.524						
400												
401				**Gamma ROS Statistics using Imputed Non-Detects**								
402				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
403				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)								
404				For such situations, GROS method may yield incorrect values of UCLs and BTVs								
405				This is especially true when the sample size is small.								
406				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
407					Minimum	0.01					Mean	8.196
408					Maximum	49.5					Median	6.05
409					SD	11.17					CV	1.362
410					k hat (MLE)	0.714				k star (bias corrected MLE)		0.658
411					Theta hat (MLE)	11.47				Theta star (bias corrected MLE)		12.47
412					nu hat (MLE)	37.14				nu star (bias corrected)		34.19
413			Adjusted Level of Significance (β)			0.0398						
414		Approximate Chi Square Value (34.19, α)				21.82			Adjusted Chi Square Value (34.19, β)			21.16
415		95% Gamma Approximate UCL (use when n>=50)				12.85			95% Gamma Adjusted UCL (use when n<50)			13.24
416												

	A	B	C	D	E	F	G	H	I	J	K	L
417	Estimates of Gamma Parameters using KM Estimates											
418					Mean (KM)	8.241					SD (KM)	10.92
419					Variance (KM)	119.2					SE of Mean (KM)	2.185
420					k hat (KM)	0.57					k star (KM)	0.53
421					nu hat (KM)	29.63					nu star (KM)	27.54
422					theta hat (KM)	14.46					theta star (KM)	15.56
423					80% gamma percentile (KM)	13.56					90% gamma percentile (KM)	22.03
424					95% gamma percentile (KM)	31.01					99% gamma percentile (KM)	52.99
425												
426	Gamma Kaplan-Meier (KM) Statistics											
427			Approximate Chi Square Value (27.54, α)			16.57				Adjusted Chi Square Value (27.54, β)		16.01
428		Approximate KM-UCL (use when n>=50)				13.7				95% Gamma Adjusted KM-UCL (use when n<50)		14.18
429												
430	Lognormal GOF Test on Detected Observations Only											
431				Shapiro Wilk Test Statistic		0.958	**Shapiro Wilk GOF Test**					
432				5% Shapiro Wilk Critical Value		0.918	Detected Data appear Lognormal at 5% Significance Level					
433				Lilliefors Test Statistic		0.16	**Lilliefors GOF Test**					
434				5% Lilliefors Critical Value		0.173	Detected Data appear Lognormal at 5% Significance Level					
435	Detected Data appear Lognormal at 5% Significance Level											
436												
437	Lognormal ROS Statistics Using Imputed Non-Detects											
438					Mean in Original Scale	8.241					Mean in Log Scale	1.443
439					SD in Original Scale	11.13					SD in Log Scale	1.184
440			95% t UCL (assumes normality of ROS data)			11.97					95% Percentile Bootstrap UCL	11.84
441					95% BCA Bootstrap UCL	12.98					95% Bootstrap t UCL	14.59
442					95% H-UCL (Log ROS)	16.39						
443												
444	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
445					KM Mean (logged)	1.441					KM Geo Mean	4.223
446					KM SD (logged)	1.166					95% Critical H Value (KM-Log)	2.729
447				KM Standard Error of Mean (logged)		0.234					95% H-UCL (KM -Log)	15.76
448					KM SD (logged)	1.166					95% Critical H Value (KM-Log)	2.729
449				KM Standard Error of Mean (logged)		0.234						
450												
451	DL/2 Statistics											
452	DL/2 Normal						DL/2 Log-Transformed					
453					Mean in Original Scale	8.234					Mean in Log Scale	1.437
454					SD in Original Scale	11.14					SD in Log Scale	1.191
455				95% t UCL (Assumes normality)		11.97					95% H-Stat UCL	16.53
456	DL/2 is not a recommended method, provided for comparisons and historical reasons											
457												
458	Nonparametric Distribution Free UCL Statistics											
459	Detected Data appear Gamma Distributed at 5% Significance Level											
460												
461	Suggested UCL to Use											
462	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)					14.18						
463												
464	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
465	Recommendations are based upon data size, data distribution, and skewness.											
466	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
467	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470	Lead											
471												
472					General Statistics							
473				Total Number of Observations		18			Number of Distinct Observations			18
474									Number of Missing Observations			0
475					Minimum	2.7				Mean		13.72
476					Maximum	63.6				Median		9.65
477					SD	13.91				Std. Error of Mean		3.279
478					Coefficient of Variation	1.014				Skewness		2.985
479												
480					Normal GOF Test							
481				Shapiro Wilk Test Statistic		0.655			Shapiro Wilk GOF Test			
482				5% Shapiro Wilk Critical Value		0.897			Data Not Normal at 5% Significance Level			
483				Lilliefors Test Statistic		0.251			Lilliefors GOF Test			
484				5% Lilliefors Critical Value		0.202			Data Not Normal at 5% Significance Level			
485				Data Not Normal at 5% Significance Level								
486												
487					Assuming Normal Distribution							
488			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
489					95% Student's-t UCL	19.42			95% Adjusted-CLT UCL (Chen-1995)			21.57
490									95% Modified-t UCL (Johnson-1978)			19.8
491												
492					Gamma GOF Test							
493					A-D Test Statistic	0.536			Anderson-Darling Gamma GOF Test			
494					5% A-D Critical Value	0.754			Detected data appear Gamma Distributed at 5% Significance Level			
495					K-S Test Statistic	0.154			Kolmogorov-Smirnov Gamma GOF Test			
496					5% K-S Critical Value	0.207			Detected data appear Gamma Distributed at 5% Significance Level			
497				Detected data appear Gamma Distributed at 5% Significance Level								
498												
499					Gamma Statistics							
500					k hat (MLE)	1.772			k star (bias corrected MLE)			1.514
501					Theta hat (MLE)	7.74			Theta star (bias corrected MLE)			9.06
502					nu hat (MLE)	63.8			nu star (bias corrected)			54.5
503				MLE Mean (bias corrected)		13.72			MLE Sd (bias corrected)			11.15
504									Approximate Chi Square Value (0.05)			38.54
505				Adjusted Level of Significance		0.0357			Adjusted Chi Square Value			37.25
506												
507					Assuming Gamma Distribution							
508			95% Approximate Gamma UCL (use when n>=50)			19.4			95% Adjusted Gamma UCL (use when n<50)			20.07
509												
510					Lognormal GOF Test							
511				Shapiro Wilk Test Statistic		0.97			Shapiro Wilk Lognormal GOF Test			
512				5% Shapiro Wilk Critical Value		0.897			Data appear Lognormal at 5% Significance Level			
513				Lilliefors Test Statistic		0.104			Lilliefors Lognormal GOF Test			
514				5% Lilliefors Critical Value		0.202			Data appear Lognormal at 5% Significance Level			
515				Data appear Lognormal at 5% Significance Level								
516												
517					Lognormal Statistics							
518				Minimum of Logged Data		0.993			Mean of logged Data			2.311
519				Maximum of Logged Data		4.153			SD of logged Data			0.769
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521	Assuming Lognormal Distribution											
522				95% H-UCL		20.89		90% Chebyshev (MVUE) UCL				21.02
523			95% Chebyshev (MVUE) UCL			24.53		97.5% Chebyshev (MVUE) UCL				29.4
524			99% Chebyshev (MVUE) UCL			38.97						
525												
526	Nonparametric Distribution Free UCL Statistics											
527	Data appear to follow a Discernible Distribution at 5% Significance Level											
528												
529	Nonparametric Distribution Free UCLs											
530			95% CLT UCL			19.11		95% Jackknife UCL				19.42
531		95% Standard Bootstrap UCL				18.87		95% Bootstrap-t UCL				25.21
532			95% Hall's Bootstrap UCL			41.03		95% Percentile Bootstrap UCL				19.45
533			95% BCA Bootstrap UCL			21.77						
534		90% Chebyshev(Mean, Sd) UCL				23.55		95% Chebyshev(Mean, Sd) UCL				28.01
535		97.5% Chebyshev(Mean, Sd) UCL				34.19		99% Chebyshev(Mean, Sd) UCL				46.34
536												
537	Suggested UCL to Use											
538			95% Adjusted Gamma UCL			20.07						
539												
540	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
541	Recommendations are based upon data size, data distribution, and skewness.											
542	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
543	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
544												
545												
546	Manganese											
547												
548	General Statistics											
549		Total Number of Observations				18		Number of Distinct Observations				18
550								Number of Missing Observations				0
551				Minimum		118		Mean				265.8
552				Maximum		537		Median				241
553				SD		105.9		Std. Error of Mean				24.97
554			Coefficient of Variation			0.399		Skewness				1.102
555												
556	Normal GOF Test											
557		Shapiro Wilk Test Statistic				0.917	Shapiro Wilk GOF Test					
558		5% Shapiro Wilk Critical Value				0.897	Data appear Normal at 5% Significance Level					
559			Lilliefors Test Statistic			0.148	Lilliefors GOF Test					
560		5% Lilliefors Critical Value				0.202	Data appear Normal at 5% Significance Level					
561	Data appear Normal at 5% Significance Level											
562												
563	Assuming Normal Distribution											
564	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
565			95% Student's-t UCL			309.3		95% Adjusted-CLT UCL (Chen-1995)				313.8
566								95% Modified-t UCL (Johnson-1978)				310.4
567												
568	Gamma GOF Test											
569			A-D Test Statistic			0.304	Anderson-Darling Gamma GOF Test					
570			5% A-D Critical Value			0.741	Detected data appear Gamma Distributed at 5% Significance Level					
571			K-S Test Statistic			0.109	Kolmogorov-Smirnov Gamma GOF Test					
572			5% K-S Critical Value			0.204	Detected data appear Gamma Distributed at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
573	Detected data appear Gamma Distributed at 5% Significance Level											
574												
575	Gamma Statistics											
576	k hat (MLE)					7.219	k star (bias corrected MLE)					6.053
577	Theta hat (MLE)					36.82	Theta star (bias corrected MLE)					43.92
578	nu hat (MLE)					259.9	nu star (bias corrected)					217.9
579	MLE Mean (bias corrected)					265.8	MLE Sd (bias corrected)					108.1
580							Approximate Chi Square Value (0.05)					184.7
581	Adjusted Level of Significance					0.0357	Adjusted Chi Square Value					181.8
582												
583	Assuming Gamma Distribution											
584	95% Approximate Gamma UCL (use when n>=50))					313.6	95% Adjusted Gamma UCL (use when n<50)					318.6
585												
586	Lognormal GOF Test											
587	Shapiro Wilk Test Statistic					0.973	Shapiro Wilk Lognormal GOF Test					
588	5% Shapiro Wilk Critical Value					0.897	Data appear Lognormal at 5% Significance Level					
589	Lilliefors Test Statistic					0.131	Lilliefors Lognormal GOF Test					
590	5% Lilliefors Critical Value					0.202	Data appear Lognormal at 5% Significance Level					
591	Data appear Lognormal at 5% Significance Level											
592												
593	Lognormal Statistics											
594	Minimum of Logged Data					4.771	Mean of logged Data					5.512
595	Maximum of Logged Data					6.286	SD of logged Data					0.388
596												
597	Assuming Lognormal Distribution											
598	95% H-UCL					319.8	90% Chebyshev (MVUE) UCL					340.2
599	95% Chebyshev (MVUE) UCL					373.9	97.5% Chebyshev (MVUE) UCL					420.7
600	99% Chebyshev (MVUE) UCL					512.5						
601												
602	Nonparametric Distribution Free UCL Statistics											
603	Data appear to follow a Discernible Distribution at 5% Significance Level											
604												
605	Nonparametric Distribution Free UCLs											
606	95% CLT UCL					306.9	95% Jackknife UCL					309.3
607	95% Standard Bootstrap UCL					306.8	95% Bootstrap-t UCL					321.2
608	95% Hall's Bootstrap UCL					325	95% Percentile Bootstrap UCL					308.8
609	95% BCA Bootstrap UCL					311.7						
610	90% Chebyshev(Mean, Sd) UCL					340.8	95% Chebyshev(Mean, Sd) UCL					374.7
611	97.5% Chebyshev(Mean, Sd) UCL					421.8	99% Chebyshev(Mean, Sd) UCL					514.3
612												
613	Suggested UCL to Use											
614	95% Student's-t UCL					309.3						
615												
616	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
617	Recommendations are based upon data size, data distribution, and skewness.											
618	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
619	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
620												
621	Mercury											
622												
623	General Statistics											
624	Total Number of Observations					18	Number of Distinct Observations					16

	A	B	C	D	E	F	G	H	I	J	K	L
625				Number of Detects		6				Number of Non-Detects		12
626				Number of Distinct Detects		6				Number of Distinct Non-Detects		11
627				Minimum Detect		0.0219				Minimum Non-Detect		0.0123
628				Maximum Detect		2.12				Maximum Non-Detect		0.0399
629				Variance Detects		0.645				Percent Non-Detects		66.67%
630				Mean Detects		0.519				SD Detects		0.803
631				Median Detects		0.169				CV Detects		1.546
632				Skewness Detects		2.211				Kurtosis Detects		4.991
633				Mean of Logged Detects		-1.589				SD of Logged Detects		1.546
634												
635					Normal GOF Test on Detects Only							
636				Shapiro Wilk Test Statistic		0.673		Shapiro Wilk GOF Test				
637				5% Shapiro Wilk Critical Value		0.788		Detected Data Not Normal at 5% Significance Level				
638				Lilliefors Test Statistic		0.33		Lilliefors GOF Test				
639				5% Lilliefors Critical Value		0.325		Detected Data Not Normal at 5% Significance Level				
640					Detected Data Not Normal at 5% Significance Level							
641												
642					Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs							
643				KM Mean		0.182				KM Standard Error of Mean		0.125
644				KM SD		0.486				95% KM (BCA) UCL		0.427
645				95% KM (t) UCL		0.4				95% KM (Percentile Bootstrap) UCL		0.405
646				95% KM (z) UCL		0.388				95% KM Bootstrap t UCL		1.31
647				90% KM Chebyshev UCL		0.558				95% KM Chebyshev UCL		0.729
648				97.5% KM Chebyshev UCL		0.966				99% KM Chebyshev UCL		1.431
649												
650					Gamma GOF Tests on Detected Observations Only							
651				A-D Test Statistic		0.369		Anderson-Darling GOF Test				
652				5% A-D Critical Value		0.727		Detected data appear Gamma Distributed at 5% Significance Level				
653				K-S Test Statistic		0.247		Kolmogorov-Smirnov GOF				
654				5% K-S Critical Value		0.345		Detected data appear Gamma Distributed at 5% Significance Level				
655					Detected data appear Gamma Distributed at 5% Significance Level							
656												
657					Gamma Statistics on Detected Data Only							
658				k hat (MLE)		0.654				k star (bias corrected MLE)		0.438
659				Theta hat (MLE)		0.795				Theta star (bias corrected MLE)		1.186
660				nu hat (MLE)		7.844				nu star (bias corrected)		5.255
661				Mean (detects)		0.519						
662												
663					Gamma ROS Statistics using Imputed Non-Detects							
664				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
665				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)								
666				For such situations, GROS method may yield incorrect values of UCLs and BTVs								
667				This is especially true when the sample size is small.								
668				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
669				Minimum		0.01				Mean		0.18
670				Maximum		2.12				Median		0.01
671				SD		0.501				CV		2.785
672				k hat (MLE)		0.356				k star (bias corrected MLE)		0.334
673				Theta hat (MLE)		0.505				Theta star (bias corrected MLE)		0.539
674				nu hat (MLE)		12.81				nu star (bias corrected)		12.01
675				Adjusted Level of Significance (β)		0.0357						
676				Approximate Chi Square Value (12.01, α)		5.235				Adjusted Chi Square Value (12.01, β)		4.811

	A	B	C	D	E	F	G	H	I	J	K	L
677	95% Gamma Approximate UCL (use when n>=50)					0.413		95% Gamma Adjusted UCL (use when n<50)				0.449
678												
679	Estimates of Gamma Parameters using KM Estimates											
680	Mean (KM)					0.182		SD (KM)				0.486
681	Variance (KM)					0.236		SE of Mean (KM)				0.125
682	k hat (KM)					0.14		k star (KM)				0.154
683	nu hat (KM)					5.048		nu star (KM)				5.54
684	theta hat (KM)					1.298		theta star (KM)				1.183
685	80% gamma percentile (KM)					0.202		90% gamma percentile (KM)				0.541
686	95% gamma percentile (KM)					0.997		99% gamma percentile (KM)				2.31
687												
688	Gamma Kaplan-Meier (KM) Statistics											
689	Approximate Chi Square Value (5.54, α)					1.41		Adjusted Chi Square Value (5.54, β)				1.221
690	95% Gamma Approximate KM-UCL (use when n>=50)					0.715		95% Gamma Adjusted KM-UCL (use when n<50)				0.826
691												
692	Lognormal GOF Test on Detected Observations Only											
693	Shapiro Wilk Test Statistic					0.98		Shapiro Wilk GOF Test				
694	5% Shapiro Wilk Critical Value					0.788		Detected Data appear Lognormal at 5% Significance Level				
695	Lilliefors Test Statistic					0.178		Lilliefors GOF Test				
696	5% Lilliefors Critical Value					0.325		Detected Data appear Lognormal at 5% Significance Level				
697	Detected Data appear Lognormal at 5% Significance Level											
698												
699	Lognormal ROS Statistics Using Imputed Non-Detects											
700	Mean in Original Scale					0.174		Mean in Log Scale				-4.912
701	SD in Original Scale					0.503		SD in Log Scale				2.599
702	95% t UCL (assumes normality of ROS data)					0.38		95% Percentile Bootstrap UCL				0.397
703	95% BCA Bootstrap UCL					0.526		95% Bootstrap t UCL				1.547
704	95% H-UCL (Log ROS)					6.564						
705												
706	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
707	KM Mean (logged)					-3.424		KM Geo Mean				0.0326
708	KM SD (logged)					1.539		95% Critical H Value (KM-Log)				3.5
709	KM Standard Error of Mean (logged)					0.401		95% H-UCL (KM -Log)				0.393
710	KM SD (logged)					1.539		95% Critical H Value (KM-Log)				3.5
711	KM Standard Error of Mean (logged)					0.401						
712												
713	DL/2 Statistics											
714	DL/2 Normal							DL/2 Log-Transformed				
715	Mean in Original Scale					0.183		Mean in Log Scale				-3.421
716	SD in Original Scale					0.5		SD in Log Scale				1.611
717	95% t UCL (Assumes normality)					0.387		95% H-Stat UCL				0.493
718	DL/2 is not a recommended method, provided for comparisons and historical reasons											
719												
720	Nonparametric Distribution Free UCL Statistics											
721	Detected Data appear Gamma Distributed at 5% Significance Level											
722												
723	Suggested UCL to Use											
724	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)					0.826						
725												
726	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
727	Recommendations are based upon data size, data distribution, and skewness.											
728	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											

	A	B	C	D	E	F	G	H	I	J	K	L
729	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
730												
731												
732	Nickel											
733												
734			General Statistics									
735		Total Number of Observations				28		Number of Distinct Observations				27
736								Number of Missing Observations				0
737		Minimum				0.585		Mean				5.945
738		Maximum				39.5		Median				3.7
739		SD				8.143		Std. Error of Mean				1.539
740		Coefficient of Variation				1.37		Skewness				3.103
741												
742			Normal GOF Test									
743		Shapiro Wilk Test Statistic				0.618		Shapiro Wilk GOF Test				
744		5% Shapiro Wilk Critical Value				0.924		Data Not Normal at 5% Significance Level				
745		Lilliefors Test Statistic				0.304		Lilliefors GOF Test				
746		5% Lilliefors Critical Value				0.164		Data Not Normal at 5% Significance Level				
747			Data Not Normal at 5% Significance Level									
748												
749			Assuming Normal Distribution									
750		95% Normal UCL						95% UCLs (Adjusted for Skewness)				
751		95% Student's-t UCL				8.566		95% Adjusted-CLT UCL (Chen-1995)				9.44
752								95% Modified-t UCL (Johnson-1978)				8.716
753												
754			Gamma GOF Test									
755		A-D Test Statistic				0.803		Anderson-Darling Gamma GOF Test				
756		5% A-D Critical Value				0.773		Data Not Gamma Distributed at 5% Significance Level				
757		K-S Test Statistic				0.169		Kolmogorov-Smirnov Gamma GOF Test				
758		5% K-S Critical Value				0.17		Detected data appear Gamma Distributed at 5% Significance Level				
759			Detected data follow Appr. Gamma Distribution at 5% Significance Level									
760												
761			Gamma Statistics									
762		k hat (MLE)				1.014		k star (bias corrected MLE)				0.929
763		Theta hat (MLE)				5.863		Theta star (bias corrected MLE)				6.399
764		nu hat (MLE)				56.78		nu star (bias corrected)				52.03
765		MLE Mean (bias corrected)				5.945		MLE Sd (bias corrected)				6.167
766								Approximate Chi Square Value (0.05)				36.46
767		Adjusted Level of Significance				0.0404		Adjusted Chi Square Value				35.65
768												
769			Assuming Gamma Distribution									
770		95% Approximate Gamma UCL (use when n>=50)				8.483		95% Adjusted Gamma UCL (use when n<50)				8.675
771												
772			Lognormal GOF Test									
773		Shapiro Wilk Test Statistic				0.971		Shapiro Wilk Lognormal GOF Test				
774		5% Shapiro Wilk Critical Value				0.924		Data appear Lognormal at 5% Significance Level				
775		Lilliefors Test Statistic				0.0969		Lilliefors Lognormal GOF Test				
776		5% Lilliefors Critical Value				0.164		Data appear Lognormal at 5% Significance Level				
777			Data appear Lognormal at 5% Significance Level									
778												
779			Lognormal Statistics									
780		Minimum of Logged Data				-0.536		Mean of logged Data				1.214

	A	B	C	D	E	F	G	H	I	J	K	L
781				Maximum of Logged Data		3.676				SD of logged Data		1.051
782												
783					Assuming Lognormal Distribution							
784				95% H-UCL		9.731				90% Chebyshev (MVUE) UCL		9.591
785			95% Chebyshev (MVUE) UCL			11.36				97.5% Chebyshev (MVUE) UCL		13.82
786			99% Chebyshev (MVUE) UCL			18.65						
787												
788					Nonparametric Distribution Free UCL Statistics							
789				Data appear to follow a Discernible Distribution at 5% Significance Level								
790												
791					Nonparametric Distribution Free UCLs							
792				95% CLT UCL		8.476				95% Jackknife UCL		8.566
793			95% Standard Bootstrap UCL			8.434				95% Bootstrap-t UCL		12.27
794			95% Hall's Bootstrap UCL			19.87				95% Percentile Bootstrap UCL		8.691
795			95% BCA Bootstrap UCL			9.367						
796			90% Chebyshev(Mean, Sd) UCL			10.56				95% Chebyshev(Mean, Sd) UCL		12.65
797			97.5% Chebyshev(Mean, Sd) UCL			15.55				99% Chebyshev(Mean, Sd) UCL		21.26
798												
799					Suggested UCL to Use							
800				95% Adjusted Gamma UCL		8.675						
801												
802			When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test									
803			When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL									
804												
805			Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.									
806			Recommendations are based upon data size, data distribution, and skewness.									
807			These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).									
808			However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.									
809												
810	Selenium											
811												
812					General Statistics							
813				Total Number of Observations		18			Number of Distinct Observations			14
814				Number of Detects		10			Number of Non-Detects			8
815				Number of Distinct Detects		8			Number of Distinct Non-Detects			6
816				Minimum Detect		0.18			Minimum Non-Detect			0.51
817				Maximum Detect		0.41			Maximum Non-Detect			0.6
818				Variance Detects		0.00464			Percent Non-Detects			44.44%
819				Mean Detects		0.292			SD Detects			0.0681
820				Median Detects		0.31			CV Detects			0.233
821				Skewness Detects		-0.162			Kurtosis Detects			-0.0925
822				Mean of Logged Detects		-1.258			SD of Logged Detects			0.249
823												
824					Normal GOF Test on Detects Only							
825				Shapiro Wilk Test Statistic		0.945		Shapiro Wilk GOF Test				
826				5% Shapiro Wilk Critical Value		0.842		Detected Data appear Normal at 5% Significance Level				
827				Lilliefors Test Statistic		0.204		Lilliefors GOF Test				
828				5% Lilliefors Critical Value		0.262		Detected Data appear Normal at 5% Significance Level				
829					Detected Data appear Normal at 5% Significance Level							
830												
831				Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs								
832				KM Mean		0.292			KM Standard Error of Mean			0.0215

	A	B	C	D	E	F	G	H	I	J	K	L
833					KM SD	0.0646			95% KM (BCA) UCL			0.327
834				95% KM (t) UCL		0.329		95% KM (Percentile Bootstrap) UCL				0.327
835				95% KM (z) UCL		0.327			95% KM Bootstrap t UCL			0.329
836				90% KM Chebyshev UCL		0.357			95% KM Chebyshev UCL			0.386
837				97.5% KM Chebyshev UCL		0.427			99% KM Chebyshev UCL			0.506
838												
839						Gamma GOF Tests on Detected Observations Only						
840					A-D Test Statistic	0.464		Anderson-Darling GOF Test				
841				5% A-D Critical Value		0.725		Detected data appear Gamma Distributed at 5% Significance Level				
842					K-S Test Statistic	0.233		Kolmogorov-Smirnov GOF				
843				5% K-S Critical Value		0.266		Detected data appear Gamma Distributed at 5% Significance Level				
844						Detected data appear Gamma Distributed at 5% Significance Level						
845												
846						Gamma Statistics on Detected Data Only						
847					k hat (MLE)	18.99			k star (bias corrected MLE)			13.36
848					Theta hat (MLE)	0.0154			Theta star (bias corrected MLE)			0.0219
849					nu hat (MLE)	379.8			nu star (bias corrected)			267.2
850					Mean (detects)	0.292						
851												
852						Gamma ROS Statistics using Imputed Non-Detects						
853			GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs									
854			GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)									
855			For such situations, GROS method may yield incorrect values of UCLs and BTVs									
856			This is especially true when the sample size is small.									
857			For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates									
858					Minimum	0.18				Mean		0.291
859					Maximum	0.41				Median		0.289
860					SD	0.0522				CV		0.18
861					k hat (MLE)	30.84			k star (bias corrected MLE)			25.74
862					Theta hat (MLE)	0.00942			Theta star (bias corrected MLE)			0.0113
863					nu hat (MLE)	1110			nu star (bias corrected)			926.6
864				Adjusted Level of Significance (β)		0.0357						
865			Approximate Chi Square Value (926.56, α)			856.9		Adjusted Chi Square Value (926.56, β)				850.5
866			95% Gamma Approximate UCL (use when n>=50)			0.314		95% Gamma Adjusted UCL (use when n<50)				0.317
867												
868						Estimates of Gamma Parameters using KM Estimates						
869					Mean (KM)	0.292				SD (KM)		0.0646
870					Variance (KM)	0.00418				SE of Mean (KM)		0.0215
871					k hat (KM)	20.42				k star (KM)		17.05
872					nu hat (KM)	735				nu star (KM)		613.9
873					theta hat (KM)	0.0143				theta star (KM)		0.0171
874				80% gamma percentile (KM)		0.349			90% gamma percentile (KM)			0.385
875				95% gamma percentile (KM)		0.417			99% gamma percentile (KM)			0.481
876												
877						Gamma Kaplan-Meier (KM) Statistics						
878			Approximate Chi Square Value (613.86, α)			557.4		Adjusted Chi Square Value (613.86, β)				552.2
879			95% Gamma Approximate KM-UCL (use when n>=50)			0.322		95% Gamma Adjusted KM-UCL (use when n<50)				0.325
880												
881						Lognormal GOF Test on Detected Observations Only						
882				Shapiro Wilk Test Statistic		0.922		Shapiro Wilk GOF Test				
883				5% Shapiro Wilk Critical Value		0.842		Detected Data appear Lognormal at 5% Significance Level				
884				Lilliefors Test Statistic		0.236		Lilliefors GOF Test				

	A	B	C	D	E	F	G	H	I	J	K	L
885				5% Lilliefors Critical Value		0.262		Detected Data appear Lognormal at 5% Significance Level				
886				Detected Data appear Lognormal at 5% Significance Level								
887												
888				Lognormal ROS Statistics Using Imputed Non-Detects								
889				Mean in Original Scale		0.289				Mean in Log Scale		-1.258
890				SD in Original Scale		0.0525				SD in Log Scale		0.191
891			95% t UCL (assumes normality of ROS data)			0.311			95% Percentile Bootstrap UCL			0.308
892				95% BCA Bootstrap UCL		0.308				95% Bootstrap t UCL		0.31
893				95% H-UCL (Log ROS)		0.314						
894												
895				Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution								
896				KM Mean (logged)		-1.258				KM Geo Mean		0.284
897				KM SD (logged)		0.236			95% Critical H Value (KM-Log)			1.809
898			KM Standard Error of Mean (logged)			0.0787			95% H-UCL (KM -Log)			0.324
899				KM SD (logged)		0.236			95% Critical H Value (KM-Log)			1.809
900			KM Standard Error of Mean (logged)			0.0787						
901												
902						DL/2 Statistics						
903		DL/2 Normal						DL/2 Log-Transformed				
904				Mean in Original Scale		0.286				Mean in Log Scale		-1.267
905				SD in Original Scale		0.051				SD in Log Scale		0.185
906			95% t UCL (Assumes normality)			0.307				95% H-Stat UCL		0.31
907				DL/2 is not a recommended method, provided for comparisons and historical reasons								
908												
909				Nonparametric Distribution Free UCL Statistics								
910				Detected Data appear Normal Distributed at 5% Significance Level								
911												
912					Suggested UCL to Use							
913				95% KM (t) UCL		0.329						
914												
915		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
916		Recommendations are based upon data size, data distribution, and skewness.										
917		These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).										
918		However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
919												
920												
921	Zinc											
922												
923					General Statistics							
924			Total Number of Observations			16			Number of Distinct Observations			16
925									Number of Missing Observations			0
926				Minimum		16.6				Mean		35.34
927				Maximum		69.1				Median		31.85
928				SD		14.15				Std. Error of Mean		3.536
929				Coefficient of Variation		0.4				Skewness		1.115
930												
931					Normal GOF Test							
932			Shapiro Wilk Test Statistic			0.875		Shapiro Wilk GOF Test				
933			5% Shapiro Wilk Critical Value			0.887		Data Not Normal at 5% Significance Level				
934			Lilliefors Test Statistic			0.274		Lilliefors GOF Test				
935			5% Lilliefors Critical Value			0.213		Data Not Normal at 5% Significance Level				
936				Data Not Normal at 5% Significance Level								

	A	B	C	D	E	F	G	H	I	J	K	L
937												
938					Assuming Normal Distribution							
939			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
940				95% Student's-t UCL		41.54			95% Adjusted-CLT UCL (Chen-1995)			42.21
941									95% Modified-t UCL (Johnson-1978)			41.71
942												
943					Gamma GOF Test							
944				A-D Test Statistic		0.667		Anderson-Darling Gamma GOF Test				
945				5% A-D Critical Value		0.74		Detected data appear Gamma Distributed at 5% Significance Level				
946				K-S Test Statistic		0.231		Kolmogorov-Smirnov Gamma GOF Test				
947				5% K-S Critical Value		0.215		Data Not Gamma Distributed at 5% Significance Level				
948			Detected data follow Appr. Gamma Distribution at 5% Significance Level									
949												
950					Gamma Statistics							
951				k hat (MLE)		7.444			k star (bias corrected MLE)			6.09
952				Theta hat (MLE)		4.748			Theta star (bias corrected MLE)			5.804
953				nu hat (MLE)		238.2			nu star (bias corrected)			194.9
954			MLE Mean (bias corrected)			35.34			MLE Sd (bias corrected)			14.32
955									Approximate Chi Square Value (0.05)			163.6
956			Adjusted Level of Significance			0.0335			Adjusted Chi Square Value			160.3
957												
958					Assuming Gamma Distribution							
959		95% Approximate Gamma UCL (use when n>=50)				42.11			95% Adjusted Gamma UCL (use when n<50)			42.96
960												
961					Lognormal GOF Test							
962			Shapiro Wilk Test Statistic			0.941		Shapiro Wilk Lognormal GOF Test				
963			5% Shapiro Wilk Critical Value			0.887		Data appear Lognormal at 5% Significance Level				
964			Lilliefors Test Statistic			0.207		Lilliefors Lognormal GOF Test				
965			5% Lilliefors Critical Value			0.213		Data appear Lognormal at 5% Significance Level				
966			Data appear Lognormal at 5% Significance Level									
967												
968					Lognormal Statistics							
969			Minimum of Logged Data			2.809			Mean of logged Data			3.496
970			Maximum of Logged Data			4.236			SD of logged Data			0.378
971												
972					Assuming Lognormal Distribution							
973				95% H-UCL		42.81			90% Chebyshev (MVUE) UCL			45.47
974			95% Chebyshev (MVUE) UCL			50.08			97.5% Chebyshev (MVUE) UCL			56.49
975			99% Chebyshev (MVUE) UCL			69.07						
976												
977					Nonparametric Distribution Free UCL Statistics							
978			Data appear to follow a Discernible Distribution at 5% Significance Level									
979												
980					Nonparametric Distribution Free UCLs							
981				95% CLT UCL		41.16				95% Jackknife UCL		41.54
982			95% Standard Bootstrap UCL			40.97				95% Bootstrap-t UCL		43.8
983				95% Hall's Bootstrap UCL		42.85				95% Percentile Bootstrap UCL		41.04
984				95% BCA Bootstrap UCL		41.94						
985			90% Chebyshev(Mean, Sd) UCL			45.95				95% Chebyshev(Mean, Sd) UCL		50.76
986			97.5% Chebyshev(Mean, Sd) UCL			57.43				99% Chebyshev(Mean, Sd) UCL		70.53
987												
988					Suggested UCL to Use							

	A	B	C	D	E	F	G	H	I	J	K	L
989				95% Adjusted Gamma UCL		42.96						
990												
991		When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test										
992		When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL										
993												
994		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
995		Recommendations are based upon data size, data distribution, and skewness.										
996		These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).										
997		However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
998												
999	Aroclor-1260											
1000												
1001		General Statistics										
1002				Total Number of Observations		18		Number of Distinct Observations				10
1003				Number of Detects		5		Number of Non-Detects				13
1004				Number of Distinct Detects		5		Number of Distinct Non-Detects				5
1005				Minimum Detect		0.0068		Minimum Non-Detect				0.033
1006				Maximum Detect		0.055		Maximum Non-Detect				0.039
1007				Variance Detects		3.8392E-4		Percent Non-Detects				72.22%
1008				Mean Detects		0.0216		SD Detects				0.0196
1009				Median Detects		0.017		CV Detects				0.907
1010				Skewness Detects		1.746		Kurtosis Detects				3.238
1011				Mean of Logged Detects		-4.127		SD of Logged Detects				0.834
1012												
1013		Normal GOF Test on Detects Only										
1014				Shapiro Wilk Test Statistic		0.803		Shapiro Wilk GOF Test				
1015				5% Shapiro Wilk Critical Value		0.762		Detected Data appear Normal at 5% Significance Level				
1016				Lilliefors Test Statistic		0.312		Lilliefors GOF Test				
1017				5% Lilliefors Critical Value		0.343		Detected Data appear Normal at 5% Significance Level				
1018		Detected Data appear Normal at 5% Significance Level										
1019												
1020		Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs										
1021				KM Mean		0.0156		KM Standard Error of Mean				0.00402
1022				KM SD		0.0112		95% KM (BCA) UCL				0.0227
1023				95% KM (t) UCL		0.0226		95% KM (Percentile Bootstrap) UCL				0.0227
1024				95% KM (z) UCL		0.0222		95% KM Bootstrap t UCL				0.0235
1025				90% KM Chebyshev UCL		0.0276		95% KM Chebyshev UCL				0.0331
1026				97.5% KM Chebyshev UCL		0.0407		99% KM Chebyshev UCL				0.0556
1027												
1028		Gamma GOF Tests on Detected Observations Only										
1029				A-D Test Statistic		0.342		Anderson-Darling GOF Test				
1030				5% A-D Critical Value		0.685		Detected data appear Gamma Distributed at 5% Significance Level				
1031				K-S Test Statistic		0.217		Kolmogorov-Smirnov GOF				
1032				5% K-S Critical Value		0.361		Detected data appear Gamma Distributed at 5% Significance Level				
1033		Detected data appear Gamma Distributed at 5% Significance Level										
1034												
1035		Gamma Statistics on Detected Data Only										
1036				k hat (MLE)		1.865		k star (bias corrected MLE)				0.879
1037				Theta hat (MLE)		0.0116		Theta star (bias corrected MLE)				0.0246
1038				nu hat (MLE)		18.65		nu star (bias corrected)				8.793
1039				Mean (detects)		0.0216						
1040												

	A	B	C	D	E	F	G	H	I	J	K	L
1041						Gamma ROS Statistics using Imputed Non-Detects						
1042						GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs						
1043						GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)						
1044						For such situations, GROS method may yield incorrect values of UCLs and BTVs						
1045						This is especially true when the sample size is small.						
1046						For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates						
1047	Minimum					0.0068		Mean				0.0166
1048	Maximum					0.055		Median				0.0126
1049	SD					0.0111		CV				0.668
1050	k hat (MLE)					3.727		k star (bias corrected MLE)				3.142
1051	Theta hat (MLE)					0.00447		Theta star (bias corrected MLE)				0.0053
1052	nu hat (MLE)					134.2		nu star (bias corrected)				113.1
1053	Adjusted Level of Significance (β)					0.0357						
1054	Approximate Chi Square Value (113.13, α)					89.58		Adjusted Chi Square Value (113.13, β)				87.56
1055	95% Gamma Approximate UCL (use when n>=50)					0.021		95% Gamma Adjusted UCL (use when n<50)				0.0215
1056												
1057						Estimates of Gamma Parameters using KM Estimates						
1058	Mean (KM)					0.0156		SD (KM)				0.0112
1059	Variance (KM)					1.2480E-4		SE of Mean (KM)				0.00402
1060	k hat (KM)					1.942		k star (KM)				1.656
1061	nu hat (KM)					69.92		nu star (KM)				59.6
1062	theta hat (KM)					0.00802		theta star (KM)				0.0094
1063	80% gamma percentile (KM)					0.0238		90% gamma percentile (KM)				0.0317
1064	95% gamma percentile (KM)					0.0393		99% gamma percentile (KM)				0.0562
1065												
1066						Gamma Kaplan-Meier (KM) Statistics						
1067	Approximate Chi Square Value (59.60, α)					42.85		Adjusted Chi Square Value (59.60, β)				41.49
1068	95% Gamma Approximate KM-UCL (use when n>=50)					0.0217		95% Gamma Adjusted KM-UCL (use when n<50)				0.0224
1069												
1070						Lognormal GOF Test on Detected Observations Only						
1071	Shapiro Wilk Test Statistic					0.939		Shapiro Wilk GOF Test				
1072	5% Shapiro Wilk Critical Value					0.762		Detected Data appear Lognormal at 5% Significance Level				
1073	Lilliefors Test Statistic					0.192		Lilliefors GOF Test				
1074	5% Lilliefors Critical Value					0.343		Detected Data appear Lognormal at 5% Significance Level				
1075						Detected Data appear Lognormal at 5% Significance Level						
1076												
1077						Lognormal ROS Statistics Using Imputed Non-Detects						
1078	Mean in Original Scale					0.0153		Mean in Log Scale				-4.348
1079	SD in Original Scale					0.0113		SD in Log Scale				0.561
1080	95% t UCL (assumes normality of ROS data)					0.02		95% Percentile Bootstrap UCL				0.0201
1081	95% BCA Bootstrap UCL					0.0215		95% Bootstrap t UCL				0.0241
1082	95% H-UCL (Log ROS)					0.0201						
1083												
1084						Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution						
1085	KM Mean (logged)					-4.348		KM Geo Mean				0.0129
1086	KM SD (logged)					0.58		95% Critical H Value (KM-Log)				2.102
1087	KM Standard Error of Mean (logged)					0.267		95% H-UCL (KM -Log)				0.0206
1088	KM SD (logged)					0.58		95% Critical H Value (KM-Log)				2.102
1089	KM Standard Error of Mean (logged)					0.267						
1090												
1091						DL/2 Statistics						
1092	DL/2 Normal							DL/2 Log-Transformed				

	A	B	C	D	E	F	G	H	I	J	K	L
1093				Mean in Original Scale		0.0188				Mean in Log Scale		-4.061
1094				SD in Original Scale		0.00969				SD in Log Scale		0.408
1095				95% t UCL (Assumes normality)		0.0228				95% H-Stat UCL		0.0227
1096				DL/2 is not a recommended method, provided for comparisons and historical reasons								
1097												
1098				Nonparametric Distribution Free UCL Statistics								
1099				Detected Data appear Normal Distributed at 5% Significance Level								
1100												
1101				Suggested UCL to Use								
1102				95% KM (t) UCL		0.0226						
1103												
1104				Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.								
1105				Recommendations are based upon data size, data distribution, and skewness.								
1106				These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).								
1107				However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.								
1108												
1109	Bis(2-ethylhexyl)phthalate											
1110												
1111				General Statistics								
1112				Total Number of Observations		29				Number of Distinct Observations		21
1113				Number of Detects		7				Number of Non-Detects		22
1114				Number of Distinct Detects		7				Number of Distinct Non-Detects		14
1115				Minimum Detect		0.14				Minimum Non-Detect		0.33
1116				Maximum Detect		1.7				Maximum Non-Detect		0.394
1117				Variance Detects		0.339				Percent Non-Detects		75.86%
1118				Mean Detects		1.034				SD Detects		0.583
1119				Median Detects		1.2				CV Detects		0.563
1120				Skewness Detects		-0.497				Kurtosis Detects		-1.098
1121				Mean of Logged Detects		-0.212				SD of Logged Detects		0.896
1122												
1123				Normal GOF Test on Detects Only								
1124				Shapiro Wilk Test Statistic		0.941			Shapiro Wilk GOF Test			
1125				5% Shapiro Wilk Critical Value		0.803			Detected Data appear Normal at 5% Significance Level			
1126				Lilliefors Test Statistic		0.183			Lilliefors GOF Test			
1127				5% Lilliefors Critical Value		0.304			Detected Data appear Normal at 5% Significance Level			
1128				Detected Data appear Normal at 5% Significance Level								
1129												
1130				Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs								
1131				KM Mean		0.356				KM Standard Error of Mean		0.0934
1132				KM SD		0.465				95% KM (BCA) UCL		0.651
1133				95% KM (t) UCL		0.515				95% KM (Percentile Bootstrap) UCL		0.587
1134				95% KM (z) UCL		0.509				95% KM Bootstrap t UCL		0.507
1135				90% KM Chebyshev UCL		0.636				95% KM Chebyshev UCL		0.763
1136				97.5% KM Chebyshev UCL		0.939				99% KM Chebyshev UCL		1.285
1137												
1138				Gamma GOF Tests on Detected Observations Only								
1139				A-D Test Statistic		0.453			Anderson-Darling GOF Test			
1140				5% A-D Critical Value		0.714			Detected data appear Gamma Distributed at 5% Significance Level			
1141				K-S Test Statistic		0.245			Kolmogorov-Smirnov GOF			
1142				5% K-S Critical Value		0.315			Detected data appear Gamma Distributed at 5% Significance Level			
1143				Detected data appear Gamma Distributed at 5% Significance Level								
1144												

	A	B	C	D	E	F	G	H	I	J	K	L
1145	Gamma Statistics on Detected Data Only										
1146					k hat (MLE)	2.19				k star (bias corrected MLE)		1.346
1147					Theta hat (MLE)	0.472				Theta star (bias corrected MLE)		0.768
1148					nu hat (MLE)	30.65				nu star (bias corrected)		18.85
1149					Mean (detects)	1.034						
1150												
1151	Gamma ROS Statistics using Imputed Non-Detects										
1152	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1153	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)										
1154	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
1155	This is especially true when the sample size is small.										
1156	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1157					Minimum	0.01				Mean		0.313
1158					Maximum	1.7				Median		0.03
1159					SD	0.503				CV		1.611
1160					k hat (MLE)	0.474				k star (bias corrected MLE)		0.448
1161					Theta hat (MLE)	0.66				Theta star (bias corrected MLE)		0.698
1162					nu hat (MLE)	27.46				nu star (bias corrected)		25.96
1163			Adjusted Level of Significance (β)			0.0407						
1164			Approximate Chi Square Value (25.96, α)			15.35			Adjusted Chi Square Value (25.96, β)			14.86
1165		95% Gamma Approximate UCL (use when n>=50)				0.529			95% Gamma Adjusted UCL (use when n<50)			0.546
1166												
1167	Estimates of Gamma Parameters using KM Estimates										
1168					Mean (KM)	0.356				SD (KM)		0.465
1169					Variance (KM)	0.217				SE of Mean (KM)		0.0934
1170					k hat (KM)	0.584				k star (KM)		0.547
1171					nu hat (KM)	33.9				nu star (KM)		31.73
1172					theta hat (KM)	0.609				theta star (KM)		0.651
1173			80% gamma percentile (KM)			0.586				90% gamma percentile (KM)		0.945
1174			95% gamma percentile (KM)			1.324				99% gamma percentile (KM)		2.249
1175												
1176	Gamma Kaplan-Meier (KM) Statistics										
1177			Approximate Chi Square Value (31.73, α)			19.86			Adjusted Chi Square Value (31.73, β)			19.29
1178		95% Gamma Approximate KM-UCL (use when n>=50)				0.569			95% Gamma Adjusted KM-UCL (use when n<50)			0.585
1179												
1180	Lognormal GOF Test on Detected Observations Only										
1181			Shapiro Wilk Test Statistic			0.83		Shapiro Wilk GOF Test				
1182			5% Shapiro Wilk Critical Value			0.803		Detected Data appear Lognormal at 5% Significance Level				
1183			Lilliefors Test Statistic			0.241		Lilliefors GOF Test				
1184			5% Lilliefors Critical Value			0.304		Detected Data appear Lognormal at 5% Significance Level				
1185	Detected Data appear Lognormal at 5% Significance Level										
1186												
1187	Lognormal ROS Statistics Using Imputed Non-Detects										
1188			Mean in Original Scale			0.366				Mean in Log Scale		-1.535
1189			SD in Original Scale			0.472				SD in Log Scale		0.94
1190		95% t UCL (assumes normality of ROS data)				0.515				95% Percentile Bootstrap UCL		0.51
1191			95% BCA Bootstrap UCL			0.545				95% Bootstrap t UCL		0.577
1192			95% H-UCL (Log ROS)			0.512						
1193												
1194	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
1195					KM Mean (logged)	-1.543				KM Geo Mean		0.214
1196					KM SD (logged)	0.854				95% Critical H Value (KM-Log)		2.293

	A	B	C	D	E	F	G	H	I	J	K	L
1197			KM Standard Error of Mean (logged)			0.171			95% H-UCL (KM -Log)			0.446
1198			KM SD (logged)			0.854			95% Critical H Value (KM-Log)			2.293
1199			KM Standard Error of Mean (logged)			0.171						
1200												
1201						DL/2 Statistics						
1202			DL/2 Normal						DL/2 Log-Transformed			
1203			Mean in Original Scale			0.386			Mean in Log Scale			-1.356
1204			SD in Original Scale			0.46			SD in Log Scale			0.778
1205			95% t UCL (Assumes normality)			0.531			95% H-Stat UCL			0.483
1206			DL/2 is not a recommended method, provided for comparisons and historical reasons									
1207												
1208			Nonparametric Distribution Free UCL Statistics									
1209			Detected Data appear Normal Distributed at 5% Significance Level									
1210												
1211			Suggested UCL to Use									
1212			95% KM (t) UCL			0.515						
1213												
1214			Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.									
1215			Recommendations are based upon data size, data distribution, and skewness.									
1216			These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).									
1217			However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.									
1218												
1219	Americium-241											
1220												
1221			General Statistics									
1222			Total Number of Observations			18			Number of Distinct Observations			18
1223			Number of Detects			5			Number of Non-Detects			13
1224			Number of Distinct Detects			5			Number of Distinct Non-Detects			13
1225			Minimum Detect			0.121			Minimum Non-Detect			-0.012
1226			Maximum Detect			0.189			Maximum Non-Detect			0.092
1227			Variance Detects			0.00107			Percent Non-Detects			72.22%
1228			Mean Detects			0.157			SD Detects			0.0328
1229			Median Detects			0.164			CV Detects			0.208
1230			Skewness Detects			-0.259			Kurtosis Detects			-3.002
1231												
1232			Normal GOF Test on Detects Only									
1233			Shapiro Wilk Test Statistic			0.843			Shapiro Wilk GOF Test			
1234			5% Shapiro Wilk Critical Value			0.762			Detected Data appear Normal at 5% Significance Level			
1235			Lilliefors Test Statistic			0.237			Lilliefors GOF Test			
1236			5% Lilliefors Critical Value			0.343			Detected Data appear Normal at 5% Significance Level			
1237			Detected Data appear Normal at 5% Significance Level									
1238												
1239			Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs									
1240			KM Mean			0.035			KM Standard Error of Mean			0.0204
1241			KM SD			0.0773			95% KM (BCA) UCL			0.0738
1242			95% KM (t) UCL			0.0705			95% KM (Percentile Bootstrap) UCL			0.0714
1243			95% KM (z) UCL			0.0685			95% KM Bootstrap t UCL			0.0473
1244			90% KM Chebyshev UCL			0.0961			95% KM Chebyshev UCL			0.124
1245			97.5% KM Chebyshev UCL			0.162			99% KM Chebyshev UCL			0.238
1246												
1247			Gamma GOF Tests on Detected Observations Only									
1248			A-D Test Statistic			0.506			Anderson-Darling GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
1249				5% A-D Critical Value		0.679	Detected data appear Gamma Distributed at 5% Significance Level					
1250				K-S Test Statistic		0.264	Kolmogorov-Smirnov GOF					
1251				5% K-S Critical Value		0.357	Detected data appear Gamma Distributed at 5% Significance Level					
1252	Detected data appear Gamma Distributed at 5% Significance Level											
1253												
1254	Gamma Statistics on Detected Data Only											
1255				k hat (MLE)		27.71		k star (bias corrected MLE)				11.22
1256				Theta hat (MLE)		0.00567		Theta star (bias corrected MLE)				0.014
1257				nu hat (MLE)		277.1		nu star (bias corrected)				112.2
1258				Mean (detects)		0.157						
1259												
1260	Estimates of Gamma Parameters using KM Estimates											
1261				Mean (KM)		0.035		SD (KM)				0.0773
1262				Variance (KM)		0.00598		SE of Mean (KM)				0.0204
1263				k hat (KM)		0.205		k star (KM)				0.208
1264				nu hat (KM)		7.372		nu star (KM)				7.477
1265				theta hat (KM)		0.171		theta star (KM)				0.169
1266			80% gamma percentile (KM)			0.047		90% gamma percentile (KM)				0.106
1267			95% gamma percentile (KM)			0.179		99% gamma percentile (KM)				0.377
1268												
1269	Gamma Kaplan-Meier (KM) Statistics											
1270								Adjusted Level of Significance (β)				0.0357
1271			Approximate Chi Square Value (7.48, α)			2.436		Adjusted Chi Square Value (7.48, β)				2.169
1272		95% Gamma Approximate KM-UCL (use when n>=50)				0.107		95% Gamma Adjusted KM-UCL (use when n<50)				0.121
1273												
1274	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1275				KM Mean (logged)		N/A		KM Geo Mean				N/A
1276				KM SD (logged)		N/A		95% Critical H Value (KM-Log)				N/A
1277			KM Standard Error of Mean (logged)			N/A		95% H-UCL (KM -Log)				N/A
1278				KM SD (logged)		N/A		95% Critical H Value (KM-Log)				N/A
1279			KM Standard Error of Mean (logged)			N/A						
1280												
1281	DL/2 Statistics											
1282				Mean in Original Scale		0.0553		SD in Original Scale				0.0683
1283			95% t UCL (Assumes normality)			0.0833						
1284	DL/2 is not a recommended method, provided for comparisons and historical reasons											
1285												
1286	Nonparametric Distribution Free UCL Statistics											
1287	Detected Data appear Normal Distributed at 5% Significance Level											
1288												
1289	Suggested UCL to Use											
1290				95% KM (t) UCL		0.0705						
1291												
1292	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1293	Recommendations are based upon data size, data distribution, and skewness.											
1294	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1295	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1296												
1297	Plutonium-239/240											
1298												
1299	General Statistics											
1300				Total Number of Observations		40		Number of Distinct Observations				40

	A	B	C	D	E	F	G	H	I	J	K	L
1301					Number of Detects	38				Number of Non-Detects		2
1302					Number of Distinct Detects	38				Number of Distinct Non-Detects		2
1303					Minimum Detect	0.101				Minimum Non-Detect		0.0308
1304					Maximum Detect	25.6				Maximum Non-Detect		0.037
1305					Variance Detects	53.69				Percent Non-Detects		5%
1306					Mean Detects	5.717				SD Detects		7.327
1307					Median Detects	1.975				CV Detects		1.282
1308					Skewness Detects	1.532				Kurtosis Detects		1.352
1309					Mean of Logged Detects	0.659				SD of Logged Detects		1.702
1310												
1311					Normal GOF Test on Detects Only							
1312					Shapiro Wilk Test Statistic	0.747			Shapiro Wilk GOF Test			
1313					5% Shapiro Wilk Critical Value	0.938			Detected Data Not Normal at 5% Significance Level			
1314					Lilliefors Test Statistic	0.222			Lilliefors GOF Test			
1315					5% Lilliefors Critical Value	0.142			Detected Data Not Normal at 5% Significance Level			
1316					Detected Data Not Normal at 5% Significance Level							
1317												
1318					Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs							
1319					KM Mean	5.432				KM Standard Error of Mean		1.147
1320					KM SD	7.155				95% KM (BCA) UCL		7.51
1321					95% KM (t) UCL	7.364				95% KM (Percentile Bootstrap) UCL		7.342
1322					95% KM (z) UCL	7.318				95% KM Bootstrap t UCL		7.752
1323					90% KM Chebyshev UCL	8.872				95% KM Chebyshev UCL		10.43
1324					97.5% KM Chebyshev UCL	12.59				99% KM Chebyshev UCL		16.84
1325												
1326					Gamma GOF Tests on Detected Observations Only							
1327					A-D Test Statistic	1.03			Anderson-Darling GOF Test			
1328					5% A-D Critical Value	0.806			Detected Data Not Gamma Distributed at 5% Significance Level			
1329					K-S Test Statistic	0.179			Kolmogorov-Smirnov GOF			
1330					5% K-S Critical Value	0.151			Detected Data Not Gamma Distributed at 5% Significance Level			
1331					Detected Data Not Gamma Distributed at 5% Significance Level							
1332												
1333					Gamma Statistics on Detected Data Only							
1334					k hat (MLE)	0.573				k star (bias corrected MLE)		0.546
1335					Theta hat (MLE)	9.969				Theta star (bias corrected MLE)		10.48
1336					nu hat (MLE)	43.58				nu star (bias corrected)		41.47
1337					Mean (detects)	5.717						
1338												
1339					Gamma ROS Statistics using Imputed Non-Detects							
1340					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1341					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
1342					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1343					This is especially true when the sample size is small.							
1344					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1345					Minimum	0.01				Mean		5.431
1346					Maximum	25.6				Median		1.915
1347					SD	7.247				CV		1.334
1348					k hat (MLE)	0.491				k star (bias corrected MLE)		0.471
1349					Theta hat (MLE)	11.06				Theta star (bias corrected MLE)		11.53
1350					nu hat (MLE)	39.29				nu star (bias corrected)		37.68
1351					Adjusted Level of Significance (β)	0.044						
1352					Approximate Chi Square Value (37.68, α)	24.62				Adjusted Chi Square Value (37.68, β)		24.23

	A	B	C	D	E	F	G	H	I	J	K	L
1353		95% Gamma Approximate UCL (use when n>=50)				8.311		95% Gamma Adjusted UCL (use when n<50)				8.447
1354												
1355						Estimates of Gamma Parameters using KM Estimates						
1356				Mean (KM)		5.432				SD (KM)		7.155
1357				Variance (KM)		51.2				SE of Mean (KM)		1.147
1358				k hat (KM)		0.576				k star (KM)		0.55
1359				nu hat (KM)		46.11				nu star (KM)		43.99
1360				theta hat (KM)		9.425				theta star (KM)		9.88
1361			80% gamma percentile (KM)			8.948			90% gamma percentile (KM)			14.4
1362			95% gamma percentile (KM)			20.17			99% gamma percentile (KM)			34.23
1363												
1364						Gamma Kaplan-Meier (KM) Statistics						
1365		Approximate Chi Square Value (43.99, α)				29.78		Adjusted Chi Square Value (43.99, β)				29.34
1366		95% Gamma Approximate KM-UCL (use when n>=50)				8.025		95% Gamma Adjusted KM-UCL (use when n<50)				8.145
1367												
1368						Lognormal GOF Test on Detected Observations Only						
1369			Shapiro Wilk Test Statistic			0.916		Shapiro Wilk GOF Test				
1370			5% Shapiro Wilk Critical Value			0.938		Detected Data Not Lognormal at 5% Significance Level				
1371			Lilliefors Test Statistic			0.154		Lilliefors GOF Test				
1372			5% Lilliefors Critical Value			0.142		Detected Data Not Lognormal at 5% Significance Level				
1373						Detected Data Not Lognormal at 5% Significance Level						
1374												
1375						Lognormal ROS Statistics Using Imputed Non-Detects						
1376			Mean in Original Scale			5.433			Mean in Log Scale			0.458
1377			SD in Original Scale			7.246			SD in Log Scale			1.879
1378		95% t UCL (assumes normality of ROS data)				7.363			95% Percentile Bootstrap UCL			7.427
1379			95% BCA Bootstrap UCL			7.597			95% Bootstrap t UCL			7.906
1380			95% H-UCL (Log ROS)			27.25						
1381												
1382						Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution						
1383			KM Mean (logged)			0.452			KM Geo Mean			1.571
1384			KM SD (logged)			1.869		95% Critical H Value (KM-Log)				3.58
1385		KM Standard Error of Mean (logged)				0.3			95% H-UCL (KM -Log)			26.31
1386			KM SD (logged)			1.869		95% Critical H Value (KM-Log)				3.58
1387		KM Standard Error of Mean (logged)				0.3						
1388												
1389						DL/2 Statistics						
1390		DL/2 Normal						DL/2 Log-Transformed				
1391			Mean in Original Scale			5.432			Mean in Log Scale			0.422
1392			SD in Original Scale			7.247			SD in Log Scale			1.961
1393		95% t UCL (Assumes normality)				7.362			95% H-Stat UCL			33.45
1394						DL/2 is not a recommended method, provided for comparisons and historical reasons						
1395												
1396						Nonparametric Distribution Free UCL Statistics						
1397						Data do not follow a Discernible Distribution at 5% Significance Level						
1398												
1399						Suggested UCL to Use						
1400			95% KM (Chebyshev) UCL			10.43						
1401												
1402		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
1403		Recommendations are based upon data size, data distribution, and skewness.										
1404		These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).										

	A	B	C	D	E	F	G	H	I	J	K	L
1405						However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.						
1406												