

	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	Time of Computation			8/13/2015 2:13:19 PM								
5	From File			ProUCLinput_15-009(c)_0-1.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Bootstrap Operations			2000								
9												
10	Beryllium											
11												
12	General Statistics											
13	Total Number of Observations				17		Number of Distinct Observations				16	
14	Number of Detects				15		Number of Non-Detects				2	
15	Number of Distinct Detects				15		Number of Distinct Non-Detects				2	
16	Minimum Detect				0.30		Minimum Non-Detect				0.52	
17	Maximum Detect				2.4		Maximum Non-Detect				0.53	
18	Variance Detects				0.27		Percent Non-Detects				11.7	
19	Mean Detects				0.64		SD Detects				0.52	
20	Median Detects				0.50		CV Detects				0.82	
21	Skewness Detects				3.02		Kurtosis Detects				9.91	
22	Mean of Logged Detects				-0.62		SD of Logged Detects				0.53	
23												
24	Normal GOF Test on Detects Only											
25	Shapiro Wilk Test Statistic				0.59		Shapiro Wilk GOF Test					
26	5% Shapiro Wilk Critical Value				0.88		Detected Data Not Normal at 5% Significance Level					
27	Lilliefors Test Statistic				0.32		Lilliefors GOF Test					
28	5% Lilliefors Critical Value				0.22		Detected Data Not Normal at 5% Significance Level					
29	Detected Data Not Normal at 5% Significance Level											
30												
31	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
32	Mean				0.61		Standard Error of Mean				0.12	
33	SD				0.48		95% KM (BCA) UCL				0.82	
34	95% KM (t) UCL				0.82		95% KM (Percentile Bootstrap) UCL				0.82	
35	95% KM (z) UCL				0.81		95% KM Bootstrap t UCL				1.27	
36	90% KM Chebyshev UCL				0.97		95% KM Chebyshev UCL				1.14	
37	97.5% KM Chebyshev UCL				1.37		99% KM Chebyshev UCL				1.82	
38												
39	Gamma GOF Tests on Detected Observations Only											
40	A-D Test Statistic				1.26		Anderson-Darling GOF Test					
41	5% A-D Critical Value				0.74		Detected Data Not Gamma Distributed at 5% Significance Level					
42	K-S Test Statistic				0.25		Kolmogorov-Smirnov GOF					
43	5% K-S Critical Value				0.22		Detected Data Not Gamma Distributed at 5% Significance Level					
44	Detected Data Not Gamma Distributed at 5% Significance Level											
45												
46	Gamma Statistics on Detected Data Only											
47	k hat (MLE)				3.00		k star (bias corrected MLE)				2.45	
48	Theta hat (MLE)				0.21		Theta star (bias corrected MLE)				0.26	
49	nu hat (MLE)				90.2		nu star (bias corrected)				73.5	
50	MLE Mean (bias corrected)				0.64		MLE Sd (bias corrected)				0.40	
51												
52	Gamma Kaplan-Meier (KM) Statistics											
53	k hat (KM)				1.59		nu hat (KM)				54.0	
54	Approximate Chi Square Value (54.09, α)				38.2		Adjusted Chi Square Value (54.09, β)				36.8	
55	Approximate KM-UCL (use when $n \geq 50$)				0.86		Gamma Adjusted KM-UCL (use when $n < 50$)				0.90	
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				0.30		Mean				0.60	
63	Maximum				2.4		Median				0.46	

	A	B	C	D	E	F	G	H	I	J	K	L
64					SD	0.50					CV	0.82
65					k hat (MLE)	3.11					k star (bias corrected MLE)	2.60
66					Theta hat (MLE)	0.19					Theta star (bias corrected MLE)	0.23
67					nu hat (MLE)	106					nu star (bias corrected)	88.6
68					MLE Mean (bias corrected)	0.60					MLE Sd (bias corrected)	0.37
69											Adjusted Level of Significance (β)	0.03
70					Approximate Chi Square Value (88.67, α)	67.96					Adjusted Chi Square Value (88.67, β)	66.0
71					Gamma Approximate UCL (use when n>=50)	0.79					Gamma Adjusted UCL (use when n<50)	0.81
72												
73					Lognormal GOF Test on Detected Observations Only							
74					Shapiro Wilk Test Statistic	0.83					Shapiro Wilk GOF Test	
75					5% Shapiro Wilk Critical Value	0.88					Detected Data Not Lognormal at 5% Significance Level	
76					Lilliefors Test Statistic	0.20					Lilliefors GOF Test	
77					5% Lilliefors Critical Value	0.22					Detected Data appear Lognormal at 5% Significance Level	
78					Detected Data appear Approximate Lognormal at 5% Significance Level							
79												
80					Lognormal ROS Statistics Using Imputed Non-Detects							
81					Mean in Original Scale	0.61					Mean in Log Scale	-0.65
82					SD in Original Scale	0.5					SD in Log Scale	0.50
83					95% t UCL (assumes normality of ROS data)	0.82					95% Percentile Bootstrap UCL	0.82
84					95% BCA Bootstrap UCL	0.94					95% Bootstrap t UCL	1.32
85					95% H-UCL (Log ROS)	0.76						
86												
87					UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed							
88					KM Mean (logged)	-0.65					95% H-UCL (KM -Log)	0.75
89					KM SD (logged)	0.5					95% Critical H Value (KM-Log)	2.03
90					KM Standard Error of Mean (logged)	0.12						
91												
92					DL/2 Statistics							
93					DL/2 Normal						DL/2 Log-Transformed	
94					Mean in Original Scale	0.59					Mean in Log Scale	-0.70
95					SD in Original Scale	0.51					SD in Log Scale	0.55
96					95% t UCL (Assumes normality)	0.81					95% H-Stat UCL	0.77
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 Approximate Lognormal Distributed at 5% Significance Level							
101												
102					Suggested UCL to Use							
103					95% KM (Chebyshev) UCL	1.14						
104												
105					Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL.							
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 Singh (2007).							
108					Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult with a statistician.							
109												
110												
111					Calcium							
112												
113					General Statistics							
114					Total Number of Observations	17					Number of Distinct Observations	17
115											Number of Missing Observations	0
116					Minimum	350					Mean	757.9
117					Maximum	1380					Median	645
118					SD	294.8					Std. Error of Mean	71.5
119					Coefficient of Variation	0.38					Skewness	0.67
120												
121					Normal GOF Test							
122					Shapiro Wilk Test Statistic	0.93					Shapiro Wilk GOF Test	
123					5% Shapiro Wilk Critical Value	0.89					Data appear Normal at 5% Significance Level	
124					Lilliefors Test Statistic	0.17					Lilliefors GOF Test	
125					5% Lilliefors Critical Value	0.21					Data appear Normal at 5% Significance Level	
126					Data appear Normal at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L	
127													
128	Assuming Normal Distribution												
129	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
130	95% Student's-t UCL						882.8	95% Adjusted-CLT UCL (Chen-1995)					888
131								95% Modified-t UCL (Johnson-1978)					884.7
132													
133	Gamma GOF Test												
134	A-D Test Statistic						0.29	Anderson-Darling Gamma GOF Test					
135	5% A-D Critical Value						0.74	data appear Gamma Distributed at 5% Significance Level					
136	K-S Test Statistic						0.14	Kolmogrov-Smirnoff Gamma GOF Test					
137	5% K-S Critical Value						0.20	data appear Gamma Distributed at 5% Significance Level					
138	Detected data appear Gamma Distributed at 5% Significance Level												
139													
140	Gamma Statistics												
141	k hat (MLE)						7.28	k star (bias corrected MLE)					6.04
142	Theta hat (MLE)						104	Theta star (bias corrected MLE)					125.5
143	nu hat (MLE)						247.8	nu star (bias corrected)					205.4
144	MLE Mean (bias corrected)						757.9	MLE Sd (bias corrected)					308.4
145								Approximate Chi Square Value (0.05)					173.2
146	Adjusted Level of Significance						0.034	Adjusted Chi Square Value					170.1
147													
148	Assuming Gamma Distribution												
149	Approximate Gamma UCL (use when n>=50)						898.7	Adjusted Gamma UCL (use when n<50)					915
150													
151	Lognormal GOF Test												
152	Shapiro Wilk Test Statistic						0.97	Shapiro Wilk Lognormal GOF Test					
153	5% Shapiro Wilk Critical Value						0.89	Data appear Lognormal at 5% Significance Level					
154	Lilliefors Test Statistic						0.12	Lilliefors Lognormal GOF Test					
155	5% Lilliefors Critical Value						0.21	Data appear Lognormal at 5% Significance Level					
156	Data appear Lognormal at 5% Significance Level												
157													
158	Lognormal Statistics												
159	Minimum of Logged Data						5.85	Mean of logged Data					6.56
160	Maximum of Logged Data						7.23	SD of logged Data					0.38
161													
162	Assuming Lognormal Distribution												
163	95% H-UCL						917.9	90% Chebyshev (MVUE) UCL					975.8
164	95% Chebyshev (MVUE) UCL						1074	97.5% Chebyshev (MVUE) UCL					1211
165	99% Chebyshev (MVUE) UCL						1480						
166													
167	Nonparametric Distribution Free UCL Statistics												
168	Data appear to follow a Discernible Distribution at 5% Significance Level												
169													
170	Nonparametric Distribution Free UCLs												
171	95% CLT UCL						875.6	95% Jackknife UCL					882.8
172	95% Standard Bootstrap UCL						871.3	95% Bootstrap-t UCL					898.6
173	95% Hall's Bootstrap UCL						884.9	95% Percentile Bootstrap UCL					877.9
174	95% BCA Bootstrap UCL						882.4						
175	90% Chebyshev(Mean, Sd) UCL						972.4	95% Chebyshev(Mean, Sd) UCL					1070
176	97.5% Chebyshev(Mean, Sd) UCL						1204	99% Chebyshev(Mean, Sd) UCL					1469
177													
178	Suggested UCL to Use												
179	95% Student's-t UCL						882.8						
180													
181	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
182	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
183	Singh and Singh (2003). However, simulation results will not cover all Real World data sets												
184	For additional insight the user may want to consult a statistician.												
185													
186													
187	Chromium												
188													
189	General Statistics												

	A	B	C	D	E	F	G	H	I	J	K	L
190	Total Number of Observations					17	Number of Distinct Observations					17
191							Number of Missing Observations					0
192	Minimum					1.6	Mean					8.44
193	Maximum					21.9	Median					5.75
194	SD					5.76	Std. Error of Mean					1.39
195	Coefficient of Variation					0.68	Skewness					0.85
196												
197	Normal GOF Test											
198	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk GOF Test					
199	5% Shapiro Wilk Critical Value					0.89	Data appear Normal at 5% Significance Level					
200	Lilliefors Test Statistic					0.21	Lilliefors GOF Test					
201	5% Lilliefors Critical Value					0.21	Data appear Normal at 5% Significance Level					
202	Data appear Normal at 5% Significance Level											
203												
204	Assuming Normal Distribution											
205	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
206	95% Student's-t UCL					10.85	95% Adjusted-CLT UCL (Chen-1995)					11.05
207							95% Modified-t UCL (Johnson-1978)					10.95
208												
209	Gamma GOF Test											
210	A-D Test Statistic					0.34	Anderson-Darling Gamma GOF Test					
211	5% A-D Critical Value					0.74	data appear Gamma Distributed at 5% Significance Level					
212	K-S Test Statistic					0.16	Kolmogrov-Smirnoff Gamma GOF Test					
213	5% K-S Critical Value					0.21	data appear Gamma Distributed at 5% Significance Level					
214	Detected data appear Gamma Distributed at 5% Significance Level											
215												
216	Gamma Statistics											
217	k hat (MLE)					2.2	k star (bias corrected MLE)					1.85
218	Theta hat (MLE)					3.83	Theta star (bias corrected MLE)					4.56
219	nu hat (MLE)					74.8	nu star (bias corrected)					62.9
220	MLE Mean (bias corrected)					8.44	MLE Sd (bias corrected)					6.20
221							Approximate Chi Square Value (0.05)					45.6
222	Adjusted Level of Significance					0.034	Adjusted Chi Square Value					44.16
223												
224	Assuming Gamma Distribution											
225	Approximate Gamma UCL (use when n>=50))					11.65	Adjusted Gamma UCL (use when n<50)					12.05
226												
227	Lognormal GOF Test											
228	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk Lognormal GOF Test					
229	5% Shapiro Wilk Critical Value					0.89	Data appear Lognormal at 5% Significance Level					
230	Lilliefors Test Statistic					0.16	Lilliefors Lognormal GOF Test					
231	5% Lilliefors Critical Value					0.21	Data appear Lognormal at 5% Significance Level					
232	Data appear Lognormal at 5% Significance Level											
233												
234	Lognormal Statistics											
235	Minimum of Logged Data					0.47	Mean of logged Data					1.89
236	Maximum of Logged Data					3.08	SD of logged Data					0.75
237												
238	Assuming Lognormal Distribution											
239	95% H-UCL					13.7	90% Chebyshev (MVUE) UCL					13.7
240	95% Chebyshev (MVUE) UCL					16.05	97.5% Chebyshev (MVUE) UCL					19.2
241	99% Chebyshev (MVUE) UCL					25.56						
242												
243	Nonparametric Distribution Free UCL Statistics											
244	Data appear to follow a Discernible Distribution at 5% Significance Level											
245												
246	Nonparametric Distribution Free UCLs											
247	95% CLT UCL					10.74	95% Jackknife UCL					10.85
248	95% Standard Bootstrap UCL					10.65	95% Bootstrap-t UCL					11.25
249	95% Hall's Bootstrap UCL					11.11	95% Percentile Bootstrap UCL					10.65
250	95% BCA Bootstrap UCL					10.94						
251	90% Chebyshev(Mean, Sd) UCL					12.64	95% Chebyshev(Mean, Sd) UCL					14.56
252	97.5% Chebyshev(Mean, Sd) UCL					17.11	99% Chebyshev(Mean, Sd) UCL					22.3

	A	B	C	D	E	F	G	H	I	J	K	L
253												
254	Suggested UCL to Use											
255	95% Student's-t UCL		10.85									
256												
257	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
258	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
259	Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
260	For additional insight the user may want to consult a statistician.											
261												
262												
263	Lead											
264												
265	General Statistics											
266	Total Number of Observations		17	Number of Distinct Observations		17						
267				Number of Missing Observations		0						
268	Minimum		3.84	Mean		6.68						
269	Maximum		9.42	Median		6.7						
270	SD		1.53	Std. Error of Mean		0.37						
271	Coefficient of Variation		0.23	Skewness		-0.071						
272												
273	Normal GOF Test											
274	Shapiro Wilk Test Statistic		0.98	Shapiro Wilk GOF Test								
275	5% Shapiro Wilk Critical Value		0.89	Data appear Normal at 5% Significance Level								
276	Lilliefors Test Statistic		0.095	Lilliefors GOF Test								
277	5% Lilliefors Critical Value		0.21	Data appear Normal at 5% Significance Level								
278	Data appear Normal at 5% Significance Level											
279												
280	Assuming Normal Distribution											
281	95% Normal UCL			95% UCLs (Adjusted for Skewness)								
282	95% Student's-t UCL		7.33	95% Adjusted-CLT UCL (Chen-1995)		7.28						
283				95% Modified-t UCL (Johnson-1978)		7.33						
284												
285	Gamma GOF Test											
286	A-D Test Statistic		0.21	Anderson-Darling Gamma GOF Test								
287	5% A-D Critical Value		0.73	data appear Gamma Distributed at 5% Significance Level								
288	K-S Test Statistic		0.12	Kolmogorov-Smirnov Gamma GOF Test								
289	5% K-S Critical Value		0.20	data appear Gamma Distributed at 5% Significance Level								
290	Detected data appear Gamma Distributed at 5% Significance Level											
291												
292	Gamma Statistics											
293	k hat (MLE)		18.96	k star (bias corrected MLE)		15.6						
294	Theta hat (MLE)		0.35	Theta star (bias corrected MLE)		0.42						
295	nu hat (MLE)		644.7	nu star (bias corrected)		532.3						
296	MLE Mean (bias corrected)		6.68	MLE Sd (bias corrected)		1.68						
297				Approximate Chi Square Value (0.05)		479.8						
298	Adjusted Level of Significance		0.034	Adjusted Chi Square Value		474.6						
299												
300	Assuming Gamma Distribution											
301	Approximate Gamma UCL (use when n>=50))		7.41	Adjusted Gamma UCL (use when n<50)		7.49						
302												
303	Lognormal GOF Test											
304	Shapiro Wilk Test Statistic		0.96	Shapiro Wilk Lognormal GOF Test								
305	5% Shapiro Wilk Critical Value		0.89	Data appear Lognormal at 5% Significance Level								
306	Lilliefors Test Statistic		0.13	Lilliefors Lognormal GOF Test								
307	5% Lilliefors Critical Value		0.21	Data appear Lognormal at 5% Significance Level								
308	Data appear Lognormal at 5% Significance Level											
309												
310	Lognormal Statistics											
311	Minimum of Logged Data		1.34	Mean of logged Data		1.87						
312	Maximum of Logged Data		2.24	SD of logged Data		0.24						
313												
314	Assuming Lognormal Distribution											
315	95% H-UCL		7.48	90% Chebyshev (MVUE) UCL		7.88						

	A	B	C	D	E	F	G	H	I	J	K	L
316		95% Chebyshev (MVUE) UCL				8.42	97.5% Chebyshev (MVUE) UCL					9.17
317		99% Chebyshev (MVUE) UCL				10.64						
318												
319	Nonparametric Distribution Free UCL Statistics											
320	Data appear to follow a Discernible Distribution at 5% Significance Level											
321												
322	Nonparametric Distribution Free UCLs											
323		95% CLT UCL				7.29		95% Jackknife UCL				7.33
324		95% Standard Bootstrap UCL				7.27		95% Bootstrap-t UCL				7.30
325		95% Hall's Bootstrap UCL				7.31		95% Percentile Bootstrap UCL				7.30
326		95% BCA Bootstrap UCL				7.26						
327		90% Chebyshev(Mean, Sd) UCL				7.8		95% Chebyshev(Mean, Sd) UCL				8.30
328		97.5% Chebyshev(Mean, Sd) UCL				9.00		99% Chebyshev(Mean, Sd) UCL				10.39
329												
330	Suggested UCL to Use											
331		95% Student's-t UCL				7.33						
332												
333	Options regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
334	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
335	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
336	For additional insight the user may want to consult a statistician.											
337												
338	highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may											
339	reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.											
340												
341	Mercury											
342												
343	General Statistics											
344		Total Number of Observations				17		Number of Distinct Observations				13
345		Number of Detects				5		Number of Non-Detects				12
346		Number of Distinct Detects				5		Number of Distinct Non-Detects				8
347		Minimum Detect				0.006		Minimum Non-Detect				0.011
348		Maximum Detect				0.013		Maximum Non-Detect				0.11
349		Variance Detects				7.5689E		Percent Non-Detects				70.5%
350		Mean Detects				0.009		SD Detects				0.002
351		Median Detects				0.008		CV Detects				0.30
352		Skewness Detects				1.66		Kurtosis Detects				3.02
353		Mean of Logged Detects				-4.72		SD of Logged Detects				0.27
354												
355	Normal GOF Test on Detects Only											
356		Shapiro Wilk Test Statistic				0.82		Shapiro Wilk GOF Test				
357		5% Shapiro Wilk Critical Value				0.76	Detected Data appear Normal at 5% Significance Level					
358		Lilliefors Test Statistic				0.31		Lilliefors GOF Test				
359		5% Lilliefors Critical Value				0.39	Detected Data appear Normal at 5% Significance Level					
360	Detected Data appear Normal at 5% Significance Level											
361												
362	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
363		Mean				0.008		Standard Error of Mean				8.7791E
364		SD				0.002		95% KM (BCA) UCL				0.010
365		95% KM (t) UCL				0.010		95% KM (Percentile Bootstrap) UCL				0.010
366		95% KM (z) UCL				0.010		95% KM Bootstrap t UCL				0.010
367		90% KM Chebyshev UCL				0.010		95% KM Chebyshev UCL				0.010
368		97.5% KM Chebyshev UCL				0.014		99% KM Chebyshev UCL				0.014
369												
370	Gamma GOF Tests on Detected Observations Only											
371		A-D Test Statistic				0.44		Anderson-Darling GOF Test				
372		5% A-D Critical Value				0.67	data appear Gamma Distributed at 5% Significance Level					
373		K-S Test Statistic				0.28		Kolmogrov-Smirnoff GOF				
374		5% K-S Critical Value				0.35	data appear Gamma Distributed at 5% Significance Level					
375	Detected data appear Gamma Distributed at 5% Significance Level											
376												
377	Gamma Statistics on Detected Data Only											
378		k hat (MLE)				15.96		k star (bias corrected MLE)				6.51

	A	B	C	D	E	F	G	H	I	J	K	L
379	Theta hat (MLE)				5.73208	Theta star (bias corrected MLE)				0.001		
380	nu hat (MLE)				159.6	nu star (bias corrected)				65.1		
381	MLE Mean (bias corrected)				0.009	MLE Sd (bias corrected)				0.003		
382												
383	Gamma Kaplan-Meier (KM) Statistics											
384	k hat (KM)				17.2	nu hat (KM)				586		
385	Approximate Chi Square Value (585.98, α)				530.8	Adjusted Chi Square Value (585.98, β)				525.3		
386	Approximate KM-UCL (use when $n \geq 50$)				0.009	Gamma Adjusted KM-UCL (use when $n < 50$)				0.009		
387												
388	Gamma ROS Statistics using Imputed Non-Detects											
389	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
390	GROS may not be used when kstar of detected data is small such as < 0.1											
391	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
392	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
393	Minimum				0.006	Mean				0.009		
394	Maximum				0.01	Median				0.01		
395	SD				0.001	CV				0.14		
396	k hat (MLE)				48.9	k star (bias corrected MLE)				40.3		
397	Theta hat (MLE)				1.99768	Theta star (bias corrected MLE)				2.42338		
398	nu hat (MLE)				1664	nu star (bias corrected)				1372		
399	MLE Mean (bias corrected)				0.009	MLE Sd (bias corrected)				0.001		
400						Adjusted Level of Significance (β)				0.03		
401	Approximate Chi Square Value (N/A, α)				1287	Adjusted Chi Square Value (N/A, β)				1278		
402	Gamma Approximate UCL (use when $n \geq 50$)				0.016	Gamma Adjusted UCL (use when $n < 50$)				0.01		
403												
404	Lognormal GOF Test on Detected Observations Only											
405	Shapiro Wilk Test Statistic				0.88	Shapiro Wilk GOF Test						
406	5% Shapiro Wilk Critical Value				0.76	Detected Data appear Lognormal at 5% Significance Level						
407	Lilliefors Test Statistic				0.27	Lilliefors GOF Test						
408	5% Lilliefors Critical Value				0.39	Detected Data appear Lognormal at 5% Significance Level						
409	Detected Data appear Lognormal at 5% Significance Level											
410												
411	Lognormal ROS Statistics Using Imputed Non-Detects											
412	Mean in Original Scale				0.008	Mean in Log Scale				-4.76		
413	SD in Original Scale				0.001	SD in Log Scale				0.16		
414	95% t UCL (assumes normality of ROS data)				0.009	95% Percentile Bootstrap UCL				0.009		
415	95% BCA Bootstrap UCL				0.009	95% Bootstrap t UCL				0.009		
416	95% H-UCL (Log ROS)				0.009							
417												
418	UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
419	KM Mean (logged)				-4.76	95% H-UCL (KM -Log)				0.009		
420	KM SD (logged)				0.21	95% Critical H Value (KM-Log)				1.8		
421	KM Standard Error of Mean (logged)				0.09							
422												
423	DL/2 Statistics											
424	DL/2 Normal					DL/2 Log-Transformed						
425	Mean in Original Scale				0.01	Mean in Log Scale				-4.42		
426	SD in Original Scale				0.01	SD in Log Scale				0.84		
427	95% t UCL (Assumes normality)				0.02	95% H-Stat UCL				0.02		
428	DL/2 is not a recommended method, provided for comparisons and historical reasons											
429												
430	Nonparametric Distribution Free UCL Statistics											
431	Detected Data appear Normal Distributed at 5% Significance Level											
432												
433	Suggested UCL to Use											
434	95% KM (t) UCL				0.01	95% KM (Percentile Bootstrap) UCL				0.01		
435												
436	Questions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
437	Recommendations are based upon data size, data distribution, and skewness.											
438	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
439	The simulation results will not cover all Real World data sets; for additional insight the user may want to consult											
440												
441	Tritium											

	A	B	C	D	E	F	G	H	I	J	K	L
442												
443	General Statistics											
444	Total Number of Observations				17	Number of Distinct Observations				16		
445	Number of Detects				6	Number of Non-Detects				11		
446	Number of Distinct Detects				6	Number of Distinct Non-Detects				10		
447	Minimum Detect				0.03	Minimum Non-Detect				-0.01		
448	Maximum Detect				0.16	Maximum Non-Detect				0.03		
449	Variance Detects				0.002	Percent Non-Detects				64.7		
450	Mean Detects				0.09	SD Detects				0.04		
451	Median Detects				0.08	CV Detects				0.49		
452	Skewness Detects				1.03	Kurtosis Detects				1.76		
453												
454	Normal GOF Test on Detects Only											
455	Shapiro Wilk Test Statistic				0.92	Shapiro Wilk GOF Test						
456	5% Shapiro Wilk Critical Value				0.78	Detected Data appear Normal at 5% Significance Level						
457	Lilliefors Test Statistic				0.23	Lilliefors GOF Test						
458	5% Lilliefors Critical Value				0.36	Detected Data appear Normal at 5% Significance Level						
459	Detected Data appear Normal at 5% Significance Level											
460												
461	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
462	Mean				0.024	Standard Error of Mean				0.01		
463	SD				0.053	95% KM (BCA) UCL				0.05		
464	95% KM (t) UCL				0.050	95% KM (Percentile Bootstrap) UCL				0.05		
465	95% KM (z) UCL				0.049	95% KM Bootstrap t UCL				0.04		
466	90% KM Chebyshev UCL				0.061	95% KM Chebyshev UCL				0.08		
467	97.5% KM Chebyshev UCL				0.11	99% KM Chebyshev UCL				0.16		
468												
469	Gamma GOF Tests on Detected Observations Only											
470	A-D Test Statistic				0.23	Anderson-Darling GOF Test						
471	5% A-D Critical Value				0.69	data appear Gamma Distributed at 5% Significance Level						
472	K-S Test Statistic				0.18	Kolmogorov-Smirnov GOF						
473	5% K-S Critical Value				0.33	data appear Gamma Distributed at 5% Significance Level						
474	Detected data appear Gamma Distributed at 5% Significance Level											
475												
476	Gamma Statistics on Detected Data Only											
477	k hat (MLE)				5.03	k star (bias corrected MLE)				2.62		
478	Theta hat (MLE)				0.014	Theta star (bias corrected MLE)				0.03		
479	nu hat (MLE)				60.4	nu star (bias corrected)				31.5		
480	MLE Mean (bias corrected)				0.09	MLE Sd (bias corrected)				0.05		
481												
482	Gamma Kaplan-Meier (KM) Statistics											
483	k hat (KM)				0.22	nu hat (KM)				7.62		
484						Adjusted Level of Significance (β)				0.03		
485	Approximate Chi Square Value (7.62, α)				2.51	Adjusted Chi Square Value (7.62, β)				2.22		
486	Approximate KM-UCL (use when $n \geq 50$)				0.07	Gamma Adjusted KM-UCL (use when $n < 50$)				0.08		
487												
488	DL/2 Statistics											
489	Mean in Original Scale				0.03	SD in Original Scale				0.04		
490	95% t UCL (Assumes normality)				0.05							
491	DL/2 is not a recommended method, provided for comparisons and historical reasons											
492												
493	Nonparametric Distribution Free UCL Statistics											
494	Detected Data appear Normal Distributed at 5% Significance Level											
495												
496	Suggested UCL to Use											
497	95% KM (t) UCL				0.05	95% KM (Percentile Bootstrap) UCL				0.05		
498												
499	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL for the data.											
500	Recommendations are based upon data size, data distribution, and skewness.											
501	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Singh (2010).											
502	These recommendations will not cover all Real World data sets; for additional insight the user may want to consult the literature.											
503												
504												

	A	B	C	D	E	F	G	H	I	J	K	L
505	Uranium											
506												
507	General Statistics											
508	Total Number of Observations					13	Number of Distinct Observations					12
509							Number of Missing Observations					0
510	Minimum					0.77	Mean					3.13
511	Maximum					8.8	Median					2.82
512	SD					2.11	Std. Error of Mean					0.58
513	Coefficient of Variation					0.67	Skewness					1.59
514												
515	Normal GOF Test											
516	Shapiro Wilk Test Statistic					0.83	Shapiro Wilk GOF Test					
517	5% Shapiro Wilk Critical Value					0.86	Data Not Normal at 5% Significance Level					
518	Lilliefors Test Statistic					0.21	Lilliefors GOF Test					
519	5% Lilliefors Critical Value					0.24	Data appear Normal at 5% Significance Level					
520	Data appear Approximate Normal at 5% Significance Level											
521												
522	Assuming Normal Distribution											
523	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
524	95% Student's-t UCL					4.18	95% Adjusted-CLT UCL (Chen-1995)					4.37
525							95% Modified-t UCL (Johnson-1978)					4.22
526												
527	Gamma GOF Test											
528	A-D Test Statistic					0.41	Anderson-Darling Gamma GOF Test					
529	5% A-D Critical Value					0.74	data appear Gamma Distributed at 5% Significance Level					
530	K-S Test Statistic					0.16	Kolmogrov-Smirnoff Gamma GOF Test					
531	5% K-S Critical Value					0.23	data appear Gamma Distributed at 5% Significance Level					
532	Detected data appear Gamma Distributed at 5% Significance Level											
533												
534	Gamma Statistics											
535	k hat (MLE)					2.68	k star (bias corrected MLE)					2.11
536	Theta hat (MLE)					1.16	Theta star (bias corrected MLE)					1.48
537	nu hat (MLE)					69.74	nu star (bias corrected)					55.0
538	MLE Mean (bias corrected)					3.13	MLE Sd (bias corrected)					2.15
539							Approximate Chi Square Value (0.05)					38.9
540	Adjusted Level of Significance					0.03	Adjusted Chi Square Value					37.0
541												
542	Assuming Gamma Distribution											
543	Approximate Gamma UCL (use when n>=50))					4.43	Adjusted Gamma UCL (use when n<50)					4.65
544												
545	Lognormal GOF Test											
546	Shapiro Wilk Test Statistic					0.94	Shapiro Wilk Lognormal GOF Test					
547	5% Shapiro Wilk Critical Value					0.86	Data appear Lognormal at 5% Significance Level					
548	Lilliefors Test Statistic					0.15	Lilliefors Lognormal GOF Test					
549	5% Lilliefors Critical Value					0.24	Data appear Lognormal at 5% Significance Level					
550	Data appear Lognormal at 5% Significance Level											
551												
552	Lognormal Statistics											
553	Minimum of Logged Data					-0.26	Mean of logged Data					0.94
554	Maximum of Logged Data					2.17	SD of logged Data					0.66
555												
556	Assuming Lognormal Distribution											
557	95% H-UCL					5.03	90% Chebyshev (MVUE) UCL					4.97
558	95% Chebyshev (MVUE) UCL					5.80	97.5% Chebyshev (MVUE) UCL					6.94
559	99% Chebyshev (MVUE) UCL					9.2						
560												
561	Nonparametric Distribution Free UCL Statistics											
562	Data appear to follow a Discernible Distribution at 5% Significance Level											
563												
564	Nonparametric Distribution Free UCLs											
565	95% CLT UCL					4.10	95% Jackknife UCL					4.18
566	95% Standard Bootstrap UCL					4.07	95% Bootstrap-t UCL					4.65
567	95% Hall's Bootstrap UCL					6.20	95% Percentile Bootstrap UCL					4.10

	A	B	C	D	E	F	G	H	I	J	K	L
568	95% BCA Bootstrap UCL					4.43						
569	90% Chebyshev(Mean, Sd) UCL					4.89	95% Chebyshev(Mean, Sd) UCL					5.69
570	97.5% Chebyshev(Mean, Sd) UCL					6.79	99% Chebyshev(Mean, Sd) UCL					8.96
571												
572	Suggested UCL to Use											
573	95% Student's-t UCL					4.18						
574												
575	ptions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
576	ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
577	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
578	For additional insight the user may want to consult a statistician.											
579												
580												
581	Uranium-234											
582												
583	General Statistics											
584	Total Number of Observations					17	Number of Distinct Observations					17
585							Number of Missing Observations					0
586	Minimum					0.49	Mean					1.29
587	Maximum					2.75	Median					1.16
588	SD					0.57	Std. Error of Mean					0.14
589	Coefficient of Variation					0.44	Skewness					0.97
590												
591	Normal GOF Test											
592	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk GOF Test					
593	5% Shapiro Wilk Critical Value					0.89	Data appear Normal at 5% Significance Level					
594	Lilliefors Test Statistic					0.13	Lilliefors GOF Test					
595	5% Lilliefors Critical Value					0.21	Data appear Normal at 5% Significance Level					
596	Data appear Normal at 5% Significance Level											
597												
598	Assuming Normal Distribution											
599	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
600	95% Student's-t UCL					1.53	95% Adjusted-CLT UCL (Chen-1995)					1.55
601							95% Modified-t UCL (Johnson-1978)					1.53
602												
603	Gamma GOF Test											
604	A-D Test Statistic					0.18	Anderson-Darling Gamma GOF Test					
605	5% A-D Critical Value					0.74	data appear Gamma Distributed at 5% Significance Level					
606	K-S Test Statistic					0.12	Kolmogrov-Smirnoff Gamma GOF Test					
607	5% K-S Critical Value					0.21	data appear Gamma Distributed at 5% Significance Level					
608	Detected data appear Gamma Distributed at 5% Significance Level											
609												
610	Gamma Statistics											
611	k hat (MLE)					5.61	k star (bias corrected MLE)					4.66
612	Theta hat (MLE)					0.23	Theta star (bias corrected MLE)					0.27
613	nu hat (MLE)					190.9	nu star (bias corrected)					158.5
614	MLE Mean (bias corrected)					1.29	MLE Sd (bias corrected)					0.59
615							Approximate Chi Square Value (0.05)					130.4
616	Adjusted Level of Significance					0.03	Adjusted Chi Square Value					127.7
617												
618	Assuming Gamma Distribution											
619	Approximate Gamma UCL (use when n>=50))					1.56	Adjusted Gamma UCL (use when n<50)					1.60
620												
621	Lognormal GOF Test											
622	Shapiro Wilk Test Statistic					0.98	Shapiro Wilk Lognormal GOF Test					
623	5% Shapiro Wilk Critical Value					0.89	Data appear Lognormal at 5% Significance Level					
624	Lilliefors Test Statistic					0.10	Lilliefors Lognormal GOF Test					
625	5% Lilliefors Critical Value					0.21	Data appear Lognormal at 5% Significance Level					
626	Data appear Lognormal at 5% Significance Level											
627												
628	Lognormal Statistics											
629	Minimum of Logged Data					-0.70	Mean of logged Data					0.16
630	Maximum of Logged Data					1.01	SD of logged Data					0.44

	A	B	C	D	E	F	G	H	I	J	K	L
631												
632	Assuming Lognormal Distribution											
633	95% H-UCL			1.62	90% Chebyshev (MVUE) UCL			1.72				
634	95% Chebyshev (MVUE) UCL			1.91	97.5% Chebyshev (MVUE) UCL			2.18				
635	99% Chebyshev (MVUE) UCL			2.71								
636												
637	Nonparametric Distribution Free UCL Statistics											
638	Data appear to follow a Discernible Distribution at 5% Significance Level											
639												
640	Nonparametric Distribution Free UCLs											
641	95% CLT UCL			1.52	95% Jackknife UCL			1.53				
642	95% Standard Bootstrap UCL			1.50	95% Bootstrap-t UCL			1.60				
643	95% Hall's Bootstrap UCL			1.60	95% Percentile Bootstrap UCL			1.51				
644	95% BCA Bootstrap UCL			1.52								
645	90% Chebyshev(Mean, Sd) UCL			1.70	95% Chebyshev(Mean, Sd) UCL			1.89				
646	97.5% Chebyshev(Mean, Sd) UCL			2.16	99% Chebyshev(Mean, Sd) UCL			2.68				
647												
648	Suggested UCL to Use											
649	95% Student's-t UCL			1.53								
650												
651	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
652	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
653	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
654	For additional insight the user may want to consult a statistician.											
655												
656	Uranium-235/236											
657												
658	General Statistics											
659	Total Number of Observations			17	Number of Distinct Observations			16				
660	Number of Detects			14	Number of Non-Detects			3				
661	Number of Distinct Detects			13	Number of Distinct Non-Detects			3				
662	Minimum Detect			0.034	Minimum Non-Detect			0.05				
663	Maximum Detect			0.17	Maximum Non-Detect			0.05				
664	Variance Detects			0.001	Percent Non-Detects			17.6				
665	Mean Detects			0.084	SD Detects			0.03				
666	Median Detects			0.084	CV Detects			0.38				
667	Skewness Detects			0.97	Kurtosis Detects			1.94				
668	Mean of Logged Detects			-2.49	SD of Logged Detects			0.39				
669												
670	Normal GOF Test on Detects Only											
671	Shapiro Wilk Test Statistic			0.93	Shapiro Wilk GOF Test							
672	5% Shapiro Wilk Critical Value			0.87	Detected Data appear Normal at 5% Significance Level							
673	Lilliefors Test Statistic			0.18	Lilliefors GOF Test							
674	5% Lilliefors Critical Value			0.23	Detected Data appear Normal at 5% Significance Level							
675	Detected Data appear Normal at 5% Significance Level											
676												
677	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
678	Mean			0.074	Standard Error of Mean			0.008				
679	SD			0.034	95% KM (BCA) UCL			0.09				
680	95% KM (t) UCL			0.094	95% KM (Percentile Bootstrap) UCL			0.09				
681	95% KM (z) UCL			0.094	95% KM Bootstrap t UCL			0.09				
682	90% KM Chebyshev UCL			0.10	95% KM Chebyshev UCL			0.11				
683	97.5% KM Chebyshev UCL			0.13	99% KM Chebyshev UCL			0.16				
684												
685	Gamma GOF Tests on Detected Observations Only											
686	A-D Test Statistic			0.24	Anderson-Darling GOF Test							
687	5% A-D Critical Value			0.73	data appear Gamma Distributed at 5% Significance Level							
688	K-S Test Statistic			0.13	Kolmogrov-Smirnoff GOF							
689	5% K-S Critical Value			0.22	data appear Gamma Distributed at 5% Significance Level							
690	Detected data appear Gamma Distributed at 5% Significance Level											
691												
692	Gamma Statistics on Detected Data Only											
693	k hat (MLE)			7.27	k star (bias corrected MLE)			5.76				

	A	B	C	D	E	F	G	H	I	J	K	L
694				Theta hat (MLE)	0.01		Theta star (bias corrected MLE)					0.01
695				nu hat (MLE)	203.6		nu star (bias corrected)					161.3
696				MLE Mean (bias corrected)	0.08		MLE Sd (bias corrected)					0.03
697												
698				Gamma Kaplan-Meier (KM) Statistics								
699				k hat (KM)	5.22		nu hat (KM)					177.7
700				Approximate Chi Square Value (177.75, α)	147.9		Adjusted Chi Square Value (177.75, β)					145.1
701				Approximate KM-UCL (use when $n \geq 50$)	0.09		Gamma Adjusted KM-UCL (use when $n < 50$)					0.09
702												
703				Gamma ROS Statistics using Imputed Non-Detects								
704				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
705				GROS may not be used when kstar of detected data is small such as < 0.1								
706				For such situations, GROS method tends to yield inflated values of UCLs and BTVs								
707				Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
708				Minimum	0.03		Mean					0.07
709				Maximum	0.17		Median					0.07
710				SD	0.03		CV					0.45
711				k hat (MLE)	5.29		k star (bias corrected MLE)					4.39
712				Theta hat (MLE)	0.01		Theta star (bias corrected MLE)					0.01
713				nu hat (MLE)	179.9		nu star (bias corrected)					149.5
714				MLE Mean (bias corrected)	0.07		MLE Sd (bias corrected)					0.03
715							Adjusted Level of Significance (β)					0.03
716				Approximate Chi Square Value (149.48, α)	122.2		Adjusted Chi Square Value (149.48, β)					119.6
717				Gamma Approximate UCL (use when $n \geq 50$)	0.09		Gamma Adjusted UCL (use when $n < 50$)					0.09
718												
719				Lognormal GOF Test on Detected Observations Only								
720				Shapiro Wilk Test Statistic	0.96		Shapiro Wilk GOF Test					
721				5% Shapiro Wilk Critical Value	0.87		Detected Data appear Lognormal at 5% Significance Level					
722				Lilliefors Test Statistic	0.16		Lilliefors GOF Test					
723				5% Lilliefors Critical Value	0.23		Detected Data appear Lognormal at 5% Significance Level					
724				Detected Data appear Lognormal at 5% Significance Level								
725												
726				Lognormal ROS Statistics Using Imputed Non-Detects								
727				Mean in Original Scale	0.08		Mean in Log Scale					-2.61
728				SD in Original Scale	0.03		SD in Log Scale					0.43
729				95% t UCL (assumes normality of ROS data)	0.09		95% Percentile Bootstrap UCL					0.09
730				95% BCA Bootstrap UCL	0.09		95% Bootstrap t UCL					0.09
731				95% H-UCL (Log ROS)	0.1							
732												
733				UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed								
734				KM Mean (logged)	-2.62		95% H-UCL (KM -Log)					0.09
735				KM SD (logged)	0.44		95% Critical H Value (KM-Log)					1.98
736				KM Standard Error of Mean (logged)	0.11							
737												
738				DL/2 Statistics								
739				DL/2 Normal			DL/2 Log-Transformed					
740				Mean in Original Scale	0.07		Mean in Log Scale					-2.69
741				SD in Original Scale	0.03		SD in Log Scale					0.57
742				95% t UCL (Assumes normality)	0.09		95% H-Stat UCL					0.10
743				DL/2 is not a recommended method, provided for comparisons and historical reasons								
744												
745				Nonparametric Distribution Free UCL Statistics								
746				Detected Data appear Normal Distributed at 5% Significance Level								
747												
748				Suggested UCL to Use								
749				95% KM (t) UCL	0.09		95% KM (Percentile Bootstrap) UCL					0.09
750												
751				Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate								
752				Recommendations are based upon data size, data distribution, and skewness.								
753				Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and								
754				Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult								
755												
756												

	A	B	C	D	E	F	G	H	I	J	K	L
757	Uranium-238											
758												
759	General Statistics											
760	Total Number of Observations					17	Number of Distinct Observations					17
761							Number of Missing Observations					0
762	Minimum					0.87	Mean					2.00
763	Maximum					3.93	Median					1.63
764	SD					0.91	Std. Error of Mean					0.22
765	Coefficient of Variation					0.45	Skewness					0.76
766												
767	Normal GOF Test											
768	Shapiro Wilk Test Statistic					0.90	Shapiro Wilk GOF Test					
769	5% Shapiro Wilk Critical Value					0.89	Data appear Normal at 5% Significance Level					
770	Lilliefors Test Statistic					0.18	Lilliefors GOF Test					
771	5% Lilliefors Critical Value					0.21	Data appear Normal at 5% Significance Level					
772	Data appear Normal at 5% Significance Level											
773												
774	Assuming Normal Distribution											
775	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
776	95% Student's-t UCL					2.38	95% Adjusted-CLT UCL (Chen-1995)					2.41
777							95% Modified-t UCL (Johnson-1978)					2.39
778												
779	Gamma GOF Test											
780	A-D Test Statistic					0.43	Anderson-Darling Gamma GOF Test					
781	5% A-D Critical Value					0.74	data appear Gamma Distributed at 5% Significance Level					
782	K-S Test Statistic					0.15	Kolmogrov-Smirnoff Gamma GOF Test					
783	5% K-S Critical Value					0.21	data appear Gamma Distributed at 5% Significance Level					
784	Detected data appear Gamma Distributed at 5% Significance Level											
785												
786	Gamma Statistics											
787	k hat (MLE)					5.47	k star (bias corrected MLE)					4.55
788	Theta hat (MLE)					0.36	Theta star (bias corrected MLE)					0.44
789	nu hat (MLE)					186.2	nu star (bias corrected)					154.7
790	MLE Mean (bias corrected)					2.00	MLE Sd (bias corrected)					0.93
791							Approximate Chi Square Value (0.05)					127
792	Adjusted Level of Significance					0.034	Adjusted Chi Square Value					124.3
793												
794	Assuming Gamma Distribution											
795	Approximate Gamma UCL (use when n>=50))					2.44	Adjusted Gamma UCL (use when n<50)					2.49
796												
797	Lognormal GOF Test											
798	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk Lognormal GOF Test					
799	5% Shapiro Wilk Critical Value					0.89	Data appear Lognormal at 5% Significance Level					
800	Lilliefors Test Statistic					0.13	Lilliefors Lognormal GOF Test					
801	5% Lilliefors Critical Value					0.21	Data appear Lognormal at 5% Significance Level					
802	Data appear Lognormal at 5% Significance Level											
803												
804	Lognormal Statistics											
805	Minimum of Logged Data					-0.12	Mean of logged Data					0.60
806	Maximum of Logged Data					1.36	SD of logged Data					0.44
807												
808	Assuming Lognormal Distribution											
809	95% H-UCL					2.51	90% Chebyshev (MVUE) UCL					2.66
810	95% Chebyshev (MVUE) UCL					2.96	97.5% Chebyshev (MVUE) UCL					3.38
811	99% Chebyshev (MVUE) UCL					4.21						
812												
813	Nonparametric Distribution Free UCL Statistics											
814	Data appear to follow a Discernible Distribution at 5% Significance Level											
815												
816	Nonparametric Distribution Free UCLs											
817	95% CLT UCL					2.36	95% Jackknife UCL					2.38
818	95% Standard Bootstrap UCL					2.36	95% Bootstrap-t UCL					2.43
819	95% Hall's Bootstrap UCL					2.38	95% Percentile Bootstrap UCL					2.36

	A	B	C	D	E	F	G	H	I	J	K	L
820	95% BCA Bootstrap UCL					2.37						
821	90% Chebyshev(Mean, Sd) UCL					2.66	95% Chebyshev(Mean, Sd) UCL					2.96
822	97.5% Chebyshev(Mean, Sd) UCL					3.38	99% Chebyshev(Mean, Sd) UCL					4.20
823												
824	Suggested UCL to Use											
825	95% Student's-t UCL					2.38						
826												
827	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
828	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
829	Singh and Singh (2003). However, simulation results will not cover all Real World data sets											
830	For additional insight the user may want to consult a statistician.											
831												
832												
833	Zinc											
834												
835	General Statistics											
836	Total Number of Observations					17	Number of Distinct Observations					17
837							Number of Missing Observations					0
838	Minimum					17	Mean					31.74
839	Maximum					42.3	Median					31.1
840	SD					7.61	Std. Error of Mean					1.84
841	Coefficient of Variation					0.24	Skewness					-0.24
842												
843	Normal GOF Test											
844	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk GOF Test					
845	5% Shapiro Wilk Critical Value					0.89	Data appear Normal at 5% Significance Level					
846	Lilliefors Test Statistic					0.11	Lilliefors GOF Test					
847	5% Lilliefors Critical Value					0.21	Data appear Normal at 5% Significance Level					
848	Data appear Normal at 5% Significance Level											
849												
850	Assuming Normal Distribution											
851	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
852	95% Student's-t UCL					34.96	95% Adjusted-CLT UCL (Chen-1995)					34.61
853							95% Modified-t UCL (Johnson-1978)					34.96
854												
855	Gamma GOF Test											
856	A-D Test Statistic					0.34	Anderson-Darling Gamma GOF Test					
857	5% A-D Critical Value					0.73	Data appear Gamma Distributed at 5% Significance Level					
858	K-S Test Statistic					0.11	Kolmogorov-Smirnov Gamma GOF Test					
859	5% K-S Critical Value					0.20	Data appear Gamma Distributed at 5% Significance Level					
860	Detected data appear Gamma Distributed at 5% Significance Level											
861												
862	Gamma Statistics											
863	k hat (MLE)					16.9	k star (bias corrected MLE)					13.9
864	Theta hat (MLE)					1.87	Theta star (bias corrected MLE)					2.27
865	nu hat (MLE)					574.5	nu star (bias corrected)					474.5
866	MLE Mean (bias corrected)					31.74	MLE Sd (bias corrected)					8.49
867							Approximate Chi Square Value (0.05)					424.9
868	Adjusted Level of Significance					0.034	Adjusted Chi Square Value					420
869												
870	Assuming Gamma Distribution											
871	Approximate Gamma UCL (use when n>=50))					35.41	Adjusted Gamma UCL (use when n<50)					35.81
872												
873	Lognormal GOF Test											
874	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk Lognormal GOF Test					
875	5% Shapiro Wilk Critical Value					0.89	Data appear Lognormal at 5% Significance Level					
876	Lilliefors Test Statistic					0.11	Lilliefors Lognormal GOF Test					
877	5% Lilliefors Critical Value					0.21	Data appear Lognormal at 5% Significance Level					
878	Data appear Lognormal at 5% Significance Level											
879												
880	Lognormal Statistics											
881	Minimum of Logged Data					2.83	Mean of logged Data					3.42
882	Maximum of Logged Data					3.74	SD of logged Data					0.25
