

	A	B	C	D	E	F	G	H	I	J	K	L		
1	UCL Statistics for Data Sets with Non-Detects													
2														
3	User Selected Options													
4	e/Time of Computation			8/13/2015 1:53:08 PM										
5	From File			ProUCLinput_12-004(b)_0-5.xls										
6	Full Precision			OFF										
7	Confidence Coefficient			95%										
8	f Bootstrap Operations			2000										
9														
10														
11	Aluminum													
12														
13	General Statistics													
14	Total Number of Observations					8		Number of Distinct Observations					8	
15								Number of Missing Observations					0	
16	Minimum					5780		Mean					9495	
17	Maximum					16400		Median					7930	
18	SD					4060		Std. Error of Mean					1435	
19	Coefficient of Variation					0.42		Skewness					1.15	
20														
21	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use													
22	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.													
23	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).													
24	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0													
25														
26	Normal GOF Test													
27	Shapiro Wilk Test Statistic					0.81		Shapiro Wilk GOF Test						
28	5% Shapiro Wilk Critical Value					0.81		Data Not Normal at 5% Significance Level						
29	Lilliefors Test Statistic					0.27		Lilliefors GOF Test						
30	5% Lilliefors Critical Value					0.31		Data appear Normal at 5% Significance Level						
31	Data appear Approximate Normal at 5% Significance Level													
32														
33	Assuming Normal Distribution													
34	95% Normal UCL							95% UCLs (Adjusted for Skewness)						
35	95% Student's-t UCL					12214		95% Adjusted-CLT UCL (Chen-1995)					12484	
36								95% Modified-t UCL (Johnson-1978)					12312	
37														
38	Gamma GOF Test													
39	A-D Test Statistic					0.58		Anderson-Darling Gamma GOF Test						
40	5% A-D Critical Value					0.71		data appear Gamma Distributed at 5% Significance Level						
41	K-S Test Statistic					0.22		Kolmogrov-Smirnoff Gamma GOF Test						
42	5% K-S Critical Value					0.29		data appear Gamma Distributed at 5% Significance Level						
43	Detected data appear Gamma Distributed at 5% Significance Level													
44														
45	Gamma Statistics													
46	k hat (MLE)					7.26		k star (bias corrected MLE)					4.62	
47	Theta hat (MLE)					1307		Theta star (bias corrected MLE)					2054	
48	nu hat (MLE)					116.2		nu star (bias corrected)					73.9	
49	MLE Mean (bias corrected)					9495		MLE Sd (bias corrected)					4416	
50								Approximate Chi Square Value (0.05)					55.1	
51	Adjusted Level of Significance					0.01		Adjusted Chi Square Value					51.0	
52														
53	Assuming Gamma Distribution													
54	roximate Gamma UCL (use when n>=50))					12732		Adjusted Gamma UCL (use when n<50)					13751	
55														
56	Lognormal GOF Test													
57	Shapiro Wilk Test Statistic					0.88		Shapiro Wilk Lognormal GOF Test						
58	5% Shapiro Wilk Critical Value					0.81		Data appear Lognormal at 5% Significance Level						
59	Lilliefors Test Statistic					0.20		Lilliefors Lognormal GOF Test						
60	5% Lilliefors Critical Value					0.31		Data appear Lognormal at 5% Significance Level						
61	Data appear Lognormal at 5% Significance Level													
62														
63	Lognormal Statistics													
64	Minimum of Logged Data					8.66		Mean of logged Data					9.08	
65	Maximum of Logged Data					9.70		SD of logged Data					0.38	
66														
67	Assuming Lognormal Distribution													
68	95% H-UCL					13137		90% Chebyshev (MVUE) UCL					13366	
69	95% Chebyshev (MVUE) UCL					15140		97.5% Chebyshev (MVUE) UCL					17603	
70	99% Chebyshev (MVUE) UCL					22440								
71														
72	Nonparametric Distribution Free UCL Statistics													
73	Data appear to follow a Discernible Distribution at 5% Significance Level													
74														
75	Nonparametric Distribution Free UCLs													
76	95% CLT UCL					11856		95% Jackknife UCL					12214	
77	95% Standard Bootstrap UCL					11711		95% Bootstrap-t UCL					16374	
78	95% Hall's Bootstrap UCL					29339		95% Percentile Bootstrap UCL					11811	
79	95% BCA Bootstrap UCL					12199								
80	90% Chebyshev(Mean, Sd) UCL					13801		95% Chebyshev(Mean, Sd) UCL					15752	
81	97.5% Chebyshev(Mean, Sd) UCL					18459		99% Chebyshev(Mean, Sd) UCL					23777	
82														

	A	B	C	D	E	F	G	H	I	J	K	L
83	Suggested UCL to Use											
84	95% Student's-t UCL					12214						
85												
86	ations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
87	ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
88	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
89	For additional insight the user may want to consult a statistician.											
90												
91												
92	Arsenic											
93												
94	General Statistics											
95	Total Number of Observations					8	Number of Distinct Observations					8
96							Number of Missing Observations					0
97	Minimum					1.76	Mean					2.5
98	Maximum					3.5	Median					2.5
99	SD					0.62	Std. Error of Mean					0.22
100	Coefficient of Variation					0.24	Skewness					0.30
101												
102	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
103	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
104	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
105	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
106												
107	Normal GOF Test											
108	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk GOF Test					
109	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level					
110	Lilliefors Test Statistic					0.18	Lilliefors GOF Test					
111	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level					
112	Data appear Normal at 5% Significance Level											
113												
114	Assuming Normal Distribution											
115	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
116	95% Student's-t UCL					2.91	95% Adjusted-CLT UCL (Chen-1995)					2.88
117							95% Modified-t UCL (Johnson-1978)					2.92
118												
119	Gamma GOF Test											
120	A-D Test Statistic					0.31	Anderson-Darling Gamma GOF Test					
121	5% A-D Critical Value					0.71	data appear Gamma Distributed at 5% Significance Level					
122	K-S Test Statistic					0.19	Kolmogorov-Smirnov Gamma GOF Test					
123	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significance Level					
124	Detected data appear Gamma Distributed at 5% Significance Level											
125												
126	Gamma Statistics											
127	k hat (MLE)					18.4	k star (bias corrected MLE)					11.6
128	Theta hat (MLE)					0.13	Theta star (bias corrected MLE)					0.21
129	nu hat (MLE)					295.5	nu star (bias corrected)					186
130	MLE Mean (bias corrected)					2.5	MLE Sd (bias corrected)					0.73
131							Approximate Chi Square Value (0.05)					155.5
132	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					148.4
133												
134	Assuming Gamma Distribution											
135	Approximate Gamma UCL (use when n>=50)					2.99	Adjusted Gamma UCL (use when n<50)					3.13
136												
137	Lognormal GOF Test											
138	Shapiro Wilk Test Statistic					0.93	Shapiro Wilk Lognormal GOF Test					
139	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level					
140	Lilliefors Test Statistic					0.18	Lilliefors Lognormal GOF Test					
141	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level					
142	Data appear Lognormal at 5% Significance Level											
143												
144	Lognormal Statistics											
145	Minimum of Logged Data					0.56	Mean of logged Data					0.88
146	Maximum of Logged Data					1.25	SD of logged Data					0.25
147												
148	Assuming Lognormal Distribution											
149	95% H-UCL					3.03	90% Chebyshev (MVUE) UCL					3.16
150	95% Chebyshev (MVUE) UCL					3.46	97.5% Chebyshev (MVUE) UCL					3.88
151	99% Chebyshev (MVUE) UCL					4.70						
152												
153	Nonparametric Distribution Free UCL Statistics											
154	Data appear to follow a Discernible Distribution at 5% Significance Level											
155												
156	Nonparametric Distribution Free UCLs											
157	95% CLT UCL					2.86	95% Jackknife UCL					2.91
158	95% Standard Bootstrap UCL					2.84	95% Bootstrap-t UCL					2.93
159	95% Hall's Bootstrap UCL					2.83	95% Percentile Bootstrap UCL					2.84
160	95% BCA Bootstrap UCL					2.85						
161	90% Chebyshev(Mean, Sd) UCL					3.16	95% Chebyshev(Mean, Sd) UCL					3.46
162	97.5% Chebyshev(Mean, Sd) UCL					3.87	99% Chebyshev(Mean, Sd) UCL					4.69
163												
164	Suggested UCL to Use											

	A	B	C	D	E	F	G	H	I	J	K	L	
165	95% Student's-t UCL					2.91							
166													
167	Questions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
168	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
169	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
170	For additional insight the user may want to consult a statistician.												
171													
172													
173	Barium												
174													
175	General Statistics												
176	Total Number of Observations					8	Number of Distinct Observations					8	
177							Number of Missing Observations					0	
178	Minimum					113	Mean					179.3	
179	Maximum					406	Median					132.5	
180	SD					99.4	Std. Error of Mean					35.1	
181	Coefficient of Variation					0.55	Skewness					2.08	
182													
183	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
184	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
185	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
186	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
187													
188	Normal GOF Test												
189	Shapiro Wilk Test Statistic					0.71	Shapiro Wilk GOF Test						
190	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level						
191	Lilliefors Test Statistic					0.27	Lilliefors GOF Test						
192	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level						
193	Data appear Approximate Normal at 5% Significance Level												
194													
195	Assuming Normal Distribution												
196	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
197	95% Student's-t UCL					245.9	95% Adjusted-CLT UCL (Chen-1995)					264.9	
198							95% Modified-t UCL (Johnson-1978)					250.2	
199													
200	Gamma GOF Test												
201	A-D Test Statistic					0.78	Anderson-Darling Gamma GOF Test						
202	5% A-D Critical Value					0.71	Data Not Gamma Distributed at 5% Significance Level						
203	K-S Test Statistic					0.27	Kolmogorov-Smirnov Gamma GOF Test						
204	5% K-S Critical Value					0.29	Data appear Gamma Distributed at 5% Significance Level						
205	Detected data follow Appr. Gamma Distribution at 5% Significance Level												
206													
207	Gamma Statistics												
208	k hat (MLE)					5.19	k star (bias corrected MLE)					3.32	
209	Theta hat (MLE)					34.5	Theta star (bias corrected MLE)					53.8	
210	nu hat (MLE)					83.0	nu star (bias corrected)					53.2	
211	MLE Mean (bias corrected)					179.3	MLE Sd (bias corrected)					98.2	
212							Approximate Chi Square Value (0.05)					37.5	
213	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					34.1	
214													
215	Assuming Gamma Distribution												
216	Approximate Gamma UCL (use when n>=50)					254.6	Adjusted Gamma UCL (use when n<50)					279.3	
217													
218	Lognormal GOF Test												
219	Shapiro Wilk Test Statistic					0.81	Shapiro Wilk Lognormal GOF Test						
220	5% Shapiro Wilk Critical Value					0.81	Data Not Lognormal at 5% Significance Level						
221	Lilliefors Test Statistic					0.25	Lilliefors Lognormal GOF Test						
222	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level						
223	Data appear Approximate Lognormal at 5% Significance Level												
224													
225	Lognormal Statistics												
226	Minimum of Logged Data					4.72	Mean of logged Data					5.08	
227	Maximum of Logged Data					6.00	SD of logged Data					0.44	
228													
229	Assuming Lognormal Distribution												
230	95% H-UCL					261.1	90% Chebyshev (MVUE) UCL					260.2	
231	95% Chebyshev (MVUE) UCL					298.1	97.5% Chebyshev (MVUE) UCL					350.6	
232	99% Chebyshev (MVUE) UCL					453.8							
233													
234	Nonparametric Distribution Free UCL Statistics												
235	Data appear to follow a Discernible Distribution at 5% Significance Level												
236													
237	Nonparametric Distribution Free UCLs												
238	95% CLT UCL					237.1	95% Jackknife UCL					245.9	
239	95% Standard Bootstrap UCL					235.2	95% Bootstrap-t UCL					368.4	
240	95% Hall's Bootstrap UCL					441	95% Percentile Bootstrap UCL					240.1	
241	95% BCA Bootstrap UCL					257.1							
242	90% Chebyshev(Mean, Sd) UCL					284.8	95% Chebyshev(Mean, Sd) UCL					332.6	
243	97.5% Chebyshev(Mean, Sd) UCL					398.9	99% Chebyshev(Mean, Sd) UCL					529.2	
244													
245	Suggested UCL to Use												
246	95% Student's-t UCL					245.9							

	A	B	C	D	E	F	G	H	I	J	K	L		
247														
248	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate													
249	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and													
250	Singh and Singh (2003). However, simulations results will not cover all Real World data sets													
251	For additional insight the user may want to consult a statistician.													
252														
253														
254	Beryllium													
255														
256	General Statistics													
257	Total Number of Observations				8		Number of Distinct Observations				8			
258							Number of Missing Observations				0			
259	Minimum				0.6		Mean				0.83			
260	Maximum				1.2		Median				0.80			
261	SD				0.21		Std. Error of Mean				0.074			
262	Coefficient of Variation				0.26		Skewness				0.64			
263														
264	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use													
265	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.													
266	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).													
267	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0													
268														
269	Normal GOF Test													
270	Shapiro Wilk Test Statistic				0.91		Shapiro Wilk GOF Test							
271	5% Shapiro Wilk Critical Value				0.81		Data appear Normal at 5% Significance Level							
272	Lilliefors Test Statistic				0.21		Lilliefors GOF Test							
273	5% Lilliefors Critical Value				0.31		Data appear Normal at 5% Significance Level							
274	Data appear Normal at 5% Significance Level													
275														
276	Assuming Normal Distribution													
277	95% Normal UCL					95% UCLs (Adjusted for Skewness)								
278	95% Student's-t UCL				0.97		95% Adjusted-CLT UCL (Chen-1995)				0.97			
279							95% Modified-t UCL (Johnson-1978)				0.98			
280														
281	Gamma GOF Test													
282	A-D Test Statistic				0.35		Anderson-Darling Gamma GOF Test							
283	5% A-D Critical Value				0.71		Data appear Gamma Distributed at 5% Significance Level							
284	K-S Test Statistic				0.21		Kolmogorov-Smirnov Gamma GOF Test							
285	5% K-S Critical Value				0.29		Data appear Gamma Distributed at 5% Significance Level							
286	Detected data appear Gamma Distributed at 5% Significance Level													
287														
288	Gamma Statistics													
289	k hat (MLE)				17.61		k star (bias corrected MLE)				11.13			
290	Theta hat (MLE)				0.04		Theta star (bias corrected MLE)				0.074			
291	nu hat (MLE)				282.7		nu star (bias corrected)				178			
292	MLE Mean (bias corrected)				0.83		MLE Sd (bias corrected)				0.24			
293							Approximate Chi Square Value (0.05)				148.2			
294	Adjusted Level of Significance				0.01		Adjusted Chi Square Value				141.3			
295														
296	Assuming Gamma Distribution													
297	Approximate Gamma UCL (use when n>=50))					1		Adjusted Gamma UCL (use when n<50)					1.04	
298														
299	Lognormal GOF Test													
300	Shapiro Wilk Test Statistic				0.92		Shapiro Wilk Lognormal GOF Test							
301	5% Shapiro Wilk Critical Value				0.81		Data appear Lognormal at 5% Significance Level							
302	Lilliefors Test Statistic				0.19		Lilliefors Lognormal GOF Test							
303	5% Lilliefors Critical Value				0.31		Data appear Lognormal at 5% Significance Level							
304	Data appear Lognormal at 5% Significance Level													
305														
306	Lognormal Statistics													
307	Minimum of Logged Data				-0.51		Mean of logged Data				-0.21			
308	Maximum of Logged Data				0.18		SD of logged Data				0.25			
309														
310	Assuming Lognormal Distribution													
311	95% H-UCL				1.01		90% Chebyshev (MVUE) UCL				1.05			
312	95% Chebyshev (MVUE) UCL				1.15		97.5% Chebyshev (MVUE) UCL				1.29			
313	99% Chebyshev (MVUE) UCL				1.57									
314														
315	Nonparametric Distribution Free UCL Statistics													
316	Data appear to follow a Discernible Distribution at 5% Significance Level													
317														
318	Nonparametric Distribution Free UCLs													
319	95% CLT UCL				0.95		95% Jackknife UCL				0.97			
320	95% Standard Bootstrap UCL				0.95		95% Bootstrap-t UCL				1.01			
321	95% Hall's Bootstrap UCL				0.98		95% Percentile Bootstrap UCL				0.95			
322	95% BCA Bootstrap UCL				0.95									
323	90% Chebyshev(Mean, Sd) UCL				1.06		95% Chebyshev(Mean, Sd) UCL				1.16			
324	97.5% Chebyshev(Mean, Sd) UCL				1.31		99% Chebyshev(Mean, Sd) UCL				1.59			
325														
326	Suggested UCL to Use													
327	95% Student's-t UCL				0.97									
328														

	A	B	C	D	E	F	G	H	I	J	K	L
329	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
330	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
331	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
332	For additional insight the user may want to consult a statistician.											
333												
334	Cadmium											
335												
336	General Statistics											
337	Total Number of Observations					8	Number of Distinct Observations					8
338	Number of Detects					5	Number of Non-Detects					3
339	Number of Distinct Detects					5	Number of Distinct Non-Detects					3
340	Minimum Detect					0.029	Minimum Non-Detect					0.52
341	Maximum Detect					0.29	Maximum Non-Detect					0.54
342	Variance Detects					0.011	Percent Non-Detects					37.5
343	Mean Detects					0.10	SD Detects					0.11
344	Median Detects					0.06	CV Detects					1.04
345	Skewness Detects					1.98	Kurtosis Detects					4.06
346	Mean of Logged Detects					-2.59	SD of Logged Detects					0.88
347												
348	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
349	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
350	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
351	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
352												
353	Normal GOF Test on Detects Only											
354	Shapiro Wilk Test Statistic					0.74	Shapiro Wilk GOF Test					
355	5% Shapiro Wilk Critical Value					0.76	Detected Data Not Normal at 5% Significance Level					
356	Lilliefors Test Statistic					0.34	Lilliefors GOF Test					
357	5% Lilliefors Critical Value					0.39	Detected Data appear Normal at 5% Significance Level					
358	Detected Data appear Approximate Normal at 5% Significance Level											
359												
360	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
361	Mean					0.10	Standard Error of Mean					0.049
362	SD					0.094	95% KM (BCA) UCL					0.18
363	95% KM (t) UCL					0.2	95% KM (Percentile Bootstrap) UCL					0.18
364	95% KM (z) UCL					0.18	95% KM Bootstrap t UCL					0.51
365	90% KM Chebyshev UCL					0.25	95% KM Chebyshev UCL					0.32
366	97.5% KM Chebyshev UCL					0.41	99% KM Chebyshev UCL					0.59
367												
368	Gamma GOF Tests on Detected Observations Only											
369	A-D Test Statistic					0.41	Anderson-Darling GOF Test					
370	5% A-D Critical Value					0.68	data appear Gamma Distributed at 5% Significance Level					
371	K-S Test Statistic					0.25	Kolmogorov-Smirnov GOF					
372	5% K-S Critical Value					0.36	data appear Gamma Distributed at 5% Significance Level					
373	Detected data appear Gamma Distributed at 5% Significance Level											
374												
375	Gamma Statistics on Detected Data Only											
376	k hat (MLE)					1.57	k star (bias corrected MLE)					0.76
377	Theta hat (MLE)					0.06	Theta star (bias corrected MLE)					0.13
378	nu hat (MLE)					15.74	nu star (bias corrected)					7.63
379	MLE Mean (bias corrected)					0.10	MLE Sd (bias corrected)					0.12
380												
381	Gamma Kaplan-Meier (KM) Statistics											
382	k hat (KM)					1.15	nu hat (KM)					18.4
383	Approximate Chi Square Value (18.40, α)					9.67	Adjusted Chi Square Value (18.40, β)					8.13
384	Approximate KM-UCL (use when $n \geq 50$)					0.20	Gamma Adjusted KM-UCL (use when $n < 50$)					0.24
385												
386	Gamma ROS Statistics using Imputed Non-Detects											
387	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
388	GROS may not be used when kstar of detected data is small such as < 0.1											
389	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
390	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimate											
391	Minimum					0.029	Mean					0.094
392	Maximum					0.29	Median					0.088
393	SD					0.084	CV					0.84
394	k hat (MLE)					2.40	k star (bias corrected MLE)					1.58
395	Theta hat (MLE)					0.04	Theta star (bias corrected MLE)					0.06
396	nu hat (MLE)					38.4	nu star (bias corrected)					25.3
397	MLE Mean (bias corrected)					0.094	MLE Sd (bias corrected)					0.079
398							Adjusted Level of Significance (β)					0.01
399	Approximate Chi Square Value (25.34, α)					14.8	Adjusted Chi Square Value (25.34, β)					12.8
400	Gamma Approximate UCL (use when $n \geq 50$)					0.16	Gamma Adjusted UCL (use when $n < 50$)					0.19
401												
402	Lognormal GOF Test on Detected Observations Only											
403	Shapiro Wilk Test Statistic					0.94	Shapiro Wilk GOF Test					
404	5% Shapiro Wilk Critical Value					0.76	Detected Data appear Lognormal at 5% Significance Level					
405	Lilliefors Test Statistic					0.19	Lilliefors GOF Test					
406	5% Lilliefors Critical Value					0.39	Detected Data appear Lognormal at 5% Significance Level					
407	Detected Data appear Lognormal at 5% Significance Level											
408												
409	Lognormal ROS Statistics Using Imputed Non-Detects											
410	Mean in Original Scale					0.094	Mean in Log Scale					-2.59

A	B	C	D	E	F	G	H	I	J	K	L
411	SD in Original Scale				0.08	SD in Log Scale				0.67	
412	95% t UCL (assumes normality of ROS data)				0.15	95% Percentile Bootstrap UCL				0.15	
413	95% BCA Bootstrap UCL				0.16	95% Bootstrap t UCL				0.27	
414	95% H-UCL (Log ROS)				0.18						
415											
416	DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed										
417	KM Mean (logged)				-2.59	95% H-UCL (KM -Log)				0.24	
418	KM SD (logged)				0.79	95% Critical H Value (KM-Log)				2.93	
419	KM Standard Error of Mean (logged)				0.39						
420											
421	DL/2 Statistics										
422	DL/2 Normal					DL/2 Log-Transformed					
423	Mean in Original Scale				0.16	Mean in Log Scale				-2.11	
424	SD in Original Scale				0.11	SD in Log Scale				0.94	
425	95% t UCL (Assumes normality)				0.24	95% H-Stat UCL				0.60	
426	DL/2 is not a recommended method, provided for comparisons and historical reasons										
427											
428	Nonparametric Distribution Free UCL Statistics										
429	Detected Data appear Approximate Normal Distributed at 5% Significance Level										
430											
431	Suggested UCL to Use										
432	95% KM (t) UCL				0.2	95% KM (Percentile Bootstrap) UCL				0.18	
433											
434	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate										
435	Recommendations are based upon data size, data distribution, and skewness.										
436	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and										
437	Recommendations results will not cover all Real World data sets; for additional insight the user may want to consult										
438											
439											
440	Calcium										
441											
442	General Statistics										
443	Total Number of Observations				8	Number of Distinct Observations				8	
444						Number of Missing Observations				0	
445	Minimum				1380	Mean				2379	
446	Maximum				3620	Median				2280	
447	SD				689.4	Std. Error of Mean				243.7	
448	Coefficient of Variation				0.29	Skewness				0.64	
449											
450	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use										
451	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.										
452	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).										
453	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0										
454											
455	Normal GOF Test										
456	Shapiro Wilk Test Statistic				0.92	Shapiro Wilk GOF Test					
457	5% Shapiro Wilk Critical Value				0.81	Data appear Normal at 5% Significance Level					
458	Lilliefors Test Statistic				0.28	Lilliefors GOF Test					
459	5% Lilliefors Critical Value				0.31	Data appear Normal at 5% Significance Level					
460	Data appear Normal at 5% Significance Level										
461											
462	Assuming Normal Distribution										
463	95% Normal UCL					95% UCLs (Adjusted for Skewness)					
464	95% Student's-t UCL				2841	95% Adjusted-CLT UCL (Chen-1995)				2839	
465						95% Modified-t UCL (Johnson-1978)				2850	
466											
467	Gamma GOF Test										
468	A-D Test Statistic				0.36	Anderson-Darling Gamma GOF Test					
469	5% A-D Critical Value				0.71	Data appear Gamma Distributed at 5% Significance Level					
470	K-S Test Statistic				0.25	Kolmogorov-Smirnov Gamma GOF Test					
471	5% K-S Critical Value				0.29	Data appear Gamma Distributed at 5% Significance Level					
472	Detected data appear Gamma Distributed at 5% Significance Level										
473											
474	Gamma Statistics										
475	k hat (MLE)				13.75	k star (bias corrected MLE)				8.70	
476	Theta hat (MLE)				172.5	Theta star (bias corrected MLE)				273.4	
477	nu hat (MLE)				220.6	nu star (bias corrected)				139.2	
478	MLE Mean (bias corrected)				2379	MLE Sd (bias corrected)				806.4	
479						Approximate Chi Square Value (0.05)				113	
480	Adjusted Level of Significance				0.01	Adjusted Chi Square Value				107	
481											
482	Assuming Gamma Distribution										
483	Approximate Gamma UCL (use when n>=50)				2932	Adjusted Gamma UCL (use when n<50)				3096	
484											
485	Lognormal GOF Test										
486	Shapiro Wilk Test Statistic				0.94	Shapiro Wilk Lognormal GOF Test					
487	5% Shapiro Wilk Critical Value				0.81	Data appear Lognormal at 5% Significance Level					
488	Lilliefors Test Statistic				0.23	Lilliefors Lognormal GOF Test					
489	5% Lilliefors Critical Value				0.31	Data appear Lognormal at 5% Significance Level					
490	Data appear Lognormal at 5% Significance Level										
491											
492	Lognormal Statistics										

	A	B	C	D	E	F	G	H	I	J	K	L
493	Minimum of Logged Data					7.23	Mean of logged Data					7.73
494	Maximum of Logged Data					8.19	SD of logged Data					0.29
495												
496	Assuming Lognormal Distribution											
497	95% H-UCL					2998	90% Chebyshev (MVUE) UCL					3118
498	95% Chebyshev (MVUE) UCL					3453	97.5% Chebyshev (MVUE) UCL					3917
499	99% Chebyshev (MVUE) UCL					4829						
500												
501	Nonparametric Distribution Free UCL Statistics											
502	Data appear to follow a Discernible Distribution at 5% Significance Level											
503												
504	Nonparametric Distribution Free UCLs											
505	95% CLT UCL					2780	95% Jackknife UCL					2841
506	95% Standard Bootstrap UCL					2757	95% Bootstrap-t UCL					3067
507	95% Hall's Bootstrap UCL					4223	95% Percentile Bootstrap UCL					2771
508	95% BCA Bootstrap UCL					2759						
509	90% Chebyshev(Mean, Sd) UCL					3110	95% Chebyshev(Mean, Sd) UCL					3441
510	97.5% Chebyshev(Mean, Sd) UCL					3901	99% Chebyshev(Mean, Sd) UCL					4804
511												
512	Suggested UCL to Use											
513	95% Student's-t UCL					2841						
514												
515	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
516	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
517	For additional insight the user may want to consult a statistician.											
518												
519												
520												
521	Chromium											
522												
523	General Statistics											
524	Total Number of Observations					8	Number of Distinct Observations					8
525							Number of Missing Observations					0
526	Minimum					7.7	Mean					10.71
527	Maximum					18.7	Median					9.44
528	SD					3.80	Std. Error of Mean					1.34
529	Coefficient of Variation					0.35	Skewness					1.60
530												
531	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
532	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
533	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
534	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
535												
536	Normal GOF Test											
537	Shapiro Wilk Test Statistic					0.80	Shapiro Wilk GOF Test					
538	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level					
539	Lilliefors Test Statistic					0.27	Lilliefors GOF Test					
540	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level					
541	Data appear Approximate Normal at 5% Significance Level											
542												
543	Assuming Normal Distribution											
544	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
545	95% Student's-t UCL					13.3	95% Adjusted-CLT UCL (Chen-1995)					13.71
546							95% Modified-t UCL (Johnson-1978)					13.41
547												
548	Gamma GOF Test											
549	A-D Test Statistic					0.58	Anderson-Darling Gamma GOF Test					
550	5% A-D Critical Value					0.71	Data appear Gamma Distributed at 5% Significance Level					
551	K-S Test Statistic					0.24	Kolmogrov-Smirnoff Gamma GOF Test					
552	5% K-S Critical Value					0.29	Data appear Gamma Distributed at 5% Significance Level					
553	Detected data appear Gamma Distributed at 5% Significance Level											
554												
555	Gamma Statistics											
556	k hat (MLE)					11.04	k star (bias corrected MLE)					6.99
557	Theta hat (MLE)					0.97	Theta star (bias corrected MLE)					1.53
558	nu hat (MLE)					176.9	nu star (bias corrected)					111.9
559	MLE Mean (bias corrected)					10.71	MLE Sd (bias corrected)					4.06
560							Approximate Chi Square Value (0.05)					88.41
561	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					83.21
562												
563	Assuming Gamma Distribution											
564	Approximate Gamma UCL (use when n>=50))					13.5%	Adjusted Gamma UCL (use when n<50)					14.41%
565												
566	Lognormal GOF Test											
567	Shapiro Wilk Test Statistic					0.86	Shapiro Wilk Lognormal GOF Test					
568	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level					
569	Lilliefors Test Statistic					0.22	Lilliefors Lognormal GOF Test					
570	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level					
571	Data appear Lognormal at 5% Significance Level											
572												
573	Lognormal Statistics											
574	Minimum of Logged Data					2.04	Mean of logged Data					2.32

	A	B	C	D	E	F	G	H	I	J	K	L
575	Maximum of Logged Data					2.92	SD of logged Data					0.31
576												
577	Assuming Lognormal Distribution											
578	95% H-UCL					13.7	90% Chebyshev (MVUE) UCL					14.2
579	95% Chebyshev (MVUE) UCL					15.8	97.5% Chebyshev (MVUE) UCL					18.0
580	99% Chebyshev (MVUE) UCL					22.4						
581												
582	Nonparametric Distribution Free UCL Statistics											
583	Data appear to follow a Discernible Distribution at 5% Significance Level											
584												
585	Nonparametric Distribution Free UCLs											
586	95% CLT UCL					12.9	95% Jackknife UCL					13.3
587	95% Standard Bootstrap UCL					12.7	95% Bootstrap-t UCL					17.3
588	95% Hall's Bootstrap UCL					24.9	95% Percentile Bootstrap UCL					12.8
589	95% BCA Bootstrap UCL					13.6						
590	90% Chebyshev(Mean, Sd) UCL					14.7	95% Chebyshev(Mean, Sd) UCL					16.6
591	97.5% Chebyshev(Mean, Sd) UCL					19.1	99% Chebyshev(Mean, Sd) UCL					24.1
592												
593	Suggested UCL to Use											
594	95% Student's-t UCL					13.3						
595												
596	ptions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
597	ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
598	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
599	For additional insight the user may want to consult a statistician.											
600												
601												
602	Cobalt											
603												
604	General Statistics											
605	Total Number of Observations					8	Number of Distinct Observations					8
606							Number of Missing Observations					0
607	Minimum					5.12	Mean					6.5
608	Maximum					9.62	Median					6.03
609	SD					1.48	Std. Error of Mean					0.52
610	Coefficient of Variation					0.22	Skewness					1.60
611												
612	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
613	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
614	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
615	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
616												
617	Normal GOF Test											
618	Shapiro Wilk Test Statistic					0.83	Shapiro Wilk GOF Test					
619	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level					
620	Lilliefors Test Statistic					0.27	Lilliefors GOF Test					
621	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level					
622	Data appear Normal at 5% Significance Level											
623												
624	Assuming Normal Distribution											
625	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
626	95% Student's-t UCL					7.49	95% Adjusted-CLT UCL (Chen-1995)					7.67
627							95% Modified-t UCL (Johnson-1978)					7.54
628												
629	Gamma GOF Test											
630	A-D Test Statistic					0.53	Anderson-Darling Gamma GOF Test					
631	5% A-D Critical Value					0.71	data appear Gamma Distributed at 5% Significance Level					
632	K-S Test Statistic					0.25	Kolmogrov-Smirnoff Gamma GOF Test					
633	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significance Level					
634	Detected data appear Gamma Distributed at 5% Significance Level											
635												
636	Gamma Statistics											
637	k hat (MLE)					25.2	k star (bias corrected MLE)					15.8
638	Theta hat (MLE)					0.25	Theta star (bias corrected MLE)					0.40
639	nu hat (MLE)					404.6	nu star (bias corrected)					254.2
640	MLE Mean (bias corrected)					6.5	MLE Sd (bias corrected)					1.63
641							Approximate Chi Square Value (0.05)					218.3
642	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					209.9
643												
644	Assuming Gamma Distribution											
645	roximate Gamma UCL (use when n>=50)					7.56	Adjusted Gamma UCL (use when n<50)					7.87
646												
647	Lognormal GOF Test											
648	Shapiro Wilk Test Statistic					0.88	Shapiro Wilk Lognormal GOF Test					
649	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level					
650	Lilliefors Test Statistic					0.24	Lilliefors Lognormal GOF Test					
651	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level					
652	Data appear Lognormal at 5% Significance Level											
653												
654	Lognormal Statistics											
655	Minimum of Logged Data					1.63	Mean of logged Data					1.85
656	Maximum of Logged Data					2.26	SD of logged Data					0.20

	A	B	C	D	E	F	G	H	I	J	K	L
657												
658	Assuming Lognormal Distribution											
659	95% H-UCL					7.58	90% Chebyshev (MVUE) UCL					7.91
660	95% Chebyshev (MVUE) UCL					8.56	97.5% Chebyshev (MVUE) UCL					9.45
661	99% Chebyshev (MVUE) UCL					11.21						
662												
663	Nonparametric Distribution Free UCL Statistics											
664	Data appear to follow a Discernible Distribution at 5% Significance Level											
665												
666	Nonparametric Distribution Free UCLs											
667	95% CLT UCL					7.36	95% Jackknife UCL					7.49
668	95% Standard Bootstrap UCL					7.33	95% Bootstrap-t UCL					9.06
669	95% Hall's Bootstrap UCL					12.54	95% Percentile Bootstrap UCL					7.37
670	95% BCA Bootstrap UCL					7.55						
671	90% Chebyshev(Mean, Sd) UCL					8.07	95% Chebyshev(Mean, Sd) UCL					8.78
672	97.5% Chebyshev(Mean, Sd) UCL					9.77	99% Chebyshev(Mean, Sd) UCL					11.71
673												
674	Suggested UCL to Use											
675	95% Student's-t UCL					7.49						
676												
677	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate UCL.											
678	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh (2003). However, simulations results will not cover all Real World data sets.											
679	For additional insight the user may want to consult a statistician.											
680												
681												
682												
683	Copper											
684												
685	General Statistics											
686	Total Number of Observations					8	Number of Distinct Observations					8
687							Number of Missing Observations					0
688	Minimum					4.12	Mean					7.38
689	Maximum					12.1	Median					6.41
690	SD					2.98	Std. Error of Mean					1.05
691	Coefficient of Variation					0.40	Skewness					0.99
692												
693	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
694												
695	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
696	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
697												
698	Normal GOF Test											
699	Shapiro Wilk Test Statistic					0.84	Shapiro Wilk GOF Test					
700	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level					
701	Lilliefors Test Statistic					0.26	Lilliefors GOF Test					
702	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level					
703	Data appear Normal at 5% Significance Level											
704												
705	Assuming Normal Distribution											
706	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
707	95% Student's-t UCL					9.37	95% Adjusted-CLT UCL (Chen-1995)					9.51
708							95% Modified-t UCL (Johnson-1978)					9.44
709												
710	Gamma GOF Test											
711	A-D Test Statistic					0.47	Anderson-Darling Gamma GOF Test					
712	5% A-D Critical Value					0.71	Data appear Gamma Distributed at 5% Significance Level					
713	K-S Test Statistic					0.21	Kolmogorov-Smirnov Gamma GOF Test					
714	5% K-S Critical Value					0.29	Data appear Gamma Distributed at 5% Significance Level					
715	Detected data appear Gamma Distributed at 5% Significance Level											
716												
717	Gamma Statistics											
718	k hat (MLE)					7.77	k star (bias corrected MLE)					4.94
719	Theta hat (MLE)					0.95	Theta star (bias corrected MLE)					1.49
720	nu hat (MLE)					124.4	nu star (bias corrected)					79.0
721	MLE Mean (bias corrected)					7.38	MLE Sd (bias corrected)					3.32
722							Approximate Chi Square Value (0.05)					59.5
723	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					55.3
724												
725	Assuming Gamma Distribution											
726	Approximate Gamma UCL (use when n>=50)					9.79	Adjusted Gamma UCL (use when n<50)					10.5
727												
728	Lognormal GOF Test											
729	Shapiro Wilk Test Statistic					0.91	Shapiro Wilk Lognormal GOF Test					
730	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level					
731	Lilliefors Test Statistic					0.19	Lilliefors Lognormal GOF Test					
732	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level					
733	Data appear Lognormal at 5% Significance Level											
734												
735	Lognormal Statistics											
736	Minimum of Logged Data					1.41	Mean of logged Data					1.93
737	Maximum of Logged Data					2.49	SD of logged Data					0.38
738												

	A	B	C	D	E	F	G	H	I	J	K	L
739	Assuming Lognormal Distribution											
740	95% H-UCL				10.14	90% Chebyshev (MVUE) UCL				10.39		
741	95% Chebyshev (MVUE) UCL				11.7	97.5% Chebyshev (MVUE) UCL				13.58		
742	99% Chebyshev (MVUE) UCL				17.2							
743												
744	Nonparametric Distribution Free UCL Statistics											
745	Data appear to follow a Discernible Distribution at 5% Significance Level											
746												
747	Nonparametric Distribution Free UCLs											
748	95% CLT UCL				9.11	95% Jackknife UCL				9.37		
749	95% Standard Bootstrap UCL				8.99	95% Bootstrap-t UCL				11.8		
750	95% Hall's Bootstrap UCL				24.2	95% Percentile Bootstrap UCL				9.03		
751	95% BCA Bootstrap UCL				9.27							
752	90% Chebyshev(Mean, Sd) UCL				10.54	95% Chebyshev(Mean, Sd) UCL				11.9		
753	97.5% Chebyshev(Mean, Sd) UCL				13.96	99% Chebyshev(Mean, Sd) UCL				17.8		
754												
755	Suggested UCL to Use											
756	95% Student's-t UCL				9.37							
757												
758	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
759	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
760	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
761	For additional insight the user may want to consult a statistician.											
762												
763												
764	Iron											
765												
766	General Statistics											
767	Total Number of Observations				8	Number of Distinct Observations				8		
768						Number of Missing Observations				0		
769	Minimum				8670	Mean				11954		
770	Maximum				21700	Median				10840		
771	SD				4197	Std. Error of Mean				1484		
772	Coefficient of Variation				0.35	Skewness				2.18		
773												
774	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
775	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
776	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
777	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
778												
779	Normal GOF Test											
780	Shapiro Wilk Test Statistic				0.73	Shapiro Wilk GOF Test						
781	5% Shapiro Wilk Critical Value				0.81	Data Not Normal at 5% Significance Level						
782	Lilliefors Test Statistic				0.31	Lilliefors GOF Test						
783	5% Lilliefors Critical Value				0.31	Data Not Normal at 5% Significance Level						
784	Data Not Normal at 5% Significance Level											
785												
786	Assuming Normal Distribution											
787	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
788	95% Student's-t UCL				14765	95% Adjusted-CLT UCL (Chen-1995)				15621		
789						95% Modified-t UCL (Johnson-1978)				14956		
790												
791	Gamma GOF Test											
792	A-D Test Statistic				0.71	Anderson-Darling Gamma GOF Test						
793	5% A-D Critical Value				0.71	Data Not Gamma Distributed at 5% Significance Level						
794	K-S Test Statistic				0.26	Kolmogorov-Smirnov Gamma GOF Test						
795	5% K-S Critical Value				0.29	Data appear Gamma Distributed at 5% Significance Level						
796	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
797												
798	Gamma Statistics											
799	k hat (MLE)				12.04	k star (bias corrected MLE)				7.61		
800	Theta hat (MLE)				991.5	Theta star (bias corrected MLE)				1569		
801	nu hat (MLE)				192.9	nu star (bias corrected)				121.9		
802	MLE Mean (bias corrected)				11954	MLE Sd (bias corrected)				4331		
803						Approximate Chi Square Value (0.05)				97.4		
804	Adjusted Level of Significance				0.01	Adjusted Chi Square Value				91.8		
805												
806	Assuming Gamma Distribution											
807	Approximate Gamma UCL (use when n>=50)				14960	Adjusted Gamma UCL (use when n<50)				15861		
808												
809	Lognormal GOF Test											
810	Shapiro Wilk Test Statistic				0.82	Shapiro Wilk Lognormal GOF Test						
811	5% Shapiro Wilk Critical Value				0.81	Data appear Lognormal at 5% Significance Level						
812	Lilliefors Test Statistic				0.24	Lilliefors Lognormal GOF Test						
813	5% Lilliefors Critical Value				0.31	Data appear Lognormal at 5% Significance Level						
814	Data appear Lognormal at 5% Significance Level											
815												
816	Lognormal Statistics											
817	Minimum of Logged Data				9.06	Mean of logged Data				9.34		
818	Maximum of Logged Data				9.98	SD of logged Data				0.29		
819												
820	Assuming Lognormal Distribution											

	A	B	C	D	E	F	G	H	I	J	K	L	
821	95% H-UCL					14994	90% Chebyshev (MVUE) UCL					15594	
822	95% Chebyshev (MVUE) UCL					17269	97.5% Chebyshev (MVUE) UCL					19595	
823	99% Chebyshev (MVUE) UCL					24162							
824													
825	Nonparametric Distribution Free UCL Statistics												
826	Data appear to follow a Discernible Distribution at 5% Significance Level												
827													
828	Nonparametric Distribution Free UCLs												
829	95% CLT UCL					14394	95% Jackknife UCL					14765	
830	95% Standard Bootstrap UCL					14229	95% Bootstrap-t UCL					18340	
831	95% Hall's Bootstrap UCL					23640	95% Percentile Bootstrap UCL					14625	
832	95% BCA Bootstrap UCL					15613							
833	90% Chebyshev(Mean, Sd) UCL					16405	95% Chebyshev(Mean, Sd) UCL					18421	
834	97.5% Chebyshev(Mean, Sd) UCL					21220	99% Chebyshev(Mean, Sd) UCL					26717	
835													
836	Suggested UCL to Use												
837	95% Adjusted Gamma UCL					15861							
838													
839	Options regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
840	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
841	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
842	For additional insight the user may want to consult a statistician.												
843													
844													
845	Lead												
846													
847	General Statistics												
848	Total Number of Observations					8	Number of Distinct Observations					8	
849							Number of Missing Observations					0	
850	Minimum					7.83	Mean					14.5	
851	Maximum					23.4	Median					12.3	
852	SD					5.82	Std. Error of Mean					2.05	
853	Coefficient of Variation					0.39	Skewness					0.80	
854													
855	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
856	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
857	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
858	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
859													
860	Normal GOF Test												
861	Shapiro Wilk Test Statistic					0.87	Shapiro Wilk GOF Test						
862	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level						
863	Lilliefors Test Statistic					0.22	Lilliefors GOF Test						
864	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level						
865	Data appear Normal at 5% Significance Level												
866													
867	Assuming Normal Distribution												
868	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
869	95% Student's-t UCL					18.4	95% Adjusted-CLT UCL (Chen-1995)					18.5	
870							95% Modified-t UCL (Johnson-1978)					18.5	
871													
872	Gamma GOF Test												
873	A-D Test Statistic					0.40	Anderson-Darling Gamma GOF Test						
874	5% A-D Critical Value					0.71	Data appear Gamma Distributed at 5% Significance Level						
875	K-S Test Statistic					0.19	Kolmogrov-Smirnoff Gamma GOF Test						
876	5% K-S Critical Value					0.29	Data appear Gamma Distributed at 5% Significance Level						
877	Detected data appear Gamma Distributed at 5% Significance Level												
878													
879	Gamma Statistics												
880	k hat (MLE)					7.67	k star (bias corrected MLE)					4.87	
881	Theta hat (MLE)					1.9	Theta star (bias corrected MLE)					2.98	
882	nu hat (MLE)					122.8	nu star (bias corrected)					78.0	
883	MLE Mean (bias corrected)					14.5	MLE Sd (bias corrected)					6.6	
884							Approximate Chi Square Value (0.05)					58.7	
885	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					54.4	
886													
887	Assuming Gamma Distribution												
888	Approximate Gamma UCL (use when n>=50)					19.3	Adjusted Gamma UCL (use when n<50)					20.8	
889													
890	Lognormal GOF Test												
891	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test						
892	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level						
893	Lilliefors Test Statistic					0.17	Lilliefors Lognormal GOF Test						
894	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level						
895	Data appear Lognormal at 5% Significance Level												
896													
897	Lognormal Statistics												
898	Minimum of Logged Data					2.05	Mean of logged Data					2.61	
899	Maximum of Logged Data					3.15	SD of logged Data					0.38	
900													
901	Assuming Lognormal Distribution												
902	95% H-UCL					20.1	90% Chebyshev (MVUE) UCL					20.5	

	A	B	C	D	E	F	G	H	I	J	K	L	
903	95% Chebyshev (MVUE) UCL					23.28	97.5% Chebyshev (MVUE) UCL					27.04	
904	99% Chebyshev (MVUE) UCL					34.44							
905													
906	Nonparametric Distribution Free UCL Statistics												
907	Data appear to follow a Discernible Distribution at 5% Significance Level												
908													
909	Nonparametric Distribution Free UCLs												
910	95% CLT UCL					17.91	95% Jackknife UCL					18.44	
911	95% Standard Bootstrap UCL					17.76	95% Bootstrap-t UCL					21.74	
912	95% Hall's Bootstrap UCL					20.64	95% Percentile Bootstrap UCL					17.84	
913	95% BCA Bootstrap UCL					18.5							
914	90% Chebyshev(Mean, Sd) UCL					20.76	95% Chebyshev(Mean, Sd) UCL					23.54	
915	97.5% Chebyshev(Mean, Sd) UCL					27.44	99% Chebyshev(Mean, Sd) UCL					35.04	
916													
917	Suggested UCL to Use												
918	95% Student's-t UCL					18.44							
919													
920	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
921	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh												
922	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
923	For additional insight the user may want to consult a statistician.												
924													
925													
926	Magnesium												
927													
928	General Statistics												
929	Total Number of Observations					8	Number of Distinct Observations					8	
930							Number of Missing Observations					0	
931	Minimum					1320	Mean					1836	
932	Maximum					3000	Median					1665	
933	SD					550.2	Std. Error of Mean					194.5	
934	Coefficient of Variation					0.3	Skewness					1.55	
935													
936	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
937	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
938	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
939	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
940													
941	Normal GOF Test												
942	Shapiro Wilk Test Statistic					0.85	Shapiro Wilk GOF Test						
943	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level						
944	Lilliefors Test Statistic					0.22	Lilliefors GOF Test						
945	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level						
946	Data appear Normal at 5% Significance Level												
947													
948	Assuming Normal Distribution												
949	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
950	95% Student's-t UCL					2205	95% Adjusted-CLT UCL (Chen-1995)					2270	
951							95% Modified-t UCL (Johnson-1978)					2223	
952													
953	Gamma GOF Test												
954	A-D Test Statistic					0.38	Anderson-Darling Gamma GOF Test						
955	5% A-D Critical Value					0.71	data appear Gamma Distributed at 5% Significance Level						
956	K-S Test Statistic					0.20	Kolmogrov-Smirnoff Gamma GOF Test						
957	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significance Level						
958	Detected data appear Gamma Distributed at 5% Significance Level												
959													
960	Gamma Statistics												
961	k hat (MLE)					14.81	k star (bias corrected MLE)					9.37	
962	Theta hat (MLE)					123.5	Theta star (bias corrected MLE)					195.8	
963	nu hat (MLE)					237.9	nu star (bias corrected)					150	
964	MLE Mean (bias corrected)					1836	MLE Sd (bias corrected)					599.6	
965							Approximate Chi Square Value (0.05)					122.7	
966	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					116.5	
967													
968	Assuming Gamma Distribution												
969	Approximate Gamma UCL (use when n>=50))					2245	Adjusted Gamma UCL (use when n<50)					2365	
970													
971	Lognormal GOF Test												
972	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test						
973	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level						
974	Lilliefors Test Statistic					0.18	Lilliefors Lognormal GOF Test						
975	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level						
976	Data appear Lognormal at 5% Significance Level												
977													
978	Lognormal Statistics												
979	Minimum of Logged Data					7.18	Mean of logged Data					7.48	
980	Maximum of Logged Data					8.00	SD of logged Data					0.27	
981													
982	Assuming Lognormal Distribution												
983	95% H-UCL					2261	90% Chebyshev (MVUE) UCL					2358	
984	95% Chebyshev (MVUE) UCL					2596	97.5% Chebyshev (MVUE) UCL					2926	

	A	B	C	D	E	F	G	H	I	J	K	L
985	99% Chebyshev (MVUE) UCL					3575						
986												
987	Nonparametric Distribution Free UCL Statistics											
988	Data appear to follow a Discernible Distribution at 5% Significance Level											
989												
990	Nonparametric Distribution Free UCLs											
991	95% CLT UCL				2156	95% Jackknife UCL				2205		
992	95% Standard Bootstrap UCL				2140	95% Bootstrap-t UCL				2578		
993	95% Hall's Bootstrap UCL				3807	95% Percentile Bootstrap UCL				2163		
994	95% BCA Bootstrap UCL				2244							
995	90% Chebyshev(Mean, Sd) UCL				2420	95% Chebyshev(Mean, Sd) UCL				2684		
996	97.5% Chebyshev(Mean, Sd) UCL				3051	99% Chebyshev(Mean, Sd) UCL				3772		
997												
998	Suggested UCL to Use											
999	95% Student's-t UCL				2205							
1000												
1001	tions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1002	ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
1003	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1004	For additional insight the user may want to consult a statistician.											
1005												
1006												
1007	Nickel											
1008												
1009	General Statistics											
1010	Total Number of Observations				8	Number of Distinct Observations				8		
1011						Number of Missing Observations				0		
1012	Minimum				4.94	Mean				7		
1013	Maximum				8.5	Median				6.75		
1014	SD				1.21	Std. Error of Mean				0.43		
1015	Coefficient of Variation				0.17					Skewness	-0.28	
1016												
1017	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
1018	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
1019	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
1020	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
1021												
1022	Normal GOF Test											
1023	Shapiro Wilk Test Statistic				0.93	Shapiro Wilk GOF Test						
1024	5% Shapiro Wilk Critical Value				0.81	Data appear Normal at 5% Significance Level						
1025	Lilliefors Test Statistic				0.18	Lilliefors GOF Test						
1026	5% Lilliefors Critical Value				0.31	Data appear Normal at 5% Significance Level						
1027	Data appear Normal at 5% Significance Level											
1028												
1029	Assuming Normal Distribution											
1030	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
1031	95% Student's-t UCL				7.81	95% Adjusted-CLT UCL (Chen-1995)				7.66		
1032						95% Modified-t UCL (Johnson-1978)				7.80		
1033												
1034	Gamma GOF Test											
1035	A-D Test Statistic				0.33	Anderson-Darling Gamma GOF Test						
1036	5% A-D Critical Value				0.71	data appear Gamma Distributed at 5% Significance Level						
1037	K-S Test Statistic				0.19	Kolmogrov-Smirnoff Gamma GOF Test						
1038	5% K-S Critical Value				0.29	data appear Gamma Distributed at 5% Significance Level						
1039	Detected data appear Gamma Distributed at 5% Significance Level											
1040												
1041	Gamma Statistics											
1042	k hat (MLE)				35.84	k star (bias corrected MLE)				22.57		
1043	Theta hat (MLE)				0.19	Theta star (bias corrected MLE)				0.31		
1044	nu hat (MLE)				574.3	nu star (bias corrected)				360.3		
1045	MLE Mean (bias corrected)				7	MLE Sd (bias corrected)				1.47		
1046						Approximate Chi Square Value (0.05)				317.3		
1047	Adjusted Level of Significance				0.015	Adjusted Chi Square Value				307		
1048												
1049	Assuming Gamma Distribution											
1050	Approximate Gamma UCL (use when n>=50)				7.94	Adjusted Gamma UCL (use when n<50)				8.21		
1051												
1052	Lognormal GOF Test											
1053	Shapiro Wilk Test Statistic				0.92	Shapiro Wilk Lognormal GOF Test						
1054	5% Shapiro Wilk Critical Value				0.81	Data appear Lognormal at 5% Significance Level						
1055	Lilliefors Test Statistic				0.17	Lilliefors Lognormal GOF Test						
1056	5% Lilliefors Critical Value				0.31	Data appear Lognormal at 5% Significance Level						
1057	Data appear Lognormal at 5% Significance Level											
1058												
1059	Lognormal Statistics											
1060	Minimum of Logged Data				1.59	Mean of logged Data				1.93		
1061	Maximum of Logged Data				2.14	SD of logged Data				0.18		
1062												
1063	Assuming Lognormal Distribution											
1064	95% H-UCL				8.00	90% Chebyshev (MVUE) UCL				8.35		
1065	95% Chebyshev (MVUE) UCL				8.96	97.5% Chebyshev (MVUE) UCL				9.81		
1066	99% Chebyshev (MVUE) UCL				11.44							

	A	B	C	D	E	F	G	H	I	J	K	L
1067												
1068	Nonparametric Distribution Free UCL Statistics											
1069	Data appear to follow a Discernible Distribution at 5% Significance Level											
1070												
1071	Nonparametric Distribution Free UCLs											
1072	95% CLT UCL				7.70	95% Jackknife UCL				7.81		
1073	95% Standard Bootstrap UCL				7.66	95% Bootstrap-t UCL				7.80		
1074	95% Hall's Bootstrap UCL				7.64	95% Percentile Bootstrap UCL				7.64		
1075	95% BCA Bootstrap UCL				7.63							
1076	90% Chebyshev(Mean, Sd) UCL				8.29	95% Chebyshev(Mean, Sd) UCL				8.87		
1077	97.5% Chebyshev(Mean, Sd) UCL				9.69	99% Chebyshev(Mean, Sd) UCL				11.25		
1078												
1079	Suggested UCL to Use											
1080	95% Student's-t UCL				7.81							
1081												
1082	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1083	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
1084	Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1085	For additional insight the user may want to consult a statistician.											
1086												
1087	highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may											
1088	not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.											
1089												
1090												
1091	Uranium											
1092												
1093	General Statistics											
1094	Total Number of Observations				8	Number of Distinct Observations				8		
1095						Number of Missing Observations				0		
1096	Minimum				0.42	Mean				1.78		
1097	Maximum				5.8	Median				1.16		
1098	SD				1.77	Std. Error of Mean				0.62		
1099	Coefficient of Variation				0.99	Skewness				2.03		
1100												
1101	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
1102	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
1103	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
1104	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
1105												
1106	Normal GOF Test											
1107	Shapiro Wilk Test Statistic				0.75	Shapiro Wilk GOF Test						
1108	5% Shapiro Wilk Critical Value				0.81	Data Not Normal at 5% Significance Level						
1109	Lilliefors Test Statistic				0.26	Lilliefors GOF Test						
1110	5% Lilliefors Critical Value				0.31	Data appear Normal at 5% Significance Level						
1111	Data appear Approximate Normal at 5% Significance Level											
1112												
1113	Assuming Normal Distribution											
1114	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
1115	95% Student's-t UCL				2.97	95% Adjusted-CLT UCL (Chen-1995)				3.29		
1116						95% Modified-t UCL (Johnson-1978)				3.04		
1117												
1118	Gamma GOF Test											
1119	A-D Test Statistic				0.39	Anderson-Darling Gamma GOF Test						
1120	5% A-D Critical Value				0.72	Data appear Gamma Distributed at 5% Significance Level						
1121	K-S Test Statistic				0.21	Kolmogorov-Smirnoff Gamma GOF Test						
1122	5% K-S Critical Value				0.29	Data appear Gamma Distributed at 5% Significance Level						
1123	Detected data appear Gamma Distributed at 5% Significance Level											
1124												
1125	Gamma Statistics											
1126	k hat (MLE)				1.61	k star (bias corrected MLE)				1.09		
1127	Theta hat (MLE)				1.10	Theta star (bias corrected MLE)				1.63		
1128	nu hat (MLE)				25.8	nu star (bias corrected)				17.4		
1129	MLE Mean (bias corrected)				1.78	MLE Sd (bias corrected)				1.70		
1130						Approximate Chi Square Value (0.05)				9.00		
1131	Adjusted Level of Significance				0.01	Adjusted Chi Square Value				7.51		
1132												
1133	Assuming Gamma Distribution											
1134	Approximate Gamma UCL (use when n>=50)				3.45	Adjusted Gamma UCL (use when n<50)				4.14		
1135												
1136	Lognormal GOF Test											
1137	Shapiro Wilk Test Statistic				0.95	Shapiro Wilk Lognormal GOF Test						
1138	5% Shapiro Wilk Critical Value				0.81	Data appear Lognormal at 5% Significance Level						
1139	Lilliefors Test Statistic				0.19	Lilliefors Lognormal GOF Test						
1140	5% Lilliefors Critical Value				0.31	Data appear Lognormal at 5% Significance Level						
1141	Data appear Lognormal at 5% Significance Level											
1142												
1143	Lognormal Statistics											
1144	Minimum of Logged Data				-0.86	Mean of logged Data				0.23		
1145	Maximum of Logged Data				1.75	SD of logged Data				0.84		
1146												
1147	Assuming Lognormal Distribution											
1148	95% H-UCL				4.84	90% Chebyshev (MVUE) UCL				3.29		

	A	B	C	D	E	F	G	H	I	J	K	L	
1149	95% Chebyshev (MVUE) UCL					4.01	97.5% Chebyshev (MVUE) UCL					5.00	
1150	99% Chebyshev (MVUE) UCL					6.94							
1151													
1152	Nonparametric Distribution Free UCL Statistics												
1153	Data appear to follow a Discernible Distribution at 5% Significance Level												
1154													
1155	Nonparametric Distribution Free UCLs												
1156	95% CLT UCL					2.81	95% Jackknife UCL					2.97	
1157	95% Standard Bootstrap UCL					2.75	95% Bootstrap-t UCL					4.72	
1158	95% Hall's Bootstrap UCL					7.34	95% Percentile Bootstrap UCL					2.80	
1159	95% BCA Bootstrap UCL					3.37							
1160	90% Chebyshev(Mean, Sd) UCL					3.66	95% Chebyshev(Mean, Sd) UCL					4.51	
1161	97.5% Chebyshev(Mean, Sd) UCL					5.69	99% Chebyshev(Mean, Sd) UCL					8.01	
1162													
1163	Suggested UCL to Use												
1164	95% Student's-t UCL					2.97							
1165													
1166	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
1167	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
1168	Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
1169	For additional insight the user may want to consult a statistician.												
1170													
1171													
1172	Vanadium												
1173													
1174	General Statistics												
1175	Total Number of Observations					8	Number of Distinct Observations					8	
1176							Number of Missing Observations					0	
1177	Minimum					12.7	Mean					23.34	
1178	Maximum					47.5	Median					21.4	
1179	SD					10.34	Std. Error of Mean					3.65	
1180	Coefficient of Variation					0.44	Skewness					2.18	
1181													
1182	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
1183	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
1184	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
1185	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
1186													
1187	Normal GOF Test												
1188	Shapiro Wilk Test Statistic					0.72	Shapiro Wilk GOF Test						
1189	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level						
1190	Lilliefors Test Statistic					0.38	Lilliefors GOF Test						
1191	5% Lilliefors Critical Value					0.31	Data Not Normal at 5% Significance Level						
1192	Data Not Normal at 5% Significance Level												
1193													
1194	Assuming Normal Distribution												
1195	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
1196	95% Student's-t UCL					30.2	95% Adjusted-CLT UCL (Chen-1995)					32.34	
1197							95% Modified-t UCL (Johnson-1978)					30.74	
1198													
1199	Gamma GOF Test												
1200	A-D Test Statistic					0.75	Anderson-Darling Gamma GOF Test						
1201	5% A-D Critical Value					0.71	Data Not Gamma Distributed at 5% Significance Level						
1202	K-S Test Statistic					0.33	Kolmogrov-Smirnoff Gamma GOF Test						
1203	5% K-S Critical Value					0.29	Data Not Gamma Distributed at 5% Significance Level						
1204	Data Not Gamma Distributed at 5% Significance Level												
1205													
1206	Gamma Statistics												
1207	k hat (MLE)					7.67	k star (bias corrected MLE)					4.88	
1208	Theta hat (MLE)					3.04	Theta star (bias corrected MLE)					4.78	
1209	nu hat (MLE)					122.8	nu star (bias corrected)					78.04	
1210	MLE Mean (bias corrected)					23.34	MLE Sd (bias corrected)					10.5	
1211							Approximate Chi Square Value (0.05)					58.7	
1212	Adjusted Level of Significance					0.015	Adjusted Chi Square Value					54.5	
1213													
1214	Assuming Gamma Distribution												
1215	Approximate Gamma UCL (use when n>=50))					31.05	Adjusted Gamma UCL (use when n<50)					33.44	
1216													
1217	Lognormal GOF Test												
1218	Shapiro Wilk Test Statistic					0.86	Shapiro Wilk Lognormal GOF Test						
1219	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level						
1220	Lilliefors Test Statistic					0.31	Lilliefors Lognormal GOF Test						
1221	5% Lilliefors Critical Value					0.31	Data Not Lognormal at 5% Significance Level						
1222	Data appear Approximate Lognormal at 5% Significance Level												
1223													
1224	Lognormal Statistics												
1225	Minimum of Logged Data					2.54	Mean of logged Data					3.08	
1226	Maximum of Logged Data					3.86	SD of logged Data					0.37	
1227													
1228	Assuming Lognormal Distribution												
1229	95% H-UCL					31.55	90% Chebyshev (MVUE) UCL					32.34	
1230	95% Chebyshev (MVUE) UCL					36.4	97.5% Chebyshev (MVUE) UCL					42.2	

	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 1:55:00 PM									
5	From File		ProUCLinput_12-004(b)_0-10.xls									
6	Full Precision		OFF									
7	Confidence Coefficient		95%									
8	Number of Bootstrap Operations		2000									
9												
10												
11	Aluminum											
12												
13	General Statistics											
14	Total Number of Observations				12		Number of Distinct Observations				12	
15							Number of Missing Observations				0	
16	Minimum				1580		Mean				8152	
17	Maximum				16400		Median				7320	
18	SD				4922		Std. Error of Mean				1421	
19	Coefficient of Variation				0.60		Skewness				0.51	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.92		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.85		Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.16		Lilliefors GOF Test					
25	5% Lilliefors Critical Value				0.25		Data appear Normal at 5% Significance Level					
26	Data appear Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL				10703		95% Adjusted-CLT UCL (Chen-1995)				10716	
31							95% Modified-t UCL (Johnson-1978)				10739	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				0.27		Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value				0.74		Data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.13		Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value				0.24		Data appear Gamma Distributed at 5% Significance Level					
38	Detected data appear Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)				2.59		k star (bias corrected MLE)				1.99	
42	Theta hat (MLE)				3147		Theta star (bias corrected MLE)				4079	
43	nu hat (MLE)				62.14		nu star (bias corrected)				47.9	
44	MLE Mean (bias corrected)				8152		MLE Sd (bias corrected)				5766	
45							Approximate Chi Square Value (0.05)				33.0	
46	Adjusted Level of Significance				0.025		Adjusted Chi Square Value				31.1	
47												
48	Assuming Gamma Distribution											
49	Approximate Gamma UCL (use when n>=50)				11824		Adjusted Gamma UCL (use when n<50)				12536	
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic				0.93		Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value				0.85		Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic				0.17		Lilliefors Lognormal GOF Test					
55	5% Lilliefors Critical Value				0.25		Data appear Lognormal at 5% Significance Level					
56	Data appear Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59	Minimum of Logged Data				7.36		Mean of logged Data				8.80	
60	Maximum of Logged Data				9.70		SD of logged Data				0.72	
61												
62	Assuming Lognormal Distribution											
63	95% H-UCL				14679		90% Chebyshev (MVUE) UCL				13876	

[illegible]

	A	B	C	D	E	F	G	H	I	J	K	L
127	Lognormal GOF Test											
128	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test					
129	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
130	Lilliefors Test Statistic					0.15	Lilliefors Lognormal GOF Test					
131	5% Lilliefors Critical Value					0.25	Data appear Lognormal at 5% Significance Level					
132	Data appear Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135	Minimum of Logged Data					-0.25	Mean of logged Data					0.69
136	Maximum of Logged Data					1.33	SD of logged Data					0.51
137												
138	Assuming Lognormal Distribution											
139	95% H-UCL					3.18	90% Chebyshev (MVUE) UCL					3.28
140	95% Chebyshev (MVUE) UCL					3.74	97.5% Chebyshev (MVUE) UCL					4.39
141	99% Chebyshev (MVUE) UCL					5.67						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147	95% CLT UCL					2.69	95% Jackknife UCL					2.73
148	95% Standard Bootstrap UCL					2.66	95% Bootstrap-t UCL					2.75
149	95% Hall's Bootstrap UCL					2.66	95% Percentile Bootstrap UCL					2.67
150	95% BCA Bootstrap UCL					2.64						
151	90% Chebyshev(Mean, Sd) UCL					3.07	95% Chebyshev(Mean, Sd) UCL					3.46
152	97.5% Chebyshev(Mean, Sd) UCL					3.99	99% Chebyshev(Mean, Sd) UCL					5.05
153												
154	Suggested UCL to Use											
155	95% Student's-t UCL					2.73						
156												
157	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
158	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	Barium											
164												
165	General Statistics											
166	Total Number of Observations					12	Number of Distinct Observations					12
167							Number of Missing Observations					0
168	Minimum					22.9	Mean					133.1
169	Maximum					406	Median					119.5
170	SD					105.5	Std. Error of Mean					30.4
171	Coefficient of Variation					0.79	Skewness					1.62
172												
173	Normal GOF Test											
174	Shapiro Wilk Test Statistic					0.84	Shapiro Wilk GOF Test					
175	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.22	Lilliefors GOF Test					
177	5% Lilliefors Critical Value					0.25	Data appear Normal at 5% Significance Level					
178	Data appear Approximate Normal at 5% Significance Level											
179												
180	Assuming Normal Distribution											
181	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
182	95% Student's-t UCL					187.8	95% Adjusted-CLT UCL (Chen-1995)					198.5
183							95% Modified-t UCL (Johnson-1978)					190.2
184												
185	Gamma GOF Test											
186	A-D Test Statistic					0.37	Anderson-Darling Gamma GOF Test					
187	5% A-D Critical Value					0.74	Data appear Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.18	Kolmogorov-Smirnov Gamma GOF Test					
189	5% K-S Critical Value					0.24	Data appear Gamma Distributed at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
190	Detected data appear Gamma Distributed at 5% Significance Level											
191												
192	Gamma Statistics											
193	k hat (MLE)				1.77	k star (bias corrected MLE)				1.38		
194	Theta hat (MLE)				75.0	Theta star (bias corrected MLE)				96.0		
195	nu hat (MLE)				42.5	nu star (bias corrected)				33.2		
196	MLE Mean (bias corrected)				133.1	MLE Sd (bias corrected)				113.1		
197						Approximate Chi Square Value (0.05)				21.0		
198	Adjusted Level of Significance				0.02	Adjusted Chi Square Value				19.6		
199												
200	Assuming Gamma Distribution											
201	Approximate Gamma UCL (use when n>=50))				210.1	Adjusted Gamma UCL (use when n<50)				225.8		
202												
203	Lognormal GOF Test											
204	Shapiro Wilk Test Statistic				0.92	Shapiro Wilk Lognormal GOF Test						
205	5% Shapiro Wilk Critical Value				0.85	Data appear Lognormal at 5% Significance Level						
206	Lilliefors Test Statistic				0.23	Lilliefors Lognormal GOF Test						
207	5% Lilliefors Critical Value				0.25	Data appear Lognormal at 5% Significance Level						
208	Data appear Lognormal at 5% Significance Level											
209												
210	Lognormal Statistics											
211	Minimum of Logged Data				3.13	Mean of logged Data				4.58		
212	Maximum of Logged Data				6.00	SD of logged Data				0.88		
213												
214	Assuming Lognormal Distribution											
215	95% H-UCL				295.6	90% Chebyshev (MVUE) UCL				250.1		
216	95% Chebyshev (MVUE) UCL				300.7	97.5% Chebyshev (MVUE) UCL				370.9		
217	99% Chebyshev (MVUE) UCL				508.8							
218												
219	Nonparametric Distribution Free UCL Statistics											
220	Data appear to follow a Discernible Distribution at 5% Significance Level											
221												
222	Nonparametric Distribution Free UCLs											
223	95% CLT UCL				183.2	95% Jackknife UCL				187.8		
224	95% Standard Bootstrap UCL				181.2	95% Bootstrap-t UCL				212.5		
225	95% Hall's Bootstrap UCL				448.5	95% Percentile Bootstrap UCL				183.1		
226	95% BCA Bootstrap UCL				196							
227	90% Chebyshev(Mean, Sd) UCL				224.5	95% Chebyshev(Mean, Sd) UCL				265.9		
228	97.5% Chebyshev(Mean, Sd) UCL				323.4	99% Chebyshev(Mean, Sd) UCL				436.2		
229												
230	Suggested UCL to Use											
231	95% Student's-t UCL				187.8							
232												
233	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
234	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
235	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
236	For additional insight the user may want to consult a statistician.											
237												
238												
239	Beryllium											
240												
241	General Statistics											
242	Total Number of Observations				12	Number of Distinct Observations				12		
243						Number of Missing Observations				0		
244	Minimum				0.36	Mean				0.78		
245	Maximum				1.6	Median				0.69		
246	SD				0.36	Std. Error of Mean				0.10		
247	Coefficient of Variation				0.46	Skewness				0.96		
248												
249	Normal GOF Test											
250	Shapiro Wilk Test Statistic				0.92	Shapiro Wilk GOF Test						
251	5% Shapiro Wilk Critical Value				0.85	Data appear Normal at 5% Significance Level						
252	Lilliefors Test Statistic				0.16	Lilliefors GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
253			5% Lilliefors Critical Value	0.25			Data appear Normal at 5% Significance Level					
254			Data appear Normal at 5% Significance Level									
255												
256			Assuming Normal Distribution									
257			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
258			95% Student's-t UCL	0.97		95% Adjusted-CLT UCL (Chen-1995)						0.99
259						95% Modified-t UCL (Johnson-1978)						0.98
260												
261			Gamma GOF Test									
262			A-D Test Statistic	0.21		Anderson-Darling Gamma GOF Test						
263			5% A-D Critical Value	0.73		data appear Gamma Distributed at 5% Significance Level						
264			K-S Test Statistic	0.12		Kolmogorov-Smirnov Gamma GOF Test						
265			5% K-S Critical Value	0.24		data appear Gamma Distributed at 5% Significance Level						
266			Detected data appear Gamma Distributed at 5% Significance Level									
267												
268			Gamma Statistics									
269			k hat (MLE)	5.34		k star (bias corrected MLE)						4.06
270			Theta hat (MLE)	0.14		Theta star (bias corrected MLE)						0.19
271			nu hat (MLE)	128.3		nu star (bias corrected)						97.5
272			MLE Mean (bias corrected)	0.78		MLE Sd (bias corrected)						0.39
273						Approximate Chi Square Value (0.05)						75.7
274			Adjusted Level of Significance	0.02		Adjusted Chi Square Value						72.8
275												
276			Assuming Gamma Distribution									
277			Approximate Gamma UCL (use when n>=50)	1.01		Adjusted Gamma UCL (use when n<50)						1.05
278												
279			Lognormal GOF Test									
280			Shapiro Wilk Test Statistic	0.96		Shapiro Wilk Lognormal GOF Test						
281			5% Shapiro Wilk Critical Value	0.85		Data appear Lognormal at 5% Significance Level						
282			Lilliefors Test Statistic	0.12		Lilliefors Lognormal GOF Test						
283			5% Lilliefors Critical Value	0.25		Data appear Lognormal at 5% Significance Level						
284			Data appear Lognormal at 5% Significance Level									
285												
286			Lognormal Statistics									
287			Minimum of Logged Data	-1.01		Mean of logged Data						-0.33
288			Maximum of Logged Data	0.47		SD of logged Data						0.46
289												
290			Assuming Lognormal Distribution									
291			95% H-UCL	1.06		90% Chebyshev (MVUE) UCL						1.10
292			95% Chebyshev (MVUE) UCL	1.25		97.5% Chebyshev (MVUE) UCL						1.45
293			99% Chebyshev (MVUE) UCL	1.84								
294												
295			Nonparametric Distribution Free UCL Statistics									
296			Data appear to follow a Discernible Distribution at 5% Significance Level									
297												
298			Nonparametric Distribution Free UCLs									
299			95% CLT UCL	0.96		95% Jackknife UCL						0.97
300			95% Standard Bootstrap UCL	0.95		95% Bootstrap-t UCL						1.02
301			95% Hall's Bootstrap UCL	1.05		95% Percentile Bootstrap UCL						0.96
302			95% BCA Bootstrap UCL	0.97								
303			90% Chebyshev(Mean, Sd) UCL	1.10		95% Chebyshev(Mean, Sd) UCL						1.24
304			97.5% Chebyshev(Mean, Sd) UCL	1.44		99% Chebyshev(Mean, Sd) UCL						1.83
305												
306			Suggested UCL to Use									
307			95% Student's-t UCL	0.97								
308												
309			Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate									
310			recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and									
311			Singh and Singh (2003). However, simulations results will not cover all Real World data sets									
312			For additional insight the user may want to consult a statistician.									
313												
314			Cadmium									
315												

	A	B	C	D	E	F	G	H	I	J	K	L
316	General Statistics											
317	Total Number of Observations					12	Number of Distinct Observations					12
318	Number of Detects					6	Number of Non-Detects					6
319	Number of Distinct Detects					6	Number of Distinct Non-Detects					6
320	Minimum Detect					0.029	Minimum Non-Detect					0.054
321	Maximum Detect					0.29	Maximum Non-Detect					0.54
322	Variance Detects					0.010	Percent Non-Detects					50%
323	Mean Detects					0.095	SD Detects					0.10
324	Median Detects					0.054	CV Detects					1.07
325	Skewness Detects					2.20	Kurtosis Detects					4.98
326	Mean of Logged Detects					-2.69	SD of Logged Detects					0.83
327												
328	Normal GOF Test on Detects Only											
329	Shapiro Wilk Test Statistic					0.68	Shapiro Wilk GOF Test					
330	5% Shapiro Wilk Critical Value					0.78	Detected Data Not Normal at 5% Significance Level					
331	Lilliefors Test Statistic					0.33	Lilliefors GOF Test					
332	5% Lilliefors Critical Value					0.36	Detected Data appear Normal at 5% Significance Level					
333	Detected Data appear Approximate Normal at 5% Significance Level											
334												
335	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
336	Mean					0.081	Standard Error of Mean					0.03
337	SD					0.081	95% KM (BCA) UCL					0.15
338	95% KM (t) UCL					0.15	95% KM (Percentile Bootstrap) UCL					0.15
339	95% KM (z) UCL					0.14	95% KM Bootstrap t UCL					0.42
340	90% KM Chebyshev UCL					0.19	95% KM Chebyshev UCL					0.24
341	97.5% KM Chebyshev UCL					0.31	99% KM Chebyshev UCL					0.45
342												
343	Gamma GOF Tests on Detected Observations Only											
344	A-D Test Statistic					0.57	Anderson-Darling GOF Test					
345	5% A-D Critical Value					0.70	Data appear Gamma Distributed at 5% Significance Level					
346	K-S Test Statistic					0.25	Kolmogrov-Smirnoff GOF					
347	5% K-S Critical Value					0.33	Data appear Gamma Distributed at 5% Significance Level					
348	Detected data appear Gamma Distributed at 5% Significance Level											
349												
350	Gamma Statistics on Detected Data Only											
351	k hat (MLE)					1.60	k star (bias corrected MLE)					0.91
352	Theta hat (MLE)					0.059	Theta star (bias corrected MLE)					0.10
353	nu hat (MLE)					19.29	nu star (bias corrected)					10.94
354	MLE Mean (bias corrected)					0.095	MLE Sd (bias corrected)					0.095
355												
356	Gamma Kaplan-Meier (KM) Statistics											
357	k hat (KM)					0.96	nu hat (KM)					23.1
358	Approximate Chi Square Value (23.10, α)					13.11	Adjusted Chi Square Value (23.10, β)					12.04
359	Approximate KM-UCL (use when $n \geq 50$)					0.15	Gamma Adjusted KM-UCL (use when $n < 50$)					0.16
360												
361	Gamma ROS Statistics using Imputed Non-Detects											
362	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
363	GROS may not be used when kstar of detected data is small such as < 0.1											
364	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
365	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimate											
366	Minimum					0.022	Mean					0.07
367	Maximum					0.29	Median					0.06
368	SD					0.072	CV					0.93
369	k hat (MLE)					2.32	k star (bias corrected MLE)					1.80
370	Theta hat (MLE)					0.033	Theta star (bias corrected MLE)					0.04
371	nu hat (MLE)					55.87	nu star (bias corrected)					43.2
372	MLE Mean (bias corrected)					0.07	MLE Sd (bias corrected)					0.05
373							Adjusted Level of Significance (β)					0.02
374	Approximate Chi Square Value (43.24, α)					29.11	Adjusted Chi Square Value (43.24, β)					27.4
375	Gamma Approximate UCL (use when $n \geq 50$)					0.11	Gamma Adjusted UCL (use when $n < 50$)					0.12
376												
377	Lognormal GOF Test on Detected Observations Only											
378	Shapiro Wilk Test Statistic					0.89	Shapiro Wilk GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
379	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Lognormal at 5% Significance Level						
380	Lilliefors Test Statistic					0.20	Lilliefors GOF Test						
381	5% Lilliefors Critical Value					0.36	Detected Data appear Lognormal at 5% Significance Level						
382	Detected Data appear Lognormal at 5% Significance Level												
383													
384	Lognormal ROS Statistics Using Imputed Non-Detects												
385	Mean in Original Scale					0.074	Mean in Log Scale					-2.78	
386	SD in Original Scale					0.072	SD in Log Scale					0.58	
387	95% t UCL (assumes normality of ROS data)					0.11	95% Percentile Bootstrap UCL					0.11	
388	95% BCA Bootstrap UCL					0.13	95% Bootstrap t UCL					0.22	
389	95% H-UCL (Log ROS)					0.10							
390													
391	Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed												
392	KM Mean (logged)					-2.77	95% H-UCL (KM -Log)					0.14	
393	KM SD (logged)					0.73	95% Critical H Value (KM-Log)					2.46	
394	KM Standard Error of Mean (logged)					0.30							
395													
396	DL/2 Statistics												
397	DL/2 Normal					DL/2 Log-Transformed							
398	Mean in Original Scale					0.15	Mean in Log Scale					-2.21	
399	SD in Original Scale					0.11	SD in Log Scale					0.98	
400	95% t UCL (Assumes normality)					0.21	95% H-Stat UCL					0.42	
401	DL/2 is not a recommended method, provided for comparisons and historical reasons												
402													
403	Nonparametric Distribution Free UCL Statistics												
404	Detected Data appear Approximate Normal Distributed at 5% Significance Level												
405													
406	Suggested UCL to Use												
407	95% KM (t) UCL					0.15	95% KM (Percentile Bootstrap) UCL					0.15	
408													
409	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
410	Recommendations are based upon data size, data distribution, and skewness.												
411	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and												
412	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult												
413													
414													
415	Calcium												
416													
417	General Statistics												
418	Total Number of Observations					12	Number of Distinct Observations					12	
419							Number of Missing Observations					0	
420	Minimum					696	Mean					2281	
421	Maximum					5490	Median					2235	
422	SD					1324	Std. Error of Mean					382.1	
423	Coefficient of Variation					0.58	Skewness					1.27	
424													
425	Normal GOF Test												
426	Shapiro Wilk Test Statistic					0.89	Shapiro Wilk GOF Test						
427	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level						
428	Lilliefors Test Statistic					0.23	Lilliefors GOF Test						
429	5% Lilliefors Critical Value					0.25	Data appear Normal at 5% Significance Level						
430	Data appear Normal at 5% Significance Level												
431													
432	Assuming Normal Distribution												
433	95% Normal UCL					95% UCLs (Adjusted for Skewness)							
434	95% Student's-t UCL					2967	95% Adjusted-CLT UCL (Chen-1995)					3060	
435							95% Modified-t UCL (Johnson-1978)					2991	
436													
437	Gamma GOF Test												
438	A-D Test Statistic					0.27	Anderson-Darling Gamma GOF Test						
439	5% A-D Critical Value					0.73	Data appear Gamma Distributed at 5% Significance Level						
440	K-S Test Statistic					0.16	Kolmogorov-Smirnov Gamma GOF Test						
441	5% K-S Critical Value					0.24	Data appear Gamma Distributed at 5% Significance Level						

	A	B	C	D	E	F	G	H	I	J	K	L
442	Detected data appear Gamma Distributed at 5% Significance Level											
443												
444	Gamma Statistics											
445	k hat (MLE)				3.41	k star (bias corrected MLE)				2.61		
446	Theta hat (MLE)				667.6	Theta star (bias corrected MLE)				871.3		
447	nu hat (MLE)				82	nu star (bias corrected)				62.8		
448	MLE Mean (bias corrected)				2281	MLE Sd (bias corrected)				1410		
449						Approximate Chi Square Value (0.05)				45.6		
450	Adjusted Level of Significance				0.029	Adjusted Chi Square Value				43.3		
451												
452	Assuming Gamma Distribution											
453	Approximate Gamma UCL (use when n>=50))				3143	Adjusted Gamma UCL (use when n<50)				3305		
454												
455	Lognormal GOF Test											
456	Shapiro Wilk Test Statistic				0.95	Shapiro Wilk Lognormal GOF Test						
457	5% Shapiro Wilk Critical Value				0.85	Data appear Lognormal at 5% Significance Level						
458	Lilliefors Test Statistic				0.16	Lilliefors Lognormal GOF Test						
459	5% Lilliefors Critical Value				0.25	Data appear Lognormal at 5% Significance Level						
460	Data appear Lognormal at 5% Significance Level											
461												
462	Lognormal Statistics											
463	Minimum of Logged Data				6.54	Mean of logged Data				7.57		
464	Maximum of Logged Data				8.61	SD of logged Data				0.59		
465												
466	Assuming Lognormal Distribution											
467	95% H-UCL				3502	90% Chebyshev (MVUE) UCL				3516		
468	95% Chebyshev (MVUE) UCL				4068	97.5% Chebyshev (MVUE) UCL				4835		
469	99% Chebyshev (MVUE) UCL				6341							
470												
471	Nonparametric Distribution Free UCL Statistics											
472	Data appear to follow a Discernible Distribution at 5% Significance Level											
473												
474	Nonparametric Distribution Free UCLs											
475	95% CLT UCL				2910	95% Jackknife UCL				2967		
476	95% Standard Bootstrap UCL				2882	95% Bootstrap-t UCL				3223		
477	95% Hall's Bootstrap UCL				3767	95% Percentile Bootstrap UCL				2917		
478	95% BCA Bootstrap UCL				2988							
479	90% Chebyshev(Mean, Sd) UCL				3427	95% Chebyshev(Mean, Sd) UCL				3947		
480	97.5% Chebyshev(Mean, Sd) UCL				4668	99% Chebyshev(Mean, Sd) UCL				6083		
481												
482	Suggested UCL to Use											
483	95% Student's-t UCL				2967							
484												
485	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
486	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
487	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
488	For additional insight the user may want to consult a statistician.											
489												
490												
491	Chromium											
492												
493	General Statistics											
494	Total Number of Observations				12	Number of Distinct Observations				12		
495						Number of Missing Observations				0		
496	Minimum				2.42	Mean				11.0		
497	Maximum				21.3	Median				9.44		
498	SD				5.17	Std. Error of Mean				1.49		
499	Coefficient of Variation				0.47	Skewness				0.67		
500												
501	Normal GOF Test											
502	Shapiro Wilk Test Statistic				0.92	Shapiro Wilk GOF Test						
503	5% Shapiro Wilk Critical Value				0.85	Data appear Normal at 5% Significance Level						
504	Lilliefors Test Statistic				0.20	Lilliefors GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
505			5% Lilliefors Critical Value		0.25		Data appear Normal at 5% Significance Level					
506			Data appear Normal at 5% Significance Level									
507												
508			Assuming Normal Distribution									
509			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
510			95% Student's-t UCL		13.64		95% Adjusted-CLT UCL (Chen-1995)					13.7
511							95% Modified-t UCL (Johnson-1978)					13.7
512												
513			Gamma GOF Test									
514			A-D Test Statistic		0.46		Anderson-Darling Gamma GOF Test					
515			5% A-D Critical Value		0.73		data appear Gamma Distributed at 5% Significance Level					
516			K-S Test Statistic		0.21		Kolmogorov-Smirnov Gamma GOF Test					
517			5% K-S Critical Value		0.24		data appear Gamma Distributed at 5% Significance Level					
518			Detected data appear Gamma Distributed at 5% Significance Level									
519												
520			Gamma Statistics									
521			k hat (MLE)		4.35		k star (bias corrected MLE)					3.32
522			Theta hat (MLE)		2.52		Theta star (bias corrected MLE)					3.31
523			nu hat (MLE)		104.5		nu star (bias corrected)					79.7
524			MLE Mean (bias corrected)		11.0		MLE Sd (bias corrected)					6.04
525							Approximate Chi Square Value (0.05)					60.1
526			Adjusted Level of Significance		0.02		Adjusted Chi Square Value					57.5
527												
528			Assuming Gamma Distribution									
529			Approximate Gamma UCL (use when n>=50)		14.5		Adjusted Gamma UCL (use when n<50)					15.2
530												
531			Lognormal GOF Test									
532			Shapiro Wilk Test Statistic		0.87		Shapiro Wilk Lognormal GOF Test					
533			5% Shapiro Wilk Critical Value		0.85		Data appear Lognormal at 5% Significance Level					
534			Lilliefors Test Statistic		0.25		Lilliefors Lognormal GOF Test					
535			5% Lilliefors Critical Value		0.25		Data appear Lognormal at 5% Significance Level					
536			Data appear Lognormal at 5% Significance Level									
537												
538			Lognormal Statistics									
539			Minimum of Logged Data		0.88		Mean of logged Data					2.27
540			Maximum of Logged Data		3.05		SD of logged Data					0.55
541												
542			Assuming Lognormal Distribution									
543			95% H-UCL		16.4		90% Chebyshev (MVUE) UCL					16.7
544			95% Chebyshev (MVUE) UCL		19.2		97.5% Chebyshev (MVUE) UCL					22.7
545			99% Chebyshev (MVUE) UCL		29.6							
546												
547			Nonparametric Distribution Free UCL Statistics									
548			Data appear to follow a Discernible Distribution at 5% Significance Level									
549												
550			Nonparametric Distribution Free UCLs									
551			95% CLT UCL		13.44		95% Jackknife UCL					13.6
552			95% Standard Bootstrap UCL		13.3		95% Bootstrap-t UCL					14.5
553			95% Hall's Bootstrap UCL		14.7		95% Percentile Bootstrap UCL					13.5
554			95% BCA Bootstrap UCL		13.7							
555			90% Chebyshev(Mean, Sd) UCL		15.4		95% Chebyshev(Mean, Sd) UCL					17.5
556			97.5% Chebyshev(Mean, Sd) UCL		20.3		99% Chebyshev(Mean, Sd) UCL					25.8
557												
558			Suggested UCL to Use									
559			95% Student's-t UCL		13.64							
560												
561			Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate									
562			Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and									
563			Singh and Singh (2003). However, simulation results will not cover all Real World data sets									
564			For additional insight the user may want to consult a statistician.									
565												
566												
567			Cobalt									

	A	B	C	D	E	F	G	H	I	J	K	L
568												
569	General Statistics											
570	Total Number of Observations					12	Number of Distinct Observations					12
571							Number of Missing Observations					0
572	Minimum					1.1	Mean					5.68
573	Maximum					9.62	Median					5.85
574	SD					2.13	Std. Error of Mean					0.61
575	Coefficient of Variation					0.37	Skewness					-0.40
576												
577	Normal GOF Test											
578	Shapiro Wilk Test Statistic					0.96	Shapiro Wilk GOF Test					
579	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
580	Lilliefors Test Statistic					0.14	Lilliefors GOF Test					
581	5% Lilliefors Critical Value					0.25	Data appear Normal at 5% Significance Level					
582	Data appear Normal at 5% Significance Level											
583												
584	Assuming Normal Distribution											
585	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
586	95% Student's-t UCL					6.78	95% Adjusted-CLT UCL (Chen-1995)					6.61
587							95% Modified-t UCL (Johnson-1978)					6.77
588												
589	Gamma GOF Test											
590	A-D Test Statistic					0.69	Anderson-Darling Gamma GOF Test					
591	5% A-D Critical Value					0.73	data appear Gamma Distributed at 5% Significance Level					
592	K-S Test Statistic					0.21	Kolmogrov-Smirnoff Gamma GOF Test					
593	5% K-S Critical Value					0.24	data appear Gamma Distributed at 5% Significance Level					
594	Detected data appear Gamma Distributed at 5% Significance Level											
595												
596	Gamma Statistics											
597	k hat (MLE)					5.06	k star (bias corrected MLE)					3.85
598	Theta hat (MLE)					1.12	Theta star (bias corrected MLE)					1.47
599	nu hat (MLE)					121.5	nu star (bias corrected)					92.4
600	MLE Mean (bias corrected)					5.68	MLE Sd (bias corrected)					2.89
601							Approximate Chi Square Value (0.05)					71.2
602	Adjusted Level of Significance					0.025	Adjusted Chi Square Value					68.4
603												
604	Assuming Gamma Distribution											
605	Approximate Gamma UCL (use when n>=50)					7.37	Adjusted Gamma UCL (use when n<50)					7.67
606												
607	Lognormal GOF Test											
608	Shapiro Wilk Test Statistic					0.77	Shapiro Wilk Lognormal GOF Test					
609	5% Shapiro Wilk Critical Value					0.85	Data Not Lognormal at 5% Significance Level					
610	Lilliefors Test Statistic					0.24	Lilliefors Lognormal GOF Test					
611	5% Lilliefors Critical Value					0.25	Data appear Lognormal at 5% Significance Level					
612	Data appear Approximate Lognormal at 5% Significance Level											
613												
614	Lognormal Statistics											
615	Minimum of Logged Data					0.094	Mean of logged Data					1.63
616	Maximum of Logged Data					2.26	SD of logged Data					0.54
617												
618	Assuming Lognormal Distribution											
619	95% H-UCL					8.59	90% Chebyshev (MVUE) UCL					8.76
620	95% Chebyshev (MVUE) UCL					10.0	97.5% Chebyshev (MVUE) UCL					11.8
621	99% Chebyshev (MVUE) UCL					15.4						
622												
623	Nonparametric Distribution Free UCL Statistics											
624	Data appear to follow a Discernible Distribution at 5% Significance Level											
625												
626	Nonparametric Distribution Free UCLs											
627	95% CLT UCL					6.69	95% Jackknife UCL					6.78
628	95% Standard Bootstrap UCL					6.67	95% Bootstrap-t UCL					6.70
629	95% Hall's Bootstrap UCL					6.79	95% Percentile Bootstrap UCL					6.63
630	95% BCA Bootstrap UCL					6.51						

	A	B	C	D	E	F	G	H	I	J	K	L
631	90% Chebyshev(Mean, Sd) UCL					7.53	95% Chebyshev(Mean, Sd) UCL					8.36
632	97.5% Chebyshev(Mean, Sd) UCL					9.52	99% Chebyshev(Mean, Sd) UCL					11.8
633												
634	Suggested UCL to Use											
635	95% Student's-t UCL					6.78						
636												
637	ations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
638	ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
639	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
640	For additional insight the user may want to consult a statistician.											
641												
642	highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may											
643	reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.											
644												
645												
646	Copper											
647												
648	General Statistics											
649	Total Number of Observations					12	Number of Distinct Observations					12
650							Number of Missing Observations					0
651	Minimum					2.14	Mean					7.93
652	Maximum					18	Median					6.41
653	SD					4.71	Std. Error of Mean					1.36
654	Coefficient of Variation					0.59	Skewness					0.90
655												
656	Normal GOF Test											
657	Shapiro Wilk Test Statistic					0.91	Shapiro Wilk GOF Test					
658	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
659	Lilliefors Test Statistic					0.22	Lilliefors GOF Test					
660	5% Lilliefors Critical Value					0.25	Data appear Normal at 5% Significance Level					
661	Data appear Normal at 5% Significance Level											
662												
663	Assuming Normal Distribution											
664	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
665	95% Student's-t UCL					10.3	95% Adjusted-CLT UCL (Chen-1995)					10.5
666							95% Modified-t UCL (Johnson-1978)					10.4
667												
668	Gamma GOF Test											
669	A-D Test Statistic					0.25	Anderson-Darling Gamma GOF Test					
670	5% A-D Critical Value					0.73	data appear Gamma Distributed at 5% Significance Level					
671	K-S Test Statistic					0.15	Kolmogorov-Smirnov Gamma GOF Test					
672	5% K-S Critical Value					0.24	data appear Gamma Distributed at 5% Significance Level					
673	Detected data appear Gamma Distributed at 5% Significance Level											
674												
675	Gamma Statistics											
676	k hat (MLE)					3.14	k star (bias corrected MLE)					2.41
677	Theta hat (MLE)					2.52	Theta star (bias corrected MLE)					3.29
678	nu hat (MLE)					75.4	nu star (bias corrected)					57.9
679	MLE Mean (bias corrected)					7.93	MLE Sd (bias corrected)					5.11
680							Approximate Chi Square Value (0.05)					41.4
681	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					39.2
682												
683	Assuming Gamma Distribution											
684	Approximate Gamma UCL (use when n>=50))					11.1	Adjusted Gamma UCL (use when n<50)					11.7
685												
686	Lognormal GOF Test											
687	Shapiro Wilk Test Statistic					0.97	Shapiro Wilk Lognormal GOF Test					
688	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
689	Lilliefors Test Statistic					0.15	Lilliefors Lognormal GOF Test					
690	5% Lilliefors Critical Value					0.25	Data appear Lognormal at 5% Significance Level					
691	Data appear Lognormal at 5% Significance Level											
692												
693	Lognormal Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
694	Minimum of Logged Data					0.76	Mean of logged Data					1.90
695	Maximum of Logged Data					2.89	SD of logged Data					0.62
696												
697	Assuming Lognormal Distribution											
698	95% H-UCL					12.5	90% Chebyshev (MVUE) UCL					12.4
699	95% Chebyshev (MVUE) UCL					14.4	97.5% Chebyshev (MVUE) UCL					17.2
700	99% Chebyshev (MVUE) UCL					22.7						
701												
702	Nonparametric Distribution Free UCL Statistics											
703	Data appear to follow a Discernible Distribution at 5% Significance Level											
704												
705	Nonparametric Distribution Free UCLs											
706	95% CLT UCL					10.1	95% Jackknife UCL					10.3
707	95% Standard Bootstrap UCL					10.0	95% Bootstrap-t UCL					10.8
708	95% Hall's Bootstrap UCL					10.6	95% Percentile Bootstrap UCL					10.2
709	95% BCA Bootstrap UCL					10.3						
710	90% Chebyshev(Mean, Sd) UCL					12.0	95% Chebyshev(Mean, Sd) UCL					13.8
711	97.5% Chebyshev(Mean, Sd) UCL					16.4	99% Chebyshev(Mean, Sd) UCL					21.4
712												
713	Suggested UCL to Use											
714	95% Student's-t UCL					10.3						
715												
716	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
717	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
718	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
719	For additional insight the user may want to consult a statistician.											
720												
721												
722	Iron											
723												
724	General Statistics											
725	Total Number of Observations					12	Number of Distinct Observations					12
726							Number of Missing Observations					0
727	Minimum					4750	Mean					10634
728	Maximum					21700	Median					9775
729	SD					4356	Std. Error of Mean					1257
730	Coefficient of Variation					0.41	Skewness					1.40
731												
732	Normal GOF Test											
733	Shapiro Wilk Test Statistic					0.89	Shapiro Wilk GOF Test					
734	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
735	Lilliefors Test Statistic					0.17	Lilliefors GOF Test					
736	5% Lilliefors Critical Value					0.25	Data appear Normal at 5% Significance Level					
737	Data appear Normal at 5% Significance Level											
738												
739	Assuming Normal Distribution											
740	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
741	95% Student's-t UCL					12892	95% Adjusted-CLT UCL (Chen-1995)					13248
742							95% Modified-t UCL (Johnson-1978)					12978
743												
744	Gamma GOF Test											
745	A-D Test Statistic					0.24	Anderson-Darling Gamma GOF Test					
746	5% A-D Critical Value					0.73	data appear Gamma Distributed at 5% Significance Level					
747	K-S Test Statistic					0.13	Kolmogrov-Smirnoff Gamma GOF Test					
748	5% K-S Critical Value					0.24	data appear Gamma Distributed at 5% Significance Level					
749	Detected data appear Gamma Distributed at 5% Significance Level											
750												
751	Gamma Statistics											
752	k hat (MLE)					7.25	k star (bias corrected MLE)					5.49
753	Theta hat (MLE)					1466	Theta star (bias corrected MLE)					1935
754	nu hat (MLE)					174.1	nu star (bias corrected)					131.9
755	MLE Mean (bias corrected)					10634	MLE Sd (bias corrected)					4536
756							Approximate Chi Square Value (0.05)					106.4

	A	B	C	D	E	F	G	H	I	J	K	L
757	Adjusted Level of Significance					0.025	Adjusted Chi Square Value					102.9
758												
759	Assuming Gamma Distribution											
760	Approximate Gamma UCL (use when n>=50))					13186	Adjusted Gamma UCL (use when n<50)					13634
761												
762	Lognormal GOF Test											
763	Shapiro Wilk Test Statistic					0.97	Shapiro Wilk Lognormal GOF Test					
764	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
765	Lilliefors Test Statistic					0.13	Lilliefors Lognormal GOF Test					
766	5% Lilliefors Critical Value					0.25	Data appear Lognormal at 5% Significance Level					
767	Data appear Lognormal at 5% Significance Level											
768												
769	Lognormal Statistics											
770	Minimum of Logged Data					8.46	Mean of logged Data					9.20
771	Maximum of Logged Data					9.98	SD of logged Data					0.39
772												
773	Assuming Lognormal Distribution											
774	95% H-UCL					13565	90% Chebyshev (MVUE) UCL					14275
775	95% Chebyshev (MVUE) UCL					15928	97.5% Chebyshev (MVUE) UCL					18223
776	99% Chebyshev (MVUE) UCL					22731						
777												
778	Nonparametric Distribution Free UCL Statistics											
779	Data appear to follow a Discernible Distribution at 5% Significance Level											
780												
781	Nonparametric Distribution Free UCLs											
782	95% CLT UCL					12703	95% Jackknife UCL					12892
783	95% Standard Bootstrap UCL					12640	95% Bootstrap-t UCL					13750
784	95% Hall's Bootstrap UCL					17737	95% Percentile Bootstrap UCL					12813
785	95% BCA Bootstrap UCL					13249						
786	90% Chebyshev(Mean, Sd) UCL					14407	95% Chebyshev(Mean, Sd) UCL					16115
787	97.5% Chebyshev(Mean, Sd) UCL					18487	99% Chebyshev(Mean, Sd) UCL					23146
788												
789	Suggested UCL to Use											
790	95% Student's-t UCL					12892						
791												
792	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
793	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
794	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
795	For additional insight the user may want to consult a statistician.											
796												
797	Lead											
798												
799	General Statistics											
800	Total Number of Observations					12	Number of Distinct Observations					12
801	Number of Detects					11	Number of Non-Detects					1
802	Number of Distinct Detects					11	Number of Distinct Non-Detects					1
803	Minimum Detect					3	Minimum Non-Detect					3.38
804	Maximum Detect					23.4	Maximum Non-Detect					3.38
805	Variance Detects					39.39	Percent Non-Detects					8.33
806	Mean Detects					12.58	SD Detects					6.27
807	Median Detects					11.5	CV Detects					0.49
808	Skewness Detects					0.62	Kurtosis Detects					0.04
809	Mean of Logged Detects					2.40	SD of Logged Detects					0.57
810												
811	Normal GOF Test on Detects Only											
812	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk GOF Test					
813	5% Shapiro Wilk Critical Value					0.85	Detected Data appear Normal at 5% Significance Level					
814	Lilliefors Test Statistic					0.19	Lilliefors GOF Test					
815	5% Lilliefors Critical Value					0.26	Detected Data appear Normal at 5% Significance Level					
816	Detected Data appear Normal at 5% Significance Level											
817												
818	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
819	Mean					11.74	Standard Error of Mean					1.91

	A	B	C	D	E	F	G	H	I	J	K	L	
820					SD	6.31				95% KM (BCA) UCL		14.9	
821					95% KM (t) UCL	15.2				95% KM (Percentile Bootstrap) UCL		14.8	
822					95% KM (z) UCL	14.9				95% KM Bootstrap t UCL		15.6	
823					90% KM Chebyshev UCL	17.5				95% KM Chebyshev UCL		20.1	
824					97.5% KM Chebyshev UCL	23.7				99% KM Chebyshev UCL		30.8	
825													
826					Gamma GOF Tests on Detected Observations Only								
827					A-D Test Statistic	0.29				Anderson-Darling GOF Test			
828					5% A-D Critical Value	0.73				data appear Gamma Distributed at 5% Significance Level			
829					K-S Test Statistic	0.14				Kolmogrov-Smirnoff GOF			
830					5% K-S Critical Value	0.25				data appear Gamma Distributed at 5% Significance Level			
831					Detected data appear Gamma Distributed at 5% Significance Level								
832													
833					Gamma Statistics on Detected Data Only								
834					k hat (MLE)	3.96				k star (bias corrected MLE)		2.94	
835					Theta hat (MLE)	3.17				Theta star (bias corrected MLE)		4.27	
836					nu hat (MLE)	87.14				nu star (bias corrected)		64.7	
837					MLE Mean (bias corrected)	12.5				MLE Sd (bias corrected)		7.33	
838													
839					Gamma Kaplan-Meier (KM) Statistics								
840					k hat (KM)	3.48				nu hat (KM)		83.6	
841					Approximate Chi Square Value (83.67, α)	63.5				Adjusted Chi Square Value (83.67, β)		60.9	
842					Approximate KM-UCL (use when n>=50)	15.5				Gamma Adjusted KM-UCL (use when n<50)		16.1	
843													
844					Gamma ROS Statistics using Imputed Non-Detects								
845					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
846					GROS may not be used when kstar of detected data is small such as < 0.1								
847					For such situations, GROS method tends to yield inflated values of UCLs and BTVs								
848					Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
849					Minimum	3				Mean		11.8	
850					Maximum	23.4				Median		11.3	
851					SD	6.56				CV		0.55	
852					k hat (MLE)	3.10				k star (bias corrected MLE)		2.38	
853					Theta hat (MLE)	3.79				Theta star (bias corrected MLE)		4.94	
854					nu hat (MLE)	74.6				nu star (bias corrected)		57.3	
855					MLE Mean (bias corrected)	11.8				MLE Sd (bias corrected)		7.64	
856										Adjusted Level of Significance (β)		0.02	
857					Approximate Chi Square Value (57.30, α)	40.9				Adjusted Chi Square Value (57.30, β)		38.7	
858					Gamma Approximate UCL (use when n>=50)	16.5				Gamma Adjusted UCL (use when n<50)		17.4	
859													
860					Lognormal GOF Test on Detected Observations Only								
861					Shapiro Wilk Test Statistic	0.92				Shapiro Wilk GOF Test			
862					5% Shapiro Wilk Critical Value	0.85				Detected Data appear Lognormal at 5% Significance Level			
863					Lilliefors Test Statistic	0.18				Lilliefors GOF Test			
864					5% Lilliefors Critical Value	0.26				Detected Data appear Lognormal at 5% Significance Level			
865					Detected Data appear Lognormal at 5% Significance Level								
866													
867					Lognormal ROS Statistics Using Imputed Non-Detects								
868					Mean in Original Scale	11.8				Mean in Log Scale		2.31	
869					SD in Original Scale	6.48				SD in Log Scale		0.62	
870					95% Bootstrap t UCL (assumes normality of ROS data)	15.2				95% Percentile Bootstrap UCL		14.8	
871					95% BCA Bootstrap UCL	15.0				95% Bootstrap t UCL		15.6	
872					95% H-UCL (Log ROS)	19.0							
873													
874					Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed								
875					KM Mean (logged)	2.29				95% H-UCL (KM -Log)		18.9	
876					KM SD (logged)	0.63				95% Critical H Value (KM-Log)		2.32	
877					KM Standard Error of Mean (logged)	0.19							
878													
879					DL/2 Statistics								
880					DL/2 Normal					DL/2 Log-Transformed			
881					Mean in Original Scale	11.6				Mean in Log Scale		2.24	
882					SD in Original Scale	6.76				SD in Log Scale		0.77	

	A	B	C	D	E	F	G	H	I	J	K	L
883	95% t UCL (Assumes normality)					15.11	95% H-Stat UCL					22.8
884	DL/2 is not a recommended method, provided for comparisons and historical reasons											
885												
886	Nonparametric Distribution Free UCL Statistics											
887	Detected Data appear Normal Distributed at 5% Significance Level											
888												
889	Suggested UCL to Use											
890	95% KM (t) UCL					15.21	95% KM (Percentile Bootstrap) UCL					14.8
891												
892	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
893	Recommendations are based upon data size, data distribution, and skewness.											
894	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
895	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult											
896												
897												
898	Magnesium											
899												
900	General Statistics											
901	Total Number of Observations					12	Number of Distinct Observations					12
902							Number of Missing Observations					0
903	Minimum					351	Mean					1645
904	Maximum					3230	Median					1595
905	SD					868.7	Std. Error of Mean					250.8
906	Coefficient of Variation					0.52	Skewness					0.47
907												
908	Normal GOF Test											
909	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk GOF Test					
910	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
911	Lilliefors Test Statistic					0.14	Lilliefors GOF Test					
912	5% Lilliefors Critical Value					0.25	Data appear Normal at 5% Significance Level					
913	Data appear Normal at 5% Significance Level											
914												
915	Assuming Normal Distribution											
916	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
917	95% Student's-t UCL					2095	95% Adjusted-CLT UCL (Chen-1995)					2094
918							95% Modified-t UCL (Johnson-1978)					2101
919												
920	Gamma GOF Test											
921	A-D Test Statistic					0.26	Anderson-Darling Gamma GOF Test					
922	5% A-D Critical Value					0.73	Data appear Gamma Distributed at 5% Significance Level					
923	K-S Test Statistic					0.17	Kolmogorov-Smirnov Gamma GOF Test					
924	5% K-S Critical Value					0.24	Data appear Gamma Distributed at 5% Significance Level					
925	Detected data appear Gamma Distributed at 5% Significance Level											
926												
927	Gamma Statistics											
928	k hat (MLE)					3.29	k star (bias corrected MLE)					2.52
929	Theta hat (MLE)					499.1	Theta star (bias corrected MLE)					650.8
930	nu hat (MLE)					79.04	nu star (bias corrected)					60.63
931	MLE Mean (bias corrected)					1645	MLE Sd (bias corrected)					1035
932							Approximate Chi Square Value (0.05)					43.7
933	Adjusted Level of Significance					0.025	Adjusted Chi Square Value					41.5
934												
935	Assuming Gamma Distribution											
936	Approximate Gamma UCL (use when n>=50)					2280	Adjusted Gamma UCL (use when n<50)					2400
937												
938	Lognormal GOF Test											
939	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test					
940	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
941	Lilliefors Test Statistic					0.21	Lilliefors Lognormal GOF Test					
942	5% Lilliefors Critical Value					0.25	Data appear Lognormal at 5% Significance Level					
943	Data appear Lognormal at 5% Significance Level											
944												
945	Lognormal Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
946	Minimum of Logged Data					5.86	Mean of logged Data					7.24
947	Maximum of Logged Data					8.08	SD of logged Data					0.64
948												
949	Assuming Lognormal Distribution											
950	95% H-UCL					2703	90% Chebyshev (MVUE) UCL					2661
951	95% Chebyshev (MVUE) UCL					3102	97.5% Chebyshev (MVUE) UCL					3713
952	99% Chebyshev (MVUE) UCL					4914						
953												
954	Nonparametric Distribution Free UCL Statistics											
955	Data appear to follow a Discernible Distribution at 5% Significance Level											
956												
957	Nonparametric Distribution Free UCLs											
958	95% CLT UCL					2057	95% Jackknife UCL					2095
959	95% Standard Bootstrap UCL					2040	95% Bootstrap-t UCL					2144
960	95% Hall's Bootstrap UCL					2175	95% Percentile Bootstrap UCL					2042
961	95% BCA Bootstrap UCL					2063						
962	90% Chebyshev(Mean, Sd) UCL					2397	95% Chebyshev(Mean, Sd) UCL					2738
963	97.5% Chebyshev(Mean, Sd) UCL					3211	99% Chebyshev(Mean, Sd) UCL					4140
964												
965	Suggested UCL to Use											
966	95% Student's-t UCL					2095						
967												
968	Directions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
969	recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
970	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
971	For additional insight the user may want to consult a statistician.											
972												
973												
974	Nickel											
975												
976	General Statistics											
977	Total Number of Observations					12	Number of Distinct Observations					12
978							Number of Missing Observations					0
979	Minimum					2.35	Mean					6.93
980	Maximum					13.9	Median					6.75
981	SD					2.89	Std. Error of Mean					0.83
982	Coefficient of Variation					0.41	Skewness					0.9
983												
984	Normal GOF Test											
985	Shapiro Wilk Test Statistic					0.91	Shapiro Wilk GOF Test					
986	5% Shapiro Wilk Critical Value					0.85	Data appear Normal at 5% Significance Level					
987	Lilliefors Test Statistic					0.21	Lilliefors GOF Test					
988	5% Lilliefors Critical Value					0.25	Data appear Normal at 5% Significance Level					
989	Data appear Normal at 5% Significance Level											
990												
991	Assuming Normal Distribution											
992	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
993	95% Student's-t UCL					8.43	95% Adjusted-CLT UCL (Chen-1995)					8.54
994							95% Modified-t UCL (Johnson-1978)					8.47
995												
996	Gamma GOF Test											
997	A-D Test Statistic					0.43	Anderson-Darling Gamma GOF Test					
998	5% A-D Critical Value					0.73	data appear Gamma Distributed at 5% Significance Level					
999	K-S Test Statistic					0.19	Kolmogrov-Smirnoff Gamma GOF Test					
1000	5% K-S Critical Value					0.24	data appear Gamma Distributed at 5% Significance Level					
1001	Detected data appear Gamma Distributed at 5% Significance Level											
1002												
1003	Gamma Statistics											
1004	k hat (MLE)					5.96	k star (bias corrected MLE)					4.52
1005	Theta hat (MLE)					1.16	Theta star (bias corrected MLE)					1.53
1006	nu hat (MLE)					143.1	nu star (bias corrected)					108.7
1007	MLE Mean (bias corrected)					6.93	MLE Sd (bias corrected)					3.26
1008							Approximate Chi Square Value (0.05)					85.61

	A	B	C	D	E	F	G	H	I	J	K	L
1009	Adjusted Level of Significance					0.025	Adjusted Chi Square Value					82.5
1010												
1011	Assuming Gamma Distribution											
1012	Approximate Gamma UCL (use when n>=50))					8.80	Adjusted Gamma UCL (use when n<50)					9.13
1013												
1014	Lognormal GOF Test											
1015	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test					
1016	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
1017	Lilliefors Test Statistic					0.22	Lilliefors Lognormal GOF Test					
1018	5% Lilliefors Critical Value					0.25	Data appear Lognormal at 5% Significance Level					
1019	Data appear Lognormal at 5% Significance Level											
1020												
1021	Lognormal Statistics											
1022	Minimum of Logged Data					0.85	Mean of logged Data					1.85
1023	Maximum of Logged Data					2.63	SD of logged Data					0.45
1024												
1025	Assuming Lognormal Distribution											
1026	95% H-UCL					9.39	90% Chebyshev (MVUE) UCL					9.79
1027	95% Chebyshev (MVUE) UCL					11.0	97.5% Chebyshev (MVUE) UCL					12.8
1028	99% Chebyshev (MVUE) UCL					16.3						
1029												
1030	Nonparametric Distribution Free UCL Statistics											
1031	Data appear to follow a Discernible Distribution at 5% Significance Level											
1032												
1033	Nonparametric Distribution Free UCLs											
1034	95% CLT UCL					8.31	95% Jackknife UCL					8.43
1035	95% Standard Bootstrap UCL					8.27	95% Bootstrap-t UCL					8.62
1036	95% Hall's Bootstrap UCL					9.39	95% Percentile Bootstrap UCL					8.25
1037	95% BCA Bootstrap UCL					8.53						
1038	90% Chebyshev(Mean, Sd) UCL					9.44	95% Chebyshev(Mean, Sd) UCL					10.5
1039	97.5% Chebyshev(Mean, Sd) UCL					12.14	99% Chebyshev(Mean, Sd) UCL					15.2
1040												
1041	Suggested UCL to Use											
1042	95% Student's-t UCL					8.43						
1043												
1044	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1045	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
1046	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1047	For additional insight the user may want to consult a statistician.											
1048												
1049	Selenium											
1050												
1051	General Statistics											
1052	Total Number of Observations					12	Number of Distinct Observations					10
1053	Number of Detects					6	Number of Non-Detects					6
1054	Number of Distinct Detects					6	Number of Distinct Non-Detects					4
1055	Minimum Detect					0.69	Minimum Non-Detect					1.01
1056	Maximum Detect					1.3	Maximum Non-Detect					1.09
1057	Variance Detects					0.054	Percent Non-Detects					50%
1058	Mean Detects					1.00	SD Detects					0.23
1059	Median Detects					0.99	CV Detects					0.23
1060	Skewness Detects					-0.055	Kurtosis Detects					-1.53
1061	Mean of Logged Detects					-0.018	SD of Logged Detects					0.23
1062												
1063	Normal GOF Test on Detects Only											
1064	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk GOF Test					
1065	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Normal at 5% Significance Level					
1066	Lilliefors Test Statistic					0.20	Lilliefors GOF Test					
1067	5% Lilliefors Critical Value					0.36	Detected Data appear Normal at 5% Significance Level					
1068	Detected Data appear Normal at 5% Significance Level											
1069												
1070	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											
1071	Mean					0.90	Standard Error of Mean					0.06

	A	B	C	D	E	F	G	H	I	J	K	L
1072					SD	0.18					95% KM (BCA) UCL	1.03
1073					95% KM (t) UCL	1.03					95% KM (Percentile Bootstrap) UCL	1.03
1074					95% KM (z) UCL	1.02					95% KM Bootstrap t UCL	1.02
1075					90% KM Chebyshev UCL	1.11					95% KM Chebyshev UCL	1.20
1076					97.5% KM Chebyshev UCL	1.33					99% KM Chebyshev UCL	1.58
1077												
1078					Gamma GOF Tests on Detected Observations Only							
1079					A-D Test Statistic	0.27					Anderson-Darling GOF Test	
1080					5% A-D Critical Value	0.69					data appear Gamma Distributed at 5% Significance Level	
1081					K-S Test Statistic	0.20					Kolmogrov-Smirnoff GOF	
1082					5% K-S Critical Value	0.33					data appear Gamma Distributed at 5% Significance Level	
1083					Detected data appear Gamma Distributed at 5% Significance Level							
1084												
1085					Gamma Statistics on Detected Data Only							
1086					k hat (MLE)	21.64					k star (bias corrected MLE)	10.94
1087					Theta hat (MLE)	0.04					Theta star (bias corrected MLE)	0.09
1088					nu hat (MLE)	259.8					nu star (bias corrected)	131.2
1089					MLE Mean (bias corrected)	1.00					MLE Sd (bias corrected)	0.30
1090												
1091					Gamma Kaplan-Meier (KM) Statistics							
1092					k hat (KM)	23.1					nu hat (KM)	554.7
1093					Approximate Chi Square Value (554.65, α)	501					Adjusted Chi Square Value (554.65, β)	493.2
1094					Approximate KM-UCL (use when $n \geq 50$)	1.00					Gamma Adjusted KM-UCL (use when $n < 50$)	1.02
1095												
1096					Gamma ROS Statistics using Imputed Non-Detects							
1097					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1098					GROS may not be used when kstar of detected data is small such as < 0.1							
1099					For such situations, GROS method tends to yield inflated values of UCLs and BTVs							
1100					Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1101					Minimum	0.69					Mean	0.91
1102					Maximum	1.3					Median	0.87
1103					SD	0.19					CV	0.21
1104					k hat (MLE)	27.12					k star (bias corrected MLE)	20.34
1105					Theta hat (MLE)	0.03					Theta star (bias corrected MLE)	0.04
1106					nu hat (MLE)	650.8					nu star (bias corrected)	489.5
1107					MLE Mean (bias corrected)	0.91					MLE Sd (bias corrected)	0.20
1108											Adjusted Level of Significance (β)	0.02
1109					Approximate Chi Square Value (489.46, α)	439.2					Adjusted Chi Square Value (489.46, β)	431.9
1110					Gamma Approximate UCL (use when $n \geq 50$)	1.01					Gamma Adjusted UCL (use when $n < 50$)	1.03
1111												
1112					Lognormal GOF Test on Detected Observations Only							
1113					Shapiro Wilk Test Statistic	0.94					Shapiro Wilk GOF Test	
1114					5% Shapiro Wilk Critical Value	0.78					Detected Data appear Lognormal at 5% Significance Level	
1115					Lilliefors Test Statistic	0.18					Lilliefors GOF Test	
1116					5% Lilliefors Critical Value	0.36					Detected Data appear Lognormal at 5% Significance Level	
1117					Detected Data appear Lognormal at 5% Significance Level							
1118												
1119					Lognormal ROS Statistics Using Imputed Non-Detects							
1120					Mean in Original Scale	0.90					Mean in Log Scale	-0.11
1121					SD in Original Scale	0.19					SD in Log Scale	0.19
1122					95% Bootstrap t UCL (assumes normality of ROS data)	1.00					95% Percentile Bootstrap UCL	1
1123					95% BCA Bootstrap UCL	1.00					95% Bootstrap t UCL	1.05
1124					95% H-UCL (Log ROS)	1.01						
1125												
1126					Estimates using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed							
1127					KM Mean (logged)	-0.11					95% H-UCL (KM -Log)	1.01
1128					KM SD (logged)	0.19					95% Critical H Value (KM-Log)	1.84
1129					KM Standard Error of Mean (logged)	0.07						
1130												
1131					DL/2 Statistics							
1132					DL/2 Normal				DL/2 Log-Transformed			
1133					Mean in Original Scale	0.76					Mean in Log Scale	-0.32
1134					SD in Original Scale	0.29					SD in Log Scale	0.36

	A	B	C	D	E	F	G	H	I	J	K	L
1135	95% t UCL (Assumes normality)					0.91	95% H-Stat UCL					0.95
1136	DL/2 is not a recommended method, provided for comparisons and historical reasons											
1137												
1138	Nonparametric Distribution Free UCL Statistics											
1139	Detected Data appear Normal Distributed at 5% Significance Level											
1140												
1141	Suggested UCL to Use											
1142	95% KM (t) UCL					1.03	95% KM (Percentile Bootstrap) UCL					1.03
1143												
1144	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1145	Recommendations are based upon data size, data distribution, and skewness.											
1146	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
1147	Simulation results will not cover all Real World data sets; for additional insight the user may want to consult											
1148												
1149												
1150	Uranium											
1151												
1152	General Statistics											
1153	Total Number of Observations					12	Number of Distinct Observations					12
1154							Number of Missing Observations					0
1155	Minimum					0.42	Mean					1.44
1156	Maximum					5.8	Median					0.88
1157	SD					1.50	Std. Error of Mean					0.43
1158	Coefficient of Variation					1.04	Skewness					2.58
1159												
1160	Normal GOF Test											
1161	Shapiro Wilk Test Statistic					0.65	Shapiro Wilk GOF Test					
1162	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
1163	Lilliefors Test Statistic					0.29	Lilliefors GOF Test					
1164	5% Lilliefors Critical Value					0.25	Data Not Normal at 5% Significance Level					
1165	Data Not Normal at 5% Significance Level											
1166												
1167	Assuming Normal Distribution											
1168	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1169	95% Student's-t UCL					2.22	95% Adjusted-CLT UCL (Chen-1995)					2.50
1170							95% Modified-t UCL (Johnson-1978)					2.27
1171												
1172	Gamma GOF Test											
1173	A-D Test Statistic					0.79	Anderson-Darling Gamma GOF Test					
1174	5% A-D Critical Value					0.74	Data Not Gamma Distributed at 5% Significance Level					
1175	K-S Test Statistic					0.27	Kolmogorov-Smirnov Gamma GOF Test					
1176	5% K-S Critical Value					0.24	Data Not Gamma Distributed at 5% Significance Level					
1177	Data Not Gamma Distributed at 5% Significance Level											
1178												
1179	Gamma Statistics											
1180	k hat (MLE)					1.74	k star (bias corrected MLE)					1.36
1181	Theta hat (MLE)					0.82	Theta star (bias corrected MLE)					1.05
1182	nu hat (MLE)					41.9	nu star (bias corrected)					32.8
1183	MLE Mean (bias corrected)					1.44	MLE Sd (bias corrected)					1.23
1184							Approximate Chi Square Value (0.05)					20.7
1185	Adjusted Level of Significance					0.025	Adjusted Chi Square Value					19.2
1186												
1187	Assuming Gamma Distribution											
1188	Approximate Gamma UCL (use when n>=50)					2.28	Adjusted Gamma UCL (use when n<50)					2.45
1189												
1190	Lognormal GOF Test											
1191	Shapiro Wilk Test Statistic					0.91	Shapiro Wilk Lognormal GOF Test					
1192	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
1193	Lilliefors Test Statistic					0.23	Lilliefors Lognormal GOF Test					
1194	5% Lilliefors Critical Value					0.25	Data appear Lognormal at 5% Significance Level					
1195	Data appear Lognormal at 5% Significance Level											
1196												
1197	Lognormal Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
1198	Minimum of Logged Data					-0.86	Mean of logged Data					0.05
1199	Maximum of Logged Data					1.75	SD of logged Data					0.75
1200												
1201	Assuming Lognormal Distribution											
1202	95% H-UCL					2.45	90% Chebyshev (MVUE) UCL					2.28
1203	95% Chebyshev (MVUE) UCL					2.70	97.5% Chebyshev (MVUE) UCL					3.28
1204	99% Chebyshev (MVUE) UCL					4.42						
1205												
1206	Nonparametric Distribution Free UCL Statistics											
1207	Data appear to follow a Discernible Distribution at 5% Significance Level											
1208												
1209	Nonparametric Distribution Free UCLs											
1210	95% CLT UCL					2.15	95% Jackknife UCL					2.22
1211	95% Standard Bootstrap UCL					2.12	95% Bootstrap-t UCL					3.54
1212	95% Hall's Bootstrap UCL					4.97	95% Percentile Bootstrap UCL					2.16
1213	95% BCA Bootstrap UCL					2.57						
1214	90% Chebyshev(Mean, Sd) UCL					2.74	95% Chebyshev(Mean, Sd) UCL					3.33
1215	97.5% Chebyshev(Mean, Sd) UCL					4.15	99% Chebyshev(Mean, Sd) UCL					5.76
1216												
1217	Suggested UCL to Use											
1218	95% H-UCL					2.45						
1219												
1220	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1221	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
1222	Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1223	For additional insight the user may want to consult a statistician.											
1224												
1225	ProUCL computes and outputs H-statistic based UCLs for historical reasons only.											
1226	often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical											
1227	Manual. It is therefore recommended to avoid the use of H-statistic based 95% UCLs.											
1228	Nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma											
1229												
1230												
1231	Vanadium											
1232												
1233	General Statistics											
1234	Total Number of Observations					12	Number of Distinct Observations					12
1235							Number of Missing Observations					0
1236	Minimum					3.62	Mean					18.4
1237	Maximum					47.5	Median					20.1
1238	SD					11.7	Std. Error of Mean					3.39
1239	Coefficient of Variation					0.63	Skewness					1.09
1240												
1241	Normal GOF Test											
1242	Shapiro Wilk Test Statistic					0.85	Shapiro Wilk GOF Test					
1243	5% Shapiro Wilk Critical Value					0.85	Data Not Normal at 5% Significance Level					
1244	Lilliefors Test Statistic					0.26	Lilliefors GOF Test					
1245	5% Lilliefors Critical Value					0.25	Data Not Normal at 5% Significance Level					
1246	Data Not Normal at 5% Significance Level											
1247												
1248	Assuming Normal Distribution											
1249	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1250	95% Student's-t UCL					24.5	95% Adjusted-CLT UCL (Chen-1995)					25.2
1251							95% Modified-t UCL (Johnson-1978)					24.7
1252												
1253	Gamma GOF Test											
1254	A-D Test Statistic					0.74	Anderson-Darling Gamma GOF Test					
1255	5% A-D Critical Value					0.74	Data Not Gamma Distributed at 5% Significance Level					
1256	K-S Test Statistic					0.23	Kolmogrov-Smirnoff Gamma GOF Test					
1257	5% K-S Critical Value					0.24	Data appear Gamma Distributed at 5% Significance Level					
1258	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
1259												
1260	Gamma Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
1261	k hat (MLE)					2.32	k star (bias corrected MLE)					1.80
1262	Theta hat (MLE)					7.93	Theta star (bias corrected MLE)					10.2
1263	nu hat (MLE)					55.8	nu star (bias corrected)					43.2
1264	MLE Mean (bias corrected)					18.4	MLE Sd (bias corrected)					13.7
1265							Approximate Chi Square Value (0.05)					29.1
1266	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					27.4
1267												
1268	Assuming Gamma Distribution											
1269	Approximate Gamma UCL (use when n>=50)					27.4	Adjusted Gamma UCL (use when n<50)					29.1
1270												
1271	Lognormal GOF Test											
1272	Shapiro Wilk Test Statistic					0.86	Shapiro Wilk Lognormal GOF Test					
1273	5% Shapiro Wilk Critical Value					0.85	Data appear Lognormal at 5% Significance Level					
1274	Lilliefors Test Statistic					0.26	Lilliefors Lognormal GOF Test					
1275	5% Lilliefors Critical Value					0.25	Data Not Lognormal at 5% Significance Level					
1276	Data appear Approximate Lognormal at 5% Significance Level											
1277												
1278	Lognormal Statistics											
1279	Minimum of Logged Data					1.28	Mean of logged Data					2.68
1280	Maximum of Logged Data					3.86	SD of logged Data					0.77
1281												
1282	Assuming Lognormal Distribution											
1283	95% H-UCL					36.0	90% Chebyshev (MVUE) UCL					32.9
1284	95% Chebyshev (MVUE) UCL					39.1	97.5% Chebyshev (MVUE) UCL					47.6
1285	99% Chebyshev (MVUE) UCL					64.5						
1286												
1287	Nonparametric Distribution Free UCL Statistics											
1288	Data appear to follow a Discernible Distribution at 5% Significance Level											
1289												
1290	Nonparametric Distribution Free UCLs											
1291	95% CLT UCL					24.0	95% Jackknife UCL					24.5
1292	95% Standard Bootstrap UCL					23.8	95% Bootstrap-t UCL					25.5
1293	95% Hall's Bootstrap UCL					29.4	95% Percentile Bootstrap UCL					24.1
1294	95% BCA Bootstrap UCL					24.7						
1295	90% Chebyshev(Mean, Sd) UCL					28.6	95% Chebyshev(Mean, Sd) UCL					33.2
1296	97.5% Chebyshev(Mean, Sd) UCL					39.7	99% Chebyshev(Mean, Sd) UCL					52.3
1297												
1298	Suggested UCL to Use											
1299	95% Adjusted Gamma UCL					29.1						
1300												
1301	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
1302	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh											
1303	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
1304	For additional insight the user may want to consult a statistician.											
1305												