

	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		9/2/2015 10:32:23 AM											
5	From File		ProUCLinput_15-008(g)_0-5.xls											
6	Full Precision		OFF											
7	Confidence Coefficient		95%											
8	Bootstrap Operations		2000											
9														
10														
11	Calcium													
12														
13	General Statistics													
14	Total Number of Observations				8		Number of Distinct Observations				8			
15							Number of Missing Observations				0			
16	Minimum				928		Mean				3172			
17	Maximum				6080		Median				2885			
18	SD				1714		Std. Error of Mean				606			
19	Coefficient of Variation				0.54		Skewness				0.41			
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				0.96		Shapiro Wilk GOF Test							
28	5% Shapiro Wilk Critical Value				0.81		Data appear Normal at 5% Significance Level							
29	Lilliefors Test Statistic				0.17		Lilliefors GOF Test							
30	5% Lilliefors Critical Value				0.31		Data appear Normal at 5% Significance Level							
31	Data appear 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				4320		95% Adjusted-CLT UCL (Chen-1995)				4265			
36							95% Modified-t UCL (Johnson-1978)				4335			
37														
38	Gamma GOF Test													
39	A-D Test Statistic				0.20		Anderson-Darling Gamma GOF Test							
40	5% A-D Critical Value				0.72		data appear Gamma Distributed at 5% Significance Level							
41	K-S Test Statistic				0.15		Kolmogorov-Smirnov 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)				3.44		k star (bias corrected MLE)				2.23			
47	Theta hat (MLE)				921.7		Theta star (bias corrected MLE)				1420			
48	nu hat (MLE)				55.0		nu star (bias corrected)				35.7			
49	MLE Mean (bias corrected)				3172		MLE Sd (bias corrected)				2122			
50							Approximate Chi Square Value (0.05)				23.0			
51	Adjusted Level of Significance				0.01		Adjusted Chi Square Value				20.5			
52														
53	Assuming Gamma Distribution													
54	Approximate Gamma UCL (use when n>=50)						4916		Adjusted Gamma UCL (use when n<50)				5524	
55														
56	Lognormal GOF Test													
57	Shapiro Wilk Test Statistic				0.95		Shapiro Wilk Lognormal GOF Test							
58	5% Shapiro Wilk Critical Value				0.81		Data appear Lognormal at 5% Significance Level							
59	Lilliefors Test Statistic				0.16		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													

	A	B	C	D	E	F	G	H	I	J	K	L
64	Minimum of Logged Data					6.83	Mean of logged Data					7.91
65	Maximum of Logged Data					8.71	SD of logged Data					0.62
66												
67	Assuming Lognormal Distribution											
68	95% H-UCL					6105	90% Chebyshev (MVUE) UCL					5393
69	95% Chebyshev (MVUE) UCL					6375	97.5% Chebyshev (MVUE) UCL					7739
70	99% Chebyshev (MVUE) UCL					10419						
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					4169	95% Jackknife UCL					4320
77	95% Standard Bootstrap UCL					4139	95% Bootstrap-t UCL					4521
78	95% Hall's Bootstrap UCL					4373	95% Percentile Bootstrap UCL					4154
79	95% BCA Bootstrap UCL					4169						
80	90% Chebyshev(Mean, Sd) UCL					4990	95% Chebyshev(Mean, Sd) UCL					5814
81	97.5% Chebyshev(Mean, Sd) UCL					6957	99% Chebyshev(Mean, Sd) UCL					9202
82												
83	Suggested UCL to Use											
84	95% Student's-t UCL					4320						
85												
86	itions 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	Chromium											
93												
94	General Statistics											
95	Total Number of Observations					8	Number of Distinct Observations					7
96							Number of Missing Observations					0
97	Minimum					2.97	Mean					10.1
98	Maximum					25.4	Median					7.66
99	SD					7.43	Std. Error of Mean					2.62
100	Coefficient of Variation					0.73	Skewness					1.34
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					0.86	Shapiro Wilk GOF Test					
109	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level					
110	Lilliefors Test Statistic					0.20	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					15.14	95% Adjusted-CLT UCL (Chen-1995)					15.8
117							95% Modified-t UCL (Johnson-1978)					15.3
118												
119	Gamma GOF Test											
120	A-D Test Statistic					0.24	Anderson-Darling Gamma GOF Test					
121	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
122	K-S Test Statistic					0.14	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											

	A	B	C	D	E	F	G	H	I	J	K	L
127	k hat (MLE)					2.38	k star (bias corrected MLE)					1.57
128	Theta hat (MLE)					4.26	Theta star (bias corrected MLE)					6.45
129	nu hat (MLE)					38.14	nu star (bias corrected)					25.19
130	MLE Mean (bias corrected)					10.11	MLE Sd (bias corrected)					8.10
131							Approximate Chi Square Value (0.05)					14.74
132	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					12.74
133												
134	Assuming Gamma Distribution											
135	Approximate Gamma UCL (use when n>=50))					17.34	Adjusted Gamma UCL (use when n<50)					20.04
136												
137	Lognormal GOF Test											
138	Shapiro Wilk Test Statistic					0.97	Shapiro Wilk Lognormal GOF Test					
139	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level					
140	Lilliefors Test Statistic					0.15	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					1.08	Mean of logged Data					2.09
146	Maximum of Logged Data					3.23	SD of logged Data					0.71
147												
148	Assuming Lognormal Distribution											
149	95% H-UCL					22.34	90% Chebyshev (MVUE) UCL					17.94
150	95% Chebyshev (MVUE) UCL					21.54	97.5% Chebyshev (MVUE) UCL					26.54
151	99% Chebyshev (MVUE) UCL					36.24						
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					14.44	95% Jackknife UCL					15.14
158	95% Standard Bootstrap UCL					14.24	95% Bootstrap-t UCL					17.94
159	95% Hall's Bootstrap UCL					17.44	95% Percentile Bootstrap UCL					14.44
160	95% BCA Bootstrap UCL					15.64						
161	90% Chebyshev(Mean, Sd) UCL					18.04	95% Chebyshev(Mean, Sd) UCL					21.64
162	97.5% Chebyshev(Mean, Sd) UCL					26.54	99% Chebyshev(Mean, Sd) UCL					36.34
163												
164	Suggested UCL to Use											
165	95% Student's-t UCL					15.14						
166												
167	Recommendations 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 Singh											
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	Cobalt											
174												
175	General Statistics											
176	Total Number of Observations					8	Number of Distinct Observations					8
177							Number of Missing Observations					0
178	Minimum					0.95	Mean					3.77
179	Maximum					14	Median					2.44
180	SD					4.31	Std. Error of Mean					1.52
181	Coefficient of Variation					1.14	Skewness					2.38
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					0.67	Shapiro Wilk GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
190	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level						
191	Lilliefors Test Statistic					0.32	Lilliefors GOF Test						
192	5% Lilliefors Critical Value					0.31	Data Not Normal at 5% Significance Level						
193	Data Not 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					6.66	95% Adjusted-CLT UCL (Chen-1995)					7.65	
198							95% Modified-t UCL (Johnson-1978)					6.87	
199													
200	Gamma GOF Test												
201	A-D Test Statistic					0.49	Anderson-Darling Gamma GOF Test						
202	5% A-D Critical Value					0.73	data appear Gamma Distributed at 5% Significance Level						
203	K-S Test Statistic					0.20	Kolmogrov-Smirnoff Gamma GOF Test						
204	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significance Level						
205	Detected data appear Gamma Distributed at 5% Significance Level												
206													
207	Gamma Statistics												
208	k hat (MLE)					1.38	k star (bias corrected MLE)					0.95	
209	Theta hat (MLE)					2.71	Theta star (bias corrected MLE)					3.96	
210	nu hat (MLE)					22.19	nu star (bias corrected)					15.2	
211	MLE Mean (bias corrected)					3.77	MLE Sd (bias corrected)					3.86	
212							Approximate Chi Square Value (0.05)					7.4	
213	Adjusted Level of Significance					0.019	Adjusted Chi Square Value					6.07	
214													
215	Assuming Gamma Distribution												
216	Approximate Gamma UCL (use when n>=50)					7.74	Adjusted Gamma UCL (use when n<50)					9.43	
217													
218	Lognormal GOF Test												
219	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test						
220	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level						
221	Lilliefors Test Statistic					0.15	Lilliefors Lognormal GOF Test						
222	5% Lilliefors Critical Value					0.31	Data appear Lognormal at 5% Significance Level						
223	Data appear Lognormal at 5% Significance Level												
224													
225	Lognormal Statistics												
226	Minimum of Logged Data					-0.042	Mean of logged Data					0.92	
227	Maximum of Logged Data					2.63	SD of logged Data					0.89	
228													
229	Assuming Lognormal Distribution												
230	95% H-UCL					11.11	90% Chebyshev (MVUE) UCL					6.99	
231	95% Chebyshev (MVUE) UCL					8.55	97.5% Chebyshev (MVUE) UCL					10.7	
232	99% Chebyshev (MVUE) UCL					14.91							
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					6.27	95% Jackknife UCL					6.66	
239	95% Standard Bootstrap UCL					6.07	95% Bootstrap-t UCL					11.4	
240	95% Hall's Bootstrap UCL					15.84	95% Percentile Bootstrap UCL					6.51	
241	95% BCA Bootstrap UCL					7.39							
242	90% Chebyshev(Mean, Sd) UCL					8.34	95% Chebyshev(Mean, Sd) UCL					10.4	
243	97.5% Chebyshev(Mean, Sd) UCL					13.29	99% Chebyshev(Mean, Sd) UCL					18.9	
244													
245	Suggested UCL to Use												
246	95% Adjusted Gamma UCL					9.43							
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 Singh												
250	and 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													

[illegible]

	A	B	C	D	E	F	G	H	I	J	K	L	
316	Data appear to follow a Discernible Distribution at 5% Significance Level												
317													
318	Nonparametric Distribution Free UCLs												
319	95% CLT UCL					24.34	95% Jackknife UCL					25.72	
320	95% Standard Bootstrap UCL					23.94	95% Bootstrap-t UCL					34.93	
321	95% Hall's Bootstrap UCL					24.83	95% Percentile Bootstrap UCL					24.56	
322	95% BCA Bootstrap UCL					25.63							
323	90% Chebyshev(Mean, Sd) UCL					31.62	95% Chebyshev(Mean, Sd) UCL					38.81	
324	97.5% Chebyshev(Mean, Sd) UCL					48.94	99% Chebyshev(Mean, Sd) UCL					68.72	
325													
326	Suggested UCL to Use												
327	95% Student's-t UCL					25.72							
328													
329	Recommendations 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 Singh												
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													
335	Lead												
336													
337	General Statistics												
338	Total Number of Observations					8	Number of Distinct Observations					8	
339							Number of Missing Observations					0	
340	Minimum					3.67	Mean					55.93	
341	Maximum					370	Median					7.55	
342	SD					127.3	Std. Error of Mean					45	
343	Coefficient of Variation					2.27	Skewness					2.79	
344													
345	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
346	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
347	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
348	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0												
349													
350	Normal GOF Test												
351	Shapiro Wilk Test Statistic					0.47	Shapiro Wilk GOF Test						
352	5% Shapiro Wilk Critical Value					0.81	Data Not Normal at 5% Significance Level						
353	Lilliefors Test Statistic					0.44	Lilliefors GOF Test						
354	5% Lilliefors Critical Value					0.31	Data Not Normal at 5% Significance Level						
355	Data Not Normal at 5% Significance Level												
356													
357	Assuming Normal Distribution												
358	95% Normal UCL						95% UCLs (Adjusted for Skewness)						
359	95% Student's-t UCL					141.2	95% Adjusted-CLT UCL (Chen-1995)					177.5	
360							95% Modified-t UCL (Johnson-1978)					148.6	
361													
362	Gamma GOF Test												
363	A-D Test Statistic					1.25	Anderson-Darling Gamma GOF Test						
364	5% A-D Critical Value					0.77	Data Not Gamma Distributed at 5% Significance Level						
365	K-S Test Statistic					0.31	Kolmogrov-Smirnoff Gamma GOF Test						
366	5% K-S Critical Value					0.31	Data appear Gamma Distributed at 5% Significance Level						
367	Detected data follow Appr. Gamma Distribution at 5% Significance Level												
368													
369	Gamma Statistics												
370	k hat (MLE)					0.44	k star (bias corrected MLE)					0.36	
371	Theta hat (MLE)					125.2	Theta star (bias corrected MLE)					154.3	
372	nu hat (MLE)					7.14	nu star (bias corrected)					5.8	
373	MLE Mean (bias corrected)					55.92	MLE Sd (bias corrected)					92.81	
374							Approximate Chi Square Value (0.05)					1.53	
375	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					1.05	
376													
377	Assuming Gamma Distribution												
378	Approximate Gamma UCL (use when n>=50)					210.8	Adjusted Gamma UCL (use when n<50)					308.5	

	A	B	C	D	E	F	G	H	I	J	K	L
379												
380	Lognormal GOF Test											
381	Shapiro Wilk Test Statistic				0.81	Shapiro Wilk Lognormal GOF Test						
382	5% Shapiro Wilk Critical Value				0.81	Data Not Lognormal at 5% Significance Level						
383	Lilliefors Test Statistic				0.24	Lilliefors Lognormal GOF Test						
384	5% Lilliefors Critical Value				0.31	Data appear Lognormal at 5% Significance Level						
385	Data appear Approximate Lognormal at 5% Significance Level											
386												
387	Lognormal Statistics											
388	Minimum of Logged Data				1.3	Mean of logged Data						2.57
389	Maximum of Logged Data				5.91	SD of logged Data						1.53
390												
391	Assuming Lognormal Distribution											
392	95% H-UCL				704.3	90% Chebyshev (MVUE) UCL						88.1
393	95% Chebyshev (MVUE) UCL				113	97.5% Chebyshev (MVUE) UCL						147.4
394	99% Chebyshev (MVUE) UCL				214.9							
395												
396	Nonparametric Distribution Free UCL Statistics											
397	Data appear to follow a Discernible Distribution at 5% Significance Level											
398												
399	Nonparametric Distribution Free UCLs											
400	95% CLT UCL				129.9	95% Jackknife UCL						141.2
401	95% Standard Bootstrap UCL				123.8	95% Bootstrap-t UCL						1512
402	95% Hall's Bootstrap UCL				1185	95% Percentile Bootstrap UCL						145.2
403	95% BCA Bootstrap UCL				190.6							
404	90% Chebyshev(Mean, Sd) UCL				190.9	95% Chebyshev(Mean, Sd) UCL						252.1
405	97.5% Chebyshev(Mean, Sd) UCL				336.9	99% Chebyshev(Mean, Sd) UCL						503.7
406												
407	Suggested UCL to Use											
408	95% Adjusted Gamma UCL				308.5							
409												
410	tions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
411	mmendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
412	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
413	For additional insight the user may want to consult a statistician.											
414												
415	TATB											
416												
417	General Statistics											
418	Total Number of Observations				8	Number of Distinct Observations						7
419	Number of Detects				6	Number of Non-Detects						2
420	Number of Distinct Detects				6	Number of Distinct Non-Detects						1
421	Minimum Detect				0.32	Minimum Non-Detect						1
422	Maximum Detect				27.3	Maximum Non-Detect						1
423	Variance Detects				129	Percent Non-Detects						25%
424	Mean Detects				11.8	SD Detects						11.3
425	Median Detects				10.9	CV Detects						0.96
426	Skewness Detects				0.27	Kurtosis Detects						-2.04
427	Mean of Logged Detects				1.51	SD of Logged Detects						1.92
428												
429	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
430	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
431	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
432	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0											
433												
434	Normal GOF Test on Detects Only											
435	Shapiro Wilk Test Statistic				0.89	Shapiro Wilk GOF Test						
436	5% Shapiro Wilk Critical Value				0.78	ected Data appear Normal at 5% Significance Level						
437	Lilliefors Test Statistic				0.21	Lilliefors GOF Test						
438	5% Lilliefors Critical Value				0.36	ected Data appear Normal at 5% Significance Level						
439	Detected Data appear Normal at 5% Significance Level											
440												
441	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs											

	A	B	C	D	E	F	G	H	I	J	K	L
442	Mean					8.96	Standard Error of Mean					3.96
443	SD					10.24	95% KM (BCA) UCL					15.04
444	95% KM (t) UCL					16.44	95% KM (Percentile Bootstrap) UCL					15.34
445	95% KM (z) UCL					15.49	95% KM Bootstrap t UCL					19.34
446	90% KM Chebyshev UCL					20.87	95% KM Chebyshev UCL					26.24
447	97.5% KM Chebyshev UCL					33.74	99% KM Chebyshev UCL					48.44
448												
449	Gamma GOF Tests on Detected Observations Only											
450	A-D Test Statistic					0.44	Anderson-Darling GOF Test					
451	5% A-D Critical Value					0.724	data appear Gamma Distributed at 5% Significance Level					
452	K-S Test Statistic					0.25	Kolmogrov-Smirnoff GOF					
453	5% K-S Critical Value					0.344	data appear Gamma Distributed at 5% Significance Level					
454	Detected data appear Gamma Distributed at 5% Significance Level											
455												
456	Gamma Statistics on Detected Data Only											
457	k hat (MLE)					0.64	k star (bias corrected MLE)					0.43
458	Theta hat (MLE)					18.37	Theta star (bias corrected MLE)					27.34
459	nu hat (MLE)					7.71	nu star (bias corrected)					5.19
460	MLE Mean (bias corrected)					11.87	MLE Sd (bias corrected)					17.94
461												
462	Gamma Kaplan-Meier (KM) Statistics											
463	k hat (KM)					0.76	nu hat (KM)					12.24
464	Approximate Chi Square Value (12.27, α)					5.40	Adjusted Chi Square Value (12.27, β)					4.31
465	Approximate KM-UCL (use when n>=50)					20.34	Gamma Adjusted KM-UCL (use when n<50)					25.54
466												
467	Gamma ROS Statistics using Imputed Non-Detects											
468	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
469	GROS may not be used when kstar of detected data is small such as < 0.1											
470	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
471	Gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
472	Minimum					0.01	Mean					9.11
473	Maximum					27.34	Median					3.66
474	SD					10.83	CV					1.18
475	k hat (MLE)					0.41	k star (bias corrected MLE)					0.34
476	Theta hat (MLE)					21.74	Theta star (bias corrected MLE)					26.34
477	nu hat (MLE)					6.70	nu star (bias corrected)					5.52
478	MLE Mean (bias corrected)					9.11	MLE Sd (bias corrected)					15.54
479							Adjusted Level of Significance (β)					0.019
480	Approximate Chi Square Value (5.53, α)					1.40	Adjusted Chi Square Value (5.53, β)					0.94
481	Gamma Approximate UCL (use when n>=50)					35.93	Gamma Adjusted UCL (use when n<50)					53.24
482												
483	Lognormal GOF Test on Detected Observations Only											
484	Shapiro Wilk Test Statistic					0.84	Shapiro Wilk GOF Test					
485	5% Shapiro Wilk Critical Value					0.78	Detected Data appear Lognormal at 5% Significance Level					
486	Lilliefors Test Statistic					0.24	Lilliefors GOF Test					
487	5% Lilliefors Critical Value					0.36	Detected Data appear Lognormal at 5% Significance Level					
488	Detected Data appear Lognormal at 5% Significance Level											
489												
490	Lognormal ROS Statistics Using Imputed Non-Detects											
491	Mean in Original Scale					9.01	Mean in Log Scale					0.98
492	SD in Original Scale					10.9	SD in Log Scale					1.93
493	95% t UCL (assumes normality of ROS data)					16.34	95% Percentile Bootstrap UCL					15.14
494	95% BCA Bootstrap UCL					15.9	95% Bootstrap t UCL					19.24
495	95% H-UCL (Log ROS)					1342						
496												
497	DLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed											
498	KM Mean (logged)					0.92	95% H-UCL (KM -Log)					724.9
499	KM SD (logged)					1.84	95% Critical H Value (KM-Log)					5.69
500	KM Standard Error of Mean (logged)					0.71						
501												
502	DL/2 Statistics											
503	DL/2 Normal					DL/2 Log-Transformed						
504	Mean in Original Scale					8.98	Mean in Log Scale					0.96

	A	B	C	D	E	F	G	H	I	J	K	L
505	SD in Original Scale					10.93	SD in Log Scale					1.92
506	95% t UCL (Assumes normality)					16.31	95% H-Stat UCL					1239
507	DL/2 is not a recommended method, provided for comparisons and historical reasons											
508												
509	Nonparametric Distribution Free UCL Statistics											
510	Detected Data appear Normal Distributed at 5% Significance Level											
511												
512	Suggested UCL to Use											
513	95% KM (t) UCL					16.44	95% KM (Percentile Bootstrap) UCL					15.3
514												
515	Options regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
516	Recommendations are based upon data size, data distribution, and skewness.											
517	Recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and											
518	Options results will not cover all Real World data sets; for additional insight the user may want to cons											
519												
520												
521	Uranium											
522												
523	General Statistics											
524	Total Number of Observations					8	Number of Distinct Observations					8
525							Number of Missing Observations					0
526	Minimum					1.08	Mean					3.53
527	Maximum					7.77	Median					3.75
528	SD					2.11	Std. Error of Mean					0.74
529	Coefficient of Variation					0.59	Skewness					0.97
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					0.89	Shapiro Wilk GOF Test					
538	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level					
539	Lilliefors Test Statistic					0.24	Lilliefors GOF Test					
540	5% Lilliefors Critical Value					0.31	Data appear Normal at 5% Significance Level					
541	Data appear 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					4.95	95% Adjusted-CLT UCL (Chen-1995)					5.04
546							95% Modified-t UCL (Johnson-1978)					4.99
547												
548	Gamma GOF Test											
549	A-D Test Statistic					0.39	Anderson-Darling Gamma GOF Test					
550	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significan					
551	K-S Test Statistic					0.23	Kolmogrov-Smirnoff Gamma GOF Test					
552	5% K-S Critical Value					0.29	data appear Gamma Distributed at 5% Significan					
553	Detected data appear Gamma Distributed at 5% Significance Level											
554												
555	Gamma Statistics											
556	k hat (MLE)					3.04	k star (bias corrected MLE)					1.98
557	Theta hat (MLE)					1.16	Theta star (bias corrected MLE)					1.77
558	nu hat (MLE)					48.74	nu star (bias corrected)					31.8
559	MLE Mean (bias corrected)					3.53	MLE Sd (bias corrected)					2.50
560							Approximate Chi Square Value (0.05)					19.9
561	Adjusted Level of Significance					0.01	Adjusted Chi Square Value					17.5
562												
563	Assuming Gamma Distribution											
564	Approximate Gamma UCL (use when n>=50))					5.64	Adjusted Gamma UCL (use when n<50)					6.4
565												
566	Lognormal GOF Test											
567	Shapiro Wilk Test Statistic					0.91	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
568	5% Shapiro Wilk Critical Value					0.81	Data appear Lognormal at 5% Significance Level						
569	Lilliefors Test Statistic					0.25	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					0.07	Mean of logged Data					1.09	
575	Maximum of Logged Data					2.05	SD of logged Data					0.66	
576													
577	Assuming Lognormal Distribution												
578	95% H-UCL					7.17	90% Chebyshev (MVUE) UCL					6.13	
579	95% Chebyshev (MVUE) UCL					7.29	97.5% Chebyshev (MVUE) UCL					8.89	
580	99% Chebyshev (MVUE) UCL					12.04							
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					4.76	95% Jackknife UCL					4.95	
587	95% Standard Bootstrap UCL					4.69	95% Bootstrap-t UCL					5.23	
588	95% Hall's Bootstrap UCL					5.86	95% Percentile Bootstrap UCL					4.70	
589	95% BCA Bootstrap UCL					4.89							
590	90% Chebyshev(Mean, Sd) UCL					5.77	95% Chebyshev(Mean, Sd) UCL					6.79	
591	97.5% Chebyshev(Mean, Sd) UCL					8.20	99% Chebyshev(Mean, Sd) UCL					10.9	
592													
593	Suggested UCL to Use												
594	95% Student's-t UCL					4.95							
595													
596	Options regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
597	recommendations 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	Uranium-238												
603													
604	General Statistics												
605	Total Number of Observations					8	Number of Distinct Observations					8	
606							Number of Missing Observations					0	
607	Minimum					1.14	Mean					2.10	
608	Maximum					4.14	Median					1.76	
609	SD					1.03	Std. Error of Mean					0.36	
610	Coefficient of Variation					0.49	Skewness					1.21	
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					0.88	Shapiro Wilk GOF Test						
619	5% Shapiro Wilk Critical Value					0.81	Data appear Normal at 5% Significance Level						
620	Lilliefors Test Statistic					0.22	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					2.79	95% Adjusted-CLT UCL (Chen-1995)					2.87	
627							95% Modified-t UCL (Johnson-1978)					2.82	
628													
629	Gamma GOF Test												
630	A-D Test Statistic					0.30	Anderson-Darling Gamma GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
631			5% A-D Critical Value	0.71		data appear Gamma Distributed at 5% Significance Level						
632			K-S Test Statistic	0.18		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)	5.47		k star (bias corrected MLE)					3.50	
638			Theta hat (MLE)	0.38		Theta star (bias corrected MLE)					0.60	
639			nu hat (MLE)	87.64		nu star (bias corrected)					56.1	
640			MLE Mean (bias corrected)	2.10		MLE Sd (bias corrected)					1.12	
641						Approximate Chi Square Value (0.05)					39.8	
642			Adjusted Level of Significance	0.01		Adjusted Chi Square Value					36.4	
643												
644			Assuming Gamma Distribution									
645			Approximate Gamma UCL (use when n>=50))	2.96		Adjusted Gamma UCL (use when n<50)					3.24	
646												
647			Lognormal GOF Test									
648			Shapiro Wilk Test Statistic	0.94		Shapiro Wilk Lognormal GOF Test						
649			5% Shapiro Wilk Critical Value	0.81		Data appear Lognormal at 5% Significance Level						
650			Lilliefors Test Statistic	0.15		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	0.13		Mean of logged Data					0.65	
656			Maximum of Logged Data	1.42		SD of logged Data					0.45	
657												
658			Assuming Lognormal Distribution									
659			95% H-UCL	3.13		90% Chebyshev (MVUE) UCL					3.11	
660			95% Chebyshev (MVUE) UCL	3.57		97.5% Chebyshev (MVUE) UCL					4.21	
661			99% Chebyshev (MVUE) UCL	5.46								
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	2.70		95% Jackknife UCL					2.79	
668			95% Standard Bootstrap UCL	2.66		95% Bootstrap-t UCL					3.22	
669			95% Hall's Bootstrap UCL	3.09		95% Percentile Bootstrap UCL					2.73	
670			95% BCA Bootstrap UCL	2.80								
671			90% Chebyshev(Mean, Sd) UCL	3.20		95% Chebyshev(Mean, Sd) UCL					3.69	
672			97.5% Chebyshev(Mean, Sd) UCL	4.38		99% Chebyshev(Mean, Sd) UCL					5.73	
673												
674			Suggested UCL to Use									
675			95% Student's-t UCL	2.79								
676												
677			Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate									
678			Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and									
679			Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets									
680			For additional insight the user may want to consult a statistician.									
681												