

	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 2:59:56 PM								
5	From File			ProUCLinput_C-12-003_0-5.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	f Bootstrap Operations			2000								
9												
10												
11	Barium											
12												
13	General Statistics											
14	Total Number of Observations				10		Number of Distinct Observations				10	
15							Number of Missing Observations				0	
16	Minimum				36.2		Mean				95.2	
17	Maximum				161		Median				100.2	
18	SD				38.04		Std. Error of Mean				12.04	
19	Coefficient of Variation				0.4		Skewness				0.005	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.97		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.84		Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.14		Lilliefors GOF Test					
25	5% Lilliefors Critical Value				0.28		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				117.3		95% Adjusted-CLT UCL (Chen-1995)				115	
31							95% Modified-t UCL (Johnson-1978)				117.3	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				0.32		Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value				0.72		data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.15		Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value				0.26		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)				5.98		k star (bias corrected MLE)				4.25	
42	Theta hat (MLE)				15.91		Theta star (bias corrected MLE)				22.38	
43	nu hat (MLE)				119.6		nu star (bias corrected)				85.04	
44	MLE Mean (bias corrected)				95.2		MLE Sd (bias corrected)				46.10	
45							Approximate Chi Square Value (0.05)				64.82	
46	Adjusted Level of Significance				0.024		Adjusted Chi Square Value				61.79	
47												
48	Assuming Gamma Distribution											
49	Approximate Gamma UCL (use when n>=50))				125.5		Adjusted Gamma UCL (use when n<50)				131.2	
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic				0.93		Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value				0.84		Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic				0.18		Lilliefors Lognormal GOF Test					
55	5% Lilliefors Critical Value				0.28		Data appear Lognormal at 5% Significance Level					
56	Data appear Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59	Minimum of Logged Data				3.58		Mean of logged Data				4.47	
60	Maximum of Logged Data				5.08		SD of logged Data				0.46	
61												
62	Assuming Lognormal Distribution											
63	95% H-UCL				135.5		90% Chebyshev (MVUE) UCL				138.7	

[illegible]

[illegible]

	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)				7.28	k star (bias corrected MLE)				5.16		
194	Theta hat (MLE)				0.55	Theta star (bias corrected MLE)				0.78		
195	nu hat (MLE)				145.7	nu star (bias corrected)				103.3		
196	MLE Mean (bias corrected)				4.07	MLE Sd (bias corrected)				1.79		
197						Approximate Chi Square Value (0.05)				80.8		
198	Adjusted Level of Significance				0.02	Adjusted Chi Square Value				77.4		
199												
200	Assuming Gamma Distribution											
201	Approximate Gamma UCL (use when n>=50)				5.20	Adjusted Gamma UCL (use when n<50)				5.43		
202												
203	Lognormal GOF Test											
204	Shapiro Wilk Test Statistic				0.94	Shapiro Wilk Lognormal GOF Test						
205	5% Shapiro Wilk Critical Value				0.84	Data appear Lognormal at 5% Significance Level						
206	Lilliefors Test Statistic				0.17	Lilliefors Lognormal GOF Test						
207	5% Lilliefors Critical Value				0.28	Data appear Lognormal at 5% Significance Level						
208	Data appear Lognormal at 5% Significance Level											
209												
210	Lognormal Statistics											
211	Minimum of Logged Data				0.65	Mean of logged Data				1.33		
212	Maximum of Logged Data				1.89	SD of logged Data				0.4		
213												
214	Assuming Lognormal Distribution											
215	95% H-UCL				5.43	90% Chebyshev (MVUE) UCL				5.64		
216	95% Chebyshev (MVUE) UCL				6.35	97.5% Chebyshev (MVUE) UCL				7.34		
217	99% Chebyshev (MVUE) UCL				9.27							
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				4.89	95% Jackknife UCL				4.98		
224	95% Standard Bootstrap UCL				4.88	95% Bootstrap-t UCL				5.06		
225	95% Hall's Bootstrap UCL				4.85	95% Percentile Bootstrap UCL				4.85		
226	95% BCA Bootstrap UCL				4.95							
227	90% Chebyshev(Mean, Sd) UCL				5.56	95% Chebyshev(Mean, Sd) UCL				6.24		
228	97.5% Chebyshev(Mean, Sd) UCL				7.18	99% Chebyshev(Mean, Sd) UCL				9.03		
229												
230	Suggested UCL to Use											
231	95% Student's-t UCL				4.98							
232												
233	Recommendations 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 Singh											
235	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	Uranium											
240												
241	General Statistics											
242	Total Number of Observations				10	Number of Distinct Observations				10		
243						Number of Missing Observations				0		
244	Minimum				0.29	Mean				0.90		
245	Maximum				2.35	Median				0.65		
246	SD				0.70	Std. Error of Mean				0.22		
247	Coefficient of Variation				0.77	Skewness				1.14		
248												
249	Normal GOF Test											
250	Shapiro Wilk Test Statistic				0.84	Shapiro Wilk GOF Test						
251	5% Shapiro Wilk Critical Value				0.84	Data appear Normal at 5% Significance Level						
252	Lilliefors Test Statistic				0.23	Lilliefors GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
253			5% Lilliefors Critical Value	0.28		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	1.31		95% Adjusted-CLT UCL (Chen-1995)					1.35	
259						95% Modified-t UCL (Johnson-1978)					1.32	
260												
261			Gamma GOF Test									
262			A-D Test Statistic	0.46		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	0.20		Kolmogorov-Smirnov Gamma GOF Test						
265			5% K-S Critical Value	0.27		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)	2.07		k star (bias corrected MLE)					1.51	
270			Theta hat (MLE)	0.43		Theta star (bias corrected MLE)					0.59	
271			nu hat (MLE)	41.45		nu star (bias corrected)					30.3	
272			MLE Mean (bias corrected)	0.90		MLE Sd (bias corrected)					0.73	
273						Approximate Chi Square Value (0.05)					18.7	
274			Adjusted Level of Significance	0.02		Adjusted Chi Square Value					17.2	
275												
276			Assuming Gamma Distribution									
277			Approximate Gamma UCL (use when n>=50))	1.46		Adjusted Gamma UCL (use when n<50)					1.6	
278												
279			Lognormal GOF Test									
280			Shapiro Wilk Test Statistic	0.90		Shapiro Wilk Lognormal GOF Test						
281			5% Shapiro Wilk Critical Value	0.84		Data appear Lognormal at 5% Significance Level						
282			Lilliefors Test Statistic	0.19		Lilliefors Lognormal GOF Test						
283			5% Lilliefors Critical Value	0.28		Data appear Lognormal at 5% Significance Level						
284			Data appear Lognormal at 5% Significance Level									
285												
286			Lognormal Statistics									
287			Minimum of Logged Data	-1.21		Mean of logged Data					-0.35	
288			Maximum of Logged Data	0.85		SD of logged Data					0.75	
289												
290			Assuming Lognormal Distribution									
291			95% H-UCL	1.80		90% Chebyshev (MVUE) UCL					1.56	
292			95% Chebyshev (MVUE) UCL	1.86		97.5% Chebyshev (MVUE) UCL					2.28	
293			99% Chebyshev (MVUE) UCL	3.10								
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	1.27		95% Jackknife UCL					1.31	
300			95% Standard Bootstrap UCL	1.25		95% Bootstrap-t UCL					1.51	
301			95% Hall's Bootstrap UCL	1.37		95% Percentile Bootstrap UCL					1.25	
302			95% BCA Bootstrap UCL	1.34								
303			90% Chebyshev(Mean, Sd) UCL	1.57		95% Chebyshev(Mean, Sd) UCL					1.87	
304			97.5% Chebyshev(Mean, Sd) UCL	2.29		99% Chebyshev(Mean, Sd) UCL					3.12	
305												
306			Suggested UCL to Use									
307			95% Student's-t UCL	1.31								
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 Singh									
311			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												