

	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 3:51:02 PM								
5	From File			ProUCLinput_C-12-001_0-5.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Bootstrap Operations			2000								
9												
10												
11	Aluminum											
12												
13	General Statistics											
14	Total Number of Observations				10		Number of Distinct Observations				10	
15							Number of Missing Observations				0	
16	Minimum				7200		Mean				8944	
17	Maximum				11500		Median				8675	
18	SD				1395		Std. Error of Mean				441.3	
19	Coefficient of Variation				0.15		Skewness				0.64	
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic				0.93		Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value				0.84		Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.13		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				9753		95% Adjusted-CLT UCL (Chen-1995)				9765	
31							95% Modified-t UCL (Johnson-1978)				9768	
32												
33	Gamma GOF Test											
34	A-D Test Statistic				0.25		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				0.11		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)				47.2		k star (bias corrected MLE)				33.1	
42	Theta hat (MLE)				189.4		Theta star (bias corrected MLE)				270.1	
43	nu hat (MLE)				944.3		nu star (bias corrected)				662.4	
44	MLE Mean (bias corrected)				8944		MLE Sd (bias corrected)				1554	
45							Approximate Chi Square Value (0.05)				603.6	
46	Adjusted Level of Significance				0.02		Adjusted Chi Square Value				593.9	
47												
48	Assuming Gamma Distribution											
49	Approximate Gamma UCL (use when n>=50))				9814		Adjusted Gamma UCL (use when n<50)				9975	
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic				0.95		Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value				0.84		Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic				0.11		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				8.88		Mean of logged Data				9.08	
60	Maximum of Logged Data				9.35		SD of logged Data				0.15	
61												
62	Assuming Lognormal Distribution											
63	95% H-UCL				9833		90% Chebyshev (MVUE) UCL				10240	

	A	B	C	D	E	F	G	H	I	J	K	L
64			95% Chebyshev (MVUE) UCL	10828			97.5% Chebyshev (MVUE) UCL					11644
65			99% Chebyshev (MVUE) UCL	13247								
66												
67			Nonparametric Distribution Free UCL Statistics									
68			Data appear to follow a Discernible Distribution at 5% Significance Level									
69												
70			Nonparametric Distribution Free UCLs									
71			95% CLT UCL	9670			95% Jackknife UCL					9753
72			95% Standard Bootstrap UCL	9655			95% Bootstrap-t UCL					9892
73			95% Hall's Bootstrap UCL	10109			95% Percentile Bootstrap UCL					9695
74			95% BCA Bootstrap UCL	9684								
75			90% Chebyshev(Mean, Sd) UCL	10268			95% Chebyshev(Mean, Sd) UCL					10867
76			97.5% Chebyshev(Mean, Sd) UCL	11700			99% Chebyshev(Mean, Sd) UCL					13335
77												
78			Suggested UCL to Use									
79			95% Student's-t UCL	9753								
80												
81			ations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate									
82			ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and									
83			and Singh and Singh (2003). However, simulations results will not cover all Real World data sets									
84			For additional insight the user may want to consult a statistician.									
85												
86												
87			Barium									
88												
89			General Statistics									
90			Total Number of Observations	10			Number of Distinct Observations					9
91							Number of Missing Observations					0
92			Minimum	66.8			Mean					115.3
93			Maximum	161			Median					116.5
94			SD	29.5			Std. Error of Mean					9.34
95			Coefficient of Variation	0.25			Skewness					-0.17
96												
97			Normal GOF Test									
98			Shapiro Wilk Test Statistic	0.97			Shapiro Wilk GOF Test					
99			5% Shapiro Wilk Critical Value	0.84			Data appear Normal at 5% Significance Level					
100			Lilliefors Test Statistic	0.14			Lilliefors GOF Test					
101			5% Lilliefors Critical Value	0.28			Data appear Normal at 5% Significance Level					
102			Data appear Normal at 5% Significance Level									
103												
104			Assuming Normal Distribution									
105			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
106			95% Student's-t UCL	132.4			95% Adjusted-CLT UCL (Chen-1995)					130.1
107							95% Modified-t UCL (Johnson-1978)					132.3
108												
109			Gamma GOF Test									
110			A-D Test Statistic	0.23			Anderson-Darling Gamma GOF Test					
111			5% A-D Critical Value	0.72			Data appear Gamma Distributed at 5% Significance Level					
112			K-S Test Statistic	0.17			Kolmogorov-Smirnov Gamma GOF Test					
113			5% K-S Critical Value	0.26			Data appear Gamma Distributed at 5% Significance Level					
114			Detected data appear Gamma Distributed at 5% Significance Level									
115												
116			Gamma Statistics									
117			k hat (MLE)	15.6			k star (bias corrected MLE)					11.0
118			Theta hat (MLE)	7.37			Theta star (bias corrected MLE)					10.4
119			nu hat (MLE)	312.8			nu star (bias corrected)					220.3
120			MLE Mean (bias corrected)	115.3			MLE Sd (bias corrected)					34.7
121							Approximate Chi Square Value (0.05)					186.9
122			Adjusted Level of Significance	0.02			Adjusted Chi Square Value					181.6
123												
124			Assuming Gamma Distribution									
125			Approximate Gamma UCL (use when n>=50)	135.8			Adjusted Gamma UCL (use when n<50)					139.8
126												

	A	B	C	D	E	F	G	H	I	J	K	L
127	Lognormal GOF Test											
128	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk Lognormal GOF Test					
129	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level					
130	Lilliefors Test Statistic					0.17	Lilliefors Lognormal GOF Test					
131	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
132	Data appear Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135	Minimum of Logged Data					4.20	Mean of logged Data					4.71
136	Maximum of Logged Data					5.08	SD of logged Data					0.27
137												
138	Assuming Lognormal Distribution											
139	95% H-UCL					138.6	90% Chebyshev (MVUE) UCL					145.7
140	95% Chebyshev (MVUE) UCL					159.4	97.5% Chebyshev (MVUE) UCL					178.5
141	99% Chebyshev (MVUE) UCL					215.9						
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					130.6	95% Jackknife UCL					132.4
148	95% Standard Bootstrap UCL					129.9	95% Bootstrap-t UCL					132
149	95% Hall's Bootstrap UCL					129.6	95% Percentile Bootstrap UCL					129.6
150	95% BCA Bootstrap UCL					129.5						
151	90% Chebyshev(Mean, Sd) UCL					143.3	95% Chebyshev(Mean, Sd) UCL					156
152	97.5% Chebyshev(Mean, Sd) UCL					173.6	99% Chebyshev(Mean, Sd) UCL					208.2
153												
154	Suggested UCL to Use											
155	95% Student's-t UCL					132.4						
156												
157	Recommendations 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	Singh 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	highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may											
163	not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.											
164												
165												
166	Calcium											
167												
168	General Statistics											
169	Total Number of Observations					10	Number of Distinct Observations					10
170							Number of Missing Observations					0
171	Minimum					1360	Mean					2241
172	Maximum					4530	Median					1875
173	SD					1039	Std. Error of Mean					328.5
174	Coefficient of Variation					0.46	Skewness					1.63
175												
176	Normal GOF Test											
177	Shapiro Wilk Test Statistic					0.77	Shapiro Wilk GOF Test					
178	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level					
179	Lilliefors Test Statistic					0.27	Lilliefors GOF Test					
180	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
181	Data appear Approximate Normal at 5% Significance Level											
182												
183	Assuming Normal Distribution											
184	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
185	95% Student's-t UCL					2843	95% Adjusted-CLT UCL (Chen-1995)					2963
186							95% Modified-t UCL (Johnson-1978)					2872
187												
188	Gamma GOF Test											
189	A-D Test Statistic					0.76	Anderson-Darling Gamma GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L	
190	5% A-D Critical Value					0.72	Data Not Gamma Distributed at 5% Significance Level						
191	K-S Test Statistic					0.24	Kolmogrov-Smirnoff Gamma GOF Test						
192	5% K-S Critical Value					0.26	Data appear Gamma Distributed at 5% Significance Level						
193	Detected data follow Appr. Gamma Distribution at 5% Significance Level												
194													
195	Gamma Statistics												
196	k hat (MLE)					6.63	k star (bias corrected MLE)					4.71	
197	Theta hat (MLE)					337.8	Theta star (bias corrected MLE)					475.7	
198	nu hat (MLE)					132.7	nu star (bias corrected)					94.2	
199	MLE Mean (bias corrected)					2241	MLE Sd (bias corrected)					1032	
200							Approximate Chi Square Value (0.05)					72.8	
201	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					69.5	
202													
203	Assuming Gamma Distribution												
204	Approximate Gamma UCL (use when n>=50)					2899	Adjusted Gamma UCL (use when n<50)					3035	
205													
206	Lognormal GOF Test												
207	Shapiro Wilk Test Statistic					0.86	Shapiro Wilk Lognormal GOF Test						
208	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level						
209	Lilliefors Test Statistic					0.21	Lilliefors Lognormal GOF Test						
210	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level						
211	Data appear Lognormal at 5% Significance Level												
212													
213	Lognormal Statistics												
214	Minimum of Logged Data					7.21	Mean of logged Data					7.63	
215	Maximum of Logged Data					8.41	SD of logged Data					0.39	
216													
217	Assuming Lognormal Distribution												
218	95% H-UCL					2940	90% Chebyshev (MVUE) UCL					3058	
219	95% Chebyshev (MVUE) UCL					3437	97.5% Chebyshev (MVUE) UCL					3962	
220	99% Chebyshev (MVUE) UCL					4995							
221													
222	Nonparametric Distribution Free UCL Statistics												
223	Data appear to follow a Discernible Distribution at 5% Significance Level												
224													
225	Nonparametric Distribution Free UCLs												
226	95% CLT UCL					2781	95% Jackknife UCL					2843	
227	95% Standard Bootstrap UCL					2754	95% Bootstrap-t UCL					3913	
228	95% Hall's Bootstrap UCL					5982	95% Percentile Bootstrap UCL					2771	
229	95% BCA Bootstrap UCL					2946							
230	90% Chebyshev(Mean, Sd) UCL					3227	95% Chebyshev(Mean, Sd) UCL					3673	
231	97.5% Chebyshev(Mean, Sd) UCL					4293	99% Chebyshev(Mean, Sd) UCL					5510	
232													
233	Suggested UCL to Use												
234	95% Student's-t UCL					2843							
235													
236	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
237	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and												
238	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
239	For additional insight the user may want to consult a statistician.												
240													
241													
242	Chromium												
243													
244	General Statistics												
245	Total Number of Observations					10	Number of Distinct Observations					10	
246							Number of Missing Observations					0	
247	Minimum					6.73	Mean					11.6	
248	Maximum					27	Median					9.40	
249	SD					6.17	Std. Error of Mean					1.95	
250	Coefficient of Variation					0.53	Skewness					2.05	
251													
252	Normal GOF Test												

	A	B	C	D	E	F	G	H	I	J	K	L
253	Shapiro Wilk Test Statistic					0.75	Shapiro Wilk GOF Test					
254	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level					
255	Lilliefors Test Statistic					0.28	Lilliefors GOF Test					
256	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
257	Data Not Normal at 5% Significance Level											
258												
259	Assuming Normal Distribution											
260	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
261	95% Student's-t UCL					15.14	95% Adjusted-CLT UCL (Chen-1995)					16.14
262							95% Modified-t UCL (Johnson-1978)					15.34
263												
264	Gamma GOF Test											
265	A-D Test Statistic					0.63	Anderson-Darling Gamma GOF Test					
266	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
267	K-S Test Statistic					0.21	Kolmogrov-Smirnoff Gamma GOF Test					
268	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level					
269	Detected data appear Gamma Distributed at 5% Significance Level											
270												
271	Gamma Statistics											
272	k hat (MLE)					5.42	k star (bias corrected MLE)					3.86
273	Theta hat (MLE)					2.13	Theta star (bias corrected MLE)					3.00
274	nu hat (MLE)					108.5	nu star (bias corrected)					77.2
275	MLE Mean (bias corrected)					11.6	MLE Sd (bias corrected)					5.89
276							Approximate Chi Square Value (0.05)					58.0
277	Adjusted Level of Significance					0.024	Adjusted Chi Square Value					55.1
278												
279	Assuming Gamma Distribution											
280	Approximate Gamma UCL (use when n>=50)					15.44	Adjusted Gamma UCL (use when n<50)					16.24
281												
282	Lognormal GOF Test											
283	Shapiro Wilk Test Statistic					0.88	Shapiro Wilk Lognormal GOF Test					
284	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level					
285	Lilliefors Test Statistic					0.18	Lilliefors Lognormal GOF Test					
286	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
287	Data appear Lognormal at 5% Significance Level											
288												
289	Lognormal Statistics											
290	Minimum of Logged Data					1.90	Mean of logged Data					2.35
291	Maximum of Logged Data					3.29	SD of logged Data					0.42
292												
293	Assuming Lognormal Distribution											
294	95% H-UCL					15.61	90% Chebyshev (MVUE) UCL					16.14
295	95% Chebyshev (MVUE) UCL					18.34	97.5% Chebyshev (MVUE) UCL					21.24
296	99% Chebyshev (MVUE) UCL					27.11						
297												
298	Nonparametric Distribution Free UCL Statistics											
299	Data appear to follow a Discernible Distribution at 5% Significance Level											
300												
301	Nonparametric Distribution Free UCLs											
302	95% CLT UCL					14.8	95% Jackknife UCL					15.14
303	95% Standard Bootstrap UCL					14.6	95% Bootstrap-t UCL					20.34
304	95% Hall's Bootstrap UCL					30.64	95% Percentile Bootstrap UCL					14.8
305	95% BCA Bootstrap UCL					16.54						
306	90% Chebyshev(Mean, Sd) UCL					17.44	95% Chebyshev(Mean, Sd) UCL					20.14
307	97.5% Chebyshev(Mean, Sd) UCL					23.84	99% Chebyshev(Mean, Sd) UCL					31.04
308												
309	Suggested UCL to Use											
310	95% Adjusted Gamma UCL					16.24						
311												
312	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
313	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
314	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
315	For additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
316												
317												
318	Cobalt											
319												
320	General Statistics											
321	Total Number of Observations					10	Number of Distinct Observations					10
322							Number of Missing Observations					0
323	Minimum					2.46	Mean					4.25
324	Maximum					6.26	Median					4.20
325	SD					1.24	Std. Error of Mean					0.39
326	Coefficient of Variation					0.29	Skewness					0.12
327												
328	Normal GOF Test											
329	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk GOF Test					
330	5% Shapiro Wilk Critical Value					0.84	Data appear Normal at 5% Significance Level					
331	Lilliefors Test Statistic					0.18	Lilliefors GOF Test					
332	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
333	Data appear Normal at 5% Significance Level											
334												
335	Assuming Normal Distribution											
336	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
337	95% Student's-t UCL					4.96	95% Adjusted-CLT UCL (Chen-1995)					4.91
338							95% Modified-t UCL (Johnson-1978)					4.97
339												
340	Gamma GOF Test											
341	A-D Test Statistic					0.32	Anderson-Darling Gamma GOF Test					
342	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
343	K-S Test Statistic					0.18	Kolmogrov-Smirnoff Gamma GOF Test					
344	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level					
345	Detected data appear Gamma Distributed at 5% Significance Level											
346												
347	Gamma Statistics											
348	k hat (MLE)					12.5	k star (bias corrected MLE)					8.87
349	Theta hat (MLE)					0.33	Theta star (bias corrected MLE)					0.47
350	nu hat (MLE)					251.6	nu star (bias corrected)					177.5
351	MLE Mean (bias corrected)					4.25	MLE Sd (bias corrected)					1.42
352							Approximate Chi Square Value (0.05)					147.7
353	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					142.9
354												
355	Assuming Gamma Distribution											
356	Approximate Gamma UCL (use when n>=50))					5.10	Adjusted Gamma UCL (use when n<50)					5.27
357												
358	Lognormal GOF Test											
359	Shapiro Wilk Test Statistic					0.94	Shapiro Wilk Lognormal GOF Test					
360	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level					
361	Lilliefors Test Statistic					0.18	Lilliefors Lognormal GOF Test					
362	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
363	Data appear Lognormal at 5% Significance Level											
364												
365	Lognormal Statistics											
366	Minimum of Logged Data					0.9	Mean of logged Data					1.40
367	Maximum of Logged Data					1.83	SD of logged Data					0.30
368												
369	Assuming Lognormal Distribution											
370	95% H-UCL					5.22	90% Chebyshev (MVUE) UCL					5.48
371	95% Chebyshev (MVUE) UCL					6.04	97.5% Chebyshev (MVUE) UCL					6.82
372	99% Chebyshev (MVUE) UCL					8.34						
373												
374	Nonparametric Distribution Free UCL Statistics											
375	Data appear to follow a Discernible Distribution at 5% Significance Level											
376												
377	Nonparametric Distribution Free UCLs											
378	95% CLT UCL					4.89	95% Jackknife UCL					4.96

	A	B	C	D	E	F	G	H	I	J	K	L
379	95% Standard Bootstrap UCL					4.85	95% Bootstrap-t UCL					5.00
380	95% Hall's Bootstrap UCL					4.88	95% Percentile Bootstrap UCL					4.87
381	95% BCA Bootstrap UCL					4.92						
382	90% Chebyshev(Mean, Sd) UCL					5.42	95% Chebyshev(Mean, Sd) UCL					5.95
383	97.5% Chebyshev(Mean, Sd) UCL					6.69	99% Chebyshev(Mean, Sd) UCL					8.15
384												
385	Suggested UCL to Use											
386	95% Student's-t UCL					4.96						
387												
388	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
389	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
390	Singh and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
391	For additional insight the user may want to consult a statistician.											
392												
393												
394	Copper											
395												
396	General Statistics											
397	Total Number of Observations					10	Number of Distinct Observations					10
398							Number of Missing Observations					0
399	Minimum					3.77	Mean					4.88
400	Maximum					6.03	Median					4.91
401	SD					0.85	Std. Error of Mean					0.27
402	Coefficient of Variation					0.17	Skewness					0.01
403												
404	Normal GOF Test											
405	Shapiro Wilk Test Statistic					0.87	Shapiro Wilk GOF Test					
406	5% Shapiro Wilk Critical Value					0.84	Data appear Normal at 5% Significance Level					
407	Lilliefors Test Statistic					0.21	Lilliefors GOF Test					
408	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
409	Data appear Normal at 5% Significance Level											
410												
411	Assuming Normal Distribution											
412	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
413	95% Student's-t UCL					5.37	95% Adjusted-CLT UCL (Chen-1995)					5.32
414							95% Modified-t UCL (Johnson-1978)					5.37
415												
416	Gamma GOF Test											
417	A-D Test Statistic					0.64	Anderson-Darling Gamma GOF Test					
418	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
419	K-S Test Statistic					0.23	Kolmogorov-Smirnoff Gamma GOF Test					
420	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level					
421	Detected data appear Gamma Distributed at 5% Significance Level											
422												
423	Gamma Statistics											
424	k hat (MLE)					35.98	k star (bias corrected MLE)					25.2
425	Theta hat (MLE)					0.13	Theta star (bias corrected MLE)					0.19
426	nu hat (MLE)					719.7	nu star (bias corrected)					505.1
427	MLE Mean (bias corrected)					4.88	MLE Sd (bias corrected)					0.97
428							Approximate Chi Square Value (0.05)					454
429	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					445.6
430												
431	Assuming Gamma Distribution											
432	Approximate Gamma UCL (use when n>=50))					5.42	Adjusted Gamma UCL (use when n<50)					5.53
433												
434	Lognormal GOF Test											
435	Shapiro Wilk Test Statistic					0.87	Shapiro Wilk Lognormal GOF Test					
436	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level					
437	Lilliefors Test Statistic					0.22	Lilliefors Lognormal GOF Test					
438	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
439	Data appear Lognormal at 5% Significance Level											
440												
441	Lognormal Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
442	Minimum of Logged Data					1.32	Mean of logged Data					1.57
443	Maximum of Logged Data					1.79	SD of logged Data					0.17
444												
445	Assuming Lognormal Distribution											
446	95% H-UCL					5.45	90% Chebyshev (MVUE) UCL					5.70
447	95% Chebyshev (MVUE) UCL					6.07	97.5% Chebyshev (MVUE) UCL					6.58
448	99% Chebyshev (MVUE) UCL					7.60						
449												
450	Nonparametric Distribution Free UCL Statistics											
451	Data appear to follow a Discernible Distribution at 5% Significance Level											
452												
453	Nonparametric Distribution Free UCLs											
454	95% CLT UCL					5.32	95% Jackknife UCL					5.37
455	95% Standard Bootstrap UCL					5.29	95% Bootstrap-t UCL					5.37
456	95% Hall's Bootstrap UCL					5.25	95% Percentile Bootstrap UCL					5.31
457	95% BCA Bootstrap UCL					5.27						
458	90% Chebyshev(Mean, Sd) UCL					5.68	95% Chebyshev(Mean, Sd) UCL					6.05
459	97.5% Chebyshev(Mean, Sd) UCL					6.56	99% Chebyshev(Mean, Sd) UCL					7.56
460												
461	Suggested UCL to Use											
462	95% Student's-t UCL					5.37						
463												
464	ptions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
465	ommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
466	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
467	For additional insight the user may want to consult a statistician.											
468												
469												
470	Magnesium											
471												
472	General Statistics											
473	Total Number of Observations					10	Number of Distinct Observations					10
474							Number of Missing Observations					0
475	Minimum					1350	Mean					1684
476	Maximum					2100	Median					1695
477	SD					246.8	Std. Error of Mean					78.09
478	Coefficient of Variation					0.14	Skewness					0.31
479												
480	Normal GOF Test											
481	Shapiro Wilk Test Statistic					0.95	Shapiro Wilk GOF Test					
482	5% Shapiro Wilk Critical Value					0.84	Data appear Normal at 5% Significance Level					
483	Lilliefors Test Statistic					0.18	Lilliefors GOF Test					
484	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
485	Data appear Normal at 5% Significance Level											
486												
487	Assuming Normal Distribution											
488	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
489	95% Student's-t UCL					1827	95% Adjusted-CLT UCL (Chen-1995)					1821
490							95% Modified-t UCL (Johnson-1978)					1828
491												
492	Gamma GOF Test											
493	A-D Test Statistic					0.25	Anderson-Darling Gamma GOF Test					
494	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level					
495	K-S Test Statistic					0.19	Kolmogrov-Smirnoff Gamma GOF Test					
496	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level					
497	Detected data appear Gamma Distributed at 5% Significance Level											
498												
499	Gamma Statistics											
500	k hat (MLE)					52.24	k star (bias corrected MLE)					36.69
501	Theta hat (MLE)					32.22	Theta star (bias corrected MLE)					45.99
502	nu hat (MLE)					1045	nu star (bias corrected)					733
503	MLE Mean (bias corrected)					1684	MLE Sd (bias corrected)					278.2
504							Approximate Chi Square Value (0.05)					671.2

A	B	C	D	E	F	G	H	I	J	K	L	
505	Adjusted Level of Significance				0.02	Adjusted Chi Square Value				660.9		
506												
507	Assuming Gamma Distribution											
508	Approximate Gamma UCL (use when n>=50))				1839	Adjusted Gamma UCL (use when n<50)				1868		
509												
510	Lognormal GOF Test											
511	Shapiro Wilk Test Statistic				0.96	Shapiro Wilk Lognormal GOF Test						
512	5% Shapiro Wilk Critical Value				0.84	Data appear Lognormal at 5% Significance Level						
513	Lilliefors Test Statistic				0.18	Lilliefors Lognormal GOF Test						
514	5% Lilliefors Critical Value				0.28	Data appear Lognormal at 5% Significance Level						
515	Data appear Lognormal at 5% Significance Level											
516												
517	Lognormal Statistics											
518	Minimum of Logged Data				7.20	Mean of logged Data				7.41		
519	Maximum of Logged Data				7.65	SD of logged Data				0.14		
520												
521	Assuming Lognormal Distribution											
522	95% H-UCL				1843	90% Chebyshev (MVUE) UCL				1917		
523	95% Chebyshev (MVUE) UCL				2023	97.5% Chebyshev (MVUE) UCL				2170		
524	99% Chebyshev (MVUE) UCL				2458							
525												
526	Nonparametric Distribution Free UCL Statistics											
527	Data appear to follow a Discernible Distribution at 5% Significance Level											
528												
529	Nonparametric Distribution Free UCLs											
530	95% CLT UCL				1812	95% Jackknife UCL				1827		
531	95% Standard Bootstrap UCL				1803	95% Bootstrap-t UCL				1837		
532	95% Hall's Bootstrap UCL				1830	95% Percentile Bootstrap UCL				1807		
533	95% BCA Bootstrap UCL				1815							
534	90% Chebyshev(Mean, Sd) UCL				1918	95% Chebyshev(Mean, Sd) UCL				2024		
535	97.5% Chebyshev(Mean, Sd) UCL				2171	99% Chebyshev(Mean, Sd) UCL				2461		
536												
537	Suggested UCL to Use											
538	95% Student's-t UCL				1827							
539												
540	Instructions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
541	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											
542	Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
543	For additional insight the user may want to consult a statistician.											
544												
545												
546	Nickel											
547												
548	General Statistics											
549	Total Number of Observations				10	Number of Distinct Observations				10		
550						Number of Missing Observations				0		
551	Minimum				5.23	Mean				6.92		
552	Maximum				9.28	Median				6.7		
553	SD				1.42	Std. Error of Mean				0.45		
554	Coefficient of Variation				0.20	Skewness				0.79		
555												
556	Normal GOF Test											
557	Shapiro Wilk Test Statistic				0.89	Shapiro Wilk GOF Test						
558	5% Shapiro Wilk Critical Value				0.84	Data appear Normal at 5% Significance Level						
559	Lilliefors Test Statistic				0.16	Lilliefors GOF Test						
560	5% Lilliefors Critical Value				0.28	Data appear Normal at 5% Significance Level						
561	Data appear Normal at 5% Significance Level											
562												
563	Assuming Normal Distribution											
564	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
565	95% Student's-t UCL				7.75	95% Adjusted-CLT UCL (Chen-1995)				7.79		
566						95% Modified-t UCL (Johnson-1978)				7.77		
567												

	A	B	C	D	E	F	G	H	I	J	K	L	
568	Gamma GOF Test												
569	A-D Test Statistic					0.38	Anderson-Darling Gamma GOF Test						
570	5% A-D Critical Value					0.72	data appear Gamma Distributed at 5% Significance Level						
571	K-S Test Statistic					0.17	Kolmogrov-Smirnoff Gamma GOF Test						
572	5% K-S Critical Value					0.26	data appear Gamma Distributed at 5% Significance Level						
573	Detected data appear Gamma Distributed at 5% Significance Level												
574													
575	Gamma Statistics												
576	k hat (MLE)					27.94	k star (bias corrected MLE)					19.63	
577	Theta hat (MLE)					0.24	Theta star (bias corrected MLE)					0.35	
578	nu hat (MLE)					558.8	nu star (bias corrected)					392.5	
579	MLE Mean (bias corrected)					6.92	MLE Sd (bias corrected)					1.56	
580							Approximate Chi Square Value (0.05)					347.6	
581	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					340.2	
582													
583	Assuming Gamma Distribution												
584	Approximate Gamma UCL (use when n>=50))					7.82	Adjusted Gamma UCL (use when n<50)					7.99	
585													
586	Lognormal GOF Test												
587	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test						
588	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level						
589	Lilliefors Test Statistic					0.16	Lilliefors Lognormal GOF Test						
590	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level						
591	Data appear Lognormal at 5% Significance Level												
592													
593	Lognormal Statistics												
594	Minimum of Logged Data					1.65	Mean of logged Data					1.91	
595	Maximum of Logged Data					2.22	SD of logged Data					0.19	
596													
597	Assuming Lognormal Distribution												
598	95% H-UCL					7.85	90% Chebyshev (MVUE) UCL					8.22	
599	95% Chebyshev (MVUE) UCL					8.81	97.5% Chebyshev (MVUE) UCL					9.63	
600	99% Chebyshev (MVUE) UCL					11.23							
601													
602	Nonparametric Distribution Free UCL Statistics												
603	Data appear to follow a Discernible Distribution at 5% Significance Level												
604													
605	Nonparametric Distribution Free UCLs												
606	95% CLT UCL					7.66	95% Jackknife UCL					7.75	
607	95% Standard Bootstrap UCL					7.62	95% Bootstrap-t UCL					8.06	
608	95% Hall's Bootstrap UCL					8.22	95% Percentile Bootstrap UCL					7.64	
609	95% BCA Bootstrap UCL					7.74							
610	90% Chebyshev(Mean, Sd) UCL					8.27	95% Chebyshev(Mean, Sd) UCL					8.89	
611	97.5% Chebyshev(Mean, Sd) UCL					9.73	99% Chebyshev(Mean, Sd) UCL					11.4	
612													
613	Suggested UCL to Use												
614	95% Student's-t UCL					7.75							
615													
616	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate												
617	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Singh												
618	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets												
619	For additional insight the user may want to consult a statistician.												
620													
621													
622	Uranium												
623													
624	General Statistics												
625	Total Number of Observations					10	Number of Distinct Observations					10	
626							Number of Missing Observations					0	
627	Minimum					0.39	Mean					1.31	
628	Maximum					4.07	Median					0.96	
629	SD					1.12	Std. Error of Mean					0.35	
630	Coefficient of Variation					0.85	Skewness					1.83	

	A	B	C	D	E	F	G	H	I	J	K	L
631												
632	Normal GOF Test											
633	Shapiro Wilk Test Statistic					0.78	Shapiro Wilk GOF Test					
634	5% Shapiro Wilk Critical Value					0.84	Data Not Normal at 5% Significance Level					
635	Lilliefors Test Statistic					0.22	Lilliefors GOF Test					
636	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
637	Data appear Approximate Normal at 5% Significance Level											
638												
639	Assuming Normal Distribution											
640	95% Normal UCL					95% UCLs (Adjusted for Skewness)						
641	95% Student's-t UCL					1.96	95% Adjusted-CLT UCL (Chen-1995)					2.11
642							95% Modified-t UCL (Johnson-1978)					1.99
643												
644	Gamma GOF Test											
645	A-D Test Statistic					0.47	Anderson-Darling Gamma GOF Test					
646	5% A-D Critical Value					0.73	data appear Gamma Distributed at 5% Significance Level					
647	K-S Test Statistic					0.24	Kolmogrov-Smirnoff Gamma GOF Test					
648	5% K-S Critical Value					0.27	data appear Gamma Distributed at 5% Significance Level					
649	Detected data appear Gamma Distributed at 5% Significance Level											
650												
651	Gamma Statistics											
652	k hat (MLE)					1.94	k star (bias corrected MLE)					1.43
653	Theta hat (MLE)					0.67	Theta star (bias corrected MLE)					0.91
654	nu hat (MLE)					38.9	nu star (bias corrected)					28.6
655	MLE Mean (bias corrected)					1.31	MLE Sd (bias corrected)					1.09
656							Approximate Chi Square Value (0.05)					17.3
657	Adjusted Level of Significance					0.02	Adjusted Chi Square Value					15.8
658												
659	Assuming Gamma Distribution											
660	Approximate Gamma UCL (use when n>=50)					2.15	Adjusted Gamma UCL (use when n<50)					2.35
661												
662	Lognormal GOF Test											
663	Shapiro Wilk Test Statistic					0.92	Shapiro Wilk Lognormal GOF Test					
664	5% Shapiro Wilk Critical Value					0.84	Data appear Lognormal at 5% Significance Level					
665	Lilliefors Test Statistic					0.22	Lilliefors Lognormal GOF Test					
666	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
667	Data appear Lognormal at 5% Significance Level											
668												
669	Lognormal Statistics											
670	Minimum of Logged Data					-0.92	Mean of logged Data					-0.007
671	Maximum of Logged Data					1.40	SD of logged Data					0.76
672												
673	Assuming Lognormal Distribution											
674	95% H-UCL					2.61	90% Chebyshev (MVUE) UCL					2.25
675	95% Chebyshev (MVUE) UCL					2.68	97.5% Chebyshev (MVUE) UCL					3.29
676	99% Chebyshev (MVUE) UCL					4.49						
677												
678	Nonparametric Distribution Free UCL Statistics											
679	Data appear to follow a Discernible Distribution at 5% Significance Level											
680												
681	Nonparametric Distribution Free UCLs											
682	95% CLT UCL					1.89	95% Jackknife UCL					1.96
683	95% Standard Bootstrap UCL					1.86	95% Bootstrap-t UCL					2.37
684	95% Hall's Bootstrap UCL					4.26	95% Percentile Bootstrap UCL					1.85
685	95% BCA Bootstrap UCL					2.10						
686	90% Chebyshev(Mean, Sd) UCL					2.37	95% Chebyshev(Mean, Sd) UCL					2.86
687	97.5% Chebyshev(Mean, Sd) UCL					3.53	99% Chebyshev(Mean, Sd) UCL					4.85
688												
689	Suggested UCL to Use											
690	95% Student's-t UCL					1.96						
691												
692	Recommendations regarding the selection of a 95% UCL are provided to help the user to select the most appropriate											
693	Recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and											

	A	B	C	D	E	F	G	H	I	J	K	L
694	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets											
695	For additional insight the user may want to consult a statistician.											
696												