	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			3/10/2015 11:16:06 AM								
5	From File			EPC_026SubR1.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					13	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					6000	Mean					11500
17	Maximum					16100	Median					11500
18	SD					2086	Std. Error of Mean					578.6
19	Coefficient of Variation					0.181	Skewness					-0.741
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.625	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.866	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.423	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.246	Data Not Normal at 5% Significance Level					
26	Data Not 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					12531	95% Adjusted-CLT UCL (Chen-1995)					12325
31							95% Modified-t UCL (Johnson-1978)					12511
32												
33	Gamma GOF Test											
34	A-D Test Statistic					2.758	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.733	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.448	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.236	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					27.39	k star (bias corrected MLE)					21.12
42	Theta hat (MLE)					419.9	Theta star (bias corrected MLE)					544.5
43	nu hat (MLE)					712.1	nu star (bias corrected)					549.1
44	MLE Mean (bias corrected)					11500	MLE Sd (bias corrected)					2502
45							Approximate Chi Square Value (0.05)					495.8
46	Adjusted Level of Significance					0.0301	Adjusted Chi Square Value					488.5
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					12738	95% Adjusted Gamma UCL (use when n<50)					12926
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.571	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.458	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	8.7	Mean of logged Data					9.332
60					Maximum of Logged Data	9.687	SD of logged Data					0.212
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	12920	90% Chebyshev (MVUE) UCL					13567
64					95% Chebyshev (MVUE) UCL	14491	97.5% Chebyshev (MVUE) UCL					15774
65					99% Chebyshev (MVUE) UCL	18294						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	12452	95% Jackknife UCL					12531
72					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
73					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	13236	95% Chebyshev(Mean, Sd) UCL					14022
76					97.5% Chebyshev(Mean, Sd) UCL	15113	99% Chebyshev(Mean, Sd) UCL					17257
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	12531	or 95% Modified-t UCL					12511
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
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	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												
90	**Antimony**											
91												
92	**General Statistics**											
93					Total Number of Observations	13	Number of Distinct Observations					8
94							Number of Missing Observations					0
95					Minimum	0.15	Mean					59.37
96					Maximum	121.4	Median					59.37
97					SD	27.92	Std. Error of Mean					7.743
98					Coefficient of Variation	0.47	Skewness					0.0612
99												
100	**Normal GOF Test**											
101					Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**					
102					5% Shapiro Wilk Critical Value	0.866	Data appear Normal at 5% Significance Level					
103					Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**					
104					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
105	Data appear Approximate Normal at 5% Significance Level											
106												
107	Assuming Normal Distribution											
108	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
109					95% Student's-t UCL	73.17			95% Adjusted-CLT UCL (Chen-1995)			72.25
110									95% Modified-t UCL (Johnson-1978)			73.2
111												
112	Gamma GOF Test											
113					A-D Test Statistic	2.201	Anderson-Darling Gamma GOF Test					
114					5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level					
115					K-S Test Statistic	0.386	Kolmogrov-Smirnoff Gamma GOF Test					
116					5% K-S Critical Value	0.242	Data Not Gamma Distributed at 5% Significance Level					
117	Data Not Gamma Distributed at 5% Significance Level											
118												
119	Gamma Statistics											
120					k hat (MLE)	1.29			k star (bias corrected MLE)			1.044
121					Theta hat (MLE)	46.02			Theta star (bias corrected MLE)			56.88
122					nu hat (MLE)	33.55			nu star (bias corrected)			27.14
123					MLE Mean (bias corrected)	59.37			MLE Sd (bias corrected)			58.11
124									Approximate Chi Square Value (0.05)			16.26
125					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			15.07
126												
127	Assuming Gamma Distribution											
128				95% Approximate Gamma UCL (use when n>=50))		99.1			95% Adjusted Gamma UCL (use when n<50)			106.9
129												
130	Lognormal GOF Test											
131					Shapiro Wilk Test Statistic	0.483	Shapiro Wilk Lognormal GOF Test					
132					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
133					Lilliefors Test Statistic	0.37	Lilliefors Lognormal GOF Test					
134					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
135	Data Not Lognormal at 5% Significance Level											
136												
137	Lognormal Statistics											
138					Minimum of Logged Data	-1.897			Mean of logged Data			3.649
139					Maximum of Logged Data	4.799			SD of logged Data			1.698
140												
141	Assuming Lognormal Distribution											
142					95% H-UCL	1235			90% Chebyshev (MVUE) UCL			337.3
143					95% Chebyshev (MVUE) UCL	430.7			97.5% Chebyshev (MVUE) UCL			560.4
144					99% Chebyshev (MVUE) UCL	815.2						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data appear to follow a Discernible Distribution at 5% Significance Level											
148												
149	Nonparametric Distribution Free UCLs											
150					95% CLT UCL	72.11			95% Jackknife UCL			73.17
151					95% Standard Bootstrap UCL	71.56			95% Bootstrap-t UCL			73.37
152					95% Hall's Bootstrap UCL	76.18			95% Percentile Bootstrap UCL			71.96
153					95% BCA Bootstrap UCL	71.57						
154					90% Chebyshev(Mean, Sd) UCL	82.6			95% Chebyshev(Mean, Sd) UCL			93.12
155					97.5% Chebyshev(Mean, Sd) UCL	107.7			99% Chebyshev(Mean, Sd) UCL			136.4
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157						Suggested UCL to Use						
158					95% Student's-t UCL	73.17						
159												
160					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
161					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
162					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
163					For additional insight the user may want to consult a statistician.							
164												
165												
166	Arsenic											
167												
168						General Statistics						
169					Total Number of Observations	13			Number of Distinct Observations			5
170									Number of Missing Observations			0
171					Minimum	7.6			Mean			9.796
172					Maximum	10.3			Median			10
173					SD	0.678			Std. Error of Mean			0.188
174					Coefficient of Variation	0.0692			Skewness			-3.282
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.476			Shapiro Wilk GOF Test			
178					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			
179					Lilliefors Test Statistic	0.407			Lilliefors GOF Test			
180					5% Lilliefors Critical Value	0.246			Data Not Normal at 5% Significance Level			
181						Data Not 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	10.13			95% Adjusted-CLT UCL (Chen-1995)			9.923
186									95% Modified-t UCL (Johnson-1978)			10.1
187												
188						Gamma GOF Test						
189					A-D Test Statistic	3.196			Anderson-Darling Gamma GOF Test			
190					5% A-D Critical Value	0.732			Data Not Gamma Distributed at 5% Significance Level			
191					K-S Test Statistic	0.414			Kolmogrov-Smirnoff Gamma GOF Test			
192					5% K-S Critical Value	0.236			Data Not Gamma Distributed at 5% Significance Level			
193						Data Not Gamma Distributed at 5% Significance Level						
194												
195						Gamma Statistics						
196					k hat (MLE)	195.7			k star (bias corrected MLE)			150.6
197					Theta hat (MLE)	0.05			Theta star (bias corrected MLE)			0.065
198					nu hat (MLE)	5089			nu star (bias corrected)			3916
199					MLE Mean (bias corrected)	9.796			MLE Sd (bias corrected)			0.798
200									Approximate Chi Square Value (0.05)			3772
201					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			3752
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	10.17			95% Adjusted Gamma UCL (use when n<50)			10.23
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.457			Shapiro Wilk Lognormal GOF Test			
208					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.414	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	2.028				Mean of logged Data		2.279
215					Maximum of Logged Data	2.332				SD of logged Data		0.0772
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		10.43
219					95% Chebyshev (MVUE) UCL	10.71				97.5% Chebyshev (MVUE) UCL		11.11
220					99% Chebyshev (MVUE) UCL	11.89						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data do not follow a Discernible Distribution (0.05)**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	10.11				95% Jackknife UCL		10.13
227					95% Standard Bootstrap UCL	10.1				95% Bootstrap-t UCL		10.03
228					95% Hall's Bootstrap UCL	9.985				95% Percentile Bootstrap UCL		10.02
229					95% BCA Bootstrap UCL	9.992						
230					90% Chebyshev(Mean, Sd) UCL	10.36				95% Chebyshev(Mean, Sd) UCL		10.62
231					97.5% Chebyshev(Mean, Sd) UCL	10.97				99% Chebyshev(Mean, Sd) UCL		11.67
232												
233	**Suggested UCL to Use**											
234					95% Student's-t UCL	10.13				or 95% Modified-t UCL		10.1
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
238	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	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
242	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
243												
244												
245	**Beryllium**											
246												
247	**General Statistics**											
248					Total Number of Observations	13				Number of Distinct Observations		4
249										Number of Missing Observations		0
250					Minimum	0.73				Mean		8.857
251					Maximum	24.9				Median		8.857
252					SD	5.672				Std. Error of Mean		1.573
253					Coefficient of Variation	0.64				Skewness		1.671
254												
255	**Normal GOF Test**											
256					Shapiro Wilk Test Statistic	0.629	**Shapiro Wilk GOF Test**					
257					5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level					
258					Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**					
259					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
260	**Data Not Normal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
261												
262	**Assuming Normal Distribution**											
263	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
264					95% Student's-t UCL	11.66				95% Adjusted-CLT UCL (Chen-1995)		12.22
265										95% Modified-t UCL (Johnson-1978)		11.78
266												
267	**Gamma GOF Test**											
268					A-D Test Statistic	2.54	**Anderson-Darling Gamma GOF Test**					
269					5% A-D Critical Value	0.745	Data Not Gamma Distributed at 5% Significance Level					
270					K-S Test Statistic	0.442	**Kolmogrov-Smirnoff Gamma GOF Test**					
271					5% K-S Critical Value	0.24	Data Not Gamma Distributed at 5% Significance Level					
272	**Data Not Gamma Distributed at 5% Significance Level**											
273												
274	**Gamma Statistics**											
275					k hat (MLE)	1.904				k star (bias corrected MLE)		1.516
276					Theta hat (MLE)	4.652				Theta star (bias corrected MLE)		5.842
277					nu hat (MLE)	49.51				nu star (bias corrected)		39.41
278					MLE Mean (bias corrected)	8.857				MLE Sd (bias corrected)		7.193
279										Approximate Chi Square Value (0.05)		26.03
280					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		24.49
281												
282	**Assuming Gamma Distribution**											
283					95% Approximate Gamma UCL (use when n>=50))	13.41				95% Adjusted Gamma UCL (use when n<50)		14.25
284												
285	**Lognormal GOF Test**											
286					Shapiro Wilk Test Statistic	0.617	**Shapiro Wilk Lognormal GOF Test**					
287					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
288					Lilliefors Test Statistic	0.462	**Lilliefors Lognormal GOF Test**					
289					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
290	**Data Not Lognormal at 5% Significance Level**											
291												
292	**Lognormal Statistics**											
293					Minimum of Logged Data	-0.315				Mean of logged Data		1.896
294					Maximum of Logged Data	3.215				SD of logged Data		0.969
295												
296	**Assuming Lognormal Distribution**											
297					95% H-UCL	23.29				90% Chebyshev (MVUE) UCL		18.94
298					95% Chebyshev (MVUE) UCL	22.93				97.5% Chebyshev (MVUE) UCL		28.46
299					99% Chebyshev (MVUE) UCL	39.32						
300												
301	**Nonparametric Distribution Free UCL Statistics**											
302	**Data do not follow a Discernible Distribution (0.05)**											
303												
304	**Nonparametric Distribution Free UCLs**											
305					95% CLT UCL	11.44				95% Jackknife UCL		11.66
306					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
307					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
308					95% BCA Bootstrap UCL	N/A						
309					90% Chebyshev(Mean, Sd) UCL	13.58				95% Chebyshev(Mean, Sd) UCL		15.71
310					97.5% Chebyshev(Mean, Sd) UCL	18.68				99% Chebyshev(Mean, Sd) UCL		24.51
311												
312	**Suggested UCL to Use**											

	A	B	C	D	E	F	G	H	I	J	K	L
313					95% Chebyshev (Mean, Sd) UCL	15.71						
314												
315	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
316	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
317	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
318	For additional insight the user may want to consult a statistician.											
319												
320												
321	**Cadmium**											
322												
323	**General Statistics**											
324	Total Number of Observations					13	Number of Distinct Observations					7
325							Number of Missing Observations					0
326	Minimum					0.14	Mean					7.633
327	Maximum					19.6	Median					7.633
328	SD					5.485	Std. Error of Mean					1.521
329	Coefficient of Variation					0.719	Skewness					0.546
330												
331	**Normal GOF Test**											
332	Shapiro Wilk Test Statistic					0.915	**Shapiro Wilk GOF Test**					
333	5% Shapiro Wilk Critical Value					0.866	Data appear Normal at 5% Significance Level					
334	Lilliefors Test Statistic					0.192	**Lilliefors GOF Test**					
335	5% Lilliefors Critical Value					0.246	Data appear Normal at 5% Significance Level					
336	**Data appear Normal at 5% Significance Level**											
337												
338	**Assuming Normal Distribution**											
339	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
340	95% Student's-t UCL					10.34	95% Adjusted-CLT UCL (Chen-1995)					10.38
341							95% Modified-t UCL (Johnson-1978)					10.38
342												
343	**Gamma GOF Test**											
344	A-D Test Statistic					0.766	**Anderson-Darling Gamma GOF Test**					
345	5% A-D Critical Value					0.755	Data Not Gamma Distributed at 5% Significance Level					
346	K-S Test Statistic					0.315	**Kolmogrov-Smirnoff Gamma GOF Test**					
347	5% K-S Critical Value					0.242	Data Not Gamma Distributed at 5% Significance Level					
348	**Data Not Gamma Distributed at 5% Significance Level**											
349												
350	**Gamma Statistics**											
351	k hat (MLE)					1.164	k star (bias corrected MLE)					0.946
352	Theta hat (MLE)					6.56	Theta star (bias corrected MLE)					8.066
353	nu hat (MLE)					30.25	nu star (bias corrected)					24.6
354	MLE Mean (bias corrected)					7.633	MLE Sd (bias corrected)					7.846
355							Approximate Chi Square Value (0.05)					14.31
356	Adjusted Level of Significance					0.0301	Adjusted Chi Square Value					13.2
357												
358	**Assuming Gamma Distribution**											
359	95% Approximate Gamma UCL (use when n>=50))					13.12	95% Adjusted Gamma UCL (use when n<50)					14.23
360												
361	**Lognormal GOF Test**											
362	Shapiro Wilk Test Statistic					0.805	**Shapiro Wilk Lognormal GOF Test**					
363	5% Shapiro Wilk Critical Value					0.866	Data Not Lognormal at 5% Significance Level					
364	Lilliefors Test Statistic					0.333	**Lilliefors Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
365					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
366	Data Not Lognormal at 5% Significance Level											
367												
368	Lognormal Statistics											
369					Minimum of Logged Data	-1.966				Mean of logged Data		1.545
370					Maximum of Logged Data	2.976				SD of logged Data		1.359
371												
372	Assuming Lognormal Distribution											
373					95% H-UCL	46.67				90% Chebyshev (MVUE) UCL		23.62
374					95% Chebyshev (MVUE) UCL	29.57				97.5% Chebyshev (MVUE) UCL		37.82
375					99% Chebyshev (MVUE) UCL	54.03						
376												
377	Nonparametric Distribution Free UCL Statistics											
378	Data appear to follow a Discernible Distribution at 5% Significance Level											
379												
380	Nonparametric Distribution Free UCLs											
381					95% CLT UCL	10.13				95% Jackknife UCL		10.34
382					95% Standard Bootstrap UCL	10.09				95% Bootstrap-t UCL		10.59
383					95% Hall's Bootstrap UCL	10.98				95% Percentile Bootstrap UCL		10.16
384					95% BCA Bootstrap UCL	10.25						
385					90% Chebyshev(Mean, Sd) UCL	12.2				95% Chebyshev(Mean, Sd) UCL		14.26
386					97.5% Chebyshev(Mean, Sd) UCL	17.13				99% Chebyshev(Mean, Sd) UCL		22.77
387												
388	Suggested UCL to Use											
389					95% Student's-t UCL	10.34						
390												
391	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
392	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
393	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
394	For additional insight the user may want to consult a statistician.											
395												
396												
397	Cobalt											
398												
399	General Statistics											
400					Total Number of Observations	13				Number of Distinct Observations		4
401										Number of Missing Observations		0
402					Minimum	7.2				Mean		10.7
403					Maximum	16.2				Median		10.7
404					SD	1.969				Std. Error of Mean		0.546
405					Coefficient of Variation	0.184				Skewness		1.491
406												
407	Normal GOF Test											
408					Shapiro Wilk Test Statistic	0.648	Shapiro Wilk GOF Test					
409					5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level					
410					Lilliefors Test Statistic	0.423	Lilliefors GOF Test					
411					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
412	Data Not Normal at 5% Significance Level											
413												
414	Assuming Normal Distribution											
415	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
416					95% Student's-t UCL	11.67				95% Adjusted-CLT UCL (Chen-1995)		11.84

	A	B	C	D	E	F	G	H	I	J	K	L
417										95% Modified-t UCL (Johnson-1978)		11.71
418												
419					Gamma GOF Test							
420					A-D Test Statistic	2.317	Anderson-Darling Gamma GOF Test					
421					5% A-D Critical Value	0.733	Data Not Gamma Distributed at 5% Significance Level					
422					K-S Test Statistic	0.4	Kolmogrov-Smirnoff Gamma GOF Test					
423					5% K-S Critical Value	0.236	Data Not Gamma Distributed at 5% Significance Level					
424					Data Not Gamma Distributed at 5% Significance Level							
425												
426					Gamma Statistics							
427					k hat (MLE)	34.68	k star (bias corrected MLE)					26.73
428					Theta hat (MLE)	0.309	Theta star (bias corrected MLE)					0.4
429					nu hat (MLE)	901.7	nu star (bias corrected)					695
430					MLE Mean (bias corrected)	10.7	MLE Sd (bias corrected)					2.07
431							Approximate Chi Square Value (0.05)					634.8
432					Adjusted Level of Significance	0.0301	Adjusted Chi Square Value					626.6
433												
434					Assuming Gamma Distribution							
435					95% Approximate Gamma UCL (use when n>=50))	11.71	95% Adjusted Gamma UCL (use when n<50)					11.87
436												
437					Lognormal GOF Test							
438					Shapiro Wilk Test Statistic	0.687	Shapiro Wilk Lognormal GOF Test					
439					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
440					Lilliefors Test Statistic	0.39	Lilliefors Lognormal GOF Test					
441					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
442					Data Not Lognormal at 5% Significance Level							
443												
444					Lognormal Statistics							
445					Minimum of Logged Data	1.974	Mean of logged Data					2.356
446					Maximum of Logged Data	2.785	SD of logged Data					0.175
447												
448					Assuming Lognormal Distribution							
449					95% H-UCL	11.74	90% Chebyshev (MVUE) UCL					12.26
450					95% Chebyshev (MVUE) UCL	12.97	97.5% Chebyshev (MVUE) UCL					13.96
451					99% Chebyshev (MVUE) UCL	15.89						
452												
453					Nonparametric Distribution Free UCL Statistics							
454					Data do not follow a Discernible Distribution (0.05)							
455												
456					Nonparametric Distribution Free UCLs							
457					95% CLT UCL	11.6	95% Jackknife UCL					11.67
458					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
459					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
460					95% BCA Bootstrap UCL	N/A						
461					90% Chebyshev(Mean, Sd) UCL	12.34	95% Chebyshev(Mean, Sd) UCL					13.08
462					97.5% Chebyshev(Mean, Sd) UCL	14.11	99% Chebyshev(Mean, Sd) UCL					16.13
463												
464					Suggested UCL to Use							
465					95% Student's-t UCL	11.67				or 95% Modified-t UCL		11.71
466												
467					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
468					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							

	A	B	C	D	E	F	G	H	I	J	K	L
469	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
470	For additional insight the user may want to consult a statistician.											
471												
472												
473	Iron											
474												
475	**General Statistics**											
476					Total Number of Observations	13			Number of Distinct Observations			13
477									Number of Missing Observations			0
478					Minimum	6836			Mean			25614
479					Maximum	37876			Median			26244
480					SD	7389			Std. Error of Mean			2049
481					Coefficient of Variation	0.288			Skewness			-0.961
482												
483	**Normal GOF Test**											
484					Shapiro Wilk Test Statistic	0.88			**Shapiro Wilk GOF Test**			
485					5% Shapiro Wilk Critical Value	0.866			Data appear Normal at 5% Significance Level			
486					Lilliefors Test Statistic	0.222			**Lilliefors GOF Test**			
487					5% Lilliefors Critical Value	0.246			Data appear Normal at 5% Significance Level			
488	**Data appear Normal at 5% Significance Level**											
489												
490	**Assuming Normal Distribution**											
491					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
492					95% Student's-t UCL	29267			95% Adjusted-CLT UCL (Chen-1995)			28401
493									95% Modified-t UCL (Johnson-1978)			29175
494												
495	**Gamma GOF Test**											
496					A-D Test Statistic	1.174			**Anderson-Darling Gamma GOF Test**			
497					5% A-D Critical Value	0.734			Data Not Gamma Distributed at 5% Significance Level			
498					K-S Test Statistic	0.285			**Kolmogrov-Smirnoff Gamma GOF Test**			
499					5% K-S Critical Value	0.237			Data Not Gamma Distributed at 5% Significance Level			
500	**Data Not Gamma Distributed at 5% Significance Level**											
501												
502	**Gamma Statistics**											
503					k hat (MLE)	8.507			k star (bias corrected MLE)			6.595
504					Theta hat (MLE)	3011			Theta star (bias corrected MLE)			3884
505					nu hat (MLE)	221.2			nu star (bias corrected)			171.5
506					MLE Mean (bias corrected)	25614			MLE Sd (bias corrected)			9974
507									Approximate Chi Square Value (0.05)			142.2
508					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			138.4
509												
510	**Assuming Gamma Distribution**											
511					95% Approximate Gamma UCL (use when n>=50))	30889			95% Adjusted Gamma UCL (use when n<50)			31737
512												
513	**Lognormal GOF Test**											
514					Shapiro Wilk Test Statistic	0.694			**Shapiro Wilk Lognormal GOF Test**			
515					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
516					Lilliefors Test Statistic	0.323			**Lilliefors Lognormal GOF Test**			
517					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
518	**Data Not Lognormal at 5% Significance Level**											
519												
520	**Lognormal Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
521					Minimum of Logged Data	8.83					Mean of logged Data	10.09
522					Maximum of Logged Data	10.54					SD of logged Data	0.413
523												
524					Assuming Lognormal Distribution							
525					95% H-UCL	33418					90% Chebyshev (MVUE) UCL	35225
526					95% Chebyshev (MVUE) UCL	39363					97.5% Chebyshev (MVUE) UCL	45106
527					99% Chebyshev (MVUE) UCL	56386						
528												
529					Nonparametric Distribution Free UCL Statistics							
530					Data appear to follow a Discernible Distribution at 5% Significance Level							
531												
532					Nonparametric Distribution Free UCLs							
533					95% CLT UCL	28985					95% Jackknife UCL	29267
534					95% Standard Bootstrap UCL	28882					95% Bootstrap-t UCL	28842
535					95% Hall's Bootstrap UCL	29166					95% Percentile Bootstrap UCL	28808
536					95% BCA Bootstrap UCL	28216						
537					90% Chebyshev(Mean, Sd) UCL	31762					95% Chebyshev(Mean, Sd) UCL	34547
538					97.5% Chebyshev(Mean, Sd) UCL	38412					99% Chebyshev(Mean, Sd) UCL	46004
539												
540					Suggested UCL to Use							
541					95% Student's-t UCL	29267						
542												
543					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
544					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
545					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
546					For additional insight the user may want to consult a statistician.							
547												
548					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
549					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
550												
551												
552	Manganese											
553												
554					General Statistics							
555					Total Number of Observations	13					Number of Distinct Observations	13
556											Number of Missing Observations	0
557					Minimum	86					Mean	544.1
558					Maximum	1790					Median	500
559					SD	430.8					Std. Error of Mean	119.5
560					Coefficient of Variation	0.792					Skewness	2.154
561												
562					Normal GOF Test							
563					Shapiro Wilk Test Statistic	0.785					Shapiro Wilk GOF Test	
564					5% Shapiro Wilk Critical Value	0.866					Data Not Normal at 5% Significance Level	
565					Lilliefors Test Statistic	0.249					Lilliefors GOF Test	
566					5% Lilliefors Critical Value	0.246					Data Not Normal at 5% Significance Level	
567					Data Not Normal at 5% Significance Level							
568												
569					Assuming Normal Distribution							
570					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
571					95% Student's-t UCL	757					95% Adjusted-CLT UCL (Chen-1995)	816.9
572											95% Modified-t UCL (Johnson-1978)	768.9

	A	B	C	D	E	F	G	H	I	J	K	L
573												
574						Gamma GOF Test						
575					A-D Test Statistic	0.281	Anderson-Darling Gamma GOF Test					
576					5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level					
577					K-S Test Statistic	0.167	Kolmogrov-Smirnoff Gamma GOF Test					
578					5% K-S Critical Value	0.239	Detected data appear Gamma Distributed at 5% Significance Level					
579					Detected data appear Gamma Distributed at 5% Significance Level							
580												
581						Gamma Statistics						
582					k hat (MLE)	2.124	k star (bias corrected MLE)					1.685
583					Theta hat (MLE)	256.1	Theta star (bias corrected MLE)					322.9
584					nu hat (MLE)	55.22	nu star (bias corrected)					43.81
585					MLE Mean (bias corrected)	544.1	MLE Sd (bias corrected)					419.1
586							Approximate Chi Square Value (0.05)					29.63
587					Adjusted Level of Significance	0.0301	Adjusted Chi Square Value					27.98
588												
589						Assuming Gamma Distribution						
590					95% Approximate Gamma UCL (use when n>=50)	804.4	95% Adjusted Gamma UCL (use when n<50)					851.9
591												
592						Lognormal GOF Test						
593					Shapiro Wilk Test Statistic	0.967	Shapiro Wilk Lognormal GOF Test					
594					5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level					
595					Lilliefors Test Statistic	0.156	Lilliefors Lognormal GOF Test					
596					5% Lilliefors Critical Value	0.246	Data appear Lognormal at 5% Significance Level					
597					Data appear Lognormal at 5% Significance Level							
598												
599						Lognormal Statistics						
600					Minimum of Logged Data	4.454	Mean of logged Data					6.046
601					Maximum of Logged Data	7.49	SD of logged Data					0.766
602												
603						Assuming Lognormal Distribution						
604					95% H-UCL	977.1	90% Chebyshev (MVUE) UCL					920.6
605					95% Chebyshev (MVUE) UCL	1088	97.5% Chebyshev (MVUE) UCL					1321
606					99% Chebyshev (MVUE) UCL	1777						
607												
608						Nonparametric Distribution Free UCL Statistics						
609						Data appear to follow a Discernible Distribution at 5% Significance Level						
610												
611						Nonparametric Distribution Free UCLs						
612					95% CLT UCL	740.6	95% Jackknife UCL					757
613					95% Standard Bootstrap UCL	732.4	95% Bootstrap-t UCL					911.4
614					95% Hall's Bootstrap UCL	1648	95% Percentile Bootstrap UCL					754.2
615					95% BCA Bootstrap UCL	826						
616					90% Chebyshev(Mean, Sd) UCL	902.5	95% Chebyshev(Mean, Sd) UCL					1065
617					97.5% Chebyshev(Mean, Sd) UCL	1290	99% Chebyshev(Mean, Sd) UCL					1733
618												
619						Suggested UCL to Use						
620					95% Adjusted Gamma UCL	851.9						
621												
622					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
623					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
624					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							

	A	B	C	D	E	F	G	H	I	J	K	L
625	For additional insight the user may want to consult a statistician.											
626												
627												
628	Mercury											
629												
630	**General Statistics**											
631					Total Number of Observations	13			Number of Distinct Observations			7
632									Number of Missing Observations			0
633					Minimum	0.021			Mean			18.24
634					Maximum	40			Median			10
635					SD	18.3			Std. Error of Mean			5.077
636					Coefficient of Variation	1.003			Skewness			0.392
637												
638	**Normal GOF Test**											
639					Shapiro Wilk Test Statistic	0.746			**Shapiro Wilk GOF Test**			
640					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			
641					Lilliefors Test Statistic	0.289			**Lilliefors GOF Test**			
642					5% Lilliefors Critical Value	0.246			Data Not Normal at 5% Significance Level			
643	**Data Not Normal at 5% Significance Level**											
644												
645	**Assuming Normal Distribution**											
646	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
647					95% Student's-t UCL	27.29			95% Adjusted-CLT UCL (Chen-1995)			27.18
648									95% Modified-t UCL (Johnson-1978)			27.38
649												
650	**Gamma GOF Test**											
651					A-D Test Statistic	1.062			**Anderson-Darling Gamma GOF Test**			
652					5% A-D Critical Value	0.811			Data Not Gamma Distributed at 5% Significance Level			
653					K-S Test Statistic	0.242			**Kolmogrov-Smirnoff Gamma GOF Test**			
654					5% K-S Critical Value	0.253			Detected data appear Gamma Distributed at 5% Significance Level			
655	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
656												
657	**Gamma Statistics**											
658					k hat (MLE)	0.395			k star (bias corrected MLE)			0.355
659					Theta hat (MLE)	46.21			Theta star (bias corrected MLE)			51.39
660					nu hat (MLE)	10.26			nu star (bias corrected)			9.228
661					MLE Mean (bias corrected)	18.24			MLE Sd (bias corrected)			30.62
662									Approximate Chi Square Value (0.05)			3.465
663					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			2.98
664												
665	**Assuming Gamma Distribution**											
666					95% Approximate Gamma UCL (use when n>=50)	48.58			95% Adjusted Gamma UCL (use when n<50)			56.48
667												
668	**Lognormal GOF Test**											
669					Shapiro Wilk Test Statistic	0.784			**Shapiro Wilk Lognormal GOF Test**			
670					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
671					Lilliefors Test Statistic	0.284			**Lilliefors Lognormal GOF Test**			
672					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
673	**Data Not Lognormal at 5% Significance Level**											
674												
675	**Lognormal Statistics**											
676					Minimum of Logged Data	-3.863			Mean of logged Data			1.233

	A	B	C	D	E	F	G	H	I	J	K	L
677					Maximum of Logged Data	3.689					SD of logged Data	2.925
678												
679					Assuming Lognormal Distribution							
680					95% H-UCL	75799					90% Chebyshev (MVUE) UCL	304.3
681					95% Chebyshev (MVUE) UCL	402.3					97.5% Chebyshev (MVUE) UCL	538.3
682					99% Chebyshev (MVUE) UCL	805.5						
683												
684					Nonparametric Distribution Free UCL Statistics							
685					Data appear to follow a Discernible Distribution at 5% Significance Level							
686												
687					Nonparametric Distribution Free UCLs							
688					95% CLT UCL	26.59					95% Jackknife UCL	27.29
689					95% Standard Bootstrap UCL	26.41					95% Bootstrap-t UCL	28.71
690					95% Hall's Bootstrap UCL	25.29					95% Percentile Bootstrap UCL	26.69
691					95% BCA Bootstrap UCL	26.69						
692					90% Chebyshev(Mean, Sd) UCL	33.47					95% Chebyshev(Mean, Sd) UCL	40.37
693					97.5% Chebyshev(Mean, Sd) UCL	49.94					99% Chebyshev(Mean, Sd) UCL	68.75
694												
695					Suggested UCL to Use							
696					95% Adjusted Gamma UCL	56.48						
697												
698					Recommended UCL exceeds the maximum observation							
699												
700					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
701					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
702					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
703					For additional insight the user may want to consult a statistician.							
704												
705												
706	Nickel											
707												
708					General Statistics							
709					Total Number of Observations	13					Number of Distinct Observations	10
710											Number of Missing Observations	0
711					Minimum	15					Mean	39.77
712					Maximum	264					Median	23
713					SD	67.5					Std. Error of Mean	18.72
714					Coefficient of Variation	1.697					Skewness	3.582
715												
716					Normal GOF Test							
717					Shapiro Wilk Test Statistic	0.366					Shapiro Wilk GOF Test	
718					5% Shapiro Wilk Critical Value	0.866					Data Not Normal at 5% Significance Level	
719					Lilliefors Test Statistic	0.481					Lilliefors GOF Test	
720					5% Lilliefors Critical Value	0.246					Data Not Normal at 5% Significance Level	
721					Data Not Normal at 5% Significance Level							
722												
723					Assuming Normal Distribution							
724					95% Normal UCL						95% UCLs (Adjusted for Skewness)	
725					95% Student's-t UCL	73.13					95% Adjusted-CLT UCL (Chen-1995)	90.43
726											95% Modified-t UCL (Johnson-1978)	76.23
727												
728					Gamma GOF Test							

	A	B	C	D	E	F	G	H	I	J	K	L
729					A-D Test Statistic	3.06	Anderson-Darling Gamma GOF Test					
730					5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level					
731					K-S Test Statistic	0.419	Kolmogrov-Smirnoff Gamma GOF Test					
732					5% K-S Critical Value	0.242	Data Not Gamma Distributed at 5% Significance Level					
733	Data Not Gamma Distributed at 5% Significance Level											
734												
735	Gamma Statistics											
736					k hat (MLE)	1.233				k star (bias corrected MLE)		0.999
737					Theta hat (MLE)	32.26				Theta star (bias corrected MLE)		39.79
738					nu hat (MLE)	32.05				nu star (bias corrected)		25.99
739					MLE Mean (bias corrected)	39.77				MLE Sd (bias corrected)		39.78
740										Approximate Chi Square Value (0.05)		15.37
741					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		14.21
742												
743	Assuming Gamma Distribution											
744					95% Approximate Gamma UCL (use when n>=50))	67.24				95% Adjusted Gamma UCL (use when n<50)		72.7
745												
746	Lognormal GOF Test											
747					Shapiro Wilk Test Statistic	0.565	Shapiro Wilk Lognormal GOF Test					
748					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
749					Lilliefors Test Statistic	0.35	Lilliefors Lognormal GOF Test					
750					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
751	Data Not Lognormal at 5% Significance Level											
752												
753	Lognormal Statistics											
754					Minimum of Logged Data	2.708				Mean of logged Data		3.225
755					Maximum of Logged Data	5.576				SD of logged Data		0.733
756												
757	Assuming Lognormal Distribution											
758					95% H-UCL	54.88				90% Chebyshev (MVUE) UCL		52.64
759					95% Chebyshev (MVUE) UCL	61.95				97.5% Chebyshev (MVUE) UCL		74.86
760					99% Chebyshev (MVUE) UCL	100.2						
761												
762	Nonparametric Distribution Free UCL Statistics											
763	Data do not follow a Discernible Distribution (0.05)											
764												
765	Nonparametric Distribution Free UCLs											
766					95% CLT UCL	70.56				95% Jackknife UCL		73.13
767					95% Standard Bootstrap UCL	69.03				95% Bootstrap-t UCL		453.8
768					95% Hall's Bootstrap UCL	284.9				95% Percentile Bootstrap UCL		76.31
769					95% BCA Bootstrap UCL	95.92						
770					90% Chebyshev(Mean, Sd) UCL	95.93				95% Chebyshev(Mean, Sd) UCL		121.4
771					97.5% Chebyshev(Mean, Sd) UCL	156.7				99% Chebyshev(Mean, Sd) UCL		226
772												
773	Suggested UCL to Use											
774					95% Chebyshev (Mean, Sd) UCL	121.4						
775												
776	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
777	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
778	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
779	For additional insight the user may want to consult a statistician.											
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781												
782	PAH, Total											
783												
784						General Statistics						
785					Total Number of Observations	13				Number of Distinct Observations		4
786										Number of Missing Observations		0
787					Minimum	0.109				Mean		0.265
788					Maximum	0.43				Median		0.265
789					SD	0.0657				Std. Error of Mean		0.0182
790					Coefficient of Variation	0.248				Skewness		0.258
791												
792						Normal GOF Test						
793					Shapiro Wilk Test Statistic	0.594				Shapiro Wilk GOF Test		
794					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
795					Lilliefors Test Statistic	0.423				Lilliefors GOF Test		
796					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
797						Data Not Normal at 5% Significance Level						
798												
799						Assuming Normal Distribution						
800					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
801					95% Student's-t UCL	0.297				95% Adjusted-CLT UCL (Chen-1995)		0.296
802										95% Modified-t UCL (Johnson-1978)		0.297
803												
804						Gamma GOF Test						
805					A-D Test Statistic	2.959				Anderson-Darling Gamma GOF Test		
806					5% A-D Critical Value	0.734				Data Not Gamma Distributed at 5% Significance Level		
807					K-S Test Statistic	0.401				Kolmogrov-Smirnoff Gamma GOF Test		
808					5% K-S Critical Value	0.236				Data Not Gamma Distributed at 5% Significance Level		
809						Data Not Gamma Distributed at 5% Significance Level						
810												
811						Gamma Statistics						
812					k hat (MLE)	14.92				k star (bias corrected MLE)		11.53
813					Theta hat (MLE)	0.0177				Theta star (bias corrected MLE)		0.023
814					nu hat (MLE)	387.8				nu star (bias corrected)		299.7
815					MLE Mean (bias corrected)	0.265				MLE Sd (bias corrected)		0.0779
816										Approximate Chi Square Value (0.05)		260.6
817					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		255.4
818												
819						Assuming Gamma Distribution						
820					95% Approximate Gamma UCL (use when n>=50))	0.304				95% Adjusted Gamma UCL (use when n<50)		0.31
821												
822						Lognormal GOF Test						
823					Shapiro Wilk Test Statistic	0.554				Shapiro Wilk Lognormal GOF Test		
824					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
825					Lilliefors Test Statistic	0.419				Lilliefors Lognormal GOF Test		
826					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
827						Data Not Lognormal at 5% Significance Level						
828												
829						Lognormal Statistics						
830					Minimum of Logged Data	-2.219				Mean of logged Data		-1.364
831					Maximum of Logged Data	-0.844				SD of logged Data		0.291
832												

	A	B	C	D	E	F	G	H	I	J	K	L
833					Assuming Lognormal Distribution							
834					95% H-UCL	0.313				90% Chebyshev (MVUE) UCL		0.331
835					95% Chebyshev (MVUE) UCL	0.36				97.5% Chebyshev (MVUE) UCL		0.401
836					99% Chebyshev (MVUE) UCL	0.481						
837												
838					Nonparametric Distribution Free UCL Statistics							
839					Data do not follow a Discernible Distribution (0.05)							
840												
841					Nonparametric Distribution Free UCLs							
842					95% CLT UCL	0.295				95% Jackknife UCL		0.297
843					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
844					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
845					95% BCA Bootstrap UCL	N/A						
846					90% Chebyshev(Mean, Sd) UCL	0.319				95% Chebyshev(Mean, Sd) UCL		0.344
847					97.5% Chebyshev(Mean, Sd) UCL	0.378				99% Chebyshev(Mean, Sd) UCL		0.446
848												
849					Suggested UCL to Use							
850					95% Student's-t UCL	0.297				or 95% Modified-t UCL		0.297
851												
852					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
853					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
854					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
855					For additional insight the user may want to consult a statistician.							
856												
857												
858	PCB, Total											
859												
860					General Statistics							
861					Total Number of Observations	13				Number of Distinct Observations		4
862										Number of Missing Observations		0
863					Minimum	0.048				Mean		3.972
864					Maximum	5				Median		5
865					SD	1.964				Std. Error of Mean		0.545
866					Coefficient of Variation	0.494				Skewness		-1.495
867												
868					Normal GOF Test							
869					Shapiro Wilk Test Statistic	0.56				Shapiro Wilk GOF Test		
870					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
871					Lilliefors Test Statistic	0.469				Lilliefors GOF Test		
872					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
873					Data Not Normal at 5% Significance Level							
874												
875					Assuming Normal Distribution							
876					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
877					95% Student's-t UCL	4.943				95% Adjusted-CLT UCL (Chen-1995)		4.627
878										95% Modified-t UCL (Johnson-1978)		4.905
879												
880					Gamma GOF Test							
881					A-D Test Statistic	2.929				Anderson-Darling Gamma GOF Test		
882					5% A-D Critical Value	0.753				Data Not Gamma Distributed at 5% Significance Level		
883					K-S Test Statistic	0.483				Kolmogrov-Smirnoff Gamma GOF Test		
884					5% K-S Critical Value	0.242				Data Not Gamma Distributed at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
885	**Data Not Gamma Distributed at 5% Significance Level**											
886												
887	**Gamma Statistics**											
888					k hat (MLE)	1.335				k star (bias corrected MLE)		1.078
889					Theta hat (MLE)	2.976				Theta star (bias corrected MLE)		3.685
890					nu hat (MLE)	34.7				nu star (bias corrected)		28.03
891					MLE Mean (bias corrected)	3.972				MLE Sd (bias corrected)		3.826
892										Approximate Chi Square Value (0.05)		16.95
893					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		15.73
894												
895	**Assuming Gamma Distribution**											
896				95% Approximate Gamma UCL (use when n>=50))		6.568				95% Adjusted Gamma UCL (use when n<50)		7.077
897												
898	**Lognormal GOF Test**											
899					Shapiro Wilk Test Statistic	0.554				**Shapiro Wilk Lognormal GOF Test**		
900					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
901					Lilliefors Test Statistic	0.448				**Lilliefors Lognormal GOF Test**		
902					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
903	**Data Not Lognormal at 5% Significance Level**											
904												
905	**Lognormal Statistics**											
906					Minimum of Logged Data	-3.037				Mean of logged Data		0.96
907					Maximum of Logged Data	1.609				SD of logged Data		1.401
908												
909	**Assuming Lognormal Distribution**											
910					95% H-UCL	29.73				90% Chebyshev (MVUE) UCL		14.07
911					95% Chebyshev (MVUE) UCL	17.66				97.5% Chebyshev (MVUE) UCL		22.64
912					99% Chebyshev (MVUE) UCL	32.43						
913												
914	**Nonparametric Distribution Free UCL Statistics**											
915	**Data do not follow a Discernible Distribution (0.05)**											
916												
917	**Nonparametric Distribution Free UCLs**											
918					95% CLT UCL	4.868				95% Jackknife UCL		4.943
919					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
920					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
921					95% BCA Bootstrap UCL	N/A						
922					90% Chebyshev(Mean, Sd) UCL	5.606				95% Chebyshev(Mean, Sd) UCL		6.347
923					97.5% Chebyshev(Mean, Sd) UCL	7.374				99% Chebyshev(Mean, Sd) UCL		9.392
924												
925	**Suggested UCL to Use**											
926					95% Chebyshev (Mean, Sd) UCL	6.347						
927												
928	**Recommended UCL exceeds the maximum observation**											
929												
930	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
931	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
932	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
933	For additional insight the user may want to consult a statistician.											
934												
935	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
936	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											

	A	B	C	D	E	F	G	H	I	J	K	L
937												
938												
939	**Thallium**											
940												
941						**General Statistics**						
942					Total Number of Observations	13			Number of Distinct Observations			4
943									Number of Missing Observations			0
944					Minimum	0.098			Mean			0.226
945					Maximum	0.41			Median			0.226
946					SD	0.0667			Std. Error of Mean			0.0185
947					Coefficient of Variation	0.295			Skewness			1.314
948												
949						**Normal GOF Test**						
950					Shapiro Wilk Test Statistic	0.647			**Shapiro Wilk GOF Test**			
951					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			
952					Lilliefors Test Statistic	0.423			**Lilliefors GOF Test**			
953					5% Lilliefors Critical Value	0.246			Data Not Normal at 5% Significance Level			
954						**Data Not Normal at 5% Significance Level**						
955												
956						**Assuming Normal Distribution**						
957					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
958					95% Student's-t UCL	0.259			95% Adjusted-CLT UCL (Chen-1995)			0.264
959									95% Modified-t UCL (Johnson-1978)			0.26
960												
961						**Gamma GOF Test**						
962					A-D Test Statistic	2.356			**Anderson-Darling Gamma GOF Test**			
963					5% A-D Critical Value	0.734			Data Not Gamma Distributed at 5% Significance Level			
964					K-S Test Statistic	0.386			**Kolmogrov-Smirnoff Gamma GOF Test**			
965					5% K-S Critical Value	0.237			Data Not Gamma Distributed at 5% Significance Level			
966						**Data Not Gamma Distributed at 5% Significance Level**						
967												
968						**Gamma Statistics**						
969					k hat (MLE)	12.55			k star (bias corrected MLE)			9.707
970					Theta hat (MLE)	0.018			Theta star (bias corrected MLE)			0.0233
971					nu hat (MLE)	326.4			nu star (bias corrected)			252.4
972					MLE Mean (bias corrected)	0.226			MLE Sd (bias corrected)			0.0725
973									Approximate Chi Square Value (0.05)			216.6
974					Adjusted Level of Significance	0.0301			Adjusted Chi Square Value			211.9
975												
976						**Assuming Gamma Distribution**						
977					95% Approximate Gamma UCL (use when n>=50))	0.263			95% Adjusted Gamma UCL (use when n<50)			0.269
978												
979						**Lognormal GOF Test**						
980					Shapiro Wilk Test Statistic	0.667			**Shapiro Wilk Lognormal GOF Test**			
981					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
982					Lilliefors Test Statistic	0.399			**Lilliefors Lognormal GOF Test**			
983					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
984						**Data Not Lognormal at 5% Significance Level**						
985												
986						**Lognormal Statistics**						
987					Minimum of Logged Data	-2.323			Mean of logged Data			-1.528
988					Maximum of Logged Data	-0.892			SD of logged Data			0.305

	A	B	C	D	E	F	G	H	I	J	K	L
989												
990					Assuming Lognormal Distribution							
991					95% H-UCL	0.269			90% Chebyshev (MVUE) UCL			0.285
992				95% Chebyshev (MVUE) UCL		0.311			97.5% Chebyshev (MVUE) UCL			0.347
993				99% Chebyshev (MVUE) UCL		0.419						
994												
995					Nonparametric Distribution Free UCL Statistics							
996					Data do not follow a Discernible Distribution (0.05)							
997												
998					Nonparametric Distribution Free UCLs							
999					95% CLT UCL	0.256			95% Jackknife UCL			0.259
1000				95% Standard Bootstrap UCL		N/A			95% Bootstrap-t UCL			N/A
1001				95% Hall's Bootstrap UCL		N/A			95% Percentile Bootstrap UCL			N/A
1002				95% BCA Bootstrap UCL		N/A						
1003				90% Chebyshev(Mean, Sd) UCL		0.281			95% Chebyshev(Mean, Sd) UCL			0.307
1004				97.5% Chebyshev(Mean, Sd) UCL		0.342			99% Chebyshev(Mean, Sd) UCL			0.41
1005												
1006					Suggested UCL to Use							
1007				95% Student's-t UCL		0.259			or 95% Modified-t UCL			0.26
1008												
1009					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1010					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1011					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1012					For additional insight the user may want to consult a statistician.							
1013												
1014												
1015	Uranium											
1016												
1017					General Statistics							
1018				Total Number of Observations		13			Number of Distinct Observations			9
1019									Number of Missing Observations			0
1020				Minimum		6.7			Mean			142.1
1021				Maximum		481.5			Median			11.54
1022				SD		191.4			Std. Error of Mean			53.1
1023				Coefficient of Variation		1.348			Skewness			1.101
1024												
1025					Normal GOF Test							
1026				Shapiro Wilk Test Statistic		0.712			Shapiro Wilk GOF Test			
1027				5% Shapiro Wilk Critical Value		0.866			Data Not Normal at 5% Significance Level			
1028				Lilliefors Test Statistic		0.309			Lilliefors GOF Test			
1029				5% Lilliefors Critical Value		0.246			Data Not Normal at 5% Significance Level			
1030					Data Not Normal at 5% Significance Level							
1031												
1032					Assuming Normal Distribution							
1033				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
1034				95% Student's-t UCL		236.7			95% Adjusted-CLT UCL (Chen-1995)			246.7
1035									95% Modified-t UCL (Johnson-1978)			239.4
1036												
1037					Gamma GOF Test							
1038				A-D Test Statistic		1.327			Anderson-Darling Gamma GOF Test			
1039				5% A-D Critical Value		0.789			Data Not Gamma Distributed at 5% Significance Level			
1040				K-S Test Statistic		0.32			Kolmogrov-Smirnoff Gamma GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
1041					5% K-S Critical Value	0.25	Data Not Gamma Distributed at 5% Significance Level					
1042	**Data Not Gamma Distributed at 5% Significance Level**											
1043												
1044	**Gamma Statistics**											
1045					k hat (MLE)	0.511				k star (bias corrected MLE)		0.445
1046					Theta hat (MLE)	277.9				Theta star (bias corrected MLE)		319.6
1047					nu hat (MLE)	13.29				nu star (bias corrected)		11.56
1048					MLE Mean (bias corrected)	142.1				MLE Sd (bias corrected)		213.1
1049										Approximate Chi Square Value (0.05)		4.937
1050					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		4.336
1051												
1052	**Assuming Gamma Distribution**											
1053				95% Approximate Gamma UCL (use when n>=50))		332.6				95% Adjusted Gamma UCL (use when n<50)		378.6
1054												
1055	**Lognormal GOF Test**											
1056					Shapiro Wilk Test Statistic	0.788	**Shapiro Wilk Lognormal GOF Test**					
1057					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
1058					Lilliefors Test Statistic	0.305	**Lilliefors Lognormal GOF Test**					
1059					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
1060	**Data Not Lognormal at 5% Significance Level**											
1061												
1062	**Lognormal Statistics**											
1063					Minimum of Logged Data	1.902				Mean of logged Data		3.718
1064					Maximum of Logged Data	6.177				SD of logged Data		1.747
1065												
1066	**Assuming Lognormal Distribution**											
1067					95% H-UCL	1592				90% Chebyshev (MVUE) UCL		392.9
1068					95% Chebyshev (MVUE) UCL	503				97.5% Chebyshev (MVUE) UCL		655.8
1069					99% Chebyshev (MVUE) UCL	955.8						
1070												
1071	**Nonparametric Distribution Free UCL Statistics**											
1072	**Data do not follow a Discernible Distribution (0.05)**											
1073												
1074	**Nonparametric Distribution Free UCLs**											
1075					95% CLT UCL	229.4				95% Jackknife UCL		236.7
1076					95% Standard Bootstrap UCL	223.9				95% Bootstrap-t UCL		272.7
1077					95% Hall's Bootstrap UCL	214.2				95% Percentile Bootstrap UCL		230.4
1078					95% BCA Bootstrap UCL	244						
1079					90% Chebyshev(Mean, Sd) UCL	301.4				95% Chebyshev(Mean, Sd) UCL		373.5
1080					97.5% Chebyshev(Mean, Sd) UCL	473.7				99% Chebyshev(Mean, Sd) UCL		670.4
1081												
1082	**Suggested UCL to Use**											
1083					99% Chebyshev (Mean, Sd) UCL	670.4						
1084												
1085	**Recommended UCL exceeds the maximum observation**											
1086												
1087	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1088	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1089	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1090	For additional insight the user may want to consult a statistician.											
1091												
1092												

	A	B	C	D	E	F	G	H	I	J	K	L
1093	Uranium-234											
1094												
1095						General Statistics						
1096					Total Number of Observations	13				Number of Distinct Observations		4
1097										Number of Missing Observations		0
1098					Minimum	0.299				Mean		4.88
1099					Maximum	12.2				Median		4.88
1100					SD	2.615				Std. Error of Mean		0.725
1101					Coefficient of Variation	0.536				Skewness		1.517
1102												
1103						Normal GOF Test						
1104					Shapiro Wilk Test Statistic	0.647				Shapiro Wilk GOF Test		
1105					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
1106					Lilliefors Test Statistic	0.423				Lilliefors GOF Test		
1107					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
1108						Data Not Normal at 5% Significance Level						
1109												
1110						Assuming Normal Distribution						
1111					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1112					95% Student's-t UCL	6.172				95% Adjusted-CLT UCL (Chen-1995)		6.399
1113										95% Modified-t UCL (Johnson-1978)		6.223
1114												
1115						Gamma GOF Test						
1116					A-D Test Statistic	2.432				Anderson-Darling Gamma GOF Test		
1117					5% A-D Critical Value	0.741				Data Not Gamma Distributed at 5% Significance Level		
1118					K-S Test Statistic	0.429				Kolmogrov-Smirnoff Gamma GOF Test		
1119					5% K-S Critical Value	0.239				Data Not Gamma Distributed at 5% Significance Level		
1120						Data Not Gamma Distributed at 5% Significance Level						
1121												
1122						Gamma Statistics						
1123					k hat (MLE)	2.562				k star (bias corrected MLE)		2.022
1124					Theta hat (MLE)	1.905				Theta star (bias corrected MLE)		2.414
1125					nu hat (MLE)	66.6				nu star (bias corrected)		52.56
1126					MLE Mean (bias corrected)	4.88				MLE Sd (bias corrected)		3.432
1127										Approximate Chi Square Value (0.05)		36.91
1128					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		35.05
1129												
1130						Assuming Gamma Distribution						
1131					95% Approximate Gamma UCL (use when n>=50))	6.949				95% Adjusted Gamma UCL (use when n<50)		7.318
1132												
1133						Lognormal GOF Test						
1134					Shapiro Wilk Test Statistic	0.584				Shapiro Wilk Lognormal GOF Test		
1135					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
1136					Lilliefors Test Statistic	0.442				Lilliefors Lognormal GOF Test		
1137					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
1138						Data Not Lognormal at 5% Significance Level						
1139												
1140						Lognormal Statistics						
1141					Minimum of Logged Data	-1.207				Mean of logged Data		1.377
1142					Maximum of Logged Data	2.501				SD of logged Data		0.854
1143												
1144						Assuming Lognormal Distribution						

1145					95% H-UCL	10.85				90% Chebyshev (MVUE) UCL		9.672
1146				95% Chebyshev (MVUE) UCL		11.56				97.5% Chebyshev (MVUE) UCL		14.17
1147				99% Chebyshev (MVUE) UCL		19.31						
1148												
1149					Nonparametric Distribution Free UCL Statistics							
1150					Data do not follow a Discernible Distribution (0.05)							
1151												
1152					Nonparametric Distribution Free UCLs							
1153					95% CLT UCL	6.073				95% Jackknife UCL		6.172
1154				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1155				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1156				95% BCA Bootstrap UCL		N/A						
1157				90% Chebyshev(Mean, Sd) UCL		7.056				95% Chebyshev(Mean, Sd) UCL		8.041
1158				97.5% Chebyshev(Mean, Sd) UCL		9.409				99% Chebyshev(Mean, Sd) UCL		12.1
1159												
1160					Suggested UCL to Use							
1161				95% Chebyshev (Mean, Sd) UCL		8.041						
1162												
1163	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1164	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1165	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1166	For additional insight the user may want to consult a statistician.											
1167												
1168												
1169	Uranium-235											
1170												
1171					General Statistics							
1172				Total Number of Observations		13				Number of Distinct Observations		4
1173										Number of Missing Observations		0
1174					Minimum	0.0335				Mean		0.746
1175					Maximum	1.96				Median		0.746
1176					SD	0.432				Std. Error of Mean		0.12
1177					Coefficient of Variation	0.579				Skewness		1.598
1178												
1179					Normal GOF Test							
1180					Shapiro Wilk Test Statistic	0.644				Shapiro Wilk GOF Test		
1181					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
1182					Lilliefors Test Statistic	0.423				Lilliefors GOF Test		
1183					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
1184					Data Not Normal at 5% Significance Level							
1185												
1186					Assuming Normal Distribution							
1187					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1188					95% Student's-t UCL	0.959				95% Adjusted-CLT UCL (Chen-1995)		0.999
1189										95% Modified-t UCL (Johnson-1978)		0.968
1190												
1191					Gamma GOF Test							
1192					A-D Test Statistic	2.421				Anderson-Darling Gamma GOF Test		
1193					5% A-D Critical Value	0.743				Data Not Gamma Distributed at 5% Significance Level		
1194					K-S Test Statistic	0.437				Kolmogrov-Smirnoff Gamma GOF Test		
1195					5% K-S Critical Value	0.239				Data Not Gamma Distributed at 5% Significance Level		
1196					Data Not Gamma Distributed at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
1197												
1198						Gamma Statistics						
1199					k hat (MLE)	2.148				k star (bias corrected MLE)		1.703
1200					Theta hat (MLE)	0.347				Theta star (bias corrected MLE)		0.438
1201					nu hat (MLE)	55.84				nu star (bias corrected)		44.29
1202					MLE Mean (bias corrected)	0.746				MLE Sd (bias corrected)		0.571
1203										Approximate Chi Square Value (0.05)		30.02
1204					Adjusted Level of Significance	0.0301				Adjusted Chi Square Value		28.36
1205												
1206						Assuming Gamma Distribution						
1207					95% Approximate Gamma UCL (use when n>=50))	1.1				95% Adjusted Gamma UCL (use when n<50)		1.164
1208												
1209						Lognormal GOF Test						
1210					Shapiro Wilk Test Statistic	0.593				Shapiro Wilk Lognormal GOF Test		
1211					5% Shapiro Wilk Critical Value	0.866				Data Not Lognormal at 5% Significance Level		
1212					Lilliefors Test Statistic	0.449				Lilliefors Lognormal GOF Test		
1213					5% Lilliefors Critical Value	0.246				Data Not Lognormal at 5% Significance Level		
1214						Data Not Lognormal at 5% Significance Level						
1215												
1216						Lognormal Statistics						
1217					Minimum of Logged Data	-3.396				Mean of logged Data		-0.544
1218					Maximum of Logged Data	0.673				SD of logged Data		0.957
1219												
1220						Assuming Lognormal Distribution						
1221					95% H-UCL	1.976				90% Chebyshev (MVUE) UCL		1.624
1222					95% Chebyshev (MVUE) UCL	1.963				97.5% Chebyshev (MVUE) UCL		2.434
1223					99% Chebyshev (MVUE) UCL	3.359						
1224												
1225						Nonparametric Distribution Free UCL Statistics						
1226						Data do not follow a Discernible Distribution (0.05)						
1227												
1228						Nonparametric Distribution Free UCLs						
1229					95% CLT UCL	0.942				95% Jackknife UCL		0.959
1230					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1231					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1232					95% BCA Bootstrap UCL	N/A						
1233					90% Chebyshev(Mean, Sd) UCL	1.105				95% Chebyshev(Mean, Sd) UCL		1.267
1234					97.5% Chebyshev(Mean, Sd) UCL	1.493				99% Chebyshev(Mean, Sd) UCL		1.936
1235												
1236						Suggested UCL to Use						
1237					95% Chebyshev (Mean, Sd) UCL	1.267						
1238												
1239						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
1240						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
1241						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
1242						For additional insight the user may want to consult a statistician.						
1243												
1244												
1245	Uranium-238											
1246												
1247						General Statistics						
1248					Total Number of Observations	13				Number of Distinct Observations		4

1249							Number of Missing Observations					0
1250					Minimum	1.68	Mean					40.49
1251					Maximum	108	Median					40.49
1252					SD	23.96	Std. Error of Mean					6.644
1253					Coefficient of Variation	0.592	Skewness					1.616
1254												
1255					**Normal GOF Test**							
1256					Shapiro Wilk Test Statistic	0.642	**Shapiro Wilk GOF Test**					
1257					5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level					
1258					Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**					
1259					5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level					
1260					**Data Not Normal at 5% Significance Level**							
1261												
1262					**Assuming Normal Distribution**							
1263			**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**					
1264					95% Student's-t UCL	52.34	95% Adjusted-CLT UCL (Chen-1995)					54.6
1265							95% Modified-t UCL (Johnson-1978)					52.83
1266												
1267					**Gamma GOF Test**							
1268					A-D Test Statistic	2.424	**Anderson-Darling Gamma GOF Test**					
1269					5% A-D Critical Value	0.743	Data Not Gamma Distributed at 5% Significance Level					
1270					K-S Test Statistic	0.439	**Kolmogrov-Smirnoff Gamma GOF Test**					
1271					5% K-S Critical Value	0.239	Data Not Gamma Distributed at 5% Significance Level					
1272					**Data Not Gamma Distributed at 5% Significance Level**							
1273												
1274					**Gamma Statistics**							
1275					k hat (MLE)	2.044	k star (bias corrected MLE)					1.623
1276					Theta hat (MLE)	19.81	Theta star (bias corrected MLE)					24.95
1277					nu hat (MLE)	53.13	nu star (bias corrected)					42.21
1278					MLE Mean (bias corrected)	40.49	MLE Sd (bias corrected)					31.78
1279							Approximate Chi Square Value (0.05)					28.31
1280					Adjusted Level of Significance	0.0301	Adjusted Chi Square Value					26.7
1281												
1282					**Assuming Gamma Distribution**							
1283					95% Approximate Gamma UCL (use when n>=50))	60.36	95% Adjusted Gamma UCL (use when n<50)					64.01
1284												
1285					**Lognormal GOF Test**							
1286					Shapiro Wilk Test Statistic	0.596	**Shapiro Wilk Lognormal GOF Test**					
1287					5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level					
1288					Lilliefors Test Statistic	0.452	**Lilliefors Lognormal GOF Test**					
1289					5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level					
1290					**Data Not Lognormal at 5% Significance Level**							
1291												
1292					**Lognormal Statistics**							
1293					Minimum of Logged Data	0.519	Mean of logged Data					3.437
1294					Maximum of Logged Data	4.682	SD of logged Data					0.988
1295												
1296					**Assuming Lognormal Distribution**							
1297					95% H-UCL	113.3	90% Chebyshev (MVUE) UCL					90.68
1298					95% Chebyshev (MVUE) UCL	110	97.5% Chebyshev (MVUE) UCL					136.7
1299					99% Chebyshev (MVUE) UCL	189.3						
1300												

	A	B	C	D	E	F	G	H	I	J	K	L
1301	Nonparametric Distribution Free UCL Statistics											
1302	Data do not follow a Discernible Distribution (0.05)											
1303												
1304	Nonparametric Distribution Free UCLs											
1305					95% CLT UCL	51.42				95% Jackknife UCL		52.34
1306					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
1307					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
1308					95% BCA Bootstrap UCL	N/A						
1309					90% Chebyshev(Mean, Sd) UCL	60.43				95% Chebyshev(Mean, Sd) UCL		69.46
1310					97.5% Chebyshev(Mean, Sd) UCL	81.99				99% Chebyshev(Mean, Sd) UCL		106.6
1311												
1312	Suggested UCL to Use											
1313					95% Chebyshev (Mean, Sd) UCL	69.46						
1314												
1315	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1316	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1317	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1318	For additional insight the user may want to consult a statistician.											
1319												
1320												
1321	Vanadium											
1322												
1323	General Statistics											
1324					Total Number of Observations	13				Number of Distinct Observations		13
1325										Number of Missing Observations		0
1326					Minimum	5				Mean		113.3
1327					Maximum	184				Median		119
1328					SD	39.41				Std. Error of Mean		10.93
1329					Coefficient of Variation	0.348				Skewness		-1.481
1330												
1331	Normal GOF Test											
1332					Shapiro Wilk Test Statistic	0.793				Shapiro Wilk GOF Test		
1333					5% Shapiro Wilk Critical Value	0.866				Data Not Normal at 5% Significance Level		
1334					Lilliefors Test Statistic	0.266				Lilliefors GOF Test		
1335					5% Lilliefors Critical Value	0.246				Data Not Normal at 5% Significance Level		
1336	Data Not Normal at 5% Significance Level											
1337												
1338	Assuming Normal Distribution											
1339	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1340					95% Student's-t UCL	132.8				95% Adjusted-CLT UCL (Chen-1995)		126.5
1341										95% Modified-t UCL (Johnson-1978)		132
1342												
1343	Gamma GOF Test											
1344					A-D Test Statistic	2.452				Anderson-Darling Gamma GOF Test		
1345					5% A-D Critical Value	0.74				Data Not Gamma Distributed at 5% Significance Level		
1346					K-S Test Statistic	0.346				Kolmogrov-Smirnoff Gamma GOF Test		
1347					5% K-S Critical Value	0.238				Data Not Gamma Distributed at 5% Significance Level		
1348	Data Not Gamma Distributed at 5% Significance Level											
1349												
1350	Gamma Statistics											
1351					k hat (MLE)	2.887				k star (bias corrected MLE)		2.272
1352					Theta hat (MLE)	39.25				Theta star (bias corrected MLE)		49.88

	A	B	C	D	E	F	G	H	I	J	K	L
1353					nu hat (MLE)	75.05					nu star (bias corrected)	59.07
1354					MLE Mean (bias corrected)	113.3					MLE Sd (bias corrected)	75.18
1355											Approximate Chi Square Value (0.05)	42.4
1356					Adjusted Level of Significance	0.0301					Adjusted Chi Square Value	40.39
1357												
1358					**Assuming Gamma Distribution**							
1359					95% Approximate Gamma UCL (use when n>=50))	157.9					95% Adjusted Gamma UCL (use when n<50)	165.7
1360												
1361					**Lognormal GOF Test**							
1362					Shapiro Wilk Test Statistic	0.482			**Shapiro Wilk Lognormal GOF Test**			
1363					5% Shapiro Wilk Critical Value	0.866			Data Not Lognormal at 5% Significance Level			
1364					Lilliefors Test Statistic	0.387			**Lilliefors Lognormal GOF Test**			
1365					5% Lilliefors Critical Value	0.246			Data Not Lognormal at 5% Significance Level			
1366					**Data Not Lognormal at 5% Significance Level**							
1367												
1368					**Lognormal Statistics**							
1369					Minimum of Logged Data	1.609					Mean of logged Data	4.547
1370					Maximum of Logged Data	5.215					SD of logged Data	0.899
1371												
1372					**Assuming Lognormal Distribution**							
1373					95% H-UCL	283					90% Chebyshev (MVUE) UCL	244.1
1374					95% Chebyshev (MVUE) UCL	293.1					97.5% Chebyshev (MVUE) UCL	361.3
1375					99% Chebyshev (MVUE) UCL	495.1						
1376												
1377					**Nonparametric Distribution Free UCL Statistics**							
1378					**Data do not follow a Discernible Distribution (0.05)**							
1379												
1380					**Nonparametric Distribution Free UCLs**							
1381					95% CLT UCL	131.3					95% Jackknife UCL	132.8
1382					95% Standard Bootstrap UCL	130.9					95% Bootstrap-t UCL	129.1
1383					95% Hall's Bootstrap UCL	128.9					95% Percentile Bootstrap UCL	129.8
1384					95% BCA Bootstrap UCL	126.7						
1385					90% Chebyshev(Mean, Sd) UCL	146.1					95% Chebyshev(Mean, Sd) UCL	161
1386					97.5% Chebyshev(Mean, Sd) UCL	181.6					99% Chebyshev(Mean, Sd) UCL	222.1
1387												
1388					**Suggested UCL to Use**							
1389					95% Chebyshev (Mean, Sd) UCL	161						
1390												
1391	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1392	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1393	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1394	For additional insight the user may want to consult a statistician.											
1395												
1396	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1397	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1398												