	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			3/1/2015 12:54:55 PM								
5	From File			EPC_026SurfR1_EU04.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					16	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					5200	Mean					10400
17	Maximum					13100	Median					10400
18	SD					1645	Std. Error of Mean					411.2
19	Coefficient of Variation					0.158	Skewness					-1.803
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.572	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.887	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.438	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.222	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					11121	95% Adjusted-CLT UCL (Chen-1995)					10878
31							95% Modified-t UCL (Johnson-1978)					11090
32												
33	Gamma GOF Test											
34	A-D Test Statistic					3.583	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.736	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.461	Kolmogrov-Smirnoff Gamma GOF Test					
37	5% K-S Critical Value					0.215	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)					32.57	k star (bias corrected MLE)					26.5
42	Theta hat (MLE)					319.4	Theta star (bias corrected MLE)					392.4
43	nu hat (MLE)					1042	nu star (bias corrected)					848
44	MLE Mean (bias corrected)					10400	MLE Sd (bias corrected)					2020
45							Approximate Chi Square Value (0.05)					781.4
46	Adjusted Level of Significance					0.0335	Adjusted Chi Square Value					774.2
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					11286	95% Adjusted Gamma UCL (use when n<50)					11392
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.502	Shapiro Wilk Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
53				5% Shapiro Wilk Critical Value		0.887	Data Not Lognormal at 5% Significance Level					
54				Lilliefors Test Statistic		0.469	**Lilliefors Lognormal GOF Test**					
55				5% Lilliefors Critical Value		0.222	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59				Minimum of Logged Data		8.556	Mean of logged Data					9.234
60				Maximum of Logged Data		9.48	SD of logged Data					0.196
61												
62	**Assuming Lognormal Distribution**											
63				95% H-UCL		11434	90% Chebyshev (MVUE) UCL					11967
64				95% Chebyshev (MVUE) UCL		12665	97.5% Chebyshev (MVUE) UCL					13634
65				99% Chebyshev (MVUE) UCL		15537						
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		11076	95% Jackknife UCL					11121
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		11634	95% Chebyshev(Mean, Sd) UCL					12192
76				97.5% Chebyshev(Mean, Sd) UCL		12968	99% Chebyshev(Mean, Sd) UCL					14491
77												
78	**Suggested UCL to Use**											
79				95% Student's-t UCL		11121	or 95% Modified-t UCL					11090
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	**Arsenic**											
91												
92	**General Statistics**											
93				Total Number of Observations		16	Number of Distinct Observations					4
94							Number of Missing Observations					0
95				Minimum		6.9	Mean					19.19
96				Maximum		160	Median					10
97				SD		37.56	Std. Error of Mean					9.39
98				Coefficient of Variation		1.957	Skewness					3.997
99												
100	**Normal GOF Test**											
101				Shapiro Wilk Test Statistic		0.283	**Shapiro Wilk GOF Test**					
102				5% Shapiro Wilk Critical Value		0.887	Data Not Normal at 5% Significance Level					
103				Lilliefors Test Statistic		0.533	**Lilliefors GOF Test**					
104				5% Lilliefors Critical Value		0.222	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
105	Data Not 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	35.65			95% Adjusted-CLT UCL (Chen-1995)			44.66
110									95% Modified-t UCL (Johnson-1978)			37.21
111												
112	Gamma GOF Test											
113					A-D Test Statistic	5.454	Anderson-Darling Gamma GOF Test					
114					5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level					
115					K-S Test Statistic	0.551	Kolmogrov-Smirnoff Gamma GOF Test					
116					5% K-S Critical Value	0.221	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)	1.136			k star (bias corrected MLE)			0.964
121					Theta hat (MLE)	16.89			Theta star (bias corrected MLE)			19.89
122					nu hat (MLE)	36.34			nu star (bias corrected)			30.86
123					MLE Mean (bias corrected)	19.19			MLE Sd (bias corrected)			19.54
124									Approximate Chi Square Value (0.05)			19.17
125					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			18.13
126												
127	Assuming Gamma Distribution											
128				95% Approximate Gamma UCL (use when n>=50))		30.89			95% Adjusted Gamma UCL (use when n<50)			32.67
129												
130	Lognormal GOF Test											
131					Shapiro Wilk Test Statistic	0.34	Shapiro Wilk Lognormal GOF Test					
132					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
133					Lilliefors Test Statistic	0.517	Lilliefors Lognormal GOF Test					
134					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
135	Data Not Lognormal at 5% Significance Level											
136												
137	Lognormal Statistics											
138					Minimum of Logged Data	1.932			Mean of logged Data			2.453
139					Maximum of Logged Data	5.075			SD of logged Data			0.705
140												
141	Assuming Lognormal Distribution											
142					95% H-UCL	22.61			90% Chebyshev (MVUE) UCL			22.82
143					95% Chebyshev (MVUE) UCL	26.53			97.5% Chebyshev (MVUE) UCL			31.68
144					99% Chebyshev (MVUE) UCL	41.79						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data do not follow a Discernible Distribution (0.05)											
148												
149	Nonparametric Distribution Free UCLs											
150					95% CLT UCL	34.63			95% Jackknife UCL			35.65
151					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
152					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
153					95% BCA Bootstrap UCL	N/A						
154					90% Chebyshev(Mean, Sd) UCL	47.36			95% Chebyshev(Mean, Sd) UCL			60.12
155					97.5% Chebyshev(Mean, Sd) UCL	77.82			99% Chebyshev(Mean, Sd) UCL			112.6
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157						Suggested UCL to Use						
158					95% Chebyshev (Mean, Sd) UCL	60.12						
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	Cesium-137											
167												
168						General Statistics						
169					Total Number of Observations	16			Number of Distinct Observations			7
170									Number of Missing Observations			0
171					Minimum	0.136			Mean			0.626
172					Maximum	1.69			Median			0.626
173					SD	0.364			Std. Error of Mean			0.091
174					Coefficient of Variation	0.582			Skewness			1.661
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.758			Shapiro Wilk GOF Test			
178					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
179					Lilliefors Test Statistic	0.375			Lilliefors GOF Test			
180					5% Lilliefors Critical Value	0.222			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	0.786			95% Adjusted-CLT UCL (Chen-1995)			0.816
186									95% Modified-t UCL (Johnson-1978)			0.792
187												
188						Gamma GOF Test						
189					A-D Test Statistic	1.499			Anderson-Darling Gamma GOF Test			
190					5% A-D Critical Value	0.744			Data Not Gamma Distributed at 5% Significance Level			
191					K-S Test Statistic	0.323			Kolmogrov-Smirnoff Gamma GOF Test			
192					5% K-S Critical Value	0.216			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)	3.318			k star (bias corrected MLE)			2.738
197					Theta hat (MLE)	0.189			Theta star (bias corrected MLE)			0.229
198					nu hat (MLE)	106.2			nu star (bias corrected)			87.6
199					MLE Mean (bias corrected)	0.626			MLE Sd (bias corrected)			0.378
200									Approximate Chi Square Value (0.05)			67.03
201					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			64.98
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	0.818			95% Adjusted Gamma UCL (use when n<50)			0.844
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.834			Shapiro Wilk Lognormal GOF Test			
208					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
209					Lilliefors Test Statistic	0.352	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	-1.995				Mean of logged Data		-0.626
215					Maximum of Logged Data	0.525				SD of logged Data		0.612
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	0.909				90% Chebyshev (MVUE) UCL		0.941
219					95% Chebyshev (MVUE) UCL	1.08				97.5% Chebyshev (MVUE) UCL		1.272
220					99% Chebyshev (MVUE) UCL	1.649						
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	0.776				95% Jackknife UCL		0.786
227					95% Standard Bootstrap UCL	0.767				95% Bootstrap-t UCL		0.858
228					95% Hall's Bootstrap UCL	1.751				95% Percentile Bootstrap UCL		0.783
229					95% BCA Bootstrap UCL	0.819						
230					90% Chebyshev(Mean, Sd) UCL	0.899				95% Chebyshev(Mean, Sd) UCL		1.023
231					97.5% Chebyshev(Mean, Sd) UCL	1.195				99% Chebyshev(Mean, Sd) UCL		1.532
232												
233	**Suggested UCL to Use**											
234					95% Chebyshev (Mean, Sd) UCL	1.023						
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												
242	**Chromium**											
243												
244	**General Statistics**											
245					Total Number of Observations	16				Number of Distinct Observations		9
246										Number of Missing Observations		0
247					Minimum	12				Mean		48.95
248					Maximum	231				Median		16
249					SD	59.93				Std. Error of Mean		14.98
250					Coefficient of Variation	1.224				Skewness		2.131
251												
252	**Normal GOF Test**											
253					Shapiro Wilk Test Statistic	0.684	**Shapiro Wilk GOF Test**					
254					5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level					
255					Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**					
256					5% Lilliefors Critical Value	0.222	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)**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					95% Student's-t UCL	75.22				95% Adjusted-CLT UCL (Chen-1995)		82.12
262										95% Modified-t UCL (Johnson-1978)		76.55
263												
264					Gamma GOF Test							
265					A-D Test Statistic	1.559			Anderson-Darling Gamma GOF Test			
266					5% A-D Critical Value	0.763			Data Not Gamma Distributed at 5% Significance Level			
267					K-S Test Statistic	0.289			Kolmogrov-Smirnoff Gamma GOF Test			
268					5% K-S Critical Value	0.221			Data Not Gamma Distributed at 5% Significance Level			
269					Data Not Gamma Distributed at 5% Significance Level							
270												
271					Gamma Statistics							
272					k hat (MLE)	1.031			k star (bias corrected MLE)			0.88
273					Theta hat (MLE)	47.47			Theta star (bias corrected MLE)			55.65
274					nu hat (MLE)	33			nu star (bias corrected)			28.15
275					MLE Mean (bias corrected)	48.95			MLE Sd (bias corrected)			52.19
276									Approximate Chi Square Value (0.05)			17.04
277					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			16.06
278												
279					Assuming Gamma Distribution							
280					95% Approximate Gamma UCL (use when n>=50))	80.85			95% Adjusted Gamma UCL (use when n<50)			85.77
281												
282					Lognormal GOF Test							
283					Shapiro Wilk Test Statistic	0.793			Shapiro Wilk Lognormal GOF Test			
284					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
285					Lilliefors Test Statistic	0.293			Lilliefors Lognormal GOF Test			
286					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
287					Data Not Lognormal at 5% Significance Level							
288												
289					Lognormal Statistics							
290					Minimum of Logged Data	2.485			Mean of logged Data			3.333
291					Maximum of Logged Data	5.442			SD of logged Data			1.037
292												
293					Assuming Lognormal Distribution							
294					95% H-UCL	100.5			90% Chebyshev (MVUE) UCL			85.05
295					95% Chebyshev (MVUE) UCL	102.9			97.5% Chebyshev (MVUE) UCL			127.6
296					99% Chebyshev (MVUE) UCL	176.1						
297												
298					Nonparametric Distribution Free UCL Statistics							
299					Data do not follow a Discernible Distribution (0.05)							
300												
301					Nonparametric Distribution Free UCLs							
302					95% CLT UCL	73.59			95% Jackknife UCL			75.22
303					95% Standard Bootstrap UCL	73.38			95% Bootstrap-t UCL			95
304					95% Hall's Bootstrap UCL	97.79			95% Percentile Bootstrap UCL			75.21
305					95% BCA Bootstrap UCL	84.13						
306					90% Chebyshev(Mean, Sd) UCL	93.9			95% Chebyshev(Mean, Sd) UCL			114.3
307					97.5% Chebyshev(Mean, Sd) UCL	142.5			99% Chebyshev(Mean, Sd) UCL			198
308												
309					Suggested UCL to Use							
310					95% Chebyshev (Mean, Sd) UCL	114.3						
311												
312	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

Iron

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	22125	Mean	26687
Maximum	33738	Median	26121
SD	3296	Std. Error of Mean	823.9
Coefficient of Variation	0.123	Skewness	0.799

Normal GOF Test

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.222	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	28131	95% Adjusted-CLT UCL (Chen-1995)	28218
		95% Modified-t UCL (Johnson-1978)	28158

Gamma GOF Test

A-D Test Statistic	0.375	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.15	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	73.02	k star (bias corrected MLE)	59.37
Theta hat (MLE)	365.4	Theta star (bias corrected MLE)	449.5
nu hat (MLE)	2337	nu star (bias corrected)	1900
MLE Mean (bias corrected)	26687	MLE Sd (bias corrected)	3463
		Approximate Chi Square Value (0.05)	1800
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1789

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	28173	95% Adjusted Gamma UCL (use when n<50)	28348

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.222	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

	A	B	C	D	E	F	G	H	I	J	K	L
365						Lognormal Statistics						
366					Minimum of Logged Data	10					Mean of logged Data	10.19
367					Maximum of Logged Data	10.43					SD of logged Data	0.12
368												
369						Assuming Lognormal Distribution						
370					95% H-UCL	28184					90% Chebyshev (MVUE) UCL	29087
371					95% Chebyshev (MVUE) UCL	30175					97.5% Chebyshev (MVUE) UCL	31686
372					99% Chebyshev (MVUE) UCL	34655						
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	28042					95% Jackknife UCL	28131
379					95% Standard Bootstrap UCL	27995					95% Bootstrap-t UCL	28612
380					95% Hall's Bootstrap UCL	28277					95% Percentile Bootstrap UCL	28036
381					95% BCA Bootstrap UCL	28223						
382					90% Chebyshev(Mean, Sd) UCL	29158					95% Chebyshev(Mean, Sd) UCL	30278
383					97.5% Chebyshev(Mean, Sd) UCL	31832					99% Chebyshev(Mean, Sd) UCL	34884
384												
385						Suggested UCL to Use						
386					95% Student's-t UCL	28131						
387												
388					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
389					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
390					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	Mercury											
395												
396						General Statistics						
397					Total Number of Observations	16					Number of Distinct Observations	6
398											Number of Missing Observations	0
399					Minimum	0.0493					Mean	28.35
400					Maximum	40					Median	40
401					SD	18.07					Std. Error of Mean	4.517
402					Coefficient of Variation	0.637					Skewness	-0.969
403												
404						Normal GOF Test						
405					Shapiro Wilk Test Statistic	0.616			Shapiro Wilk GOF Test			
406					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
407					Lilliefors Test Statistic	0.428			Lilliefors GOF Test			
408					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
409						Data Not 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	36.27					95% Adjusted-CLT UCL (Chen-1995)	34.61
414											95% Modified-t UCL (Johnson-1978)	36.08
415												
416						Gamma GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
417					A-D Test Statistic	3.258	**Anderson-Darling Gamma GOF Test**					
418					5% A-D Critical Value	0.788	Data Not Gamma Distributed at 5% Significance Level					
419					K-S Test Statistic	0.448	**Kolmogrov-Smirnoff Gamma GOF Test**					
420					5% K-S Critical Value	0.226	Data Not Gamma Distributed at 5% Significance Level					
421	**Data Not Gamma Distributed at 5% Significance Level**											
422												
423	**Gamma Statistics**											
424					k hat (MLE)	0.591				k star (bias corrected MLE)		0.522
425					Theta hat (MLE)	47.98				Theta star (bias corrected MLE)		54.34
426					nu hat (MLE)	18.91				nu star (bias corrected)		16.69
427					MLE Mean (bias corrected)	28.35				MLE Sd (bias corrected)		39.25
428										Approximate Chi Square Value (0.05)		8.454
429					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		7.794
430												
431	**Assuming Gamma Distribution**											
432					95% Approximate Gamma UCL (use when n>=50))	55.98				95% Adjusted Gamma UCL (use when n<50)		60.72
433												
434	**Lognormal GOF Test**											
435					Shapiro Wilk Test Statistic	0.635	**Shapiro Wilk Lognormal GOF Test**					
436					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
437					Lilliefors Test Statistic	0.408	**Lilliefors Lognormal GOF Test**					
438					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
439	**Data Not Lognormal at 5% Significance Level**											
440												
441	**Lognormal Statistics**											
442					Minimum of Logged Data	-3.01				Mean of logged Data		2.296
443					Maximum of Logged Data	3.689				SD of logged Data		2.382
444												
445	**Assuming Lognormal Distribution**											
446					95% H-UCL	4172				90% Chebyshev (MVUE) UCL		318.9
447					95% Chebyshev (MVUE) UCL	416.1				97.5% Chebyshev (MVUE) UCL		551
448					99% Chebyshev (MVUE) UCL	816.1						
449												
450	**Nonparametric Distribution Free UCL Statistics**											
451	**Data do not follow a Discernible Distribution (0.05)**											
452												
453	**Nonparametric Distribution Free UCLs**											
454					95% CLT UCL	35.78				95% Jackknife UCL		36.27
455					95% Standard Bootstrap UCL	35.54				95% Bootstrap-t UCL		35.11
456					95% Hall's Bootstrap UCL	34.3				95% Percentile Bootstrap UCL		35.05
457					95% BCA Bootstrap UCL	35.02						
458					90% Chebyshev(Mean, Sd) UCL	41.9				95% Chebyshev(Mean, Sd) UCL		48.04
459					97.5% Chebyshev(Mean, Sd) UCL	56.56				99% Chebyshev(Mean, Sd) UCL		73.29
460												
461	**Suggested UCL to Use**											
462					99% Chebyshev (Mean, Sd) UCL	73.29						
463												
464	**Recommended UCL exceeds the maximum observation**											
465												
466	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
467	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
468	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
469	For additional insight the user may want to consult a statistician.											
470												
471	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
472	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
473												
474												
475	**Molybdenum**											
476												
477	**General Statistics**											
478					Total Number of Observations	16			Number of Distinct Observations		4	
479									Number of Missing Observations		0	
480					Minimum	0.64			Mean		10.79	
481					Maximum	78			Median		3	
482					SD	22.16			Std. Error of Mean		5.539	
483					Coefficient of Variation	2.053			Skewness		2.682	
484												
485	**Normal GOF Test**											
486					Shapiro Wilk Test Statistic	0.429			**Shapiro Wilk GOF Test**			
487					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
488					Lilliefors Test Statistic	0.512			**Lilliefors GOF Test**			
489					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
490	**Data Not Normal at 5% Significance Level**											
491												
492	**Assuming Normal Distribution**											
493	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
494					95% Student's-t UCL	20.5			95% Adjusted-CLT UCL (Chen-1995)		23.87	
495									95% Modified-t UCL (Johnson-1978)		21.12	
496												
497	**Gamma GOF Test**											
498					A-D Test Statistic	4.285			**Anderson-Darling Gamma GOF Test**			
499					5% A-D Critical Value	0.786			Data Not Gamma Distributed at 5% Significance Level			
500					K-S Test Statistic	0.523			**Kolmogrov-Smirnoff Gamma GOF Test**			
501					5% K-S Critical Value	0.225			Data Not Gamma Distributed at 5% Significance Level			
502	**Data Not Gamma Distributed at 5% Significance Level**											
503												
504	**Gamma Statistics**											
505					k hat (MLE)	0.62			k star (bias corrected MLE)		0.546	
506					Theta hat (MLE)	17.39			Theta star (bias corrected MLE)		19.77	
507					nu hat (MLE)	19.85			nu star (bias corrected)		17.46	
508					MLE Mean (bias corrected)	10.79			MLE Sd (bias corrected)		14.61	
509									Approximate Chi Square Value (0.05)		9.004	
510					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value		8.319	
511												
512	**Assuming Gamma Distribution**											
513					95% Approximate Gamma UCL (use when n>=50))	20.93			95% Adjusted Gamma UCL (use when n<50)		22.65	
514												
515	**Lognormal GOF Test**											
516					Shapiro Wilk Test Statistic	0.569			**Shapiro Wilk Lognormal GOF Test**			
517					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
518					Lilliefors Test Statistic	0.473			**Lilliefors Lognormal GOF Test**			
519					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
520	**Data Not Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
521												
522						Lognormal Statistics						
523					Minimum of Logged Data	-0.446				Mean of logged Data		1.387
524					Maximum of Logged Data	4.357				SD of logged Data		1.158
525												
526						Assuming Lognormal Distribution						
527					95% H-UCL	18.96				90% Chebyshev (MVUE) UCL		14.5
528					95% Chebyshev (MVUE) UCL	17.74				97.5% Chebyshev (MVUE) UCL		22.24
529					99% Chebyshev (MVUE) UCL	31.07						
530												
531						Nonparametric Distribution Free UCL Statistics						
532						Data do not follow a Discernible Distribution (0.05)						
533												
534						Nonparametric Distribution Free UCLs						
535					95% CLT UCL	19.9				95% Jackknife UCL		20.5
536					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
537					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
538					95% BCA Bootstrap UCL	N/A						
539					90% Chebyshev(Mean, Sd) UCL	27.41				95% Chebyshev(Mean, Sd) UCL		34.93
540					97.5% Chebyshev(Mean, Sd) UCL	45.38				99% Chebyshev(Mean, Sd) UCL		65.9
541												
542						Suggested UCL to Use						
543					95% Chebyshev (Mean, Sd) UCL	34.93						
544												
545					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
546					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
547					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
548					For additional insight the user may want to consult a statistician.							
549												
550												
551	Neptunium-237											
552												
553						General Statistics						
554					Total Number of Observations	16				Number of Distinct Observations		7
555										Number of Missing Observations		0
556					Minimum	0.052				Mean		1.712
557					Maximum	4.1				Median		1.712
558					SD	0.993				Std. Error of Mean		0.248
559					Coefficient of Variation	0.58				Skewness		0.622
560												
561						Normal GOF Test						
562					Shapiro Wilk Test Statistic	0.806				Shapiro Wilk GOF Test		
563					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
564					Lilliefors Test Statistic	0.313				Lilliefors GOF Test		
565					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
566						Data Not Normal at 5% Significance Level						
567												
568						Assuming Normal Distribution						
569					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
570					95% Student's-t UCL	2.148				95% Adjusted-CLT UCL (Chen-1995)		2.162
571										95% Modified-t UCL (Johnson-1978)		2.154
572												

	A	B	C	D	E	F	G	H	I	J	K	L
573						Gamma GOF Test						
574					A-D Test Statistic	2.163	Anderson-Darling Gamma GOF Test					
575					5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level					
576					K-S Test Statistic	0.415	Kolmogrov-Smirnoff Gamma GOF Test					
577					5% K-S Critical Value	0.219	Data Not Gamma Distributed at 5% Significance Level					
578						Data Not Gamma Distributed at 5% Significance Level						
579												
580						Gamma Statistics						
581					k hat (MLE)	1.675				k star (bias corrected MLE)		1.403
582					Theta hat (MLE)	1.022				Theta star (bias corrected MLE)		1.221
583					nu hat (MLE)	53.61				nu star (bias corrected)		44.89
584					MLE Mean (bias corrected)	1.712				MLE Sd (bias corrected)		1.446
585										Approximate Chi Square Value (0.05)		30.52
586					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		29.18
587												
588						Assuming Gamma Distribution						
589					95% Approximate Gamma UCL (use when n>=50))	2.518				95% Adjusted Gamma UCL (use when n<50)		2.635
590												
591						Lognormal GOF Test						
592					Shapiro Wilk Test Statistic	0.668	Shapiro Wilk Lognormal GOF Test					
593					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
594					Lilliefors Test Statistic	0.428	Lilliefors Lognormal GOF Test					
595					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
596						Data Not Lognormal at 5% Significance Level						
597												
598						Lognormal Statistics						
599					Minimum of Logged Data	-2.957				Mean of logged Data		0.211
600					Maximum of Logged Data	1.411				SD of logged Data		1.114
601												
602						Assuming Lognormal Distribution						
603					95% H-UCL	5.267				90% Chebyshev (MVUE) UCL		4.189
604					95% Chebyshev (MVUE) UCL	5.104				97.5% Chebyshev (MVUE) UCL		6.374
605					99% Chebyshev (MVUE) UCL	8.868						
606												
607						Nonparametric Distribution Free UCL Statistics						
608						Data do not follow a Discernible Distribution (0.05)						
609												
610						Nonparametric Distribution Free UCLs						
611					95% CLT UCL	2.121				95% Jackknife UCL		2.148
612					95% Standard Bootstrap UCL	2.102				95% Bootstrap-t UCL		2.21
613					95% Hall's Bootstrap UCL	2.455				95% Percentile Bootstrap UCL		2.135
614					95% BCA Bootstrap UCL	2.128						
615					90% Chebyshev(Mean, Sd) UCL	2.457				95% Chebyshev(Mean, Sd) UCL		2.795
616					97.5% Chebyshev(Mean, Sd) UCL	3.263				99% Chebyshev(Mean, Sd) UCL		4.183
617												
618						Suggested UCL to Use						
619					95% Chebyshev (Mean, Sd) UCL	2.795						
620												
621						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
622						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
623						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
624						For additional insight the user may want to consult a statistician.						

	A	B	C	D	E	F	G	H	I	J	K	L
625												
626												
627	**Nickel**											
628												
629						**General Statistics**						
630					Total Number of Observations	16			Number of Distinct Observations			15
631									Number of Missing Observations			0
632					Minimum	17			Mean			55.75
633					Maximum	203			Median			36
634					SD	47.89			Std. Error of Mean			11.97
635					Coefficient of Variation	0.859			Skewness			2.221
636												
637						**Normal GOF Test**						
638					Shapiro Wilk Test Statistic	0.738			**Shapiro Wilk GOF Test**			
639					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
640					Lilliefors Test Statistic	0.23			**Lilliefors GOF Test**			
641					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
642						**Data Not Normal at 5% Significance Level**						
643												
644						**Assuming Normal Distribution**						
645					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
646					95% Student's-t UCL	76.74			95% Adjusted-CLT UCL (Chen-1995)			82.54
647									95% Modified-t UCL (Johnson-1978)			77.84
648												
649						**Gamma GOF Test**						
650					A-D Test Statistic	0.71			**Anderson-Darling Gamma GOF Test**			
651					5% A-D Critical Value	0.749			Detected data appear Gamma Distributed at 5% Significance Level			
652					K-S Test Statistic	0.197			**Kolmogrov-Smirnoff Gamma GOF Test**			
653					5% K-S Critical Value	0.218			Detected data appear Gamma Distributed at 5% Significance Level			
654						**Detected data appear Gamma Distributed at 5% Significance Level**						
655												
656						**Gamma Statistics**						
657					k hat (MLE)	2.185			k star (bias corrected MLE)			1.817
658					Theta hat (MLE)	25.52			Theta star (bias corrected MLE)			30.69
659					nu hat (MLE)	69.91			nu star (bias corrected)			58.13
660					MLE Mean (bias corrected)	55.75			MLE Sd (bias corrected)			41.36
661									Approximate Chi Square Value (0.05)			41.6
662					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			40.01
663												
664						**Assuming Gamma Distribution**						
665					95% Approximate Gamma UCL (use when n>=50)	77.9			95% Adjusted Gamma UCL (use when n<50)			80.99
666												
667						**Lognormal GOF Test**						
668					Shapiro Wilk Test Statistic	0.937			**Shapiro Wilk Lognormal GOF Test**			
669					5% Shapiro Wilk Critical Value	0.887			Data appear Lognormal at 5% Significance Level			
670					Lilliefors Test Statistic	0.176			**Lilliefors Lognormal GOF Test**			
671					5% Lilliefors Critical Value	0.222			Data appear Lognormal at 5% Significance Level			
672						**Data appear Lognormal at 5% Significance Level**						
673												
674						**Lognormal Statistics**						
675					Minimum of Logged Data	2.833			Mean of logged Data			3.775
676					Maximum of Logged Data	5.313			SD of logged Data			0.679

	A	B	C	D	E	F	G	H	I	J	K	L
677												
678					Assuming Lognormal Distribution							
679					95% H-UCL	81.49			90% Chebyshev (MVUE) UCL			82.93
680				95% Chebyshev (MVUE) UCL		96.06			97.5% Chebyshev (MVUE) UCL			114.3
681				99% Chebyshev (MVUE) UCL		150						
682												
683					Nonparametric Distribution Free UCL Statistics							
684					Data appear to follow a Discernible Distribution at 5% Significance Level							
685												
686					Nonparametric Distribution Free UCLs							
687					95% CLT UCL	75.44			95% Jackknife UCL			76.74
688				95% Standard Bootstrap UCL		74.83			95% Bootstrap-t UCL			92.91
689				95% Hall's Bootstrap UCL		152.4			95% Percentile Bootstrap UCL			77.06
690				95% BCA Bootstrap UCL		81						
691				90% Chebyshev(Mean, Sd) UCL		91.66			95% Chebyshev(Mean, Sd) UCL			107.9
692				97.5% Chebyshev(Mean, Sd) UCL		130.5			99% Chebyshev(Mean, Sd) UCL			174.9
693												
694					Suggested UCL to Use							
695				95% Adjusted Gamma UCL		80.99						
696												
697					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
698					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
699					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
700					For additional insight the user may want to consult a statistician.							
701												
702												
703	PAH, Total											
704												
705					General Statistics							
706				Total Number of Observations		16			Number of Distinct Observations			4
707									Number of Missing Observations			0
708				Minimum		0.02			Mean			3.373
709				Maximum		9.62			Median			3.373
710				SD		1.977			Std. Error of Mean			0.494
711				Coefficient of Variation		0.586			Skewness			1.792
712												
713					Normal GOF Test							
714				Shapiro Wilk Test Statistic		0.575			Shapiro Wilk GOF Test			
715				5% Shapiro Wilk Critical Value		0.887			Data Not Normal at 5% Significance Level			
716				Lilliefors Test Statistic		0.438			Lilliefors GOF Test			
717				5% Lilliefors Critical Value		0.222			Data Not Normal at 5% Significance Level			
718					Data Not Normal at 5% Significance Level							
719												
720					Assuming Normal Distribution							
721				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
722				95% Student's-t UCL		4.24			95% Adjusted-CLT UCL (Chen-1995)			4.423
723									95% Modified-t UCL (Johnson-1978)			4.277
724												
725					Gamma GOF Test							
726				A-D Test Statistic		3.663			Anderson-Darling Gamma GOF Test			
727				5% A-D Critical Value		0.755			Data Not Gamma Distributed at 5% Significance Level			
728				K-S Test Statistic		0.484			Kolmogrov-Smirnoff Gamma GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
729					5% K-S Critical Value	0.219	Data Not Gamma Distributed at 5% Significance Level					
730	**Data Not Gamma Distributed at 5% Significance Level**											
731												
732	**Gamma Statistics**											
733					k hat (MLE)	1.471				k star (bias corrected MLE)		1.237
734					Theta hat (MLE)	2.293				Theta star (bias corrected MLE)		2.727
735					nu hat (MLE)	47.08				nu star (bias corrected)		39.58
736					MLE Mean (bias corrected)	3.373				MLE Sd (bias corrected)		3.033
737										Approximate Chi Square Value (0.05)		26.17
738					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		24.93
739												
740	**Assuming Gamma Distribution**											
741					95% Approximate Gamma UCL (use when n>=50))	5.102				95% Adjusted Gamma UCL (use when n<50)		5.356
742												
743	**Lognormal GOF Test**											
744					Shapiro Wilk Test Statistic	0.49	**Shapiro Wilk Lognormal GOF Test**					
745					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
746					Lilliefors Test Statistic	0.482	**Lilliefors Lognormal GOF Test**					
747					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
748	**Data Not Lognormal at 5% Significance Level**											
749												
750	**Lognormal Statistics**											
751					Minimum of Logged Data	-3.912				Mean of logged Data		0.839
752					Maximum of Logged Data	2.264				SD of logged Data		1.389
753												
754	**Assuming Lognormal Distribution**											
755					95% H-UCL	20.15				90% Chebyshev (MVUE) UCL		12
756					95% Chebyshev (MVUE) UCL	14.96				97.5% Chebyshev (MVUE) UCL		19.06
757					99% Chebyshev (MVUE) UCL	27.12						
758												
759	**Nonparametric Distribution Free UCL Statistics**											
760	**Data do not follow a Discernible Distribution (0.05)**											
761												
762	**Nonparametric Distribution Free UCLs**											
763					95% CLT UCL	4.186				95% Jackknife UCL		4.24
764					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
765					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
766					95% BCA Bootstrap UCL	N/A						
767					90% Chebyshev(Mean, Sd) UCL	4.856				95% Chebyshev(Mean, Sd) UCL		5.528
768					97.5% Chebyshev(Mean, Sd) UCL	6.46				99% Chebyshev(Mean, Sd) UCL		8.292
769												
770	**Suggested UCL to Use**											
771					95% Chebyshev (Mean, Sd) UCL	5.528						
772												
773	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
774	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
775	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
776	For additional insight the user may want to consult a statistician.											
777												
778												
779	**PCB, Total**											
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781	General Statistics											
782	Total Number of Observations					16	Number of Distinct Observations					8
783							Number of Missing Observations					0
784	Minimum					0.019	Mean					2.117
785	Maximum					5	Median					0.445
786	SD					2.345	Std. Error of Mean					0.586
787	Coefficient of Variation					1.107	Skewness					0.48
788												
789	Normal GOF Test											
790	Shapiro Wilk Test Statistic					0.695	Shapiro Wilk GOF Test					
791	5% Shapiro Wilk Critical Value					0.887	Data Not Normal at 5% Significance Level					
792	Lilliefors Test Statistic					0.319	Lilliefors GOF Test					
793	5% Lilliefors Critical Value					0.222	Data Not Normal at 5% Significance Level					
794	Data Not Normal at 5% Significance Level											
795												
796	Assuming Normal Distribution											
797	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
798	95% Student's-t UCL					3.145	95% Adjusted-CLT UCL (Chen-1995)					3.157
799							95% Modified-t UCL (Johnson-1978)					3.157
800												
801	Gamma GOF Test											
802	A-D Test Statistic					1.29	Anderson-Darling Gamma GOF Test					
803	5% A-D Critical Value					0.792	Data Not Gamma Distributed at 5% Significance Level					
804	K-S Test Statistic					0.254	Kolmogrov-Smirnoff Gamma GOF Test					
805	5% K-S Critical Value					0.226	Data Not Gamma Distributed at 5% Significance Level					
806	Data Not Gamma Distributed at 5% Significance Level											
807												
808	Gamma Statistics											
809	k hat (MLE)					0.553	k star (bias corrected MLE)					0.491
810	Theta hat (MLE)					3.826	Theta star (bias corrected MLE)					4.31
811	nu hat (MLE)					17.71	nu star (bias corrected)					15.72
812	MLE Mean (bias corrected)					2.117	MLE Sd (bias corrected)					3.021
813							Approximate Chi Square Value (0.05)					7.766
814	Adjusted Level of Significance					0.0335	Adjusted Chi Square Value					7.137
815												
816	Assuming Gamma Distribution											
817	95% Approximate Gamma UCL (use when n>=50))					4.286	95% Adjusted Gamma UCL (use when n<50)					4.664
818												
819	Lognormal GOF Test											
820	Shapiro Wilk Test Statistic					0.865	Shapiro Wilk Lognormal GOF Test					
821	5% Shapiro Wilk Critical Value					0.887	Data Not Lognormal at 5% Significance Level					
822	Lilliefors Test Statistic					0.235	Lilliefors Lognormal GOF Test					
823	5% Lilliefors Critical Value					0.222	Data Not Lognormal at 5% Significance Level					
824	Data Not Lognormal at 5% Significance Level											
825												
826	Lognormal Statistics											
827	Minimum of Logged Data					-3.963	Mean of logged Data					-0.38
828	Maximum of Logged Data					1.609	SD of logged Data					1.844
829												
830	Assuming Lognormal Distribution											
831	95% H-UCL					27.35	90% Chebyshev (MVUE) UCL					7.791
832	95% Chebyshev (MVUE) UCL					9.971	97.5% Chebyshev (MVUE) UCL					13

833					99% Chebyshev (MVUE) UCL	18.94						
834												
835					Nonparametric Distribution Free UCL Statistics							
836					Data do not follow a Discernible Distribution (0.05)							
837												
838					Nonparametric Distribution Free UCLs							
839					95% CLT UCL	3.082				95% Jackknife UCL		3.145
840					95% Standard Bootstrap UCL	3.044				95% Bootstrap-t UCL		3.233
841					95% Hall's Bootstrap UCL	2.996				95% Percentile Bootstrap UCL		3.025
842					95% BCA Bootstrap UCL	3.118						
843					90% Chebyshev(Mean, Sd) UCL	3.876				95% Chebyshev(Mean, Sd) UCL		4.673
844					97.5% Chebyshev(Mean, Sd) UCL	5.779				99% Chebyshev(Mean, Sd) UCL		7.951
845												
846					Suggested UCL to Use							
847					99% Chebyshev (Mean, Sd) UCL	7.951						
848												
849					Recommended UCL exceeds the maximum observation							
850												
851					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
852					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
853					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
854					For additional insight the user may want to consult a statistician.							
855												
856												
857	Plutonium-239/240											
858												
859					General Statistics							
860					Total Number of Observations	16				Number of Distinct Observations		7
861										Number of Missing Observations		0
862					Minimum	0.0205				Mean		4.565
863					Maximum	15.9				Median		4.565
864					SD	3.596				Std. Error of Mean		0.899
865					Coefficient of Variation	0.788				Skewness		1.997
866												
867					Normal GOF Test							
868					Shapiro Wilk Test Statistic	0.69				Shapiro Wilk GOF Test		
869					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
870					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
871					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
872					Data Not Normal at 5% Significance Level							
873												
874					Assuming Normal Distribution							
875					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
876					95% Student's-t UCL	6.141				95% Adjusted-CLT UCL (Chen-1995)		6.524
877										95% Modified-t UCL (Johnson-1978)		6.216
878												
879					Gamma GOF Test							
880					A-D Test Statistic	2.452				Anderson-Darling Gamma GOF Test		
881					5% A-D Critical Value	0.767				Data Not Gamma Distributed at 5% Significance Level		
882					K-S Test Statistic	0.387				Kolmogrov-Smirnoff Gamma GOF Test		
883					5% K-S Critical Value	0.222				Data Not Gamma Distributed at 5% Significance Level		
884					Data Not Gamma Distributed at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
885												
886						Gamma Statistics						
887					k hat (MLE)	0.921				k star (bias corrected MLE)		0.79
888					Theta hat (MLE)	4.958				Theta star (bias corrected MLE)		5.781
889					nu hat (MLE)	29.46				nu star (bias corrected)		25.27
890					MLE Mean (bias corrected)	4.565				MLE Sd (bias corrected)		5.137
891										Approximate Chi Square Value (0.05)		14.82
892					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		13.91
893												
894						Assuming Gamma Distribution						
895					95% Approximate Gamma UCL (use when n>=50))	7.785				95% Adjusted Gamma UCL (use when n<50)		8.292
896												
897						Lognormal GOF Test						
898					Shapiro Wilk Test Statistic	0.652				Shapiro Wilk Lognormal GOF Test		
899					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
900					Lilliefors Test Statistic	0.413				Lilliefors Lognormal GOF Test		
901					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
902						Data Not Lognormal at 5% Significance Level						
903												
904						Lognormal Statistics						
905					Minimum of Logged Data	-3.887				Mean of logged Data		0.885
906					Maximum of Logged Data	2.766				SD of logged Data		1.732
907												
908						Assuming Lognormal Distribution						
909					95% H-UCL	63.98				90% Chebyshev (MVUE) UCL		22.55
910					95% Chebyshev (MVUE) UCL	28.7				97.5% Chebyshev (MVUE) UCL		37.24
911					99% Chebyshev (MVUE) UCL	54.01						
912												
913						Nonparametric Distribution Free UCL Statistics						
914						Data do not follow a Discernible Distribution (0.05)						
915												
916						Nonparametric Distribution Free UCLs						
917					95% CLT UCL	6.044				95% Jackknife UCL		6.141
918					95% Standard Bootstrap UCL	6				95% Bootstrap-t UCL		6.738
919					95% Hall's Bootstrap UCL	14.21				95% Percentile Bootstrap UCL		6.1
920					95% BCA Bootstrap UCL	6.348						
921					90% Chebyshev(Mean, Sd) UCL	7.262				95% Chebyshev(Mean, Sd) UCL		8.484
922					97.5% Chebyshev(Mean, Sd) UCL	10.18				99% Chebyshev(Mean, Sd) UCL		13.51
923												
924						Suggested UCL to Use						
925					99% Chebyshev (Mean, Sd) UCL	13.51						
926												
927						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
928						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
929						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
930						For additional insight the user may want to consult a statistician.						
931												
932												
933	Protactinium-231											
934												
935						General Statistics						
936					Total Number of Observations	16				Number of Distinct Observations		3

	A	B	C	D	E	F	G	H	I	J	K	L
937											Number of Missing Observations	0
938					Minimum	2.46					Mean	16.19
939					Maximum	29.92					Median	16.19
940					SD	5.013					Std. Error of Mean	1.253
941					Coefficient of Variation	0.31					Skewness	0
942												
943					Normal GOF Test							
944					Shapiro Wilk Test Statistic	0.511	Shapiro Wilk GOF Test					
945					5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level					
946					Lilliefors Test Statistic	0.438	Lilliefors GOF Test					
947					5% Lilliefors Critical Value	0.222	Data Not Normal at 5% Significance Level					
948					Data Not Normal at 5% Significance Level							
949												
950					Assuming Normal Distribution							
951				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
952					95% Student's-t UCL	18.39					95% Adjusted-CLT UCL (Chen-1995)	18.25
953											95% Modified-t UCL (Johnson-1978)	18.39
954												
955					Gamma GOF Test							
956					A-D Test Statistic	4.367	Anderson-Darling Gamma GOF Test					
957					5% A-D Critical Value	0.741	Data Not Gamma Distributed at 5% Significance Level					
958					K-S Test Statistic	0.49	Kolmogrov-Smirnoff Gamma GOF Test					
959					5% K-S Critical Value	0.216	Data Not Gamma Distributed at 5% Significance Level					
960					Data Not Gamma Distributed at 5% Significance Level							
961												
962					Gamma Statistics							
963					k hat (MLE)	6.461					k star (bias corrected MLE)	5.291
964					Theta hat (MLE)	2.506					Theta star (bias corrected MLE)	3.06
965					nu hat (MLE)	206.7					nu star (bias corrected)	169.3
966					MLE Mean (bias corrected)	16.19					MLE Sd (bias corrected)	7.038
967											Approximate Chi Square Value (0.05)	140.2
968					Adjusted Level of Significance	0.0335					Adjusted Chi Square Value	137.2
969												
970					Assuming Gamma Distribution							
971					95% Approximate Gamma UCL (use when n>=50))	19.55					95% Adjusted Gamma UCL (use when n<50)	19.98
972												
973					Lognormal GOF Test							
974					Shapiro Wilk Test Statistic	0.417	Shapiro Wilk Lognormal GOF Test					
975					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
976					Lilliefors Test Statistic	0.5	Lilliefors Lognormal GOF Test					
977					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
978					Data Not Lognormal at 5% Significance Level							
979												
980					Lognormal Statistics							
981					Minimum of Logged Data	0.9					Mean of logged Data	2.705
982					Maximum of Logged Data	3.399					SD of logged Data	0.505
983												
984					Assuming Lognormal Distribution							
985					95% H-UCL	22.21					90% Chebyshev (MVUE) UCL	23.42
986					95% Chebyshev (MVUE) UCL	26.41					97.5% Chebyshev (MVUE) UCL	30.55
987					99% Chebyshev (MVUE) UCL	38.68						
988												

	A	B	C	D	E	F	G	H	I	J	K	L
989	Nonparametric Distribution Free UCL Statistics											
990	Data do not follow a Discernible Distribution (0.05)											
991												
992	Nonparametric Distribution Free UCLs											
993					95% CLT UCL	18.25				95% Jackknife UCL		18.39
994					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
995					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
996					95% BCA Bootstrap UCL	N/A						
997					90% Chebyshev(Mean, Sd) UCL	19.95				95% Chebyshev(Mean, Sd) UCL		21.65
998					97.5% Chebyshev(Mean, Sd) UCL	24.02				99% Chebyshev(Mean, Sd) UCL		28.66
999												
1000	Suggested UCL to Use											
1001					95% Chebyshev (Mean, Sd) UCL	21.65						
1002												
1003	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1004	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1005	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1006	For additional insight the user may want to consult a statistician.											
1007												
1008												
1009	Technetium-99											
1010												
1011	General Statistics											
1012					Total Number of Observations	16				Number of Distinct Observations		7
1013										Number of Missing Observations		0
1014					Minimum	7.52				Mean		372
1015					Maximum	1870				Median		372
1016					SD	425.5				Std. Error of Mean		106.4
1017					Coefficient of Variation	1.144				Skewness		3.172
1018												
1019	Normal GOF Test											
1020					Shapiro Wilk Test Statistic	0.548				Shapiro Wilk GOF Test		
1021					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1022					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
1023					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1024	Data Not Normal at 5% Significance Level											
1025												
1026	Assuming Normal Distribution											
1027					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1028					95% Student's-t UCL	558.5				95% Adjusted-CLT UCL (Chen-1995)		637.1
1029										95% Modified-t UCL (Johnson-1978)		572.5
1030												
1031	Gamma GOF Test											
1032					A-D Test Statistic	1.704				Anderson-Darling Gamma GOF Test		
1033					5% A-D Critical Value	0.765				Data Not Gamma Distributed at 5% Significance Level		
1034					K-S Test Statistic	0.321				Kolmogrov-Smirnoff Gamma GOF Test		
1035					5% K-S Critical Value	0.221				Data Not Gamma Distributed at 5% Significance Level		
1036	Data Not Gamma Distributed at 5% Significance Level											
1037												
1038	Gamma Statistics											
1039					k hat (MLE)	0.973				k star (bias corrected MLE)		0.832
1040					Theta hat (MLE)	382.5				Theta star (bias corrected MLE)		447.2

	A	B	C	D	E	F	G	H	I	J	K	L
1041					nu hat (MLE)	31.12				nu star (bias corrected)		26.62
1042					MLE Mean (bias corrected)	372				MLE Sd (bias corrected)		407.9
1043										Approximate Chi Square Value (0.05)		15.86
1044					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		14.92
1045												
1046					Assuming Gamma Distribution							
1047				95% Approximate Gamma UCL (use when n>=50))		624.5				95% Adjusted Gamma UCL (use when n<50)		663.8
1048												
1049					Lognormal GOF Test							
1050					Shapiro Wilk Test Statistic	0.771				Shapiro Wilk Lognormal GOF Test		
1051					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1052					Lilliefors Test Statistic	0.354				Lilliefors Lognormal GOF Test		
1053					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1054					Data Not Lognormal at 5% Significance Level							
1055												
1056					Lognormal Statistics							
1057					Minimum of Logged Data	2.018				Mean of logged Data		5.323
1058					Maximum of Logged Data	7.534				SD of logged Data		1.384
1059												
1060					Assuming Lognormal Distribution							
1061					95% H-UCL	1762				90% Chebyshev (MVUE) UCL		1056
1062					95% Chebyshev (MVUE) UCL	1315				97.5% Chebyshev (MVUE) UCL		1675
1063					99% Chebyshev (MVUE) UCL	2383						
1064												
1065					Nonparametric Distribution Free UCL Statistics							
1066					Data do not follow a Discernible Distribution (0.05)							
1067												
1068					Nonparametric Distribution Free UCLs							
1069					95% CLT UCL	547				95% Jackknife UCL		558.5
1070					95% Standard Bootstrap UCL	538.9				95% Bootstrap-t UCL		732.7
1071					95% Hall's Bootstrap UCL	1292				95% Percentile Bootstrap UCL		557.3
1072					95% BCA Bootstrap UCL	656.1						
1073					90% Chebyshev(Mean, Sd) UCL	691.1				95% Chebyshev(Mean, Sd) UCL		835.7
1074					97.5% Chebyshev(Mean, Sd) UCL	1036				99% Chebyshev(Mean, Sd) UCL		1430
1075												
1076					Suggested UCL to Use							
1077					95% Chebyshev (Mean, Sd) UCL	835.7						
1078												
1079					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1080					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1081					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1082					For additional insight the user may want to consult a statistician.							
1083												
1084												
1085	Thorium-230											
1086												
1087					General Statistics							
1088					Total Number of Observations	16				Number of Distinct Observations		7
1089										Number of Missing Observations		0
1090					Minimum	0.581				Mean		27.99
1091					Maximum	111				Median		27.99
1092					SD	24.57				Std. Error of Mean		6.142

	A	B	C	D	E	F	G	H	I	J	K	L
1093					Coefficient of Variation	0.878					Skewness	2.643
1094												
1095					Normal GOF Test							
1096					Shapiro Wilk Test Statistic	0.578	Shapiro Wilk GOF Test					
1097					5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level					
1098					Lilliefors Test Statistic	0.418	Lilliefors GOF Test					
1099					5% Lilliefors Critical Value	0.222	Data Not Normal at 5% Significance Level					
1100					Data Not Normal at 5% Significance Level							
1101												
1102					Assuming Normal Distribution							
1103			95% Normal UCL				95% UCLs (Adjusted for Skewness)					
1104					95% Student's-t UCL	38.76					95% Adjusted-CLT UCL (Chen-1995)	42.43
1105											95% Modified-t UCL (Johnson-1978)	39.43
1106												
1107					Gamma GOF Test							
1108					A-D Test Statistic	2.726	Anderson-Darling Gamma GOF Test					
1109					5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level					
1110					K-S Test Statistic	0.38	Kolmogrov-Smirnoff Gamma GOF Test					
1111					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
1112					Data Not Gamma Distributed at 5% Significance Level							
1113												
1114					Gamma Statistics							
1115					k hat (MLE)	1.094					k star (bias corrected MLE)	0.93
1116					Theta hat (MLE)	25.59					Theta star (bias corrected MLE)	30.09
1117					nu hat (MLE)	35					nu star (bias corrected)	29.77
1118					MLE Mean (bias corrected)	27.99					MLE Sd (bias corrected)	29.02
1119											Approximate Chi Square Value (0.05)	18.31
1120					Adjusted Level of Significance	0.0335					Adjusted Chi Square Value	17.29
1121												
1122					Assuming Gamma Distribution							
1123					95% Approximate Gamma UCL (use when n>=50))	45.5					95% Adjusted Gamma UCL (use when n<50)	48.18
1124												
1125					Lognormal GOF Test							
1126					Shapiro Wilk Test Statistic	0.657	Shapiro Wilk Lognormal GOF Test					
1127					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
1128					Lilliefors Test Statistic	0.417	Lilliefors Lognormal GOF Test					
1129					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
1130					Data Not Lognormal at 5% Significance Level							
1131												
1132					Lognormal Statistics							
1133					Minimum of Logged Data	-0.543					Mean of logged Data	2.809
1134					Maximum of Logged Data	4.71					SD of logged Data	1.393
1135												
1136					Assuming Lognormal Distribution							
1137					95% H-UCL	146.3					90% Chebyshev (MVUE) UCL	86.67
1138					95% Chebyshev (MVUE) UCL	108.1					97.5% Chebyshev (MVUE) UCL	137.7
1139					99% Chebyshev (MVUE) UCL	196						
1140												
1141					Nonparametric Distribution Free UCL Statistics							
1142					Data do not follow a Discernible Distribution (0.05)							
1143												
1144					Nonparametric Distribution Free UCLs							

	A	B	C	D	E	F	G	H	I	J	K	L
1145					95% CLT UCL	38.09					95% Jackknife UCL	38.76
1146					95% Standard Bootstrap UCL	37.91					95% Bootstrap-t UCL	44.45
1147					95% Hall's Bootstrap UCL	85.77					95% Percentile Bootstrap UCL	38.34
1148					95% BCA Bootstrap UCL	43.46						
1149					90% Chebyshev(Mean, Sd) UCL	46.42					95% Chebyshev(Mean, Sd) UCL	54.76
1150					97.5% Chebyshev(Mean, Sd) UCL	66.35					99% Chebyshev(Mean, Sd) UCL	89.1
1151												
1152					**Suggested UCL to Use**							
1153					95% Chebyshev (Mean, Sd) UCL	54.76						
1154												
1155	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1156	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1157	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1158	For additional insight the user may want to consult a statistician.											
1159												
1160												
1161	**Uranium**											
1162												
1163					**General Statistics**							
1164					Total Number of Observations	16					Number of Distinct Observations	14
1165											Number of Missing Observations	0
1166					Minimum	10					Mean	680.4
1167					Maximum	3100					Median	258.5
1168					SD	836.6					Std. Error of Mean	209.2
1169					Coefficient of Variation	1.23					Skewness	1.763
1170												
1171					**Normal GOF Test**							
1172					Shapiro Wilk Test Statistic	0.782			**Shapiro Wilk GOF Test**			
1173					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
1174					Lilliefors Test Statistic	0.241			**Lilliefors GOF Test**			
1175					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
1176					**Data Not Normal at 5% Significance Level**							
1177												
1178					**Assuming Normal Distribution**							
1179					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
1180					95% Student's-t UCL	1047			95% Adjusted-CLT UCL (Chen-1995)			1123
1181									95% Modified-t UCL (Johnson-1978)			1062
1182												
1183					**Gamma GOF Test**							
1184					A-D Test Statistic	0.405			**Anderson-Darling Gamma GOF Test**			
1185					5% A-D Critical Value	0.79			Detected data appear Gamma Distributed at 5% Significance Level			
1186					K-S Test Statistic	0.146			**Kolmogrov-Smirnoff Gamma GOF Test**			
1187					5% K-S Critical Value	0.226			Detected data appear Gamma Distributed at 5% Significance Level			
1188					**Detected data appear Gamma Distributed at 5% Significance Level**							
1189												
1190					**Gamma Statistics**							
1191					k hat (MLE)	0.577			k star (bias corrected MLE)			0.51
1192					Theta hat (MLE)	1179			Theta star (bias corrected MLE)			1333
1193					nu hat (MLE)	18.46			nu star (bias corrected)			16.34
1194					MLE Mean (bias corrected)	680.4			MLE Sd (bias corrected)			952.3
1195									Approximate Chi Square Value (0.05)			8.199
1196					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			7.55

	A	B	C	D	E	F	G	H	I	J	K	L
1197												
1198						Assuming Gamma Distribution						
1199					95% Approximate Gamma UCL (use when n>=50)	1356				95% Adjusted Gamma UCL (use when n<50)		1472
1200												
1201						Lognormal GOF Test						
1202					Shapiro Wilk Test Statistic	0.896				Shapiro Wilk Lognormal GOF Test		
1203					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
1204					Lilliefors Test Statistic	0.156				Lilliefors Lognormal GOF Test		
1205					5% Lilliefors Critical Value	0.222				Data appear Lognormal at 5% Significance Level		
1206						Data appear Lognormal at 5% Significance Level						
1207												
1208						Lognormal Statistics						
1209					Minimum of Logged Data	2.303				Mean of logged Data		5.446
1210					Maximum of Logged Data	8.039				SD of logged Data		1.879
1211												
1212						Assuming Lognormal Distribution						
1213					95% H-UCL	10600				90% Chebyshev (MVUE) UCL		2814
1214					95% Chebyshev (MVUE) UCL	3607				97.5% Chebyshev (MVUE) UCL		4709
1215					99% Chebyshev (MVUE) UCL	6872						
1216												
1217						Nonparametric Distribution Free UCL Statistics						
1218						Data appear to follow a Discernible Distribution at 5% Significance Level						
1219												
1220						Nonparametric Distribution Free UCLs						
1221					95% CLT UCL	1024				95% Jackknife UCL		1047
1222					95% Standard Bootstrap UCL	1010				95% Bootstrap-t UCL		1236
1223					95% Hall's Bootstrap UCL	1279				95% Percentile Bootstrap UCL		1053
1224					95% BCA Bootstrap UCL	1143						
1225					90% Chebyshev(Mean, Sd) UCL	1308				95% Chebyshev(Mean, Sd) UCL		1592
1226					97.5% Chebyshev(Mean, Sd) UCL	1987				99% Chebyshev(Mean, Sd) UCL		2761
1227												
1228						Suggested UCL to Use						
1229					95% Adjusted Gamma UCL	1472						
1230												
1231						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
1232						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
1233						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
1234						For additional insight the user may want to consult a statistician.						
1235												
1236												
1237	Uranium-234											
1238												
1239						General Statistics						
1240					Total Number of Observations	16				Number of Distinct Observations		7
1241										Number of Missing Observations		0
1242					Minimum	3.1				Mean		109
1243					Maximum	437				Median		109
1244					SD	97.7				Std. Error of Mean		24.43
1245					Coefficient of Variation	0.897				Skewness		2.6
1246												
1247						Normal GOF Test						
1248					Shapiro Wilk Test Statistic	0.622				Shapiro Wilk GOF Test		

	A	B	C	D	E	F	G	H	I	J	K	L
1249					5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level					
1250					Lilliefors Test Statistic	0.375	**Lilliefors GOF Test**					
1251					5% Lilliefors Critical Value	0.222	Data Not Normal at 5% Significance Level					
1252	**Data Not Normal at 5% Significance Level**											
1253												
1254	**Assuming Normal Distribution**											
1255	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1256					95% Student's-t UCL	151.8				95% Adjusted-CLT UCL (Chen-1995)		166.1
1257										95% Modified-t UCL (Johnson-1978)		154.4
1258												
1259	**Gamma GOF Test**											
1260					A-D Test Statistic	2.266	**Anderson-Darling Gamma GOF Test**					
1261					5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level					
1262					K-S Test Statistic	0.378	**Kolmogrov-Smirnoff Gamma GOF Test**					
1263					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
1264	**Data Not Gamma Distributed at 5% Significance Level**											
1265												
1266	**Gamma Statistics**											
1267					k hat (MLE)	1.065				k star (bias corrected MLE)		0.907
1268					Theta hat (MLE)	102.3				Theta star (bias corrected MLE)		120.1
1269					nu hat (MLE)	34.09				nu star (bias corrected)		29.04
1270					MLE Mean (bias corrected)	109				MLE Sd (bias corrected)		114.4
1271										Approximate Chi Square Value (0.05)		17.74
1272					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		16.74
1273												
1274	**Assuming Gamma Distribution**											
1275					95% Approximate Gamma UCL (use when n>=50))	178.4				95% Adjusted Gamma UCL (use when n<50)		189
1276												
1277	**Lognormal GOF Test**											
1278					Shapiro Wilk Test Statistic	0.687	**Shapiro Wilk Lognormal GOF Test**					
1279					5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level					
1280					Lilliefors Test Statistic	0.399	**Lilliefors Lognormal GOF Test**					
1281					5% Lilliefors Critical Value	0.222	Data Not Lognormal at 5% Significance Level					
1282	**Data Not Lognormal at 5% Significance Level**											
1283												
1284	**Lognormal Statistics**											
1285					Minimum of Logged Data	1.131				Mean of logged Data		4.153
1286					Maximum of Logged Data	6.08				SD of logged Data		1.403
1287												
1288	**Assuming Lognormal Distribution**											
1289					95% H-UCL	577				90% Chebyshev (MVUE) UCL		337.6
1290					95% Chebyshev (MVUE) UCL	421.2				97.5% Chebyshev (MVUE) UCL		537.2
1291					99% Chebyshev (MVUE) UCL	765						
1292												
1293	**Nonparametric Distribution Free UCL Statistics**											
1294	**Data do not follow a Discernible Distribution (0.05)**											
1295												
1296	**Nonparametric Distribution Free UCLs**											
1297					95% CLT UCL	149.1				95% Jackknife UCL		151.8
1298					95% Standard Bootstrap UCL	148.1				95% Bootstrap-t UCL		173
1299					95% Hall's Bootstrap UCL	339.6				95% Percentile Bootstrap UCL		152.5
1300					95% BCA Bootstrap UCL	171.4						

	A	B	C	D	E	F	G	H	I	J	K	L
1301				90% Chebyshev(Mean, Sd) UCL		182.2				95% Chebyshev(Mean, Sd) UCL		215.4
1302				97.5% Chebyshev(Mean, Sd) UCL		261.5				99% Chebyshev(Mean, Sd) UCL		352
1303												
1304						**Suggested UCL to Use**						
1305				95% Chebyshev (Mean, Sd) UCL		215.4						
1306												
1307					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1308					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1309					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1310					For additional insight the user may want to consult a statistician.							
1311												
1312												
1313	**Uranium-235**											
1314												
1315						**General Statistics**						
1316					Total Number of Observations	16				Number of Distinct Observations		7
1317										Number of Missing Observations		0
1318					Minimum	0.2				Mean		7.287
1319					Maximum	31.9				Median		7.287
1320					SD	7.216				Std. Error of Mean		1.804
1321					Coefficient of Variation	0.99				Skewness		2.788
1322												
1323						**Normal GOF Test**						
1324					Shapiro Wilk Test Statistic	0.595				**Shapiro Wilk GOF Test**		
1325					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1326					Lilliefors Test Statistic	0.375				**Lilliefors GOF Test**		
1327					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1328						**Data Not Normal at 5% Significance Level**						
1329												
1330						**Assuming Normal Distribution**						
1331					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1332					95% Student's-t UCL	10.45				95% Adjusted-CLT UCL (Chen-1995)		11.6
1333										95% Modified-t UCL (Johnson-1978)		10.66
1334												
1335						**Gamma GOF Test**						
1336					A-D Test Statistic	2.083				**Anderson-Darling Gamma GOF Test**		
1337					5% A-D Critical Value	0.764				Data Not Gamma Distributed at 5% Significance Level		
1338					K-S Test Statistic	0.383				**Kolmogrov-Smirnoff Gamma GOF Test**		
1339					5% K-S Critical Value	0.221				Data Not Gamma Distributed at 5% Significance Level		
1340						**Data Not Gamma Distributed at 5% Significance Level**						
1341												
1342						**Gamma Statistics**						
1343					k hat (MLE)	0.992				k star (bias corrected MLE)		0.848
1344					Theta hat (MLE)	7.343				Theta star (bias corrected MLE)		8.594
1345					nu hat (MLE)	31.76				nu star (bias corrected)		27.13
1346					MLE Mean (bias corrected)	7.287				MLE Sd (bias corrected)		7.914
1347										Approximate Chi Square Value (0.05)		16.26
1348					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		15.3
1349												
1350						**Assuming Gamma Distribution**						
1351					95% Approximate Gamma UCL (use when n>=50))	12.16				95% Adjusted Gamma UCL (use when n<50)		12.92
1352												

	A	B	C	D	E	F	G	H	I	J	K	L
1353					Lognormal GOF Test							
1354				Shapiro Wilk Test Statistic		0.721	Shapiro Wilk Lognormal GOF Test					
1355				5% Shapiro Wilk Critical Value		0.887	Data Not Lognormal at 5% Significance Level					
1356				Lilliefors Test Statistic		0.409	Lilliefors Lognormal GOF Test					
1357				5% Lilliefors Critical Value		0.222	Data Not Lognormal at 5% Significance Level					
1358					Data Not Lognormal at 5% Significance Level							
1359												
1360					Lognormal Statistics							
1361				Minimum of Logged Data		-1.609			Mean of logged Data			1.404
1362				Maximum of Logged Data		3.463			SD of logged Data			1.424
1363												
1364					Assuming Lognormal Distribution							
1365				95% H-UCL		39.24			90% Chebyshev (MVUE) UCL			22.35
1366				95% Chebyshev (MVUE) UCL		27.92			97.5% Chebyshev (MVUE) UCL			35.66
1367				99% Chebyshev (MVUE) UCL		50.86						
1368												
1369					Nonparametric Distribution Free UCL Statistics							
1370					Data do not follow a Discernible Distribution (0.05)							
1371												
1372					Nonparametric Distribution Free UCLs							
1373				95% CLT UCL		10.25			95% Jackknife UCL			10.45
1374				95% Standard Bootstrap UCL		10.17			95% Bootstrap-t UCL			12.31
1375				95% Hall's Bootstrap UCL		23.56			95% Percentile Bootstrap UCL			10.46
1376				95% BCA Bootstrap UCL		12.15						
1377				90% Chebyshev(Mean, Sd) UCL		12.7			95% Chebyshev(Mean, Sd) UCL			15.15
1378				97.5% Chebyshev(Mean, Sd) UCL		18.55			99% Chebyshev(Mean, Sd) UCL			25.24
1379												
1380					Suggested UCL to Use							
1381				95% Chebyshev (Mean, Sd) UCL		15.15						
1382												
1383					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1384					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1385					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1386					For additional insight the user may want to consult a statistician.							
1387												
1388												
1389	Uranium-238											
1390												
1391					General Statistics							
1392				Total Number of Observations		16			Number of Distinct Observations			7
1393									Number of Missing Observations			0
1394				Minimum		3.93			Mean			260.2
1395				Maximum		1040			Median			260.2
1396				SD		236.9			Std. Error of Mean			59.22
1397				Coefficient of Variation		0.91			Skewness			2.431
1398												
1399					Normal GOF Test							
1400				Shapiro Wilk Test Statistic		0.657	Shapiro Wilk GOF Test					
1401				5% Shapiro Wilk Critical Value		0.887	Data Not Normal at 5% Significance Level					
1402				Lilliefors Test Statistic		0.375	Lilliefors GOF Test					
1403				5% Lilliefors Critical Value		0.222	Data Not Normal at 5% Significance Level					
1404					Data Not Normal at 5% Significance Level							

	A	B	C	D	E	F	G	H	I	J	K	L
1405												
1406						Assuming Normal Distribution						
1407				95% Normal UCL					95% UCLs (Adjusted for Skewness)			
1408					95% Student's-t UCL	364				95% Adjusted-CLT UCL (Chen-1995)		396.1
1409										95% Modified-t UCL (Johnson-1978)		370
1410												
1411						Gamma GOF Test						
1412					A-D Test Statistic	2.132			Anderson-Darling Gamma GOF Test			
1413					5% A-D Critical Value	0.768			Data Not Gamma Distributed at 5% Significance Level			
1414					K-S Test Statistic	0.389			Kolmogrov-Smirnoff Gamma GOF Test			
1415					5% K-S Critical Value	0.222			Data Not Gamma Distributed at 5% Significance Level			
1416						Data Not Gamma Distributed at 5% Significance Level						
1417												
1418						Gamma Statistics						
1419					k hat (MLE)	0.899			k star (bias corrected MLE)			0.772
1420					Theta hat (MLE)	289.4			Theta star (bias corrected MLE)			337
1421					nu hat (MLE)	28.77			nu star (bias corrected)			24.71
1422					MLE Mean (bias corrected)	260.2			MLE Sd (bias corrected)			296.1
1423									Approximate Chi Square Value (0.05)			14.39
1424					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			13.5
1425												
1426						Assuming Gamma Distribution						
1427					95% Approximate Gamma UCL (use when n>=50))	446.8			95% Adjusted Gamma UCL (use when n<50)			476.3
1428												
1429						Lognormal GOF Test						
1430					Shapiro Wilk Test Statistic	0.693			Shapiro Wilk Lognormal GOF Test			
1431					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
1432					Lilliefors Test Statistic	0.406			Lilliefors Lognormal GOF Test			
1433					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
1434						Data Not Lognormal at 5% Significance Level						
1435												
1436						Lognormal Statistics						
1437					Minimum of Logged Data	1.369			Mean of logged Data			4.911
1438					Maximum of Logged Data	6.947			SD of logged Data			1.623
1439												
1440						Assuming Lognormal Distribution						
1441					95% H-UCL	2460			90% Chebyshev (MVUE) UCL			1044
1442					95% Chebyshev (MVUE) UCL	1321			97.5% Chebyshev (MVUE) UCL			1706
1443					99% Chebyshev (MVUE) UCL	2462						
1444												
1445						Nonparametric Distribution Free UCL Statistics						
1446						Data do not follow a Discernible Distribution (0.05)						
1447												
1448						Nonparametric Distribution Free UCLs						
1449					95% CLT UCL	357.6			95% Jackknife UCL			364
1450					95% Standard Bootstrap UCL	352.9			95% Bootstrap-t UCL			427.7
1451					95% Hall's Bootstrap UCL	844.9			95% Percentile Bootstrap UCL			365
1452					95% BCA Bootstrap UCL	398.8						
1453					90% Chebyshev(Mean, Sd) UCL	437.9			95% Chebyshev(Mean, Sd) UCL			518.3
1454					97.5% Chebyshev(Mean, Sd) UCL	630			99% Chebyshev(Mean, Sd) UCL			849.4
1455												
1456						Suggested UCL to Use						

	A	B	C	D	E	F	G	H	I	J	K	L
1457				99% Chebyshev (Mean, Sd) UCL		849.4						
1458												
1459	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1460	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1461	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1462	For additional insight the user may want to consult a statistician.											
1463												
1464												
1465	**Vanadium**											
1466												
1467	**General Statistics**											
1468	Total Number of Observations					16	Number of Distinct Observations					14
1469							Number of Missing Observations					0
1470	Minimum					98	Mean					134.6
1471	Maximum					161	Median					138
1472	SD					16.51	Std. Error of Mean					4.128
1473	Coefficient of Variation					0.123	Skewness					-0.783
1474												
1475	**Normal GOF Test**											
1476	Shapiro Wilk Test Statistic					0.947	**Shapiro Wilk GOF Test**					
1477	5% Shapiro Wilk Critical Value					0.887	Data appear Normal at 5% Significance Level					
1478	Lilliefors Test Statistic					0.163	**Lilliefors GOF Test**					
1479	5% Lilliefors Critical Value					0.222	Data appear Normal at 5% Significance Level					
1480	**Data appear Normal at 5% Significance Level**											
1481												
1482	**Assuming Normal Distribution**											
1483	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1484	95% Student's-t UCL					141.9	95% Adjusted-CLT UCL (Chen-1995)					140.6
1485							95% Modified-t UCL (Johnson-1978)					141.7
1486												
1487	**Gamma GOF Test**											
1488	A-D Test Statistic					0.52	**Anderson-Darling Gamma GOF Test**					
1489	5% A-D Critical Value					0.736	Detected data appear Gamma Distributed at 5% Significance Level					
1490	K-S Test Statistic					0.179	**Kolmogrov-Smirnoff Gamma GOF Test**					
1491	5% K-S Critical Value					0.214	Detected data appear Gamma Distributed at 5% Significance Level					
1492	**Detected data appear Gamma Distributed at 5% Significance Level**											
1493												
1494	**Gamma Statistics**											
1495	k hat (MLE)					65.74	k star (bias corrected MLE)					53.46
1496	Theta hat (MLE)					2.048	Theta star (bias corrected MLE)					2.518
1497	nu hat (MLE)					2104	nu star (bias corrected)					1711
1498	MLE Mean (bias corrected)					134.6	MLE Sd (bias corrected)					18.41
1499							Approximate Chi Square Value (0.05)					1616
1500	Adjusted Level of Significance					0.0335	Adjusted Chi Square Value					1605
1501												
1502	**Assuming Gamma Distribution**											
1503	95% Approximate Gamma UCL (use when n>=50))					142.5	95% Adjusted Gamma UCL (use when n<50)					143.5
1504												
1505	**Lognormal GOF Test**											
1506	Shapiro Wilk Test Statistic					0.915	**Shapiro Wilk Lognormal GOF Test**					
1507	5% Shapiro Wilk Critical Value					0.887	Data appear Lognormal at 5% Significance Level					
1508	Lilliefors Test Statistic					0.19	**Lilliefors Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
1509					5% Lilliefors Critical Value	0.222	Data appear Lognormal at 5% Significance Level					
1510	**Data appear Lognormal at 5% Significance Level**											
1511												
1512	**Lognormal Statistics**											
1513					Minimum of Logged Data	4.585				Mean of logged Data		4.895
1514					Maximum of Logged Data	5.081				SD of logged Data		0.13
1515												
1516	**Assuming Lognormal Distribution**											
1517					95% H-UCL	142.9				90% Chebyshev (MVUE) UCL		147.9
1518					95% Chebyshev (MVUE) UCL	153.8				97.5% Chebyshev (MVUE) UCL		162.1
1519					99% Chebyshev (MVUE) UCL	178.4						
1520												
1521	**Nonparametric Distribution Free UCL Statistics**											
1522	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1523												
1524	**Nonparametric Distribution Free UCLs**											
1525					95% CLT UCL	141.4				95% Jackknife UCL		141.9
1526					95% Standard Bootstrap UCL	141.3				95% Bootstrap-t UCL		140.9
1527					95% Hall's Bootstrap UCL	140.9				95% Percentile Bootstrap UCL		141
1528					95% BCA Bootstrap UCL	140.2						
1529					90% Chebyshev(Mean, Sd) UCL	147				95% Chebyshev(Mean, Sd) UCL		152.6
1530					97.5% Chebyshev(Mean, Sd) UCL	160.4				99% Chebyshev(Mean, Sd) UCL		175.7
1531												
1532	**Suggested UCL to Use**											
1533					95% Student's-t UCL	141.9						
1534												
1535	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1536	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1537	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1538	For additional insight the user may want to consult a statistician.											
1539												
1540	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1541	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1542												