	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			2/20/2015 2:14:08 PM								
5	From File			EPC_026Sub_EU04.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												

	A	B	C	D	E	F	G	H	I	J	K	L
11	Aluminum											
12												
13						General Statistics						
14					Total Number of Observations	16				Number of Distinct Observations		6
15										Number of Missing Observations		0
16					Minimum	5200				Mean		11124
17					Maximum	15700				Median		11124
18					SD	2071				Std. Error of Mean		517.7
19					Coefficient of Variation	0.186				Skewness		-0.941
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.726				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.375				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	12032				95% Adjusted-CLT UCL (Chen-1995)		11845
31										95% Modified-t UCL (Johnson-1978)		12011
32												
33						Gamma GOF Test						
34					A-D Test Statistic	2.475				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	0.402				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)	24.55				k star (bias corrected MLE)		19.99
42					Theta hat (MLE)	453.1				Theta star (bias corrected MLE)		556.5
43					nu hat (MLE)	785.6				nu star (bias corrected)		639.6
44					MLE Mean (bias corrected)	11124				MLE Sd (bias corrected)		2488
45										Approximate Chi Square Value (0.05)		581.9
46					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		575.7
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	12226				95% Adjusted Gamma UCL (use when n<50)		12359
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.638				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.411				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		9.296
60					Maximum of Logged Data	9.661				SD of logged Data		0.225
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62					Assuming Lognormal Distribution							
63					95% H-UCL	12419				90% Chebyshev (MVUE) UCL		13052
64					95% Chebyshev (MVUE) UCL	13909				97.5% Chebyshev (MVUE) UCL		15100
65					99% Chebyshev (MVUE) UCL	17437						
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	11976				95% Jackknife UCL		12032
72					95% Standard Bootstrap UCL	11925				95% Bootstrap-t UCL		11909
73					95% Hall's Bootstrap UCL	11994				95% Percentile Bootstrap UCL		11955
74					95% BCA Bootstrap UCL	11809						
75					90% Chebyshev(Mean, Sd) UCL	12677				95% Chebyshev(Mean, Sd) UCL		13381
76					97.5% Chebyshev(Mean, Sd) UCL	14357				99% Chebyshev(Mean, Sd) UCL		16276
77												
78					Suggested UCL to Use							
79					95% Student's-t UCL	12032				or 95% Modified-t UCL		12011
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												

	A	B	C	D	E	F	G	H	I	J	K	L
90	Antimony											
91												
92						General Statistics						
93					Total Number of Observations	16				Number of Distinct Observations		9
94										Number of Missing Observations		0
95					Minimum	0.18				Mean		47.33
96					Maximum	106.8				Median		47.33
97					SD	23.73				Std. Error of Mean		5.933
98					Coefficient of Variation	0.501				Skewness		0.366
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.879				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.25				Lilliefors GOF Test		
104					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
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	57.73				95% Adjusted-CLT UCL (Chen-1995)		57.67
110										95% Modified-t UCL (Johnson-1978)		57.82
111												
112						Gamma GOF Test						
113					A-D Test Statistic	2.25				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.755				Data Not Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.36				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.219				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)	1.465				k star (bias corrected MLE)		1.232
121					Theta hat (MLE)	32.31				Theta star (bias corrected MLE)		38.42
122					nu hat (MLE)	46.88				nu star (bias corrected)		39.42
123					MLE Mean (bias corrected)	47.33				MLE Sd (bias corrected)		42.64
124										Approximate Chi Square Value (0.05)		26.04
125					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		24.8
126												
127						Assuming Gamma Distribution						
128					95% Approximate Gamma UCL (use when n>=50))	71.66				95% Adjusted Gamma UCL (use when n<50)		75.22
129												
130						Lognormal GOF Test						
131					Shapiro Wilk Test Statistic	0.53				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.358				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	-1.715				Mean of logged Data		3.479
139					Maximum of Logged Data	4.671				SD of logged Data		1.469
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141	Assuming Lognormal Distribution											
142					95% H-UCL	358.2				90% Chebyshev (MVUE) UCL		191.8
143				95% Chebyshev (MVUE) UCL		240.4				97.5% Chebyshev (MVUE) UCL		307.8
144				99% Chebyshev (MVUE) UCL		440.3						
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	57.09				95% Jackknife UCL		57.73
151				95% Standard Bootstrap UCL		56.33				95% Bootstrap-t UCL		57.96
152				95% Hall's Bootstrap UCL		61.04				95% Percentile Bootstrap UCL		56.69
153				95% BCA Bootstrap UCL		57.63						
154				90% Chebyshev(Mean, Sd) UCL		65.13				95% Chebyshev(Mean, Sd) UCL		73.19
155				97.5% Chebyshev(Mean, Sd) UCL		84.38				99% Chebyshev(Mean, Sd) UCL		106.4
156												
157	Suggested UCL to Use											
158				95% Chebyshev (Mean, Sd) UCL		73.19						
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												

	A	B	C	D	E	F	G	H	I	J	K	L
166	Arsenic											
167												
168						General Statistics						
169					Total Number of Observations	16				Number of Distinct Observations		7
170										Number of Missing Observations		0
171					Minimum	6.9				Mean		19.65
172					Maximum	160				Median		11
173					SD	37.46				Std. Error of Mean		9.365
174					Coefficient of Variation	1.907				Skewness		3.987
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.306				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.512				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	36.07				95% Adjusted-CLT UCL (Chen-1995)		45.03
186										95% Modified-t UCL (Johnson-1978)		37.62
187												
188						Gamma GOF Test						
189					A-D Test Statistic	4.482				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.761				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.486				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.22				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)	1.161				k star (bias corrected MLE)		0.985
197					Theta hat (MLE)	16.92				Theta star (bias corrected MLE)		19.94
198					nu hat (MLE)	37.17				nu star (bias corrected)		31.53
199					MLE Mean (bias corrected)	19.65				MLE Sd (bias corrected)		19.8
200										Approximate Chi Square Value (0.05)		19.7
201					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		18.64
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	31.45				95% Adjusted Gamma UCL (use when n<50)		33.24
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.469				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.426				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	1.932				Mean of logged Data		2.489
215					Maximum of Logged Data	5.075				SD of logged Data		0.712
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217	Assuming Lognormal Distribution											
218					95% H-UCL	23.68				90% Chebyshev (MVUE) UCL		23.85
219				95% Chebyshev (MVUE) UCL		27.75				97.5% Chebyshev (MVUE) UCL		33.17
220				99% Chebyshev (MVUE) UCL		43.81						
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	35.05				95% Jackknife UCL		36.07
227				95% Standard Bootstrap UCL		34.72				95% Bootstrap-t UCL		295
228				95% Hall's Bootstrap UCL		278				95% Percentile Bootstrap UCL		38.23
229				95% BCA Bootstrap UCL		47.74						
230				90% Chebyshev(Mean, Sd) UCL		47.75				95% Chebyshev(Mean, Sd) UCL		60.47
231				97.5% Chebyshev(Mean, Sd) UCL		78.14				99% Chebyshev(Mean, Sd) UCL		112.8
232												
233	Suggested UCL to Use											
234				95% Chebyshev (Mean, Sd) UCL		60.47						
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												

	A	B	C	D	E	F	G	H	I	J	K	L
242	Cadmium											
243												
244					General Statistics							
245					Total Number of Observations	16			Number of Distinct Observations			6
246									Number of Missing Observations			0
247					Minimum	0.14			Mean			7.205
248					Maximum	14.77			Median			7.205
249					SD	4.085			Std. Error of Mean			1.021
250					Coefficient of Variation	0.567			Skewness			0.044
251												
252					Normal GOF Test							
253					Shapiro Wilk Test Statistic	0.899			Shapiro Wilk GOF Test			
254					5% Shapiro Wilk Critical Value	0.887			Data appear Normal at 5% Significance Level			
255					Lilliefors Test Statistic	0.25			Lilliefors GOF Test			
256					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
257					Data appear Approximate Normal at 5% Significance Level							
258												
259					Assuming Normal Distribution							
260					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
261					95% Student's-t UCL	8.995			95% Adjusted-CLT UCL (Chen-1995)			8.897
262									95% Modified-t UCL (Johnson-1978)			8.997
263												
264					Gamma GOF Test							
265					A-D Test Statistic	1.331			Anderson-Darling Gamma GOF Test			
266					5% A-D Critical Value	0.753			Data Not Gamma Distributed at 5% Significance Level			
267					K-S Test Statistic	0.353			Kolmogrov-Smirnoff Gamma GOF Test			
268					5% K-S Critical Value	0.219			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)	1.678			k star (bias corrected MLE)			1.405
273					Theta hat (MLE)	4.294			Theta star (bias corrected MLE)			5.128
274					nu hat (MLE)	53.7			nu star (bias corrected)			44.96
275					MLE Mean (bias corrected)	7.205			MLE Sd (bias corrected)			6.078
276									Approximate Chi Square Value (0.05)			30.58
277					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			29.23
278												
279					Assuming Gamma Distribution							
280					95% Approximate Gamma UCL (use when n>=50))	10.59			95% Adjusted Gamma UCL (use when n<50)			11.08
281												
282					Lognormal GOF Test							
283					Shapiro Wilk Test Statistic	0.701			Shapiro Wilk Lognormal GOF Test			
284					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
285					Lilliefors Test Statistic	0.363			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	-1.966			Mean of logged Data			1.648
291					Maximum of Logged Data	2.693			SD of logged Data			1.136
292												

	A	B	C	D	E	F	G	H	I	J	K	L
293	**Assuming Lognormal Distribution**											
294					95% H-UCL	23.31				90% Chebyshev (MVUE) UCL		18.2
295				95% Chebyshev (MVUE) UCL		22.22				97.5% Chebyshev (MVUE) UCL		27.79
296				99% Chebyshev (MVUE) UCL		38.75						
297												
298	**Nonparametric Distribution Free UCL Statistics**											
299	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
300												
301	**Nonparametric Distribution Free UCLs**											
302					95% CLT UCL	8.885				95% Jackknife UCL		8.995
303				95% Standard Bootstrap UCL		8.812				95% Bootstrap-t UCL		9.054
304				95% Hall's Bootstrap UCL		8.89				95% Percentile Bootstrap UCL		8.77
305				95% BCA Bootstrap UCL		8.918						
306				90% Chebyshev(Mean, Sd) UCL		10.27				95% Chebyshev(Mean, Sd) UCL		11.66
307				97.5% Chebyshev(Mean, Sd) UCL		13.58				99% Chebyshev(Mean, Sd) UCL		17.37
308												
309	**Suggested UCL to Use**											
310				95% Student's-t UCL		8.995						
311												
312	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
313	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
314	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
315	For additional insight the user may want to consult a statistician.											
316												
317												

	A	B	C	D	E	F	G	H	I	J	K	L
318	Cesium-137											
319												
320						General Statistics						
321					Total Number of Observations	16				Number of Distinct Observations		9
322										Number of Missing Observations		0
323					Minimum	-0.0106				Mean		1.885
324					Maximum	11.1				Median		1.885
325					SD	2.572				Std. Error of Mean		0.643
326					Coefficient of Variation	1.365				Skewness		3.399
327												
328						Normal GOF Test						
329					Shapiro Wilk Test Statistic	0.52				Shapiro Wilk GOF Test		
330					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
331					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
332					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
333						Data Not Normal at 5% Significance Level						
334												
335						Assuming Normal Distribution						
336					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
337					95% Student's-t UCL	3.012				95% Adjusted-CLT UCL (Chen-1995)		3.526
338										95% Modified-t UCL (Johnson-1978)		3.103
339						Gamma Statistics Not Available						
340						Lognormal Statistics Not Available						
341												
342						Nonparametric Distribution Free UCL Statistics						
343						Data do not follow a Discernible Distribution (0.05)						
344												
345						Nonparametric Distribution Free UCLs						
346					95% CLT UCL	2.943				95% Jackknife UCL		3.012
347					95% Standard Bootstrap UCL	2.934				95% Bootstrap-t UCL		4.496
348					95% Hall's Bootstrap UCL	7.31				95% Percentile Bootstrap UCL		3.109
349					95% BCA Bootstrap UCL	3.678						
350					90% Chebyshev(Mean, Sd) UCL	3.814				95% Chebyshev(Mean, Sd) UCL		4.688
351					97.5% Chebyshev(Mean, Sd) UCL	5.901				99% Chebyshev(Mean, Sd) UCL		8.283
352												
353						Suggested UCL to Use						
354					95% Chebyshev (Mean, Sd) UCL	4.688						
355												
356						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
357						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
358						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
359						For additional insight the user may want to consult a statistician.						
360												
361												

	A	B	C	D	E	F	G	H	I	J	K	L
362	Chromium											
363												
364					General Statistics							
365					Total Number of Observations	16			Number of Distinct Observations			12
366									Number of Missing Observations			0
367					Minimum	10.9			Mean			77.51
368					Maximum	231			Median			85
369					SD	55.69			Std. Error of Mean			13.92
370					Coefficient of Variation	0.718			Skewness			1.306
371												
372					Normal GOF Test							
373					Shapiro Wilk Test Statistic	0.861			Shapiro Wilk GOF Test			
374					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
375					Lilliefors Test Statistic	0.217			Lilliefors GOF Test			
376					5% Lilliefors Critical Value	0.222			Data appear Normal at 5% Significance Level			
377					Data appear Approximate Normal at 5% Significance Level							
378												
379					Assuming Normal Distribution							
380					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
381					95% Student's-t UCL	101.9			95% Adjusted-CLT UCL (Chen-1995)			105.3
382									95% Modified-t UCL (Johnson-1978)			102.7
383												
384					Gamma GOF Test							
385					A-D Test Statistic	0.661			Anderson-Darling Gamma GOF Test			
386					5% A-D Critical Value	0.751			Detected data appear Gamma Distributed at 5% Significance Level			
387					K-S Test Statistic	0.27			Kolmogrov-Smirnoff Gamma GOF Test			
388					5% K-S Critical Value	0.218			Data Not Gamma Distributed at 5% Significance Level			
389					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
390												
391					Gamma Statistics							
392					k hat (MLE)	1.921			k star (bias corrected MLE)			1.602
393					Theta hat (MLE)	40.35			Theta star (bias corrected MLE)			48.38
394					nu hat (MLE)	61.46			nu star (bias corrected)			51.27
395					MLE Mean (bias corrected)	77.51			MLE Sd (bias corrected)			61.23
396									Approximate Chi Square Value (0.05)			35.83
397					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			34.36
398												
399					Assuming Gamma Distribution							
400					95% Approximate Gamma UCL (use when n>=50))	110.9			95% Adjusted Gamma UCL (use when n<50)			115.7
401												
402					Lognormal GOF Test							
403					Shapiro Wilk Test Statistic	0.913			Shapiro Wilk Lognormal GOF Test			
404					5% Shapiro Wilk Critical Value	0.887			Data appear Lognormal at 5% Significance Level			
405					Lilliefors Test Statistic	0.296			Lilliefors Lognormal GOF Test			
406					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
407					Data appear Approximate Lognormal at 5% Significance Level							
408												
409					Lognormal Statistics							
410					Minimum of Logged Data	2.389			Mean of logged Data			4.068
411					Maximum of Logged Data	5.442			SD of logged Data			0.845
412												

	A	B	C	D	E	F	G	H	I	J	K	L
413	**Assuming Lognormal Distribution**											
414					95% H-UCL	143.4				90% Chebyshev (MVUE) UCL		136.6
415				95% Chebyshev (MVUE) UCL		161.8				97.5% Chebyshev (MVUE) UCL		196.6
416				99% Chebyshev (MVUE) UCL		265.1						
417												
418	**Nonparametric Distribution Free UCL Statistics**											
419	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
420												
421	**Nonparametric Distribution Free UCLs**											
422					95% CLT UCL	100.4				95% Jackknife UCL		101.9
423				95% Standard Bootstrap UCL		99.68				95% Bootstrap-t UCL		108.6
424				95% Hall's Bootstrap UCL		119.6				95% Percentile Bootstrap UCL		100.7
425				95% BCA Bootstrap UCL		101.8						
426				90% Chebyshev(Mean, Sd) UCL		119.3				95% Chebyshev(Mean, Sd) UCL		138.2
427				97.5% Chebyshev(Mean, Sd) UCL		164.5				99% Chebyshev(Mean, Sd) UCL		216
428												
429	**Suggested UCL to Use**											
430				95% Student's-t UCL		101.9						
431												
432	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
433	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
434	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
435	For additional insight the user may want to consult a statistician.											
436												
437												

	A	B	C	D	E	F	G	H	I	J	K	L
438	Cobalt											
439												
440					General Statistics							
441					Total Number of Observations	16				Number of Distinct Observations		4
442										Number of Missing Observations		0
443					Minimum	7.2				Mean		13.22
444					Maximum	23.6				Median		13.22
445					SD	3.296				Std. Error of Mean		0.824
446					Coefficient of Variation	0.249				Skewness		1.739
447												
448					Normal GOF Test							
449					Shapiro Wilk Test Statistic	0.58				Shapiro Wilk GOF Test		
450					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
451					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
452					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
453					Data Not Normal at 5% Significance Level							
454												
455					Assuming Normal Distribution							
456					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
457					95% Student's-t UCL	14.66				95% Adjusted-CLT UCL (Chen-1995)		14.96
458										95% Modified-t UCL (Johnson-1978)		14.72
459												
460					Gamma GOF Test							
461					A-D Test Statistic	3.304				Anderson-Darling Gamma GOF Test		
462					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
463					K-S Test Statistic	0.407				Kolmogrov-Smirnoff Gamma GOF Test		
464					5% K-S Critical Value	0.215				Data Not Gamma Distributed at 5% Significance Level		
465					Data Not Gamma Distributed at 5% Significance Level							
466												
467					Gamma Statistics							
468					k hat (MLE)	18.84				k star (bias corrected MLE)		15.35
469					Theta hat (MLE)	0.702				Theta star (bias corrected MLE)		0.861
470					nu hat (MLE)	603				nu star (bias corrected)		491.2
471					MLE Mean (bias corrected)	13.22				MLE Sd (bias corrected)		3.374
472										Approximate Chi Square Value (0.05)		440.9
473					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		435.4
474												
475					Assuming Gamma Distribution							
476					95% Approximate Gamma UCL (use when n>=50))	14.73				95% Adjusted Gamma UCL (use when n<50)		14.92
477												
478					Lognormal GOF Test							
479					Shapiro Wilk Test Statistic	0.627				Shapiro Wilk Lognormal GOF Test		
480					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
481					Lilliefors Test Statistic	0.42				Lilliefors Lognormal GOF Test		
482					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
483					Data Not Lognormal at 5% Significance Level							
484												
485					Lognormal Statistics							
486					Minimum of Logged Data	1.974				Mean of logged Data		2.555
487					Maximum of Logged Data	3.161				SD of logged Data		0.239
488												

	A	B	C	D	E	F	G	H	I	J	K	L
489					Assuming Lognormal Distribution							
490					95% H-UCL	14.82				90% Chebyshev (MVUE) UCL		15.6
491				95% Chebyshev (MVUE) UCL		16.68				97.5% Chebyshev (MVUE) UCL		18.18
492				99% Chebyshev (MVUE) UCL		21.12						
493												
494					Nonparametric Distribution Free UCL Statistics							
495					Data do not follow a Discernible Distribution (0.05)							
496												
497					Nonparametric Distribution Free UCLs							
498					95% CLT UCL	14.58				95% Jackknife UCL		14.66
499				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
500				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
501				95% BCA Bootstrap UCL		N/A						
502				90% Chebyshev(Mean, Sd) UCL		15.69				95% Chebyshev(Mean, Sd) UCL		16.81
503				97.5% Chebyshev(Mean, Sd) UCL		18.37				99% Chebyshev(Mean, Sd) UCL		21.42
504												
505					Suggested UCL to Use							
506					95% Student's-t UCL	14.66				or 95% Modified-t UCL		14.72
507												
508	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
509	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
510	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
511	For additional insight the user may want to consult a statistician.											
512												
513												

	A	B	C	D	E	F	G	H	I	J	K	L
514	Copper											
515												
516					General Statistics							
517					Total Number of Observations	16				Number of Distinct Observations		16
518										Number of Missing Observations		0
519					Minimum	9.79				Mean		665.4
520					Maximum	9520				Median		66
521					SD	2362				Std. Error of Mean		590.4
522					Coefficient of Variation	3.549				Skewness		3.998
523												
524					Normal GOF Test							
525					Shapiro Wilk Test Statistic	0.287				Shapiro Wilk GOF Test		
526					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
527					Lilliefors Test Statistic	0.518				Lilliefors GOF Test		
528					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
529					Data Not Normal at 5% Significance Level							
530												
531					Assuming Normal Distribution							
532					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
533					95% Student's-t UCL	1700				95% Adjusted-CLT UCL (Chen-1995)		2267
534										95% Modified-t UCL (Johnson-1978)		1799
535												
536					Gamma GOF Test							
537					A-D Test Statistic	3.936				Anderson-Darling Gamma GOF Test		
538					5% A-D Critical Value	0.831				Data Not Gamma Distributed at 5% Significance Level		
539					K-S Test Statistic	0.439				Kolmogrov-Smirnoff Gamma GOF Test		
540					5% K-S Critical Value	0.232				Data Not Gamma Distributed at 5% Significance Level		
541					Data Not Gamma Distributed at 5% Significance Level							
542												
543					Gamma Statistics							
544					k hat (MLE)	0.331				k star (bias corrected MLE)		0.311
545					Theta hat (MLE)	2009				Theta star (bias corrected MLE)		2141
546					nu hat (MLE)	10.6				nu star (bias corrected)		9.944
547					MLE Mean (bias corrected)	665.4				MLE Sd (bias corrected)		1194
548										Approximate Chi Square Value (0.05)		3.907
549					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		3.487
550												
551					Assuming Gamma Distribution							
552					95% Approximate Gamma UCL (use when n>=50))	1694				95% Adjusted Gamma UCL (use when n<50)		1898
553												
554					Lognormal GOF Test							
555					Shapiro Wilk Test Statistic	0.702				Shapiro Wilk Lognormal GOF Test		
556					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
557					Lilliefors Test Statistic	0.262				Lilliefors Lognormal GOF Test		
558					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
559					Data Not Lognormal at 5% Significance Level							
560												
561					Lognormal Statistics							
562					Minimum of Logged Data	2.281				Mean of logged Data		4.452
563					Maximum of Logged Data	9.161				SD of logged Data		1.419
564												

	A	B	C	D	E	F	G	H	I	J	K	L
565	Assuming Lognormal Distribution											
566					95% H-UCL	815.3				90% Chebyshev (MVUE) UCL		467.2
567				95% Chebyshev (MVUE) UCL		583.5				97.5% Chebyshev (MVUE) UCL		745
568				99% Chebyshev (MVUE) UCL		1062						
569												
570	Nonparametric Distribution Free UCL Statistics											
571	Data do not follow a Discernible Distribution (0.05)											
572												
573	Nonparametric Distribution Free UCLs											
574					95% CLT UCL	1637				95% Jackknife UCL		1700
575				95% Standard Bootstrap UCL		1616				95% Bootstrap-t UCL		48263
576				95% Hall's Bootstrap UCL		18815				95% Percentile Bootstrap UCL		1844
577				95% BCA Bootstrap UCL		2438						
578				90% Chebyshev(Mean, Sd) UCL		2437				95% Chebyshev(Mean, Sd) UCL		3239
579				97.5% Chebyshev(Mean, Sd) UCL		4352				99% Chebyshev(Mean, Sd) UCL		6540
580												
581	Suggested UCL to Use											
582				95% Chebyshev (Mean, Sd) UCL		3239						
583												
584	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
585	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
586	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
587	For additional insight the user may want to consult a statistician.											
588												
589												

	A	B	C	D	E	F	G	H	I	J	K	L
590	Iron											
591												
592					General Statistics							
593					Total Number of Observations	16				Number of Distinct Observations		16
594										Number of Missing Observations		0
595					Minimum	23163				Mean		29055
596					Maximum	51700				Median		27650
597					SD	6858				Std. Error of Mean		1714
598					Coefficient of Variation	0.236				Skewness		2.624
599												
600					Normal GOF Test							
601					Shapiro Wilk Test Statistic	0.711				Shapiro Wilk GOF Test		
602					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
603					Lilliefors Test Statistic	0.268				Lilliefors GOF Test		
604					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
605					Data Not Normal at 5% Significance Level							
606												
607					Assuming Normal Distribution							
608					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
609					95% Student's-t UCL	32061				95% Adjusted-CLT UCL (Chen-1995)		33077
610										95% Modified-t UCL (Johnson-1978)		32248
611												
612					Gamma GOF Test							
613					A-D Test Statistic	1.023				Anderson-Darling Gamma GOF Test		
614					5% A-D Critical Value	0.736				Data Not Gamma Distributed at 5% Significance Level		
615					K-S Test Statistic	0.245				Kolmogrov-Smirnoff Gamma GOF Test		
616					5% K-S Critical Value	0.215				Data Not Gamma Distributed at 5% Significance Level		
617					Data Not Gamma Distributed at 5% Significance Level							
618												
619					Gamma Statistics							
620					k hat (MLE)	24.72				k star (bias corrected MLE)		20.13
621					Theta hat (MLE)	1175				Theta star (bias corrected MLE)		1443
622					nu hat (MLE)	791.1				nu star (bias corrected)		644.1
623					MLE Mean (bias corrected)	29055				MLE Sd (bias corrected)		6476
624										Approximate Chi Square Value (0.05)		586.2
625					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		580
626												
627					Assuming Gamma Distribution							
628					95% Approximate Gamma UCL (use when n>=50))	31924				95% Adjusted Gamma UCL (use when n<50)		32270
629												
630					Lognormal GOF Test							
631					Shapiro Wilk Test Statistic	0.817				Shapiro Wilk Lognormal GOF Test		
632					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
633					Lilliefors Test Statistic	0.231				Lilliefors Lognormal GOF Test		
634					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
635					Data Not Lognormal at 5% Significance Level							
636												
637					Lognormal Statistics							
638					Minimum of Logged Data	10.05				Mean of logged Data		10.26
639					Maximum of Logged Data	10.85				SD of logged Data		0.197
640												

	A	B	C	D	E	F	G	H	I	J	K	L
641	Assuming Lognormal Distribution											
642					95% H-UCL	31802				90% Chebyshev (MVUE) UCL		33291
643					95% Chebyshev (MVUE) UCL	35238				97.5% Chebyshev (MVUE) UCL		37942
644					99% Chebyshev (MVUE) UCL	43252						
645												
646	Nonparametric Distribution Free UCL Statistics											
647	Data do not follow a Discernible Distribution (0.05)											
648												
649	Nonparametric Distribution Free UCLs											
650					95% CLT UCL	31875				95% Jackknife UCL		32061
651					95% Standard Bootstrap UCL	31815				95% Bootstrap-t UCL		35035
652					95% Hall's Bootstrap UCL	43933				95% Percentile Bootstrap UCL		32184
653					95% BCA Bootstrap UCL	33519						
654					90% Chebyshev(Mean, Sd) UCL	34199				95% Chebyshev(Mean, Sd) UCL		36529
655					97.5% Chebyshev(Mean, Sd) UCL	39762				99% Chebyshev(Mean, Sd) UCL		46114
656												
657	Suggested UCL to Use											
658					95% Student's-t UCL	32061				or 95% Modified-t UCL		32248
659												
660	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
661	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
662	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
663	For additional insight the user may want to consult a statistician.											
664												
665												

	A	B	C	D	E	F	G	H	I	J	K	L
666	Manganese											
667												
668					General Statistics							
669					Total Number of Observations	16				Number of Distinct Observations		15
670										Number of Missing Observations		0
671					Minimum	210				Mean		594.6
672					Maximum	1800				Median		488.5
673					SD	383.9				Std. Error of Mean		95.99
674					Coefficient of Variation	0.646				Skewness		2.34
675												
676					Normal GOF Test							
677					Shapiro Wilk Test Statistic	0.742				Shapiro Wilk GOF Test		
678					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
679					Lilliefors Test Statistic	0.284				Lilliefors GOF Test		
680					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
681					Data Not Normal at 5% Significance Level							
682												
683					Assuming Normal Distribution							
684					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
685					95% Student's-t UCL	762.9				95% Adjusted-CLT UCL (Chen-1995)		812.5
686										95% Modified-t UCL (Johnson-1978)		772.3
687												
688					Gamma GOF Test							
689					A-D Test Statistic	0.712				Anderson-Darling Gamma GOF Test		
690					5% A-D Critical Value	0.742				Detected data appear Gamma Distributed at 5% Significance Level		
691					K-S Test Statistic	0.21				Kolmogrov-Smirnoff Gamma GOF Test		
692					5% K-S Critical Value	0.216				Detected data appear Gamma Distributed at 5% Significance Level		
693					Detected data appear Gamma Distributed at 5% Significance Level							
694												
695					Gamma Statistics							
696					k hat (MLE)	3.758				k star (bias corrected MLE)		3.095
697					Theta hat (MLE)	158.2				Theta star (bias corrected MLE)		192.1
698					nu hat (MLE)	120.2				nu star (bias corrected)		99.03
699					MLE Mean (bias corrected)	594.6				MLE Sd (bias corrected)		338
700										Approximate Chi Square Value (0.05)		77.08
701					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		74.87
702												
703					Assuming Gamma Distribution							
704					95% Approximate Gamma UCL (use when n>=50)	764				95% Adjusted Gamma UCL (use when n<50)		786.5
705												
706					Lognormal GOF Test							
707					Shapiro Wilk Test Statistic	0.945				Shapiro Wilk Lognormal GOF Test		
708					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
709					Lilliefors Test Statistic	0.172				Lilliefors Lognormal GOF Test		
710					5% Lilliefors Critical Value	0.222				Data appear Lognormal at 5% Significance Level		
711					Data appear Lognormal at 5% Significance Level							
712												
713					Lognormal Statistics							
714					Minimum of Logged Data	5.347				Mean of logged Data		6.249
715					Maximum of Logged Data	7.496				SD of logged Data		0.513
716												

	A	B	C	D	E	F	G	H	I	J	K	L
717	Assuming Lognormal Distribution											
718					95% H-UCL	775.8				90% Chebyshev (MVUE) UCL		817.4
719				95% Chebyshev (MVUE) UCL		922.7				97.5% Chebyshev (MVUE) UCL		1069
720				99% Chebyshev (MVUE) UCL		1356						
721												
722	Nonparametric Distribution Free UCL Statistics											
723	Data appear to follow a Discernible Distribution at 5% Significance Level											
724												
725	Nonparametric Distribution Free UCLs											
726					95% CLT UCL	752.5				95% Jackknife UCL		762.9
727				95% Standard Bootstrap UCL		749.1				95% Bootstrap-t UCL		913.1
728				95% Hall's Bootstrap UCL		1444				95% Percentile Bootstrap UCL		770.6
729				95% BCA Bootstrap UCL		802.5						
730				90% Chebyshev(Mean, Sd) UCL		882.6				95% Chebyshev(Mean, Sd) UCL		1013
731				97.5% Chebyshev(Mean, Sd) UCL		1194				99% Chebyshev(Mean, Sd) UCL		1550
732												
733	Suggested UCL to Use											
734				95% Adjusted Gamma UCL		786.5						
735												
736	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
737	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
738	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
739	For additional insight the user may want to consult a statistician.											
740												
741												

	A	B	C	D	E	F	G	H	I	J	K	L
742	Mercury											
743												
744					General Statistics							
745					Total Number of Observations	16			Number of Distinct Observations			7
746									Number of Missing Observations			0
747					Minimum	0.0493			Mean			6.514
748					Maximum	12.4			Median			10
749					SD	5.005			Std. Error of Mean			1.251
750					Coefficient of Variation	0.768			Skewness			-0.52
751												
752					Normal GOF Test							
753					Shapiro Wilk Test Statistic	0.694			Shapiro Wilk GOF Test			
754					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
755					Lilliefors Test Statistic	0.382			Lilliefors GOF Test			
756					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
757					Data Not Normal at 5% Significance Level							
758												
759					Assuming Normal Distribution							
760					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
761					95% Student's-t UCL	8.707			95% Adjusted-CLT UCL (Chen-1995)			8.398
762									95% Modified-t UCL (Johnson-1978)			8.68
763												
764					Gamma GOF Test							
765					A-D Test Statistic	2.464			Anderson-Darling Gamma GOF Test			
766					5% A-D Critical Value	0.785			Data Not Gamma Distributed at 5% Significance Level			
767					K-S Test Statistic	0.407			Kolmogrov-Smirnoff Gamma GOF Test			
768					5% K-S Critical Value	0.225			Data Not Gamma Distributed at 5% Significance Level			
769					Data Not Gamma Distributed at 5% Significance Level							
770												
771					Gamma Statistics							
772					k hat (MLE)	0.633			k star (bias corrected MLE)			0.556
773					Theta hat (MLE)	10.29			Theta star (bias corrected MLE)			11.71
774					nu hat (MLE)	20.27			nu star (bias corrected)			17.8
775					MLE Mean (bias corrected)	6.514			MLE Sd (bias corrected)			8.734
776									Approximate Chi Square Value (0.05)			9.246
777					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			8.55
778												
779					Assuming Gamma Distribution							
780					95% Approximate Gamma UCL (use when n>=50))	12.54			95% Adjusted Gamma UCL (use when n<50)			13.56
781												
782					Lognormal GOF Test							
783					Shapiro Wilk Test Statistic	0.73			Shapiro Wilk Lognormal GOF Test			
784					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
785					Lilliefors Test Statistic	0.387			Lilliefors Lognormal GOF Test			
786					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
787					Data Not Lognormal at 5% Significance Level							
788												
789					Lognormal Statistics							
790					Minimum of Logged Data	-3.01			Mean of logged Data			0.906
791					Maximum of Logged Data	2.518			SD of logged Data			1.96
792												

	A	B	C	D	E	F	G	H	I	J	K	L
793					Assuming Lognormal Distribution							
794					95% H-UCL	155.9				90% Chebyshev (MVUE) UCL		34.9
795				95% Chebyshev (MVUE) UCL		44.89				97.5% Chebyshev (MVUE) UCL		58.76
796				99% Chebyshev (MVUE) UCL		86.01						
797												
798					Nonparametric Distribution Free UCL Statistics							
799					Data do not follow a Discernible Distribution (0.05)							
800												
801					Nonparametric Distribution Free UCLs							
802					95% CLT UCL	8.572				95% Jackknife UCL		8.707
803				95% Standard Bootstrap UCL		8.518				95% Bootstrap-t UCL		8.493
804				95% Hall's Bootstrap UCL		8.273				95% Percentile Bootstrap UCL		8.489
805				95% BCA Bootstrap UCL		8.458						
806				90% Chebyshev(Mean, Sd) UCL		10.27				95% Chebyshev(Mean, Sd) UCL		11.97
807				97.5% Chebyshev(Mean, Sd) UCL		14.33				99% Chebyshev(Mean, Sd) UCL		18.96
808												
809					Suggested UCL to Use							
810				99% Chebyshev (Mean, Sd) UCL		18.96						
811												
812					Recommended UCL exceeds the maximum observation							
813												
814					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
815					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
816					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
817					For additional insight the user may want to consult a statistician.							
818												
819					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
820					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
821												
822												

	A	B	C	D	E	F	G	H	I	J	K	L
823	Molybdenum											
824												
825					General Statistics							
826					Total Number of Observations	16				Number of Distinct Observations		5
827										Number of Missing Observations		0
828					Minimum	0.64				Mean		19.65
829					Maximum	78				Median		15
830					SD	19.38				Std. Error of Mean		4.844
831					Coefficient of Variation	0.986				Skewness		2.388
832												
833					Normal GOF Test							
834					Shapiro Wilk Test Statistic	0.576				Shapiro Wilk GOF Test		
835					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
836					Lilliefors Test Statistic	0.47				Lilliefors GOF Test		
837					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
838					Data Not Normal at 5% Significance Level							
839												
840					Assuming Normal Distribution							
841					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
842					95% Student's-t UCL	28.14				95% Adjusted-CLT UCL (Chen-1995)		30.71
843										95% Modified-t UCL (Johnson-1978)		28.62
844												
845					Gamma GOF Test							
846					A-D Test Statistic	2.637				Anderson-Darling Gamma GOF Test		
847					5% A-D Critical Value	0.76				Data Not Gamma Distributed at 5% Significance Level		
848					K-S Test Statistic	0.387				Kolmogrov-Smirnoff Gamma GOF Test		
849					5% K-S Critical Value	0.22				Data Not Gamma Distributed at 5% Significance Level		
850					Data Not Gamma Distributed at 5% Significance Level							
851												
852					Gamma Statistics							
853					k hat (MLE)	1.203				k star (bias corrected MLE)		1.019
854					Theta hat (MLE)	16.34				Theta star (bias corrected MLE)		19.28
855					nu hat (MLE)	38.49				nu star (bias corrected)		32.61
856					MLE Mean (bias corrected)	19.65				MLE Sd (bias corrected)		19.47
857										Approximate Chi Square Value (0.05)		20.55
858					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		19.47
859												
860					Assuming Gamma Distribution							
861					95% Approximate Gamma UCL (use when n>=50))	31.17				95% Adjusted Gamma UCL (use when n<50)		32.91
862												
863					Lognormal GOF Test							
864					Shapiro Wilk Test Statistic	0.65				Shapiro Wilk Lognormal GOF Test		
865					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
866					Lilliefors Test Statistic	0.44				Lilliefors Lognormal GOF Test		
867					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
868					Data Not Lognormal at 5% Significance Level							
869												
870					Lognormal Statistics							
871					Minimum of Logged Data	-0.446				Mean of logged Data		2.508
872					Maximum of Logged Data	4.357				SD of logged Data		1.23
873												

	A	B	C	D	E	F	G	H	I	J	K	L
874	Assuming Lognormal Distribution											
875					95% H-UCL	69.45				90% Chebyshev (MVUE) UCL		49.56
876				95% Chebyshev (MVUE) UCL		61.01				97.5% Chebyshev (MVUE) UCL		76.9
877				99% Chebyshev (MVUE) UCL		108.1						
878												
879	Nonparametric Distribution Free UCL Statistics											
880	Data do not follow a Discernible Distribution (0.05)											
881												
882	Nonparametric Distribution Free UCLs											
883					95% CLT UCL	27.62				95% Jackknife UCL		28.14
884				95% Standard Bootstrap UCL		27.17				95% Bootstrap-t UCL		45.18
885				95% Hall's Bootstrap UCL		90.59				95% Percentile Bootstrap UCL		28.42
886				95% BCA Bootstrap UCL		30.03						
887				90% Chebyshev(Mean, Sd) UCL		34.18				95% Chebyshev(Mean, Sd) UCL		40.77
888				97.5% Chebyshev(Mean, Sd) UCL		49.9				99% Chebyshev(Mean, Sd) UCL		67.85
889												
890	Suggested UCL to Use											
891				95% Chebyshev (Mean, Sd) UCL		40.77						
892												
893	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
894	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
895	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
896	For additional insight the user may want to consult a statistician.											
897												
898												

	A	B	C	D	E	F	G	H	I	J	K	L
899	Neptunium-237											
900												
901					General Statistics							
902					Total Number of Observations	16			Number of Distinct Observations			9
903									Number of Missing Observations			0
904					Minimum	0.00884			Mean			7.909
905					Maximum	52.6			Median			7.909
906					SD	12.38			Std. Error of Mean			3.095
907					Coefficient of Variation	1.565			Skewness			3.499
908												
909					Normal GOF Test							
910					Shapiro Wilk Test Statistic	0.502			Shapiro Wilk GOF Test			
911					5% Shapiro Wilk Critical Value	0.887			Data Not Normal at 5% Significance Level			
912					Lilliefors Test Statistic	0.438			Lilliefors GOF Test			
913					5% Lilliefors Critical Value	0.222			Data Not Normal at 5% Significance Level			
914					Data Not Normal at 5% Significance Level							
915												
916					Assuming Normal Distribution							
917					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
918					95% Student's-t UCL	13.33			95% Adjusted-CLT UCL (Chen-1995)			15.89
919									95% Modified-t UCL (Johnson-1978)			13.79
920												
921					Gamma GOF Test							
922					A-D Test Statistic	1.048			Anderson-Darling Gamma GOF Test			
923					5% A-D Critical Value	0.789			Data Not Gamma Distributed at 5% Significance Level			
924					K-S Test Statistic	0.266			Kolmogrov-Smirnoff Gamma GOF Test			
925					5% K-S Critical Value	0.226			Data Not Gamma Distributed at 5% Significance Level			
926					Data Not Gamma Distributed at 5% Significance Level							
927												
928					Gamma Statistics							
929					k hat (MLE)	0.578			k star (bias corrected MLE)			0.512
930					Theta hat (MLE)	13.67			Theta star (bias corrected MLE)			15.46
931					nu hat (MLE)	18.51			nu star (bias corrected)			16.37
932					MLE Mean (bias corrected)	7.909			MLE Sd (bias corrected)			11.06
933									Approximate Chi Square Value (0.05)			8.225
934					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			7.575
935												
936					Assuming Gamma Distribution							
937					95% Approximate Gamma UCL (use when n>=50))	15.74			95% Adjusted Gamma UCL (use when n<50)			17.09
938												
939					Lognormal GOF Test							
940					Shapiro Wilk Test Statistic	0.808			Shapiro Wilk Lognormal GOF Test			
941					5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level			
942					Lilliefors Test Statistic	0.26			Lilliefors Lognormal GOF Test			
943					5% Lilliefors Critical Value	0.222			Data Not Lognormal at 5% Significance Level			
944					Data Not Lognormal at 5% Significance Level							
945												
946					Lognormal Statistics							
947					Minimum of Logged Data	-4.728			Mean of logged Data			0.994
948					Maximum of Logged Data	3.963			SD of logged Data			2.079
949												

	A	B	C	D	E	F	G	H	I	J	K	L
950	Assuming Lognormal Distribution											
951					95% H-UCL	280.4				90% Chebyshev (MVUE) UCL		47.78
952				95% Chebyshev (MVUE) UCL		61.75				97.5% Chebyshev (MVUE) UCL		81.14
953				99% Chebyshev (MVUE) UCL		119.2						
954												
955	Nonparametric Distribution Free UCL Statistics											
956	Data do not follow a Discernible Distribution (0.05)											
957												
958	Nonparametric Distribution Free UCLs											
959					95% CLT UCL	13				95% Jackknife UCL		13.33
960				95% Standard Bootstrap UCL		12.85				95% Bootstrap-t UCL		21.98
961				95% Hall's Bootstrap UCL		33.53				95% Percentile Bootstrap UCL		13.44
962				95% BCA Bootstrap UCL		17.12						
963				90% Chebyshev(Mean, Sd) UCL		17.19				95% Chebyshev(Mean, Sd) UCL		21.4
964				97.5% Chebyshev(Mean, Sd) UCL		27.24				99% Chebyshev(Mean, Sd) UCL		38.7
965												
966	Suggested UCL to Use											
967				99% Chebyshev (Mean, Sd) UCL		38.7						
968												
969	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
970	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
971	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
972	For additional insight the user may want to consult a statistician.											
973												
974												

	A	B	C	D	E	F	G	H	I	J	K	L
975	Nickel											
976												
977					General Statistics							
978					Total Number of Observations	16				Number of Distinct Observations		16
979										Number of Missing Observations		0
980					Minimum	17				Mean		1154
981					Maximum	17600				Median		41.5
982					SD	4386				Std. Error of Mean		1096
983					Coefficient of Variation	3.801				Skewness		3.999
984												
985					Normal GOF Test							
986					Shapiro Wilk Test Statistic	0.281				Shapiro Wilk GOF Test		
987					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
988					Lilliefors Test Statistic	0.523				Lilliefors GOF Test		
989					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
990					Data Not Normal at 5% Significance Level							
991												
992					Assuming Normal Distribution							
993					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
994					95% Student's-t UCL	3076				95% Adjusted-CLT UCL (Chen-1995)		4129
995										95% Modified-t UCL (Johnson-1978)		3259
996												
997					Gamma GOF Test							
998					A-D Test Statistic	4.198				Anderson-Darling Gamma GOF Test		
999					5% A-D Critical Value	0.862				Data Not Gamma Distributed at 5% Significance Level		
1000					K-S Test Statistic	0.438				Kolmogrov-Smirnoff Gamma GOF Test		
1001					5% K-S Critical Value	0.236				Data Not Gamma Distributed at 5% Significance Level		
1002					Data Not Gamma Distributed at 5% Significance Level							
1003												
1004					Gamma Statistics							
1005					k hat (MLE)	0.247				k star (bias corrected MLE)		0.243
1006					Theta hat (MLE)	4666				Theta star (bias corrected MLE)		4756
1007					nu hat (MLE)	7.914				nu star (bias corrected)		7.764
1008					MLE Mean (bias corrected)	1154				MLE Sd (bias corrected)		2343
1009										Approximate Chi Square Value (0.05)		2.599
1010					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		2.271
1011												
1012					Assuming Gamma Distribution							
1013					95% Approximate Gamma UCL (use when n>=50))	3447				95% Adjusted Gamma UCL (use when n<50)		3945
1014												
1015					Lognormal GOF Test							
1016					Shapiro Wilk Test Statistic	0.655				Shapiro Wilk Lognormal GOF Test		
1017					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1018					Lilliefors Test Statistic	0.243				Lilliefors Lognormal GOF Test		
1019					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1020					Data Not Lognormal at 5% Significance Level							
1021												
1022					Lognormal Statistics							
1023					Minimum of Logged Data	2.833				Mean of logged Data		4.174
1024					Maximum of Logged Data	9.776				SD of logged Data		1.638
1025												

	A	B	C	D	E	F	G	H	I	J	K	L
1026	Assuming Lognormal Distribution											
1027					95% H-UCL	1236				90% Chebyshev (MVUE) UCL		512.5
1028				95% Chebyshev (MVUE) UCL		649				97.5% Chebyshev (MVUE) UCL		838.5
1029				99% Chebyshev (MVUE) UCL		1211						
1030												
1031	Nonparametric Distribution Free UCL Statistics											
1032	Data do not follow a Discernible Distribution (0.05)											
1033												
1034	Nonparametric Distribution Free UCLs											
1035					95% CLT UCL	2957				95% Jackknife UCL		3076
1036				95% Standard Bootstrap UCL		2907				95% Bootstrap-t UCL		174265
1037				95% Hall's Bootstrap UCL		90115				95% Percentile Bootstrap UCL		3344
1038				95% BCA Bootstrap UCL		4447						
1039				90% Chebyshev(Mean, Sd) UCL		4443				95% Chebyshev(Mean, Sd) UCL		5933
1040				97.5% Chebyshev(Mean, Sd) UCL		8001				99% Chebyshev(Mean, Sd) UCL		12064
1041												
1042	Suggested UCL to Use											
1043				99% Chebyshev (Mean, Sd) UCL		12064						
1044												
1045	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1046	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1047	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1048	For additional insight the user may want to consult a statistician.											
1049												
1050												

	A	B	C	D	E	F	G	H	I	J	K	L
1051	PAH, Total											
1052												
1053						General Statistics						
1054					Total Number of Observations	16				Number of Distinct Observations		7
1055										Number of Missing Observations		0
1056					Minimum	0.02				Mean		1.903
1057					Maximum	9.62				Median		1.903
1058					SD	2.185				Std. Error of Mean		0.546
1059					Coefficient of Variation	1.148				Skewness		3.217
1060												
1061						Normal GOF Test						
1062					Shapiro Wilk Test Statistic	0.537				Shapiro Wilk GOF Test		
1063					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1064					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
1065					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1066						Data Not Normal at 5% Significance Level						
1067												
1068						Assuming Normal Distribution						
1069					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1070					95% Student's-t UCL	2.86				95% Adjusted-CLT UCL (Chen-1995)		3.271
1071										95% Modified-t UCL (Johnson-1978)		2.933
1072												
1073						Gamma GOF Test						
1074					A-D Test Statistic	1.715				Anderson-Darling Gamma GOF Test		
1075					5% A-D Critical Value	0.762				Data Not Gamma Distributed at 5% Significance Level		
1076					K-S Test Statistic	0.317				Kolmogrov-Smirnoff Gamma GOF Test		
1077					5% K-S Critical Value	0.221				Data Not Gamma Distributed at 5% Significance Level		
1078						Data Not Gamma Distributed at 5% Significance Level						
1079												
1080						Gamma Statistics						
1081					k hat (MLE)	1.048				k star (bias corrected MLE)		0.893
1082					Theta hat (MLE)	1.815				Theta star (bias corrected MLE)		2.129
1083					nu hat (MLE)	33.55				nu star (bias corrected)		28.59
1084					MLE Mean (bias corrected)	1.903				MLE Sd (bias corrected)		2.013
1085										Approximate Chi Square Value (0.05)		17.39
1086					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		16.4
1087												
1088						Assuming Gamma Distribution						
1089					95% Approximate Gamma UCL (use when n>=50))	3.128				95% Adjusted Gamma UCL (use when n<50)		3.317
1090												
1091						Lognormal GOF Test						
1092					Shapiro Wilk Test Statistic	0.74				Shapiro Wilk Lognormal GOF Test		
1093					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1094					Lilliefors Test Statistic	0.346				Lilliefors Lognormal GOF Test		
1095					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1096						Data Not Lognormal at 5% Significance Level						
1097												
1098						Lognormal Statistics						
1099					Minimum of Logged Data	-3.912				Mean of logged Data		0.0956
1100					Maximum of Logged Data	2.264				SD of logged Data		1.344
1101												

	A	B	C	D	E	F	G	H	I	J	K	L
1102	Assuming Lognormal Distribution											
1103					95% H-UCL	8.431				90% Chebyshev (MVUE) UCL		5.307
1104				95% Chebyshev (MVUE) UCL		6.592				97.5% Chebyshev (MVUE) UCL		8.376
1105				99% Chebyshev (MVUE) UCL		11.88						
1106												
1107	Nonparametric Distribution Free UCL Statistics											
1108	Data do not follow a Discernible Distribution (0.05)											
1109												
1110	Nonparametric Distribution Free UCLs											
1111					95% CLT UCL	2.801				95% Jackknife UCL		2.86
1112				95% Standard Bootstrap UCL		2.775				95% Bootstrap-t UCL		3.753
1113				95% Hall's Bootstrap UCL		6.559				95% Percentile Bootstrap UCL		2.838
1114				95% BCA Bootstrap UCL		3.445						
1115				90% Chebyshev(Mean, Sd) UCL		3.541				95% Chebyshev(Mean, Sd) UCL		4.284
1116				97.5% Chebyshev(Mean, Sd) UCL		5.314				99% Chebyshev(Mean, Sd) UCL		7.338
1117												
1118	Suggested UCL to Use											
1119				95% Chebyshev (Mean, Sd) UCL		4.284						
1120												
1121	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1122	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1123	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1124	For additional insight the user may want to consult a statistician.											
1125												
1126												

	A	B	C	D	E	F	G	H	I	J	K	L
1127	PCB, Total											
1128												
1129						General Statistics						
1130					Total Number of Observations	16				Number of Distinct Observations		10
1131										Number of Missing Observations		0
1132					Minimum	0.019				Mean		2.111
1133					Maximum	5				Median		0.445
1134					SD	2.351				Std. Error of Mean		0.588
1135					Coefficient of Variation	1.114				Skewness		0.479
1136												
1137						Normal GOF Test						
1138					Shapiro Wilk Test Statistic	0.696				Shapiro Wilk GOF Test		
1139					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1140					Lilliefors Test Statistic	0.317				Lilliefors GOF Test		
1141					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1142						Data Not Normal at 5% Significance Level						
1143												
1144						Assuming Normal Distribution						
1145					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1146					95% Student's-t UCL	3.141				95% Adjusted-CLT UCL (Chen-1995)		3.153
1147										95% Modified-t UCL (Johnson-1978)		3.153
1148												
1149						Gamma GOF Test						
1150					A-D Test Statistic	1.238				Anderson-Darling Gamma GOF Test		
1151					5% A-D Critical Value	0.793				Data Not Gamma Distributed at 5% Significance Level		
1152					K-S Test Statistic	0.253				Kolmogrov-Smirnoff Gamma GOF Test		
1153					5% K-S Critical Value	0.227				Data Not Gamma Distributed at 5% Significance Level		
1154						Data Not Gamma Distributed at 5% Significance Level						
1155												
1156						Gamma Statistics						
1157					k hat (MLE)	0.534				k star (bias corrected MLE)		0.476
1158					Theta hat (MLE)	3.952				Theta star (bias corrected MLE)		4.438
1159					nu hat (MLE)	17.09				nu star (bias corrected)		15.22
1160					MLE Mean (bias corrected)	2.111				MLE Sd (bias corrected)		3.061
1161										Approximate Chi Square Value (0.05)		7.414
1162					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		6.801
1163												
1164						Assuming Gamma Distribution						
1165					95% Approximate Gamma UCL (use when n>=50))	4.333				95% Adjusted Gamma UCL (use when n<50)		4.723
1166												
1167						Lognormal GOF Test						
1168					Shapiro Wilk Test Statistic	0.871				Shapiro Wilk Lognormal GOF Test		
1169					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1170					Lilliefors Test Statistic	0.234				Lilliefors Lognormal GOF Test		
1171					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1172						Data Not Lognormal at 5% Significance Level						
1173												
1174						Lognormal Statistics						
1175					Minimum of Logged Data	-3.963				Mean of logged Data		-0.43
1176					Maximum of Logged Data	1.609				SD of logged Data		1.894
1177												

	A	B	C	D	E	F	G	H	I	J	K	L
1178					Assuming Lognormal Distribution							
1179					95% H-UCL	31.52				90% Chebyshev (MVUE) UCL		8.116
1180				95% Chebyshev (MVUE) UCL		10.41				97.5% Chebyshev (MVUE) UCL		13.6
1181				99% Chebyshev (MVUE) UCL		19.85						
1182												
1183					Nonparametric Distribution Free UCL Statistics							
1184					Data do not follow a Discernible Distribution (0.05)							
1185												
1186					Nonparametric Distribution Free UCLs							
1187					95% CLT UCL	3.078				95% Jackknife UCL		3.141
1188				95% Standard Bootstrap UCL		3.044				95% Bootstrap-t UCL		3.207
1189				95% Hall's Bootstrap UCL		2.982				95% Percentile Bootstrap UCL		3.022
1190				95% BCA Bootstrap UCL		3.037						
1191				90% Chebyshev(Mean, Sd) UCL		3.874				95% Chebyshev(Mean, Sd) UCL		4.673
1192				97.5% Chebyshev(Mean, Sd) UCL		5.781				99% Chebyshev(Mean, Sd) UCL		7.959
1193												
1194					Suggested UCL to Use							
1195				99% Chebyshev (Mean, Sd) UCL		7.959						
1196												
1197					Recommended UCL exceeds the maximum observation							
1198												
1199					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1200					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1201					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1202					For additional insight the user may want to consult a statistician.							
1203												
1204												

	A	B	C	D	E	F	G	H	I	J	K	L
1205	Plutonium-239/240											
1206												
1207						General Statistics						
1208					Total Number of Observations	16				Number of Distinct Observations		9
1209										Number of Missing Observations		0
1210					Minimum	0.0109				Mean		4.843
1211					Maximum	15.9				Median		4.843
1212					SD	4.138				Std. Error of Mean		1.034
1213					Coefficient of Variation	0.854				Skewness		1.302
1214												
1215						Normal GOF Test						
1216					Shapiro Wilk Test Statistic	0.816				Shapiro Wilk GOF Test		
1217					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1218					Lilliefors Test Statistic	0.313				Lilliefors GOF Test		
1219					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1220						Data Not Normal at 5% Significance Level						
1221												
1222						Assuming Normal Distribution						
1223					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1224					95% Student's-t UCL	6.657				95% Adjusted-CLT UCL (Chen-1995)		6.905
1225										95% Modified-t UCL (Johnson-1978)		6.713
1226												
1227						Gamma GOF Test						
1228					A-D Test Statistic	1.609				Anderson-Darling Gamma GOF Test		
1229					5% A-D Critical Value	0.778				Data Not Gamma Distributed at 5% Significance Level		
1230					K-S Test Statistic	0.343				Kolmogrov-Smirnoff Gamma GOF Test		
1231					5% K-S Critical Value	0.224				Data Not Gamma Distributed at 5% Significance Level		
1232						Data Not Gamma Distributed at 5% Significance Level						
1233												
1234						Gamma Statistics						
1235					k hat (MLE)	0.706				k star (bias corrected MLE)		0.616
1236					Theta hat (MLE)	6.855				Theta star (bias corrected MLE)		7.866
1237					nu hat (MLE)	22.61				nu star (bias corrected)		19.7
1238					MLE Mean (bias corrected)	4.843				MLE Sd (bias corrected)		6.172
1239										Approximate Chi Square Value (0.05)		10.63
1240					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		9.879
1241												
1242						Assuming Gamma Distribution						
1243					95% Approximate Gamma UCL (use when n>=50))	8.975				95% Adjusted Gamma UCL (use when n<50)		9.659
1244												
1245						Lognormal GOF Test						
1246					Shapiro Wilk Test Statistic	0.744				Shapiro Wilk Lognormal GOF Test		
1247					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1248					Lilliefors Test Statistic	0.368				Lilliefors Lognormal GOF Test		
1249					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1250						Data Not Lognormal at 5% Significance Level						
1251												
1252						Lognormal Statistics						
1253					Minimum of Logged Data	-4.519				Mean of logged Data		0.723
1254					Maximum of Logged Data	2.766				SD of logged Data		2.007
1255												

	A	B	C	D	E	F	G	H	I	J	K	L
1256					Assuming Lognormal Distribution							
1257					95% H-UCL	158				90% Chebyshev (MVUE) UCL		31.8
1258				95% Chebyshev (MVUE) UCL		40.98				97.5% Chebyshev (MVUE) UCL		53.73
1259				99% Chebyshev (MVUE) UCL		78.78						
1260												
1261					Nonparametric Distribution Free UCL Statistics							
1262					Data do not follow a Discernible Distribution (0.05)							
1263												
1264					Nonparametric Distribution Free UCLs							
1265					95% CLT UCL	6.545				95% Jackknife UCL		6.657
1266				95% Standard Bootstrap UCL		6.473				95% Bootstrap-t UCL		7.47
1267				95% Hall's Bootstrap UCL		9.573				95% Percentile Bootstrap UCL		6.591
1268				95% BCA Bootstrap UCL		6.754						
1269				90% Chebyshev(Mean, Sd) UCL		7.947				95% Chebyshev(Mean, Sd) UCL		9.353
1270				97.5% Chebyshev(Mean, Sd) UCL		11.3				99% Chebyshev(Mean, Sd) UCL		15.14
1271												
1272					Suggested UCL to Use							
1273				99% Chebyshev (Mean, Sd) UCL		15.14						
1274												
1275	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1276	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1277	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1278	For additional insight the user may want to consult a statistician.											
1279												
1280												

	A	B	C	D	E	F	G	H	I	J	K	L
1281	Protactinium-231											
1282												
1283						General Statistics						
1284					Total Number of Observations	16				Number of Distinct Observations		3
1285										Number of Missing Observations		0
1286					Minimum	2.46				Mean		16.19
1287					Maximum	29.92				Median		16.19
1288					SD	5.013				Std. Error of Mean		1.253
1289					Coefficient of Variation	0.31				Skewness		0
1290												
1291						Normal GOF Test						
1292					Shapiro Wilk Test Statistic	0.511				Shapiro Wilk GOF Test		
1293					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1294					Lilliefors Test Statistic	0.438				Lilliefors GOF Test		
1295					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1296						Data Not Normal at 5% Significance Level						
1297												
1298						Assuming Normal Distribution						
1299					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1300					95% Student's-t UCL	18.39				95% Adjusted-CLT UCL (Chen-1995)		18.25
1301										95% Modified-t UCL (Johnson-1978)		18.39
1302												
1303						Gamma GOF Test						
1304					A-D Test Statistic	4.367				Anderson-Darling Gamma GOF Test		
1305					5% A-D Critical Value	0.741				Data Not Gamma Distributed at 5% Significance Level		
1306					K-S Test Statistic	0.49				Kolmogrov-Smirnoff Gamma GOF Test		
1307					5% K-S Critical Value	0.216				Data Not Gamma Distributed at 5% Significance Level		
1308						Data Not Gamma Distributed at 5% Significance Level						
1309												
1310						Gamma Statistics						
1311					k hat (MLE)	6.461				k star (bias corrected MLE)		5.291
1312					Theta hat (MLE)	2.506				Theta star (bias corrected MLE)		3.06
1313					nu hat (MLE)	206.7				nu star (bias corrected)		169.3
1314					MLE Mean (bias corrected)	16.19				MLE Sd (bias corrected)		7.038
1315										Approximate Chi Square Value (0.05)		140.2
1316					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		137.2
1317												
1318						Assuming Gamma Distribution						
1319					95% Approximate Gamma UCL (use when n>=50))	19.55				95% Adjusted Gamma UCL (use when n<50)		19.98
1320												
1321						Lognormal GOF Test						
1322					Shapiro Wilk Test Statistic	0.417				Shapiro Wilk Lognormal GOF Test		
1323					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1324					Lilliefors Test Statistic	0.5				Lilliefors Lognormal GOF Test		
1325					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1326						Data Not Lognormal at 5% Significance Level						
1327												
1328						Lognormal Statistics						
1329					Minimum of Logged Data	0.9				Mean of logged Data		2.705
1330					Maximum of Logged Data	3.399				SD of logged Data		0.505
1331												

	A	B	C	D	E	F	G	H	I	J	K	L
1332	Assuming Lognormal Distribution											
1333					95% H-UCL	22.21				90% Chebyshev (MVUE) UCL		23.42
1334				95% Chebyshev (MVUE) UCL		26.41				97.5% Chebyshev (MVUE) UCL		30.55
1335				99% Chebyshev (MVUE) UCL		38.68						
1336												
1337	Nonparametric Distribution Free UCL Statistics											
1338	Data do not follow a Discernible Distribution (0.05)											
1339												
1340	Nonparametric Distribution Free UCLs											
1341					95% CLT UCL	18.25				95% Jackknife UCL		18.39
1342				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1343				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1344				95% BCA Bootstrap UCL		N/A						
1345				90% Chebyshev(Mean, Sd) UCL		19.95				95% Chebyshev(Mean, Sd) UCL		21.65
1346				97.5% Chebyshev(Mean, Sd) UCL		24.02				99% Chebyshev(Mean, Sd) UCL		28.66
1347												
1348	Suggested UCL to Use											
1349				95% Chebyshev (Mean, Sd) UCL		21.65						
1350												
1351	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1352	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1353	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1354	For additional insight the user may want to consult a statistician.											
1355												
1356												

	A	B	C	D	E	F	G	H	I	J	K	L
1357	Technetium-99											
1358												
1359						General Statistics						
1360					Total Number of Observations	16				Number of Distinct Observations		9
1361										Number of Missing Observations		0
1362					Minimum	4.05				Mean		881.1
1363					Maximum	4840				Median		881.1
1364					SD	1176				Std. Error of Mean		294.1
1365					Coefficient of Variation	1.335				Skewness		2.788
1366												
1367						Normal GOF Test						
1368					Shapiro Wilk Test Statistic	0.633				Shapiro Wilk GOF Test		
1369					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1370					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
1371					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1372						Data Not Normal at 5% Significance Level						
1373												
1374						Assuming Normal Distribution						
1375					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1376					95% Student's-t UCL	1397				95% Adjusted-CLT UCL (Chen-1995)		1584
1377										95% Modified-t UCL (Johnson-1978)		1431
1378												
1379						Gamma GOF Test						
1380					A-D Test Statistic	1.104				Anderson-Darling Gamma GOF Test		
1381					5% A-D Critical Value	0.795				Data Not Gamma Distributed at 5% Significance Level		
1382					K-S Test Statistic	0.305				Kolmogrov-Smirnoff Gamma GOF Test		
1383					5% K-S Critical Value	0.227				Data Not Gamma Distributed at 5% Significance Level		
1384						Data Not Gamma Distributed at 5% Significance Level						
1385												
1386						Gamma Statistics						
1387					k hat (MLE)	0.515				k star (bias corrected MLE)		0.46
1388					Theta hat (MLE)	1710				Theta star (bias corrected MLE)		1915
1389					nu hat (MLE)	16.48				nu star (bias corrected)		14.73
1390					MLE Mean (bias corrected)	881.1				MLE Sd (bias corrected)		1299
1391										Approximate Chi Square Value (0.05)		7.071
1392					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		6.475
1393												
1394						Assuming Gamma Distribution						
1395					95% Approximate Gamma UCL (use when n>=50))	1835				95% Adjusted Gamma UCL (use when n<50)		2004
1396												
1397						Lognormal GOF Test						
1398					Shapiro Wilk Test Statistic	0.822				Shapiro Wilk Lognormal GOF Test		
1399					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1400					Lilliefors Test Statistic	0.337				Lilliefors Lognormal GOF Test		
1401					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1402						Data Not Lognormal at 5% Significance Level						
1403												
1404						Lognormal Statistics						
1405					Minimum of Logged Data	1.399				Mean of logged Data		5.554
1406					Maximum of Logged Data	8.485				SD of logged Data		2.199
1407												

	A	B	C	D	E	F	G	H	I	J	K	L
1408	Assuming Lognormal Distribution											
1409					95% H-UCL	45508			90% Chebyshev (MVUE) UCL			5757
1410				95% Chebyshev (MVUE) UCL		7471			97.5% Chebyshev (MVUE) UCL			9850
1411				99% Chebyshev (MVUE) UCL		14524						
1412												
1413	Nonparametric Distribution Free UCL Statistics											
1414	Data do not follow a Discernible Distribution (0.05)											
1415												
1416	Nonparametric Distribution Free UCLs											
1417					95% CLT UCL	1365			95% Jackknife UCL			1397
1418				95% Standard Bootstrap UCL		1358			95% Bootstrap-t UCL			1882
1419				95% Hall's Bootstrap UCL		3651			95% Percentile Bootstrap UCL			1380
1420				95% BCA Bootstrap UCL		1597						
1421				90% Chebyshev(Mean, Sd) UCL		1763			95% Chebyshev(Mean, Sd) UCL			2163
1422				97.5% Chebyshev(Mean, Sd) UCL		2718			99% Chebyshev(Mean, Sd) UCL			3807
1423												
1424	Suggested UCL to Use											
1425				99% Chebyshev (Mean, Sd) UCL		3807						
1426												
1427	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1428	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1429	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1430	For additional insight the user may want to consult a statistician.											
1431												
1432												

	A	B	C	D	E	F	G	H	I	J	K	L
1433	Thallium											
1434												
1435					General Statistics							
1436					Total Number of Observations	16				Number of Distinct Observations		5
1437										Number of Missing Observations		0
1438					Minimum	0.1				Mean		1.008
1439					Maximum	2				Median		1.008
1440					SD	0.476				Std. Error of Mean		0.119
1441					Coefficient of Variation	0.473				Skewness		0.59
1442												
1443					Normal GOF Test							
1444					Shapiro Wilk Test Statistic	0.761				Shapiro Wilk GOF Test		
1445					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1446					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
1447					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1448					Data Not Normal at 5% Significance Level							
1449												
1450					Assuming Normal Distribution							
1451					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1452					95% Student's-t UCL	1.217				95% Adjusted-CLT UCL (Chen-1995)		1.223
1453										95% Modified-t UCL (Johnson-1978)		1.22
1454												
1455					Gamma GOF Test							
1456					A-D Test Statistic	2.156				Anderson-Darling Gamma GOF Test		
1457					5% A-D Critical Value	0.744				Data Not Gamma Distributed at 5% Significance Level		
1458					K-S Test Statistic	0.386				Kolmogrov-Smirnoff Gamma GOF Test		
1459					5% K-S Critical Value	0.217				Data Not Gamma Distributed at 5% Significance Level		
1460					Data Not Gamma Distributed at 5% Significance Level							
1461												
1462					Gamma Statistics							
1463					k hat (MLE)	3.3				k star (bias corrected MLE)		2.723
1464					Theta hat (MLE)	0.305				Theta star (bias corrected MLE)		0.37
1465					nu hat (MLE)	105.6				nu star (bias corrected)		87.13
1466					MLE Mean (bias corrected)	1.008				MLE Sd (bias corrected)		0.611
1467										Approximate Chi Square Value (0.05)		66.61
1468					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		64.57
1469												
1470					Assuming Gamma Distribution							
1471					95% Approximate Gamma UCL (use when n>=50))	1.318				95% Adjusted Gamma UCL (use when n<50)		1.36
1472												
1473					Lognormal GOF Test							
1474					Shapiro Wilk Test Statistic	0.678				Shapiro Wilk Lognormal GOF Test		
1475					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1476					Lilliefors Test Statistic	0.403				Lilliefors Lognormal GOF Test		
1477					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1478					Data Not Lognormal at 5% Significance Level							
1479												
1480					Lognormal Statistics							
1481					Minimum of Logged Data	-2.303				Mean of logged Data		-0.151
1482					Maximum of Logged Data	0.693				SD of logged Data		0.699
1483												

	A	B	C	D	E	F	G	H	I	J	K	L
1484	Assuming Lognormal Distribution											
1485					95% H-UCL	1.655				90% Chebyshev (MVUE) UCL		1.674
1486				95% Chebyshev (MVUE) UCL		1.945				97.5% Chebyshev (MVUE) UCL		2.32
1487				99% Chebyshev (MVUE) UCL		3.057						
1488												
1489	Nonparametric Distribution Free UCL Statistics											
1490	Data do not follow a Discernible Distribution (0.05)											
1491												
1492	Nonparametric Distribution Free UCLs											
1493					95% CLT UCL	1.204				95% Jackknife UCL		1.217
1494				95% Standard Bootstrap UCL		1.195				95% Bootstrap-t UCL		1.255
1495				95% Hall's Bootstrap UCL		1.414				95% Percentile Bootstrap UCL		1.199
1496				95% BCA Bootstrap UCL		1.199						
1497				90% Chebyshev(Mean, Sd) UCL		1.365				95% Chebyshev(Mean, Sd) UCL		1.527
1498				97.5% Chebyshev(Mean, Sd) UCL		1.752				99% Chebyshev(Mean, Sd) UCL		2.193
1499												
1500	Suggested UCL to Use											
1501				95% Chebyshev (Mean, Sd) UCL		1.527						
1502												
1503	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1504	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1505	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1506	For additional insight the user may want to consult a statistician.											
1507												
1508												

	A	B	C	D	E	F	G	H	I	J	K	L
1509	Thorium-230											
1510												
1511						General Statistics						
1512					Total Number of Observations	16				Number of Distinct Observations		9
1513										Number of Missing Observations		0
1514					Minimum	0.389				Mean		23.41
1515					Maximum	111				Median		23.41
1516					SD	25.46				Std. Error of Mean		6.365
1517					Coefficient of Variation	1.088				Skewness		2.896
1518												
1519						Normal GOF Test						
1520					Shapiro Wilk Test Statistic	0.592				Shapiro Wilk GOF Test		
1521					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1522					Lilliefors Test Statistic	0.366				Lilliefors GOF Test		
1523					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1524						Data Not Normal at 5% Significance Level						
1525												
1526						Assuming Normal Distribution						
1527					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1528					95% Student's-t UCL	34.57				95% Adjusted-CLT UCL (Chen-1995)		38.81
1529										95% Modified-t UCL (Johnson-1978)		35.34
1530												
1531						Gamma GOF Test						
1532					A-D Test Statistic	1.936				Anderson-Darling Gamma GOF Test		
1533					5% A-D Critical Value	0.771				Data Not Gamma Distributed at 5% Significance Level		
1534					K-S Test Statistic	0.332				Kolmogrov-Smirnoff Gamma GOF Test		
1535					5% K-S Critical Value	0.223				Data Not Gamma Distributed at 5% Significance Level		
1536						Data Not Gamma Distributed at 5% Significance Level						
1537												
1538						Gamma Statistics						
1539					k hat (MLE)	0.832				k star (bias corrected MLE)		0.717
1540					Theta hat (MLE)	28.15				Theta star (bias corrected MLE)		32.63
1541					nu hat (MLE)	26.61				nu star (bias corrected)		22.96
1542					MLE Mean (bias corrected)	23.41				MLE Sd (bias corrected)		27.64
1543										Approximate Chi Square Value (0.05)		13.06
1544					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		12.21
1545												
1546						Assuming Gamma Distribution						
1547					95% Approximate Gamma UCL (use when n>=50))	41.16				95% Adjusted Gamma UCL (use when n<50)		44
1548												
1549						Lognormal GOF Test						
1550					Shapiro Wilk Test Statistic	0.747				Shapiro Wilk Lognormal GOF Test		
1551					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1552					Lilliefors Test Statistic	0.372				Lilliefors Lognormal GOF Test		
1553					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1554						Data Not Lognormal at 5% Significance Level						
1555												
1556						Lognormal Statistics						
1557					Minimum of Logged Data	-0.944				Mean of logged Data		2.443
1558					Maximum of Logged Data	4.71				SD of logged Data		1.586
1559												

	A	B	C	D	E	F	G	H	I	J	K	L
1560	Assuming Lognormal Distribution											
1561					95% H-UCL	183.8				90% Chebyshev (MVUE) UCL		82.91
1562				95% Chebyshev (MVUE) UCL		104.7				97.5% Chebyshev (MVUE) UCL		134.9
1563				99% Chebyshev (MVUE) UCL		194.2						
1564												
1565	Nonparametric Distribution Free UCL Statistics											
1566	Data do not follow a Discernible Distribution (0.05)											
1567												
1568	Nonparametric Distribution Free UCLs											
1569					95% CLT UCL	33.88				95% Jackknife UCL		34.57
1570				95% Standard Bootstrap UCL		33.55				95% Bootstrap-t UCL		42.9
1571				95% Hall's Bootstrap UCL		80.73				95% Percentile Bootstrap UCL		35.45
1572				95% BCA Bootstrap UCL		40.05						
1573				90% Chebyshev(Mean, Sd) UCL		42.51				95% Chebyshev(Mean, Sd) UCL		51.16
1574				97.5% Chebyshev(Mean, Sd) UCL		63.16				99% Chebyshev(Mean, Sd) UCL		86.75
1575												
1576	Suggested UCL to Use											
1577				99% Chebyshev (Mean, Sd) UCL		86.75						
1578												
1579	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1580	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1581	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1582	For additional insight the user may want to consult a statistician.											
1583												
1584												

	A	B	C	D	E	F	G	H	I	J	K	L
1585	Uranium											
1586												
1587						General Statistics						
1588					Total Number of Observations	16				Number of Distinct Observations		16
1589										Number of Missing Observations		0
1590					Minimum	11.37				Mean		698.4
1591					Maximum	3100				Median		258.5
1592					SD	822.7				Std. Error of Mean		205.7
1593					Coefficient of Variation	1.178				Skewness		1.82
1594												
1595						Normal GOF Test						
1596					Shapiro Wilk Test Statistic	0.773				Shapiro Wilk GOF Test		
1597					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1598					Lilliefors Test Statistic	0.251				Lilliefors GOF Test		
1599					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1600						Data Not Normal at 5% Significance Level						
1601												
1602						Assuming Normal Distribution						
1603					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1604					95% Student's-t UCL	1059				95% Adjusted-CLT UCL (Chen-1995)		1137
1605										95% Modified-t UCL (Johnson-1978)		1075
1606												
1607						Gamma GOF Test						
1608					A-D Test Statistic	0.533				Anderson-Darling Gamma GOF Test		
1609					5% A-D Critical Value	0.773				Detected data appear Gamma Distributed at 5% Significance Level		
1610					K-S Test Statistic	0.172				Kolmogrov-Smirnoff Gamma GOF Test		
1611					5% K-S Critical Value	0.223				Detected data appear Gamma Distributed at 5% Significance Level		
1612						Detected data appear Gamma Distributed at 5% Significance Level						
1613												
1614						Gamma Statistics						
1615					k hat (MLE)	0.783				k star (bias corrected MLE)		0.678
1616					Theta hat (MLE)	892.1				Theta star (bias corrected MLE)		1030
1617					nu hat (MLE)	25.05				nu star (bias corrected)		21.69
1618					MLE Mean (bias corrected)	698.4				MLE Sd (bias corrected)		848.3
1619										Approximate Chi Square Value (0.05)		12.1
1620					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		11.29
1621												
1622						Assuming Gamma Distribution						
1623					95% Approximate Gamma UCL (use when n>=50)	1251				95% Adjusted Gamma UCL (use when n<50)		1341
1624												
1625						Lognormal GOF Test						
1626					Shapiro Wilk Test Statistic	0.932				Shapiro Wilk Lognormal GOF Test		
1627					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
1628					Lilliefors Test Statistic	0.156				Lilliefors Lognormal GOF Test		
1629					5% Lilliefors Critical Value	0.222				Data appear Lognormal at 5% Significance Level		
1630						Data appear Lognormal at 5% Significance Level						
1631												
1632						Lognormal Statistics						
1633					Minimum of Logged Data	2.431				Mean of logged Data		5.788
1634					Maximum of Logged Data	8.039				SD of logged Data		1.441
1635												

	A	B	C	D	E	F	G	H	I	J	K	L
1636	**Assuming Lognormal Distribution**											
1637					95% H-UCL	3319				90% Chebyshev (MVUE) UCL		1846
1638				95% Chebyshev (MVUE) UCL		2309				97.5% Chebyshev (MVUE) UCL		2952
1639				99% Chebyshev (MVUE) UCL		4215						
1640												
1641	**Nonparametric Distribution Free UCL Statistics**											
1642	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1643												
1644	**Nonparametric Distribution Free UCLs**											
1645					95% CLT UCL	1037				95% Jackknife UCL		1059
1646				95% Standard Bootstrap UCL		1024				95% Bootstrap-t UCL		1231
1647				95% Hall's Bootstrap UCL		1320				95% Percentile Bootstrap UCL		1070
1648				95% BCA Bootstrap UCL		1148						
1649				90% Chebyshev(Mean, Sd) UCL		1315				95% Chebyshev(Mean, Sd) UCL		1595
1650				97.5% Chebyshev(Mean, Sd) UCL		1983				99% Chebyshev(Mean, Sd) UCL		2745
1651												
1652	**Suggested UCL to Use**											
1653				95% Adjusted Gamma UCL		1341						
1654												
1655	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1656	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1657	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1658	For additional insight the user may want to consult a statistician.											
1659												
1660												

	A	B	C	D	E	F	G	H	I	J	K	L
1661	Uranium-234											
1662												
1663						General Statistics						
1664					Total Number of Observations	16				Number of Distinct Observations		9
1665										Number of Missing Observations		0
1666					Minimum	1.95				Mean		94.72
1667					Maximum	437				Median		94.72
1668					SD	101				Std. Error of Mean		25.25
1669					Coefficient of Variation	1.066				Skewness		2.748
1670												
1671						Normal GOF Test						
1672					Shapiro Wilk Test Statistic	0.632				Shapiro Wilk GOF Test		
1673					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1674					Lilliefors Test Statistic	0.346				Lilliefors GOF Test		
1675					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1676						Data Not Normal at 5% Significance Level						
1677												
1678						Assuming Normal Distribution						
1679					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1680					95% Student's-t UCL	139				95% Adjusted-CLT UCL (Chen-1995)		154.8
1681										95% Modified-t UCL (Johnson-1978)		141.9
1682												
1683						Gamma GOF Test						
1684					A-D Test Statistic	1.739				Anderson-Darling Gamma GOF Test		
1685					5% A-D Critical Value	0.771				Data Not Gamma Distributed at 5% Significance Level		
1686					K-S Test Statistic	0.333				Kolmogrov-Smirnoff Gamma GOF Test		
1687					5% K-S Critical Value	0.223				Data Not Gamma Distributed at 5% Significance Level		
1688						Data Not Gamma Distributed at 5% Significance Level						
1689												
1690						Gamma Statistics						
1691					k hat (MLE)	0.82				k star (bias corrected MLE)		0.708
1692					Theta hat (MLE)	115.5				Theta star (bias corrected MLE)		133.8
1693					nu hat (MLE)	26.24				nu star (bias corrected)		22.65
1694					MLE Mean (bias corrected)	94.72				MLE Sd (bias corrected)		112.6
1695										Approximate Chi Square Value (0.05)		12.83
1696					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		11.99
1697												
1698						Assuming Gamma Distribution						
1699					95% Approximate Gamma UCL (use when n>=50))	167.3				95% Adjusted Gamma UCL (use when n<50)		178.9
1700												
1701						Lognormal GOF Test						
1702					Shapiro Wilk Test Statistic	0.756				Shapiro Wilk Lognormal GOF Test		
1703					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1704					Lilliefors Test Statistic	0.361				Lilliefors Lognormal GOF Test		
1705					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1706						Data Not Lognormal at 5% Significance Level						
1707												
1708						Lognormal Statistics						
1709					Minimum of Logged Data	0.668				Mean of logged Data		3.829
1710					Maximum of Logged Data	6.08				SD of logged Data		1.6
1711												

	A	B	C	D	E	F	G	H	I	J	K	L
1712					Assuming Lognormal Distribution							
1713					95% H-UCL	771.5				90% Chebyshev (MVUE) UCL		340
1714				95% Chebyshev (MVUE) UCL		429.7				97.5% Chebyshev (MVUE) UCL		554.1
1715				99% Chebyshev (MVUE) UCL		798.5						
1716												
1717					Nonparametric Distribution Free UCL Statistics							
1718					Data do not follow a Discernible Distribution (0.05)							
1719												
1720					Nonparametric Distribution Free UCLs							
1721					95% CLT UCL	136.3				95% Jackknife UCL		139
1722				95% Standard Bootstrap UCL		135.4				95% Bootstrap-t UCL		170.4
1723				95% Hall's Bootstrap UCL		328.5				95% Percentile Bootstrap UCL		138.3
1724				95% BCA Bootstrap UCL		152.9						
1725				90% Chebyshev(Mean, Sd) UCL		170.5				95% Chebyshev(Mean, Sd) UCL		204.8
1726				97.5% Chebyshev(Mean, Sd) UCL		252.4				99% Chebyshev(Mean, Sd) UCL		346
1727												
1728					Suggested UCL to Use							
1729				99% Chebyshev (Mean, Sd) UCL		346						
1730												
1731	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1732	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1733	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1734	For additional insight the user may want to consult a statistician.											
1735												
1736												

	A	B	C	D	E	F	G	H	I	J	K	L
1737	Uranium-235											
1738												
1739						General Statistics						
1740					Total Number of Observations	16				Number of Distinct Observations		9
1741										Number of Missing Observations		0
1742					Minimum	0.116				Mean		6.091
1743					Maximum	31.9				Median		6.091
1744					SD	7.425				Std. Error of Mean		1.856
1745					Coefficient of Variation	1.219				Skewness		3.043
1746												
1747						Normal GOF Test						
1748					Shapiro Wilk Test Statistic	0.594				Shapiro Wilk GOF Test		
1749					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1750					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
1751					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1752						Data Not Normal at 5% Significance Level						
1753												
1754						Assuming Normal Distribution						
1755					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1756					95% Student's-t UCL	9.345				95% Adjusted-CLT UCL (Chen-1995)		10.65
1757										95% Modified-t UCL (Johnson-1978)		9.58
1758												
1759						Gamma GOF Test						
1760					A-D Test Statistic	1.392				Anderson-Darling Gamma GOF Test		
1761					5% A-D Critical Value	0.774				Data Not Gamma Distributed at 5% Significance Level		
1762					K-S Test Statistic	0.275				Kolmogrov-Smirnoff Gamma GOF Test		
1763					5% K-S Critical Value	0.223				Data Not Gamma Distributed at 5% Significance Level		
1764						Data Not Gamma Distributed at 5% Significance Level						
1765												
1766						Gamma Statistics						
1767					k hat (MLE)	0.765				k star (bias corrected MLE)		0.663
1768					Theta hat (MLE)	7.962				Theta star (bias corrected MLE)		9.184
1769					nu hat (MLE)	24.48				nu star (bias corrected)		21.22
1770					MLE Mean (bias corrected)	6.091				MLE Sd (bias corrected)		7.479
1771										Approximate Chi Square Value (0.05)		11.76
1772					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		10.96
1773												
1774						Assuming Gamma Distribution						
1775					95% Approximate Gamma UCL (use when n>=50))	10.99				95% Adjusted Gamma UCL (use when n<50)		11.79
1776												
1777						Lognormal GOF Test						
1778					Shapiro Wilk Test Statistic	0.798				Shapiro Wilk Lognormal GOF Test		
1779					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1780					Lilliefors Test Statistic	0.324				Lilliefors Lognormal GOF Test		
1781					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1782						Data Not Lognormal at 5% Significance Level						
1783												
1784						Lognormal Statistics						
1785					Minimum of Logged Data	-2.154				Mean of logged Data		1.026
1786					Maximum of Logged Data	3.463				SD of logged Data		1.615
1787												

	A	B	C	D	E	F	G	H	I	J	K	L
1788					Assuming Lognormal Distribution							
1789					95% H-UCL	49.16				90% Chebyshev (MVUE) UCL		21.15
1790				95% Chebyshev (MVUE) UCL		26.75				97.5% Chebyshev (MVUE) UCL		34.52
1791				99% Chebyshev (MVUE) UCL		49.79						
1792												
1793					Nonparametric Distribution Free UCL Statistics							
1794					Data do not follow a Discernible Distribution (0.05)							
1795												
1796					Nonparametric Distribution Free UCLs							
1797					95% CLT UCL	9.144				95% Jackknife UCL		9.345
1798				95% Standard Bootstrap UCL		9.054				95% Bootstrap-t UCL		12.38
1799				95% Hall's Bootstrap UCL		22.53				95% Percentile Bootstrap UCL		9.498
1800				95% BCA Bootstrap UCL		11.01						
1801				90% Chebyshev(Mean, Sd) UCL		11.66				95% Chebyshev(Mean, Sd) UCL		14.18
1802				97.5% Chebyshev(Mean, Sd) UCL		17.68				99% Chebyshev(Mean, Sd) UCL		24.56
1803												
1804					Suggested UCL to Use							
1805				99% Chebyshev (Mean, Sd) UCL		24.56						
1806												
1807	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1808	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1809	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1810	For additional insight the user may want to consult a statistician.											
1811												
1812												

	A	B	C	D	E	F	G	H	I	J	K	L
1813	Uranium-238											
1814												
1815						General Statistics						
1816					Total Number of Observations	16				Number of Distinct Observations		9
1817										Number of Missing Observations		0
1818					Minimum	1.95				Mean		213.3
1819					Maximum	1040				Median		213.3
1820					SD	245.5				Std. Error of Mean		61.38
1821					Coefficient of Variation	1.151				Skewness		2.747
1822												
1823						Normal GOF Test						
1824					Shapiro Wilk Test Statistic	0.65				Shapiro Wilk GOF Test		
1825					5% Shapiro Wilk Critical Value	0.887				Data Not Normal at 5% Significance Level		
1826					Lilliefors Test Statistic	0.375				Lilliefors GOF Test		
1827					5% Lilliefors Critical Value	0.222				Data Not Normal at 5% Significance Level		
1828						Data Not Normal at 5% Significance Level						
1829												
1830						Assuming Normal Distribution						
1831					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1832					95% Student's-t UCL	320.9				95% Adjusted-CLT UCL (Chen-1995)		359.3
1833										95% Modified-t UCL (Johnson-1978)		327.9
1834												
1835						Gamma GOF Test						
1836					A-D Test Statistic	1.381				Anderson-Darling Gamma GOF Test		
1837					5% A-D Critical Value	0.78				Data Not Gamma Distributed at 5% Significance Level		
1838					K-S Test Statistic	0.283				Kolmogrov-Smirnoff Gamma GOF Test		
1839					5% K-S Critical Value	0.224				Data Not Gamma Distributed at 5% Significance Level		
1840						Data Not Gamma Distributed at 5% Significance Level						
1841												
1842						Gamma Statistics						
1843					k hat (MLE)	0.689				k star (bias corrected MLE)		0.601
1844					Theta hat (MLE)	309.6				Theta star (bias corrected MLE)		354.7
1845					nu hat (MLE)	22.04				nu star (bias corrected)		19.24
1846					MLE Mean (bias corrected)	213.3				MLE Sd (bias corrected)		275.1
1847										Approximate Chi Square Value (0.05)		10.29
1848					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		9.556
1849												
1850						Assuming Gamma Distribution						
1851					95% Approximate Gamma UCL (use when n>=50))	398.7				95% Adjusted Gamma UCL (use when n<50)		429.5
1852												
1853						Lognormal GOF Test						
1854					Shapiro Wilk Test Statistic	0.784				Shapiro Wilk Lognormal GOF Test		
1855					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
1856					Lilliefors Test Statistic	0.309				Lilliefors Lognormal GOF Test		
1857					5% Lilliefors Critical Value	0.222				Data Not Lognormal at 5% Significance Level		
1858						Data Not Lognormal at 5% Significance Level						
1859												
1860						Lognormal Statistics						
1861					Minimum of Logged Data	0.668				Mean of logged Data		4.483
1862					Maximum of Logged Data	6.947				SD of logged Data		1.832
1863												

	A	B	C	D	E	F	G	H	I	J	K	L
1864					Assuming Lognormal Distribution							
1865					95% H-UCL	3382				90% Chebyshev (MVUE) UCL		986.6
1866				95% Chebyshev (MVUE) UCL		1262				97.5% Chebyshev (MVUE) UCL		1644
1867				99% Chebyshev (MVUE) UCL		2395						
1868												
1869					Nonparametric Distribution Free UCL Statistics							
1870					Data do not follow a Discernible Distribution (0.05)							
1871												
1872					Nonparametric Distribution Free UCLs							
1873					95% CLT UCL	314.3				95% Jackknife UCL		320.9
1874				95% Standard Bootstrap UCL		310.7				95% Bootstrap-t UCL		411.9
1875				95% Hall's Bootstrap UCL		797.7				95% Percentile Bootstrap UCL		320.8
1876				95% BCA Bootstrap UCL		359.9						
1877				90% Chebyshev(Mean, Sd) UCL		397.4				95% Chebyshev(Mean, Sd) UCL		480.8
1878				97.5% Chebyshev(Mean, Sd) UCL		596.6				99% Chebyshev(Mean, Sd) UCL		824
1879												
1880					Suggested UCL to Use							
1881				99% Chebyshev (Mean, Sd) UCL		824						
1882												
1883					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1884					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
1885					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
1886					For additional insight the user may want to consult a statistician.							
1887												
1888												

	A	B	C	D	E	F	G	H	I	J	K	L
1889	Vanadium											
1890												
1891					General Statistics							
1892					Total Number of Observations	16				Number of Distinct Observations		14
1893										Number of Missing Observations		0
1894					Minimum	98				Mean		134.6
1895					Maximum	161				Median		138
1896					SD	16.51				Std. Error of Mean		4.128
1897					Coefficient of Variation	0.123				Skewness		-0.783
1898												
1899					Normal GOF Test							
1900					Shapiro Wilk Test Statistic	0.947				Shapiro Wilk GOF Test		
1901					5% Shapiro Wilk Critical Value	0.887				Data appear Normal at 5% Significance Level		
1902					Lilliefors Test Statistic	0.163				Lilliefors GOF Test		
1903					5% Lilliefors Critical Value	0.222				Data appear Normal at 5% Significance Level		
1904					Data appear Normal at 5% Significance Level							
1905												
1906					Assuming Normal Distribution							
1907					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1908					95% Student's-t UCL	141.9				95% Adjusted-CLT UCL (Chen-1995)		140.6
1909										95% Modified-t UCL (Johnson-1978)		141.7
1910												
1911					Gamma GOF Test							
1912					A-D Test Statistic	0.52				Anderson-Darling Gamma GOF Test		
1913					5% A-D Critical Value	0.736				Detected data appear Gamma Distributed at 5% Significance Level		
1914					K-S Test Statistic	0.179				Kolmogrov-Smirnoff Gamma GOF Test		
1915					5% K-S Critical Value	0.214				Detected data appear Gamma Distributed at 5% Significance Level		
1916					Detected data appear Gamma Distributed at 5% Significance Level							
1917												
1918					Gamma Statistics							
1919					k hat (MLE)	65.74				k star (bias corrected MLE)		53.46
1920					Theta hat (MLE)	2.048				Theta star (bias corrected MLE)		2.518
1921					nu hat (MLE)	2104				nu star (bias corrected)		1711
1922					MLE Mean (bias corrected)	134.6				MLE Sd (bias corrected)		18.41
1923										Approximate Chi Square Value (0.05)		1616
1924					Adjusted Level of Significance	0.0335				Adjusted Chi Square Value		1605
1925												
1926					Assuming Gamma Distribution							
1927					95% Approximate Gamma UCL (use when n>=50))	142.5				95% Adjusted Gamma UCL (use when n<50)		143.5
1928												
1929					Lognormal GOF Test							
1930					Shapiro Wilk Test Statistic	0.915				Shapiro Wilk Lognormal GOF Test		
1931					5% Shapiro Wilk Critical Value	0.887				Data appear Lognormal at 5% Significance Level		
1932					Lilliefors Test Statistic	0.19				Lilliefors Lognormal GOF Test		
1933					5% Lilliefors Critical Value	0.222				Data appear Lognormal at 5% Significance Level		
1934					Data appear Lognormal at 5% Significance Level							
1935												
1936					Lognormal Statistics							
1937					Minimum of Logged Data	4.585				Mean of logged Data		4.895
1938					Maximum of Logged Data	5.081				SD of logged Data		0.13
1939												

	A	B	C	D	E	F	G	H	I	J	K	L
1940	**Assuming Lognormal Distribution**											
1941					95% H-UCL	142.9				90% Chebyshev (MVUE) UCL		147.9
1942				95% Chebyshev (MVUE) UCL		153.8				97.5% Chebyshev (MVUE) UCL		162.1
1943				99% Chebyshev (MVUE) UCL		178.4						
1944												
1945	**Nonparametric Distribution Free UCL Statistics**											
1946	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1947												
1948	**Nonparametric Distribution Free UCLs**											
1949					95% CLT UCL	141.4				95% Jackknife UCL		141.9
1950				95% Standard Bootstrap UCL		141.1				95% Bootstrap-t UCL		141.1
1951				95% Hall's Bootstrap UCL		140.5				95% Percentile Bootstrap UCL		141.1
1952				95% BCA Bootstrap UCL		140.2						
1953				90% Chebyshev(Mean, Sd) UCL		147				95% Chebyshev(Mean, Sd) UCL		152.6
1954				97.5% Chebyshev(Mean, Sd) UCL		160.4				99% Chebyshev(Mean, Sd) UCL		175.7
1955												
1956	**Suggested UCL to Use**											
1957				95% Student's-t UCL		141.9						
1958												
1959	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1960	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1961	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1962	For additional insight the user may want to consult a statistician.											
1963												
1964	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1965	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1966												