	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			2/18/2015 1:43:30 PM								
5	From File			EPC_015Sub_EU07.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	12				Number of Distinct Observations		4
15										Number of Missing Observations		0
16					Minimum	8360				Mean		10753
17					Maximum	12900				Median		10753
18					SD	972.2				Std. Error of Mean		280.7
19					Coefficient of Variation	0.0904				Skewness		-0.451
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.634				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				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	11257				95% Adjusted-CLT UCL (Chen-1995)		11176
31										95% Modified-t UCL (Johnson-1978)		11251
32												
33						Gamma GOF Test						
34					A-D Test Statistic	2.466				Anderson-Darling Gamma GOF Test		
35					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
36					K-S Test Statistic	0.428				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.245				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)	127.6				k star (bias corrected MLE)		95.79
42					Theta hat (MLE)	84.24				Theta star (bias corrected MLE)		112.3
43					nu hat (MLE)	3064				nu star (bias corrected)		2299
44					MLE Mean (bias corrected)	10753				MLE Sd (bias corrected)		1099
45										Approximate Chi Square Value (0.05)		2189
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		2172
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	11296				95% Adjusted Gamma UCL (use when n<50)		11381
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.62				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.433				Lilliefors Lognormal GOF Test		
55					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	9.031				Mean of logged Data		9.279
60					Maximum of Logged Data	9.465				SD of logged Data		0.0938
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	N/A				90% Chebyshev (MVUE) UCL		11629
64					95% Chebyshev (MVUE) UCL	12025				97.5% Chebyshev (MVUE) UCL		12575
65					99% Chebyshev (MVUE) UCL	13656						
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	11215				95% Jackknife UCL		11257
72					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
73					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	11595				95% Chebyshev(Mean, Sd) UCL		11977
76					97.5% Chebyshev(Mean, Sd) UCL	12506				99% Chebyshev(Mean, Sd) UCL		13546
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	11257				or 95% Modified-t UCL		11251
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	12				Number of Distinct Observations		12
94										Number of Missing Observations		0
95					Minimum	44.57				Mean		109.4
96					Maximum	283				Median		90.3
97					SD	61.63				Std. Error of Mean		17.79
98					Coefficient of Variation	0.563				Skewness		2.245
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.762				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.24				Lilliefors GOF Test		
104					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
105						Data appear Approximate Normal at 5% Significance Level						
106												
107						Assuming Normal Distribution						
108					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
109					95% Student's-t UCL	141.4				95% Adjusted-CLT UCL (Chen-1995)		151
110										95% Modified-t UCL (Johnson-1978)		143.3
111												
112						Gamma GOF Test						
113					A-D Test Statistic	0.515				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.733				Detected data appear Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.168				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
117						Detected data appear Gamma Distributed at 5% Significance Level						
118												
119						Gamma Statistics						
120					k hat (MLE)	4.753				k star (bias corrected MLE)		3.621
121					Theta hat (MLE)	23.02				Theta star (bias corrected MLE)		30.22
122					nu hat (MLE)	114.1				nu star (bias corrected)		86.9
123					MLE Mean (bias corrected)	109.4				MLE Sd (bias corrected)		57.5
124										Approximate Chi Square Value (0.05)		66.41
125					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		63.68
126												
127						Assuming Gamma Distribution						
128					95% Approximate Gamma UCL (use when n>=50))	143.2				95% Adjusted Gamma UCL (use when n<50)		149.3
129												
130						Lognormal GOF Test						
131					Shapiro Wilk Test Statistic	0.942				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.153				Lilliefors Lognormal GOF Test		
134					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
135						Data appear Lognormal at 5% Significance Level						
136												
137						Lognormal Statistics						
138					Minimum of Logged Data	3.797				Mean of logged Data		4.586
139					Maximum of Logged Data	5.645				SD of logged Data		0.464
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141	Assuming Lognormal Distribution											
142					95% H-UCL	146.5				90% Chebyshev (MVUE) UCL		152.6
143					95% Chebyshev (MVUE) UCL	172.7				97.5% Chebyshev (MVUE) UCL		200.5
144					99% Chebyshev (MVUE) UCL	255.3						
145												
146	Nonparametric Distribution Free UCL Statistics											
147	Data appear to follow a Discernible Distribution at 5% Significance Level											
148												
149	Nonparametric Distribution Free UCLs											
150					95% CLT UCL	138.7				95% Jackknife UCL		141.4
151					95% Standard Bootstrap UCL	137.4				95% Bootstrap-t UCL		166.8
152					95% Hall's Bootstrap UCL	263.6				95% Percentile Bootstrap UCL		140.1
153					95% BCA Bootstrap UCL	149.6						
154					90% Chebyshev(Mean, Sd) UCL	162.8				95% Chebyshev(Mean, Sd) UCL		187
155					97.5% Chebyshev(Mean, Sd) UCL	220.5				99% Chebyshev(Mean, Sd) UCL		286.4
156												
157	Suggested UCL to Use											
158					95% Student's-t UCL	141.4						
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	12				Number of Distinct Observations		10
170										Number of Missing Observations		0
171					Minimum	6.17				Mean		12.24
172					Maximum	33.09				Median		10.66
173					SD	7.511				Std. Error of Mean		2.168
174					Coefficient of Variation	0.614				Skewness		2.353
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.677				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.399				Lilliefors GOF Test		
180					5% Lilliefors Critical Value	0.256				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	16.13				95% Adjusted-CLT UCL (Chen-1995)		17.38
186										95% Modified-t UCL (Johnson-1978)		16.38
187												
188						Gamma GOF Test						
189					A-D Test Statistic	1.125				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.734				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.358				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.246				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)	4.454				k star (bias corrected MLE)		3.396
197					Theta hat (MLE)	2.748				Theta star (bias corrected MLE)		3.604
198					nu hat (MLE)	106.9				nu star (bias corrected)		81.51
199					MLE Mean (bias corrected)	12.24				MLE Sd (bias corrected)		6.641
200										Approximate Chi Square Value (0.05)		61.7
201					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		59.08
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	16.17				95% Adjusted Gamma UCL (use when n<50)		16.89
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.843				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.325				Lilliefors Lognormal GOF Test		
210					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
211						Data Not Lognormal at 5% Significance Level						
212												
213						Lognormal Statistics						
214					Minimum of Logged Data	1.82				Mean of logged Data		2.388
215					Maximum of Logged Data	3.499				SD of logged Data		0.46
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217					Assuming Lognormal Distribution							
218					95% H-UCL	16.19				90% Chebyshev (MVUE) UCL		16.88
219				95% Chebyshev (MVUE) UCL		19.09				97.5% Chebyshev (MVUE) UCL		22.15
220				99% Chebyshev (MVUE) UCL		28.18						
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	15.81				95% Jackknife UCL		16.13
227				95% Standard Bootstrap UCL		15.63				95% Bootstrap-t UCL		25.01
228				95% Hall's Bootstrap UCL		37.16				95% Percentile Bootstrap UCL		16.15
229				95% BCA Bootstrap UCL		17.46						
230				90% Chebyshev(Mean, Sd) UCL		18.74				95% Chebyshev(Mean, Sd) UCL		21.69
231				97.5% Chebyshev(Mean, Sd) UCL		25.78				99% Chebyshev(Mean, Sd) UCL		33.81
232												
233					Suggested UCL to Use							
234					95% Student's-t UCL	16.13				or 95% Modified-t UCL		16.38
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	12				Number of Distinct Observations		6
246										Number of Missing Observations		0
247					Minimum	0.034				Mean		11.48
248					Maximum	17.97				Median		12
249					SD	5.675				Std. Error of Mean		1.638
250					Coefficient of Variation	0.495				Skewness		-1.17
251												
252					Normal GOF Test							
253					Shapiro Wilk Test Statistic	0.774				Shapiro Wilk GOF Test		
254					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
255					Lilliefors Test Statistic	0.37				Lilliefors GOF Test		
256					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
257					Data Not Normal at 5% Significance Level							
258												
259					Assuming Normal Distribution							
260					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
261					95% Student's-t UCL	14.42				95% Adjusted-CLT UCL (Chen-1995)		13.58
262										95% Modified-t UCL (Johnson-1978)		14.33
263												
264					Gamma GOF Test							
265					A-D Test Statistic	2.38				Anderson-Darling Gamma GOF Test		
266					5% A-D Critical Value	0.756				Data Not Gamma Distributed at 5% Significance Level		
267					K-S Test Statistic	0.48				Kolmogrov-Smirnoff Gamma GOF Test		
268					5% K-S Critical Value	0.252				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)	1.034				k star (bias corrected MLE)		0.831
273					Theta hat (MLE)	11.1				Theta star (bias corrected MLE)		13.81
274					nu hat (MLE)	24.81				nu star (bias corrected)		19.94
275					MLE Mean (bias corrected)	11.48				MLE Sd (bias corrected)		12.59
276										Approximate Chi Square Value (0.05)		10.81
277					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		9.796
278												
279					Assuming Gamma Distribution							
280					95% Approximate Gamma UCL (use when n>=50))	21.17				95% Adjusted Gamma UCL (use when n<50)		23.36
281												
282					Lognormal GOF Test							
283					Shapiro Wilk Test Statistic	0.545				Shapiro Wilk Lognormal GOF Test		
284					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
285					Lilliefors Test Statistic	0.462				Lilliefors Lognormal GOF Test		
286					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
287					Data Not Lognormal at 5% Significance Level							
288												
289					Lognormal Statistics							
290					Minimum of Logged Data	-3.381				Mean of logged Data		1.884
291					Maximum of Logged Data	2.889				SD of logged Data		1.826
292												

	A	B	C	D	E	F	G	H	I	J	K	L
293	**Assuming Lognormal Distribution**											
294					95% H-UCL	435.7				90% Chebyshev (MVUE) UCL		71.72
295				95% Chebyshev (MVUE) UCL		92.29				97.5% Chebyshev (MVUE) UCL		120.8
296				99% Chebyshev (MVUE) UCL		176.9						
297												
298	**Nonparametric Distribution Free UCL Statistics**											
299	**Data do not follow a Discernible Distribution (0.05)**											
300												
301	**Nonparametric Distribution Free UCLs**											
302					95% CLT UCL	14.17				95% Jackknife UCL		14.42
303				95% Standard Bootstrap UCL		14.06				95% Bootstrap-t UCL		14.02
304				95% Hall's Bootstrap UCL		13.49				95% Percentile Bootstrap UCL		13.89
305				95% BCA Bootstrap UCL		13.7						
306				90% Chebyshev(Mean, Sd) UCL		16.39				95% Chebyshev(Mean, Sd) UCL		18.62
307				97.5% Chebyshev(Mean, Sd) UCL		21.71				99% Chebyshev(Mean, Sd) UCL		27.78
308												
309	**Suggested UCL to Use**											
310				99% Chebyshev (Mean, Sd) UCL		27.78						
311												
312	**Recommended UCL exceeds the maximum observation**											
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
316	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
317	For additional insight the user may want to consult a statistician.											
318												
319	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
320	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
321												
322												

	A	B	C	D	E	F	G	H	I	J	K	L
323	Chromium											
324												
325					General Statistics							
326					Total Number of Observations	12			Number of Distinct Observations			11
327									Number of Missing Observations			0
328					Minimum	32.45			Mean			54.09
329					Maximum	85			Median			40.67
330					SD	21.85			Std. Error of Mean			6.308
331					Coefficient of Variation	0.404			Skewness			0.506
332												
333					Normal GOF Test							
334					Shapiro Wilk Test Statistic	0.8			Shapiro Wilk GOF Test			
335					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
336					Lilliefors Test Statistic	0.299			Lilliefors GOF Test			
337					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
338					Data Not Normal at 5% Significance Level							
339												
340					Assuming Normal Distribution							
341					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
342					95% Student's-t UCL	65.41			95% Adjusted-CLT UCL (Chen-1995)			65.45
343									95% Modified-t UCL (Johnson-1978)			65.57
344												
345					Gamma GOF Test							
346					A-D Test Statistic	1.038			Anderson-Darling Gamma GOF Test			
347					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
348					K-S Test Statistic	0.287			Kolmogrov-Smirnoff Gamma GOF Test			
349					5% K-S Critical Value	0.246			Data Not Gamma Distributed at 5% Significance Level			
350					Data Not Gamma Distributed at 5% Significance Level							
351												
352					Gamma Statistics							
353					k hat (MLE)	7.003			k star (bias corrected MLE)			5.308
354					Theta hat (MLE)	7.723			Theta star (bias corrected MLE)			10.19
355					nu hat (MLE)	168.1			nu star (bias corrected)			127.4
356					MLE Mean (bias corrected)	54.09			MLE Sd (bias corrected)			23.48
357									Approximate Chi Square Value (0.05)			102.3
358					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			98.9
359												
360					Assuming Gamma Distribution							
361					95% Approximate Gamma UCL (use when n>=50))	67.34			95% Adjusted Gamma UCL (use when n<50)			69.67
362												
363					Lognormal GOF Test							
364					Shapiro Wilk Test Statistic	0.823			Shapiro Wilk Lognormal GOF Test			
365					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
366					Lilliefors Test Statistic	0.267			Lilliefors Lognormal GOF Test			
367					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
368					Data Not Lognormal at 5% Significance Level							
369												
370					Lognormal Statistics							
371					Minimum of Logged Data	3.48			Mean of logged Data			3.917
372					Maximum of Logged Data	4.443			SD of logged Data			0.396
373												

	A	B	C	D	E	F	G	H	I	J	K	L
374	Assuming Lognormal Distribution											
375					95% H-UCL	69.19				90% Chebyshev (MVUE) UCL		72.77
376				95% Chebyshev (MVUE) UCL		81.28				97.5% Chebyshev (MVUE) UCL		93.09
377				99% Chebyshev (MVUE) UCL		116.3						
378												
379	Nonparametric Distribution Free UCL Statistics											
380	Data do not follow a Discernible Distribution (0.05)											
381												
382	Nonparametric Distribution Free UCLs											
383					95% CLT UCL	64.46				95% Jackknife UCL		65.41
384				95% Standard Bootstrap UCL		64.12				95% Bootstrap-t UCL		66.09
385				95% Hall's Bootstrap UCL		62.69				95% Percentile Bootstrap UCL		63.81
386				95% BCA Bootstrap UCL		64.76						
387				90% Chebyshev(Mean, Sd) UCL		73.01				95% Chebyshev(Mean, Sd) UCL		81.58
388				97.5% Chebyshev(Mean, Sd) UCL		93.48				99% Chebyshev(Mean, Sd) UCL		116.9
389												
390	Suggested UCL to Use											
391					95% Student's-t UCL	65.41				or 95% Modified-t UCL		65.57
392												
393	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
394	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
395	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
396	For additional insight the user may want to consult a statistician.											
397												
398												

	A	B	C	D	E	F	G	H	I	J	K	L
399	Copper											
400												
401					General Statistics							
402					Total Number of Observations	12				Number of Distinct Observations		12
403										Number of Missing Observations		0
404					Minimum	12				Mean		342.2
405					Maximum	1803				Median		138.9
406					SD	502.1				Std. Error of Mean		144.9
407					Coefficient of Variation	1.467				Skewness		2.559
408												
409					Normal GOF Test							
410					Shapiro Wilk Test Statistic	0.665				Shapiro Wilk GOF Test		
411					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
412					Lilliefors Test Statistic	0.255				Lilliefors GOF Test		
413					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
414					Data appear Approximate Normal at 5% Significance Level							
415												
416					Assuming Normal Distribution							
417					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
418					95% Student's-t UCL	602.4				95% Adjusted-CLT UCL (Chen-1995)		694.9
419										95% Modified-t UCL (Johnson-1978)		620.3
420												
421					Gamma GOF Test							
422					A-D Test Statistic	0.399				Anderson-Darling Gamma GOF Test		
423					5% A-D Critical Value	0.774				Detected data appear Gamma Distributed at 5% Significance Level		
424					K-S Test Statistic	0.157				Kolmogrov-Smirnoff Gamma GOF Test		
425					5% K-S Critical Value	0.256				Detected data appear Gamma Distributed at 5% Significance Level		
426					Detected data appear Gamma Distributed at 5% Significance Level							
427												
428					Gamma Statistics							
429					k hat (MLE)	0.647				k star (bias corrected MLE)		0.541
430					Theta hat (MLE)	528.5				Theta star (bias corrected MLE)		632.3
431					nu hat (MLE)	15.54				nu star (bias corrected)		12.99
432					MLE Mean (bias corrected)	342.2				MLE Sd (bias corrected)		465.1
433										Approximate Chi Square Value (0.05)		5.884
434					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.173
435												
436					Assuming Gamma Distribution							
437					95% Approximate Gamma UCL (use when n>=50))	755.2				95% Adjusted Gamma UCL (use when n<50)		859.1
438												
439					Lognormal GOF Test							
440					Shapiro Wilk Test Statistic	0.951				Shapiro Wilk Lognormal GOF Test		
441					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
442					Lilliefors Test Statistic	0.159				Lilliefors Lognormal GOF Test		
443					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
444					Data appear Lognormal at 5% Significance Level							
445												
446					Lognormal Statistics							
447					Minimum of Logged Data	2.485				Mean of logged Data		4.891
448					Maximum of Logged Data	7.497				SD of logged Data		1.545
449												

	A	B	C	D	E	F	G	H	I	J	K	L
450	**Assuming Lognormal Distribution**											
451					95% H-UCL	2822				90% Chebyshev (MVUE) UCL		908.1
452					95% Chebyshev (MVUE) UCL	1153				97.5% Chebyshev (MVUE) UCL		1492
453					99% Chebyshev (MVUE) UCL	2159						
454												
455	**Nonparametric Distribution Free UCL Statistics**											
456	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
457												
458	**Nonparametric Distribution Free UCLs**											
459					95% CLT UCL	580.6				95% Jackknife UCL		602.4
460					95% Standard Bootstrap UCL	571.7				95% Bootstrap-t UCL		894.6
461					95% Hall's Bootstrap UCL	1465				95% Percentile Bootstrap UCL		590.3
462					95% BCA Bootstrap UCL	689.7						
463					90% Chebyshev(Mean, Sd) UCL	777				95% Chebyshev(Mean, Sd) UCL		973.9
464					97.5% Chebyshev(Mean, Sd) UCL	1247				99% Chebyshev(Mean, Sd) UCL		1784
465												
466	**Suggested UCL to Use**											
467					95% Student's-t UCL	602.4						
468												
469	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
470	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
471	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
472	For additional insight the user may want to consult a statistician.											
473												
474												

	A	B	C	D	E	F	G	H	I	J	K	L
475	Iron											
476												
477					General Statistics							
478					Total Number of Observations	12				Number of Distinct Observations		12
479										Number of Missing Observations		0
480					Minimum	13693				Mean		27173
481					Maximum	60522				Median		21041
482					SD	14081				Std. Error of Mean		4065
483					Coefficient of Variation	0.518				Skewness		1.28
484												
485					Normal GOF Test							
486					Shapiro Wilk Test Statistic	0.852				Shapiro Wilk GOF Test		
487					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
488					Lilliefors Test Statistic	0.224				Lilliefors GOF Test		
489					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
490					Data appear Approximate Normal at 5% Significance Level							
491												
492					Assuming Normal Distribution							
493					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
494					95% Student's-t UCL	34473				95% Adjusted-CLT UCL (Chen-1995)		35463
495										95% Modified-t UCL (Johnson-1978)		34723
496												
497					Gamma GOF Test							
498					A-D Test Statistic	0.539				Anderson-Darling Gamma GOF Test		
499					5% A-D Critical Value	0.733				Detected data appear Gamma Distributed at 5% Significance Level		
500					K-S Test Statistic	0.225				Kolmogrov-Smirnoff Gamma GOF Test		
501					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
502					Detected data appear Gamma Distributed at 5% Significance Level							
503												
504					Gamma Statistics							
505					k hat (MLE)	4.761				k star (bias corrected MLE)		3.626
506					Theta hat (MLE)	5708				Theta star (bias corrected MLE)		7494
507					nu hat (MLE)	114.3				nu star (bias corrected)		87.02
508					MLE Mean (bias corrected)	27173				MLE Sd (bias corrected)		14270
509										Approximate Chi Square Value (0.05)		66.52
510					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		63.79
511												
512					Assuming Gamma Distribution							
513					95% Approximate Gamma UCL (use when n>=50))	35549				95% Adjusted Gamma UCL (use when n<50)		37070
514												
515					Lognormal GOF Test							
516					Shapiro Wilk Test Statistic	0.917				Shapiro Wilk Lognormal GOF Test		
517					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
518					Lilliefors Test Statistic	0.207				Lilliefors Lognormal GOF Test		
519					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
520					Data appear Lognormal at 5% Significance Level							
521												
522					Lognormal Statistics							
523					Minimum of Logged Data	9.525				Mean of logged Data		10.1
524					Maximum of Logged Data	11.01				SD of logged Data		0.475
525												

	A	B	C	D	E	F	G	H	I	J	K	L
526	**Assuming Lognormal Distribution**											
527					95% H-UCL	36902				90% Chebyshev (MVUE) UCL		38346
528					95% Chebyshev (MVUE) UCL	43484				97.5% Chebyshev (MVUE) UCL		50615
529					99% Chebyshev (MVUE) UCL	64622						
530												
531	**Nonparametric Distribution Free UCL Statistics**											
532	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
533												
534	**Nonparametric Distribution Free UCLs**											
535					95% CLT UCL	33859				95% Jackknife UCL		34473
536					95% Standard Bootstrap UCL	33469				95% Bootstrap-t UCL		37206
537					95% Hall's Bootstrap UCL	36736				95% Percentile Bootstrap UCL		34011
538					95% BCA Bootstrap UCL	35221						
539					90% Chebyshev(Mean, Sd) UCL	39367				95% Chebyshev(Mean, Sd) UCL		44891
540					97.5% Chebyshev(Mean, Sd) UCL	52558				99% Chebyshev(Mean, Sd) UCL		67618
541												
542	**Suggested UCL to Use**											
543					95% Student's-t UCL	34473						
544												
545	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
546	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
547	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
548	For additional insight the user may want to consult a statistician.											
549												
550												

	A	B	C	D	E	F	G	H	I	J	K	L
551	Manganese											
552												
553					General Statistics							
554					Total Number of Observations	12			Number of Distinct Observations			12
555									Number of Missing Observations			0
556					Minimum	232.7			Mean			722.5
557					Maximum	2903			Median			576.7
558					SD	715.8			Std. Error of Mean			206.6
559					Coefficient of Variation	0.991			Skewness			2.986
560												
561					Normal GOF Test							
562					Shapiro Wilk Test Statistic	0.594			Shapiro Wilk GOF Test			
563					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
564					Lilliefors Test Statistic	0.331			Lilliefors GOF Test			
565					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
566					Data Not Normal at 5% Significance Level							
567												
568					Assuming Normal Distribution							
569					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
570					95% Student's-t UCL	1094			95% Adjusted-CLT UCL (Chen-1995)			1253
571									95% Modified-t UCL (Johnson-1978)			1123
572												
573					Gamma GOF Test							
574					A-D Test Statistic	0.856			Anderson-Darling Gamma GOF Test			
575					5% A-D Critical Value	0.741			Data Not Gamma Distributed at 5% Significance Level			
576					K-S Test Statistic	0.238			Kolmogrov-Smirnoff Gamma GOF Test			
577					5% K-S Critical Value	0.248			Detected data appear Gamma Distributed at 5% Significance Level			
578					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
579												
580					Gamma Statistics							
581					k hat (MLE)	2.117			k star (bias corrected MLE)			1.643
582					Theta hat (MLE)	341.3			Theta star (bias corrected MLE)			439.7
583					nu hat (MLE)	50.81			nu star (bias corrected)			39.44
584					MLE Mean (bias corrected)	722.5			MLE Sd (bias corrected)			563.6
585									Approximate Chi Square Value (0.05)			26.05
586					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			24.4
587												
588					Assuming Gamma Distribution							
589					95% Approximate Gamma UCL (use when n>=50)	1094			95% Adjusted Gamma UCL (use when n<50)			1168
590												
591					Lognormal GOF Test							
592					Shapiro Wilk Test Statistic	0.898			Shapiro Wilk Lognormal GOF Test			
593					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
594					Lilliefors Test Statistic	0.181			Lilliefors Lognormal GOF Test			
595					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
596					Data appear Lognormal at 5% Significance Level							
597												
598					Lognormal Statistics							
599					Minimum of Logged Data	5.45			Mean of logged Data			6.328
600					Maximum of Logged Data	7.974			SD of logged Data			0.669
601												

	A	B	C	D	E	F	G	H	I	J	K	L
602	**Assuming Lognormal Distribution**											
603					95% H-UCL	1130				90% Chebyshev (MVUE) UCL		1098
604					95% Chebyshev (MVUE) UCL	1285				97.5% Chebyshev (MVUE) UCL		1545
605					99% Chebyshev (MVUE) UCL	2055						
606												
607	**Nonparametric Distribution Free UCL Statistics**											
608	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
609												
610	**Nonparametric Distribution Free UCLs**											
611					95% CLT UCL	1062				95% Jackknife UCL		1094
612					95% Standard Bootstrap UCL	1042				95% Bootstrap-t UCL		1777
613					95% Hall's Bootstrap UCL	2592				95% Percentile Bootstrap UCL		1097
614					95% BCA Bootstrap UCL	1269						
615					90% Chebyshev(Mean, Sd) UCL	1342				95% Chebyshev(Mean, Sd) UCL		1623
616					97.5% Chebyshev(Mean, Sd) UCL	2013				99% Chebyshev(Mean, Sd) UCL		2779
617												
618	**Suggested UCL to Use**											
619					95% Adjusted Gamma UCL	1168						
620												
621	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
622	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
623	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
624	For additional insight the user may want to consult a statistician.											
625												
626												

	A	B	C	D	E	F	G	H	I	J	K	L
627	Nickel											
628												
629					General Statistics							
630					Total Number of Observations	12				Number of Distinct Observations		11
631										Number of Missing Observations		0
632					Minimum	65				Mean		244.1
633					Maximum	834.4				Median		101.5
634					SD	250				Std. Error of Mean		72.16
635					Coefficient of Variation	1.024				Skewness		1.572
636												
637					Normal GOF Test							
638					Shapiro Wilk Test Statistic	0.757				Shapiro Wilk GOF Test		
639					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
640					Lilliefors Test Statistic	0.289				Lilliefors GOF Test		
641					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
642					Data Not Normal at 5% Significance Level							
643												
644					Assuming Normal Distribution							
645					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
646					95% Student's-t UCL	373.7				95% Adjusted-CLT UCL (Chen-1995)		397.8
647										95% Modified-t UCL (Johnson-1978)		379.1
648												
649					Gamma GOF Test							
650					A-D Test Statistic	0.904				Anderson-Darling Gamma GOF Test		
651					5% A-D Critical Value	0.749				Data Not Gamma Distributed at 5% Significance Level		
652					K-S Test Statistic	0.28				Kolmogrov-Smirnoff Gamma GOF Test		
653					5% K-S Critical Value	0.251				Data Not Gamma Distributed at 5% Significance Level		
654					Data Not Gamma Distributed at 5% Significance Level							
655												
656					Gamma Statistics							
657					k hat (MLE)	1.326				k star (bias corrected MLE)		1.05
658					Theta hat (MLE)	184				Theta star (bias corrected MLE)		232.4
659					nu hat (MLE)	31.84				nu star (bias corrected)		25.21
660					MLE Mean (bias corrected)	244.1				MLE Sd (bias corrected)		238.2
661										Approximate Chi Square Value (0.05)		14.77
662					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		13.57
663												
664					Assuming Gamma Distribution							
665					95% Approximate Gamma UCL (use when n>=50))	416.6				95% Adjusted Gamma UCL (use when n<50)		453.6
666												
667					Lognormal GOF Test							
668					Shapiro Wilk Test Statistic	0.852				Shapiro Wilk Lognormal GOF Test		
669					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
670					Lilliefors Test Statistic	0.245				Lilliefors Lognormal GOF Test		
671					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
672					Data appear Approximate Lognormal at 5% Significance Level							
673												
674					Lognormal Statistics							
675					Minimum of Logged Data	4.174				Mean of logged Data		5.075
676					Maximum of Logged Data	6.727				SD of logged Data		0.929
677												

	A	B	C	D	E	F	G	H	I	J	K	L
678	Assuming Lognormal Distribution											
679					95% H-UCL	537.5				90% Chebyshev (MVUE) UCL		435.8
680				95% Chebyshev (MVUE) UCL		526.8				97.5% Chebyshev (MVUE) UCL		653.1
681				99% Chebyshev (MVUE) UCL		901.2						
682												
683	Nonparametric Distribution Free UCL Statistics											
684	Data appear to follow a Discernible Distribution at 5% Significance Level											
685												
686	Nonparametric Distribution Free UCLs											
687					95% CLT UCL	362.8				95% Jackknife UCL		373.7
688				95% Standard Bootstrap UCL		358.6				95% Bootstrap-t UCL		492.1
689				95% Hall's Bootstrap UCL		541.9				95% Percentile Bootstrap UCL		368.2
690				95% BCA Bootstrap UCL		393.3						
691				90% Chebyshev(Mean, Sd) UCL		460.6				95% Chebyshev(Mean, Sd) UCL		558.6
692				97.5% Chebyshev(Mean, Sd) UCL		694.7				99% Chebyshev(Mean, Sd) UCL		962.1
693												
694	Suggested UCL to Use											
695				95% Chebyshev (Mean, Sd) UCL		558.6						
696												
697	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
698	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
699	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
700	For additional insight the user may want to consult a statistician.											
701												
702												

	A	B	C	D	E	F	G	H	I	J	K	L
703	PAH, Total											
704												
705						General Statistics						
706					Total Number of Observations	12				Number of Distinct Observations		3
707										Number of Missing Observations		0
708					Minimum	0.0073				Mean		0.0831
709					Maximum	0.159				Median		0.0831
710					SD	0.0323				Std. Error of Mean		0.00933
711					Coefficient of Variation	0.389				Skewness		1.578E-15
712												
713						Normal GOF Test						
714					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
715					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
716					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
717					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
718						Data Not Normal at 5% Significance Level						
719												
720						Assuming Normal Distribution						
721					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
722					95% Student's-t UCL	0.0998				95% Adjusted-CLT UCL (Chen-1995)		0.0984
723										95% Modified-t UCL (Johnson-1978)		0.0998
724												
725						Gamma GOF Test						
726					A-D Test Statistic	2.994				Anderson-Darling Gamma GOF Test		
727					5% A-D Critical Value	0.737				Data Not Gamma Distributed at 5% Significance Level		
728					K-S Test Statistic	0.488				Kolmogrov-Smirnoff Gamma GOF Test		
729					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
730						Data Not Gamma Distributed at 5% Significance Level						
731												
732						Gamma Statistics						
733					k hat (MLE)	3.522				k star (bias corrected MLE)		2.697
734					Theta hat (MLE)	0.0236				Theta star (bias corrected MLE)		0.0308
735					nu hat (MLE)	84.53				nu star (bias corrected)		64.73
736					MLE Mean (bias corrected)	0.0831				MLE Sd (bias corrected)		0.0506
737										Approximate Chi Square Value (0.05)		47.22
738					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		44.94
739												
740						Assuming Gamma Distribution						
741					95% Approximate Gamma UCL (use when n>=50))	0.114				95% Adjusted Gamma UCL (use when n<50)		0.12
742												
743						Lognormal GOF Test						
744					Shapiro Wilk Test Statistic	0.469				Shapiro Wilk Lognormal GOF Test		
745					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
746					Lilliefors Test Statistic	0.496				Lilliefors Lognormal GOF Test		
747					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
748						Data Not Lognormal at 5% Significance Level						
749												
750						Lognormal Statistics						
751					Minimum of Logged Data	-4.92				Mean of logged Data		-2.637
752					Maximum of Logged Data	-1.84				SD of logged Data		0.743
753												

	A	B	C	D	E	F	G	H	I	J	K	L
754	Assuming Lognormal Distribution											
755					95% H-UCL	0.164				90% Chebyshev (MVUE) UCL		0.154
756				95% Chebyshev (MVUE) UCL		0.181				97.5% Chebyshev (MVUE) UCL		0.22
757				99% Chebyshev (MVUE) UCL		0.297						
758												
759	Nonparametric Distribution Free UCL Statistics											
760	Data do not follow a Discernible Distribution (0.05)											
761												
762	Nonparametric Distribution Free UCLs											
763					95% CLT UCL	0.0984				95% Jackknife UCL		0.0998
764				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
765				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
766				95% BCA Bootstrap UCL		N/A						
767				90% Chebyshev(Mean, Sd) UCL		0.111				95% Chebyshev(Mean, Sd) UCL		0.124
768				97.5% Chebyshev(Mean, Sd) UCL		0.141				99% Chebyshev(Mean, Sd) UCL		0.176
769												
770	Suggested UCL to Use											
771				95% Chebyshev (Mean, Sd) UCL		0.124						
772												
773	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
774	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
775	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
776	For additional insight the user may want to consult a statistician.											
777												
778												

	A	B	C	D	E	F	G	H	I	J	K	L
779	PCB, Total											
780												
781						General Statistics						
782					Total Number of Observations	12				Number of Distinct Observations		5
783										Number of Missing Observations		0
784					Minimum	0.34				Mean		8.808
785					Maximum	50				Median		5
786					SD	13.3				Std. Error of Mean		3.838
787					Coefficient of Variation	1.51				Skewness		3.171
788												
789						Normal GOF Test						
790					Shapiro Wilk Test Statistic	0.513				Shapiro Wilk GOF Test		
791					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
792					Lilliefors Test Statistic	0.381				Lilliefors GOF Test		
793					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
794						Data Not Normal at 5% Significance Level						
795												
796						Assuming Normal Distribution						
797					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
798					95% Student's-t UCL	15.7				95% Adjusted-CLT UCL (Chen-1995)		18.87
799										95% Modified-t UCL (Johnson-1978)		16.29
800												
801						Gamma GOF Test						
802					A-D Test Statistic	1.288				Anderson-Darling Gamma GOF Test		
803					5% A-D Critical Value	0.762				Data Not Gamma Distributed at 5% Significance Level		
804					K-S Test Statistic	0.296				Kolmogrov-Smirnoff Gamma GOF Test		
805					5% K-S Critical Value	0.254				Data Not Gamma Distributed at 5% Significance Level		
806						Data Not Gamma Distributed at 5% Significance Level						
807												
808						Gamma Statistics						
809					k hat (MLE)	0.838				k star (bias corrected MLE)		0.684
810					Theta hat (MLE)	10.52				Theta star (bias corrected MLE)		12.88
811					nu hat (MLE)	20.1				nu star (bias corrected)		16.41
812					MLE Mean (bias corrected)	8.808				MLE Sd (bias corrected)		10.65
813										Approximate Chi Square Value (0.05)		8.252
814					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		7.385
815												
816						Assuming Gamma Distribution						
817					95% Approximate Gamma UCL (use when n>=50))	17.51				95% Adjusted Gamma UCL (use when n<50)		19.57
818												
819						Lognormal GOF Test						
820					Shapiro Wilk Test Statistic	0.791				Shapiro Wilk Lognormal GOF Test		
821					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
822					Lilliefors Test Statistic	0.374				Lilliefors Lognormal GOF Test		
823					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
824						Data Not Lognormal at 5% Significance Level						
825												
826						Lognormal Statistics						
827					Minimum of Logged Data	-1.079				Mean of logged Data		1.471
828					Maximum of Logged Data	3.912				SD of logged Data		1.36
829												

	A	B	C	D	E	F	G	H	I	J	K	L
830	Assuming Lognormal Distribution											
831					95% H-UCL	48.13				90% Chebyshev (MVUE) UCL		22.12
832				95% Chebyshev (MVUE) UCL		27.76				97.5% Chebyshev (MVUE) UCL		35.58
833				99% Chebyshev (MVUE) UCL		50.95						
834												
835	Nonparametric Distribution Free UCL Statistics											
836	Data do not follow a Discernible Distribution (0.05)											
837												
838	Nonparametric Distribution Free UCLs											
839					95% CLT UCL	15.12				95% Jackknife UCL		15.7
840				95% Standard Bootstrap UCL		14.94				95% Bootstrap-t UCL		33.19
841				95% Hall's Bootstrap UCL		42.3				95% Percentile Bootstrap UCL		16.25
842				95% BCA Bootstrap UCL		20.03						
843				90% Chebyshev(Mean, Sd) UCL		20.32				95% Chebyshev(Mean, Sd) UCL		25.54
844				97.5% Chebyshev(Mean, Sd) UCL		32.78				99% Chebyshev(Mean, Sd) UCL		46.99
845												
846	Suggested UCL to Use											
847				95% Chebyshev (Mean, Sd) UCL		25.54						
848												
849	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
850	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
851	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
852	For additional insight the user may want to consult a statistician.											
853												
854												

	A	B	C	D	E	F	G	H	I	J	K	L
855	Uranium											
856												
857					General Statistics							
858					Total Number of Observations	12			Number of Distinct Observations			12
859									Number of Missing Observations			0
860					Minimum	1.6			Mean			39.61
861					Maximum	82.92			Median			44.88
862					SD	26.66			Std. Error of Mean			7.696
863					Coefficient of Variation	0.673			Skewness			0.115
864												
865					Normal GOF Test							
866					Shapiro Wilk Test Statistic	0.949			Shapiro Wilk GOF Test			
867					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
868					Lilliefors Test Statistic	0.166			Lilliefors GOF Test			
869					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
870					Data appear Normal at 5% Significance Level							
871												
872					Assuming Normal Distribution							
873					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
874					95% Student's-t UCL	53.43			95% Adjusted-CLT UCL (Chen-1995)			52.54
875									95% Modified-t UCL (Johnson-1978)			53.47
876												
877					Gamma GOF Test							
878					A-D Test Statistic	0.442			Anderson-Darling Gamma GOF Test			
879					5% A-D Critical Value	0.747			Detected data appear Gamma Distributed at 5% Significance Level			
880					K-S Test Statistic	0.209			Kolmogrov-Smirnoff Gamma GOF Test			
881					5% K-S Critical Value	0.25			Detected data appear Gamma Distributed at 5% Significance Level			
882					Detected data appear Gamma Distributed at 5% Significance Level							
883												
884					Gamma Statistics							
885					k hat (MLE)	1.425			k star (bias corrected MLE)			1.124
886					Theta hat (MLE)	27.79			Theta star (bias corrected MLE)			35.22
887					nu hat (MLE)	34.21			nu star (bias corrected)			26.99
888					MLE Mean (bias corrected)	39.61			MLE Sd (bias corrected)			37.35
889									Approximate Chi Square Value (0.05)			16.14
890					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			14.87
891												
892					Assuming Gamma Distribution							
893					95% Approximate Gamma UCL (use when n>=50))	66.22			95% Adjusted Gamma UCL (use when n<50)			71.86
894												
895					Lognormal GOF Test							
896					Shapiro Wilk Test Statistic	0.849			Shapiro Wilk Lognormal GOF Test			
897					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
898					Lilliefors Test Statistic	0.227			Lilliefors Lognormal GOF Test			
899					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
900					Data appear Approximate Lognormal at 5% Significance Level							
901												
902					Lognormal Statistics							
903					Minimum of Logged Data	0.47			Mean of logged Data			3.289
904					Maximum of Logged Data	4.418			SD of logged Data			1.151
905												

	A	B	C	D	E	F	G	H	I	J	K	L
906					Assuming Lognormal Distribution							
907					95% H-UCL	157.8				90% Chebyshev (MVUE) UCL		99.69
908				95% Chebyshev (MVUE) UCL		123.1				97.5% Chebyshev (MVUE) UCL		155.6
909				99% Chebyshev (MVUE) UCL		219.5						
910												
911					Nonparametric Distribution Free UCL Statistics							
912					Data appear to follow a Discernible Distribution at 5% Significance Level							
913												
914					Nonparametric Distribution Free UCLs							
915					95% CLT UCL	52.27				95% Jackknife UCL		53.43
916				95% Standard Bootstrap UCL		51.58				95% Bootstrap-t UCL		53.49
917				95% Hall's Bootstrap UCL		51.77				95% Percentile Bootstrap UCL		51.37
918				95% BCA Bootstrap UCL		52.65						
919				90% Chebyshev(Mean, Sd) UCL		62.7				95% Chebyshev(Mean, Sd) UCL		73.15
920				97.5% Chebyshev(Mean, Sd) UCL		87.67				99% Chebyshev(Mean, Sd) UCL		116.2
921												
922					Suggested UCL to Use							
923					95% Student's-t UCL	53.43						
924												
925					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
926					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
927					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
928					For additional insight the user may want to consult a statistician.							
929												
930												

	A	B	C	D	E	F	G	H	I	J	K	L
931	Uranium-234											
932												
933					General Statistics							
934					Total Number of Observations	12			Number of Distinct Observations			3
935									Number of Missing Observations			0
936					Minimum	0.8			Mean			3.645
937					Maximum	6.49			Median			3.645
938					SD	1.213			Std. Error of Mean			0.35
939					Coefficient of Variation	0.333			Skewness			-1.95E-15
940												
941					Normal GOF Test							
942					Shapiro Wilk Test Statistic	0.6			Shapiro Wilk GOF Test			
943					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
944					Lilliefors Test Statistic	0.417			Lilliefors GOF Test			
945					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
946					Data Not Normal at 5% Significance Level							
947												
948					Assuming Normal Distribution							
949					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
950					95% Student's-t UCL	4.274			95% Adjusted-CLT UCL (Chen-1995)			4.221
951									95% Modified-t UCL (Johnson-1978)			4.274
952												
953					Gamma GOF Test							
954					A-D Test Statistic	2.862			Anderson-Darling Gamma GOF Test			
955					5% A-D Critical Value	0.731			Data Not Gamma Distributed at 5% Significance Level			
956					K-S Test Statistic	0.469			Kolmogrov-Smirnoff Gamma GOF Test			
957					5% K-S Critical Value	0.246			Data Not Gamma Distributed at 5% Significance Level			
958					Data Not Gamma Distributed at 5% Significance Level							
959												
960					Gamma Statistics							
961					k hat (MLE)	6.548			k star (bias corrected MLE)			4.966
962					Theta hat (MLE)	0.557			Theta star (bias corrected MLE)			0.734
963					nu hat (MLE)	157.1			nu star (bias corrected)			119.2
964					MLE Mean (bias corrected)	3.645			MLE Sd (bias corrected)			1.636
965									Approximate Chi Square Value (0.05)			94.99
966					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			91.69
967												
968					Assuming Gamma Distribution							
969					95% Approximate Gamma UCL (use when n>=50))	4.574			95% Adjusted Gamma UCL (use when n<50)			4.738
970												
971					Lognormal GOF Test							
972					Shapiro Wilk Test Statistic	0.513			Shapiro Wilk Lognormal GOF Test			
973					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
974					Lilliefors Test Statistic	0.481			Lilliefors Lognormal GOF Test			
975					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
976					Data Not Lognormal at 5% Significance Level							
977												
978					Lognormal Statistics							
979					Minimum of Logged Data	-0.223			Mean of logged Data			1.215
980					Maximum of Logged Data	1.87			SD of logged Data			0.482
981												

	A	B	C	D	E	F	G	H	I	J	K	L
982					Assuming Lognormal Distribution							
983					95% H-UCL	5.153				90% Chebyshev (MVUE) UCL		5.346
984				95% Chebyshev (MVUE) UCL		6.071				97.5% Chebyshev (MVUE) UCL		7.077
985				99% Chebyshev (MVUE) UCL		9.052						
986												
987					Nonparametric Distribution Free UCL Statistics							
988					Data do not follow a Discernible Distribution (0.05)							
989												
990					Nonparametric Distribution Free UCLs							
991					95% CLT UCL	4.221				95% Jackknife UCL		4.274
992				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
993				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
994				95% BCA Bootstrap UCL		N/A						
995				90% Chebyshev(Mean, Sd) UCL		4.696				95% Chebyshev(Mean, Sd) UCL		5.171
996				97.5% Chebyshev(Mean, Sd) UCL		5.832				99% Chebyshev(Mean, Sd) UCL		7.129
997												
998					Suggested UCL to Use							
999				95% Student's-t UCL		4.274				or 95% Modified-t UCL		4.274
1000												
1001	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1002	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1003	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1004	For additional insight the user may want to consult a statistician.											
1005												
1006	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
1007	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
1008												
1009												

	A	B	C	D	E	F	G	H	I	J	K	L
1010	Uranium-235											
1011												
1012						General Statistics						
1013					Total Number of Observations	12				Number of Distinct Observations		3
1014										Number of Missing Observations		0
1015					Minimum	0.055				Mean		0.253
1016					Maximum	0.45				Median		0.253
1017					SD	0.0842				Std. Error of Mean		0.0243
1018					Coefficient of Variation	0.334				Skewness		0
1019												
1020						Normal GOF Test						
1021					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1022					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1023					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1024					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1025						Data Not Normal at 5% Significance Level						
1026												
1027						Assuming Normal Distribution						
1028					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1029					95% Student's-t UCL	0.296				95% Adjusted-CLT UCL (Chen-1995)		0.292
1030										95% Modified-t UCL (Johnson-1978)		0.296
1031												
1032						Gamma GOF Test						
1033					A-D Test Statistic	2.863				Anderson-Darling Gamma GOF Test		
1034					5% A-D Critical Value	0.731				Data Not Gamma Distributed at 5% Significance Level		
1035					K-S Test Statistic	0.469				Kolmogrov-Smirnoff Gamma GOF Test		
1036					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1037						Data Not Gamma Distributed at 5% Significance Level						
1038												
1039						Gamma Statistics						
1040					k hat (MLE)	6.503				k star (bias corrected MLE)		4.933
1041					Theta hat (MLE)	0.0388				Theta star (bias corrected MLE)		0.0512
1042					nu hat (MLE)	156.1				nu star (bias corrected)		118.4
1043					MLE Mean (bias corrected)	0.253				MLE Sd (bias corrected)		0.114
1044										Approximate Chi Square Value (0.05)		94.26
1045					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		90.98
1046												
1047						Assuming Gamma Distribution						
1048					95% Approximate Gamma UCL (use when n>=50))	0.317				95% Adjusted Gamma UCL (use when n<50)		0.329
1049												
1050						Lognormal GOF Test						
1051					Shapiro Wilk Test Statistic	0.513				Shapiro Wilk Lognormal GOF Test		
1052					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1053					Lilliefors Test Statistic	0.481				Lilliefors Lognormal GOF Test		
1054					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1055						Data Not Lognormal at 5% Significance Level						
1056												
1057						Lognormal Statistics						
1058					Minimum of Logged Data	-2.9				Mean of logged Data		-1.455
1059					Maximum of Logged Data	-0.799				SD of logged Data		0.484
1060												

	A	B	C	D	E	F	G	H	I	J	K	L
1061					Assuming Lognormal Distribution							
1062					95% H-UCL	0.358				90% Chebyshev (MVUE) UCL		0.371
1063				95% Chebyshev (MVUE) UCL		0.421				97.5% Chebyshev (MVUE) UCL		0.491
1064				99% Chebyshev (MVUE) UCL		0.629						
1065												
1066					Nonparametric Distribution Free UCL Statistics							
1067					Data do not follow a Discernible Distribution (0.05)							
1068												
1069					Nonparametric Distribution Free UCLs							
1070					95% CLT UCL	0.292				95% Jackknife UCL		0.296
1071				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1072				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1073				95% BCA Bootstrap UCL		N/A						
1074				90% Chebyshev(Mean, Sd) UCL		0.325				95% Chebyshev(Mean, Sd) UCL		0.358
1075				97.5% Chebyshev(Mean, Sd) UCL		0.404				99% Chebyshev(Mean, Sd) UCL		0.494
1076												
1077					Suggested UCL to Use							
1078					95% Student's-t UCL	0.296				or 95% Modified-t UCL		0.296
1079												
1080	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1081	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1082	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1083	For additional insight the user may want to consult a statistician.											
1084												
1085												

	A	B	C	D	E	F	G	H	I	J	K	L
1086	Uranium-238											
1087												
1088						General Statistics						
1089					Total Number of Observations	12				Number of Distinct Observations		3
1090										Number of Missing Observations		0
1091					Minimum	0.89				Mean		4.47
1092					Maximum	8.05				Median		4.47
1093					SD	1.527				Std. Error of Mean		0.441
1094					Coefficient of Variation	0.342				Skewness		1.525E-15
1095												
1096						Normal GOF Test						
1097					Shapiro Wilk Test Statistic	0.6				Shapiro Wilk GOF Test		
1098					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1099					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
1100					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
1101						Data Not Normal at 5% Significance Level						
1102												
1103						Assuming Normal Distribution						
1104					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
1105					95% Student's-t UCL	5.261				95% Adjusted-CLT UCL (Chen-1995)		5.195
1106										95% Modified-t UCL (Johnson-1978)		5.261
1107												
1108						Gamma GOF Test						
1109					A-D Test Statistic	2.875				Anderson-Darling Gamma GOF Test		
1110					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
1111					K-S Test Statistic	0.471				Kolmogrov-Smirnoff Gamma GOF Test		
1112					5% K-S Critical Value	0.246				Data Not Gamma Distributed at 5% Significance Level		
1113						Data Not Gamma Distributed at 5% Significance Level						
1114												
1115						Gamma Statistics						
1116					k hat (MLE)	6.012				k star (bias corrected MLE)		4.564
1117					Theta hat (MLE)	0.744				Theta star (bias corrected MLE)		0.979
1118					nu hat (MLE)	144.3				nu star (bias corrected)		109.5
1119					MLE Mean (bias corrected)	4.47				MLE Sd (bias corrected)		2.092
1120										Approximate Chi Square Value (0.05)		86.39
1121					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		83.25
1122												
1123						Assuming Gamma Distribution						
1124					95% Approximate Gamma UCL (use when n>=50))	5.668				95% Adjusted Gamma UCL (use when n<50)		5.882
1125												
1126						Lognormal GOF Test						
1127					Shapiro Wilk Test Statistic	0.508				Shapiro Wilk Lognormal GOF Test		
1128					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
1129					Lilliefors Test Statistic	0.483				Lilliefors Lognormal GOF Test		
1130					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
1131						Data Not Lognormal at 5% Significance Level						
1132												
1133						Lognormal Statistics						
1134					Minimum of Logged Data	-0.117				Mean of logged Data		1.412
1135					Maximum of Logged Data	2.086				SD of logged Data		0.51
1136												

	A	B	C	D	E	F	G	H	I	J	K	L
1137	Assuming Lognormal Distribution											
1138					95% H-UCL	6.51				90% Chebyshev (MVUE) UCL		6.71
1139				95% Chebyshev (MVUE) UCL		7.657				97.5% Chebyshev (MVUE) UCL		8.971
1140				99% Chebyshev (MVUE) UCL		11.55						
1141												
1142	Nonparametric Distribution Free UCL Statistics											
1143	Data do not follow a Discernible Distribution (0.05)											
1144												
1145	Nonparametric Distribution Free UCLs											
1146					95% CLT UCL	5.195				95% Jackknife UCL		5.261
1147				95% Standard Bootstrap UCL		N/A				95% Bootstrap-t UCL		N/A
1148				95% Hall's Bootstrap UCL		N/A				95% Percentile Bootstrap UCL		N/A
1149				95% BCA Bootstrap UCL		N/A						
1150				90% Chebyshev(Mean, Sd) UCL		5.792				95% Chebyshev(Mean, Sd) UCL		6.391
1151				97.5% Chebyshev(Mean, Sd) UCL		7.222				99% Chebyshev(Mean, Sd) UCL		8.855
1152												
1153	Suggested UCL to Use											
1154				95% Chebyshev (Mean, Sd) UCL		6.391						
1155												
1156	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1157	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
1158	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
1159	For additional insight the user may want to consult a statistician.											
1160												