	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 1:49:25 PM								
5	From File			EPC_015Sub_EU01.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	Antimony											
12												
13						General Statistics						
14					Total Number of Observations	12				Number of Distinct Observations		12
15										Number of Missing Observations		0
16					Minimum	30				Mean		92.16
17					Maximum	135				Median		99.66
18					SD	30.92				Std. Error of Mean		8.927
19					Coefficient of Variation	0.336				Skewness		-0.912
20												
21						Normal GOF Test						
22					Shapiro Wilk Test Statistic	0.918				Shapiro Wilk GOF Test		
23					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
24					Lilliefors Test Statistic	0.172				Lilliefors GOF Test		
25					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
26						Data appear Normal at 5% Significance Level						
27												
28						Assuming Normal Distribution						
29					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
30					95% Student's-t UCL	108.2				95% Adjusted-CLT UCL (Chen-1995)		104.3
31										95% Modified-t UCL (Johnson-1978)		107.8
32												
33						Gamma GOF Test						
34					A-D Test Statistic	0.847				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	0.232				Kolmogrov-Smirnoff Gamma GOF Test		
37					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
38						Detected data follow Appr. Gamma Distribution at 5% Significance Level						
39												
40						Gamma Statistics						
41					k hat (MLE)	6.843				k star (bias corrected MLE)		5.188
42					Theta hat (MLE)	13.47				Theta star (bias corrected MLE)		17.76
43					nu hat (MLE)	164.2				nu star (bias corrected)		124.5
44					MLE Mean (bias corrected)	92.16				MLE Sd (bias corrected)		40.46
45										Approximate Chi Square Value (0.05)		99.74
46					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		96.36
47												
48						Assuming Gamma Distribution						
49					95% Approximate Gamma UCL (use when n>=50))	115.1				95% Adjusted Gamma UCL (use when n<50)		119.1
50												
51						Lognormal GOF Test						
52					Shapiro Wilk Test Statistic	0.802				Shapiro Wilk Lognormal GOF Test		
53					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
54					Lilliefors Test Statistic	0.266				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	3.401				Mean of logged Data		4.449
60					Maximum of Logged Data	4.905				SD of logged Data		0.447
61												

	A	B	C	D	E	F	G	H	I	J	K	L
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	125.1				90% Chebyshev (MVUE) UCL		130.7
64					95% Chebyshev (MVUE) UCL	147.4				97.5% Chebyshev (MVUE) UCL		170.7
65					99% Chebyshev (MVUE) UCL	216.4						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	106.8				95% Jackknife UCL		108.2
72					95% Standard Bootstrap UCL	106.2				95% Bootstrap-t UCL		105.8
73					95% Hall's Bootstrap UCL	104.6				95% Percentile Bootstrap UCL		106.1
74					95% BCA Bootstrap UCL	104.6						
75					90% Chebyshev(Mean, Sd) UCL	118.9				95% Chebyshev(Mean, Sd) UCL		131.1
76					97.5% Chebyshev(Mean, Sd) UCL	147.9				99% Chebyshev(Mean, Sd) UCL		181
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	108.2						
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	Arsenic											
91												
92						General Statistics						
93					Total Number of Observations	12				Number of Distinct Observations		11
94										Number of Missing Observations		0
95					Minimum	7.35				Mean		11.48
96					Maximum	20.04				Median		11
97					SD	3.246				Std. Error of Mean		0.937
98					Coefficient of Variation	0.283				Skewness		1.598
99												
100						Normal GOF Test						
101					Shapiro Wilk Test Statistic	0.839				Shapiro Wilk GOF Test		
102					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
103					Lilliefors Test Statistic	0.204				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	13.16				95% Adjusted-CLT UCL (Chen-1995)		13.48
110										95% Modified-t UCL (Johnson-1978)		13.23
111												
112						Gamma GOF Test						
113					A-D Test Statistic	0.565				Anderson-Darling Gamma GOF Test		
114					5% A-D Critical Value	0.731				Detected data appear Gamma Distributed at 5% Significance Level		
115					K-S Test Statistic	0.167				Kolmogrov-Smirnoff Gamma GOF Test		
116					5% K-S Critical Value	0.245				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)	15.57				k star (bias corrected MLE)		11.73
121					Theta hat (MLE)	0.737				Theta star (bias corrected MLE)		0.978
122					nu hat (MLE)	373.7				nu star (bias corrected)		281.6
123					MLE Mean (bias corrected)	11.48				MLE Sd (bias corrected)		3.35
124										Approximate Chi Square Value (0.05)		243.7
125					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		238.4
126												
127						Assuming Gamma Distribution						
128					95% Approximate Gamma UCL (use when n>=50))	13.26				95% Adjusted Gamma UCL (use when n<50)		13.56
129												
130						Lognormal GOF Test						
131					Shapiro Wilk Test Statistic	0.913				Shapiro Wilk Lognormal GOF Test		
132					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
133					Lilliefors Test Statistic	0.184				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	1.995				Mean of logged Data		2.408
139					Maximum of Logged Data	2.998				SD of logged Data		0.261
140												

	A	B	C	D	E	F	G	H	I	J	K	L
141	**Assuming Lognormal Distribution**											
142					95% H-UCL	13.34				90% Chebyshev (MVUE) UCL		14.07
143					95% Chebyshev (MVUE) UCL	15.25				97.5% Chebyshev (MVUE) UCL		16.88
144					99% Chebyshev (MVUE) UCL	20.1						
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	13.02				95% Jackknife UCL		13.16
151					95% Standard Bootstrap UCL	12.92				95% Bootstrap-t UCL		13.77
152					95% Hall's Bootstrap UCL	21.83				95% Percentile Bootstrap UCL		13.03
153					95% BCA Bootstrap UCL	13.45						
154					90% Chebyshev(Mean, Sd) UCL	14.29				95% Chebyshev(Mean, Sd) UCL		15.56
155					97.5% Chebyshev(Mean, Sd) UCL	17.33				99% Chebyshev(Mean, Sd) UCL		20.8
156												
157	**Suggested UCL to Use**											
158					95% Student's-t UCL	13.16						
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	Cadmium											
167												
168						General Statistics						
169					Total Number of Observations	12				Number of Distinct Observations		9
170										Number of Missing Observations		0
171					Minimum	0.11				Mean		8.083
172					Maximum	16.74				Median		12
173					SD	6.64				Std. Error of Mean		1.917
174					Coefficient of Variation	0.821				Skewness		-0.248
175												
176						Normal GOF Test						
177					Shapiro Wilk Test Statistic	0.802				Shapiro Wilk GOF Test		
178					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
179					Lilliefors Test Statistic	0.306				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	11.53				95% Adjusted-CLT UCL (Chen-1995)		11.09
186										95% Modified-t UCL (Johnson-1978)		11.5
187												
188						Gamma GOF Test						
189					A-D Test Statistic	1.268				Anderson-Darling Gamma GOF Test		
190					5% A-D Critical Value	0.774				Data Not Gamma Distributed at 5% Significance Level		
191					K-S Test Statistic	0.356				Kolmogrov-Smirnoff Gamma GOF Test		
192					5% K-S Critical Value	0.257				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)	0.639				k star (bias corrected MLE)		0.535
197					Theta hat (MLE)	12.65				Theta star (bias corrected MLE)		15.11
198					nu hat (MLE)	15.34				nu star (bias corrected)		12.84
199					MLE Mean (bias corrected)	8.083				MLE Sd (bias corrected)		11.05
200										Approximate Chi Square Value (0.05)		5.782
201					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		5.078
202												
203						Assuming Gamma Distribution						
204					95% Approximate Gamma UCL (use when n>=50))	17.94				95% Adjusted Gamma UCL (use when n<50)		20.43
205												
206						Lognormal GOF Test						
207					Shapiro Wilk Test Statistic	0.775				Shapiro Wilk Lognormal GOF Test		
208					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
209					Lilliefors Test Statistic	0.339				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	-2.207				Mean of logged Data		1.132
215					Maximum of Logged Data	2.818				SD of logged Data		1.954
216												

	A	B	C	D	E	F	G	H	I	J	K	L
217					Assuming Lognormal Distribution							
218					95% H-UCL	366.6				90% Chebyshev (MVUE) UCL		42.17
219				95% Chebyshev (MVUE) UCL		54.54				97.5% Chebyshev (MVUE) UCL		71.7
220				99% Chebyshev (MVUE) UCL		105.4						
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	11.24				95% Jackknife UCL		11.53
227				95% Standard Bootstrap UCL		11.13				95% Bootstrap-t UCL		11.29
228				95% Hall's Bootstrap UCL		10.71				95% Percentile Bootstrap UCL		11.04
229				95% BCA Bootstrap UCL		11.08						
230				90% Chebyshev(Mean, Sd) UCL		13.83				95% Chebyshev(Mean, Sd) UCL		16.44
231				97.5% Chebyshev(Mean, Sd) UCL		20.05				99% Chebyshev(Mean, Sd) UCL		27.16
232												
233					Suggested UCL to Use							
234				99% Chebyshev (Mean, Sd) UCL		27.16						
235												
236					Recommended UCL exceeds the maximum observation							
237												
238					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
239					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
240					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
241					For additional insight the user may want to consult a statistician.							
242												
243					Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be							
244					reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.							
245												
246												

	A	B	C	D	E	F	G	H	I	J	K	L
247	Chromium											
248												
249					General Statistics							
250					Total Number of Observations	12			Number of Distinct Observations			8
251									Number of Missing Observations			0
252					Minimum	9.26			Mean			57.74
253					Maximum	85			Median			52.48
254					SD	26.5			Std. Error of Mean			7.651
255					Coefficient of Variation	0.459			Skewness			-0.275
256												
257					Normal GOF Test							
258					Shapiro Wilk Test Statistic	0.856			Shapiro Wilk GOF Test			
259					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
260					Lilliefors Test Statistic	0.265			Lilliefors GOF Test			
261					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
262					Data Not Normal at 5% Significance Level							
263												
264					Assuming Normal Distribution							
265					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
266					95% Student's-t UCL	71.48			95% Adjusted-CLT UCL (Chen-1995)			69.68
267									95% Modified-t UCL (Johnson-1978)			71.38
268												
269					Gamma GOF Test							
270					A-D Test Statistic	0.745			Anderson-Darling Gamma GOF Test			
271					5% A-D Critical Value	0.737			Data Not Gamma Distributed at 5% Significance Level			
272					K-S Test Statistic	0.247			Kolmogrov-Smirnoff Gamma GOF Test			
273					5% K-S Critical Value	0.247			Detected data appear Gamma Distributed at 5% Significance Level			
274					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
275												
276					Gamma Statistics							
277					k hat (MLE)	3.586			k star (bias corrected MLE)			2.745
278					Theta hat (MLE)	16.1			Theta star (bias corrected MLE)			21.03
279					nu hat (MLE)	86.07			nu star (bias corrected)			65.88
280					MLE Mean (bias corrected)	57.74			MLE Sd (bias corrected)			34.85
281									Approximate Chi Square Value (0.05)			48.21
282					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			45.91
283												
284					Assuming Gamma Distribution							
285					95% Approximate Gamma UCL (use when n>=50)	78.92			95% Adjusted Gamma UCL (use when n<50)			82.87
286												
287					Lognormal GOF Test							
288					Shapiro Wilk Test Statistic	0.793			Shapiro Wilk Lognormal GOF Test			
289					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
290					Lilliefors Test Statistic	0.211			Lilliefors Lognormal GOF Test			
291					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
292					Data appear Approximate Lognormal at 5% Significance Level							
293												
294					Lognormal Statistics							
295					Minimum of Logged Data	2.226			Mean of logged Data			3.91
296					Maximum of Logged Data	4.443			SD of logged Data			0.648
297												

	A	B	C	D	E	F	G	H	I	J	K	L
298	**Assuming Lognormal Distribution**											
299					95% H-UCL	97.14				90% Chebyshev (MVUE) UCL		95.39
300					95% Chebyshev (MVUE) UCL	111.3				97.5% Chebyshev (MVUE) UCL		133.3
301					99% Chebyshev (MVUE) UCL	176.6						
302												
303	**Nonparametric Distribution Free UCL Statistics**											
304	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
305												
306	**Nonparametric Distribution Free UCLs**											
307					95% CLT UCL	70.33				95% Jackknife UCL		71.48
308					95% Standard Bootstrap UCL	69.9				95% Bootstrap-t UCL		71.5
309					95% Hall's Bootstrap UCL	69.5				95% Percentile Bootstrap UCL		69.16
310					95% BCA Bootstrap UCL	69.68						
311					90% Chebyshev(Mean, Sd) UCL	80.69				95% Chebyshev(Mean, Sd) UCL		91.09
312					97.5% Chebyshev(Mean, Sd) UCL	105.5				99% Chebyshev(Mean, Sd) UCL		133.9
313												
314	**Suggested UCL to Use**											
315					95% Adjusted Gamma UCL	82.87						
316												
317	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
318	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
319	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
320	For additional insight the user may want to consult a statistician.											
321												
322	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
323	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
324												
325												

	A	B	C	D	E	F	G	H	I	J	K	L
326	Iron											
327												
328						General Statistics						
329					Total Number of Observations	12				Number of Distinct Observations		12
330										Number of Missing Observations		0
331					Minimum	19309				Mean		26667
332					Maximum	37400				Median		26235
333					SD	5876				Std. Error of Mean		1696
334					Coefficient of Variation	0.22				Skewness		0.826
335												
336						Normal GOF Test						
337					Shapiro Wilk Test Statistic	0.904				Shapiro Wilk GOF Test		
338					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
339					Lilliefors Test Statistic	0.154				Lilliefors GOF Test		
340					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
341						Data appear Normal at 5% Significance Level						
342												
343						Assuming Normal Distribution						
344					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
345					95% Student's-t UCL	29714				95% Adjusted-CLT UCL (Chen-1995)		29890
346										95% Modified-t UCL (Johnson-1978)		29781
347												
348						Gamma GOF Test						
349					A-D Test Statistic	0.367				Anderson-Darling Gamma GOF Test		
350					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
351					K-S Test Statistic	0.159				Kolmogrov-Smirnoff Gamma GOF Test		
352					5% K-S Critical Value	0.245				Detected data appear Gamma Distributed at 5% Significance Level		
353						Detected data appear Gamma Distributed at 5% Significance Level						
354												
355						Gamma Statistics						
356					k hat (MLE)	23.93				k star (bias corrected MLE)		18
357					Theta hat (MLE)	1114				Theta star (bias corrected MLE)		1481
358					nu hat (MLE)	574.3				nu star (bias corrected)		432
359					MLE Mean (bias corrected)	26667				MLE Sd (bias corrected)		6285
360										Approximate Chi Square Value (0.05)		384.8
361					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		378
362												
363						Assuming Gamma Distribution						
364					95% Approximate Gamma UCL (use when n>=50))	29937				95% Adjusted Gamma UCL (use when n<50)		30476
365												
366						Lognormal GOF Test						
367					Shapiro Wilk Test Statistic	0.939				Shapiro Wilk Lognormal GOF Test		
368					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
369					Lilliefors Test Statistic	0.147				Lilliefors Lognormal GOF Test		
370					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
371						Data appear Lognormal at 5% Significance Level						
372												
373						Lognormal Statistics						
374					Minimum of Logged Data	9.868				Mean of logged Data		10.17
375					Maximum of Logged Data	10.53				SD of logged Data		0.212
376												

	A	B	C	D	E	F	G	H	I	J	K	L
377						Assuming Lognormal Distribution						
378					95% H-UCL	30053				90% Chebyshev (MVUE) UCL		31560
379					95% Chebyshev (MVUE) UCL	33783				97.5% Chebyshev (MVUE) UCL		36869
380					99% Chebyshev (MVUE) UCL	42929						
381												
382						Nonparametric Distribution Free UCL Statistics						
383						Data appear to follow a Discernible Distribution at 5% Significance Level						
384												
385						Nonparametric Distribution Free UCLs						
386					95% CLT UCL	29457				95% Jackknife UCL		29714
387					95% Standard Bootstrap UCL	29381				95% Bootstrap-t UCL		30638
388					95% Hall's Bootstrap UCL	31169				95% Percentile Bootstrap UCL		29449
389					95% BCA Bootstrap UCL	30038						
390					90% Chebyshev(Mean, Sd) UCL	31756				95% Chebyshev(Mean, Sd) UCL		34061
391					97.5% Chebyshev(Mean, Sd) UCL	37261				99% Chebyshev(Mean, Sd) UCL		43545
392												
393						Suggested UCL to Use						
394					95% Student's-t UCL	29714						
395												
396						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
397						These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)						
398						and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.						
399						For additional insight the user may want to consult a statistician.						
400												
401												

	A	B	C	D	E	F	G	H	I	J	K	L
402	Manganese											
403												
404					General Statistics							
405					Total Number of Observations	12				Number of Distinct Observations		12
406										Number of Missing Observations		0
407					Minimum	199.3				Mean		492.1
408					Maximum	832.7				Median		439.9
409					SD	210.7				Std. Error of Mean		60.82
410					Coefficient of Variation	0.428				Skewness		0.38
411												
412					Normal GOF Test							
413					Shapiro Wilk Test Statistic	0.922				Shapiro Wilk GOF Test		
414					5% Shapiro Wilk Critical Value	0.859				Data appear Normal at 5% Significance Level		
415					Lilliefors Test Statistic	0.177				Lilliefors GOF Test		
416					5% Lilliefors Critical Value	0.256				Data appear Normal at 5% Significance Level		
417					Data appear Normal at 5% Significance Level							
418												
419					Assuming Normal Distribution							
420					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
421					95% Student's-t UCL	601.3				95% Adjusted-CLT UCL (Chen-1995)		599.2
422										95% Modified-t UCL (Johnson-1978)		602.4
423												
424					Gamma GOF Test							
425					A-D Test Statistic	0.357				Anderson-Darling Gamma GOF Test		
426					5% A-D Critical Value	0.732				Detected data appear Gamma Distributed at 5% Significance Level		
427					K-S Test Statistic	0.167				Kolmogrov-Smirnoff Gamma GOF Test		
428					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
429					Detected data appear Gamma Distributed at 5% Significance Level							
430												
431					Gamma Statistics							
432					k hat (MLE)	5.79				k star (bias corrected MLE)		4.398
433					Theta hat (MLE)	84.99				Theta star (bias corrected MLE)		111.9
434					nu hat (MLE)	139				nu star (bias corrected)		105.6
435					MLE Mean (bias corrected)	492.1				MLE Sd (bias corrected)		234.6
436										Approximate Chi Square Value (0.05)		82.84
437					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		79.78
438												
439					Assuming Gamma Distribution							
440					95% Approximate Gamma UCL (use when n>=50))	627				95% Adjusted Gamma UCL (use when n<50)		651.1
441												
442					Lognormal GOF Test							
443					Shapiro Wilk Test Statistic	0.945				Shapiro Wilk Lognormal GOF Test		
444					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
445					Lilliefors Test Statistic	0.145				Lilliefors Lognormal GOF Test		
446					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
447					Data appear Lognormal at 5% Significance Level							
448												
449					Lognormal Statistics							
450					Minimum of Logged Data	5.295				Mean of logged Data		6.11
451					Maximum of Logged Data	6.725				SD of logged Data		0.449
452												

	A	B	C	D	E	F	G	H	I	J	K	L
453	**Assuming Lognormal Distribution**											
454					95% H-UCL	659.6				90% Chebyshev (MVUE) UCL		688.8
455					95% Chebyshev (MVUE) UCL	777.4				97.5% Chebyshev (MVUE) UCL		900.2
456					99% Chebyshev (MVUE) UCL	1142						
457												
458	**Nonparametric Distribution Free UCL Statistics**											
459	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
460												
461	**Nonparametric Distribution Free UCLs**											
462					95% CLT UCL	592.1				95% Jackknife UCL		601.3
463					95% Standard Bootstrap UCL	588.2				95% Bootstrap-t UCL		617.7
464					95% Hall's Bootstrap UCL	584.8				95% Percentile Bootstrap UCL		591.8
465					95% BCA Bootstrap UCL	593.2						
466					90% Chebyshev(Mean, Sd) UCL	674.5				95% Chebyshev(Mean, Sd) UCL		757.2
467					97.5% Chebyshev(Mean, Sd) UCL	871.9				99% Chebyshev(Mean, Sd) UCL		1097
468												
469	**Suggested UCL to Use**											
470					95% Student's-t UCL	601.3						
471												
472	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
473	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
474	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
475	For additional insight the user may want to consult a statistician.											
476												
477												

	A	B	C	D	E	F	G	H	I	J	K	L
478	Nickel											
479												
480					General Statistics							
481					Total Number of Observations	12				Number of Distinct Observations		10
482										Number of Missing Observations		0
483					Minimum	60.51				Mean		103.2
484					Maximum	260.5				Median		83.77
485					SD	56.68				Std. Error of Mean		16.36
486					Coefficient of Variation	0.549				Skewness		2.242
487												
488					Normal GOF Test							
489					Shapiro Wilk Test Statistic	0.728				Shapiro Wilk GOF Test		
490					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
491					Lilliefors Test Statistic	0.262				Lilliefors GOF Test		
492					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
493					Data Not Normal at 5% Significance Level							
494												
495					Assuming Normal Distribution							
496					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
497					95% Student's-t UCL	132.6				95% Adjusted-CLT UCL (Chen-1995)		141.4
498										95% Modified-t UCL (Johnson-1978)		134.3
499												
500					Gamma GOF Test							
501					A-D Test Statistic	0.784				Anderson-Darling Gamma GOF Test		
502					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
503					K-S Test Statistic	0.234				Kolmogrov-Smirnoff Gamma GOF Test		
504					5% K-S Critical Value	0.246				Detected data appear Gamma Distributed at 5% Significance Level		
505					Detected data follow Appr. Gamma Distribution at 5% Significance Level							
506												
507					Gamma Statistics							
508					k hat (MLE)	5.228				k star (bias corrected MLE)		3.976
509					Theta hat (MLE)	19.74				Theta star (bias corrected MLE)		25.95
510					nu hat (MLE)	125.5				nu star (bias corrected)		95.43
511					MLE Mean (bias corrected)	103.2				MLE Sd (bias corrected)		51.75
512										Approximate Chi Square Value (0.05)		73.9
513					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		71.01
514												
515					Assuming Gamma Distribution							
516					95% Approximate Gamma UCL (use when n>=50)	133.3				95% Adjusted Gamma UCL (use when n<50)		138.7
517												
518					Lognormal GOF Test							
519					Shapiro Wilk Test Statistic	0.868				Shapiro Wilk Lognormal GOF Test		
520					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
521					Lilliefors Test Statistic	0.207				Lilliefors Lognormal GOF Test		
522					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
523					Data appear Lognormal at 5% Significance Level							
524												
525					Lognormal Statistics							
526					Minimum of Logged Data	4.103				Mean of logged Data		4.538
527					Maximum of Logged Data	5.563				SD of logged Data		0.43
528												

	A	B	C	D	E	F	G	H	I	J	K	L
529					Assuming Lognormal Distribution							
530					95% H-UCL	133.9				90% Chebyshev (MVUE) UCL		140.3
531				95% Chebyshev (MVUE) UCL		157.7				97.5% Chebyshev (MVUE) UCL		182
532				99% Chebyshev (MVUE) UCL		229.6						
533												
534					Nonparametric Distribution Free UCL Statistics							
535					Data appear to follow a Discernible Distribution at 5% Significance Level							
536												
537					Nonparametric Distribution Free UCLs							
538					95% CLT UCL	130.1				95% Jackknife UCL		132.6
539				95% Standard Bootstrap UCL		129				95% Bootstrap-t UCL		168
540				95% Hall's Bootstrap UCL		245.2				95% Percentile Bootstrap UCL		132.3
541				95% BCA Bootstrap UCL		141						
542				90% Chebyshev(Mean, Sd) UCL		152.3				95% Chebyshev(Mean, Sd) UCL		174.5
543				97.5% Chebyshev(Mean, Sd) UCL		205.4				99% Chebyshev(Mean, Sd) UCL		266
544												
545					Suggested UCL to Use							
546				95% Adjusted Gamma UCL		138.7						
547												
548					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
549					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
550					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
551					For additional insight the user may want to consult a statistician.							
552												
553												

	A	B	C	D	E	F	G	H	I	J	K	L
554	PAH, Total											
555												
556						General Statistics						
557					Total Number of Observations	12				Number of Distinct Observations		5
558										Number of Missing Observations		0
559					Minimum	0.0078				Mean		0.678
560					Maximum	1.714				Median		0.678
561					SD	0.38				Std. Error of Mean		0.11
562					Coefficient of Variation	0.561				Skewness		1.587
563												
564						Normal GOF Test						
565					Shapiro Wilk Test Statistic	0.678				Shapiro Wilk GOF Test		
566					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
567					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
568					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
569						Data Not Normal at 5% Significance Level						
570												
571						Assuming Normal Distribution						
572					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
573					95% Student's-t UCL	0.875				95% Adjusted-CLT UCL (Chen-1995)		0.912
574										95% Modified-t UCL (Johnson-1978)		0.884
575												
576						Gamma GOF Test						
577					A-D Test Statistic	2.357				Anderson-Darling Gamma GOF Test		
578					5% A-D Critical Value	0.745				Data Not Gamma Distributed at 5% Significance Level		
579					K-S Test Statistic	0.371				Kolmogrov-Smirnoff Gamma GOF Test		
580					5% K-S Critical Value	0.249				Data Not Gamma Distributed at 5% Significance Level		
581						Data Not Gamma Distributed at 5% Significance Level						
582												
583						Gamma Statistics						
584					k hat (MLE)	1.586				k star (bias corrected MLE)		1.245
585					Theta hat (MLE)	0.428				Theta star (bias corrected MLE)		0.545
586					nu hat (MLE)	38.07				nu star (bias corrected)		29.88
587					MLE Mean (bias corrected)	0.678				MLE Sd (bias corrected)		0.608
588										Approximate Chi Square Value (0.05)		18.4
589					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		17.04
590												
591						Assuming Gamma Distribution						
592					95% Approximate Gamma UCL (use when n>=50))	1.101				95% Adjusted Gamma UCL (use when n<50)		1.189
593												
594						Lognormal GOF Test						
595					Shapiro Wilk Test Statistic	0.502				Shapiro Wilk Lognormal GOF Test		
596					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
597					Lilliefors Test Statistic	0.423				Lilliefors Lognormal GOF Test		
598					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
599						Data Not Lognormal at 5% Significance Level						
600												
601						Lognormal Statistics						
602					Minimum of Logged Data	-4.854				Mean of logged Data		-0.736
603					Maximum of Logged Data	0.539				SD of logged Data		1.333
604												

	A	B	C	D	E	F	G	H	I	J	K	L
605					Assuming Lognormal Distribution							
606					95% H-UCL	4.861				90% Chebyshev (MVUE) UCL		2.337
607				95% Chebyshev (MVUE) UCL		2.927				97.5% Chebyshev (MVUE) UCL		3.746
608				99% Chebyshev (MVUE) UCL		5.355						
609												
610					Nonparametric Distribution Free UCL Statistics							
611					Data do not follow a Discernible Distribution (0.05)							
612												
613					Nonparametric Distribution Free UCLs							
614					95% CLT UCL	0.859				95% Jackknife UCL		0.875
615				95% Standard Bootstrap UCL		0.856				95% Bootstrap-t UCL		0.935
616				95% Hall's Bootstrap UCL		1.945				95% Percentile Bootstrap UCL		0.866
617				95% BCA Bootstrap UCL		0.907						
618				90% Chebyshev(Mean, Sd) UCL		1.007				95% Chebyshev(Mean, Sd) UCL		1.156
619				97.5% Chebyshev(Mean, Sd) UCL		1.363				99% Chebyshev(Mean, Sd) UCL		1.77
620												
621					Suggested UCL to Use							
622				95% Chebyshev (Mean, Sd) UCL		1.156						
623												
624					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
625					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
626					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
627					For additional insight the user may want to consult a statistician.							
628												
629												

	A	B	C	D	E	F	G	H	I	J	K	L
630	Technetium-99											
631												
632						General Statistics						
633					Total Number of Observations	12				Number of Distinct Observations		5
634										Number of Missing Observations		0
635					Minimum	-0.02				Mean		46.52
636					Maximum	183				Median		46.52
637					SD	47.52				Std. Error of Mean		13.72
638					Coefficient of Variation	1.022				Skewness		2.297
639												
640						Normal GOF Test						
641					Shapiro Wilk Test Statistic	0.636				Shapiro Wilk GOF Test		
642					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
643					Lilliefors Test Statistic	0.417				Lilliefors GOF Test		
644					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
645						Data Not Normal at 5% Significance Level						
646												
647						Assuming Normal Distribution						
648					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
649					95% Student's-t UCL	71.15				95% Adjusted-CLT UCL (Chen-1995)		78.8
650										95% Modified-t UCL (Johnson-1978)		72.67
651						Gamma Statistics Not Available						
652						Lognormal Statistics Not Available						
653												
654						Nonparametric Distribution Free UCL Statistics						
655						Data do not follow a Discernible Distribution (0.05)						
656												
657						Nonparametric Distribution Free UCLs						
658					95% CLT UCL	69.08				95% Jackknife UCL		71.15
659					95% Standard Bootstrap UCL	68.44				95% Bootstrap-t UCL		84.96
660					95% Hall's Bootstrap UCL	173.5				95% Percentile Bootstrap UCL		69.26
661					95% BCA Bootstrap UCL	80.52						
662					90% Chebyshev(Mean, Sd) UCL	87.67				95% Chebyshev(Mean, Sd) UCL		106.3
663					97.5% Chebyshev(Mean, Sd) UCL	132.2				99% Chebyshev(Mean, Sd) UCL		183
664												
665						Suggested UCL to Use						
666					95% Chebyshev (Mean, Sd) UCL	106.3						
667												
668	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
669	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
670	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
671	For additional insight the user may want to consult a statistician.											
672												
673												

	A	B	C	D	E	F	G	H	I	J	K	L
674	Thallium											
675												
676					General Statistics							
677					Total Number of Observations	12			Number of Distinct Observations			6
678									Number of Missing Observations			0
679					Minimum	0.24			Mean			6.652
680					Maximum	16.5			Median			6.652
681					SD	5.124			Std. Error of Mean			1.479
682					Coefficient of Variation	0.77			Skewness			0.737
683												
684					Normal GOF Test							
685					Shapiro Wilk Test Statistic	0.807			Shapiro Wilk GOF Test			
686					5% Shapiro Wilk Critical Value	0.859			Data Not Normal at 5% Significance Level			
687					Lilliefors Test Statistic	0.333			Lilliefors GOF Test			
688					5% Lilliefors Critical Value	0.256			Data Not Normal at 5% Significance Level			
689					Data Not Normal at 5% Significance Level							
690												
691					Assuming Normal Distribution							
692					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
693					95% Student's-t UCL	9.309			95% Adjusted-CLT UCL (Chen-1995)			9.421
694									95% Modified-t UCL (Johnson-1978)			9.361
695												
696					Gamma GOF Test							
697					A-D Test Statistic	1.347			Anderson-Darling Gamma GOF Test			
698					5% A-D Critical Value	0.756			Data Not Gamma Distributed at 5% Significance Level			
699					K-S Test Statistic	0.379			Kolmogrov-Smirnoff Gamma GOF Test			
700					5% K-S Critical Value	0.252			Data Not Gamma Distributed at 5% Significance Level			
701					Data Not Gamma Distributed at 5% Significance Level							
702												
703					Gamma Statistics							
704					k hat (MLE)	1.054			k star (bias corrected MLE)			0.846
705					Theta hat (MLE)	6.311			Theta star (bias corrected MLE)			7.862
706					nu hat (MLE)	25.3			nu star (bias corrected)			20.31
707					MLE Mean (bias corrected)	6.652			MLE Sd (bias corrected)			7.232
708									Approximate Chi Square Value (0.05)			11.08
709					Adjusted Level of Significance	0.029			Adjusted Chi Square Value			10.05
710												
711					Assuming Gamma Distribution							
712					95% Approximate Gamma UCL (use when n>=50))	12.19			95% Adjusted Gamma UCL (use when n<50)			13.44
713												
714					Lognormal GOF Test							
715					Shapiro Wilk Test Statistic	0.754			Shapiro Wilk Lognormal GOF Test			
716					5% Shapiro Wilk Critical Value	0.859			Data Not Lognormal at 5% Significance Level			
717					Lilliefors Test Statistic	0.402			Lilliefors Lognormal GOF Test			
718					5% Lilliefors Critical Value	0.256			Data Not Lognormal at 5% Significance Level			
719					Data Not Lognormal at 5% Significance Level							
720												
721					Lognormal Statistics							
722					Minimum of Logged Data	-1.427			Mean of logged Data			1.351
723					Maximum of Logged Data	2.803			SD of logged Data			1.392
724												

	A	B	C	D	E	F	G	H	I	J	K	L
725					Assuming Lognormal Distribution							
726					95% H-UCL	47.52				90% Chebyshev (MVUE) UCL		20.62
727				95% Chebyshev (MVUE) UCL		25.94				97.5% Chebyshev (MVUE) UCL		33.31
728				99% Chebyshev (MVUE) UCL		47.79						
729												
730					Nonparametric Distribution Free UCL Statistics							
731					Data do not follow a Discernible Distribution (0.05)							
732												
733					Nonparametric Distribution Free UCLs							
734					95% CLT UCL	9.085				95% Jackknife UCL		9.309
735				95% Standard Bootstrap UCL		8.934				95% Bootstrap-t UCL		10.12
736				95% Hall's Bootstrap UCL		12.3				95% Percentile Bootstrap UCL		9.022
737				95% BCA Bootstrap UCL		9.195						
738				90% Chebyshev(Mean, Sd) UCL		11.09				95% Chebyshev(Mean, Sd) UCL		13.1
739				97.5% Chebyshev(Mean, Sd) UCL		15.89				99% Chebyshev(Mean, Sd) UCL		21.37
740												
741					Suggested UCL to Use							
742				95% Chebyshev (Mean, Sd) UCL		13.1						
743												
744					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
745					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
746					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
747					For additional insight the user may want to consult a statistician.							
748												
749												

	A	B	C	D	E	F	G	H	I	J	K	L
750	Uranium											
751												
752					General Statistics							
753					Total Number of Observations	12				Number of Distinct Observations		10
754										Number of Missing Observations		0
755					Minimum	6.9				Mean		21.3
756					Maximum	45.33				Median		19.31
757					SD	13.64				Std. Error of Mean		3.937
758					Coefficient of Variation	0.64				Skewness		0.863
759												
760					Normal GOF Test							
761					Shapiro Wilk Test Statistic	0.847				Shapiro Wilk GOF Test		
762					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
763					Lilliefors Test Statistic	0.288				Lilliefors GOF Test		
764					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
765					Data Not Normal at 5% Significance Level							
766												
767					Assuming Normal Distribution							
768					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
769					95% Student's-t UCL	28.38				95% Adjusted-CLT UCL (Chen-1995)		28.83
770										95% Modified-t UCL (Johnson-1978)		28.54
771												
772					Gamma GOF Test							
773					A-D Test Statistic	0.499				Anderson-Darling Gamma GOF Test		
774					5% A-D Critical Value	0.74				Detected data appear Gamma Distributed at 5% Significance Level		
775					K-S Test Statistic	0.211				Kolmogrov-Smirnoff Gamma GOF Test		
776					5% K-S Critical Value	0.248				Detected data appear Gamma Distributed at 5% Significance Level		
777					Detected data appear Gamma Distributed at 5% Significance Level							
778												
779					Gamma Statistics							
780					k hat (MLE)	2.771				k star (bias corrected MLE)		2.134
781					Theta hat (MLE)	7.688				Theta star (bias corrected MLE)		9.984
782					nu hat (MLE)	66.5				nu star (bias corrected)		51.21
783					MLE Mean (bias corrected)	21.3				MLE Sd (bias corrected)		14.58
784										Approximate Chi Square Value (0.05)		35.78
785					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		33.82
786												
787					Assuming Gamma Distribution							
788					95% Approximate Gamma UCL (use when n>=50)	30.5				95% Adjusted Gamma UCL (use when n<50)		32.26
789												
790					Lognormal GOF Test							
791					Shapiro Wilk Test Statistic	0.915				Shapiro Wilk Lognormal GOF Test		
792					5% Shapiro Wilk Critical Value	0.859				Data appear Lognormal at 5% Significance Level		
793					Lilliefors Test Statistic	0.173				Lilliefors Lognormal GOF Test		
794					5% Lilliefors Critical Value	0.256				Data appear Lognormal at 5% Significance Level		
795					Data appear Lognormal at 5% Significance Level							
796												
797					Lognormal Statistics							
798					Minimum of Logged Data	1.932				Mean of logged Data		2.868
799					Maximum of Logged Data	3.814				SD of logged Data		0.656
800												

	A	B	C	D	E	F	G	H	I	J	K	L
801					Assuming Lognormal Distribution							
802					95% H-UCL	34.7				90% Chebyshev (MVUE) UCL		33.95
803					95% Chebyshev (MVUE) UCL	39.65				97.5% Chebyshev (MVUE) UCL		47.57
804					99% Chebyshev (MVUE) UCL	63.11						
805												
806					Nonparametric Distribution Free UCL Statistics							
807					Data appear to follow a Discernible Distribution at 5% Significance Level							
808												
809					Nonparametric Distribution Free UCLs							
810					95% CLT UCL	27.78				95% Jackknife UCL		28.38
811					95% Standard Bootstrap UCL	27.38				95% Bootstrap-t UCL		30.04
812					95% Hall's Bootstrap UCL	27.87				95% Percentile Bootstrap UCL		27.65
813					95% BCA Bootstrap UCL	28.81						
814					90% Chebyshev(Mean, Sd) UCL	33.12				95% Chebyshev(Mean, Sd) UCL		38.47
815					97.5% Chebyshev(Mean, Sd) UCL	45.89				99% Chebyshev(Mean, Sd) UCL		60.48
816												
817					Suggested UCL to Use							
818					95% Adjusted Gamma UCL	32.26						
819												
820					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
821					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
822					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
823					For additional insight the user may want to consult a statistician.							
824												
825												

	A	B	C	D	E	F	G	H	I	J	K	L
826	Uranium-238											
827												
828						General Statistics						
829					Total Number of Observations	12				Number of Distinct Observations		5
830										Number of Missing Observations		0
831					Minimum	0.711				Mean		1.147
832					Maximum	1.85				Median		1.147
833					SD	0.285				Std. Error of Mean		0.0823
834					Coefficient of Variation	0.249				Skewness		0.89
835												
836						Normal GOF Test						
837					Shapiro Wilk Test Statistic	0.752				Shapiro Wilk GOF Test		
838					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
839					Lilliefors Test Statistic	0.333				Lilliefors GOF Test		
840					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
841						Data Not Normal at 5% Significance Level						
842												
843						Assuming Normal Distribution						
844					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
845					95% Student's-t UCL	1.295				95% Adjusted-CLT UCL (Chen-1995)		1.305
846										95% Modified-t UCL (Johnson-1978)		1.299
847												
848						Gamma GOF Test						
849					A-D Test Statistic	1.604				Anderson-Darling Gamma GOF Test		
850					5% A-D Critical Value	0.732				Data Not Gamma Distributed at 5% Significance Level		
851					K-S Test Statistic	0.365				Kolmogrov-Smirnoff Gamma GOF Test		
852					5% K-S Critical Value	0.245				Data Not Gamma Distributed at 5% Significance Level		
853						Data Not Gamma Distributed at 5% Significance Level						
854												
855						Gamma Statistics						
856					k hat (MLE)	17.99				k star (bias corrected MLE)		13.55
857					Theta hat (MLE)	0.0638				Theta star (bias corrected MLE)		0.0847
858					nu hat (MLE)	431.7				nu star (bias corrected)		325.1
859					MLE Mean (bias corrected)	1.147				MLE Sd (bias corrected)		0.312
860										Approximate Chi Square Value (0.05)		284.4
861					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		278.5
862												
863						Assuming Gamma Distribution						
864					95% Approximate Gamma UCL (use when n>=50))	1.312				95% Adjusted Gamma UCL (use when n<50)		1.339
865												
866						Lognormal GOF Test						
867					Shapiro Wilk Test Statistic	0.764				Shapiro Wilk Lognormal GOF Test		
868					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
869					Lilliefors Test Statistic	0.378				Lilliefors Lognormal GOF Test		
870					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
871						Data Not Lognormal at 5% Significance Level						
872												
873						Lognormal Statistics						
874					Minimum of Logged Data	-0.341				Mean of logged Data		0.109
875					Maximum of Logged Data	0.615				SD of logged Data		0.25
876												

	A	B	C	D	E	F	G	H	I	J	K	L
877					Assuming Lognormal Distribution							
878					95% H-UCL	1.326				90% Chebyshev (MVUE) UCL		1.397
879					95% Chebyshev (MVUE) UCL	1.51				97.5% Chebyshev (MVUE) UCL		1.667
880					99% Chebyshev (MVUE) UCL	1.976						
881												
882					Nonparametric Distribution Free UCL Statistics							
883					Data do not follow a Discernible Distribution (0.05)							
884												
885					Nonparametric Distribution Free UCLs							
886					95% CLT UCL	1.283				95% Jackknife UCL		1.295
887					95% Standard Bootstrap UCL	1.278				95% Bootstrap-t UCL		1.305
888					95% Hall's Bootstrap UCL	1.431				95% Percentile Bootstrap UCL		1.287
889					95% BCA Bootstrap UCL	1.301						
890					90% Chebyshev(Mean, Sd) UCL	1.394				95% Chebyshev(Mean, Sd) UCL		1.506
891					97.5% Chebyshev(Mean, Sd) UCL	1.661				99% Chebyshev(Mean, Sd) UCL		1.967
892												
893					Suggested UCL to Use							
894					95% Student's-t UCL	1.295				or 95% Modified-t UCL		1.299
895												
896	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
897	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
898	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
899	For additional insight the user may want to consult a statistician.											
900												
901												

	A	B	C	D	E	F	G	H	I	J	K	L
902	Vanadium											
903												
904						General Statistics						
905					Total Number of Observations	12				Number of Distinct Observations		7
906										Number of Missing Observations		0
907					Minimum	11.6				Mean		51.82
908					Maximum	83.44				Median		70
909					SD	25.59				Std. Error of Mean		7.388
910					Coefficient of Variation	0.494				Skewness		-0.438
911												
912						Normal GOF Test						
913					Shapiro Wilk Test Statistic	0.804				Shapiro Wilk GOF Test		
914					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
915					Lilliefors Test Statistic	0.345				Lilliefors GOF Test		
916					5% Lilliefors Critical Value	0.256				Data Not Normal at 5% Significance Level		
917						Data Not Normal at 5% Significance Level						
918												
919						Assuming Normal Distribution						
920					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
921					95% Student's-t UCL	65.09				95% Adjusted-CLT UCL (Chen-1995)		62.97
922										95% Modified-t UCL (Johnson-1978)		64.93
923												
924						Gamma GOF Test						
925					A-D Test Statistic	1.248				Anderson-Darling Gamma GOF Test		
926					5% A-D Critical Value	0.738				Data Not Gamma Distributed at 5% Significance Level		
927					K-S Test Statistic	0.357				Kolmogrov-Smirnoff Gamma GOF Test		
928					5% K-S Critical Value	0.247				Data Not Gamma Distributed at 5% Significance Level		
929						Data Not Gamma Distributed at 5% Significance Level						
930												
931						Gamma Statistics						
932					k hat (MLE)	3.257				k star (bias corrected MLE)		2.499
933					Theta hat (MLE)	15.91				Theta star (bias corrected MLE)		20.74
934					nu hat (MLE)	78.18				nu star (bias corrected)		59.97
935					MLE Mean (bias corrected)	51.82				MLE Sd (bias corrected)		32.78
936										Approximate Chi Square Value (0.05)		43.16
937					Adjusted Level of Significance	0.029				Adjusted Chi Square Value		40.99
938												
939						Assuming Gamma Distribution						
940					95% Approximate Gamma UCL (use when n>=50))	72				95% Adjusted Gamma UCL (use when n<50)		75.81
941												
942						Lognormal GOF Test						
943					Shapiro Wilk Test Statistic	0.802				Shapiro Wilk Lognormal GOF Test		
944					5% Shapiro Wilk Critical Value	0.859				Data Not Lognormal at 5% Significance Level		
945					Lilliefors Test Statistic	0.344				Lilliefors Lognormal GOF Test		
946					5% Lilliefors Critical Value	0.256				Data Not Lognormal at 5% Significance Level		
947						Data Not Lognormal at 5% Significance Level						
948												
949						Lognormal Statistics						
950					Minimum of Logged Data	2.451				Mean of logged Data		3.786
951					Maximum of Logged Data	4.424				SD of logged Data		0.653
952												

	A	B	C	D	E	F	G	H	I	J	K	L
953	**Assuming Lognormal Distribution**											
954					95% H-UCL	86.61				90% Chebyshev (MVUE) UCL		84.84
955					95% Chebyshev (MVUE) UCL	99.05				97.5% Chebyshev (MVUE) UCL		118.8
956					99% Chebyshev (MVUE) UCL	157.5						
957												
958	**Nonparametric Distribution Free UCL Statistics**											
959	**Data do not follow a Discernible Distribution (0.05)**											
960												
961	**Nonparametric Distribution Free UCLs**											
962					95% CLT UCL	63.97				95% Jackknife UCL		65.09
963					95% Standard Bootstrap UCL	63.7				95% Bootstrap-t UCL		64.68
964					95% Hall's Bootstrap UCL	62.01				95% Percentile Bootstrap UCL		63.45
965					95% BCA Bootstrap UCL	62.38						
966					90% Chebyshev(Mean, Sd) UCL	73.99				95% Chebyshev(Mean, Sd) UCL		84.03
967					97.5% Chebyshev(Mean, Sd) UCL	97.96				99% Chebyshev(Mean, Sd) UCL		125.3
968												
969	**Suggested UCL to Use**											
970					95% Chebyshev (Mean, Sd) UCL	84.03						
971												
972	**Recommended UCL exceeds the maximum observation**											
973												
974	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
975	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
976	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
977	For additional insight the user may want to consult a statistician.											
978												
979	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
980	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
981												