	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Uncensored Full Data Sets**											
2												
3	User Selected Options											
4	Date/Time of Computation			3/2/2015 8:42:40 PM								
5	From File			EPC_013Surf_EU06.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Iron**											
12												
13	**General Statistics**											
14	Total Number of Observations					10	Number of Distinct Observations					10
15							Number of Missing Observations					0
16	Minimum					17735	Mean					25568
17	Maximum					43337	Median					22634
18	SD					9171	Std. Error of Mean					2900
19	Coefficient of Variation					0.359	Skewness					1.365
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.788	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.272	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
26	**Data appear Approximate 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					30884	95% Adjusted-CLT UCL (Chen-1995)					31675
31							95% Modified-t UCL (Johnson-1978)					31092
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					0.742	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.725	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.227	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.267	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)					10.27	k star (bias corrected MLE)					7.256
42	Theta hat (MLE)					2489	Theta star (bias corrected MLE)					3524
43	nu hat (MLE)					205.4	nu star (bias corrected)					145.1
44	MLE Mean (bias corrected)					25568	MLE Sd (bias corrected)					9492
45							Approximate Chi Square Value (0.05)					118.3
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					114.1
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					31369	95% Adjusted Gamma UCL (use when n<50)					32527
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.853	**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.208	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	9.783				Mean of logged Data		10.1
60					Maximum of Logged Data	10.68				SD of logged Data		0.319
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	31662				90% Chebyshev (MVUE) UCL		33238
64					95% Chebyshev (MVUE) UCL	36757				97.5% Chebyshev (MVUE) UCL		41641
65					99% Chebyshev (MVUE) UCL	51236						
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	30338				95% Jackknife UCL		30884
72					95% Standard Bootstrap UCL	30201				95% Bootstrap-t UCL		38103
73					95% Hall's Bootstrap UCL	63111				95% Percentile Bootstrap UCL		30463
74					95% BCA Bootstrap UCL	31176						
75					90% Chebyshev(Mean, Sd) UCL	34268				95% Chebyshev(Mean, Sd) UCL		38209
76					97.5% Chebyshev(Mean, Sd) UCL	43679				99% Chebyshev(Mean, Sd) UCL		54423
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	30884						
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												
87	**Neptunium-237**											
88												
89	**General Statistics**											
90					Total Number of Observations	10				Number of Distinct Observations		5
91										Number of Missing Observations		0
92					Minimum	8.2000E-4				Mean		0.281
93					Maximum	1.08				Median		0.281
94					SD	0.308				Std. Error of Mean		0.0973
95					Coefficient of Variation	1.094				Skewness		2.159
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.682	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

	A	B	C	D	E	F	G	H	I	J	K	L
105	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
106					95% Student's-t UCL	0.459				95% Adjusted-CLT UCL (Chen-1995)		0.512
107										95% Modified-t UCL (Johnson-1978)		0.471
108												
109	Gamma GOF Test											
110					A-D Test Statistic	1.043	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.369	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.279	Data Not Gamma Distributed at 5% Significance Level					
114	Data Not Gamma Distributed at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	0.593				k star (bias corrected MLE)		0.482
118					Theta hat (MLE)	0.474				Theta star (bias corrected MLE)		0.584
119					nu hat (MLE)	11.86				nu star (bias corrected)		9.636
120					MLE Mean (bias corrected)	0.281				MLE Sd (bias corrected)		0.405
121										Approximate Chi Square Value (0.05)		3.716
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		3.104
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	0.729				95% Adjusted Gamma UCL (use when n<50)		0.873
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.767	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.38	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
132	Data Not Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	-7.106				Mean of logged Data		-2.312
136					Maximum of Logged Data	0.077				SD of logged Data		2.226
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	97.29				90% Chebyshev (MVUE) UCL		2.09
140					95% Chebyshev (MVUE) UCL	2.734				97.5% Chebyshev (MVUE) UCL		3.627
141					99% Chebyshev (MVUE) UCL	5.382						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data do not follow a Discernible Distribution (0.05)											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	0.441				95% Jackknife UCL		0.459
148					95% Standard Bootstrap UCL	0.434				95% Bootstrap-t UCL		0.572
149					95% Hall's Bootstrap UCL	1.154				95% Percentile Bootstrap UCL		0.441
150					95% BCA Bootstrap UCL	0.493						
151					90% Chebyshev(Mean, Sd) UCL	0.573				95% Chebyshev(Mean, Sd) UCL		0.705
152					97.5% Chebyshev(Mean, Sd) UCL	0.889				99% Chebyshev(Mean, Sd) UCL		1.249
153												
154	Suggested UCL to Use											
155					99% Chebyshev (Mean, Sd) UCL	1.249						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	**Recommended UCL exceeds the maximum observation**											
158												
159	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
160	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
161	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
162	For additional insight the user may want to consult a statistician.											
163												
164												
165	**PAH, Total**											
166												
167	**General Statistics**											
168	Total Number of Observations					10	Number of Distinct Observations					4
169							Number of Missing Observations					0
170	Minimum					0.46	Mean					0.594
171	Maximum					0.833	Median					0.594
172	SD					0.0977	Std. Error of Mean					0.0309
173	Coefficient of Variation					0.164	Skewness					1.495
174												
175	**Normal GOF Test**											
176	Shapiro Wilk Test Statistic					0.718	**Shapiro Wilk GOF Test**					
177	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
178	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
179	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
180	**Data Not Normal at 5% Significance Level**											
181												
182	**Assuming Normal Distribution**											
183	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
184	95% Student's-t UCL					0.651	95% Adjusted-CLT UCL (Chen-1995)					0.661
185							95% Modified-t UCL (Johnson-1978)					0.653
186												
187	**Gamma GOF Test**											
188	A-D Test Statistic					1.421	**Anderson-Darling Gamma GOF Test**					
189	5% A-D Critical Value					0.724	Data Not Gamma Distributed at 5% Significance Level					
190	K-S Test Statistic					0.38	**Kolmogrov-Smirnoff Gamma GOF Test**					
191	5% K-S Critical Value					0.266	Data Not Gamma Distributed at 5% Significance Level					
192	**Data Not Gamma Distributed at 5% Significance Level**											
193												
194	**Gamma Statistics**											
195	k hat (MLE)					44.91	k star (bias corrected MLE)					31.51
196	Theta hat (MLE)					0.0132	Theta star (bias corrected MLE)					0.0189
197	nu hat (MLE)					898.3	nu star (bias corrected)					630.1
198	MLE Mean (bias corrected)					0.594	MLE Sd (bias corrected)					0.106
199							Approximate Chi Square Value (0.05)					572.9
200	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					563.4
201												
202	**Assuming Gamma Distribution**											
203	95% Approximate Gamma UCL (use when n>=50))					0.654	95% Adjusted Gamma UCL (use when n<50)					0.665
204												
205	**Lognormal GOF Test**											
206	Shapiro Wilk Test Statistic					0.758	**Shapiro Wilk Lognormal GOF Test**					
207	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
208	Lilliefors Test Statistic					0.371	**Lilliefors Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
209					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
210	Data Not Lognormal at 5% Significance Level											
211												
212	Lognormal Statistics											
213					Minimum of Logged Data	-0.777				Mean of logged Data		-0.531
214					Maximum of Logged Data	-0.183				SD of logged Data		0.155
215												
216	Assuming Lognormal Distribution											
217					95% H-UCL	0.654				90% Chebyshev (MVUE) UCL		0.682
218					95% Chebyshev (MVUE) UCL	0.721				97.5% Chebyshev (MVUE) UCL		0.776
219					99% Chebyshev (MVUE) UCL	0.884						
220												
221	Nonparametric Distribution Free UCL Statistics											
222	Data do not follow a Discernible Distribution (0.05)											
223												
224	Nonparametric Distribution Free UCLs											
225					95% CLT UCL	0.645				95% Jackknife UCL		0.651
226					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
227					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
228					95% BCA Bootstrap UCL	N/A						
229					90% Chebyshev(Mean, Sd) UCL	0.687				95% Chebyshev(Mean, Sd) UCL		0.729
230					97.5% Chebyshev(Mean, Sd) UCL	0.787				99% Chebyshev(Mean, Sd) UCL		0.902
231												
232	Suggested UCL to Use											
233					95% Student's-t UCL	0.651				or 95% Modified-t UCL		0.653
234												
235	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
236	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
237	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
238	For additional insight the user may want to consult a statistician.											
239												
240												
241	PCB, Total											
242												
243	General Statistics											
244					Total Number of Observations	10				Number of Distinct Observations		3
245										Number of Missing Observations		0
246					Minimum	0.1				Mean		3.589
247					Maximum	5				Median		5
248					SD	2.278				Std. Error of Mean		0.72
249					Coefficient of Variation	0.635				Skewness		-1.054
250												
251	Normal GOF Test											
252					Shapiro Wilk Test Statistic	0.612	Shapiro Wilk GOF Test					
253					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
254					Lilliefors Test Statistic	0.432	Lilliefors GOF Test					
255					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
256	Data Not Normal at 5% Significance Level											
257												
258	Assuming Normal Distribution											
259	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
260					95% Student's-t UCL	4.909				95% Adjusted-CLT UCL (Chen-1995)		4.517

	A	B	C	D	E	F	G	H	I	J	K	L
261										95% Modified-t UCL (Johnson-1978)		4.869
262												
263						Gamma GOF Test						
264					A-D Test Statistic	2.018	Anderson-Darling Gamma GOF Test					
265					5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level					
266					K-S Test Statistic	0.452	Kolmogrov-Smirnoff Gamma GOF Test					
267					5% K-S Critical Value	0.275	Data Not Gamma Distributed at 5% Significance Level					
268						Data Not Gamma Distributed at 5% Significance Level						
269												
270						Gamma Statistics						
271					k hat (MLE)	0.901	k star (bias corrected MLE)					0.697
272					Theta hat (MLE)	3.984	Theta star (bias corrected MLE)					5.147
273					nu hat (MLE)	18.02	nu star (bias corrected)					13.95
274					MLE Mean (bias corrected)	3.589	MLE Sd (bias corrected)					4.298
275							Approximate Chi Square Value (0.05)					6.534
276					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					5.676
277												
278						Assuming Gamma Distribution						
279					95% Approximate Gamma UCL (use when n>=50))	7.66	95% Adjusted Gamma UCL (use when n<50)					8.818
280												
281						Lognormal GOF Test						
282					Shapiro Wilk Test Statistic	0.628	Shapiro Wilk Lognormal GOF Test					
283					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
284					Lilliefors Test Statistic	0.422	Lilliefors Lognormal GOF Test					
285					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
286						Data Not Lognormal at 5% Significance Level						
287												
288						Lognormal Statistics						
289					Minimum of Logged Data	-2.303	Mean of logged Data					0.629
290					Maximum of Logged Data	1.609	SD of logged Data					1.664
291												
292						Assuming Lognormal Distribution						
293					95% H-UCL	95.51	90% Chebyshev (MVUE) UCL					15.47
294					95% Chebyshev (MVUE) UCL	19.84	97.5% Chebyshev (MVUE) UCL					25.91
295					99% Chebyshev (MVUE) UCL	37.83						
296												
297						Nonparametric Distribution Free UCL Statistics						
298						Data do not follow a Discernible Distribution (0.05)						
299												
300						Nonparametric Distribution Free UCLs						
301					95% CLT UCL	4.774	95% Jackknife UCL					4.909
302					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
303					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
304					95% BCA Bootstrap UCL	N/A						
305					90% Chebyshev(Mean, Sd) UCL	5.75	95% Chebyshev(Mean, Sd) UCL					6.728
306					97.5% Chebyshev(Mean, Sd) UCL	8.087	99% Chebyshev(Mean, Sd) UCL					10.76
307												
308						Suggested UCL to Use						
309					99% Chebyshev (Mean, Sd) UCL	10.76						
310												
311						Recommended UCL exceeds the maximum observation						
312												

	A	B	C	D	E	F	G	H	I	J	K	L
313	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
314	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
315	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
316	For additional insight the user may want to consult a statistician.											
317												
318	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
319	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
320												
321												
322	**Technetium-99**											
323												
324	**General Statistics**											
325	Total Number of Observations					10	Number of Distinct Observations					4
326							Number of Missing Observations					0
327	Minimum					0	Mean					40.7
328	Maximum					142	Median					40.7
329	SD					39.4	Std. Error of Mean					12.46
330	Coefficient of Variation					0.968	Skewness					2.037
331												
332	**Normal GOF Test**											
333	Shapiro Wilk Test Statistic					0.704	**Shapiro Wilk GOF Test**					
334	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
335	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
336	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
337	**Data Not Normal at 5% Significance Level**											
338												
339	**Assuming Normal Distribution**											
340	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
341	95% Student's-t UCL					63.54	95% Adjusted-CLT UCL (Chen-1995)					69.77
342							95% Modified-t UCL (Johnson-1978)					64.88
343	**Gamma Statistics Not Available**											
344	**Lognormal Statistics Not Available**											
345												
346	**Nonparametric Distribution Free UCL Statistics**											
347	**Data do not follow a Discernible Distribution (0.05)**											
348												
349	**Nonparametric Distribution Free UCLs**											
350	95% CLT UCL					61.19	95% Jackknife UCL					63.54
351	95% Standard Bootstrap UCL					N/A	95% Bootstrap-t UCL					N/A
352	95% Hall's Bootstrap UCL					N/A	95% Percentile Bootstrap UCL					N/A
353	95% BCA Bootstrap UCL					N/A						
354	90% Chebyshev(Mean, Sd) UCL					78.08	95% Chebyshev(Mean, Sd) UCL					95.01
355	97.5% Chebyshev(Mean, Sd) UCL					118.5	99% Chebyshev(Mean, Sd) UCL					164.7
356												
357	**Suggested UCL to Use**											
358	95% Chebyshev (Mean, Sd) UCL					95.01						
359												
360	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
361	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
362	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
363	For additional insight the user may want to consult a statistician.											
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365												
366	Uranium											
367												
368						General Statistics						
369					Total Number of Observations	10			Number of Distinct Observations			3
370									Number of Missing Observations			0
371					Minimum	10			Mean			15.3
372					Maximum	60			Median			10
373					SD	15.73			Std. Error of Mean			4.976
374					Coefficient of Variation	1.028			Skewness			3.142
375												
376						Normal GOF Test						
377					Shapiro Wilk Test Statistic	0.395			Shapiro Wilk GOF Test			
378					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
379					Lilliefors Test Statistic	0.458			Lilliefors GOF Test			
380					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
381						Data Not Normal at 5% Significance Level						
382												
383						Assuming Normal Distribution						
384					95% Normal UCL				95% UCLs (Adjusted for Skewness)			
385					95% Student's-t UCL	24.42			95% Adjusted-CLT UCL (Chen-1995)			28.77
386									95% Modified-t UCL (Johnson-1978)			25.24
387												
388						Gamma GOF Test						
389					A-D Test Statistic	2.931			Anderson-Darling Gamma GOF Test			
390					5% A-D Critical Value	0.734			Data Not Gamma Distributed at 5% Significance Level			
391					K-S Test Statistic	0.454			Kolmogrov-Smirnoff Gamma GOF Test			
392					5% K-S Critical Value	0.269			Data Not Gamma Distributed at 5% Significance Level			
393						Data Not Gamma Distributed at 5% Significance Level						
394												
395						Gamma Statistics						
396					k hat (MLE)	2.428			k star (bias corrected MLE)			1.766
397					Theta hat (MLE)	6.302			Theta star (bias corrected MLE)			8.663
398					nu hat (MLE)	48.56			nu star (bias corrected)			35.32
399					MLE Mean (bias corrected)	15.3			MLE Sd (bias corrected)			11.51
400									Approximate Chi Square Value (0.05)			22.72
401					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			20.98
402												
403						Assuming Gamma Distribution						
404					95% Approximate Gamma UCL (use when n>=50))	23.78			95% Adjusted Gamma UCL (use when n<50)			25.76
405												
406						Lognormal GOF Test						
407					Shapiro Wilk Test Statistic	0.435			Shapiro Wilk Lognormal GOF Test			
408					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
409					Lilliefors Test Statistic	0.442			Lilliefors Lognormal GOF Test			
410					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
411						Data Not Lognormal at 5% Significance Level						
412												
413						Lognormal Statistics						
414					Minimum of Logged Data	2.303			Mean of logged Data			2.508
415					Maximum of Logged Data	4.094			SD of logged Data			0.563
416												

	A	B	C	D	E	F	G	H	I	J	K	L
417					Assuming Lognormal Distribution							
418					95% H-UCL	22.22				90% Chebyshev (MVUE) UCL		21.87
419					95% Chebyshev (MVUE) UCL	25.36				97.5% Chebyshev (MVUE) UCL		30.22
420					99% Chebyshev (MVUE) UCL	39.76						
421												
422					Nonparametric Distribution Free UCL Statistics							
423					Data do not follow a Discernible Distribution (0.05)							
424												
425					Nonparametric Distribution Free UCLs							
426					95% CLT UCL	23.48				95% Jackknife UCL		24.42
427					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
428					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
429					95% BCA Bootstrap UCL	N/A						
430					90% Chebyshev(Mean, Sd) UCL	30.23				95% Chebyshev(Mean, Sd) UCL		36.99
431					97.5% Chebyshev(Mean, Sd) UCL	46.37				99% Chebyshev(Mean, Sd) UCL		64.81
432												
433					Suggested UCL to Use							
434					95% Chebyshev (Mean, Sd) UCL	36.99						
435												
436					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
437					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
438					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
439					For additional insight the user may want to consult a statistician.							
440												
441												
442	Uranium-234											
443												
444					General Statistics							
445					Total Number of Observations	10				Number of Distinct Observations		5
446										Number of Missing Observations		0
447					Minimum	0.478				Mean		8.614
448					Maximum	30.7				Median		8.614
449					SD	8.519				Std. Error of Mean		2.694
450					Coefficient of Variation	0.989				Skewness		2.139
451												
452					Normal GOF Test							
453					Shapiro Wilk Test Statistic	0.691				Shapiro Wilk GOF Test		
454					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
455					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
456					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
457					Data Not Normal at 5% Significance Level							
458												
459					Assuming Normal Distribution							
460					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
461					95% Student's-t UCL	13.55				95% Adjusted-CLT UCL (Chen-1995)		14.99
462										95% Modified-t UCL (Johnson-1978)		13.86
463												
464					Gamma GOF Test							
465					A-D Test Statistic	0.964				Anderson-Darling Gamma GOF Test		
466					5% A-D Critical Value	0.747				Data Not Gamma Distributed at 5% Significance Level		
467					K-S Test Statistic	0.328				Kolmogrov-Smirnoff Gamma GOF Test		
468					5% K-S Critical Value	0.273				Data Not Gamma Distributed at 5% Significance Level		

	A	B	C	D	E	F	G	H	I	J	K	L
469	Data Not Gamma Distributed at 5% Significance Level											
470												
471	Gamma Statistics											
472					k hat (MLE)	1.07				k star (bias corrected MLE)		0.816
473					Theta hat (MLE)	8.048				Theta star (bias corrected MLE)		10.56
474					nu hat (MLE)	21.41				nu star (bias corrected)		16.32
475					MLE Mean (bias corrected)	8.614				MLE Sd (bias corrected)		9.536
476										Approximate Chi Square Value (0.05)		8.187
477					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		7.208
478												
479	Assuming Gamma Distribution											
480					95% Approximate Gamma UCL (use when n>=50))	17.17				95% Adjusted Gamma UCL (use when n<50)		19.5
481												
482	Lognormal GOF Test											
483					Shapiro Wilk Test Statistic	0.809				Shapiro Wilk Lognormal GOF Test		
484					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
485					Lilliefors Test Statistic	0.361				Lilliefors Lognormal GOF Test		
486					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
487	Data Not Lognormal at 5% Significance Level											
488												
489	Lognormal Statistics											
490					Minimum of Logged Data	-0.738				Mean of logged Data		1.618
491					Maximum of Logged Data	3.424				SD of logged Data		1.289
492												
493	Assuming Lognormal Distribution											
494					95% H-UCL	57.36				90% Chebyshev (MVUE) UCL		23.37
495					95% Chebyshev (MVUE) UCL	29.33				97.5% Chebyshev (MVUE) UCL		37.61
496					99% Chebyshev (MVUE) UCL	53.88						
497												
498	Nonparametric Distribution Free UCL Statistics											
499	Data do not follow a Discernible Distribution (0.05)											
500												
501	Nonparametric Distribution Free UCLs											
502					95% CLT UCL	13.04				95% Jackknife UCL		13.55
503					95% Standard Bootstrap UCL	12.88				95% Bootstrap-t UCL		16.6
504					95% Hall's Bootstrap UCL	33.01				95% Percentile Bootstrap UCL		13.63
505					95% BCA Bootstrap UCL	14.45						
506					90% Chebyshev(Mean, Sd) UCL	16.7				95% Chebyshev(Mean, Sd) UCL		20.36
507					97.5% Chebyshev(Mean, Sd) UCL	25.44				99% Chebyshev(Mean, Sd) UCL		35.42
508												
509	Suggested UCL to Use											
510					95% Chebyshev (Mean, Sd) UCL	20.36						
511												
512	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
513	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
514	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
515	For additional insight the user may want to consult a statistician.											
516												
517												
518	Uranium-235											
519												
520	General Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
521					Total Number of Observations	10				Number of Distinct Observations		5
522										Number of Missing Observations		0
523					Minimum	0.0372					Mean	0.588
524					Maximum	2.11					Median	0.588
525					SD	0.587					Std. Error of Mean	0.186
526					Coefficient of Variation	0.998					Skewness	2.143
527												
528					Normal GOF Test							
529					Shapiro Wilk Test Statistic	0.688			Shapiro Wilk GOF Test			
530					5% Shapiro Wilk Critical Value	0.842			Data Not Normal at 5% Significance Level			
531					Lilliefors Test Statistic	0.4			Lilliefors GOF Test			
532					5% Lilliefors Critical Value	0.28			Data Not Normal at 5% Significance Level			
533					Data Not Normal at 5% Significance Level							
534												
535					Assuming Normal Distribution							
536			95% Normal UCL						95% UCLs (Adjusted for Skewness)			
537					95% Student's-t UCL	0.928			95% Adjusted-CLT UCL (Chen-1995)			1.028
538									95% Modified-t UCL (Johnson-1978)			0.949
539												
540					Gamma GOF Test							
541					A-D Test Statistic	0.99			Anderson-Darling Gamma GOF Test			
542					5% A-D Critical Value	0.747			Data Not Gamma Distributed at 5% Significance Level			
543					K-S Test Statistic	0.329			Kolmogrov-Smirnoff Gamma GOF Test			
544					5% K-S Critical Value	0.273			Data Not Gamma Distributed at 5% Significance Level			
545					Data Not Gamma Distributed at 5% Significance Level							
546												
547					Gamma Statistics							
548					k hat (MLE)	1.054			k star (bias corrected MLE)			0.805
549					Theta hat (MLE)	0.558			Theta star (bias corrected MLE)			0.731
550					nu hat (MLE)	21.09			nu star (bias corrected)			16.09
551					MLE Mean (bias corrected)	0.588			MLE Sd (bias corrected)			0.655
552									Approximate Chi Square Value (0.05)			8.028
553					Adjusted Level of Significance	0.0267			Adjusted Chi Square Value			7.06
554												
555					Assuming Gamma Distribution							
556					95% Approximate Gamma UCL (use when n>=50))	1.178			95% Adjusted Gamma UCL (use when n<50)			1.34
557												
558					Lognormal GOF Test							
559					Shapiro Wilk Test Statistic	0.798			Shapiro Wilk Lognormal GOF Test			
560					5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level			
561					Lilliefors Test Statistic	0.363			Lilliefors Lognormal GOF Test			
562					5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level			
563					Data Not Lognormal at 5% Significance Level							
564												
565					Lognormal Statistics							
566					Minimum of Logged Data	-3.291			Mean of logged Data			-1.075
567					Maximum of Logged Data	0.747			SD of logged Data			1.296
568												
569					Assuming Lognormal Distribution							
570					95% H-UCL	3.977			90% Chebyshev (MVUE) UCL			1.597
571					95% Chebyshev (MVUE) UCL	2.006			97.5% Chebyshev (MVUE) UCL			2.573
572					99% Chebyshev (MVUE) UCL	3.688						

	A	B	C	D	E	F	G	H	I	J	K	L
573												
574						Nonparametric Distribution Free UCL Statistics						
575						Data do not follow a Discernible Distribution (0.05)						
576												
577						Nonparametric Distribution Free UCLs						
578					95% CLT UCL	0.893				95% Jackknife UCL		0.928
579					95% Standard Bootstrap UCL	0.884				95% Bootstrap-t UCL		1.137
580					95% Hall's Bootstrap UCL	2.265				95% Percentile Bootstrap UCL		0.905
581					95% BCA Bootstrap UCL	1.044						
582					90% Chebyshev(Mean, Sd) UCL	1.145				95% Chebyshev(Mean, Sd) UCL		1.397
583					97.5% Chebyshev(Mean, Sd) UCL	1.747				99% Chebyshev(Mean, Sd) UCL		2.434
584												
585						Suggested UCL to Use						
586					95% Chebyshev (Mean, Sd) UCL	1.397						
587												
588					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
589					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
590					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
591					For additional insight the user may want to consult a statistician.							
592												
593												
594	Uranium-238											
595												
596						General Statistics						
597					Total Number of Observations	10				Number of Distinct Observations		5
598										Number of Missing Observations		0
599					Minimum	1.31				Mean		17.68
600					Maximum	62.9				Median		17.68
601					SD	17.44				Std. Error of Mean		5.514
602					Coefficient of Variation	0.986				Skewness		2.142
603												
604						Normal GOF Test						
605					Shapiro Wilk Test Statistic	0.688				Shapiro Wilk GOF Test		
606					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
607					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
608					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
609						Data Not Normal at 5% Significance Level						
610												
611						Assuming Normal Distribution						
612					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
613					95% Student's-t UCL	27.79				95% Adjusted-CLT UCL (Chen-1995)		30.74
614										95% Modified-t UCL (Johnson-1978)		28.41
615												
616						Gamma GOF Test						
617					A-D Test Statistic	0.993				Anderson-Darling Gamma GOF Test		
618					5% A-D Critical Value	0.746				Data Not Gamma Distributed at 5% Significance Level		
619					K-S Test Statistic	0.326				Kolmogrov-Smirnoff Gamma GOF Test		
620					5% K-S Critical Value	0.273				Data Not Gamma Distributed at 5% Significance Level		
621						Data Not Gamma Distributed at 5% Significance Level						
622												
623						Gamma Statistics						
624					k hat (MLE)	1.107				k star (bias corrected MLE)		0.841

	A	B	C	D	E	F	G	H	I	J	K	L
625					Theta hat (MLE)	15.97				Theta star (bias corrected MLE)		21.01
626					nu hat (MLE)	22.14				nu star (bias corrected)		16.83
627					MLE Mean (bias corrected)	17.68				MLE Sd (bias corrected)		19.27
628										Approximate Chi Square Value (0.05)		8.55
629					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		7.546
630												
631					**Assuming Gamma Distribution**							
632				95% Approximate Gamma UCL (use when n>=50))		34.79				95% Adjusted Gamma UCL (use when n<50)		39.42
633												
634					**Lognormal GOF Test**							
635					Shapiro Wilk Test Statistic	0.798				**Shapiro Wilk Lognormal GOF Test**		
636					5% Shapiro Wilk Critical Value	0.842				Data Not Lognormal at 5% Significance Level		
637					Lilliefors Test Statistic	0.361				**Lilliefors Lognormal GOF Test**		
638					5% Lilliefors Critical Value	0.28				Data Not Lognormal at 5% Significance Level		
639					**Data Not Lognormal at 5% Significance Level**							
640												
641					**Lognormal Statistics**							
642					Minimum of Logged Data	0.27				Mean of logged Data		2.357
643					Maximum of Logged Data	4.142				SD of logged Data		1.246
644												
645					**Assuming Lognormal Distribution**							
646					95% H-UCL	103.5				90% Chebyshev (MVUE) UCL		45.89
647					95% Chebyshev (MVUE) UCL	57.44				97.5% Chebyshev (MVUE) UCL		73.46
648					99% Chebyshev (MVUE) UCL	104.9						
649												
650					**Nonparametric Distribution Free UCL Statistics**							
651					**Data do not follow a Discernible Distribution (0.05)**							
652												
653					**Nonparametric Distribution Free UCLs**							
654					95% CLT UCL	26.75				95% Jackknife UCL		27.79
655					95% Standard Bootstrap UCL	26.13				95% Bootstrap-t UCL		34
656					95% Hall's Bootstrap UCL	67.54				95% Percentile Bootstrap UCL		26.72
657					95% BCA Bootstrap UCL	30.86						
658					90% Chebyshev(Mean, Sd) UCL	34.22				95% Chebyshev(Mean, Sd) UCL		41.71
659					97.5% Chebyshev(Mean, Sd) UCL	52.11				99% Chebyshev(Mean, Sd) UCL		72.54
660												
661					**Suggested UCL to Use**							
662					95% Chebyshev (Mean, Sd) UCL	41.71						
663												
664					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
665					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
666					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
667					For additional insight the user may want to consult a statistician.							
668												
669												
670	**Vanadium**											
671												
672					**General Statistics**							
673					Total Number of Observations	10				Number of Distinct Observations		8
674										Number of Missing Observations		0
675					Minimum	84				Mean		107.9
676					Maximum	158				Median		102

	A	B	C	D	E	F	G	H	I	J	K	L
677					SD	20.73					Std. Error of Mean	6.557
678					Coefficient of Variation	0.192					Skewness	1.76
679												
680					Normal GOF Test							
681					Shapiro Wilk Test Statistic	0.827	Shapiro Wilk GOF Test					
682					5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level					
683					Lilliefors Test Statistic	0.26	Lilliefors GOF Test					
684					5% Lilliefors Critical Value	0.28	Data appear Normal at 5% Significance Level					
685					Data appear Approximate Normal at 5% Significance Level							
686												
687					Assuming Normal Distribution							
688				95% Normal UCL			95% UCLs (Adjusted for Skewness)					
689					95% Student's-t UCL	119.9					95% Adjusted-CLT UCL (Chen-1995)	122.6
690											95% Modified-t UCL (Johnson-1978)	120.5
691												
692					Gamma GOF Test							
693					A-D Test Statistic	0.628	Anderson-Darling Gamma GOF Test					
694					5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level					
695					K-S Test Statistic	0.232	Kolmogrov-Smirnoff Gamma GOF Test					
696					5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level					
697					Detected data appear Gamma Distributed at 5% Significance Level							
698												
699					Gamma Statistics							
700					k hat (MLE)	34.48					k star (bias corrected MLE)	24.2
701					Theta hat (MLE)	3.129					Theta star (bias corrected MLE)	4.458
702					nu hat (MLE)	689.6					nu star (bias corrected)	484.1
703					MLE Mean (bias corrected)	107.9					MLE Sd (bias corrected)	21.93
704											Approximate Chi Square Value (0.05)	434
705					Adjusted Level of Significance	0.0267					Adjusted Chi Square Value	425.8
706												
707					Assuming Gamma Distribution							
708					95% Approximate Gamma UCL (use when n>=50))	120.3					95% Adjusted Gamma UCL (use when n<50)	122.7
709												
710					Lognormal GOF Test							
711					Shapiro Wilk Test Statistic	0.889	Shapiro Wilk Lognormal GOF Test					
712					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
713					Lilliefors Test Statistic	0.223	Lilliefors Lognormal GOF Test					
714					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
715					Data appear Lognormal at 5% Significance Level							
716												
717					Lognormal Statistics							
718					Minimum of Logged Data	4.431					Mean of logged Data	4.667
719					Maximum of Logged Data	5.063					SD of logged Data	0.175
720												
721					Assuming Lognormal Distribution							
722					95% H-UCL	120.3					90% Chebyshev (MVUE) UCL	125.7
723					95% Chebyshev (MVUE) UCL	133.8					97.5% Chebyshev (MVUE) UCL	145
724					99% Chebyshev (MVUE) UCL	167.1						
725												
726					Nonparametric Distribution Free UCL Statistics							
727					Data appear to follow a Discernible Distribution at 5% Significance Level							
728												

	A	B	C	D	E	F	G	H	I	J	K	L
729	**Nonparametric Distribution Free UCLs**											
730					95% CLT UCL	118.7				95% Jackknife UCL		119.9
731					95% Standard Bootstrap UCL	118.2				95% Bootstrap-t UCL		131.4
732					95% Hall's Bootstrap UCL	184.3				95% Percentile Bootstrap UCL		118.7
733					95% BCA Bootstrap UCL	123.1						
734					90% Chebyshev(Mean, Sd) UCL	127.6				95% Chebyshev(Mean, Sd) UCL		136.5
735					97.5% Chebyshev(Mean, Sd) UCL	148.8				99% Chebyshev(Mean, Sd) UCL		173.1
736												
737	**Suggested UCL to Use**											
738					95% Student's-t UCL	119.9						
739												
740	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
741	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
742	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
743	For additional insight the user may want to consult a statistician.											
744												