	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 7:26:40 PM								
5	From File			EPC_013Sub_EU04.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Cobalt-60**											
12												
13	**General Statistics**											
14	Total Number of Observations					10	Number of Distinct Observations					3
15							Number of Missing Observations					0
16	Minimum					0.00331	Mean					0.0502
17	Maximum					0.097	Median					0.0502
18	SD					0.0221	Std. Error of Mean					0.00698
19	Coefficient of Variation					0.44	Skewness					1.748E-15
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic					0.659	**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.4	**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL					0.063	95% Adjusted-CLT UCL (Chen-1995)					0.0616
31							95% Modified-t UCL (Johnson-1978)					0.063
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic					2.329	**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value					0.734	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.483	**Kolmogrov-Smirnoff Gamma GOF Test**					
37	5% K-S Critical Value					0.269	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)					2.583	k star (bias corrected MLE)					1.875
42	Theta hat (MLE)					0.0194	Theta star (bias corrected MLE)					0.0267
43	nu hat (MLE)					51.67	nu star (bias corrected)					37.5
44	MLE Mean (bias corrected)					0.0502	MLE Sd (bias corrected)					0.0366
45							Approximate Chi Square Value (0.05)					24.48
46	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					22.67
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))					0.0768	95% Adjusted Gamma UCL (use when n<50)					0.083
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic					0.508	**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 Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.49	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-5.711			Mean of logged Data			-3.198
60					Maximum of Logged Data	-2.333			SD of logged Data			0.907
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	0.149			90% Chebyshev (MVUE) UCL			0.111
64					95% Chebyshev (MVUE) UCL	0.135			97.5% Chebyshev (MVUE) UCL			0.168
65					99% Chebyshev (MVUE) UCL	0.232						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	0.0616			95% Jackknife UCL			0.063
72					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
73					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	0.0711			95% Chebyshev(Mean, Sd) UCL			0.0806
76					97.5% Chebyshev(Mean, Sd) UCL	0.0938			99% Chebyshev(Mean, Sd) UCL			0.12
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	0.0806						
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	Iron											
88												
89	**General Statistics**											
90					Total Number of Observations	10			Number of Distinct Observations			10
91									Number of Missing Observations			0
92					Minimum	17066			Mean			23601
93					Maximum	36780			Median			20377
94					SD	6701			Std. Error of Mean			2119
95					Coefficient of Variation	0.284			Skewness			0.891
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.862	**Shapiro Wilk GOF Test**					
99					5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level					
100					Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**					
101					5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level					
102	**Data appear Approximate 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	27485				95% Adjusted-CLT UCL (Chen-1995)		27724
107										95% Modified-t UCL (Johnson-1978)		27585
108												
109	Gamma GOF Test											
110					A-D Test Statistic	0.62	Anderson-Darling Gamma GOF Test					
111					5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.275	Kolmogrov-Smirnoff Gamma GOF Test					
113					5% K-S Critical Value	0.266	Data Not Gamma Distributed at 5% Significance Level					
114	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
115												
116	Gamma Statistics											
117					k hat (MLE)	14.99				k star (bias corrected MLE)		10.56
118					Theta hat (MLE)	1574				Theta star (bias corrected MLE)		2235
119					nu hat (MLE)	299.8				nu star (bias corrected)		211.2
120					MLE Mean (bias corrected)	23601				MLE Sd (bias corrected)		7263
121										Approximate Chi Square Value (0.05)		178.6
122					Adjusted Level of Significance	0.0267				Adjusted Chi Square Value		173.3
123												
124	Assuming Gamma Distribution											
125					95% Approximate Gamma UCL (use when n>=50))	27913				95% Adjusted Gamma UCL (use when n<50)		28753
126												
127	Lognormal GOF Test											
128					Shapiro Wilk Test Statistic	0.885	Shapiro Wilk Lognormal GOF Test					
129					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.258	Lilliefors Lognormal GOF Test					
131					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
132	Data appear Lognormal at 5% Significance Level											
133												
134	Lognormal Statistics											
135					Minimum of Logged Data	9.745				Mean of logged Data		10.04
136					Maximum of Logged Data	10.51				SD of logged Data		0.269
137												
138	Assuming Lognormal Distribution											
139					95% H-UCL	28166				90% Chebyshev (MVUE) UCL		29618
140					95% Chebyshev (MVUE) UCL	32358				97.5% Chebyshev (MVUE) UCL		36160
141					99% Chebyshev (MVUE) UCL	43629						
142												
143	Nonparametric Distribution Free UCL Statistics											
144	Data appear to follow a Discernible Distribution at 5% Significance Level											
145												
146	Nonparametric Distribution Free UCLs											
147					95% CLT UCL	27086				95% Jackknife UCL		27485
148					95% Standard Bootstrap UCL	26932				95% Bootstrap-t UCL		28988
149					95% Hall's Bootstrap UCL	27100				95% Percentile Bootstrap UCL		26923
150					95% BCA Bootstrap UCL	27555						
151					90% Chebyshev(Mean, Sd) UCL	29958				95% Chebyshev(Mean, Sd) UCL		32838
152					97.5% Chebyshev(Mean, Sd) UCL	36834				99% Chebyshev(Mean, Sd) UCL		44685
153												
154	Suggested UCL to Use											
155					95% Student's-t UCL	27485						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
159	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
160	For additional insight the user may want to consult a statistician.											
161												
162												
163	**Manganese**											
164												
165	**General Statistics**											
166	Total Number of Observations					10	Number of Distinct Observations					10
167							Number of Missing Observations					0
168	Minimum					303	Mean					750.9
169	Maximum					1453	Median					541
170	SD					434.9	Std. Error of Mean					137.5
171	Coefficient of Variation					0.579	Skewness					0.81
172												
173	**Normal GOF Test**											
174	Shapiro Wilk Test Statistic					0.829	**Shapiro Wilk GOF Test**					
175	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
176	Lilliefors Test Statistic					0.276	**Lilliefors GOF Test**					
177	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
178	**Data appear Approximate Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
182	95% Student's-t UCL					1003	95% Adjusted-CLT UCL (Chen-1995)					1015
183							95% Modified-t UCL (Johnson-1978)					1009
184												
185	**Gamma GOF Test**											
186	A-D Test Statistic					0.61	**Anderson-Darling Gamma GOF Test**					
187	5% A-D Critical Value					0.73	Detected data appear Gamma Distributed at 5% Significance Level					
188	K-S Test Statistic					0.247	**Kolmogrov-Smirnoff Gamma GOF Test**					
189	5% K-S Critical Value					0.268	Detected data appear Gamma Distributed at 5% Significance Level					
190	**Detected data appear Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193	k hat (MLE)					3.613	k star (bias corrected MLE)					2.596
194	Theta hat (MLE)					207.8	Theta star (bias corrected MLE)					289.2
195	nu hat (MLE)					72.27	nu star (bias corrected)					51.92
196	MLE Mean (bias corrected)					750.9	MLE Sd (bias corrected)					466
197							Approximate Chi Square Value (0.05)					36.37
198	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					34.12
199												
200	**Assuming Gamma Distribution**											
201	95% Approximate Gamma UCL (use when n>=50))					1072	95% Adjusted Gamma UCL (use when n<50)					1143
202												
203	**Lognormal GOF Test**											
204	Shapiro Wilk Test Statistic					0.904	**Shapiro Wilk Lognormal GOF Test**					
205	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
206	Lilliefors Test Statistic					0.214	**Lilliefors Lognormal GOF Test**					
207	5% Lilliefors Critical Value					0.28	Data appear Lognormal at 5% Significance Level					
208	**Data appear Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210						Lognormal Statistics						
211					Minimum of Logged Data	5.714				Mean of logged Data		6.477
212					Maximum of Logged Data	7.281				SD of logged Data		0.561
213												
214						Assuming Lognormal Distribution						
215					95% H-UCL	1170				90% Chebyshev (MVUE) UCL		1153
216					95% Chebyshev (MVUE) UCL	1337				97.5% Chebyshev (MVUE) UCL		1592
217					99% Chebyshev (MVUE) UCL	2093						
218												
219						Nonparametric Distribution Free UCL Statistics						
220						Data appear to follow a Discernible Distribution at 5% Significance Level						
221												
222						Nonparametric Distribution Free UCLs						
223					95% CLT UCL	977.1				95% Jackknife UCL		1003
224					95% Standard Bootstrap UCL	967.7				95% Bootstrap-t UCL		1049
225					95% Hall's Bootstrap UCL	933.2				95% Percentile Bootstrap UCL		963.5
226					95% BCA Bootstrap UCL	983.2						
227					90% Chebyshev(Mean, Sd) UCL	1164				95% Chebyshev(Mean, Sd) UCL		1350
228					97.5% Chebyshev(Mean, Sd) UCL	1610				99% Chebyshev(Mean, Sd) UCL		2119
229												
230						Suggested UCL to Use						
231					95% Student's-t UCL	1003						
232												
233					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
234					These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)							
235					and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.							
236					For additional insight the user may want to consult a statistician.							
237												
238												
239	PAH, Total											
240												
241						General Statistics						
242					Total Number of Observations	10				Number of Distinct Observations		4
243										Number of Missing Observations		0
244					Minimum	0.0511				Mean		0.383
245					Maximum	0.5				Median		0.383
246					SD	0.128				Std. Error of Mean		0.0404
247					Coefficient of Variation	0.334				Skewness		-2.162
248												
249						Normal GOF Test						
250					Shapiro Wilk Test Statistic	0.68				Shapiro Wilk GOF Test		
251					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
252					Lilliefors Test Statistic	0.4				Lilliefors GOF Test		
253					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
254						Data Not Normal at 5% Significance Level						
255												
256						Assuming Normal Distribution						
257					95% Normal UCL					95% UCLs (Adjusted for Skewness)		
258					95% Student's-t UCL	0.457				95% Adjusted-CLT UCL (Chen-1995)		0.42
259										95% Modified-t UCL (Johnson-1978)		0.452
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261						Gamma GOF Test						
262					A-D Test Statistic	2.045	Anderson-Darling Gamma GOF Test					
263					5% A-D Critical Value	0.729	Data Not Gamma Distributed at 5% Significance Level					
264					K-S Test Statistic	0.465	Kolmogrov-Smirnoff Gamma GOF Test					
265					5% K-S Critical Value	0.268	Data Not Gamma Distributed at 5% Significance Level					
266						Data Not Gamma Distributed at 5% Significance Level						
267												
268						Gamma Statistics						
269					k hat (MLE)	4.151	k star (bias corrected MLE)					2.972
270					Theta hat (MLE)	0.0922	Theta star (bias corrected MLE)					0.129
271					nu hat (MLE)	83.02	nu star (bias corrected)					59.45
272					MLE Mean (bias corrected)	0.383	MLE Sd (bias corrected)					0.222
273							Approximate Chi Square Value (0.05)					42.72
274					Adjusted Level of Significance	0.0267	Adjusted Chi Square Value					40.27
275												
276						Assuming Gamma Distribution						
277					95% Approximate Gamma UCL (use when n>=50))	0.533	95% Adjusted Gamma UCL (use when n<50)					0.565
278												
279						Lognormal GOF Test						
280					Shapiro Wilk Test Statistic	0.509	Shapiro Wilk Lognormal GOF Test					
281					5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level					
282					Lilliefors Test Statistic	0.474	Lilliefors Lognormal GOF Test					
283					5% Lilliefors Critical Value	0.28	Data Not Lognormal at 5% Significance Level					
284						Data Not Lognormal at 5% Significance Level						
285												
286						Lognormal Statistics						
287					Minimum of Logged Data	-2.974	Mean of logged Data					-1.086
288					Maximum of Logged Data	-0.693	SD of logged Data					0.674
289												
290						Assuming Lognormal Distribution						
291					95% H-UCL	0.742	90% Chebyshev (MVUE) UCL					0.685
292					95% Chebyshev (MVUE) UCL	0.808	97.5% Chebyshev (MVUE) UCL					0.979
293					99% Chebyshev (MVUE) UCL	1.314						
294												
295						Nonparametric Distribution Free UCL Statistics						
296						Data do not follow a Discernible Distribution (0.05)						
297												
298						Nonparametric Distribution Free UCLs						
299					95% CLT UCL	0.449	95% Jackknife UCL					0.457
300					95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL					N/A
301					95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL					N/A
302					95% BCA Bootstrap UCL	N/A						
303					90% Chebyshev(Mean, Sd) UCL	0.504	95% Chebyshev(Mean, Sd) UCL					0.559
304					97.5% Chebyshev(Mean, Sd) UCL	0.635	99% Chebyshev(Mean, Sd) UCL					0.785
305												
306						Suggested UCL to Use						
307					95% Chebyshev (Mean, Sd) UCL	0.559						
308												
309						Recommended UCL exceeds the maximum observation						
310												
311	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
312	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											

	A	B	C	D	E	F	G	H	I	J	K	L
313	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
314	For additional insight the user may want to consult a statistician.											
315												
316	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
317	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
318												
319												
320	**PCB, Total**											
321												
322	**General Statistics**											
323	Total Number of Observations					10	Number of Distinct Observations					3
324							Number of Missing Observations					0
325	Minimum					0.1	Mean					3.073
326	Maximum					5	Median					5
327	SD					2.49	Std. Error of Mean					0.787
328	Coefficient of Variation					0.81	Skewness					-0.489
329												
330	**Normal GOF Test**											
331	Shapiro Wilk Test Statistic					0.653	**Shapiro Wilk GOF Test**					
332	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
333	Lilliefors Test Statistic					0.381	**Lilliefors GOF Test**					
334	5% Lilliefors Critical Value					0.28	Data Not Normal at 5% Significance Level					
335	**Data Not Normal at 5% Significance Level**											
336												
337	**Assuming Normal Distribution**											
338	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
339	95% Student's-t UCL					4.516	95% Adjusted-CLT UCL (Chen-1995)					4.238
340							95% Modified-t UCL (Johnson-1978)					4.496
341												
342	**Gamma GOF Test**											
343	A-D Test Statistic					1.677	**Anderson-Darling Gamma GOF Test**					
344	5% A-D Critical Value					0.765	Data Not Gamma Distributed at 5% Significance Level					
345	K-S Test Statistic					0.397	**Kolmogrov-Smirnoff Gamma GOF Test**					
346	5% K-S Critical Value					0.278	Data Not Gamma Distributed at 5% Significance Level					
347	**Data Not Gamma Distributed at 5% Significance Level**											
348												
349	**Gamma Statistics**											
350	k hat (MLE)					0.655	k star (bias corrected MLE)					0.525
351	Theta hat (MLE)					4.695	Theta star (bias corrected MLE)					5.855
352	nu hat (MLE)					13.09	nu star (bias corrected)					10.5
353	MLE Mean (bias corrected)					3.073	MLE Sd (bias corrected)					4.242
354							Approximate Chi Square Value (0.05)					4.254
355	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					3.59
356												
357	**Assuming Gamma Distribution**											
358	95% Approximate Gamma UCL (use when n>=50))					7.582	95% Adjusted Gamma UCL (use when n<50)					8.984
359												
360	**Lognormal GOF Test**											
361	Shapiro Wilk Test Statistic					0.686	**Shapiro Wilk Lognormal GOF Test**					
362	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
363	Lilliefors Test Statistic					0.375	**Lilliefors Lognormal GOF Test**					
364	5% Lilliefors Critical Value					0.28	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
365	Data Not Lognormal at 5% Significance Level											
366												
367	Lognormal Statistics											
368					Minimum of Logged Data	-2.303				Mean of logged Data		0.19
369					Maximum of Logged Data	1.609				SD of logged Data		1.88
370												
371	Assuming Lognormal Distribution											
372					95% H-UCL	173.4				90% Chebyshev (MVUE) UCL		14.18
373					95% Chebyshev (MVUE) UCL	18.34				97.5% Chebyshev (MVUE) UCL		24.13
374					99% Chebyshev (MVUE) UCL	35.49						
375												
376	Nonparametric Distribution Free UCL Statistics											
377	Data do not follow a Discernible Distribution (0.05)											
378												
379	Nonparametric Distribution Free UCLs											
380					95% CLT UCL	4.368				95% Jackknife UCL		4.516
381					95% Standard Bootstrap UCL	N/A				95% Bootstrap-t UCL		N/A
382					95% Hall's Bootstrap UCL	N/A				95% Percentile Bootstrap UCL		N/A
383					95% BCA Bootstrap UCL	N/A						
384					90% Chebyshev(Mean, Sd) UCL	5.435				95% Chebyshev(Mean, Sd) UCL		6.505
385					97.5% Chebyshev(Mean, Sd) UCL	7.99				99% Chebyshev(Mean, Sd) UCL		10.91
386												
387	Suggested UCL to Use											
388					99% Chebyshev (Mean, Sd) UCL	10.91						
389												
390	Recommended UCL exceeds the maximum observation											
391												
392	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
393	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
394	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
395	For additional insight the user may want to consult a statistician.											
396												
397	Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
398	reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.											
399												
400												
401	Uranium-238											
402												
403	General Statistics											
404					Total Number of Observations	10				Number of Distinct Observations		5
405										Number of Missing Observations		0
406					Minimum	0.477				Mean		2.004
407					Maximum	4.18				Median		2.004
408					SD	0.915				Std. Error of Mean		0.289
409					Coefficient of Variation	0.457				Skewness		1.163
410												
411	Normal GOF Test											
412					Shapiro Wilk Test Statistic	0.74				Shapiro Wilk GOF Test		
413					5% Shapiro Wilk Critical Value	0.842				Data Not Normal at 5% Significance Level		
414					Lilliefors Test Statistic	0.384				Lilliefors GOF Test		
415					5% Lilliefors Critical Value	0.28				Data Not Normal at 5% Significance Level		
416	Data Not Normal at 5% Significance Level											

	A	B	C	D	E	F	G	H	I	J	K	L
417												
418						Assuming Normal Distribution						
419				95% Normal UCL						95% UCLs (Adjusted for Skewness)		
420						95% Student's-t UCL	2.535				95% Adjusted-CLT UCL (Chen-1995)	2.594
421											95% Modified-t UCL (Johnson-1978)	2.552
422												
423						Gamma GOF Test						
424						A-D Test Statistic	1.405			Anderson-Darling Gamma GOF Test		
425						5% A-D Critical Value	0.729			Data Not Gamma Distributed at 5% Significance Level		
426						K-S Test Statistic	0.361			Kolmogrov-Smirnoff Gamma GOF Test		
427						5% K-S Critical Value	0.268			Data Not Gamma Distributed at 5% Significance Level		
428						Data Not Gamma Distributed at 5% Significance Level						
429												
430						Gamma Statistics						
431						k hat (MLE)	4.704			k star (bias corrected MLE)		3.359
432						Theta hat (MLE)	0.426			Theta star (bias corrected MLE)		0.597
433						nu hat (MLE)	94.08			nu star (bias corrected)		67.19
434						MLE Mean (bias corrected)	2.004			MLE Sd (bias corrected)		1.093
435										Approximate Chi Square Value (0.05)		49.32
436						Adjusted Level of Significance	0.0267			Adjusted Chi Square Value		46.67
437												
438						Assuming Gamma Distribution						
439						95% Approximate Gamma UCL (use when n>=50))	2.73			95% Adjusted Gamma UCL (use when n<50)		2.885
440												
441						Lognormal GOF Test						
442						Shapiro Wilk Test Statistic	0.727			Shapiro Wilk Lognormal GOF Test		
443						5% Shapiro Wilk Critical Value	0.842			Data Not Lognormal at 5% Significance Level		
444						Lilliefors Test Statistic	0.38			Lilliefors Lognormal GOF Test		
445						5% Lilliefors Critical Value	0.28			Data Not Lognormal at 5% Significance Level		
446						Data Not Lognormal at 5% Significance Level						
447												
448						Lognormal Statistics						
449						Minimum of Logged Data	-0.74			Mean of logged Data		0.585
450						Maximum of Logged Data	1.43			SD of logged Data		0.543
451												
452						Assuming Lognormal Distribution						
453						95% H-UCL	3.145			90% Chebyshev (MVUE) UCL		3.124
454						95% Chebyshev (MVUE) UCL	3.611			97.5% Chebyshev (MVUE) UCL		4.288
455						99% Chebyshev (MVUE) UCL	5.617					
456												
457						Nonparametric Distribution Free UCL Statistics						
458						Data do not follow a Discernible Distribution (0.05)						
459												
460						Nonparametric Distribution Free UCLs						
461						95% CLT UCL	2.48			95% Jackknife UCL		2.535
462						95% Standard Bootstrap UCL	2.453			95% Bootstrap-t UCL		2.624
463						95% Hall's Bootstrap UCL	5.048			95% Percentile Bootstrap UCL		2.447
464						95% BCA Bootstrap UCL	2.515					
465						90% Chebyshev(Mean, Sd) UCL	2.872			95% Chebyshev(Mean, Sd) UCL		3.266
466						97.5% Chebyshev(Mean, Sd) UCL	3.811			99% Chebyshev(Mean, Sd) UCL		4.883
467												
468						Suggested UCL to Use						

	A	B	C	D	E	F	G	H	I	J	K	L
469					95% Chebyshev (Mean, Sd) UCL	3.266						
470												
471	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
472	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
473	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
474	For additional insight the user may want to consult a statistician.											
475												
476												
477	**Vanadium**											
478												
479	**General Statistics**											
480	Total Number of Observations					10	Number of Distinct Observations					9
481							Number of Missing Observations					0
482	Minimum					78	Mean					90.7
483	Maximum					110	Median					87.5
484	SD					12.83	Std. Error of Mean					4.058
485	Coefficient of Variation					0.141	Skewness					0.548
486												
487	**Normal GOF Test**											
488	Shapiro Wilk Test Statistic					0.853	**Shapiro Wilk GOF Test**					
489	5% Shapiro Wilk Critical Value					0.842	Data appear Normal at 5% Significance Level					
490	Lilliefors Test Statistic					0.198	**Lilliefors GOF Test**					
491	5% Lilliefors Critical Value					0.28	Data appear Normal at 5% Significance Level					
492	**Data appear Normal at 5% Significance Level**											
493												
494	**Assuming Normal Distribution**											
495	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
496	95% Student's-t UCL					98.14	95% Adjusted-CLT UCL (Chen-1995)					98.13
497							95% Modified-t UCL (Johnson-1978)					98.26
498												
499	**Gamma GOF Test**											
500	A-D Test Statistic					0.622	**Anderson-Darling Gamma GOF Test**					
501	5% A-D Critical Value					0.724	Detected data appear Gamma Distributed at 5% Significance Level					
502	K-S Test Statistic					0.212	**Kolmogrov-Smirnoff Gamma GOF Test**					
503	5% K-S Critical Value					0.266	Detected data appear Gamma Distributed at 5% Significance Level					
504	**Detected data appear Gamma Distributed at 5% Significance Level**											
505												
506	**Gamma Statistics**											
507	k hat (MLE)					57.26	k star (bias corrected MLE)					40.15
508	Theta hat (MLE)					1.584	Theta star (bias corrected MLE)					2.259
509	nu hat (MLE)					1145	nu star (bias corrected)					803
510	MLE Mean (bias corrected)					90.7	MLE Sd (bias corrected)					14.31
511							Approximate Chi Square Value (0.05)					738.3
512	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					727.4
513												
514	**Assuming Gamma Distribution**											
515	95% Approximate Gamma UCL (use when n>=50))					98.66	95% Adjusted Gamma UCL (use when n<50)					100.1
516												
517	**Lognormal GOF Test**											
518	Shapiro Wilk Test Statistic					0.861	**Shapiro Wilk Lognormal GOF Test**					
519	5% Shapiro Wilk Critical Value					0.842	Data appear Lognormal at 5% Significance Level					
520	Lilliefors Test Statistic					0.2	**Lilliefors Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
521					5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level					
522	Data appear Lognormal at 5% Significance Level											
523												
524	Lognormal Statistics											
525					Minimum of Logged Data	4.357				Mean of logged Data		4.499
526					Maximum of Logged Data	4.7				SD of logged Data		0.138
527												
528	Assuming Lognormal Distribution											
529					95% H-UCL	98.78				90% Chebyshev (MVUE) UCL		102.6
530					95% Chebyshev (MVUE) UCL	108				97.5% Chebyshev (MVUE) UCL		115.5
531					99% Chebyshev (MVUE) UCL	130.3						
532												
533	Nonparametric Distribution Free UCL Statistics											
534	Data appear to follow a Discernible Distribution at 5% Significance Level											
535												
536	Nonparametric Distribution Free UCLs											
537					95% CLT UCL	97.37				95% Jackknife UCL		98.14
538					95% Standard Bootstrap UCL	97.13				95% Bootstrap-t UCL		99.56
539					95% Hall's Bootstrap UCL	96.35				95% Percentile Bootstrap UCL		97.1
540					95% BCA Bootstrap UCL	97.3						
541					90% Chebyshev(Mean, Sd) UCL	102.9				95% Chebyshev(Mean, Sd) UCL		108.4
542					97.5% Chebyshev(Mean, Sd) UCL	116				99% Chebyshev(Mean, Sd) UCL		131.1
543												
544	Suggested UCL to Use											
545					95% Student's-t UCL	98.14						
546												
547	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
548	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
549	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
550	For additional insight the user may want to consult a statistician.											
551												