APPENDIX C.6

95% UCL SUPPORTING DOCUMENTATION

This appendix includes output from the U.S. EPA statistical package, ProUCL (v3.0), only for COPCs identified in Section 3.0 as requiring 95% UCL calculation. Data sets (e.g., stations or reaches) determined to have too few samples (<4) to calculate a 95% UCL via ProUCL have not been included.

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\SW stat - reach 1.xls	
Variable:	Heptachlor epoxide	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	4	
Minimum	0.0011	
Maximum	0.025	
Mean	0.014914	
Standard Deviation	0.012581	
Variance	0.000158	
Coefficient of Variation	0.843571	
Skewness	-0.375513	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.673244	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.024155	
Gamma Statistics		
k hat	0.832109	
k star (bias corrected)	0.570729	
Theta hat	0.017923	
Theta star	0.026132	
nu hat	11.64952	
nu star	7.990203	
5% Approximate Chi Square Value	2.728667	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	1.891394	
Anderson-Darling Test Statistic	1.163421	
Anderson-Darling 5% Critical Value	0.733302	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.379485	
Kolmogrov-Smirnov 5% Critical Value	0.321655	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.043673	
95% Adjusted Gamma UCL	0.063005	
Lognormal Statistics		
Minimum of log data	-6.812445	
Maximum of log data	-3.688879	
Mean of log data	-4.915021	
Standard Deviation of log data	1.537422	
Variance of log data	2.363665	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.71377	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.023916	
MLE Standard Deviation	0.074218	
MLE Coefficient of Variation	3.103199	
MLE Skewness	39.19291	
MLE Median	0.007336	
MLE 80% Quantile	0.026893	
MLE 90% Quantile	0.052896	
MLE 95% Quantile	0.092	
MLE 99% Quantile	0.262113	
MVU Estimate of Median	0.006173	
MVU Estimate of Mean	0.01824	
MVU Estimate of Standard Deviation	0.029038	
MVU Estimate of SE of Mean	0.010312	
95% H-UCL	0.665468	
95% Chebyshev (MVUE) UCL	0.063191	
97.5% Chebyshev (MVUE) UCL	0.082642	
99% Chebyshev (MVUE) UCL	0.120848	
Non-parametric Statisitics		
95% CLT UCL	0.022736	
95% Adjusted-CLT UCL	0.022015	
95% Modified-t UCL	0.024042	
95% Jackknife UCL	0.024155	
95% Chebyshev (Mean, Sd) UCL	0.035642	
97.5% Chebyshev (Mean, Sd) UCL	0.044611	
99% Chebyshev (Mean, Sd) UCL	0.062229	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.062229	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\SW stat - reach 1.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	11.6	
Maximum	77.1	
Mean	24.58571	
Standard Deviation	23.5859	
Variance	556.2948	
Coefficient of Variation	0.959334	
Skewness	2.454163	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.60761	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	41.90845	
Gamma Statistics		
k hat	2.187983	
k star (bias corrected)	1.345514	
Theta hat	11.2367	
Theta star	18.27235	
nu hat	30.63177	
nu star	18.8372	
5% Approximate Chi Square Value	9.997167	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	8.127341	
Anderson-Darling Test Statistic	1.003176	
Anderson-Darling 5% Critical Value	0.714392	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.312492	
Kolmogrov-Smirnov 5% Critical Value	0.314849	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	46.32573	
95% Adjusted Gamma UCL	56.98371	
Lognormal Statistics		
Minimum of log data	2.451005	
Maximum of log data	4.345103	
Mean of log data	2.956571	
Standard Deviation of log data	0.667546	
Variance of log data	0.445618	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.760579	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	24.03184	
MLE Standard Deviation	18.00713	
MLE Coefficient of Variation	0.749303	
MLE Skewness	2.668608	
MLE Median	19.23191	
MLE 80% Quantile	33.8063	
MLE 90% Quantile	45.34807	
MLE 95% Quantile	57.66695	
MLE 99% Quantile	90.85667	
MVU Estimate of Median	18.62702	
MVU Estimate of Mean	23.17813	
MVU Estimate of Standard Deviation	15.63346	
MVU Estimate of SE of Mean	5.886284	
95% H-UCL	51.91841	
95% Chebyshev (MVUE) UCL	48.83585	
97.5% Chebyshev (MVUE) UCL	59.93796	
99% Chebyshev (MVUE) UCL	81.74592	
Non-parametric Statisitics		
95% CLT UCL	39.24898	
95% Adjusted-CLT UCL	48.08462	
95% Modified-t UCL	43.28663	
95% Jacknife UCL	41.90845	
95% Chebyshev (Mean, Sd) UCL	63.4437	
97.5% Chebyshev (Mean, Sd) UCL	80.25758	
99% Chebyshev (Mean, Sd) UCL	113.2852	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	38.30485	
95% Bootstrap-t UCL	89.96203	
95% Hall's Bootstrap UCL	97.67162	
95% Percentile Bootstrap UCL	41.3	
95% BCA Bootstrap UCL	51.85714	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	46.32573	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\SW stat - reach 1.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	4	
Minimum	0.05	
Maximum	2.5	
Mean	0.43	
Standard Deviation	0.913446	
Variance	0.834383	
Coefficient of Variation	2.124293	
Skewness	2.637824	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.481661	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.100883	
Gamma Statistics		
k hat	0.527192	
k star (bias corrected)	0.396491	
Theta hat	0.815641	
Theta star	1.084514	
nu hat	7.380695	
nu star	5.550873	
5% Approximate Chi Square Value	1.414365	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	0.879546	
Anderson-Darling Test Statistic	1.599769	
Anderson-Darling 5% Critical Value	0.749865	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.410171	
Kolmogrov-Smirnov 5% Critical Value	0.326742	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1.687595	
95% Adjusted Gamma UCL	2.713758	
Lognormal Statistics		
Minimum of log data	-2.995732	
Maximum of log data	0.916291	
Mean of log data	-2.039013	
Standard Deviation of log data	1.348287	
Variance of log data	1.817878	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.652622	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.323009	
MLE Standard Deviation	0.733649	
MLE Coefficient of Variation	2.271294	
MLE Skewness	18.53099	
MLE Median	0.130157	
MLE 80% Quantile	0.406687	
MLE 90% Quantile	0.736045	
MLE 95% Quantile	1.195924	
MLE 99% Quantile	2.995475	
MVU Estimate of Median	0.114058	
MVU Estimate of Mean	0.266285	
MVU Estimate of Standard Deviation	0.369918	
MVU Estimate of SE of Mean	0.134053	
95% H-UCL	4.341498	
95% Chebyshev (MVUE) UCL	0.850609	
97.5% Chebyshev (MVUE) UCL	1.103447	
99% Chebyshev (MVUE) UCL	1.600097	
Non-parametric Statisitics		
95% CLT UCL	0.997886	
95% Adjusted-CLT UCL	1.365685	
95% Modified-t UCL	1.158252	
95% Jackknife UCL	1.100883	
95% Chebyshev (Mean, Sd) UCL	1.93491	
97.5% Chebyshev (Mean, Sd) UCL	2.586086	
99% Chebyshev (Mean, Sd) UCL	3.865195	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	3.865195	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\SW stat - reach 1.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	2.2	
Maximum	146	
Mean	25.78571	
Standard Deviation	53.13861	
Variance	2823.711	
Coefficient of Variation	2.060777	
Skewness	2.619039	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.513794	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	64.81351	
Gamma Statistics		
k hat	0.514182	
k star (bias corrected)	0.389056	
Theta hat	50.14903	
Theta star	66.27761	
nu hat	7.198544	
nu star	5.446787	
5% Approximate Chi Square Value	1.363561	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	0.842517	
Anderson-Darling Test Statistic	1.034189	
Anderson-Darling 5% Critical Value	0.750666	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.37827	
Kolmogrov-Smirnov 5% Critical Value	0.32698	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	103.0018	
95% Adjusted Gamma UCL	166.7021	
Lognormal Statistics		
Minimum of log data	0.788457	
Maximum of log data	4.983607	
Mean of log data	2.019826	
Standard Deviation of log data	1.470733	
Variance of log data	2.163057	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.820777	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	22.22803	
MLE Standard Deviation	61.67099	
MLE Coefficient of Variation	2.77447	
MLE Skewness	29.68039	
MLE Median	7.537012	
MLE 80% Quantile	26.11723	
MLE 90% Quantile	49.88489	
MLE 95% Quantile	84.70563	
MLE 99% Quantile	230.6154	
MVU Estimate of Median	6.437938	
MVU Estimate of Mean	17.45984	
MVU Estimate of Standard Deviation	26.54405	
MVU Estimate of SE of Mean	9.498762	
95% H-UCL	473.3066	
95% Chebyshev (MVUE) UCL	58.86398	
97.5% Chebyshev (MVUE) UCL	76.77959	
99% Chebyshev (MVUE) UCL	111.9713	
Non-parametric Statisitics		
95% CLT UCL	58.82179	
95% Adjusted-CLT UCL	80.06569	
95% Modified-t UCL	68.12714	
95% Jackknife UCL	64.81351	
95% Chebyshev (Mean, Sd) UCL	113.332	
97.5% Chebyshev (Mean, Sd) UCL	151.2134	
99% Chebyshev (Mean, Sd) UCL	225.624	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	56.38888	
95% Bootstrap-t UCL	395.3938	
95% Hall's Bootstrap UCL	319.3894	
95% Percentile Bootstrap UCL	64.41429	
95% BCA Bootstrap UCL	84.98571	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	58.86398	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\SW stat - reach 1.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	0.37	
Maximum	75.9	
Mean	13.07286	
Standard Deviation	27.90491	
Variance	778.6841	
Coefficient of Variation	2.134569	
Skewness	2.569623	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.54249	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	33.5677	
Gamma Statistics		
k hat	0.362299	
k star (bias corrected)	0.302266	
Theta hat	36.08308	
Theta star	43.24951	
nu hat	5.072183	
nu star	4.231724	
5% Approximate Chi Square Value	0.81501	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	0.460022	
Anderson-Darling Test Statistic	0.763744	
Anderson-Darling 5% Critical Value	0.773958	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.273797	
Kolmogrov-Smirnov 5% Critical Value	0.332645	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	67.87733	
95% Adjusted Gamma UCL	120.2566	
Lognormal Statistics		
Minimum of log data	-0.994252	
Maximum of log data	4.329417	
Mean of log data	0.72491	
Standard Deviation of log data	2.030684	
Variance of log data	4.123679	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.85969	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	16.22818	
MLE Standard Deviation	126.5238	
MLE Coefficient of Variation	7.796546	
MLE Skewness	497.3115	
MLE Median	2.064545	
MLE 80% Quantile	11.48266	
MLE 90% Quantile	28.05984	
MLE 95% Quantile	58.28738	
MLE 99% Quantile	232.3585	
MVU Estimate of Median	1.519791	
MVU Estimate of Mean	9.206831	
MVU Estimate of Standard Deviation	19.58021	
MVU Estimate of SE of Mean	6.479445	
95% H-UCL	4724.854	
95% Chebyshev (MVUE) UCL	37.45008	
97.5% Chebyshev (MVUE) UCL	49.67095	
99% Chebyshev (MVUE) UCL	73.6765	
Non-parametric Statisitics		
95% CLT UCL	30.42123	
95% Adjusted-CLT UCL	41.36666	
95% Modified-t UCL	35.27496	
95% Jackknife UCL	33.5677	
95% Chebyshev (Mean, Sd) UCL	59.04645	
97.5% Chebyshev (Mean, Sd) UCL	78.93926	
99% Chebyshev (Mean, Sd) UCL	118.0148	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	28.58702	
95% Bootstrap-t UCL	263.3797	
95% Hall's Bootstrap UCL	256.2216	
95% Percentile Bootstrap UCL	33.34857	
95% BCA Bootstrap UCL	44.13071	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	120.2566	95% Adjusted Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\SW stat - reach 1.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	316	
Maximum	691	
Mean	469.7143	
Standard Deviation	149.0265	
Variance	22208.9	
Coefficient of Variation	0.317271	
Skewness	0.372003	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.889297	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	579.1672	
Gamma Statistics		
k hat	11.65869	
k star (bias corrected)	6.757349	
Theta hat	40.28876	
Theta star	69.51162	
nu hat	163.2217	
nu star	94.60288	
5% Approximate Chi Square Value	73.16614	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	67.49335	
Anderson-Darling Test Statistic	0.460143	
Anderson-Darling 5% Critical Value	0.708181	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.265792	
Kolmogrov-Smirnov 5% Critical Value	0.311852	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	607.3346	
95% Adjusted Gamma UCL	658.3808	
Lognormal Statistics		
Minimum of log data	5.755742	
Maximum of log data	6.53814	
Mean of log data	6.108626	
Standard Deviation of log data	0.319148	
Variance of log data	0.101855	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.882074	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	473.2166	
MLE Standard Deviation	154.9547	
MLE Coefficient of Variation	0.32745	
MLE Skewness	1.01746	
MLE Median	449.7202	
MLE 80% Quantile	588.929	
MLE 90% Quantile	677.7176	
MLE 95% Quantile	760.2323	
MLE 99% Quantile	944.791	
MVU Estimate of Median	446.4572	
MVU Estimate of Mean	469.6757	
MVU Estimate of Standard Deviation	150.2918	
MVU Estimate of SE of Mean	56.79198	
95% H-UCL	626.468	
95% Chebyshev (MVUE) UCL	717.2262	
97.5% Chebyshev (MVUE) UCL	824.3415	
99% Chebyshev (MVUE) UCL	1034.749	
Non-parametric Statisitics		
95% CLT UCL	562.3635	
95% Adjusted-CLT UCL	570.8259	
95% Modified-t UCL	580.4872	
95% Jackknife UCL	579.1672	
95% Chebyshev (Mean, Sd) UCL	715.2368	
97.5% Chebyshev (Mean, Sd) UCL	821.4746	
99% Chebyshev (Mean, Sd) UCL	1030.158	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	556.5633	
95% Bootstrap-t UCL	588.5599	
95% Hall's Bootstrap UCL	575.0045	
95% Percentile Bootstrap UCL	557.4286	
95% BCA Bootstrap UCL	579.8571	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	579.1672	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\SW stat - reach 1.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	5	
Minimum	0.04	
Maximum	0.88	
Mean	0.203929	
Standard Deviation	0.308855	
Variance	0.095391	
Coefficient of Variation	1.514525	
Skewness	2.309055	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.632057	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.430768	
Gamma Statistics		
k hat	0.803299	
k star (bias corrected)	0.554266	
Theta hat	0.253864	
Theta star	0.367925	
nu hat	11.24619	
nu star	7.759729	
5% Approximate Chi Square Value	2.596022	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	1.785756	
Anderson-Darling Test Statistic	0.839904	
Anderson-Darling 5% Critical Value	0.734298	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.314269	
Kolmogrov-Smirnov 5% Critical Value	0.322008	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.60956	
95% Adjusted Gamma UCL	0.88614	
Lognormal Statistics		
Minimum of log data	-3.218876	
Maximum of log data	-0.127833	
Mean of log data	-2.328403	
Standard Deviation of log data	1.207206	
Variance of log data	1.457347	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.801846	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.201951	
MLE Standard Deviation	0.366559	
MLE Coefficient of Variation	1.815089	
MLE Skewness	11.42517	
MLE Median	0.097451	
MLE 80% Quantile	0.270275	
MLE 90% Quantile	0.459717	
MLE 95% Quantile	0.709958	
MLE 99% Quantile	1.61536	
MVU Estimate of Median	0.087695	
MVU Estimate of Mean	0.1745	
MVU Estimate of Standard Deviation	0.216194	
MVU Estimate of SE of Mean	0.079316	
95% H-UCL	1.679532	
95% Chebyshev (MVUE) UCL	0.520229	
97.5% Chebyshev (MVUE) UCL	0.669826	
99% Chebyshev (MVUE) UCL	0.96368	
Non-parametric Statisitics		
95% CLT UCL	0.395943	
95% Adjusted-CLT UCL	0.504803	
95% Modified-t UCL	0.447748	
95% Jackknife UCL	0.430768	
95% Chebyshev (Mean, Sd) UCL	0.71277	
97.5% Chebyshev (Mean, Sd) UCL	0.932946	
99% Chebyshev (Mean, Sd) UCL	1.365439	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.385072	
95% Bootstrap-t UCL	1.761627	
95% Hall's Bootstrap UCL	1.600095	
95% Percentile Bootstrap UCL	0.411429	
95% BCA Bootstrap UCL	0.5525	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.60956	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	106	
Maximum	221	
Mean	165.8	
Standard Deviation	50.86944	
Variance	2587.7	
Coefficient of Variation	0.306812	
Skewness	0.096098	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.903364	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	214.2984	
Gamma Statistics		
k hat	12.87945	
k star (bias corrected)	5.285112	
Theta hat	12.87322	
Theta star	31.37114	
nu hat	128.7945	
nu star	52.85112	
5% Approximate Chi Square Value	37.14806	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	31.49301	
Anderson-Darling Test Statistic	0.330226	
Anderson-Darling 5% Critical Value	0.678825	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.256726	
Kolmogrov-Smirnov 5% Critical Value	0.357466	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	235.8863	
95% Adjusted Gamma UCL	278.2432	
Lognormal Statistics		
Minimum of log data	4.663439	
Maximum of log data	5.398163	
Mean of log data	5.071459	
Standard Deviation of log data	0.316903	
Variance of log data	0.100427	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.919766	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	167.6154	
MLE Standard Deviation	54.47971	
MLE Coefficient of Variation	0.325028	
MLE Skewness	1.009421	
MLE Median	159.4067	
MLE 80% Quantile	208.3546	
MLE 90% Quantile	239.5299	
MLE 95% Quantile	268.4765	
MLE 99% Quantile	333.1437	
MVU Estimate of Median	157.8111	
MVU Estimate of Mean	165.8965	
MVU Estimate of Standard Deviation	52.39738	
MVU Estimate of SE of Mean	23.42979	
95% H-UCL	246.7659	
95% Chebyshev (MVUE) UCL	268.0246	
97.5% Chebyshev (MVUE) UCL	312.2155	
99% Chebyshev (MVUE) UCL	399.0199	
Non-parametric Statisitics		
95% CLT UCL	203.2196	
95% Adjusted-CLT UCL	204.2643	
95% Modified-t UCL	214.4614	
95% Jackknife UCL	214.2984	
95% Chebyshev (Mean, Sd) UCL	264.9628	
97.5% Chebyshev (Mean, Sd) UCL	307.8706	
99% Chebyshev (Mean, Sd) UCL	392.1547	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	198.8031	
95% Bootstrap-t UCL	238.2743	
95% Hall's Bootstrap UCL	240.2048	
95% Percentile Bootstrap UCL	200.6	
95% BCA Bootstrap UCL	216.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	214.2984	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	25.4	
Maximum	65.5	
Mean	41.18	
Standard Deviation	15.6316	
Variance	244.347	
Coefficient of Variation	0.379592	
Skewness	1.065571	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.93001	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	56.08302	
Gamma Statistics		
k hat	9.390008	
k star (bias corrected)	3.889337	
Theta hat	4.385513	
Theta star	10.58792	
nu hat	93.90008	
nu star	38.89337	
5% Approximate Chi Square Value	25.60644	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	21.01864	
Anderson-Darling Test Statistic	0.22806	
Anderson-Darling 5% Critical Value	0.679103	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.212022	
Kolmogrov-Smirnov 5% Critical Value	0.357678	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	62.54789	
95% Adjusted Gamma UCL	76.20041	
Lognormal Statistics		
Minimum of log data	3.234749	
Maximum of log data	4.18205	
Mean of log data	3.663761	
Standard Deviation of log data	0.363268	
Variance of log data	0.131964	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.980141	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	41.66838	
MLE Standard Deviation	15.65018	
MLE Coefficient of Variation	0.375589	
MLE Skewness	1.17975	
MLE Median	39.00776	
MLE 80% Quantile	53.02281	
MLE 90% Quantile	62.21277	
MLE 95% Quantile	70.9047	
MLE 99% Quantile	90.80573	
MVU Estimate of Median	38.49526	
MVU Estimate of Mean	41.10335	
MVU Estimate of Standard Deviation	14.86604	
MVU Estimate of SE of Mean	6.646824	
95% H-UCL	66.267	
95% Chebyshev (MVUE) UCL	70.07619	
97.5% Chebyshev (MVUE) UCL	82.61276	
99% Chebyshev (MVUE) UCL	107.2384	
Non-parametric Statisitics		
95% CLT UCL	52.67862	
95% Adjusted-CLT UCL	56.23818	
95% Modified-t UCL	56.63824	
95% Jackknife UCL	56.08302	
95% Chebyshev (Mean, Sd) UCL	71.6516	
97.5% Chebyshev (Mean, Sd) UCL	84.83669	
99% Chebyshev (Mean, Sd) UCL	110.7362	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	51.4984	
95% Bootstrap-t UCL	72.57141	
95% Hall's Bootstrap UCL	134.4045	
95% Percentile Bootstrap UCL	51.6	
95% BCA Bootstrap UCL	55.86	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	56.08302	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.245	
Maximum	2.7	
Mean	1.339	
Standard Deviation	0.898321	
Variance	0.80698	
Coefficient of Variation	0.670889	
Skewness	0.664964	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.964331	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.19545	
Gamma Statistics		
k hat	2.141703	
k star (bias corrected)	0.990014	
Theta hat	0.625204	
Theta star	1.352506	
nu hat	21.41703	
nu star	9.900143	
5% Approximate Chi Square Value	3.878611	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	2.419709	
Anderson-Darling Test Statistic	0.265065	
Anderson-Darling 5% Critical Value	0.684192	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.205273	
Kolmogrov-Smirnov 5% Critical Value	0.360321	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	3.417793	
95% Adjusted Gamma UCL	5.478466	
Lognormal Statistics		
Minimum of log data	-1.406497	
Maximum of log data	0.993252	
Mean of log data	0.040658	
Standard Deviation of log data	0.893362	
Variance of log data	0.798096	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.910707	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.552251	
MLE Standard Deviation	1.715437	
MLE Coefficient of Variation	1.105128	
MLE Skewness	4.665087	
MLE Median	1.041496	
MLE 80% Quantile	2.215658	
MLE 90% Quantile	3.282577	
MLE 95% Quantile	4.527814	
MLE 99% Quantile	8.319641	
MVU Estimate of Median	0.960557	
MVU Estimate of Mean	1.411306	
MVU Estimate of Standard Deviation	1.228164	
MVU Estimate of SE of Mean	0.545705	
95% H-UCL	11.32927	
95% Chebyshev (MVUE) UCL	3.789978	
97.5% Chebyshev (MVUE) UCL	4.819231	
99% Chebyshev (MVUE) UCL	6.840999	
Non-parametric Statisitics		
95% CLT UCL	1.999805	
95% Adjusted-CLT UCL	2.127461	
95% Modified-t UCL	2.215362	
95% Jackknife UCL	2.19545	
95% Chebyshev (Mean, Sd) UCL	3.090149	
97.5% Chebyshev (Mean, Sd) UCL	3.847873	
99% Chebyshev (Mean, Sd) UCL	5.336275	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.936154	
95% Bootstrap-t UCL	2.279447	
95% Hall's Bootstrap UCL	2.859329	
95% Percentile Bootstrap UCL	1.94	
95% BCA Bootstrap UCL	2.11	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.19545	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - rr-sd.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	104	
Maximum	258	
Mean	186.2	
Standard Deviation	67.73625	
Variance	4588.2	
Coefficient of Variation	0.363782	
Skewness	0.121231	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.868304	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	250.7791	
Gamma Statistics		
k hat	8.996057	
k star (bias corrected)	3.731756	
Theta hat	20.69796	
Theta star	49.89608	
nu hat	89.96057	
nu star	37.31756	
5% Approximate Chi Square Value	24.32933	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	19.87304	
Anderson-Darling Test Statistic	0.426444	
Anderson-Darling 5% Critical Value	0.679247	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.26512	
Kolmogrov-Smirnov 5% Critical Value	0.357735	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	285.603	
95% Adjusted Gamma UCL	349.6461	
Lognormal Statistics		
Minimum of log data	4.644391	
Maximum of log data	5.55296	
Mean of log data	5.170213	
Standard Deviation of log data	0.382991	
Variance of log data	0.146682	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.889469	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	189.3419	
MLE Standard Deviation	75.25861	
MLE Coefficient of Variation	0.397475	
MLE Skewness	1.25522	
MLE Median	175.9523	
MLE 80% Quantile	243.1895	
MLE 90% Quantile	287.8263	
MLE 95% Quantile	330.3768	
MLE 99% Quantile	428.8259	
MVU Estimate of Median	173.384	
MVU Estimate of Mean	186.4799	
MVU Estimate of Standard Deviation	71.07204	
MVU Estimate of SE of Mean	31.77575	
95% H-UCL	311.8403	
95% Chebyshev (MVUE) UCL	324.9871	
97.5% Chebyshev (MVUE) UCL	384.9194	
99% Chebyshev (MVUE) UCL	502.6446	
Non-parametric Statisitics		
95% CLT UCL	236.0268	
95% Adjusted-CLT UCL	237.7817	
95% Modified-t UCL	251.0528	
95% Jackknife UCL	250.7791	
95% Chebyshev (Mean, Sd) UCL	318.2423	
97.5% Chebyshev (Mean, Sd) UCL	375.3771	
99% Chebyshev (Mean, Sd) UCL	487.6073	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	232.1317	
95% Bootstrap-t UCL	300.2502	
95% Hall's Bootstrap UCL	368.2148	
95% Percentile Bootstrap UCL	235.8	
95% BCA Bootstrap UCL	237.4	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	250.7791	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	99.3	
Maximum	365	
Mean	202.06	
Standard Deviation	106.736	
Variance	11392.57	
Coefficient of Variation	0.528239	
Skewness	1.033047	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.907582	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	303.8211	
Gamma Statistics		
k hat	4.839836	
k star (bias corrected)	2.069268	
Theta hat	41.74935	
Theta star	97.64807	
nu hat	48.39836	
nu star	20.69268	
5% Approximate Chi Square Value	11.36183	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	8.502985	
Anderson-Darling Test Statistic	0.275516	
Anderson-Darling 5% Critical Value	0.680795	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.256649	
Kolmogrov-Smirnov 5% Critical Value	0.358332	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	368.0009	
95% Adjusted Gamma UCL	491.7288	
Lognormal Statistics		
Minimum of log data	4.598146	
Maximum of log data	5.899897	
Mean of log data	5.201713	
Standard Deviation of log data	0.512166	
Variance of log data	0.262314	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.964563	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	207.0312	
MLE Standard Deviation	113.3832	
MLE Coefficient of Variation	0.547662	
MLE Skewness	1.80725	
MLE Median	181.583	
MLE 80% Quantile	279.9169	
MLE 90% Quantile	350.6699	
MLE 95% Quantile	421.6709	
MLE 99% Quantile	597.6527	
MVU Estimate of Median	176.8613	
MVU Estimate of Mean	201.3138	
MVU Estimate of Standard Deviation	102.21	
MVU Estimate of SE of Mean	45.67162	
95% H-UCL	444.7604	
95% Chebyshev (MVUE) UCL	400.3918	
97.5% Chebyshev (MVUE) UCL	486.533	
99% Chebyshev (MVUE) UCL	655.7407	
Non-parametric Statisitics		
95% CLT UCL	280.5751	
95% Adjusted-CLT UCL	304.1387	
95% Modified-t UCL	307.4965	
95% Jackknife UCL	303.8211	
95% Chebyshev (Mean, Sd) UCL	410.1267	
97.5% Chebyshev (Mean, Sd) UCL	500.1574	
99% Chebyshev (Mean, Sd) UCL	677.0051	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	272.2015	
95% Bootstrap-t UCL	502.3007	
95% Hall's Bootstrap UCL	944.2295	
95% Percentile Bootstrap UCL	277.4	
95% BCA Bootstrap UCL	300.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	303.8211	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	80.8	
Maximum	249	
Mean	161.36	
Standard Deviation	65.61134	
Variance	4304.848	
Coefficient of Variation	0.406615	
Skewness	0.271805	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.976052	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	223.9132	
Gamma Statistics		
k hat	7.12619	
k star (bias corrected)	2.98381	
Theta hat	22.64323	
Theta star	54.07852	
nu hat	71.2619	
nu star	29.8381	
5% Approximate Chi Square Value	18.36358	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	14.57179	
Anderson-Darling Test Statistic	0.201417	
Anderson-Darling 5% Critical Value	0.679932	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.176375	
Kolmogrov-Smirnov 5% Critical Value	0.358004	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	262.1861	
95% Adjusted Gamma UCL	330.4107	
Lognormal Statistics		
Minimum of log data	4.391977	
Maximum of log data	5.517453	
Mean of log data	5.011836	
Standard Deviation of log data	0.434465	
Variance of log data	0.18876	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973625	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	165.0447	
MLE Standard Deviation	75.22697	
MLE Coefficient of Variation	0.455797	
MLE Skewness	1.462085	
MLE Median	150.1803	
MLE 80% Quantile	216.7966	
MLE 90% Quantile	262.4668	
MLE 95% Quantile	306.9031	
MLE 99% Quantile	412.5688	
MVU Estimate of Median	147.3632	
MVU Estimate of Mean	161.8085	
MVU Estimate of Standard Deviation	69.85969	
MVU Estimate of SE of Mean	31.22836	
95% H-UCL	299.798	
95% Chebyshev (MVUE) UCL	297.9298	
97.5% Chebyshev (MVUE) UCL	356.8296	
99% Chebyshev (MVUE) UCL	472.5268	
Non-parametric Statisitics		
95% CLT UCL	209.6238	
95% Adjusted-CLT UCL	213.4348	
95% Modified-t UCL	224.5077	
95% Jackknife UCL	223.9132	
95% Chebyshev (Mean, Sd) UCL	289.26	
97.5% Chebyshev (Mean, Sd) UCL	344.6025	
99% Chebyshev (Mean, Sd) UCL	453.312	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	204.5695	
95% Bootstrap-t UCL	251.5872	
95% Hall's Bootstrap UCL	296.2568	
95% Percentile Bootstrap UCL	206.6	
95% BCA Bootstrap UCL	215.8	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	223.9132	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	95.4	
Maximum	317	
Mean	163.88	
Standard Deviation	88.0112	
Variance	7745.972	
Coefficient of Variation	0.537047	
Skewness	1.93398	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.770552	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	247.789	
Gamma Statistics		
k hat	5.590921	
k star (bias corrected)	2.369702	
Theta hat	29.31181	
Theta star	69.15638	
nu hat	55.90921	
nu star	23.69702	
5% Approximate Chi Square Value	13.61678	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	10.43319	
Anderson-Darling Test Statistic	0.518286	
Anderson-Darling 5% Critical Value	0.680494	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.313304	
Kolmogrov-Smirnov 5% Critical Value	0.358225	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	285.1972	
95% Adjusted Gamma UCL	372.2225	
Lognormal Statistics		
Minimum of log data	4.558079	
Maximum of log data	5.758902	
Mean of log data	5.007046	
Standard Deviation of log data	0.453315	
Variance of log data	0.205495	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.881292	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	165.6362	
MLE Standard Deviation	79.1132	
MLE Coefficient of Variation	0.477632	
MLE Skewness	1.541861	
MLE Median	149.4626	
MLE 80% Quantile	219.2248	
MLE 90% Quantile	267.6169	
MLE 95% Quantile	315.0559	
MLE 99% Quantile	429.0004	
MVU Estimate of Median	146.4122	
MVU Estimate of Mean	162.0894	
MVU Estimate of Standard Deviation	72.9766	
MVU Estimate of SE of Mean	32.6191	
95% H-UCL	312.6571	
95% Chebyshev (MVUE) UCL	304.2727	
97.5% Chebyshev (MVUE) UCL	365.7956	
99% Chebyshev (MVUE) UCL	486.6453	
Non-parametric Statisitics		
95% CLT UCL	228.6211	
95% Adjusted-CLT UCL	264.9959	
95% Modified-t UCL	253.4628	
95% Jackknife UCL	247.789	
95% Chebyshev (Mean, Sd) UCL	335.4454	
97.5% Chebyshev (Mean, Sd) UCL	409.6819	
99% Chebyshev (Mean, Sd) UCL	555.5051	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	223.5985	
95% Bootstrap-t UCL	408.9107	
95% Hall's Bootstrap UCL	555.3561	
95% Percentile Bootstrap UCL	228.36	
95% BCA Bootstrap UCL	251	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	247.789	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.77	
Maximum	5.9	
Mean	2.634	
Standard Deviation	1.954682	
Variance	3.82078	
Coefficient of Variation	0.742096	
Skewness	1.519759	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.860557	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	4.497575	
Gamma Statistics		
k hat	2.496691	
k star (bias corrected)	1.13201	
Theta hat	1.054996	
Theta star	2.326835	
nu hat	24.96691	
nu star	11.3201	
5% Approximate Chi Square Value	4.781733	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	3.109844	
Anderson-Darling Test Statistic	0.275011	
Anderson-Darling 5% Critical Value	0.683546	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.247627	
Kolmogrov-Smirnov 5% Critical Value	0.359948	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	6.235634	
95% Adjusted Gamma UCL	9.587986	
Lognormal Statistics		
Minimum of log data	-0.261365	
Maximum of log data	1.774952	
Mean of log data	0.75507	
Standard Deviation of log data	0.740785	
Variance of log data	0.548763	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.972458	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.79953	
MLE Standard Deviation	2.393736	
MLE Coefficient of Variation	0.855049	
MLE Skewness	3.190283	
MLE Median	2.127761	
MLE 80% Quantile	3.979012	
MLE 90% Quantile	5.512284	
MLE 95% Quantile	7.196981	
MLE 99% Quantile	11.91903	
MVU Estimate of Median	2.013114	
MVU Estimate of Mean	2.630267	
MVU Estimate of Standard Deviation	1.913397	
MVU Estimate of SE of Mean	0.852867	
95% H-UCL	11.53213	
95% Chebyshev (MVUE) UCL	6.347828	
97.5% Chebyshev (MVUE) UCL	7.95642	
99% Chebyshev (MVUE) UCL	11.11619	
Non-parametric Statisitics		
95% CLT UCL	4.071866	
95% Adjusted-CLT UCL	4.706701	
95% Modified-t UCL	4.596596	
95% Jackknife UCL	4.497575	
95% Chebyshev (Mean, Sd) UCL	6.444376	
97.5% Chebyshev (Mean, Sd) UCL	8.093129	
99% Chebyshev (Mean, Sd) UCL	11.33178	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	3.884054	
95% Bootstrap-t UCL	6.081835	
95% Hall's Bootstrap UCL	10.98871	
95% Percentile Bootstrap UCL	4.014	
95% BCA Bootstrap UCL	4.54	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	4.497575	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	7.8	
Maximum	16.1	
Mean	10.78	
Standard Deviation	3.42739	
Variance	11.747	
Coefficient of Variation	0.31794	
Skewness	1.169212	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.867593	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	14.04764	
Gamma Statistics		
k hat	13.65089	
k star (bias corrected)	5.593691	
Theta hat	0.789692	
Theta star	1.927171	
nu hat	136.5089	
nu star	55.93691	
5% Approximate Chi Square Value	39.74507	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	33.87353	
Anderson-Darling Test Statistic	0.409531	
Anderson-Darling 5% Critical Value	0.678811	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.310771	
Kolmogrov-Smirnov 5% Critical Value	0.357433	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	15.17169	
95% Adjusted Gamma UCL	17.80151	
Lognormal Statistics		
Minimum of log data	2.054124	
Maximum of log data	2.778819	
Mean of log data	2.340618	
Standard Deviation of log data	0.297762	
Variance of log data	0.088662	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.900718	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	10.85851	
MLE Standard Deviation	3.306262	
MLE Coefficient of Variation	0.304486	
MLE Skewness	0.941687	
MLE Median	10.38765	
MLE 80% Quantile	13.35949	
MLE 90% Quantile	15.22962	
MLE 95% Quantile	16.95286	
MLE 99% Quantile	20.76383	
MVU Estimate of Median	10.29583	
MVU Estimate of Mean	10.76043	
MVU Estimate of Standard Deviation	3.194596	
MVU Estimate of SE of Mean	1.428522	
95% H-UCL	15.51512	
95% Chebyshev (MVUE) UCL	16.98721	
97.5% Chebyshev (MVUE) UCL	19.68155	
99% Chebyshev (MVUE) UCL	24.97405	
Non-parametric Statisitics		
95% CLT UCL	13.30119	
95% Adjusted-CLT UCL	14.15757	
95% Modified-t UCL	14.18122	
95% Jackknife UCL	14.04764	
95% Chebyshev (Mean, Sd) UCL	17.46121	
97.5% Chebyshev (Mean, Sd) UCL	20.35218	
99% Chebyshev (Mean, Sd) UCL	26.03092	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	13.05528	
95% Bootstrap-t UCL	25.314	
95% Hall's Bootstrap UCL	35.93647	
95% Percentile Bootstrap UCL	13.16	
95% BCA Bootstrap UCL	13.92	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	14.04764	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning'	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls
Variable	Vanadium
Raw Statistics	
Number of Observations	5
Number of Missing Data	0
Number of Valid Observations	5
Number of Distinct Observations	5
Minimum	16.4
Maximum	32.6
Mean	23.62
Standard Deviation	7.365935
Variance	54.257
Coefficient of Variation	0.311852
Skewness	0.328177
Too Few Distinct Observations?	NO
Normal Statistics	
Lilliefors Test Statisitic	N/R — Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R — Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.884519
Shapiro-Wilk 5% Critical Value	0.762
5% Normality Test Result	NORMAL — Data are normal at 5% significance level
95% Student's-t UCL	30.64261
Gamma Statistics	
k hat	12.8961
k star (bias corrected)	5.291775
Theta hat	1.831561
Theta star	4.463531
nu hat	128.961
nu star	52.91775
5% Approximate Chi Square Value	37.20398
Adjusted Level of Significance	0.0086
Adjusted Chi Square Value	31.54419
Anderson-Darling Test Statistic	0.389053
Anderson-Darling 5% Critical Value	0.678825
Anderson-Darling 5% Gamma Test Result	AD GAMMA — Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.242659
Kolmogrov-Smirnov 5% Critical Value	0.357465
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA — Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA — Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	33.59633
95% Adjusted Gamma UCL	39.62432
Lognormal Statistics	
Minimum of log data	2.797281
Maximum of log data	3.484312
Mean of log data	3.122822
Standard Deviation of log data	0.313668
Variance of log data	0.098387
Lilliefors Test Statisitic	N/R — Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R — Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.88882
Shapiro-Wilk 5% Critical Value	0.762
5% Lognormality Test Result	LOGNORMAL — Data are lognormal at 5% significance level
MLE Mean	23.85551
MLE Standard Deviation	7.670583
MLE Coefficient of Variation	0.321543
MLE Skewness	0.997875
MLE Median	22.71037
MLE 80% Quantile	29.60286
MLE 90% Quantile	33.98382
MLE 95% Quantile	38.04634
MLE 99% Quantile	47.10658
MVU Estimate of Median	22.48766
MVU Estimate of Mean	23.61594
MVU Estimate of Standard Deviation	7.383309
MVU Estimate of SE of Mean	3.301506
95% H-UCL	34.94066
95% Chebyshev (MVUE) UCL	38.00687
97.5% Chebyshev (MVUE) UCL	44.23383
99% Chebyshev (MVUE) UCL	56.4655
Non-parametric Statisitics	
95% CLT UCL	29.03839
95% Adjusted-CLT UCL	29.55498
95% Modified-t UCL	30.72319
95% Jackknife UCL	30.64261
95% Chebyshev (Mean, Sd) UCL	37.97885
97.5% Chebyshev (Mean, Sd) UCL	44.19194
99% Chebyshev (Mean, Sd) UCL	56.39634
Bootstrap Statistics	
Number of Bootstrap Runs	2000
95% Standard Bootstrap UCL	28.45508
95% Bootstrap-t UCL	35.37484
95% Hall's Bootstrap UCL	28.26427
95% Percentile Bootstrap UCL	28.82
95% BCA Bootstrap UCL	29.96
Recommendations	
Human Inspection Recommended?	NO
Appropriate Distribution	NORMAL
1st Recommended UCL	30.64261 — 95% Student's-t UCL
2nd Recommended UCL	
3rd Recommended UCL	
Recommended UCL > Max Data Value	NO
Recommendation Warning!	NONE
Alternative UCL	NONE

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nr-sd.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	226	
Maximum	595	
Mean	342.6	
Standard Deviation	149.6573	
Variance	22397.3	
Coefficient of Variation	0.436828	
Skewness	1.644518	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.818635	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	485.2818	
Gamma Statistics		
k hat	7.819632	
k star (bias corrected)	3.261186	
Theta hat	43.81281	
Theta star	105.0538	
nu hat	78.19632	
nu star	32.61186	
5% Approximate Chi Square Value	20.55573	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	16.50905	
Anderson-Darling Test Statistic	0.428702	
Anderson-Darling 5% Critical Value	0.679678	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.257588	
Kolmogrov-Smirnov 5% Critical Value	0.357904	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	543.5381	
95% Adjusted Gamma UCL	676.7696	
Lognormal Statistics		
Minimum of log data	5.420535	
Maximum of log data	6.388561	
Mean of log data	5.771261	
Standard Deviation of log data	0.388949	
Variance of log data	0.151281	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.888346	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	346.1603	
MLE Standard Deviation	139.8951	
MLE Coefficient of Variation	0.404134	
MLE Skewness	1.278406	
MLE Median	320.9423	
MLE 80% Quantile	445.8236	
MLE 90% Quantile	529.0384	
MLE 95% Quantile	608.5522	
MLE 99% Quantile	793.1062	
MVU Estimate of Median	316.1114	
MVU Estimate of Mean	340.7591	
MVU Estimate of Standard Deviation	131.8717	
MVU Estimate of SE of Mean	58.95781	
95% H-UCL	576.3256	
95% Chebyshev (MVUE) UCL	597.7502	
97.5% Chebyshev (MVUE) UCL	708.9505	
99% Chebyshev (MVUE) UCL	927.3819	
Non-parametric Statisitics		
95% CLT UCL	452.688	
95% Adjusted-CLT UCL	505.2833	
95% Modified-t UCL	493.4856	
95% Jackknife UCL	485.2818	
95% Chebyshev (Mean, Sd) UCL	634.3357	
97.5% Chebyshev (Mean, Sd) UCL	760.57	
99% Chebyshev (Mean, Sd) UCL	1008.533	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	440.6698	
95% Bootstrap-t UCL	614.3821	
95% Hall's Bootstrap UCL	901.9085	
95% Percentile Bootstrap UCL	449.2	
95% BCA Bootstrap UCL	488.4	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	485.2818	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Tetrachloroethene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.12	
Maximum	3.164	
Mean	1.131	
Standard Deviation	1.38632	
Variance	1.921884	
Coefficient of Variation	1.225747	
Skewness	1.743299	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.810908	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.762258	
Gamma Statistics		
k hat	0.91875	
k star (bias corrected)	0.396354	
Theta hat	1.231021	
Theta star	2.853509	
nu hat	7.349997	
nu star	3.170833	
5% Approximate Chi Square Value	0.424581	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.248882	
Anderson-Darling 5% Critical Value	0.667809	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.21929	
Kolmogrov-Smirnov 5% Critical Value	0.403276	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	8.446473	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.120264	
Maximum of log data	1.151837	
Mean of log data	-0.511589	
Standard Deviation of log data	1.366872	
Variance of log data	1.86834	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.999467	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.525896	
MLE Standard Deviation	3.571227	
MLE Coefficient of Variation	2.340414	
MLE Skewness	19.84094	
MLE Median	0.599542	
MLE 80% Quantile	1.902975	
MLE 90% Quantile	3.472388	
MLE 95% Quantile	5.679803	
MLE 99% Quantile	14.40761	
MVU Estimate of Median	0.469013	
MVU Estimate of Mean	1.117262	
MVU Estimate of Standard Deviation	1.357433	
MVU Estimate of SE of Mean	0.66734	
95% H-UCL	22993.43	
95% Chebyshev (MVUE) UCL	4.02613	
97.5% Chebyshev (MVUE) UCL	5.2848	
99% Chebyshev (MVUE) UCL	7.757212	
Non-parametric Statisitics		
95% CLT UCL	2.271147	
95% Adjusted-CLT UCL	2.916736	
95% Modified-t UCL	2.862956	
95% Jackknife UCL	2.762258	
95% Chebyshev (Mean, Sd) UCL	4.152415	
97.5% Chebyshev (Mean, Sd) UCL	5.459784	
99% Chebyshev (Mean, Sd) UCL	8.027856	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.762258	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Trichloroethene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.013	
Maximum	0.803	
Mean	0.25925	
Standard Deviation	0.372638	
Variance	0.138859	
Coefficient of Variation	1.437368	
Skewness	1.702007	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.787902	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.697726	
Gamma Statistics		
k hat	0.541486	
k star (bias corrected)	0.302038	
Theta hat	0.478775	
Theta star	0.858335	
nu hat	4.33189	
nu star	2.416306	
5% Approximate Chi Square Value	0.222717	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.347713	
Anderson-Darling 5% Critical Value	0.679149	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.296058	
Kolmogrov-Smirnov 5% Critical Value	0.409385	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.812664	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-4.342806	
Maximum of log data	-0.219401	
Mean of log data	-2.508719	
Standard Deviation of log data	1.936343	
Variance of log data	3.749423	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.916955	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.530461	
MLE Standard Deviation	3.417116	
MLE Coefficient of Variation	6.441781	
MLE Skewness	286.637	
MLE Median	0.081372	
MLE 80% Quantile	0.417901	
MLE 90% Quantile	0.97969	
MLE 95% Quantile	1.967108	
MLE 99% Quantile	7.353773	
MVU Estimate of Median	0.048252	
MVU Estimate of Mean	0.254966	
MVU Estimate of Standard Deviation	0.402172	
MVU Estimate of SE of Mean	0.191827	
95% H-UCL	1.19E+08	
95% Chebyshev (MVUE) UCL	1.091122	
97.5% Chebyshev (MVUE) UCL	1.452927	
99% Chebyshev (MVUE) UCL	2.163623	
Non-parametric Statisitics		
95% CLT UCL	0.565717	
95% Adjusted-CLT UCL	0.735139	
95% Modified-t UCL	0.724152	
95% Jacklnife UCL	0.697726	
95% Chebyshev (Mean, Sd) UCL	1.071395	
97.5% Chebyshev (Mean, Sd) UCL	1.422811	
99% Chebyshev (Mean, Sd) UCL	2.1131	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.697726	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.27	
Maximum	0.435	
Mean	0.335	
Standard Deviation	0.087892	
Variance	0.007725	
Coefficient of Variation	0.262364	
Skewness	1.507808	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.309333	
Maximum of log data	-0.832409	
Mean of log data	-1.115238	
Standard Deviation of log data	0.250538	
Variance of log data	0.062769	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.338289	
MLE Standard Deviation	0.086102	
MLE Coefficient of Variation	0.254522	
MLE Skewness	0.780054	
MLE Median	0.327837	
MLE 80% Quantile	0.405136	
MLE 90% Quantile	0.452351	
MLE 95% Quantile	0.495047	
MLE 99% Quantile	0.587143	
MVU Estimate of Median	0.324416	
MVU Estimate of Mean	0.334732	
MVU Estimate of Standard Deviation	0.083213	
MVU Estimate of SE of Mean	0.048043	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.2	
Maximum	0.435	
Mean	0.3175	
Standard Deviation	0.16617	
Variance	0.027613	
Coefficient of Variation	0.52337	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.609438	
Maximum of log data	-0.832409	
Mean of log data	-1.220924	
Standard Deviation of log data	0.549442	
Variance of log data	0.301887	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	4.2E-308	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-2.4E-159	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.3175	
MVU Estimate of Standard Deviation	0.16617	
MVU Estimate of SE of Mean	0.1175	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.27	
Maximum	0.44	
Mean	0.39375	
Standard Deviation	0.082601	
Variance	0.006823	
Coefficient of Variation	0.20978	
Skewness	-1.985357	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.676371	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.490945	
Gamma Statistics		
k hat	25.63132	
k star (bias corrected)	6.574497	
Theta hat	0.015362	
Theta star	0.059891	
nu hat	205.0506	
nu star	52.59598	
5% Approximate Chi Square Value	36.93396	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.86368	
Anderson-Darling 5% Critical Value	0.656874	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.447744	
Kolmogrov-Smirnov 5% Critical Value	0.394161	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.560721	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.309333	
Maximum of log data	-0.820981	
Mean of log data	-0.951673	
Standard Deviation of log data	0.238625	
Variance of log data	0.056942	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.666938	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.397245	
MLE Standard Deviation	0.096158	
MLE Coefficient of Variation	0.242062	
MLE Skewness	0.74037	
MLE Median	0.386094	
MLE 80% Quantile	0.47235	
MLE 90% Quantile	0.524641	
MLE 95% Quantile	0.571703	
MLE 99% Quantile	0.672581	
MVU Estimate of Median	0.383352	
MVU Estimate of Mean	0.394392	
MVU Estimate of Standard Deviation	0.093713	
MVU Estimate of SE of Mean	0.046855	
95% H-UCL	0.594364	
95% Chebyshev (MVUE) UCL	0.598629	
97.5% Chebyshev (MVUE) UCL	0.687003	
99% Chebyshev (MVUE) UCL	0.860596	
Non-parametric Statisitics		
95% CLT UCL	0.461683	
95% Adjusted-CLT UCL	0.417876	
95% Modified-t UCL	0.484112	
95% Jackknife UCL	0.490945	
95% Chebyshev (Mean, Sd) UCL	0.573775	
97.5% Chebyshev (Mean, Sd) UCL	0.651671	
99% Chebyshev (Mean, Sd) UCL	0.804685	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.490945	95% Student's-t UCL
2nd Recommended UCL	0.484112	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.29	
Maximum	0.54	
Mean	0.421667	
Standard Deviation	0.125532	
Variance	0.015758	
Coefficient of Variation	0.297705	
Skewness	-0.472573	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.237874	
Maximum of log data	-0.616186	
Mean of log data	-0.89549	
Standard Deviation of log data	0.315608	
Variance of log data	0.099608	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.429263	
MLE Standard Deviation	0.138924	
MLE Coefficient of Variation	0.323633	
MLE Skewness	1.004795	
MLE Median	0.408407	
MLE 80% Quantile	0.533231	
MLE 90% Quantile	0.612667	
MLE 95% Quantile	0.686386	
MLE 99% Quantile	0.850964	
MVU Estimate of Median	0.401655	
MVU Estimate of Mean	0.422081	
MVU Estimate of Standard Deviation	0.131585	
MVU Estimate of SE of Mean	0.075969	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.044	
Maximum	0.435	
Mean	0.249667	
Standard Deviation	0.196291	
Variance	0.03853	
Coefficient of Variation	0.786214	
Skewness	-0.461142	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.123566	
Maximum of log data	-0.832409	
Mean of log data	-1.755103	
Standard Deviation of log data	1.208876	
Variance of log data	1.461382	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.359008	
MLE Standard Deviation	0.653346	
MLE Coefficient of Variation	1.819867	
MLE Skewness	11.48685	
MLE Median	0.172889	
MLE 80% Quantile	0.480176	
MLE 90% Quantile	0.817343	
MLE 95% Quantile	1.263012	
MLE 99% Quantile	2.876988	
MVU Estimate of Median	0.133276	
MVU Estimate of Mean	0.267937	
MVU Estimate of Standard Deviation	0.277729	
MVU Estimate of SE of Mean	0.159584	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.22	
Maximum	0.435	
Mean	0.308333	
Standard Deviation	0.112509	
Variance	0.012658	
Coefficient of Variation	0.364895	
Skewness	1.355225	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.514128	
Maximum of log data	-0.832409	
Mean of log data	-1.218623	
Standard Deviation of log data	0.349795	
Variance of log data	0.122356	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.314288	
MLE Standard Deviation	0.113386	
MLE Coefficient of Variation	0.360772	
MLE Skewness	1.129274	
MLE Median	0.295637	
MLE 80% Quantile	0.397307	
MLE 90% Quantile	0.463413	
MLE 95% Quantile	0.525602	
MLE 99% Quantile	0.666976	
MVU Estimate of Median	0.289639	
MVU Estimate of Mean	0.307818	
MVU Estimate of Standard Deviation	0.106065	
MVU Estimate of SE of Mean	0.061234	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Phenanthrene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.27	
Maximum	0.49	
Mean	0.398333	
Standard Deviation	0.114492	
Variance	0.013108	
Coefficient of Variation	0.287427	
Skewness	-1.293343	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.309333	
Maximum of log data	-0.71335	
Mean of log data	-0.951697	
Standard Deviation of log data	0.315391	
Variance of log data	0.099471	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.405773	
MLE Standard Deviation	0.131226	
MLE Coefficient of Variation	0.323399	
MLE Skewness	1.00402	
MLE Median	0.386085	
MLE 80% Quantile	0.503993	
MLE 90% Quantile	0.579019	
MLE 95% Quantile	0.648639	
MLE 99% Quantile	0.804046	
MVU Estimate of Median	0.379711	
MVU Estimate of Mean	0.398993	
MVU Estimate of Standard Deviation	0.124304	
MVU Estimate of SE of Mean	0.071765	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable	Aroclor 1260	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.0225	
Maximum	0.0435	
Mean	0.031667	
Standard Deviation	0.010751	
Variance	0.000116	
Coefficient of Variation	0.339504	
Skewness	1.047507	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.79424	
Maximum of log data	-3.134994	
Mean of log data	-3.489898	
Standard Deviation of log data	0.332518	
Variance of log data	0.110569	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.032238	
MLE Standard Deviation	0.011023	
MLE Coefficient of Variation	0.341925	
MLE Skewness	1.065751	
MLE Median	0.030504	
MLE 80% Quantile	0.0404	
MLE 90% Quantile	0.046765	
MLE 95% Quantile	0.052712	
MLE 99% Quantile	0.066108	
MVU Estimate of Median	0.029944	
MVU Estimate of Mean	0.031639	
MVU Estimate of Standard Deviation	0.010378	
MVU Estimate of SE of Mean	0.005992	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.94	
Maximum	329	
Mean	69.865	
Standard Deviation	128.2525	
Variance	16448.7	
Coefficient of Variation	1.835719	
Skewness	2.340413	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.616144	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	175.3706	
Gamma Statistics		
k hat	0.387658	
k star (bias corrected)	0.30494	
Theta hat	180.2234	
Theta star	229.1107	
nu hat	4.651893	
nu star	3.65928	
5% Approximate Chi Square Value	0.591654	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	0.278422	
Anderson-Darling Test Statistic	0.382378	
Anderson-Darling 5% Critical Value	0.753168	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.232067	
Kolmogrov-Smirnov 5% Critical Value	0.353199	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	432.1032	
95% Adjusted Gamma UCL	918.2306	
Lognormal Statistics		
Minimum of log data	-0.061875	
Maximum of log data	5.796058	
Mean of log data	2.540487	
Standard Deviation of log data	2.29959	
Variance of log data	5.288113	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922637	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	178.4919	
MLE Standard Deviation	2505.059	
MLE Coefficient of Variation	14.03458	
MLE Skewness	2806.489	
MLE Median	12.68584	
MLE 80% Quantile	88.55642	
MLE 90% Quantile	243.5834	
MLE 95% Quantile	557.4159	
MLE 99% Quantile	2668.662	
MVU Estimate of Median	7.907004	
MVU Estimate of Mean	74.28779	
MVU Estimate of Standard Deviation	164.5375	
MVU Estimate of SE of Mean	57.97104	
95% H-UCL	2355763	
95% Chebyshev (MVUE) UCL	326.9777	
97.5% Chebyshev (MVUE) UCL	436.3168	
99% Chebyshev (MVUE) UCL	651.0923	
Non-parametric Statisitics		
95% CLT UCL	155.9877	
95% Adjusted-CLT UCL	209.4426	
95% Modified-t UCL	183.7085	
95% Jackknife UCL	175.3706	
95% Chebyshev (Mean, Sd) UCL	298.092	
97.5% Chebyshev (Mean, Sd) UCL	396.846	
99% Chebyshev (Mean, Sd) UCL	590.8291	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	149.3464	
95% Bootstrap-t UCL	557.2918	
95% Hall's Bootstrap UCL	588.1405	
95% Percentile Bootstrap UCL	171.1983	
95% BCA Bootstrap UCL	184.8667	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	918.2306	95% Adjusted Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	1.85	
Maximum	87.3	
Mean	21.24167	
Standard Deviation	32.68037	
Variance	1068.006	
Coefficient of Variation	1.538503	
Skewness	2.343583	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.628203	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	48.12584	
Gamma Statistics		
k hat	0.784647	
k star (bias corrected)	0.503434	
Theta hat	27.07163	
Theta star	42.19351	
nu hat	9.41576	
nu star	6.041213	
5% Approximate Chi Square Value	1.660462	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	0.964558	
Anderson-Darling Test Statistic	0.532605	
Anderson-Darling 5% Critical Value	0.720174	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.317468	
Kolmogrov-Smirnov 5% Critical Value	0.34309	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	77.28297	
95% Adjusted Gamma UCL	133.0407	
Lognormal Statistics		
Minimum of log data	0.615186	
Maximum of log data	4.46935	
Mean of log data	2.297642	
Standard Deviation of log data	1.288733	
Variance of log data	1.660834	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.951596	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	22.82961	
MLE Standard Deviation	47.14024	
MLE Coefficient of Variation	2.064872	
MLE Skewness	14.99861	
MLE Median	9.950688	
MLE 80% Quantile	29.56589	
MLE 90% Quantile	52.12601	
MLE 95% Quantile	82.89777	
MLE 99% Quantile	199.3846	
MVU Estimate of Median	8.639842	
MVU Estimate of Mean	18.77476	
MVU Estimate of Standard Deviation	23.98834	
MVU Estimate of SE of Mean	9.506878	
95% H-UCL	500.4989	
95% Chebyshev (MVUE) UCL	60.21428	
97.5% Chebyshev (MVUE) UCL	78.1452	
99% Chebyshev (MVUE) UCL	113.367	
Non-parametric Statisitics		
95% CLT UCL	43.18682	
95% Adjusted-CLT UCL	56.82625	
95% Modified-t UCL	50.25332	
95% Jackknife UCL	48.12584	
95% Chebyshev (Mean, Sd) UCL	79.39681	
97.5% Chebyshev (Mean, Sd) UCL	104.5606	
99% Chebyshev (Mean, Sd) UCL	153.9899	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	41.42251	
95% Bootstrap-t UCL	147.8372	
95% Hall's Bootstrap UCL	155.4396	
95% Percentile Bootstrap UCL	46.925	
95% BCA Bootstrap UCL	61.16667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	77.28297	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	20.3	
Maximum	51.4	
Mean	41.4125	
Standard Deviation	11.9466	
Variance	142.7213	
Coefficient of Variation	0.288478	
Skewness	-0.965352	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.795847	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	49.41475	
Gamma Statistics		
k hat	11.11539	
k star (bias corrected)	7.030453	
Theta hat	3.72569	
Theta star	5.890446	
nu hat	177.8463	
nu star	112.4872	
5% Approximate Chi Square Value	88.99945	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	83.72298	
Anderson-Darling Test Statistic	0.896305	
Anderson-Darling 5% Critical Value	0.715112	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.354328	
Kolmogrov-Smirnov 5% Critical Value	0.294233	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	52.34165	
95% Adjusted Gamma UCL	55.64037	
Lognormal Statistics		
Minimum of log data	3.010621	
Maximum of log data	3.939638	
Mean of log data	3.677926	
Standard Deviation of log data	0.342209	
Variance of log data	0.117107	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.778856	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	41.95006	
MLE Standard Deviation	14.78642	
MLE Coefficient of Variation	0.352477	
MLE Skewness	1.101222	
MLE Median	39.56426	
MLE 80% Quantile	52.83073	
MLE 90% Quantile	61.41568	
MLE 95% Quantile	69.4676	
MLE 99% Quantile	87.69852	
MVU Estimate of Median	39.2755	
MVU Estimate of Mean	41.63214	
MVU Estimate of Standard Deviation	14.32608	
MVU Estimate of SE of Mean	5.063242	
95% H-UCL	55.27764	
95% Chebyshev (MVUE) UCL	63.7023	
97.5% Chebyshev (MVUE) UCL	73.25208	
99% Chebyshev (MVUE) UCL	92.01077	
Non-parametric Statisitics		
95% CLT UCL	48.35997	
95% Adjusted-CLT UCL	46.81961	
95% Modified-t UCL	49.17448	
95% Jackknife UCL	49.41475	
95% Chebyshev (Mean, Sd) UCL	59.82345	
97.5% Chebyshev (Mean, Sd) UCL	67.78988	
99% Chebyshev (Mean, Sd) UCL	83.43839	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	47.84091	
95% Bootstrap-t UCL	47.91738	
95% Hall's Bootstrap UCL	46.40947	
95% Percentile Bootstrap UCL	47.425	
95% BCA Bootstrap UCL	46.1625	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	49.41475	95% Student's-t UCL
2nd Recommended UCL	49.17448	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	6	
Minimum	0.2	
Maximum	1.7	
Mean	1.018571	
Standard Deviation	0.566287	
Variance	0.320681	
Coefficient of Variation	0.555962	
Skewness	-0.180444	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.916579	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.434483	
Gamma Statistics		
k hat	2.711693	
k star (bias corrected)	1.644777	
Theta hat	0.375622	
Theta star	0.619276	
nu hat	37.9637	
nu star	23.02688	
5% Approximate Chi Square Value	13.1094	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	10.91972	
Anderson-Darling Test Statistic	0.406017	
Anderson-Darling 5% Critical Value	0.712978	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.238725	
Kolmogrov-Smirnov 5% Critical Value	0.314121	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.789137	
95% Adjusted Gamma UCL	2.147904	
Lognormal Statistics		
Minimum of log data	-1.609438	
Maximum of log data	0.530628	
Mean of log data	-0.177173	
Standard Deviation of log data	0.758702	
Variance of log data	0.575629	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.866959	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.116994	
MLE Standard Deviation	0.985395	
MLE Coefficient of Variation	0.882184	
MLE Skewness	3.333112	
MLE Median	0.837635	
MLE 80% Quantile	1.590312	
MLE 90% Quantile	2.22056	
MLE 95% Quantile	2.917982	
MLE 99% Quantile	4.89184	
MVU Estimate of Median	0.803721	
MVU Estimate of Mean	1.064368	
MVU Estimate of Standard Deviation	0.817997	
MVU Estimate of SE of Mean	0.307291	
95% H-UCL	2.872005	
95% Chebyshev (MVUE) UCL	2.403818	
97.5% Chebyshev (MVUE) UCL	2.983399	
99% Chebyshev (MVUE) UCL	4.121875	
Non-parametric Statisitics		
95% CLT UCL	1.37063	
95% Adjusted-CLT UCL	1.355032	
95% Modified-t UCL	1.43205	
95% Jackknife UCL	1.434483	
95% Chebyshev (Mean, Sd) UCL	1.951534	
97.5% Chebyshev (Mean, Sd) UCL	2.355228	
99% Chebyshev (Mean, Sd) UCL	3.148206	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.344433	
95% Bootstrap-t UCL	1.442352	
95% Hall's Bootstrap UCL	1.301088	
95% Percentile Bootstrap UCL	1.331429	
95% BCA Bootstrap UCL	1.271429	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.434483	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	7.1	
Maximum	85.3	
Mean	24.975	
Standard Deviation	26.25353	
Variance	689.2479	
Coefficient of Variation	1.051192	
Skewness	2.152899	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.697651	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	42.56052	
Gamma Statistics		
k hat	1.575729	
k star (bias corrected)	1.068164	
Theta hat	15.8498	
Theta star	23.38124	
nu hat	25.21167	
nu star	17.09063	
5% Approximate Chi Square Value	8.735686	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	7.276379	
Anderson-Darling Test Statistic	0.731093	
Anderson-Darling 5% Critical Value	0.727746	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.330209	
Kolmogrov-Smirnov 5% Critical Value	0.298682	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	48.86146	
95% Adjusted Gamma UCL	58.66083	
Lognormal Statistics		
Minimum of log data	1.960095	
Maximum of log data	4.446174	
Mean of log data	2.86816	
Standard Deviation of log data	0.828417	
Variance of log data	0.686274	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.87362	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	24.81125	
MLE Standard Deviation	24.64072	
MLE Coefficient of Variation	0.993127	
MLE Skewness	3.958903	
MLE Median	17.60459	
MLE 80% Quantile	35.45173	
MLE 90% Quantile	51.04335	
MLE 95% Quantile	68.77947	
MLE 99% Quantile	120.9113	
MVU Estimate of Median	16.86198	
MVU Estimate of Mean	23.54839	
MVU Estimate of Standard Deviation	20.07936	
MVU Estimate of SE of Mean	7.029737	
95% H-UCL	64.95459	
95% Chebyshev (MVUE) UCL	54.1903	
97.5% Chebyshev (MVUE) UCL	67.44908	
99% Chebyshev (MVUE) UCL	93.49339	
Non-parametric Statisitics		
95% CLT UCL	40.24257	
95% Adjusted-CLT UCL	47.79179	
95% Modified-t UCL	43.73805	
95% Jackknife UCL	42.56052	
95% Chebyshev (Mean, Sd) UCL	65.43441	
97.5% Chebyshev (Mean, Sd) UCL	82.94123	
99% Chebyshev (Mean, Sd) UCL	117.33	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	39.40439	
95% Bootstrap-t UCL	77.96951	
95% Hall's Bootstrap UCL	92.38243	
95% Percentile Bootstrap UCL	41.1375	
95% BCA Bootstrap UCL	50.625	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	64.95459	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	9.6	
Maximum	37.5	
Mean	22.95	
Standard Deviation	9.538344	
Variance	90.98	
Coefficient of Variation	0.415614	
Skewness	-0.030432	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963446	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	29.33911	
Gamma Statistics		
k hat	5.763079	
k star (bias corrected)	3.685258	
Theta hat	3.982246	
Theta star	6.227516	
nu hat	92.20926	
nu star	58.96412	
5% Approximate Chi Square Value	42.30581	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	38.76312	
Anderson-Darling Test Statistic	0.281517	
Anderson-Darling 5% Critical Value	0.718444	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.171422	
Kolmogrov-Smirnov 5% Critical Value	0.295093	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	31.98678	
95% Adjusted Gamma UCL	34.91016	
Lognormal Statistics		
Minimum of log data	2.261763	
Maximum of log data	3.624341	
Mean of log data	3.044057	
Standard Deviation of log data	0.473226	
Variance of log data	0.223943	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.932793	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	23.47718	
MLE Standard Deviation	11.76204	
MLE Coefficient of Variation	0.500999	
MLE Skewness	1.628748	
MLE Median	20.99023	
MLE 80% Quantile	31.30987	
MLE 90% Quantile	38.55759	
MLE 95% Quantile	45.71903	
MLE 99% Quantile	63.10385	
MVU Estimate of Median	20.69804	
MVU Estimate of Mean	23.12676	
MVU Estimate of Standard Deviation	11.05805	
MVU Estimate of SE of Mean	3.90477	
95% H-UCL	35.65787	
95% Chebyshev (MVUE) UCL	40.14726	
97.5% Chebyshev (MVUE) UCL	47.51204	
99% Chebyshev (MVUE) UCL	61.97873	
Non-parametric Statisitics		
95% CLT UCL	28.49696	
95% Adjusted-CLT UCL	28.45819	
95% Modified-t UCL	29.33307	
95% Jackknife UCL	29.33911	
95% Chebyshev (Mean, Sd) UCL	37.64957	
97.5% Chebyshev (Mean, Sd) UCL	44.01009	
99% Chebyshev (Mean, Sd) UCL	56.5041	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	28.04858	
95% Bootstrap-t UCL	29.27402	
95% Hall's Bootstrap UCL	28.11899	
95% Percentile Bootstrap UCL	28.0375	
95% BCA Bootstrap UCL	27.1125	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	29.33911	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	383	
Maximum	41000	
Mean	6765.25	
Standard Deviation	13915.08	
Variance	1.94E+08	
Coefficient of Variation	2.056847	
Skewness	2.762734	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.512726	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	16086.05	
Gamma Statistics		
k hat	0.505437	
k star (bias corrected)	0.399232	
Theta hat	13384.94	
Theta star	16945.67	
nu hat	8.086998	
nu star	6.387707	
5% Approximate Chi Square Value	1.840561	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	1.289886	
Anderson-Darling Test Statistic	0.84864	
Anderson-Darling 5% Critical Value	0.761995	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.320374	
Kolmogrov-Smirnov 5% Critical Value	0.308883	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	23478.94	
95% Adjusted Gamma UCL	33502.53	
Lognormal Statistics		
Minimum of log data	5.948035	
Maximum of log data	10.62133	
Mean of log data	7.564962	
Standard Deviation of log data	1.552931	
Variance of log data	2.411594	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892521	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	6443.06	
MLE Standard Deviation	20528.73	
MLE Coefficient of Variation	3.186177	
MLE Skewness	41.90373	
MLE Median	1929.395	
MLE 80% Quantile	7166.612	
MLE 90% Quantile	14192.63	
MLE 95% Quantile	24823.18	
MLE 99% Quantile	71473.28	
MVU Estimate of Median	1655.099	
MVU Estimate of Mean	5016.58	
MVU Estimate of Standard Deviation	8422.498	
MVU Estimate of SE of Mean	2762.317	
95% H-UCL	121796.1	
95% Chebyshev (MVUE) UCL	17057.24	
97.5% Chebyshev (MVUE) UCL	22267.24	
99% Chebyshev (MVUE) UCL	32501.28	
Non-parametric Statisitics		
95% CLT UCL	14857.48	
95% Adjusted-CLT UCL	19992.18	
95% Modified-t UCL	16886.96	
95% Jackknife UCL	16086.05	
95% Chebyshev (Mean, Sd) UCL	28209.83	
97.5% Chebyshev (Mean, Sd) UCL	37488.92	
99% Chebyshev (Mean, Sd) UCL	55715.89	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	14066.67	
95% Bootstrap-t UCL	64521.02	
95% Hall's Bootstrap UCL	55732.8	
95% Percentile Bootstrap UCL	16163	
95% BCA Bootstrap UCL	20770.5	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	32501.28	99% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	34.4	
Maximum	194	
Mean	70.7	
Standard Deviation	54.96422	
Variance	3021.066	
Coefficient of Variation	0.777429	
Skewness	1.984537	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.731915	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	107.5169	
Gamma Statistics		
k hat	2.707073	
k star (bias corrected)	1.775254	
Theta hat	26.11677	
Theta star	39.82529	
nu hat	43.31316	
nu star	28.40406	
5% Approximate Chi Square Value	17.241	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	15.08351	
Anderson-Darling Test Statistic	0.673389	
Anderson-Darling 5% Critical Value	0.722202	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.242373	
Kolmogrov-Smirnov 5% Critical Value	0.29664	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	116.4762	
95% Adjusted Gamma UCL	133.1366	
Lognormal Statistics		
Minimum of log data	3.538057	
Maximum of log data	5.267858	
Mean of log data	4.062519	
Standard Deviation of log data	0.622488	
Variance of log data	0.387491	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.84966	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	70.54596	
MLE Standard Deviation	48.5323	
MLE Coefficient of Variation	0.687953	
MLE Skewness	2.389453	
MLE Median	58.12053	
MLE 80% Quantile	98.34886	
MLE 90% Quantile	129.3362	
MLE 95% Quantile	161.8243	
MLE 99% Quantile	247.2562	
MVU Estimate of Median	56.72615	
MVU Estimate of Mean	68.64702	
MVU Estimate of Standard Deviation	43.47745	
MVU Estimate of SE of Mean	15.31815	
95% H-UCL	130.5635	
95% Chebyshev (MVUE) UCL	135.4173	
97.5% Chebyshev (MVUE) UCL	164.3089	
99% Chebyshev (MVUE) UCL	221.0607	
Non-parametric Statisitics		
95% CLT UCL	102.6641	
95% Adjusted-CLT UCL	117.2331	
95% Modified-t UCL	109.7894	
95% Jackknife UCL	107.5169	
95% Chebyshev (Mean, Sd) UCL	155.4056	
97.5% Chebyshev (Mean, Sd) UCL	192.0577	
99% Chebyshev (Mean, Sd) UCL	264.0538	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	100.6953	
95% Bootstrap-t UCL	167.2459	
95% Hall's Bootstrap UCL	225.245	
95% Percentile Bootstrap UCL	102.8875	
95% BCA Bootstrap UCL	101.4375	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	116.4762	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.015	
Maximum	0.5	
Mean	0.150833	
Standard Deviation	0.179344	
Variance	0.032164	
Coefficient of Variation	1.189019	
Skewness	1.976872	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.752338	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.298369	
Gamma Statistics		
k hat	1.01717	
k star (bias corrected)	0.619696	
Theta hat	0.148287	
Theta star	0.243399	
nu hat	12.20605	
nu star	7.436356	
5% Approximate Chi Square Value	2.412491	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	1.510786	
Anderson-Darling Test Statistic	0.323328	
Anderson-Darling 5% Critical Value	0.714849	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.221536	
Kolmogrov-Smirnov 5% Critical Value	0.340733	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.464934	
95% Adjusted Gamma UCL	0.742428	
Lognormal Statistics		
Minimum of log data	-4.199705	
Maximum of log data	-0.693147	
Mean of log data	-2.457925	
Standard Deviation of log data	1.206905	
Variance of log data	1.456619	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.966717	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.177353	
MLE Standard Deviation	0.321758	
MLE Coefficient of Variation	1.814228	
MLE Skewness	11.41408	
MLE Median	0.085612	
MLE 80% Quantile	0.237381	
MLE 90% Quantile	0.403712	
MLE 95% Quantile	0.6234	
MLE 99% Quantile	1.418124	
MVU Estimate of Median	0.075661	
MVU Estimate of Mean	0.150193	
MVU Estimate of Standard Deviation	0.179998	
MVU Estimate of SE of Mean	0.071734	
95% H-UCL	2.712294	
95% Chebyshev (MVUE) UCL	0.462873	
97.5% Chebyshev (MVUE) UCL	0.598169	
99% Chebyshev (MVUE) UCL	0.863934	
Non-parametric Statisitics		
95% CLT UCL	0.271264	
95% Adjusted-CLT UCL	0.334403	
95% Modified-t UCL	0.308217	
95% Jackknife UCL	0.298369	
95% Chebyshev (Mean, Sd) UCL	0.469978	
97.5% Chebyshev (Mean, Sd) UCL	0.608072	
99% Chebyshev (Mean, Sd) UCL	0.879331	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.26199	
95% Bootstrap-t UCL	0.520578	
95% Hall's Bootstrap UCL	0.716756	
95% Percentile Bootstrap UCL	0.275	
95% BCA Bootstrap UCL	0.35	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.464934	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	3.9	
Maximum	18	
Mean	7.75	
Standard Deviation	4.538722	
Variance	20.6	
Coefficient of Variation	0.585642	
Skewness	1.948669	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.789744	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	10.79019	
Gamma Statistics		
k hat	4.418327	
k star (bias corrected)	2.844788	
Theta hat	1.754058	
Theta star	2.724281	
nu hat	70.69323	
nu star	45.5166	
5% Approximate Chi Square Value	31.03654	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	28.04464	
Anderson-Darling Test Statistic	0.396307	
Anderson-Darling 5% Critical Value	0.718779	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.173685	
Kolmogrov-Smirnov 5% Critical Value	0.295292	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	11.36576	
95% Adjusted Gamma UCL	12.57829	
Lognormal Statistics		
Minimum of log data	1.360977	
Maximum of log data	2.890372	
Mean of log data	1.93028	
Standard Deviation of log data	0.492347	
Variance of log data	0.242406	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.931218	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.779432	
MLE Standard Deviation	4.074455	
MLE Coefficient of Variation	0.523747	
MLE Skewness	1.714911	
MLE Median	6.891443	
MLE 80% Quantile	10.44699	
MLE 90% Quantile	12.97399	
MLE 95% Quantile	15.48995	
MLE 99% Quantile	21.66027	
MVU Estimate of Median	6.787648	
MVU Estimate of Mean	7.653128	
MVU Estimate of Standard Deviation	3.810273	
MVU Estimate of SE of Mean	1.345196	
95% H-UCL	12.09125	
95% Chebyshev (MVUE) UCL	13.5167	
97.5% Chebyshev (MVUE) UCL	16.05387	
99% Chebyshev (MVUE) UCL	21.03765	
Non-parametric Statisitics		
95% CLT UCL	10.38946	
95% Adjusted-CLT UCL	11.57077	
95% Modified-t UCL	10.97445	
95% Jackknife UCL	10.79019	
95% Chebyshev (Mean, Sd) UCL	14.74464	
97.5% Chebyshev (Mean, Sd) UCL	17.77123	
99% Chebyshev (Mean, Sd) UCL	23.71637	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	10.22531	
95% Bootstrap-t UCL	13.59148	
95% Hall's Bootstrap UCL	21.73582	
95% Percentile Bootstrap UCL	10.475	
95% BCA Bootstrap UCL	10.075	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	11.36576	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	8.5	
Maximum	50.1	
Mean	31.0875	
Standard Deviation	14.17124	
Variance	200.8241	
Coefficient of Variation	0.45585	
Skewness	-0.620941	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92977	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	40.57989	
Gamma Statistics		
k hat	3.804603	
k star (bias corrected)	2.46121	
Theta hat	8.171023	
Theta star	12.63098	
nu hat	60.87365	
nu star	39.37937	
5% Approximate Chi Square Value	26.00156	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	23.28766	
Anderson-Darling Test Statistic	0.606566	
Anderson-Darling 5% Critical Value	0.719137	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.275808	
Kolmogrov-Smirnov 5% Critical Value	0.29552	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	47.08202	
95% Adjusted Gamma UCL	52.56887	
Lognormal Statistics		
Minimum of log data	2.140066	
Maximum of log data	3.914021	
Mean of log data	3.299668	
Standard Deviation of log data	0.624426	
Variance of log data	0.389908	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.829512	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	32.93782	
MLE Standard Deviation	22.74488	
MLE Coefficient of Variation	0.69054	
MLE Skewness	2.4009	
MLE Median	27.10363	
MLE 80% Quantile	45.9387	
MLE 90% Quantile	60.46444	
MLE 95% Quantile	75.70535	
MLE 99% Quantile	115.8253	
MVU Estimate of Median	26.44936	
MVU Estimate of Mean	32.04517	
MVU Estimate of Standard Deviation	20.36097	
MVU Estimate of SE of Mean	7.173371	
95% H-UCL	61.13373	
95% Chebyshev (MVUE) UCL	63.31317	
97.5% Chebyshev (MVUE) UCL	76.84286	
99% Chebyshev (MVUE) UCL	103.4193	
Non-parametric Statisitics		
95% CLT UCL	39.32869	
95% Adjusted-CLT UCL	38.15339	
95% Modified-t UCL	40.39657	
95% Jackknife UCL	40.57989	
95% Chebyshev (Mean, Sd) UCL	52.92685	
97.5% Chebyshev (Mean, Sd) UCL	62.37676	
99% Chebyshev (Mean, Sd) UCL	80.93926	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	38.90512	
95% Bootstrap-t UCL	39.04904	
95% Hall's Bootstrap UCL	37.86813	
95% Percentile Bootstrap UCL	38.4375	
95% BCA Bootstrap UCL	37.0125	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	40.57989	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 22-tt-22.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	23	
Maximum	122	
Mean	69.5875	
Standard Deviation	38.82011	
Variance	1507.001	
Coefficient of Variation	0.55786	
Skewness	0.239892	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892591	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	95.59056	
Gamma Statistics		
k hat	3.303659	
k star (bias corrected)	2.14812	
Theta hat	21.06376	
Theta star	32.3946	
nu hat	52.85855	
nu star	34.36993	
5% Approximate Chi Square Value	21.95807	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	19.48726	
Anderson-Darling Test Statistic	0.400274	
Anderson-Darling 5% Critical Value	0.720589	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.216439	
Kolmogrov-Smirnov 5% Critical Value	0.296005	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	108.922	
95% Adjusted Gamma UCL	122.7324	
Lognormal Statistics		
Minimum of log data	3.135494	
Maximum of log data	4.804021	
Mean of log data	4.083669	
Standard Deviation of log data	0.627505	
Variance of log data	0.393763	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909876	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	72.28024	
MLE Standard Deviation	50.21	
MLE Coefficient of Variation	0.694657	
MLE Skewness	2.419178	
MLE Median	59.3629	
MLE 80% Quantile	100.8779	
MLE 90% Quantile	132.9554	
MLE 95% Quantile	166.6533	
MLE 99% Quantile	255.5061	
MVU Estimate of Median	57.91588	
MVU Estimate of Mean	70.30016	
MVU Estimate of Standard Deviation	44.8949	
MVU Estimate of SE of Mean	15.81589	
95% H-UCL	134.7646	
95% Chebyshev (MVUE) UCL	139.24	
97.5% Chebyshev (MVUE) UCL	169.0704	
99% Chebyshev (MVUE) UCL	227.6663	
Non-parametric Statisitics		
95% CLT UCL	92.16309	
95% Adjusted-CLT UCL	93.40692	
95% Modified-t UCL	95.78457	
95% Jackknife UCL	95.59056	
95% Chebyshev (Mean, Sd) UCL	129.4133	
97.5% Chebyshev (Mean, Sd) UCL	155.3	
99% Chebyshev (Mean, Sd) UCL	206.1494	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	90.61818	
95% Bootstrap-t UCL	96.33493	
95% Hall's Bootstrap UCL	88.28399	
95% Percentile Bootstrap UCL	90.15	
95% BCA Bootstrap UCL	86.75	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	95.59056	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	*Trichloroethene*	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.011	
Maximum	0.037	
Mean	0.021833	
Standard Deviation	0.013531	
Variance	0.000183	
Coefficient of Variation	0.619733	
Skewness	1.293343	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-4.50986	
Maximum of log data	-3.296837	
Mean of log data	-3.950751	
Standard Deviation of log data	0.612043	
Variance of log data	0.374597	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.023203	
MLE Standard Deviation	0.015641	
MLE Coefficient of Variation	0.674096	
MLE Skewness	2.328599	
MLE Median	0.01924	
MLE 80% Quantile	0.032271	
MLE 90% Quantile	0.042245	
MLE 95% Quantile	0.052658	
MLE 99% Quantile	0.079887	
MVU Estimate of Median	0.018058	
MVU Estimate of Mean	0.021719	
MVU Estimate of Standard Deviation	0.012713	
MVU Estimate of SE of Mean	0.007337	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.11	
Maximum	1.7	
Mean	0.825	
Standard Deviation	0.555581	
Variance	0.30867	
Coefficient of Variation	0.673431	
Skewness	0.564001	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	*Shapiro Wilk method yields a more accurate result*
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.967985	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.282043	
Gamma Statistics		
k hat	1.928529	
k star (bias corrected)	1.075376	
Theta hat	0.427787	
Theta star	0.767174	
nu hat	23.14235	
nu star	12.90451	
5% Approximate Chi Square Value	5.827486	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	4.231659	
Anderson-Darling Test Statistic	0.25963	
Anderson-Darling 5% Critical Value	0.704722	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.189714	
Kolmogrov-Smirnov 5% Critical Value	0.336062	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.826897	
95% Adjusted Gamma UCL	2.51585	
Lognormal Statistics		
Minimum of log data	-2.207275	
Maximum of log data	0.530628	
Mean of log data	-0.473502	
Standard Deviation of log data	0.951476	
Variance of log data	0.905306	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892021	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.979367	
MLE Standard Deviation	1.188505	
MLE Coefficient of Variation	1.213544	
MLE Skewness	5.427807	
MLE Median	0.622817	
MLE 80% Quantile	1.391657	
MLE 90% Quantile	2.115189	
MLE 95% Quantile	2.979262	
MLE 99% Quantile	5.69524	
MVU Estimate of Median	0.577079	
MVU Estimate of Mean	0.891709	
MVU Estimate of Standard Deviation	0.845695	
MVU Estimate of SE of Mean	0.3415	
95% H-UCL	5.675022	
95% Chebyshev (MVUE) UCL	2.380273	
97.5% Chebyshev (MVUE) UCL	3.024376	
99% Chebyshev (MVUE) UCL	4.289592	
Non-parametric Statisitics		
95% CLT UCL	1.198077	
95% Adjusted-CLT UCL	1.25388	
95% Modified-t UCL	1.290747	
95% Jackknife UCL	1.282043	
95% Chebyshev (Mean, Sd) UCL	1.813663	
97.5% Chebyshev (Mean, Sd) UCL	2.241459	
99% Chebyshev (Mean, Sd) UCL	3.08178	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.17148	
95% Bootstrap-t UCL	1.519838	
95% Hall's Bootstrap UCL	2.414954	
95% Percentile Bootstrap UCL	1.181667	
95% BCA Bootstrap UCL	1.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.282043	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.15	
Maximum	1.7	
Mean	0.908333	
Standard Deviation	0.536336	
Variance	0.287657	
Coefficient of Variation	0.590462	
Skewness	0.200876	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.9696	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.349545	
Gamma Statistics		
k hat	2.387281	
k star (bias corrected)	1.304752	
Theta hat	0.380489	
Theta star	0.696173	
nu hat	28.64738	
nu star	15.65702	
5% Approximate Chi Square Value	7.719532	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	5.823345	
Anderson-Darling Test Statistic	0.349769	
Anderson-Darling 5% Critical Value	0.703095	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.268139	
Kolmogrov-Smirnov 5% Critical Value	0.335334	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.842313	
95% Adjusted Gamma UCL	2.442204	
Lognormal Statistics		
Minimum of log data	-1.89712	
Maximum of log data	0.530628	
Mean of log data	-0.319971	
Standard Deviation of log data	0.847735	
Variance of log data	0.718655	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.856928	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.040141	
MLE Standard Deviation	1.066675	
MLE Coefficient of Variation	1.02551	
MLE Skewness	4.15503	
MLE Median	0.72617	
MLE 80% Quantile	1.486412	
MLE 90% Quantile	2.158403	
MLE 95% Quantile	2.928684	
MLE 99% Quantile	5.216677	
MVU Estimate of Median	0.683601	
MVU Estimate of Mean	0.968202	
MVU Estimate of Standard Deviation	0.818995	
MVU Estimate of SE of Mean	0.331918	
95% H-UCL	4.341924	
95% Chebyshev (MVUE) UCL	2.415	
97.5% Chebyshev (MVUE) UCL	3.041031	
99% Chebyshev (MVUE) UCL	4.270746	
Non-parametric Statisitics		
95% CLT UCL	1.268488	
95% Adjusted-CLT UCL	1.287674	
95% Modified-t UCL	1.352538	
95% Jackknife UCL	1.349545	
95% Chebyshev (Mean, Sd) UCL	1.862751	
97.5% Chebyshev (Mean, Sd) UCL	2.275728	
99% Chebyshev (Mean, Sd) UCL	3.086942	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.237698	
95% Bootstrap-t UCL	1.470558	
95% Hall's Bootstrap UCL	1.621913	
95% Percentile Bootstrap UCL	1.235	
95% BCA Bootstrap UCL	1.335	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.349545	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.27	
Maximum	3.6	
Mean	1.661667	
Standard Deviation	1.107798	
Variance	1.227217	
Coefficient of Variation	0.666679	
Skewness	0.972215	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.932659	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.572986	
Gamma Statistics		
k hat	2.191478	
k star (bias corrected)	1.20685	
Theta hat	0.75824	
Theta star	1.376862	
nu hat	26.29774	
nu star	14.4822	
5% Approximate Chi Square Value	6.901633	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	5.130487	
Anderson-Darling Test Statistic	0.294823	
Anderson-Darling 5% Critical Value	0.703659	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.201127	
Kolmogrov-Smirnov 5% Critical Value	0.335585	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	3.486797	
95% Adjusted Gamma UCL	4.690509	
Lognormal Statistics		
Minimum of log data	-1.309333	
Maximum of log data	1.280934	
Mean of log data	0.262644	
Standard Deviation of log data	0.866844	
Variance of log data	0.751419	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.897355	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.893361	
MLE Standard Deviation	2.00375	
MLE Coefficient of Variation	1.058303	
MLE Skewness	4.360215	
MLE Median	1.300364	
MLE 80% Quantile	2.705069	
MLE 90% Quantile	3.961168	
MLE 95% Quantile	5.411914	
MLE 99% Quantile	9.766163	
MVU Estimate of Median	1.220737	
MVU Estimate of Mean	1.755757	
MVU Estimate of Standard Deviation	1.518392	
MVU Estimate of SE of Mean	0.614999	
95% H-UCL	8.371479	
95% Chebyshev (MVUE) UCL	4.436475	
97.5% Chebyshev (MVUE) UCL	5.596424	
99% Chebyshev (MVUE) UCL	7.874918	
Non-parametric Statisitics		
95% CLT UCL	2.405563	
95% Adjusted-CLT UCL	2.597364	
95% Modified-t UCL	2.602903	
95% Jackknife UCL	2.572986	
95% Chebyshev (Mean, Sd) UCL	3.633008	
97.5% Chebyshev (Mean, Sd) UCL	4.486009	
99% Chebyshev (Mean, Sd) UCL	6.161564	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.341682	
95% Bootstrap-t UCL	2.789453	
95% Hall's Bootstrap UCL	6.812013	
95% Percentile Bootstrap UCL	2.366667	
95% BCA Bootstrap UCL	2.816667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.572986	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.14	
Maximum	3.4	
Mean	1.31	
Standard Deviation	1.147205	
Variance	1.31608	
Coefficient of Variation	0.875729	
Skewness	1.400744	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.893583	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.253737	
Gamma Statistics		
k hat	1.417578	
k star (bias corrected)	0.8199	
Theta hat	0.924111	
Theta star	1.597755	
nu hat	17.01094	
nu star	9.838803	
5% Approximate Chi Square Value	3.840434	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	2.614488	
Anderson-Darling Test Statistic	0.168056	
Anderson-Darling 5% Critical Value	0.708995	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.133142	
Kolmogrov-Smirnov 5% Critical Value	0.33801	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	3.356088	
95% Adjusted Gamma UCL	4.929773	
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	1.223775	
Mean of log data	-0.122435	
Standard Deviation of log data	1.086776	
Variance of log data	1.181083	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.957744	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.596968	
MLE Standard Deviation	2.399653	
MLE Coefficient of Variation	1.502631	
MLE Skewness	7.900682	
MLE Median	0.884764	
MLE 80% Quantile	2.216416	
MLE 90% Quantile	3.575385	
MLE 95% Quantile	5.287325	
MLE 99% Quantile	11.08294	
MVU Estimate of Median	0.800688	
MVU Estimate of Mean	1.404077	
MVU Estimate of Standard Deviation	1.518246	
MVU Estimate of SE of Mean	0.609297	
95% H-UCL	15.03171	
95% Chebyshev (MVUE) UCL	4.05994	
97.5% Chebyshev (MVUE) UCL	5.209134	
99% Chebyshev (MVUE) UCL	7.466503	
Non-parametric Statisitics		
95% CLT UCL	2.080358	
95% Adjusted-CLT UCL	2.366532	
95% Modified-t UCL	2.298374	
95% Jackknife UCL	2.253737	
95% Chebyshev (Mean, Sd) UCL	3.351467	
97.5% Chebyshev (Mean, Sd) UCL	4.234811	
99% Chebyshev (Mean, Sd) UCL	5.96997	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.016135	
95% Bootstrap-t UCL	2.838836	
95% Hall's Bootstrap UCL	5.865511	
95% Percentile Bootstrap UCL	2.085	
95% BCA Bootstrap UCL	2.4	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.253737	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.14	
Maximum	0.33	
Mean	0.2175	
Standard Deviation	0.081803	
Variance	0.006692	
Coefficient of Variation	0.376104	
Skewness	1.10295	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.938715	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.313756	
Gamma Statistics		
k hat	10.09055	
k star (bias corrected)	2.689303	
Theta hat	0.021555	
Theta star	0.080876	
nu hat	80.72436	
nu star	21.51442	
5% Approximate Chi Square Value	11.97339	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.23861	
Anderson-Darling 5% Critical Value	0.6571	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.193758	
Kolmogrov-Smirnov 5% Critical Value	0.394924	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.390816	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	-1.108663	
Mean of log data	-1.575925	
Standard Deviation of log data	0.362255	
Variance of log data	0.131228	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.985545	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.220841	
MLE Standard Deviation	0.082699	
MLE Coefficient of Variation	0.374471	
MLE Skewness	1.175923	
MLE Median	0.206816	
MLE 80% Quantile	0.280882	
MLE 90% Quantile	0.329418	
MLE 95% Quantile	0.375305	
MLE 99% Quantile	0.480311	
MVU Estimate of Median	0.20344	
MVU Estimate of Mean	0.217145	
MVU Estimate of Standard Deviation	0.077902	
MVU Estimate of SE of Mean	0.038946	
95% H-UCL	0.47469	
95% Chebyshev (MVUE) UCL	0.386905	
97.5% Chebyshev (MVUE) UCL	0.460361	
99% Chebyshev (MVUE) UCL	0.604649	
Non-parametric Statisitics		
95% CLT UCL	0.284777	
95% Adjusted-CLT UCL	0.308878	
95% Modified-t UCL	0.317515	
95% Jackknife UCL	0.313756	
95% Chebyshev (Mean, Sd) UCL	0.395785	
97.5% Chebyshev (Mean, Sd) UCL	0.472929	
99% Chebyshev (Mean, Sd) UCL	0.624463	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.313756	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.14	
Maximum	1	
Mean	0.643333	
Standard Deviation	0.286961	
Variance	0.082347	
Coefficient of Variation	0.446054	
Skewness	-1.00495	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915312	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.879399	
Gamma Statistics		
k hat	3.527385	
k star (bias corrected)	1.874804	
Theta hat	0.182383	
Theta star	0.343147	
nu hat	42.32862	
nu star	22.49764	
5% Approximate Chi Square Value	12.71042	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	10.15876	
Anderson-Darling Test Statistic	0.674898	
Anderson-Darling 5% Critical Value	0.700618	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.341117	
Kolmogrov-Smirnov 5% Critical Value	0.334017	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.13871	
95% Adjusted Gamma UCL	1.42473	
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	0	
Mean of log data	-0.589486	
Standard Deviation of log data	0.70057	
Variance of log data	0.490799	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.747838	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.708868	
MLE Standard Deviation	0.564261	
MLE Coefficient of Variation	0.796003	
MLE Skewness	2.892373	
MLE Median	0.554612	
MLE 80% Quantile	1.002499	
MLE 90% Quantile	1.364444	
MLE 95% Quantile	1.755849	
MLE 99% Quantile	2.829332	
MVU Estimate of Median	0.532258	
MVU Estimate of Mean	0.676635	
MVU Estimate of Standard Deviation	0.473509	
MVU Estimate of SE of Mean	0.192599	
95% H-UCL	1.983879	
95% Chebyshev (MVUE) UCL	1.516154	
97.5% Chebyshev (MVUE) UCL	1.879415	
99% Chebyshev (MVUE) UCL	2.59297	
Non-parametric Statisitics		
95% CLT UCL	0.83603	
95% Adjusted-CLT UCL	0.784674	
95% Modified-t UCL	0.871388	
95% Jackknife UCL	0.879399	
95% Chebyshev (Mean, Sd) UCL	1.153984	
97.5% Chebyshev (Mean, Sd) UCL	1.374943	
99% Chebyshev (Mean, Sd) UCL	1.808975	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.817511	
95% Bootstrap-t UCL	0.82453	
95% Hall's Bootstrap UCL	0.800087	
95% Percentile Bootstrap UCL	0.815	
95% BCA Bootstrap UCL	0.851667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.879399	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Phenanthrene	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.14	
Maximum	2.7	
Mean	0.945	
Standard Deviation	0.904539	
Variance	0.81819	
Coefficient of Variation	0.957184	
Skewness	1.917944	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.791941	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.68911	
Gamma Statistics		
k hat	1.531095	
k star (bias corrected)	0.876658	
Theta hat	0.617206	
Theta star	1.077957	
nu hat	18.37313	
nu star	10.5199	
5% Approximate Chi Square Value	4.268379	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	2.956464	
Anderson-Darling Test Statistic	0.284842	
Anderson-Darling 5% Critical Value	0.707567	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.218682	
Kolmogrov-Smirnov 5% Critical Value	0.337349	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	2.329059	
95% Adjusted Gamma UCL	3.362566	
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	0.993252	
Mean of log data	-0.41739	
Standard Deviation of log data	0.969539	
Variance of log data	0.940006	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.965834	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.054022	
MLE Standard Deviation	1.316472	
MLE Coefficient of Variation	1.248998	
MLE Skewness	5.695428	
MLE Median	0.658764	
MLE 80% Quantile	1.494618	
MLE 90% Quantile	2.289808	
MLE 95% Quantile	3.246255	
MLE 99% Quantile	6.282438	
MVU Estimate of Median	0.608584	
MVU Estimate of Mean	0.955612	
MVU Estimate of Standard Deviation	0.923309	
MVU Estimate of SE of Mean	0.37257	
95% H-UCL	6.492174	
95% Chebyshev (MVUE) UCL	2.579607	
97.5% Chebyshev (MVUE) UCL	3.282311	
99% Chebyshev (MVUE) UCL	4.662637	
Non-parametric Statisitics		
95% CLT UCL	1.552405	
95% Adjusted-CLT UCL	1.861358	
95% Modified-t UCL	1.7373	
95% Jackknife UCL	1.68911	
95% Chebyshev (Mean, Sd) UCL	2.554638	
97.5% Chebyshev (Mean, Sd) UCL	3.25113	
99% Chebyshev (Mean, Sd) UCL	4.619253	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.484081	
95% Bootstrap-t UCL	2.673866	
95% *Hall's Bootstrap UCL*	4.461652	
95% Percentile Bootstrap UCL	1.61	
95% BCA Bootstrap UCL	2.016667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.68911	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Aroclor 1254	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.00155	
Maximum	0.045	
Mean	0.016067	
Standard Deviation	0.025057	
Variance	0.000628	
Coefficient of Variation	1.559568	
Skewness	1.73202	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-6.4695	
Maximum of log data	-3.101093	
Mean of log data	-5.325858	
Standard Deviation of log data	1.926957	
Variance of log data	3.713161	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.03114	
MLE Standard Deviation	0.196902	
MLE Coefficient of Variation	6.323224	
MLE Skewness	271.7922	
MLE Median	0.004864	
MLE 80% Quantile	0.024783	
MLE 90% Quantile	0.057861	
MLE 95% Quantile	0.115786	
MLE 99% Quantile	0.430092	
MVU Estimate of Median	0.002289	
MVU Estimate of Mean	0.013025	
MVU Estimate of Standard Deviation	0.018235	
MVU Estimate of SE of Mean	0.01031	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Aroclor 1260	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.011	
Maximum	0.31	
Mean	0.1625	
Standard Deviation	0.140638	
Variance	0.019779	
Coefficient of Variation	0.865464	
Skewness	-0.043255	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.923976	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.327986	
Gamma Statistics		
k hat	0.989094	
k star (bias corrected)	0.41394	
Theta hat	0.164292	
Theta star	0.392569	
nu hat	7.912751	
nu star	3.311521	
5% Approximate Chi Square Value	0.470182	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.334692	
Anderson-Darling 5% Critical Value	0.666771	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.285079	
Kolmogrov-Smirnov 5% Critical Value	0.402561	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.144498	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-4.50986	
Maximum of log data	-1.171183	
Mean of log data	-2.401411	
Standard Deviation of log data	1.528422	
Variance of log data	2.336074	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.882936	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.291308	
MLE Standard Deviation	0.890305	
MLE Coefficient of Variation	3.056232	
MLE Skewness	37.7156	
MLE Median	0.09059	
MLE 80% Quantile	0.329594	
MLE 90% Quantile	0.64572	
MLE 95% Quantile	1.119456	
MLE 99% Quantile	3.169894	
MVU Estimate of Median	0.06636	
MVU Estimate of Mean	0.193616	
MVU Estimate of Standard Deviation	0.256799	
MVU Estimate of SE of Mean	0.125369	
95% H-UCL	47878.33	
95% Chebyshev (MVUE) UCL	0.740087	
97.5% Chebyshev (MVUE) UCL	0.976545	
99% Chebyshev (MVUE) UCL	1.441022	
Non-parametric Statisitics		
95% CLT UCL	0.278164	
95% Adjusted-CLT UCL	0.276539	
95% Modified-t UCL	0.327732	
95% Jackknife UCL	0.327986	
95% Chebyshev (Mean, Sd) UCL	0.469013	
97.5% Chebyshev (Mean, Sd) UCL	0.601641	
99% Chebyshev (Mean, Sd) UCL	0.862164	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.327986	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	0.21	
Maximum	61	
Mean	14.73438	
Standard Deviation	23.72701	
Variance	562.9709	
Coefficient of Variation	1.610317	
Skewness	1.566776	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.677958	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	30.62755	
Gamma Statistics		
k hat	0.389512	
k star (bias corrected)	0.326778	
Theta hat	37.82776	
Theta star	45.0898	
nu hat	6.232195	
nu star	5.228455	
5% Approximate Chi Square Value	1.258756	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	0.835427	
Anderson-Darling Test Statistic	0.511943	
Anderson-Darling 5% Critical Value	0.781645	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.206002	
Kolmogrov-Smirnov 5% Critical Value	0.313387	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	61.20171	
95% Adjusted Gamma UCL	92.21391	
Lognormal Statistics		
Minimum of log data	-1.560648	
Maximum of log data	4.110874	
Mean of log data	0.993536	
Standard Deviation of log data	2.207303	
Variance of log data	4.872188	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.911281	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	30.86523	
MLE Standard Deviation	351.3845	
MLE Coefficient of Variation	11.38448	
MLE Skewness	1509.654	
MLE Median	2.700769	
MLE 80% Quantile	17.43898	
MLE 90% Quantile	46.05891	
MLE 95% Quantile	101.9569	
MLE 99% Quantile	458.3916	
MVU Estimate of Median	1.969704	
MVU Estimate of Mean	16.15019	
MVU Estimate of Standard Deviation	40.34599	
MVU Estimate of SE of Mean	11.77982	
95% H-UCL	9784.241	
95% Chebyshev (MVUE) UCL	67.49723	
97.5% Chebyshev (MVUE) UCL	89.71514	
99% Chebyshev (MVUE) UCL	133.3579	
Non-parametric Statisitics		
95% CLT UCL	28.53266	
95% Adjusted-CLT UCL	33.49791	
95% Modified-t UCL	31.40202	
95% Jackknife UCL	30.62755	
95% Chebyshev (Mean, Sd) UCL	51.30015	
97.5% Chebyshev (Mean, Sd) UCL	67.12219	
99% Chebyshev (Mean, Sd) UCL	98.20152	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	27.45266	
95% Bootstrap-t UCL	135.642	
95% Hall's Bootstrap UCL	128.7768	
95% Percentile Bootstrap UCL	28.94688	
95% BCA Bootstrap UCL	35.6125	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	92.21391	95% Adjusted Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	15.9	
Maximum	4210	
Mean	878.4833	
Standard Deviation	1468.549	
Variance	2156636	
Coefficient of Variation	1.671687	
Skewness	1.94863	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.641816	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1788.762	
Gamma Statistics		
k hat	0.488173	
k star (bias corrected)	0.399523	
Theta hat	1799.532	
Theta star	2198.831	
nu hat	8.78712	
nu star	7.191413	
5% Approximate Chi Square Value	2.275592	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	1.737779	
Anderson-Darling Test Statistic	0.610617	
Anderson-Darling 5% Critical Value	0.772854	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.297336	
Kolmogrov-Smirnov 5% Critical Value	0.294516	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	2776.216	
95% Adjusted Gamma UCL	3635.41	
Lognormal Statistics		
Minimum of log data	2.766319	
Maximum of log data	8.345218	
Mean of log data	5.472205	
Standard Deviation of log data	1.796692	
Variance of log data	3.228102	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.952242	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1195.424	
MLE Standard Deviation	5884.563	
MLE Coefficient of Variation	4.922574	
MLE Skewness	134.0502	
MLE Median	237.9844	
MLE 80% Quantile	1086.166	
MLE 90% Quantile	2394.559	
MLE 95% Quantile	4572.263	
MLE 99% Quantile	15542.15	
MVU Estimate of Median	198.2472	
MVU Estimate of Mean	852.6966	
MVU Estimate of Standard Deviation	1766.81	
MVU Estimate of SE of Mean	518.1289	
95% H-UCL	34783.93	
95% Chebyshev (MVUE) UCL	3111.168	
97.5% Chebyshev (MVUE) UCL	4088.411	
99% Chebyshev (MVUE) UCL	6008.014	
Non-parametric Statisitics		
95% CLT UCL	1683.666	
95% Adjusted-CLT UCL	2023.413	
95% Modified-t UCL	1841.756	
95% Jackknife UCL	1788.762	
95% Chebyshev (Mean, Sd) UCL	3012.236	
97.5% Chebyshev (Mean, Sd) UCL	3935.512	
99% Chebyshev (Mean, Sd) UCL	5749.109	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1665.629	
95% Bootstrap-t UCL	8770.85	
95% Hall's Bootstrap UCL	6936.199	
95% Percentile Bootstrap UCL	1733.878	
95% BCA Bootstrap UCL	2217.767	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	3635.41	95% Adjusted Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	63.8	
Maximum	387.5	
Mean	155.3222	
Standard Deviation	111.4526	
Variance	12421.69	
Coefficient of Variation	0.717558	
Skewness	1.556163	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.776649	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	224.4061	
Gamma Statistics		
k hat	2.878536	
k star (bias corrected)	1.993098	
Theta hat	53.95876	
Theta star	77.93005	
nu hat	51.81364	
nu star	35.87576	
5% Approximate Chi Square Value	23.16646	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	21.03718	
Anderson-Darling Test Statistic	0.616259	
Anderson-Darling 5% Critical Value	0.727161	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.213341	
Kolmogrov-Smirnov 5% Critical Value	0.281478	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	240.5332	
95% Adjusted Gamma UCL	264.8789	
Lognormal Statistics		
Minimum of log data	4.155753	
Maximum of log data	5.959716	
Mean of log data	4.86186	
Standard Deviation of log data	0.608512	
Variance of log data	0.370287	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.903816	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	155.5557	
MLE Standard Deviation	104.1353	
MLE Coefficient of Variation	0.66944	
MLE Skewness	2.308331	
MLE Median	129.2645	
MLE 80% Quantile	216.1674	
MLE 90% Quantile	282.5339	
MLE 95% Quantile	351.7297	
MLE 99% Quantile	532.328	
MVU Estimate of Median	126.6271	
MVU Estimate of Mean	151.9906	
MVU Estimate of Standard Deviation	94.64946	
MVU Estimate of SE of Mean	31.43545	
95% H-UCL	265.4936	
95% Chebyshev (MVUE) UCL	289.0146	
97.5% Chebyshev (MVUE) UCL	348.3049	
99% Chebyshev (MVUE) UCL	464.7694	
Non-parametric Statisitics		
95% CLT UCL	216.43	
95% Adjusted-CLT UCL	237.0213	
95% Modified-t UCL	227.6179	
95% Jackknife UCL	224.4061	
95% Chebyshev (Mean, Sd) UCL	317.2592	
97.5% Chebyshev (Mean, Sd) UCL	387.3294	
99% Chebyshev (Mean, Sd) UCL	524.9688	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	212.6059	
95% Bootstrap-t UCL	372.6234	
95% Hall's Bootstrap UCL	574.1785	
95% Percentile Bootstrap UCL	215.4556	
95% BCA Bootstrap UCL	206.6	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	240.5332	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	2	
Maximum	13.8	
Mean	6.75	
Standard Deviation	4.237334	
Variance	17.955	
Coefficient of Variation	0.627753	
Skewness	0.411297	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915138	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	9.376509	
Gamma Statistics		
k hat	2.568621	
k star (bias corrected)	1.786488	
Theta hat	2.62787	
Theta star	3.778363	
nu hat	46.23517	
nu star	32.15678	
5% Approximate Chi Square Value	20.19431	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	18.22109	
Anderson-Darling Test Statistic	0.363463	
Anderson-Darling 5% Critical Value	0.728081	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.177671	
Kolmogrov-Smirnov 5% Critical Value	0.281832	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	10.74849	
95% Adjusted Gamma UCL	11.91248	
Lognormal Statistics		
Minimum of log data	0.693147	
Maximum of log data	2.624669	
Mean of log data	1.702434	
Standard Deviation of log data	0.713594	
Variance of log data	0.509216	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.919244	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.078362	
MLE Standard Deviation	5.767829	
MLE Coefficient of Variation	0.814854	
MLE Skewness	2.985612	
MLE Median	5.48729	
MLE 80% Quantile	10.0284	
MLE 90% Quantile	13.72752	
MLE 95% Quantile	17.74842	
MLE 99% Quantile	28.85415	
MVU Estimate of Median	5.333801	
MVU Estimate of Mean	6.847428	
MVU Estimate of Standard Deviation	5.040346	
MVU Estimate of SE of Mean	1.669187	
95% H-UCL	13.9271	
95% Chebyshev (MVUE) UCL	14.12324	
97.5% Chebyshev (MVUE) UCL	17.2715	
99% Chebyshev (MVUE) UCL	23.45563	
Non-parametric Statisitics		
95% CLT UCL	9.073265	
95% Adjusted-CLT UCL	9.280177	
95% Modified-t UCL	9.408783	
95% Jackknife UCL	9.376509	
95% Chebyshev (Mean, Sd) UCL	12.9067	
97.5% Chebyshev (Mean, Sd) UCL	15.57071	
99% Chebyshev (Mean, Sd) UCL	20.80365	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.878124	
95% Bootstrap-t UCL	9.780792	
95% Hall's Bootstrap UCL	8.970374	
95% Percentile Bootstrap UCL	9.011111	
95% BCA Bootstrap UCL	9.966667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	9.376509	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	61.2	
Maximum	725	
Mean	403.3778	
Standard Deviation	257.9	
Variance	66512.42	
Coefficient of Variation	0.639351	
Skewness	-0.18273	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.905389	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	563.2369	
Gamma Statistics		
k hat	1.792225	
k star (bias corrected)	1.268891	
Theta hat	225.0709	
Theta star	317.8979	
nu hat	32.26006	
nu star	22.84004	
5% Approximate Chi Square Value	12.96837	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	11.43007	
Anderson-Darling Test Statistic	0.546376	
Anderson-Darling 5% Critical Value	0.731677	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.256852	
Kolmogrov-Smirnov 5% Critical Value	0.283103	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	710.4334	
95% Adjusted Gamma UCL	806.0465	
Lognormal Statistics		
Minimum of log data	4.114147	
Maximum of log data	6.586172	
Mean of log data	5.695661	
Standard Deviation of log data	0.950092	
Variance of log data	0.902674	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.842963	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	467.3125	
MLE Standard Deviation	565.8514	
MLE Coefficient of Variation	1.210863	
MLE Skewness	5.407942	
MLE Median	297.5735	
MLE 80% Quantile	664.1371	
MLE 90% Quantile	1008.812	
MLE 95% Quantile	1420.213	
MLE 99% Quantile	2712.36	
MVU Estimate of Median	282.9467	
MVU Estimate of Mean	437.9245	
MVU Estimate of Standard Deviation	438.1878	
MVU Estimate of SE of Mean	143.4654	
95% H-UCL	1363.089	
95% Chebyshev (MVUE) UCL	1063.276	
97.5% Chebyshev (MVUE) UCL	1333.865	
99% Chebyshev (MVUE) UCL	1865.387	
Non-parametric Statisitics		
95% CLT UCL	544.7804	
95% Adjusted-CLT UCL	539.1854	
95% Modified-t UCL	562.3642	
95% Jackknife UCL	563.2369	
95% Chebyshev (Mean, Sd) UCL	778.0978	
97.5% Chebyshev (Mean, Sd) UCL	940.2395	
99% Chebyshev (Mean, Sd) UCL	1258.735	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	539.6496	
95% Bootstrap-t UCL	557.439	
95% Hall's Bootstrap UCL	521.6441	
95% Percentile Bootstrap UCL	528.7111	
95% BCA Bootstrap UCL	579.3333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	563.2369	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	97.9	
Maximum	2340	
Mean	740.5444	
Standard Deviation	845.9407	
Variance	715615.6	
Coefficient of Variation	1.142323	
Skewness	1.427218	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.745824	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1264.9	
Gamma Statistics		
k hat	0.968995	
k star (bias corrected)	0.720071	
Theta hat	764.2396	
Theta star	1028.433	
nu hat	17.44191	
nu star	12.96127	
5% Approximate Chi Square Value	5.865604	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	4.896559	
Anderson-Darling Test Statistic	0.517164	
Anderson-Darling 5% Critical Value	0.744461	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.189163	
Kolmogrov-Smirnov 5% Critical Value	0.287195	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1636.387	
95% Adjusted Gamma UCL	1960.234	
Lognormal Statistics		
Minimum of log data	4.583947	
Maximum of log data	7.757906	
Mean of log data	6.009476	
Standard Deviation of log data	1.19069	
Variance of log data	1.417742	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.90024	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	827.4485	
MLE Standard Deviation	1463.389	
MLE Coefficient of Variation	1.768556	
MLE Skewness	10.83734	
MLE Median	407.2698	
MLE 80% Quantile	1113.884	
MLE 90% Quantile	1880.912	
MLE 95% Quantile	2887.541	
MLE 99% Quantile	6496.508	
MVU Estimate of Median	376.185	
MVU Estimate of Mean	738.4997	
MVU Estimate of Standard Deviation	948.6014	
MVU Estimate of SE of Mean	304.4383	
95% H-UCL	4019.703	
95% Chebyshev (MVUE) UCL	2065.515	
97.5% Chebyshev (MVUE) UCL	2639.716	
99% Chebyshev (MVUE) UCL	3767.622	
Non-parametric Statisitics		
95% CLT UCL	1204.361	
95% Adjusted-CLT UCL	1347.701	
95% Modified-t UCL	1287.258	
95% Jackknife UCL	1264.9	
95% Chebyshev (Mean, Sd) UCL	1969.668	
97.5% Chebyshev (Mean, Sd) UCL	2501.51	
99% Chebyshev (Mean, Sd) UCL	3546.212	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1176.114	
95% Bootstrap-t UCL	2405.557	
95% Hall's Bootstrap UCL	4528.303	
95% Percentile Bootstrap UCL	1199.333	
95% BCA Bootstrap UCL	1551.444	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1636.387	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	135	
Maximum	1270	
Mean	699.9444	
Standard Deviation	403.9624	
Variance	163185.7	
Coefficient of Variation	0.577135	
Skewness	-0.107718	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.929763	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	950.3403	
Gamma Statistics		
k hat	2.397614	
k star (bias corrected)	1.672484	
Theta hat	291.9337	
Theta star	418.506	
nu hat	43.15706	
nu star	30.10471	
5% Approximate Chi Square Value	18.57313	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	16.68981	
Anderson-Darling Test Statistic	0.500392	
Anderson-Darling 5% Critical Value	0.728589	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.280881	
Kolmogrov-Smirnov 5% Critical Value	0.282027	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1134.522	
95% Adjusted Gamma UCL	1262.544	
Lognormal Statistics		
Minimum of log data	4.905275	
Maximum of log data	7.146772	
Mean of log data	6.328198	
Standard Deviation of log data	0.793407	
Variance of log data	0.629495	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.868187	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	767.352	
MLE Standard Deviation	718.4737	
MLE Coefficient of Variation	0.936303	
MLE Skewness	3.629729	
MLE Median	560.1464	
MLE 80% Quantile	1095.129	
MLE 90% Quantile	1552.662	
MLE 95% Quantile	2065.966	
MLE 99% Quantile	3546.311	
MVU Estimate of Median	540.8289	
MVU Estimate of Mean	735.5349	
MVU Estimate of Standard Deviation	605.9664	
MVU Estimate of SE of Mean	200.0674	
95% H-UCL	1704.218	
95% Chebyshev (MVUE) UCL	1607.608	
97.5% Chebyshev (MVUE) UCL	1984.955	
99% Chebyshev (MVUE) UCL	2726.18	
Non-parametric Statisitics		
95% CLT UCL	921.4308	
95% Adjusted-CLT UCL	916.2647	
95% Modified-t UCL	949.5345	
95% Jackknife UCL	950.3403	
95% Chebyshev (Mean, Sd) UCL	1286.888	
97.5% Chebyshev (Mean, Sd) UCL	1540.859	
99% Chebyshev (Mean, Sd) UCL	2039.736	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	904.2146	
95% Bootstrap-t UCL	956.1909	
95% Hall's Bootstrap UCL	911.0247	
95% Percentile Bootstrap UCL	908.6667	
95% BCA Bootstrap UCL	996.1667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	950.3403	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	110.9	
Maximum	1050	
Mean	524.7667	
Standard Deviation	378.5796	
Variance	143322.5	
Coefficient of Variation	0.721425	
Skewness	0.248268	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.878694	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	759.429	
Gamma Statistics		
k hat	1.704336	
k star (bias corrected)	1.210298	
Theta hat	307.9009	
Theta star	433.5845	
nu hat	30.67806	
nu star	21.78537	
5% Approximate Chi Square Value	12.17593	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	10.6919	
Anderson-Darling Test Statistic	0.504272	
Anderson-Darling 5% Critical Value	0.732484	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.212542	
Kolmogrov-Smirnov 5% Critical Value	0.283367	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	938.921	
95% Adjusted Gamma UCL	1069.243	
Lognormal Statistics		
Minimum of log data	4.708629	
Maximum of log data	6.956545	
Mean of log data	5.94176	
Standard Deviation of log data	0.923932	
Variance of log data	0.853651	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.86103	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	583.2321	
MLE Standard Deviation	677.2036	
MLE Coefficient of Variation	1.161122	
MLE Skewness	5.048795	
MLE Median	380.6042	
MLE 80% Quantile	830.8777	
MLE 90% Quantile	1247.645	
MLE 95% Quantile	1739.979	
MLE 99% Quantile	3264.384	
MVU Estimate of Median	362.8928	
MVU Estimate of Mean	548.8716	
MVU Estimate of Standard Deviation	532.768	
MVU Estimate of SE of Mean	174.7177	
95% H-UCL	1620.3	
95% Chebyshev (MVUE) UCL	1310.449	
97.5% Chebyshev (MVUE) UCL	1639.983	
99% Chebyshev (MVUE) UCL	2287.291	
Non-parametric Statisitics		
95% CLT UCL	732.336	
95% Adjusted-CLT UCL	743.4948	
95% Modified-t UCL	761.1695	
95% Jackknife UCL	759.429	
95% Chebyshev (Mean, Sd) UCL	1074.83	
97.5% Chebyshev (Mean, Sd) UCL	1312.843	
99% Chebyshev (Mean, Sd) UCL	1780.373	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	721.0793	
95% Bootstrap-t UCL	762.2164	
95% Hall's Bootstrap UCL	698.3942	
95% Percentile Bootstrap UCL	718.3111	
95% BCA Bootstrap UCL	788.6667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	759.429	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	0.14	
Maximum	19.5	
Mean	5.156833	
Standard Deviation	7.135441	
Variance	50.91452	
Coefficient of Variation	1.383687	
Skewness	1.408856	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.759889	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	9.579732	
Gamma Statistics		
k hat	0.48753	
k star (bias corrected)	0.399094	
Theta hat	10.57747	
Theta star	12.92135	
nu hat	8.775536	
nu star	7.18369	
5% Approximate Chi Square Value	2.271307	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	1.734151	
Anderson-Darling Test Statistic	0.422161	
Anderson-Darling 5% Critical Value	0.772971	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.198192	
Kolmogrov-Smirnov 5% Critical Value	0.29454	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	16.31004	
95% Adjusted Gamma UCL	21.36209	
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	2.970414	
Mean of log data	0.332338	
Standard Deviation of log data	1.947341	
Variance of log data	3.792136	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906805	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	9.285051	
MLE Standard Deviation	61.13418	
MLE Coefficient of Variation	6.584151	
MLE Skewness	305.1822	
MLE Median	1.394224	
MLE 80% Quantile	7.22712	
MLE 90% Quantile	17.02479	
MLE 95% Quantile	34.31948	
MLE 99% Quantile	129.2634	
MVU Estimate of Median	1.124124	
MVU Estimate of Mean	6.091746	
MVU Estimate of Standard Deviation	13.91719	
MVU Estimate of SE of Mean	3.958819	
95% H-UCL	471.862	
95% Chebyshev (MVUE) UCL	23.34784	
97.5% Chebyshev (MVUE) UCL	30.81456	
99% Chebyshev (MVUE) UCL	45.4815	
Non-parametric Statisitics		
95% CLT UCL	9.069085	
95% Adjusted-CLT UCL	10.26259	
95% Modified-t UCL	9.765895	
95% Jackknife UCL	9.579732	
95% Chebyshev (Mean, Sd) UCL	15.52439	
97.5% Chebyshev (Mean, Sd) UCL	20.01044	
99% Chebyshev (Mean, Sd) UCL	28.82241	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.890355	
95% Bootstrap-t UCL	16.27091	
95% Hall's Bootstrap UCL	14.01354	
95% Percentile Bootstrap UCL	9.095556	
95% BCA Bootstrap UCL	10.48	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	21.36209	95% Adjusted Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Nickel	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	12.5	
Maximum	53.4	
Mean	23.6	
Standard Deviation	12.429	
Variance	154.48	
Coefficient of Variation	0.526652	
Skewness	1.985591	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.789852	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	31.30411	
Gamma Statistics		
k hat	5.375372	
k star (bias corrected)	3.657656	
Theta hat	4.390394	
Theta star	6.45222	
nu hat	96.7567	
nu star	65.8378	
5% Approximate Chi Square Value	48.16319	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	44.99101	
Anderson-Darling Test Statistic	0.41558	
Anderson-Darling 5% Critical Value	0.722684	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.182959	
Kolmogrov-Smirnov 5% Critical Value	0.279801	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	32.26057	
95% Adjusted Gamma UCL	34.53517	
Lognormal Statistics		
Minimum of log data	2.525729	
Maximum of log data	3.977811	
Mean of log data	3.065356	
Standard Deviation of log data	0.440818	
Variance of log data	0.19432	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.932812	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	23.62997	
MLE Standard Deviation	10.94363	
MLE Coefficient of Variation	0.463125	
MLE Skewness	1.488709	
MLE Median	21.44209	
MLE 80% Quantile	31.11987	
MLE 90% Quantile	37.781	
MLE 95% Quantile	44.27856	
MLE 99% Quantile	59.78156	
MVU Estimate of Median	21.2116	
MVU Estimate of Mean	23.35914	
MVU Estimate of Standard Deviation	10.42663	
MVU Estimate of SE of Mean	3.471824	
95% H-UCL	33.35317	
95% Chebyshev (MVUE) UCL	38.49247	
97.5% Chebyshev (MVUE) UCL	45.04067	
99% Chebyshev (MVUE) UCL	57.90335	
Non-parametric Statisitics		
95% CLT UCL	30.41463	
95% Adjusted-CLT UCL	33.3446	
95% Modified-t UCL	31.76112	
95% Jackknife UCL	31.30411	
95% Chebyshev (Mean, Sd) UCL	41.65892	
97.5% Chebyshev (Mean, Sd) UCL	49.47302	
99% Chebyshev (Mean, Sd) UCL	64.82232	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	30.20583	
95% Bootstrap-t UCL	38.11954	
95% Hall's Bootstrap UCL	58.53035	
95% Percentile Bootstrap UCL	30.5	
95% BCA Bootstrap UCL	35.24444	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	32.26057	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - 13-tt-27.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	7	
Minimum	0.215	
Maximum	3.7	
Mean	1.10375	
Standard Deviation	1.458071	
Variance	2.12597	
Coefficient of Variation	1.321015	
Skewness	1.454462	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.646476	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.080416	
Gamma Statistics		
k hat	0.862637	
k star (bias corrected)	0.622481	
Theta hat	1.279507	
Theta star	1.773146	
nu hat	13.80219	
nu star	9.9597	
5% Approximate Chi Square Value	3.91575	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	3.017471	
Anderson-Darling Test Statistic	1.14978	
Anderson-Darling 5% Critical Value	0.740791	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.330056	
Kolmogrov-Smirnov 5% Critical Value	0.302889	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	2.807385	
95% Adjusted Gamma UCL	3.643124	
Lognormal Statistics		
Minimum of log data	-1.537117	
Maximum of log data	1.308333	
Mean of log data	-0.582607	
Standard Deviation of log data	1.161547	
Variance of log data	1.349191	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.770138	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.096352	
MLE Standard Deviation	1.852253	
MLE Coefficient of Variation	1.689469	
MLE Skewness	9.890673	
MLE Median	0.55844	
MLE 80% Quantile	1.490184	
MLE 90% Quantile	2.484274	
MLE 95% Quantile	3.774007	
MLE 99% Quantile	8.324065	
MVU Estimate of Median	0.512867	
MVU Estimate of Mean	0.974009	
MVU Estimate of Standard Deviation	1.190095	
MVU Estimate of SE of Mean	0.407971	
95% H-UCL	6.137499	
95% Chebyshev (MVUE) UCL	2.752313	
97.5% Chebyshev (MVUE) UCL	3.521786	
99% Chebyshev (MVUE) UCL	5.033268	
Non-parametric Statisitics		
95% CLT UCL	1.951682	
95% Adjusted-CLT UCL	2.234932	
95% Modified-t UCL	2.124598	
95% Jackknife UCL	2.080416	
95% Chebyshev (Mean, Sd) UCL	3.350788	
97.5% Chebyshev (Mean, Sd) UCL	4.323083	
99% Chebyshev (Mean, Sd) UCL	6.232968	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.892349	
95% Bootstrap-t UCL	11.56749	
95% Hall's Bootstrap UCL	11.15958	
95% Percentile Bootstrap UCL	1.936875	
95% BCA Bootstrap UCL	2.33125	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	6.232968	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	27.4	
Maximum	120	
Mean	68.24444	
Standard Deviation	29.95639	
Variance	897.3853	
Coefficient of Variation	0.438957	
Skewness	0.666444	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.943003	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	86.81289	
Gamma Statistics		
k hat	5.811321	
k star (bias corrected)	3.948288	
Theta hat	11.74336	
Theta star	17.28457	
nu hat	104.6038	
nu star	71.06918	
5% Approximate Chi Square Value	52.65646	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	49.32873	
Anderson-Darling Test Statistic	0.183226	
Anderson-Darling 5% Critical Value	0.722596	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.130675	
Kolmogrov-Smirnov 5% Critical Value	0.279756	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	92.10792	
95% Adjusted Gamma UCL	98.32154	
Lognormal Statistics		
Minimum of log data	3.310543	
Maximum of log data	4.787492	
Mean of log data	4.134597	
Standard Deviation of log data	0.455296	
Variance of log data	0.207295	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.975182	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	69.28608	
MLE Standard Deviation	33.25335	
MLE Coefficient of Variation	0.479943	
MLE Skewness	1.550381	
MLE Median	62.46439	
MLE 80% Quantile	91.77336	
MLE 90% Quantile	112.1293	
MLE 95% Quantile	132.1	
MLE 99% Quantile	180.1186	
MVU Estimate of Median	61.74834	
MVU Estimate of Mean	68.43578	
MVU Estimate of Standard Deviation	31.57582	
MVU Estimate of SE of Mean	10.51252	
95% H-UCL	99.25063	
95% Chebyshev (MVUE) UCL	114.2588	
97.5% Chebyshev (MVUE) UCL	134.0865	
99% Chebyshev (MVUE) UCL	173.034	
Non-parametric Statisitics		
95% CLT UCL	84.66907	
95% Adjusted-CLT UCL	87.0393	
95% Modified-t UCL	87.1826	
95% Jackknife UCL	86.81289	
95% Chebyshev (Mean, Sd) UCL	111.7701	
97.5% Chebyshev (Mean, Sd) UCL	130.6036	
99% Chebyshev (Mean, Sd) UCL	167.5985	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	83.43207	
95% Bootstrap-t UCL	92.86654	
95% Hall's Bootstrap UCL	100.2148	
95% Percentile Bootstrap UCL	84.53333	
95% BCA Bootstrap UCL	90.38889	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	86.81289	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 13-tt-27.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	411.5	
Maximum	2670	
Mean	1309.611	
Standard Deviation	970.897	
Variance	942641	
Coefficient of Variation	0.741363	
Skewness	0.594673	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.816065	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1911.421	
Gamma Statistics		
k hat	1.999661	
k star (bias corrected)	1.407181	
Theta hat	654.9167	
Theta star	930.6627	
nu hat	35.99389	
nu star	25.32926	
5% Approximate Chi Square Value	14.86211	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	13.2003	
Anderson-Darling Test Statistic	0.61255	
Anderson-Darling 5% Critical Value	0.729773	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.190528	
Kolmogrov-Smirnov 5% Critical Value	0.282481	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2231.95	
95% Adjusted Gamma UCL	2512.934	
Lognormal Statistics		
Minimum of log data	6.019809	
Maximum of log data	7.889834	
Mean of log data	6.907073	
Standard Deviation of log data	0.794366	
Variance of log data	0.631017	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.857902	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1370.022	
MLE Standard Deviation	1284.846	
MLE Coefficient of Variation	0.937828	
MLE Skewness	3.638325	
MLE Median	999.3184	
MLE 80% Quantile	1955.327	
MLE 90% Quantile	2773.413	
MLE 95% Quantile	3691.565	
MLE 99% Quantile	6340.855	
MVU Estimate of Median	964.7732	
MVU Estimate of Mean	1313.06	
MVU Estimate of Standard Deviation	1083.153	
MVU Estimate of SE of Mean	357.6018	
95% H-UCL	3047.346	
95% Chebyshev (MVUE) UCL	2871.81	
97.5% Chebyshev (MVUE) UCL	3546.282	
99% Chebyshev (MVUE) UCL	4871.153	
Non-parametric Statisitics		
95% CLT UCL	1841.939	
95% Adjusted-CLT UCL	1910.486	
95% Modified-t UCL	1922.113	
95% Jackknife UCL	1911.421	
95% Chebyshev (Mean, Sd) UCL	2720.292	
97.5% Chebyshev (Mean, Sd) UCL	3330.694	
99% Chebyshev (Mean, Sd) UCL	4529.712	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1811.941	
95% Bootstrap-t UCL	2084.285	
95% Hall's Bootstrap UCL	1765.745	
95% Percentile Bootstrap UCL	1831	
95% BCA Bootstrap UCL	2075.444	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2231.95	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Trichloroethene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.053	
Maximum	0.053	
Mean	0.053	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-2.937463	
Maximum of log data	-2.937463	
Mean of log data	-2.937463	
Standard Deviation of log data	1.7E+269	
Variance of log data	1.1E-305	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	1.7E+269	
MLE Coefficient of Variation	1.7E+269	
MLE Skewness	0	
MLE Median	1.7E+269	
MLE 80% Quantile	1.1E-305	
MLE 90% Quantile	-5E+138	
MLE 95% Quantile	2.6E-308	
MLE 99% Quantile	2.6E-308	
MVU Estimate of Median	0	
MVU Estimate of Mean	0	
MVU Estimate of Standard Deviation	0	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.3	
Maximum	0.56	
Mean	0.43	
Standard Deviation	0.183848	
Variance	0.0338	
Coefficient of Variation	0.427553	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.203973	
Maximum of log data	-0.579818	
Mean of log data	-0.891896	
Standard Deviation of log data	0.441344	
Variance of log data	0.194784	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	3.1E-303	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-2.4E-159	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.43	
MVU Estimate of Standard Deviation	0.183848	
MVU Estimate of SE of Mean	0.13	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	1	
Maximum	1	
Mean	1	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	0	
Maximum of log data	0	
Mean of log data	0	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	1.6E-304	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	8.6E-174	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.3	
Maximum	1.5	
Mean	0.9	
Standard Deviation	0.848528	
Variance	0.72	
Coefficient of Variation	0.942809	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.203973	
Maximum of log data	0.405465	
Mean of log data	-0.399254	
Standard Deviation of log data	1.138044	
Variance of log data	1.295145	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	1.6E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	8.6E-174	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.9	
MVU Estimate of Standard Deviation	0.848528	
MVU Estimate of SE of Mean	0.6	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.66	
Maximum	0.72	
Mean	0.69	
Standard Deviation	0.042426	
Variance	0.0018	
Coefficient of Variation	0.061488	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-0.415515	
Maximum of log data	-0.328504	
Mean of log data	-0.37201	
Standard Deviation of log data	0.061526	
Variance of log data	0.003785	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	2.2E-304	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	4E-270	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.69	
MVU Estimate of Standard Deviation	0.042426	
MVU Estimate of SE of Mean	0.03	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.3	
Maximum	0.32	
Mean	0.31	
Standard Deviation	0.014142	
Variance	0.0002	
Coefficient of Variation	0.04562	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	*NOT AD GAMMA*	*Data not gamma distributed at 5% significance level*
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.203973	
Maximum of log data	-1.139434	
Mean of log data	-1.171704	
Standard Deviation of log data	0.045636	
Variance of log data	0.002083	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	1.1E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-2.4E-159	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	*0.31*	
MVU Estimate of Standard Deviation	0.014142	
MVU Estimate of SE of Mean	0.01	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.3	
Maximum	0.74	
Mean	0.52	
Standard Deviation	0.311127	
Variance	0.0968	
Coefficient of Variation	0.598321	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.203973	
Maximum of log data	-0.301105	
Mean of log data	-0.752539	
Standard Deviation of log data	0.638424	
Variance of log data	0.407585	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	2.9E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	4E-270	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.52	
MVU Estimate of Standard Deviation	0.311127	
MVU Estimate of SE of Mean	0.22	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Phenanthrene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.3	
Maximum	0.57	
Mean	0.435	
Standard Deviation	0.190919	
Variance	0.03645	
Coefficient of Variation	0.438894	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.203973	
Maximum of log data	-0.562119	
Mean of log data	-0.883046	
Standard Deviation of log data	0.453859	
Variance of log data	0.205988	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	1.3E-304	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	8.6E-174	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.435	
MVU Estimate of Standard Deviation	0.190919	
MVU Estimate of SE of Mean	0.135	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable	Aroclor 1260	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.0245	
Maximum	0.058	
Mean	0.04125	
Standard Deviation	0.023688	
Variance	0.000561	
Coefficient of Variation	0.574256	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.709082	
Maximum of log data	-2.847312	
Mean of log data	-3.278197	
Standard Deviation of log data	0.609363	
Variance of log data	0.371324	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	3.3E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	4E-270	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.04125	
MVU Estimate of Standard Deviation	0.023688	
MVU Estimate of SE of Mean	0.01675	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	9.9	
Maximum	68	
Mean	25.55417	
Standard Deviation	15.86118	
Variance	251.577	
Coefficient of Variation	0.620689	
Skewness	1.884028	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.816969	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	33.77703	
Gamma Statistics		
k hat	3.649608	
k star (bias corrected)	2.792761	
Theta hat	7.001894	
Theta star	9.150143	
nu hat	87.59059	
nu star	67.02627	
5% Approximate Chi Square Value	49.18146	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	46.85559	
Anderson-Darling Test Statistic	0.304023	
Anderson-Darling 5% Critical Value	0.736931	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.132927	
Kolmogrov-Smirnov 5% Critical Value	0.246754	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	34.82614	
95% Adjusted Gamma UCL	36.55488	
Lognormal Statistics		
Minimum of log data	2.292535	
Maximum of log data	4.219508	
Mean of log data	3.097588	
Standard Deviation of log data	0.541961	
Variance of log data	0.293722	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.969816	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	25.64758	
MLE Standard Deviation	14.98598	
MLE Coefficient of Variation	0.584304	
MLE Skewness	1.952399	
MLE Median	22.14448	
MLE 80% Quantile	35.00691	
MLE 90% Quantile	44.43416	
MLE 95% Quantile	54.00705	
MLE 99% Quantile	78.11563	
MVU Estimate of Median	21.87487	
MVU Estimate of Mean	25.30113	
MVU Estimate of Standard Deviation	14.12957	
MVU Estimate of SE of Mean	4.066517	
95% H-UCL	36.70526	
95% Chebyshev (MVUE) UCL	43.02667	
97.5% Chebyshev (MVUE) UCL	50.69652	
99% Chebyshev (MVUE) UCL	65.76246	
Non-parametric Statisitics		
95% CLT UCL	33.0855	
95% Adjusted-CLT UCL	35.74636	
95% Modified-t UCL	34.19207	
95% Jackknife UCL	33.77703	
95% Chebyshev (Mean, Sd) UCL	45.51238	
97.5% Chebyshev (Mean, Sd) UCL	54.14832	
99% Chebyshev (Mean, Sd) UCL	71.11194	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	32.76348	
95% Bootstrap-t UCL	38.54493	
95% Hall's Bootstrap UCL	66.886	
95% Percentile Bootstrap UCL	33.4125	
95% BCA Bootstrap UCL	37.86667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	34.82614	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	4.7	
Maximum	3230	
Mean	373.7667	
Standard Deviation	911.3005	
Variance	830468.6	
Coefficient of Variation	2.438154	
Skewness	3.310537	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.449189	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	846.2097	
Gamma Statistics		
k hat	0.372575	
k star (bias corrected)	0.334987	
Theta hat	1003.198	
Theta star	1115.765	
nu hat	8.941805	
nu star	8.039687	
5% Approximate Chi Square Value	2.757339	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	2.307716	
Anderson-Darling Test Statistic	1.066261	
Anderson-Darling 5% Critical Value	0.809743	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.281592	
Kolmogrov-Smirnov 5% Critical Value	0.262923	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1089.807	
95% Adjusted Gamma UCL	1302.139	
Lognormal Statistics		
Minimum of log data	1.547563	
Maximum of log data	8.080237	
Mean of log data	4.137043	
Standard Deviation of log data	1.895163	
Variance of log data	3.591644	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924256	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	377.2338	
MLE Standard Deviation	2241.089	
MLE Coefficient of Variation	5.940849	
MLE Skewness	227.497	
MLE Median	62.61739	
MLE 80% Quantile	310.5845	
MLE 90% Quantile	715.0324	
MLE 95% Quantile	1414.578	
MLE 99% Quantile	5141.977	
MVU Estimate of Median	53.81871	
MVU Estimate of Mean	275.77	
MVU Estimate of Standard Deviation	690.1547	
MVU Estimate of SE of Mean	164.2519	
95% H-UCL	5641.18	
95% Chebyshev (MVUE) UCL	991.7276	
97.5% Chebyshev (MVUE) UCL	1301.523	
99% Chebyshev (MVUE) UCL	1910.056	
Non-parametric Statisitics		
95% CLT UCL	806.478	
95% Adjusted-CLT UCL	1075.111	
95% Modified-t UCL	888.111	
95% Jackknife UCL	846.2097	
95% Chebyshev (Mean, Sd) UCL	1520.461	
97.5% Chebyshev (Mean, Sd) UCL	2016.637	
99% Chebyshev (Mean, Sd) UCL	2991.278	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	791.7553	
95% Bootstrap-t UCL	2878.78	
95% Hall's Bootstrap UCL	2378.105	
95% Percentile Bootstrap UCL	878.175	
95% BCA Bootstrap UCL	1135.85	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	1910.056	99% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	53.9	
Maximum	132	
Mean	81.23333	
Standard Deviation	22.27767	
Variance	496.2947	
Coefficient of Variation	0.274243	
Skewness	1.019847	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.928283	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	92.78269	
Gamma Statistics		
k hat	15.70128	
k star (bias corrected)	11.83152	
Theta hat	5.173675	
Theta star	6.865843	
nu hat	376.8308	
nu star	283.9564	
5% Approximate Chi Square Value	245.9198	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	240.5166	
Anderson-Darling Test Statistic	0.212279	
Anderson-Darling 5% Critical Value	0.731189	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.102996	
Kolmogrov-Smirnov 5% Critical Value	0.245277	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	93.79776	
95% Adjusted Gamma UCL	95.90491	
Lognormal Statistics		
Minimum of log data	3.98713	
Maximum of log data	4.882802	
Mean of log data	4.365143	
Standard Deviation of log data	0.26179	
Variance of log data	0.068534	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.968953	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	81.40285	
MLE Standard Deviation	21.68085	
MLE Coefficient of Variation	0.26634	
MLE Skewness	0.817914	
MLE Median	78.66067	
MLE 80% Quantile	98.13616	
MLE 90% Quantile	110.117	
MLE 95% Quantile	120.9997	
MLE 99% Quantile	144.6139	
MVU Estimate of Median	78.43632	
MVU Estimate of Mean	81.1646	
MVU Estimate of Standard Deviation	21.40135	
MVU Estimate of SE of Mean	6.176925	
95% H-UCL	94.52185	
95% Chebyshev (MVUE) UCL	108.0892	
97.5% Chebyshev (MVUE) UCL	119.7395	
99% Chebyshev (MVUE) UCL	142.6242	
Non-parametric Statisitics		
95% CLT UCL	91.8114	
95% Adjusted-CLT UCL	93.83444	
95% Modified-t UCL	93.09824	
95% Jackknife UCL	92.78269	
95% Chebyshev (Mean, Sd) UCL	109.2655	
97.5% Chebyshev (Mean, Sd) UCL	121.395	
99% Chebyshev (Mean, Sd) UCL	145.2211	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	91.57692	
95% Bootstrap-t UCL	96.23497	
95% Hall's Bootstrap UCL	100.8146	
95% Percentile Bootstrap UCL	91.95	
95% BCA Bootstrap UCL	98.875	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	92.78269	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	0.87	
Maximum	15.1	
Mean	6.364167	
Standard Deviation	5.377356	
Variance	28.91595	
Coefficient of Variation	0.844943	
Skewness	0.601592	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.846417	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	9.151934	
Gamma Statistics		
k hat	1.369393	
k star (bias corrected)	1.0826	
Theta hat	4.647436	
Theta star	5.878593	
nu hat	32.86543	
nu star	25.98241	
5% Approximate Chi Square Value	15.36399	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	14.13035	
Anderson-Darling Test Statistic	0.553505	
Anderson-Darling 5% Critical Value	0.748443	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.184725	
Kolmogrov-Smirnov 5% Critical Value	0.250259	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	10.76259	
95% Adjusted Gamma UCL	11.70221	
Lognormal Statistics		
Minimum of log data	-0.139262	
Maximum of log data	2.714695	
Mean of log data	1.443076	
Standard Deviation of log data	0.996556	
Variance of log data	0.993123	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.913513	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	6.956228	
MLE Standard Deviation	9.068883	
MLE Coefficient of Variation	1.303707	
MLE Skewness	6.12697	
MLE Median	4.233698	
MLE 80% Quantile	9.827311	
MLE 90% Quantile	15.23583	
MLE 95% Quantile	21.8109	
MLE 99% Quantile	42.99415	
MVU Estimate of Median	4.061544	
MVU Estimate of Mean	6.576413	
MVU Estimate of Standard Deviation	7.200294	
MVU Estimate of SE of Mean	2.022608	
95% H-UCL	16.67047	
95% Chebyshev (MVUE) UCL	15.39276	
97.5% Chebyshev (MVUE) UCL	19.2076	
99% Chebyshev (MVUE) UCL	26.70111	
Non-parametric Statisitics		
95% CLT UCL	8.917488	
95% Adjusted-CLT UCL	9.205539	
95% Modified-t UCL	9.196865	
95% Jackknife UCL	9.151934	
95% Chebyshev (Mean, Sd) UCL	13.13052	
97.5% Chebyshev (Mean, Sd) UCL	16.05833	
99% Chebyshev (Mean, Sd) UCL	21.80944	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.752762	
95% Bootstrap-t UCL	9.562513	
95% Hall's Bootstrap UCL	8.604947	
95% Percentile Bootstrap UCL	8.886667	
95% BCA Bootstrap UCL	10.08083	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	10.76259	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	17.7	
Maximum	2120	
Mean	494.2583	
Standard Deviation	668.1464	
Variance	446419.6	
Coefficient of Variation	1.351816	
Skewness	1.543211	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.757484	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	840.6436	
Gamma Statistics		
k hat	0.544004	
k star (bias corrected)	0.463558	
Theta hat	908.5571	
Theta star	1066.227	
nu hat	13.05609	
nu star	11.1254	
5% Approximate Chi Square Value	4.655838	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	4.036322	
Anderson-Darling Test Statistic	0.654152	
Anderson-Darling 5% Critical Value	0.781536	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.255829	
Kolmogrov-Smirnov 5% Critical Value	0.257999	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1181.059	
95% Adjusted Gamma UCL	1362.335	
Lognormal Statistics		
Minimum of log data	2.873565	
Maximum of log data	7.659171	
Mean of log data	5.050476	
Standard Deviation of log data	1.737977	
Variance of log data	3.020565	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898384	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	706.8079	
MLE Standard Deviation	3121.41	
MLE Coefficient of Variation	4.416207	
MLE Skewness	99.37737	
MLE Median	156.0968	
MLE 80% Quantile	677.9457	
MLE 90% Quantile	1456.479	
MLE 95% Quantile	2722.89	
MLE 99% Quantile	8892.928	
MVU Estimate of Median	137.4655	
MVU Estimate of Mean	552.9487	
MVU Estimate of Standard Deviation	1225.035	
MVU Estimate of SE of Mean	303.574	
95% H-UCL	7076.195	
95% Chebyshev (MVUE) UCL	1876.197	
97.5% Chebyshev (MVUE) UCL	2448.768	
99% Chebyshev (MVUE) UCL	3573.472	
Non-parametric Statisitics		
95% CLT UCL	811.5132	
95% Adjusted-CLT UCL	903.3244	
95% Modified-t UCL	854.9643	
95% Jackknife UCL	840.6436	
95% Chebyshev (Mean, Sd) UCL	1334.991	
97.5% Chebyshev (Mean, Sd) UCL	1698.776	
99% Chebyshev (Mean, Sd) UCL	2413.363	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	796.0098	
95% Bootstrap-t UCL	1064.92	
95% Hall's Bootstrap UCL	869.3436	
95% Percentile Bootstrap UCL	813.2667	
95% BCA Bootstrap UCL	1027.483	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1181.059	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	23.8	
Maximum	2080	
Mean	400.55	
Standard Deviation	578.2659	
Variance	334391.5	
Coefficient of Variation	1.44368	
Skewness	2.530369	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.650545	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	700.3388	
Gamma Statistics		
k hat	0.692792	
k star (bias corrected)	0.57515	
Theta hat	578.1677	
Theta star	696.4275	
nu hat	16.62701	
nu star	13.80359	
5% Approximate Chi Square Value	6.435976	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	5.68547	
Anderson-Darling Test Statistic	0.770081	
Anderson-Darling 5% Critical Value	0.770026	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.26472	
Kolmogrov-Smirnov 5% Critical Value	0.255696	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	859.0816	
95% Adjusted Gamma UCL	972.4839	
Lognormal Statistics		
Minimum of log data	3.169686	
Maximum of log data	7.640123	
Mean of log data	5.119244	
Standard Deviation of log data	1.428544	
Variance of log data	2.040739	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.893425	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	463.8742	
MLE Standard Deviation	1200.376	
MLE Coefficient of Variation	2.58772	
MLE Skewness	25.09129	
MLE Median	167.2089	
MLE 80% Quantile	559.1199	
MLE 90% Quantile	1048.298	
MLE 95% Quantile	1753.202	
MLE 99% Quantile	4637.998	
MVU Estimate of Median	153.492	
MVU Estimate of Mean	402.0387	
MVU Estimate of Standard Deviation	685.0292	
MVU Estimate of SE of Mean	181.3461	
95% H-UCL	2330.504	
95% Chebyshev (MVUE) UCL	1192.508	
97.5% Chebyshev (MVUE) UCL	1534.545	
99% Chebyshev (MVUE) UCL	2206.41	
Non-parametric Statisitics		
95% CLT UCL	675.127	
95% Adjusted-CLT UCL	805.4169	
95% Modified-t UCL	720.6614	
95% Jackknife UCL	700.3388	
95% Chebyshev (Mean, Sd) UCL	1128.185	
97.5% Chebyshev (Mean, Sd) UCL	1443.034	
99% Chebyshev (Mean, Sd) UCL	2061.492	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	672.1956	
95% Bootstrap-t UCL	1015.09	
95% Hall's Bootstrap UCL	1686.745	
95% Percentile Bootstrap UCL	682.1	
95% BCA Bootstrap UCL	869.9	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	1192.508	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	771	
Maximum	2540	
Mean	1492.75	
Standard Deviation	590.1444	
Variance	348270.4	
Coefficient of Variation	0.39534	
Skewness	0.643432	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.897886	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1798.697	
Gamma Statistics		
k hat	7.323057	
k star (bias corrected)	5.547848	
Theta hat	203.8425	
Theta star	269.0683	
nu hat	175.7534	
nu star	133.1484	
5% Approximate Chi Square Value	107.4857	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	103.9702	
Anderson-Darling Test Statistic	0.478544	
Anderson-Darling 5% Critical Value	0.731205	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.224505	
Kolmogrov-Smirnov 5% Critical Value	0.245674	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1849.15	
95% Adjusted Gamma UCL	1911.674	
Lognormal Statistics		
Minimum of log data	6.647688	
Maximum of log data	7.839919	
Mean of log data	7.238547	
Standard Deviation of log data	0.388479	
Variance of log data	0.150916	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.934379	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1501.177	
MLE Standard Deviation	605.8865	
MLE Coefficient of Variation	0.403608	
MLE Skewness	1.27657	
MLE Median	1392.07	
MLE 80% Quantile	1932.968	
MLE 90% Quantile	2293.29	
MLE 95% Quantile	2637.522	
MLE 99% Quantile	3436.296	
MVU Estimate of Median	1383.339	
MVU Estimate of Mean	1491.225	
MVU Estimate of Standard Deviation	588.4577	
MVU Estimate of SE of Mean	169.7295	
95% H-UCL	1900.527	
95% Chebyshev (MVUE) UCL	2231.059	
97.5% Chebyshev (MVUE) UCL	2551.185	
99% Chebyshev (MVUE) UCL	3180.012	
Non-parametric Statisitics		
95% CLT UCL	1772.967	
95% Adjusted-CLT UCL	1806.778	
95% Modified-t UCL	1803.971	
95% Jackknife UCL	1798.697	
95% Chebyshev (Mean, Sd) UCL	2235.332	
97.5% Chebyshev (Mean, Sd) UCL	2556.648	
99% Chebyshev (Mean, Sd) UCL	3187.811	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1761.772	
95% Bootstrap-t UCL	1851.517	
95% Hall's Bootstrap UCL	1775.744	
95% Percentile Bootstrap UCL	1760.917	
95% BCA Bootstrap UCL	1707.5	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1798.697	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	51.9	
Maximum	776	
Mean	294.1083	
Standard Deviation	280.7197	
Variance	78803.58	
Coefficient of Variation	0.954477	
Skewness	0.921073	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.785102	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	439.6411	
Gamma Statistics		
k hat	1.243671	
k star (bias corrected)	0.988309	
Theta hat	236.4841	
Theta star	297.5875	
nu hat	29.8481	
nu star	23.71941	
5% Approximate Chi Square Value	13.63377	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	12.47993	
Anderson-Darling Test Statistic	0.706696	
Anderson-Darling 5% Critical Value	0.751267	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.243647	
Kolmogrov-Smirnov 5% Critical Value	0.250971	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	511.6762	
95% Adjusted Gamma UCL	558.9833	
Lognormal Statistics		
Minimum of log data	3.949319	
Maximum of log data	6.654153	
Mean of log data	5.230822	
Standard Deviation of log data	1.010358	
Variance of log data	1.020823	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.896107	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	311.4485	
MLE Standard Deviation	414.9959	
MLE Coefficient of Variation	1.33247	
MLE Skewness	6.363183	
MLE Median	186.9465	
MLE 80% Quantile	439.0331	
MLE 90% Quantile	684.8037	
MLE 95% Quantile	985.2161	
MLE 99% Quantile	1960.421	
MVU Estimate of Median	179.1365	
MVU Estimate of Mean	293.8671	
MVU Estimate of Standard Deviation	326.973	
MVU Estimate of SE of Mean	91.72953	
95% H-UCL	761.2434	
95% Chebyshev (MVUE) UCL	693.7069	
97.5% Chebyshev (MVUE) UCL	866.7178	
99% Chebyshev (MVUE) UCL	1206.564	
Non-parametric Statisitics		
95% CLT UCL	427.402	
95% Adjusted-CLT UCL	450.4253	
95% Modified-t UCL	443.2323	
95% Jackknife UCL	439.6411	
95% Chebyshev (Mean, Sd) UCL	647.3396	
97.5% Chebyshev (Mean, Sd) UCL	800.1831	
99% Chebyshev (Mean, Sd) UCL	1100.414	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	424.5138	
95% Bootstrap-t UCL	487.8549	
95% Hall's Bootstrap UCL	405.4762	
95% Percentile Bootstrap UCL	427.1083	
95% BCA Bootstrap UCL	497.75	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	511.6762	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - wh.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	11	
Number of Missing Data	0	
Number of Valid Observations	11	
Number of Distinct Observations	11	
Minimum	0.01	
Maximum	27.5	
Mean	2.989545	
Standard Deviation	8.133633	
Variance	66.15598	
Coefficient of Variation	2.720692	
Skewness	3.309985	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.376682	
Shapiro-Wilk 5% Critical Value	0.85	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	7.434393	
Gamma Statistics		
k hat	0.390239	
k star (bias corrected)	0.344416	
Theta hat	7.66081	
Theta star	8.68004	
nu hat	8.585254	
nu star	7.577154	
5% Approximate Chi Square Value	2.492021	
Adjusted Level of Significance	0.02783	
Adjusted Chi Square Value	2.043056	
Anderson-Darling Test Statistic	1.874022	
Anderson-Darling 5% Critical Value	0.802504	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.421713	
Kolmogrov-Smirnov 5% Critical Value	0.272797	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	9.089912	
95% Adjusted Gamma UCL	11.08743	
Lognormal Statistics		
Minimum of log data	-4.60517	
Maximum of log data	3.314186	
Mean of log data	-0.597856	
Standard Deviation of log data	1.809983	
Variance of log data	3.276038	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.807069	
Shapiro-Wilk 5% Critical Value	0.85	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	2.829677	
MLE Standard Deviation	14.28096	
MLE Coefficient of Variation	5.04685	
MLE Skewness	143.6873	
MLE Median	0.549989	
MLE 80% Quantile	2.538515	
MLE 90% Quantile	5.629224	
MLE 95% Quantile	10.80021	
MLE 99% Quantile	37.04613	
MVU Estimate of Median	0.472995	
MVU Estimate of Mean	2.10711	
MVU Estimate of Standard Deviation	4.77409	
MVU Estimate of SE of Mean	1.228732	
95% H-UCL	42.75803	
95% Chebyshev (MVUE) UCL	7.463027	
97.5% Chebyshev (MVUE) UCL	9.780537	
99% Chebyshev (MVUE) UCL	14.33284	
Non-parametric Statisitics		
95% CLT UCL	7.023356	
95% Adjusted-CLT UCL	9.638516	
95% Modified-t UCL	7.842306	
95% Jackknife UCL	7.434393	
95% Chebyshev (Mean, Sd) UCL	13.67923	
97.5% Chebyshev (Mean, Sd) UCL	18.30467	
99% Chebyshev (Mean, Sd) UCL	27.39044	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	6.778895	
95% Bootstrap-t UCL	99.45698	
95% Hall's Bootstrap UCL	54.56786	
95% Percentile Bootstrap UCL	7.882727	
95% BCA Bootstrap UCL	10.38	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	27.39044	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	11.8	
Maximum	44	
Mean	24.19167	
Standard Deviation	13.06859	
Variance	170.7881	
Coefficient of Variation	0.540211	
Skewness	0.692528	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.802925	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	30.96678	
Gamma Statistics		
k hat	4.026538	
k star (bias corrected)	3.075459	
Theta hat	6.008057	
Theta star	7.866035	
nu hat	96.6369	
nu star	73.81101	
5% Approximate Chi Square Value	55.02234	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	52.55309	
Anderson-Darling Test Statistic	0.911836	
Anderson-Darling 5% Critical Value	0.735709	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.259357	
Kolmogrov-Smirnov 5% Critical Value	0.246388	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	32.45248	
95% Adjusted Gamma UCL	33.97728	
Lognormal Statistics		
Minimum of log data	2.4681	
Maximum of log data	3.78419	
Mean of log data	3.056723	
Standard Deviation of log data	0.52427	
Variance of log data	0.274859	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.841753	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	24.38949	
MLE Standard Deviation	13.71776	
MLE Coefficient of Variation	0.562445	
MLE Skewness	1.865263	
MLE Median	21.25778	
MLE 80% Quantile	33.10654	
MLE 90% Quantile	41.69618	
MLE 95% Quantile	50.35746	
MLE 99% Quantile	71.96461	
MVU Estimate of Median	21.0155	
MVU Estimate of Mean	24.08299	
MVU Estimate of Standard Deviation	12.98603	
MVU Estimate of SE of Mean	3.738742	
95% H-UCL	34.37593	
95% Chebyshev (MVUE) UCL	40.37979	
97.5% Chebyshev (MVUE) UCL	47.43142	
99% Chebyshev (MVUE) UCL	61.283	
Non-parametric Statisitics		
95% CLT UCL	30.397	
95% Adjusted-CLT UCL	31.20288	
95% Modified-t UCL	31.09248	
95% Jackknife UCL	30.96678	
95% Chebyshev (Mean, Sd) UCL	40.63595	
97.5% Chebyshev (Mean, Sd) UCL	47.75141	
99% Chebyshev (Mean, Sd) UCL	61.72834	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	30.13889	
95% Bootstrap-t UCL	31.95516	
95% Hall's Bootstrap UCL	29.50024	
95% Percentile Bootstrap UCL	30.21667	
95% BCA Bootstrap UCL	32.90833	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	40.63595	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	0.135	
Maximum	1.5	
Mean	0.564792	
Standard Deviation	0.397132	
Variance	0.157714	
Coefficient of Variation	0.703149	
Skewness	1.418399	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.862915	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.770676	
Gamma Statistics		
k hat	2.552085	
k star (bias corrected)	1.96962	
Theta hat	0.221306	
Theta star	0.286752	
nu hat	61.25005	
nu star	47.27087	
5% Approximate Chi Square Value	32.48974	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	30.62845	
Anderson-Darling Test Statistic	0.256062	
Anderson-Darling 5% Critical Value	0.740134	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.174473	
Kolmogrov-Smirnov 5% Critical Value	0.247921	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.821742	
95% Adjusted Gamma UCL	0.871679	
Lognormal Statistics		
Minimum of log data	-2.002481	
Maximum of log data	0.405465	
Mean of log data	-0.779827	
Standard Deviation of log data	0.677627	
Variance of log data	0.459178	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.98492	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.576812	
MLE Standard Deviation	0.440336	
MLE Coefficient of Variation	0.763395	
MLE Skewness	2.735072	
MLE Median	0.458485	
MLE 80% Quantile	0.812831	
MLE 90% Quantile	1.095185	
MLE 95% Quantile	1.397757	
MLE 99% Quantile	2.217394	
MVU Estimate of Median	0.449784	
MVU Estimate of Mean	0.564025	
MVU Estimate of Standard Deviation	0.400189	
MVU Estimate of SE of Mean	0.114723	
95% H-UCL	0.938196	
95% Chebyshev (MVUE) UCL	1.06409	
97.5% Chebyshev (MVUE) UCL	1.280469	
99% Chebyshev (MVUE) UCL	1.705502	
Non-parametric Statisitics		
95% CLT UCL	0.753361	
95% Adjusted-CLT UCL	0.803519	
95% Modified-t UCL	0.778499	
95% Jackknife UCL	0.770676	
95% Chebyshev (Mean, Sd) UCL	1.064506	
97.5% Chebyshev (Mean, Sd) UCL	1.280732	
99% Chebyshev (Mean, Sd) UCL	1.705468	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.744068	
95% Bootstrap-t UCL	0.892049	
95% Hall's Bootstrap UCL	1.108749	
95% Percentile Bootstrap UCL	0.75125	
95% BCA Bootstrap UCL	0.851667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.770676	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	32.3	
Maximum	163	
Mean	78.2125	
Standard Deviation	37.64676	
Variance	1417.278	
Coefficient of Variation	0.481339	
Skewness	1.150689	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.891643	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	97.7296	
Gamma Statistics		
k hat	5.295454	
k star (bias corrected)	4.027146	
Theta hat	14.76974	
Theta star	19.42132	
nu hat	127.0909	
nu star	96.65151	
5% Approximate Chi Square Value	74.97047	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	72.06134	
Anderson-Darling Test Statistic	0.370979	
Anderson-Darling 5% Critical Value	0.73189	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.236379	
Kolmogrov-Smirnov 5% Critical Value	0.245898	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	100.8311	
95% Adjusted Gamma UCL	104.9017	
Lognormal Statistics		
Minimum of log data	3.475067	
Maximum of log data	5.09375	
Mean of log data	4.262048	
Standard Deviation of log data	0.455845	
Variance of log data	0.207795	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.968345	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	78.72376	
MLE Standard Deviation	37.83335	
MLE Coefficient of Variation	0.480584	
MLE Skewness	1.552747	
MLE Median	70.95512	
MLE 80% Quantile	104.2964	
MLE 90% Quantile	127.4608	
MLE 95% Quantile	150.1918	
MLE 99% Quantile	204.8634	
MVU Estimate of Median	70.34303	
MVU Estimate of Mean	77.99156	
MVU Estimate of Standard Deviation	36.32203	
MVU Estimate of SE of Mean	10.46885	
95% H-UCL	104.8949	
95% Chebyshev (MVUE) UCL	123.6242	
97.5% Chebyshev (MVUE) UCL	143.3695	
99% Chebyshev (MVUE) UCL	182.1553	
Non-parametric Statisitics		
95% CLT UCL	96.08825	
95% Adjusted-CLT UCL	99.94556	
95% Modified-t UCL	98.33127	
95% Jackknife UCL	97.7296	
95% Chebyshev (Mean, Sd) UCL	125.5836	
97.5% Chebyshev (Mean, Sd) UCL	146.0812	
99% Chebyshev (Mean, Sd) UCL	186.3446	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	95.81152	
95% Bootstrap-t UCL	105.972	
95% Hall's Bootstrap UCL	104.2933	
95% Percentile Bootstrap UCL	96.74583	
95% BCA Bootstrap UCL	104.825	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	97.7296	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	62.5	
Maximum	3230	
Mean	1116.208	
Standard Deviation	1198.512	
Variance	1436432	
Coefficient of Variation	1.073735	
Skewness	0.754764	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.808378	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1737.55	
Gamma Statistics		
k hat	0.757926	
k star (bias corrected)	0.624	
Theta hat	1472.714	
Theta star	1788.796	
nu hat	18.19022	
nu star	14.976	
5% Approximate Chi Square Value	7.243667	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	6.439545	
Anderson-Darling Test Statistic	0.701616	
Anderson-Darling 5% Critical Value	0.765319	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.206277	
Kolmogrov-Smirnov 5% Critical Value	0.254732	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2307.717	
95% Adjusted Gamma UCL	2595.888	
Lognormal Statistics		
Minimum of log data	4.135167	
Maximum of log data	8.080237	
Mean of log data	6.228983	
Standard Deviation of log data	1.4396	
Variance of log data	2.072449	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.889148	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1429.683	
MLE Standard Deviation	3767.493	
MLE Coefficient of Variation	2.635195	
MLE Skewness	26.20506	
MLE Median	507.2395	
MLE 80% Quantile	1712.048	
MLE 90% Quantile	3225.585	
MLE 95% Quantile	5416.07	
MLE 99% Quantile	14436.19	
MVU Estimate of Median	465.0052	
MVU Estimate of Mean	1235.371	
MVU Estimate of Standard Deviation	2126.085	
MVU Estimate of SE of Mean	561.692	
95% H-UCL	7345.251	
95% Chebyshev (MVUE) UCL	3683.73	
97.5% Chebyshev (MVUE) UCL	4743.137	
99% Chebyshev (MVUE) UCL	6824.136	
Non-parametric Statisitics		
95% CLT UCL	1685.296	
95% Adjusted-CLT UCL	1765.844	
95% Modified-t UCL	1750.114	
95% Jackknife UCL	1737.55	
95% Chebyshev (Mean, Sd) UCL	2624.303	
97.5% Chebyshev (Mean, Sd) UCL	3276.857	
99% Chebyshev (Mean, Sd) UCL	4558.673	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1676.154	
95% Bootstrap-t UCL	1847.382	
95% Hall's Bootstrap UCL	1620.576	
95% Percentile Bootstrap UCL	1683.917	
95% BCA Bootstrap UCL	1976.375	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2307.717	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wh.xls	
Variable	Chromium VI	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	0.02301	
Maximum	2.756	
Mean	0.642536	
Standard Deviation	0.86859	
Variance	0.754449	
Coefficient of Variation	1.351816	
Skewness	1.543211	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.757484	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.092837	
Gamma Statistics		
k hat	0.544004	
k star (bias corrected)	0.463558	
Theta hat	1.181124	
Theta star	1.386095	
nu hat	13.05609	
nu star	11.1254	
5% Approximate Chi Square Value	4.655838	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	4.036322	
Anderson-Darling Test Statistic	0.654152	
Anderson-Darling 5% Critical Value	0.781536	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.255829	
Kolmogrov-Smirnov 5% Critical Value	0.257999	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.535377	
95% Adjusted Gamma UCL	1.771035	
Lognormal Statistics		
Minimum of log data	-3.771826	
Maximum of log data	1.01378	
Mean of log data	-1.594915	
Standard Deviation of log data	1.737977	
Variance of log data	3.020565	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898384	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.91885	
MLE Standard Deviation	4.057833	
MLE Coefficient of Variation	4.416207	
MLE Skewness	99.37737	
MLE Median	0.202926	
MLE 80% Quantile	0.881329	
MLE 90% Quantile	1.893423	
MLE 95% Quantile	3.539757	
MLE 99% Quantile	11.56081	
MVU Estimate of Median	0.178705	
MVU Estimate of Mean	0.718833	
MVU Estimate of Standard Deviation	1.592546	
MVU Estimate of SE of Mean	0.394646	
95% H-UCL	9.199054	
95% Chebyshev (MVUE) UCL	2.439056	
97.5% Chebyshev (MVUE) UCL	3.183398	
99% Chebyshev (MVUE) UCL	4.645514	
Non-parametric Statisitics		
95% CLT UCL	1.054967	
95% Adjusted-CLT UCL	1.174322	
95% Modified-t UCL	1.111454	
95% Jackknife UCL	1.092837	
95% Chebyshev (Mean, Sd) UCL	1.735488	
97.5% Chebyshev (Mean, Sd) UCL	2.208409	
99% Chebyshev (Mean, Sd) UCL	3.137371	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.042093	
95% Bootstrap-t UCL	1.303345	
95% Hall's Bootstrap UCL	1.128796	
95% Percentile Bootstrap UCL	1.058617	
95% BCA Bootstrap UCL	1.30319	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.535377	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable	Trichloroethene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.042	
Maximum	0.053	
Mean	0.0475	
Standard Deviation	0.007778	
Variance	6.05E-05	
Coefficient of Variation	0.163751	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.170086	
Maximum of log data	-2.937463	
Mean of log data	-3.053775	
Standard Deviation of log data	0.164489	
Variance of log data	0.027057	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	1.7E+269	
MLE Coefficient of Variation	1.7E+269	
MLE Skewness	0	
MLE Median	1.7E+269	
MLE 80% Quantile	1.7E-306	
MLE 90% Quantile	-5E+138	
MLE 95% Quantile	2.6E-308	
MLE 99% Quantile	2.6E-308	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.0475	
MVU Estimate of Standard Deviation	0.007778	
MVU Estimate of SE of Mean	0.0055	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.13	
Maximum	0.56	
Mean	0.28375	
Standard Deviation	0.190148	
Variance	0.036156	
Coefficient of Variation	0.670125	
Skewness	1.629241	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.846647	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.507494	
Gamma Statistics		
k hat	3.506159	
k star (bias corrected)	1.043206	
Theta hat	0.080929	
Theta star	0.271998	
nu hat	28.04927	
nu star	8.345652	
5% Approximate Chi Square Value	2.936069	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.337314	
Anderson-Darling 5% Critical Value	0.659142	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.284773	
Kolmogrov-Smirnov 5% Critical Value	0.396358	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.806547	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.040221	
Maximum of log data	-0.579818	
Mean of log data	-1.408994	
Standard Deviation of log data	0.612689	
Variance of log data	0.375388	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956041	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.294847	
MLE Standard Deviation	0.199006	
MLE Coefficient of Variation	0.674949	
MLE Skewness	2.332323	
MLE Median	0.244389	
MLE 80% Quantile	0.410134	
MLE 90% Quantile	0.537037	
MLE 95% Quantile	0.66957	
MLE 99% Quantile	1.016252	
MVU Estimate of Median	0.233082	
MVU Estimate of Mean	0.280274	
MVU Estimate of Standard Deviation	0.167129	
MVU Estimate of SE of Mean	0.083481	
95% H-UCL	2.177996	
95% Chebyshev (MVUE) UCL	0.644158	
97.5% Chebyshev (MVUE) UCL	0.801611	
99% Chebyshev (MVUE) UCL	1.110896	
Non-parametric Statisitics		
95% CLT UCL	0.440133	
95% Adjusted-CLT UCL	0.522888	
95% Modified-t UCL	0.520402	
95% Jackknife UCL	0.507494	
95% Chebyshev (Mean, Sd) UCL	0.698168	
97.5% Chebyshev (Mean, Sd) UCL	0.877487	
99% Chebyshev (Mean, Sd) UCL	1.229724	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.507494	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.16	
Maximum	1	
Mean	0.41625	
Standard Deviation	0.393136	
Variance	0.154556	
Coefficient of Variation	0.944472	
Skewness	1.882089	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.75458	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.878846	
Gamma Statistics		
k hat	1.955077	
k star (bias corrected)	0.655436	
Theta hat	0.212907	
Theta star	0.635074	
nu hat	15.64061	
nu star	5.243487	
5% Approximate Chi Square Value	1.265893	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.492481	
Anderson-Darling 5% Critical Value	0.660714	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.332712	
Kolmogrov-Smirnov 5% Critical Value	0.398043	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.72416	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	0	
Mean of log data	-1.153502	
Standard Deviation of log data	0.808705	
Variance of log data	0.654003	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.883159	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.437578	
MLE Standard Deviation	0.420445	
MLE Coefficient of Variation	0.960846	
MLE Skewness	3.769614	
MLE Median	0.31553	
MLE 80% Quantile	0.624911	
MLE 90% Quantile	0.891975	
MLE 95% Quantile	1.193413	
MLE 99% Quantile	2.069992	
MVU Estimate of Median	0.29036	
MVU Estimate of Mean	0.398811	
MVU Estimate of Standard Deviation	0.308033	
MVU Estimate of SE of Mean	0.153584	
95% H-UCL	13.35146	
95% Chebyshev (MVUE) UCL	1.068269	
97.5% Chebyshev (MVUE) UCL	1.357944	
99% Chebyshev (MVUE) UCL	1.926955	
Non-parametric Statisitics		
95% CLT UCL	0.739576	
95% Adjusted-CLT UCL	0.937229	
95% Modified-t UCL	0.909676	
95% Jackknife UCL	0.878846	
95% Chebyshev (Mean, Sd) UCL	1.273071	
97.5% Chebyshev (Mean, Sd) UCL	1.643818	
99% Chebyshev (Mean, Sd) UCL	2.372079	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.878846	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.29	
Maximum	1.5	
Mean	0.78375	
Standard Deviation	0.553585	
Variance	0.306456	
Coefficient of Variation	0.706328	
Skewness	0.779359	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.91974	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.435143	
Gamma Statistics		
k hat	2.603915	
k star (bias corrected)	0.817645	
Theta hat	0.300989	
Theta star	0.958545	
nu hat	20.83132	
nu star	6.541163	
5% Approximate Chi Square Value	1.921832	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.290703	
Anderson-Darling 5% Critical Value	0.659862	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.266255	
Kolmogrov-Smirnov 5% Critical Value	0.397091	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	2.667578	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.237874	
Maximum of log data	0.405465	
Mean of log data	-0.447804	
Standard Deviation of log data	0.751462	
Variance of log data	0.564695	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.948412	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.847507	
MLE Standard Deviation	0.73831	
MLE Coefficient of Variation	0.871155	
MLE Skewness	3.274595	
MLE Median	0.63903	
MLE 80% Quantile	1.205846	
MLE 90% Quantile	1.678373	
MLE 95% Quantile	2.199766	
MLE 99% Quantile	3.669651	
MVU Estimate of Median	0.594868	
MVU Estimate of Mean	0.783213	
MVU Estimate of Standard Deviation	0.565463	
MVU Estimate of SE of Mean	0.282124	
95% H-UCL	16.40561	
95% Chebyshev (MVUE) UCL	2.012964	
97.5% Chebyshev (MVUE) UCL	2.545078	
99% Chebyshev (MVUE) UCL	3.590313	
Non-parametric Statisitics		
95% CLT UCL	1.239033	
95% Adjusted-CLT UCL	1.354283	
95% Modified-t UCL	1.45312	
95% Jackknife UCL	1.435143	
95% Chebyshev (Mean, Sd) UCL	1.99026	
97.5% Chebyshev (Mean, Sd) UCL	2.512318	
99% Chebyshev (Mean, Sd) UCL	3.5378	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.435143	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.2	
Maximum	0.91	
Mean	0.5575	
Standard Deviation	0.317949	
Variance	0.101092	
Coefficient of Variation	0.570312	
Skewness	-0.031244	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.967124	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.931625	
Gamma Statistics		
k hat	3.429029	
k star (bias corrected)	1.023924	
Theta hat	0.162582	
Theta star	0.544474	
nu hat	27.43223	
nu star	8.191392	
5% Approximate Chi Square Value	2.845649	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.260747	
Anderson-Darling 5% Critical Value	0.659183	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.24919	
Kolmogrov-Smirnov 5% Critical Value	0.396388	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.604801	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.609438	
Maximum of log data	-0.094311	
Mean of log data	-0.737136	
Standard Deviation of log data	0.676563	
Variance of log data	0.457737	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.946008	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.601537	
MLE Standard Deviation	0.458312	
MLE Coefficient of Variation	0.761901	
MLE Skewness	2.727983	
MLE Median	0.478482	
MLE 80% Quantile	0.84752	
MLE 90% Quantile	1.141391	
MLE 95% Quantile	1.45617	
MLE 99% Quantile	2.308387	
MVU Estimate of Median	0.451571	
MVU Estimate of Mean	0.564949	
MVU Estimate of Standard Deviation	0.369896	
MVU Estimate of SE of Mean	0.184679	
95% H-UCL	6.754754	
95% Chebyshev (MVUE) UCL	1.369945	
97.5% Chebyshev (MVUE) UCL	1.718267	
99% Chebyshev (MVUE) UCL	2.402479	
Non-parametric Statisitics		
95% CLT UCL	0.81899	
95% Adjusted-CLT UCL	0.816336	
95% Modified-t UCL	0.931211	
95% Jackknife UCL	0.931625	
95% Chebyshev (Mean, Sd) UCL	1.250454	
97.5% Chebyshev (Mean, Sd) UCL	1.550296	
99% Chebyshev (Mean, Sd) UCL	2.139277	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.931625	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.046	
Maximum	0.32	
Mean	0.188667	
Standard Deviation	0.137351	
Variance	0.018865	
Coefficient of Variation	0.72801	
Skewness	-0.368783	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.079114	
Maximum of log data	-1.139434	
Mean of log data	-1.942662	
Standard Deviation of log data	1.011864	
Variance of log data	1.023868	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.239135	
MLE Standard Deviation	0.319399	
MLE Coefficient of Variation	1.335643	
MLE Skewness	6.389639	
MLE Median	0.143322	
MLE 80% Quantile	0.337012	
MLE 90% Quantile	0.526019	
MLE 95% Quantile	0.757186	
MLE 99% Quantile	1.508224	
MVU Estimate of Median	0.119889	
MVU Estimate of Mean	0.196571	
MVU Estimate of Standard Deviation	0.17766	
MVU Estimate of SE of Mean	0.10231	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.14	
Maximum	0.74	
Mean	0.315	
Standard Deviation	0.284429	
Variance	0.0809	
Coefficient of Variation	0.90295	
Skewness	1.953471	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.711928	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.649683	
Gamma Statistics		
k hat	2.212603	
k star (bias corrected)	0.719817	
Theta hat	0.142366	
Theta star	0.437611	
nu hat	17.70082	
nu star	5.758539	
5% Approximate Chi Square Value	1.517266	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.644232	
Anderson-Darling 5% Critical Value	0.660308	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level.
Kolmogrov-Smirnov Test Statistic	0.403579	
Kolmogrov-Smirnov 5% Critical Value	0.397615	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.195532	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	-0.301105	
Mean of log data	-1.397864	
Standard Deviation of log data	0.746324	
Variance of log data	0.556999	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.807855	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.326487	
MLE Standard Deviation	0.281883	
MLE Coefficient of Variation	0.863381	
MLE Skewness	3.233731	
MLE Median	0.247124	
MLE 80% Quantile	0.464302	
MLE 90% Quantile	0.644786	
MLE 95% Quantile	0.843529	
MLE 99% Quantile	1.402261	
MVU Estimate of Median	0.230274	
MVU Estimate of Mean	0.302075	
MVU Estimate of Standard Deviation	0.216712	
MVU Estimate of SE of Mean	0.108129	
95% H-UCL	6.077107	
95% Chebyshev (MVUE) UCL	0.7734	
97.5% Chebyshev (MVUE) UCL	0.977342	
99% Chebyshev (MVUE) UCL	1.377948	
Non-parametric Statisitics		
95% CLT UCL	0.548922	
95% Adjusted-CLT UCL	0.697345	
95% Modified-t UCL	0.672834	
95% Jackknife UCL	0.649683	
95% Chebyshev (Mean, Sd) UCL	0.934899	
97.5% Chebyshev (Mean, Sd) UCL	1.20313	
99% Chebyshev (Mean, Sd) UCL	1.730018	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.195532	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable	Phenanthrene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.16	
Maximum	0.57	
Mean	0.31	
Standard Deviation	0.226053	
Variance	0.0511	
Coefficient of Variation	0.729204	
Skewness	1.671239	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	-0.562119	
Mean of log data	-1.334713	
Standard Deviation of log data	0.678325	
Variance of log data	0.460124	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.331327	
MLE Standard Deviation	0.253258	
MLE Coefficient of Variation	0.764376	
MLE Skewness	2.739731	
MLE Median	0.263234	
MLE 80% Quantile	0.466952	
MLE 90% Quantile	0.629351	
MLE 95% Quantile	0.803427	
MLE 99% Quantile	1.275158	
MVU Estimate of Median	0.243431	
MVU Estimate of Mean	0.305182	
MVU Estimate of Standard Deviation	0.196088	
MVU Estimate of SE of Mean	0.113145	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Aroclor 1260	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.011	
Maximum	0.058	
Mean	0.028167	
Standard Deviation	0.025934	
Variance	0.000673	
Coefficient of Variation	0.920741	
Skewness	1.673568	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	*Shapiro Wilk method yields a more accurate result*
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-4.50986	
Maximum of log data	-2.847312	
Mean of log data	-3.841363	
Standard Deviation of log data	0.877784	
Variance of log data	0.770505	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.031552	
MLE Standard Deviation	0.033995	
MLE Coefficient of Variation	1.077431	
MLE Skewness	4.483034	
MLE Median	0.021464	
MLE 80% Quantile	0.045066	
MLE 90% Quantile	0.06631	
MLE 95% Quantile	0.090953	
MLE 99% Quantile	0.165359	
MVU Estimate of Median	0.018795	
MVU Estimate of Mean	0.027341	
MVU Estimate of Standard Deviation	0.021989	
MVU Estimate of SE of Mean	0.012676	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	30	
Number of Missing Data	0	
Number of Valid Observations	30	
Number of Distinct Observations	30	
Minimum	0.5	
Maximum	68	
Mean	9.991667	
Standard Deviation	12.87038	
Variance	165.6467	
Coefficient of Variation	1.288112	
Skewness	3.367425	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.649397	
Shapiro-Wilk 5% Critical Value	0.927	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	13.98427	
Gamma Statistics		
k hat	0.887665	
k star (bias corrected)	0.821121	
Theta hat	11.25612	
Theta star	12.16833	
nu hat	53.25991	
nu star	49.26725	
5% Approximate Chi Square Value	34.15029	
Adjusted Level of Significance	0.041	
Adjusted Chi Square Value	33.4239	
Anderson-Darling Test Statistic	0.50413	
Anderson-Darling 5% Critical Value	0.781011	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.104051	
Kolmogrov-Smirnov 5% Critical Value	0.165464	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	14.41458	
95% Adjusted Gamma UCL	14.72784	
Lognormal Statistics		
Minimum of log data	-0.693147	
Maximum of log data	4.219508	
Mean of log data	1.642024	
Standard Deviation of log data	1.271383	
Variance of log data	1.616415	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.944662	
Shapiro-Wilk 5% Critical Value	0.927	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	11.59103	
MLE Standard Deviation	23.28328	
MLE Coefficient of Variation	2.008733	
MLE Skewness	14.13145	
MLE Median	5.165615	
MLE 80% Quantile	15.12491	
MLE 90% Quantile	26.4631	
MLE 95% Quantile	41.82312	
MLE 99% Quantile	99.41084	
MVU Estimate of Median	5.028192	
MVU Estimate of Mean	11.07565	
MVU Estimate of Standard Deviation	18.91263	
MVU Estimate of SE of Mean	3.116748	
95% H-UCL	22.36553	
95% Chebyshev (MVUE) UCL	24.66124	
97.5% Chebyshev (MVUE) UCL	30.53973	
99% Chebyshev (MVUE) UCL	42.0869	
Non-parametric Statisitics		
95% CLT UCL	13.85674	
95% Adjusted-CLT UCL	15.40039	
95% Modified-t UCL	14.22505	
95% Jackknife UCL	13.98427	
95% Chebyshev (Mean, Sd) UCL	20.23421	
97.5% Chebyshev (Mean, Sd) UCL	24.66616	
99% Chebyshev (Mean, Sd) UCL	33.37188	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	13.80834	
95% Bootstrap-t UCL	17.01148	
95% Hall's Bootstrap UCL	31.12862	
95% Percentile Bootstrap UCL	14.11333	
95% BCA Bootstrap UCL	16.99167	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	14.41458	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	30	
Minimum	6.6	
Maximum	4250	
Mean	643.0016	
Standard Deviation	1102.33	
Variance	1215132	
Coefficient of Variation	1.714351	
Skewness	2.373377	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.618068	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	973.401	
Gamma Statistics		
k hat	0.427702	
k star (bias corrected)	0.408438	
Theta hat	1503.388	
Theta star	1574.294	
nu hat	27.37291	
nu star	26.14003	
5% Approximate Chi Square Value	15.4854	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	15.0457	
Anderson-Darling Test Statistic	1.175493	
Anderson-Darling 5% Critical Value	0.826463	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.181023	
Kolmogrov-Smirnov 5% Critical Value	0.165931	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1085.415	
95% Adjusted Gamma UCL	1117.135	
Lognormal Statistics		
Minimum of log data	1.88707	
Maximum of log data	8.354674	
Mean of log data	4.944045	
Standard Deviation of log data	1.955027	
Variance of log data	3.82213	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.932737	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	948.7161	
MLE Standard Deviation	6343.033	
MLE Coefficient of Variation	6.685913	
MLE Skewness	318.9277	
MLE Median	140.3367	
MLE 80% Quantile	732.1917	
MLE 90% Quantile	1730.653	
MLE 95% Quantile	3498.41	
MLE 99% Quantile	13245.82	
MVU Estimate of Median	132.1867	
MVU Estimate of Mean	815.5704	
MVU Estimate of Standard Deviation	3183.843	
MVU Estimate of SE of Mean	381.4983	
95% H-UCL	3514.979	
95% Chebyshev (MVUE) UCL	2478.483	
97.5% Chebyshev (MVUE) UCL	3198.027	
99% Chebyshev (MVUE) UCL	4611.431	
Non-parametric Statisitics		
95% CLT UCL	963.5282	
95% Adjusted-CLT UCL	1050.887	
95% Modified-t UCL	987.0273	
95% Jackknife UCL	973.401	
95% Chebyshev (Mean, Sd) UCL	1492.404	
97.5% Chebyshev (Mean, Sd) UCL	1859.941	
99% Chebyshev (Mean, Sd) UCL	2581.897	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	963.7996	
95% Bootstrap-t UCL	1137.682	
95% Hall's Bootstrap UCL	1030.174	
95% Percentile Bootstrap UCL	981.9516	
95% BCA Bootstrap UCL	1160.413	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	2478.483	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	14.1	
Maximum	205	
Mean	92.72031	
Standard Deviation	47.83401	
Variance	2288.092	
Coefficient of Variation	0.515896	
Skewness	0.626861	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.950053	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	107.0575	
Gamma Statistics		
k hat	3.37364	
k star (bias corrected)	3.078195	
Theta hat	27.48376	
Theta star	30.12165	
nu hat	215.913	
nu star	197.0045	
5% Approximate Chi Square Value	165.5243	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	163.982	
Anderson-Darling Test Statistic	0.344308	
Anderson-Darling 5% Critical Value	0.752122	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.097756	
Kolmogrov-Smirnov 5% Critical Value	0.156407	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	110.3543	
95% Adjusted Gamma UCL	111.3922	
Lognormal Statistics		
Minimum of log data	2.646175	
Maximum of log data	5.32301	
Mean of log data	4.37412	
Standard Deviation of log data	0.61926	
Variance of log data	0.383483	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.926837	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	96.14535	
MLE Standard Deviation	65.73041	
MLE Coefficient of Variation	0.683657	
MLE Skewness	2.370502	
MLE Median	79.36994	
MLE 80% Quantile	133.9403	
MLE 90% Quantile	175.8917	
MLE 95% Quantile	219.8185	
MLE 99% Quantile	335.1299	
MVU Estimate of Median	78.8957	
MVU Estimate of Mean	95.4725	
MVU Estimate of Standard Deviation	63.59473	
MVU Estimate of SE of Mean	11.15073	
95% H-UCL	120.4137	
95% Chebyshev (MVUE) UCL	144.0774	
97.5% Chebyshev (MVUE) UCL	165.1088	
99% Chebyshev (MVUE) UCL	206.4208	
Non-parametric Statisitics		
95% CLT UCL	106.6291	
95% Adjusted-CLT UCL	107.6303	
95% Modified-t UCL	107.2137	
95% Jackknife UCL	107.0575	
95% Chebyshev (Mean, Sd) UCL	129.5789	
97.5% Chebyshev (Mean, Sd) UCL	145.5276	
99% Chebyshev (Mean, Sd) UCL	176.8558	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	106.4577	
95% Bootstrap-t UCL	108.6022	
95% Hall's Bootstrap UCL	107.6139	
95% Percentile Bootstrap UCL	106.5234	
95% BCA Bootstrap UCL	103.3063	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	107.0575	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	0.46	
Maximum	15.2	
Mean	7.312188	
Standard Deviation	4.111383	
Variance	16.90347	
Coefficient of Variation	0.562264	
Skewness	0.07539	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.959126	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	8.544485	
Gamma Statistics		
k hat	2.06668	
k star (bias corrected)	1.893762	
Theta hat	3.538132	
Theta star	3.861196	
nu hat	132.2675	
nu star	121.2008	
5% Approximate Chi Square Value	96.77321	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	95.60551	
Anderson-Darling Test Statistic	0.812072	
Anderson-Darling 5% Critical Value	0.758568	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.108147	
Kolmogrov-Smirnov 5% Critical Value	0.157481	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	9.157935	
95% Adjusted Gamma UCL	9.269788	
Lognormal Statistics		
Minimum of log data	-0.776529	
Maximum of log data	2.721295	
Mean of log data	1.728513	
Standard Deviation of log data	0.893006	
Variance of log data	0.79746	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.829144	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	8.391698	
MLE Standard Deviation	9.268537	
MLE Coefficient of Variation	1.104489	
MLE Skewness	4.660827	
MLE Median	5.632272	
MLE 80% Quantile	11.97838	
MLE 90% Quantile	17.74362	
MLE 95% Quantile	24.47147	
MLE 99% Quantile	44.95425	
MVU Estimate of Median	5.562501	
MVU Estimate of Mean	8.251453	
MVU Estimate of Standard Deviation	8.569704	
MVU Estimate of SE of Mean	1.468261	
95% H-UCL	12.12976	
95% Chebyshev (MVUE) UCL	14.65145	
97.5% Chebyshev (MVUE) UCL	17.42074	
99% Chebyshev (MVUE) UCL	22.86046	
Non-parametric Statisitics		
95% CLT UCL	8.507662	
95% Adjusted-CLT UCL	8.518012	
95% Modified-t UCL	8.546099	
95% Jackknife UCL	8.544485	
95% Chebyshev (Mean, Sd) UCL	10.48022	
97.5% Chebyshev (Mean, Sd) UCL	11.85103	
99% Chebyshev (Mean, Sd) UCL	14.54372	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.490059	
95% Bootstrap-t UCL	8.674152	
95% Hall's Bootstrap UCL	8.565861	
95% Percentile Bootstrap UCL	8.534688	
95% BCA Bootstrap UCL	8.871563	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	8.544485	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	14.3	
Maximum	5500	
Mean	1045.963	
Standard Deviation	1163.041	
Variance	1352664	
Coefficient of Variation	1.111933	
Skewness	1.998719	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.794464	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1394.559	
Gamma Statistics		
k hat	0.763508	
k star (bias corrected)	0.712762	
Theta hat	1369.944	
Theta star	1467.478	
nu hat	48.86449	
nu star	45.61678	
5% Approximate Chi Square Value	31.11936	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	30.47756	
Anderson-Darling Test Statistic	0.281979	
Anderson-Darling 5% Critical Value	0.787088	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.093058	
Kolmogrov-Smirnov 5% Critical Value	0.161512	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1533.24	
95% Adjusted Gamma UCL	1565.527	
Lognormal Statistics		
Minimum of log data	2.66026	
Maximum of log data	8.612503	
Mean of log data	6.170523	
Standard Deviation of log data	1.530108	
Variance of log data	2.341232	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.933211	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1542.468	
MLE Standard Deviation	4727.614	
MLE Coefficient of Variation	3.064968	
MLE Skewness	37.9873	
MLE Median	478.4363	
MLE 80% Quantile	1743.177	
MLE 90% Quantile	3417.663	
MLE 95% Quantile	5928.647	
MLE 99% Quantile	16807.07	
MVU Estimate of Median	461.2318	
MVU Estimate of Mean	1434.552	
MVU Estimate of Standard Deviation	3389.175	
MVU Estimate of SE of Mean	495.8219	
95% H-UCL	3625.004	
95% Chebyshev (MVUE) UCL	3595.789	
97.5% Chebyshev (MVUE) UCL	4530.959	
99% Chebyshev (MVUE) UCL	6367.917	
Non-parametric Statisitics		
95% CLT UCL	1384.142	
95% Adjusted-CLT UCL	1461.763	
95% Modified-t UCL	1406.666	
95% Jackknife UCL	1394.559	
95% Chebyshev (Mean, Sd) UCL	1942.146	
97.5% Chebyshev (Mean, Sd) UCL	2329.925	
99% Chebyshev (Mean, Sd) UCL	3091.642	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1376.864	
95% Bootstrap-t UCL	1497.6	
95% Hall's Bootstrap UCL	1608.6	
95% Percentile Bootstrap UCL	1402.813	
95% BCA Bootstrap UCL	1553.125	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1533.24	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	31	
Minimum	18.8	
Maximum	2080	
Mean	629.7125	
Standard Deviation	465.206	
Variance	216416.6	
Coefficient of Variation	0.738759	
Skewness	1.055874	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92269	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	769.1478	
Gamma Statistics		
k hat	1.339539	
k star (bias corrected)	1.23479	
Theta hat	470.0965	
Theta star	509.9752	
nu hat	85.73049	
nu star	79.02659	
5% Approximate Chi Square Value	59.5417	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	58.63611	
Anderson-Darling Test Statistic	0.68406	
Anderson-Darling 5% Critical Value	0.768015	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.169185	
Kolmogrov-Smirnov 5% Critical Value	0.158877	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	835.7846	
95% Adjusted Gamma UCL	848.6926	
Lognormal Statistics		
Minimum of log data	2.933857	
Maximum of log data	7.640123	
Mean of log data	6.027681	
Standard Deviation of log data	1.15761	
Variance of log data	1.340062	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.854271	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	810.5494	
MLE Standard Deviation	1360.97	
MLE Coefficient of Variation	1.679071	
MLE Skewness	9.770982	
MLE Median	414.7523	
MLE 80% Quantile	1103.081	
MLE 90% Quantile	1835.754	
MLE 95% Quantile	2784.853	
MLE 99% Quantile	6125.913	
MVU Estimate of Median	406.1529	
MVU Estimate of Mean	784.1488	
MVU Estimate of Standard Deviation	1168.063	
MVU Estimate of SE of Mean	191.1947	
95% H-UCL	1394.217	
95% Chebyshev (MVUE) UCL	1617.547	
97.5% Chebyshev (MVUE) UCL	1978.16	
99% Chebyshev (MVUE) UCL	2686.512	
Non-parametric Statisitics		
95% CLT UCL	764.9813	
95% Adjusted-CLT UCL	781.3829	
95% Modified-t UCL	771.7061	
95% Jackknife UCL	769.1478	
95% Chebyshev (Mean, Sd) UCL	988.1778	
97.5% Chebyshev (Mean, Sd) UCL	1143.286	
99% Chebyshev (Mean, Sd) UCL	1447.966	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	761.7799	
95% Bootstrap-t UCL	789.5811	
95% Hall's Bootstrap UCL	803.862	
95% Percentile Bootstrap UCL	772.3844	
95% BCA Bootstrap UCL	821.0031	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	835.7846	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	23.9	
Maximum	1240	
Mean	468.4344	
Standard Deviation	254.2232	
Variance	64629.44	
Coefficient of Variation	0.542708	
Skewness	0.578618	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.958143	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	544.6322	
Gamma Statistics		
k hat	2.438091	
k star (bias corrected)	2.230353	
Theta hat	192.1316	
Theta star	210.027	
nu hat	156.0378	
nu star	142.7426	
5% Approximate Chi Square Value	116.128	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	114.8441	
Anderson-Darling Test Statistic	1.014276	
Anderson-Darling 5% Critical Value	0.756326	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.185787	
Kolmogrov-Smirnov 5% Critical Value	0.157111	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	575.7919	
95% Adjusted Gamma UCL	582.2286	
Lognormal Statistics		
Minimum of log data	3.173878	
Maximum of log data	7.122867	
Mean of log data	5.930518	
Standard Deviation of log data	0.804933	
Variance of log data	0.647917	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.847397	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	520.337	
MLE Standard Deviation	496.794	
MLE Coefficient of Variation	0.954754	
MLE Skewness	3.734575	
MLE Median	376.3494	
MLE 80% Quantile	742.993	
MLE 90% Quantile	1058.764	
MLE 95% Quantile	1414.644	
MLE 99% Quantile	2447.427	
MVU Estimate of Median	372.5574	
MVU Estimate of Mean	513.5963	
MVU Estimate of Standard Deviation	467.4651	
MVU Estimate of SE of Mean	80.87662	
95% H-UCL	715.4475	
95% Chebyshev (MVUE) UCL	866.1293	
97.5% Chebyshev (MVUE) UCL	1018.671	
99% Chebyshev (MVUE) UCL	1318.309	
Non-parametric Statisitics		
95% CLT UCL	542.3553	
95% Adjusted-CLT UCL	547.2671	
95% Modified-t UCL	545.3984	
95% Jackknife UCL	544.6322	
95% Chebyshev (Mean, Sd) UCL	664.3265	
97.5% Chebyshev (Mean, Sd) UCL	749.0892	
99% Chebyshev (Mean, Sd) UCL	915.5891	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	541.48	
95% Bootstrap-t UCL	550.0631	
95% Hall's Bootstrap UCL	563.6579	
95% Percentile Bootstrap UCL	541.7969	
95% BCA Bootstrap UCL	528.2938	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	544.6322	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&HVOU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	31	
Minimum	89.5	
Maximum	2020	
Mean	828.1531	
Standard Deviation	580.8321	
Variance	337366	
Coefficient of Variation	0.701358	
Skewness	0.486343	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922525	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1002.245	
Gamma Statistics		
k hat	1.651563	
k star (bias corrected)	1.517562	
Theta hat	501.4361	
Theta star	545.7129	
nu hat	105.7	
nu star	97.12397	
5% Approximate Chi Square Value	75.38696	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	74.362	
Anderson-Darling Test Statistic	0.60229	
Anderson-Darling 5% Critical Value	0.762786	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.13741	
Kolmogrov-Smirnov 5% Critical Value	0.158079	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1066.942	
95% Adjusted Gamma UCL	1081.648	
Lognormal Statistics		
Minimum of log data	4.494239	
Maximum of log data	7.610853	
Mean of log data	6.386876	
Standard Deviation of log data	0.924609	
Variance of log data	0.854902	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.91281	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	910.8035	
MLE Standard Deviation	1058.707	
MLE Coefficient of Variation	1.162388	
MLE Skewness	5.057717	
MLE Median	593.998	
MLE 80% Quantile	1297.469	
MLE 90% Quantile	1948.858	
MLE 95% Quantile	2718.562	
MLE 99% Quantile	5102.66	
MVU Estimate of Median	586.1131	
MVU Estimate of Mean	894.2009	
MVU Estimate of Standard Deviation	971.9725	
MVU Estimate of SE of Mean	165.8458	
95% H-UCL	1341.558	
95% Chebyshev (MVUE) UCL	1617.106	
97.5% Chebyshev (MVUE) UCL	1929.907	
99% Chebyshev (MVUE) UCL	2544.345	
Non-parametric Statisitics		
95% CLT UCL	997.0427	
95% Adjusted-CLT UCL	1006.475	
95% Modified-t UCL	1003.716	
95% Jackknife UCL	1002.245	
95% Chebyshev (Mean, Sd) UCL	1275.714	
97.5% Chebyshev (Mean, Sd) UCL	1469.374	
99% Chebyshev (Mean, Sd) UCL	1849.782	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	993.739	
95% Bootstrap-t UCL	1016.905	
95% Hall's Bootstrap UCL	1005.706	
95% Percentile Bootstrap UCL	997.4188	
95% BCA Bootstrap UCL	1059.263	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1066.942	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	30	
Minimum	0.045	
Maximum	27.5	
Mean	3.163281	
Standard Deviation	5.501886	
Variance	30.27075	
Coefficient of Variation	1.739297	
Skewness	3.268623	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.583947	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	4.812351	
Gamma Statistics		
k hat	0.583534	
k star (bias corrected)	0.549661	
Theta hat	5.420901	
Theta star	5.754965	
nu hat	37.34619	
nu star	35.17832	
5% Approximate Chi Square Value	22.60598	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	22.06561	
Anderson-Darling Test Statistic	0.784407	
Anderson-Darling 5% Critical Value	0.802821	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.160891	
Kolmogrov-Smirnov 5% Critical Value	0.163438	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	4.922544	
95% Adjusted Gamma UCL	5.043092	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	3.314186	
Mean of log data	0.088383	
Standard Deviation of log data	1.558251	
Variance of log data	2.428145	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.987065	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	3.678317	
MLE Standard Deviation	11.82671	
MLE Coefficient of Variation	3.21525	
MLE Skewness	42.88446	
MLE Median	1.092406	
MLE 80% Quantile	4.075954	
MLE 90% Quantile	8.09086	
MLE 95% Quantile	14.17819	
MLE 99% Quantile	40.97138	
MVU Estimate of Median	1.051691	
MVU Estimate of Mean	3.407421	
MVU Estimate of Standard Deviation	8.326438	
MVU Estimate of SE of Mean	1.204922	
95% H-UCL	8.879252	
95% Chebyshev (MVUE) UCL	8.659556	
97.5% Chebyshev (MVUE) UCL	10.93216	
99% Chebyshev (MVUE) UCL	15.39625	
Non-parametric Statisitics		
95% CLT UCL	4.763075	
95% Adjusted-CLT UCL	5.363566	
95% Modified-t UCL	4.906016	
95% Jackknife UCL	4.812351	
95% Chebyshev (Mean, Sd) UCL	7.402769	
97.5% Chebyshev (Mean, Sd) UCL	9.237199	
99% Chebyshev (Mean, Sd) UCL	12.84058	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.745439	
95% Bootstrap-t UCL	6.246242	
95% Hall's Bootstrap UCL	10.3954	
95% Percentile Bootstrap UCL	4.929688	
95% BCA Bootstrap UCL	5.9925	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	4.922544	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable	Nickel	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	30	
Minimum	0.4	
Maximum	79.2	
Mean	29.2625	
Standard Deviation	15.2405	
Variance	232.2729	
Coefficient of Variation	0.52082	
Skewness	0.632915	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.927749	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	33.83051	
Gamma Statistics		
k hat	2.154651	
k star (bias corrected)	1.973486	
Theta hat	13.58109	
Theta star	14.82782	
nu hat	137.8977	
nu star	126.3031	
5% Approximate Chi Square Value	101.3409	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	100.1449	
Anderson-Darling Test Statistic	1.943842	
Anderson-Darling 5% Critical Value	0.758037	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.221366	
Kolmogrov-Smirnov 5% Critical Value	0.157394	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	36.4704	
95% *Adjusted Gamma* UCL	36.90598	
Lognormal Statistics		
Minimum of log data	-0.916291	
Maximum of log data	4.371976	
Mean of log data	3.126654	
Standard Deviation of log data	0.965616	
Variance of log data	0.932414	
Lilliefors Test Statisitic	N/R	*Shapiro Wilk method yields a more accurate result*
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.714447	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	36.33789	
MLE Standard Deviation	45.10342	
MLE Coefficient of Variation	1.241223	
MLE Skewness	5.635937	
MLE Median	22.79758	
MLE 80% Quantile	51.55244	
MLE 90% Quantile	78.84394	
MLE 95% Quantile	111.6191	
MLE 99% Quantile	215.4387	
MVU Estimate of Median	22.4677	
MVU Estimate of Mean	35.59889	
MVU Estimate of Standard Deviation	41.00204	
MVU Estimate of SE of Mean	6.95528	
95% H-UCL	54.88654	
95% Chebyshev (MVUE) UCL	65.91625	
97.5% Chebyshev (MVUE) UCL	79.0346	
99% Chebyshev (MVUE) UCL	104.803	
Non-parametric Statisitics		
95% CLT UCL	33.69401	
95% Adjusted-CLT UCL	34.0161	
95% Modified-t UCL	33.88075	
95% Jackknife UCL	33.83051	
95% Chebyshev (Mean, Sd) UCL	41.0061	
97.5% Chebyshev (Mean, Sd) UCL	46.08756	
99% Chebyshev (Mean, Sd) UCL	56.06911	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	33.6512	
95% Bootstrap-t UCL	34.14197	
95% Hall's Bootstrap UCL	34.52513	
95% Percentile Bootstrap UCL	33.58281	
95% BCA Bootstrap UCL	32.61406	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	41.0061	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	*NONE*	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - nt-1.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	31	
Number of Missing Data	0	
Number of Valid Observations	31	
Number of Distinct Observations	29	
Minimum	0.115	
Maximum	18.1	
Mean	2.717742	
Standard Deviation	4.682787	
Variance	21.9285	
Coefficient of Variation	1.723043	
Skewness	2.093169	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.614623	
Shapiro-Wilk 5% Critical Value	0.929	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	4.145229	
Gamma Statistics		
k hat	0.486856	
k star (bias corrected)	0.461247	
Theta hat	5.582226	
Theta star	5.892167	
nu hat	30.18509	
nu star	28.59729	
5% Approximate Chi Square Value	17.39181	
Adjusted Level of Significance	0.0413	
Adjusted Chi Square Value	16.90532	
Anderson-Darling Test Statistic	2.95045	
Anderson-Darling 5% Critical Value	0.812697	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.33507	
Kolmogrov-Smirnov 5% Critical Value	0.16706	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	4.468774	
95% Adjusted Gamma UCL	4.597373	
Lognormal Statistics		
Minimum of log data	-2.162823	
Maximum of log data	2.895912	
Mean of log data	-0.310275	
Standard Deviation of log data	1.587814	
Variance of log data	2.521153	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858797	
Shapiro-Wilk 5% Critical Value	0.929	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	2.586489	
MLE Standard Deviation	8.74942	
MLE Coefficient of Variation	3.382741	
MLE Skewness	48.8567	
MLE Median	0.733245	
MLE 80% Quantile	2.805067	
MLE 90% Quantile	5.641024	
MLE 95% Quantile	9.990939	
MLE 99% Quantile	29.45842	
MVU Estimate of Median	0.70399	
MVU Estimate of Mean	2.379956	
MVU Estimate of Standard Deviation	5.984315	
MVU Estimate of SE of Mean	0.871946	
95% H-UCL	6.542384	
95% Chebyshev (MVUE) UCL	6.180682	
97.5% Chebyshev (MVUE) UCL	7.825259	
99% Chebyshev (MVUE) UCL	11.05571	
Non-parametric Statisitics		
95% CLT UCL	4.101152	
95% Adjusted-CLT UCL	4.439005	
95% Modified-t UCL	4.197927	
95% Jackknife UCL	4.145229	
95% Chebyshev (Mean, Sd) UCL	6.383809	
97.5% Chebyshev (Mean, Sd) UCL	7.970119	
99% Chebyshev (Mean, Sd) UCL	11.08612	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.094792	
95% Bootstrap-t UCL	4.899978	
95% Hall's Bootstrap UCL	4.475257	
95% Percentile Bootstrap UCL	4.143226	
95% BCA Bootstrap UCL	4.744355	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	11.08612	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	10.3	
Maximum	107	
Mean	60.65781	
Standard Deviation	28.54584	
Variance	814.8649	
Coefficient of Variation	0.470604	
Skewness	-0.163366	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.942233	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	69.2138	
Gamma Statistics		
k hat	3.489732	
k star (bias corrected)	3.183403	
Theta hat	17.38179	
Theta star	19.05439	
nu hat	223.3429	
nu star	203.7378	
5% Approximate Chi Square Value	171.7036	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	170.1319	
Anderson-Darling Test Statistic	0.934963	
Anderson-Darling 5% Critical Value	0.751869	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.181672	
Kolmogrov-Smirnov 5% Critical Value	0.156363	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	71.97456	
95% Adjusted Gamma UCL	72.63948	
Lognormal Statistics		
Minimum of log data	2.332144	
Maximum of log data	4.672829	
Mean of log data	3.955182	
Standard Deviation of log data	0.615763	
Variance of log data	0.379164	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.889013	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	63.10275	
MLE Standard Deviation	42.84777	
MLE Coefficient of Variation	0.679016	
MLE Skewness	2.350116	
MLE Median	52.20521	
MLE 80% Quantile	87.83868	
MLE 90% Quantile	115.1733	
MLE 95% Quantile	143.7553	
MLE 99% Quantile	218.6444	
MVU Estimate of Median	51.89678	
MVU Estimate of Mean	62.6668	
MVU Estimate of Standard Deviation	41.47301	
MVU Estimate of SE of Mean	7.273146	
95% H-UCL	78.9034	
95% Chebyshev (MVUE) UCL	94.36971	
97.5% Chebyshev (MVUE) UCL	108.0876	
99% Chebyshev (MVUE) UCL	135.0337	
Non-parametric Statisitics		
95% CLT UCL	68.95814	
95% Adjusted-CLT UCL	68.80242	
95% Modified-t UCL	69.18951	
95% Jackknife UCL	69.2138	
95% Chebyshev (Mean, Sd) UCL	82.65386	
97.5% Chebyshev (Mean, Sd) UCL	92.17156	
99% Chebyshev (Mean, Sd) UCL	110.8673	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	68.78722	
95% Bootstrap-t UCL	69.38127	
95% Hall's Bootstrap UCL	69.08591	
95% Percentile Bootstrap UCL	68.68438	
95% BCA Bootstrap UCL	66.91406	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	69.2138	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	80.1	
Maximum	3770	
Mean	1372.128	
Standard Deviation	942.4868	
Variance	888281.5	
Coefficient of Variation	0.68688	
Skewness	0.681586	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.940725	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1654.618	
Gamma Statistics		
k hat	1.67643	
k star (bias corrected)	1.540098	
Theta hat	818.482	
Theta star	890.9354	
nu hat	107.2915	
nu star	98.56629	
5% Approximate Chi Square Value	76.65926	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	75.62528	
Anderson-Darling Test Statistic	0.382076	
Anderson-Darling 5% Critical Value	0.762514	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.13102	
Kolmogrov-Smirnov 5% Critical Value	0.158041	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1764.243	
95% Adjusted Gamma UCL	1788.365	
Lognormal Statistics		
Minimum of log data	4.383276	
Maximum of log data	8.23483	
Mean of log data	6.897133	
Standard Deviation of log data	0.961138	
Variance of log data	0.923786	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.900055	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1570.307	
MLE Standard Deviation	1935.246	
MLE Coefficient of Variation	1.2324	
MLE Skewness	5.56898	
MLE Median	989.4343	
MLE 80% Quantile	2228.97	
MLE 90% Quantile	3402.262	
MLE 95% Quantile	4808.812	
MLE 99% Quantile	9253.346	
MVU Estimate of Median	975.249	
MVU Estimate of Mean	1538.746	
MVU Estimate of Standard Deviation	1761.231	
MVU Estimate of SE of Mean	298.9616	
95% H-UCL	2365.27	
95% Chebyshev (MVUE) UCL	2841.889	
97.5% Chebyshev (MVUE) UCL	3405.761	
99% Chebyshev (MVUE) UCL	4513.377	
Non-parametric Statisitics		
95% CLT UCL	1646.177	
95% Adjusted-CLT UCL	1667.627	
95% Modified-t UCL	1657.964	
95% Jackknife UCL	1654.618	
95% Chebyshev (Mean, Sd) UCL	2098.363	
97.5% Chebyshev (Mean, Sd) UCL	2412.605	
99% Chebyshev (Mean, Sd) UCL	3029.874	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1636.875	
95% Bootstrap-t UCL	1708.744	
95% Hall's Bootstrap UCL	1674.577	
95% Percentile Bootstrap UCL	1630.469	
95% BCA Bootstrap UCL	1731.566	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1654.618	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-1.xls	
Variable:	Chromium VI	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	0.01859	
Maximum	7.15	
Mean	1.359751	
Standard Deviation	1.511953	
Variance	2.286002	
Coefficient of Variation	1.111933	
Skewness	1.998719	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.794464	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.812926	
Gamma Statistics		
k hat	0.763508	
k star (bias corrected)	0.712762	
Theta hat	1.780927	
Theta star	1.907721	
nu hat	48.86449	
nu star	45.61678	
5% Approximate Chi Square Value	31.11936	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	30.47756	
Anderson-Darling Test Statistic	0.281979	
Anderson-Darling 5% Critical Value	0.787088	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.093058	
Kolmogrov-Smirnov 5% Critical Value	0.161512	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.993212	
95% Adjusted Gamma UCL	2.035185	
Lognormal Statistics		
Minimum of log data	-3.985131	
Maximum of log data	1.967112	
Mean of log data	-0.474868	
Standard Deviation of log data	1.530108	
Variance of log data	2.341232	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.933211	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.005208	
MLE Standard Deviation	6.145899	
MLE Coefficient of Variation	3.064968	
MLE Skewness	37.9873	
MLE Median	0.621967	
MLE 80% Quantile	2.26613	
MLE 90% Quantile	4.442962	
MLE 95% Quantile	7.707241	
MLE 99% Quantile	21.8492	
MVU Estimate of Median	0.599601	
MVU Estimate of Mean	1.864918	
MVU Estimate of Standard Deviation	4.405927	
MVU Estimate of SE of Mean	0.644568	
95% H-UCL	4.712505	
95% Chebyshev (MVUE) UCL	4.674526	
97.5% Chebyshev (MVUE) UCL	5.890246	
99% Chebyshev (MVUE) UCL	8.278293	
Non-parametric Statisitics		
95% CLT UCL	1.799384	
95% Adjusted-CLT UCL	1.900291	
95% Modified-t UCL	1.828666	
95% Jackknife UCL	1.812926	
95% Chebyshev (Mean, Sd) UCL	2.524789	
97.5% Chebyshev (Mean, Sd) UCL	3.028902	
99% Chebyshev (Mean, Sd) UCL	4.019134	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.788559	
95% Bootstrap-t UCL	1.996915	
95% *Hall's* Bootstrap UCL	2.111455	
95% Percentile Bootstrap UCL	1.832114	
95% BCA Bootstrap UCL	2.047971	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.993212	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Trichloroethene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.011	
Maximum	0.053	
Mean	0.035333	
Standard Deviation	0.021779	
Variance	0.000474	
Coefficient of Variation	0.616392	
Skewness	-1.248395	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-4.50986	
Maximum of log data	-2.937463	
Mean of log data	-3.539136	
Standard Deviation of log data	0.848679	
Variance of log data	0.720257	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.041627	
MLE Standard Deviation	0.042756	
MLE Coefficient of Variation	1.027113	
MLE Skewness	4.164901	
MLE Median	0.029038	
MLE 80% Quantile	0.059487	
MLE 90% Quantile	0.086416	
MLE 95% Quantile	0.117296	
MLE 99% Quantile	0.209065	
MVU Estimate of Median	0.025656	
MVU Estimate of Mean	0.03644	
MVU Estimate of Standard Deviation	0.028484	
MVU Estimate of SE of Mean	0.016423	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.13	
Maximum	0.56	
Mean	0.252	
Standard Deviation	0.181025	
Variance	0.03277	
Coefficient of Variation	0.718353	
Skewness	1.771725	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.767335	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.424587	
Gamma Statistics		
k hat	3.145699	
k star (bias corrected)	1.391613	
Theta hat	0.080109	
Theta star	0.181085	
nu hat	31.45699	
nu star	13.91613	
5% Approximate Chi Square Value	6.512834	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	4.478624	
Anderson-Darling Test Statistic	0.530653	
Anderson-Darling 5% Critical Value	0.682427	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.310103	
Kolmogrov-Smirnov 5% Critical Value	0.359279	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.538455	
95% Adjusted Gamma UCL	0.783023	
Lognormal Statistics		
Minimum of log data	-2.040221	
Maximum of log data	-0.579818	
Mean of log data	-1.545613	
Standard Deviation of log data	0.610818	
Variance of log data	0.373099	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.854188	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.256901	
MLE Standard Deviation	0.172761	
MLE Coefficient of Variation	0.672479	
MLE Skewness	2.32155	
MLE Median	0.213181	
MLE 80% Quantile	0.357195	
MLE 90% Quantile	0.467334	
MLE 95% Quantile	0.582272	
MLE 99% Quantile	0.882629	
MVU Estimate of Median	0.205326	
MVU Estimate of Mean	0.246619	
MVU Estimate of Standard Deviation	0.148784	
MVU Estimate of SE of Mean	0.06643	
95% H-UCL	0.709418	
95% Chebyshev (MVUE) UCL	0.536182	
97.5% Chebyshev (MVUE) UCL	0.661476	
99% Chebyshev (MVUE) UCL	0.907592	
Non-parametric Statisitics		
95% CLT UCL	0.385162	
95% Adjusted-CLT UCL	0.453702	
95% Modified-t UCL	0.435278	
95% Jackknife UCL	0.424587	
95% Chebyshev (Mean, Sd) UCL	0.604882	
97.5% Chebyshev (Mean, Sd) UCL	0.757575	
99% Chebyshev (Mean, Sd) UCL	1.05751	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.371491	
95% Bootstrap-t UCL	1.904523	
95% Hall's Bootstrap UCL	1.168349	
95% Percentile Bootstrap UCL	0.392	
95% BCA Bootstrap UCL	0.474	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.424587	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	3	
Minimum	0.16	
Maximum	1	
Mean	0.356	
Standard Deviation	0.365075	
Variance	0.13328	
Coefficient of Variation	1.025493	
Skewness	2.092235	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.657485	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.704059	
Gamma Statistics		
k hat	1.774359	
k star (bias corrected)	0.843077	
Theta hat	0.200636	
Theta star	0.422263	
nu hat	17.74359	
nu star	8.430768	
5% Approximate Chi Square Value	2.986222	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	1.760902	
Anderson-Darling Test Statistic	0.827539	
Anderson-Darling 5% Critical Value	0.685325	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.350155	
Kolmogrov-Smirnov 5% Critical Value	0.361012	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.005067	
95% Adjusted Gamma UCL	1.704441	
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	0	
Mean of log data	-1.340343	
Standard Deviation of log data	0.797184	
Variance of log data	0.635503	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.737939	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.359662	
MLE Standard Deviation	0.338917	
MLE Coefficient of Variation	0.942323	
MLE Skewness	3.663723	
MLE Median	0.261756	
MLE 80% Quantile	0.513388	
MLE 90% Quantile	0.729088	
MLE 95% Quantile	0.971441	
MLE 99% Quantile	1.671811	
MVU Estimate of Median	0.24547	
MVU Estimate of Mean	0.334178	
MVU Estimate of Standard Deviation	0.260869	
MVU Estimate of SE of Mean	0.116161	
95% H-UCL	1.807355	
95% Chebyshev (MVUE) UCL	0.840512	
97.5% Chebyshev (MVUE) UCL	1.059603	
99% Chebyshev (MVUE) UCL	1.489966	
Non-parametric Statisitics		
95% CLT UCL	0.62455	
95% Adjusted-CLT UCL	0.787781	
95% Modified-t UCL	0.72952	
95% Jackknife UCL	0.704059	
95% Chebyshev (Mean, Sd) UCL	1.067663	
97.5% Chebyshev (Mean, Sd) UCL	1.3756	
99% Chebyshev (Mean, Sd) UCL	1.980483	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.005067	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.29	
Maximum	1.5	
Mean	0.668	
Standard Deviation	0.504401	
Variance	0.25442	
Coefficient of Variation	0.755091	
Skewness	1.540321	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.814318	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.148891	
Gamma Statistics		
k hat	2.674557	
k star (bias corrected)	1.203156	
Theta hat	0.249761	
Theta star	0.555206	
nu hat	26.74557	
nu star	12.03156	
5% Approximate Chi Square Value	5.246815	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	3.472384	
Anderson-Darling Test Statistic	0.424172	
Anderson-Darling 5% Critical Value	0.683222	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.300522	
Kolmogrov-Smirnov 5% Critical Value	0.359762	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.531802	
95% Adjusted Gamma UCL	2.314572	
Lognormal Statistics		
Minimum of log data	-1.237874	
Maximum of log data	0.405465	
Mean of log data	-0.60191	
Standard Deviation of log data	0.677845	
Variance of log data	0.459473	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.903483	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.689234	
MLE Standard Deviation	0.526369	
MLE Coefficient of Variation	0.763701	
MLE Skewness	2.736525	
MLE Median	0.547764	
MLE 80% Quantile	0.971289	
MLE 90% Quantile	1.308812	
MLE 95% Quantile	1.670535	
MLE 99% Quantile	2.650521	
MVU Estimate of Median	0.522978	
MVU Estimate of Mean	0.654797	
MVU Estimate of Standard Deviation	0.43714	
MVU Estimate of SE of Mean	0.195028	
95% H-UCL	2.315853	
95% Chebyshev (MVUE) UCL	1.504904	
97.5% Chebyshev (MVUE) UCL	1.872746	
99% Chebyshev (MVUE) UCL	2.5953	
Non-parametric Statisitics		
95% CLT UCL	1.039038	
95% Adjusted-CLT UCL	1.205072	
95% Modified-t UCL	1.174789	
95% Jackknife UCL	1.148891	
95% Chebyshev (Mean, Sd) UCL	1.651258	
97.5% Chebyshev (Mean, Sd) UCL	2.076714	
99% Chebyshev (Mean, Sd) UCL	2.912441	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.003319	
95% Bootstrap-t UCL	3.431292	
95% Hall's Bootstrap UCL	3.551126	
95% Percentile Bootstrap UCL	1.016	
95% BCA Bootstrap UCL	1.258	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.148891	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.2	
Maximum	0.8	
Mean	0.492	
Standard Deviation	0.256262	
Variance	0.06567	
Coefficient of Variation	0.520857	
Skewness	0.303274	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906746	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.736317	
Gamma Statistics		
k hat	4.284109	
k star (bias corrected)	1.846977	
Theta hat	0.114843	
Theta star	0.266381	
nu hat	42.84109	
nu star	18.46977	
5% Approximate Chi Square Value	9.729815	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	7.125654	
Anderson-Darling Test Statistic	0.320271	
Anderson-Darling 5% Critical Value	0.681089	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.240857	
Kolmogrov-Smirnov 5% Critical Value	0.35841	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.933947	
95% Adjusted Gamma UCL	1.275269	
Lognormal Statistics		
Minimum of log data	-1.609438	
Maximum of log data	-0.223144	
Mean of log data	-0.830503	
Standard Deviation of log data	0.567467	
Variance of log data	0.322018	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.931522	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.511968	
MLE Standard Deviation	0.315561	
MLE Coefficient of Variation	0.616368	
MLE Skewness	2.08327	
MLE Median	0.43583	
MLE 80% Quantile	0.703988	
MLE 90% Quantile	0.903654	
MLE 95% Quantile	1.108468	
MLE 99% Quantile	1.631376	
MVU Estimate of Median	0.421945	
MVU Estimate of Mean	0.494431	
MVU Estimate of Standard Deviation	0.277585	
MVU Estimate of SE of Mean	0.123987	
95% H-UCL	1.259081	
95% Chebyshev (MVUE) UCL	1.034879	
97.5% Chebyshev (MVUE) UCL	1.268731	
99% Chebyshev (MVUE) UCL	1.728089	
Non-parametric Statisitics		
95% CLT UCL	0.680506	
95% Adjusted-CLT UCL	0.697115	
95% Modified-t UCL	0.738908	
95% Jackknife UCL	0.736317	
95% Chebyshev (Mean, Sd) UCL	0.991546	
97.5% Chebyshev (Mean, Sd) UCL	1.2077	
99% Chebyshev (Mean, Sd) UCL	1.632292	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.659369	
95% Bootstrap-t UCL	1.000527	
95% Hall's Bootstrap UCL	1.494753	
95% Percentile Bootstrap UCL	0.678	
95% BCA Bootstrap UCL	0.718	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.736317	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.046	
Maximum	0.365	
Mean	0.243667	
Standard Deviation	0.172657	
Variance	0.02981	
Coefficient of Variation	0.708577	
Skewness	-1.600627	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.079114	
Maximum of log data	-1.007858	
Mean of log data	-1.742135	
Standard Deviation of log data	1.159725	
Variance of log data	1.344962	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.343127	
MLE Standard Deviation	0.578048	
MLE Coefficient of Variation	1.684648	
MLE Skewness	9.835043	
MLE Median	0.175146	
MLE 80% Quantile	0.466654	
MLE 90% Quantile	0.777331	
MLE 95% Quantile	1.180115	
MLE 99% Quantile	2.59967	
MVU Estimate of Median	0.138031	
MVU Estimate of Mean	0.262919	
MVU Estimate of Standard Deviation	0.26421	
MVU Estimate of SE of Mean	0.151912	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.079	
Maximum	0.74	
Mean	0.27975	
Standard Deviation	0.308761	
Variance	0.095334	
Coefficient of Variation	1.103705	
Skewness	1.924171	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.732136	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.643064	
Gamma Statistics		
k hat	1.440403	
k star (bias corrected)	0.526767	
Theta hat	0.194216	
Theta star	0.531069	
nu hat	11.52323	
nu star	4.21414	
5% Approximate Chi Square Value	0.807765	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.524211	
Anderson-Darling 5% Critical Value	0.662875	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.376472	
Kolmogrov-Smirnov 5% Critical Value	0.399843	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.459465	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.538307	
Maximum of log data	-0.301105	
Mean of log data	-1.659527	
Standard Deviation of log data	0.955948	
Variance of log data	0.913836	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.887458	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.30041	
MLE Standard Deviation	0.367173	
MLE Coefficient of Variation	1.22224	
MLE Skewness	5.492588	
MLE Median	0.190229	
MLE 80% Quantile	0.426667	
MLE 90% Quantile	0.649772	
MLE 95% Quantile	0.916684	
MLE 99% Quantile	1.757703	
MVU Estimate of Median	0.169232	
MVU Estimate of Mean	0.262458	
MVU Estimate of Standard Deviation	0.235656	
MVU Estimate of SE of Mean	0.117228	
95% H-UCL	34.49066	
95% Chebyshev (MVUE) UCL	0.773441	
97.5% Chebyshev (MVUE) UCL	0.994544	
99% Chebyshev (MVUE) UCL	1.428858	
Non-parametric Statisitics		
95% CLT UCL	0.533684	
95% Adjusted-CLT UCL	0.692387	
95% Modified-t UCL	0.667818	
95% Jackknife UCL	0.643064	
95% Chebyshev (Mean, Sd) UCL	0.95268	
97.5% Chebyshev (Mean, Sd) UCL	1.243857	
99% Chebyshev (Mean, Sd) UCL	1.815818	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.459465	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Phenanthrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.16	
Maximum	0.57	
Mean	0.33375	
Standard Deviation	0.17867	
Variance	0.031923	
Coefficient of Variation	0.53534	
Skewness	0.835401	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956847	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.543988	
Gamma Statistics		
k hat	4.703433	
k star (bias corrected)	1.342525	
Theta hat	0.070959	
Theta star	0.248599	
nu hat	37.62746	
nu star	10.7402	
5% Approximate Chi Square Value	4.408618	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.209772	
Anderson-Darling 5% Critical Value	0.658986	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.198353	
Kolmogrov-Smirnov 5% Critical Value	0.39597	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.813076	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	-0.562119	
Mean of log data	-1.207419	
Standard Deviation of log data	0.5463	
Variance of log data	0.298444	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.993989	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.347081	
MLE Standard Deviation	0.204678	
MLE Coefficient of Variation	0.589712	
MLE Skewness	1.974214	
MLE Median	0.298968	
MLE 80% Quantile	0.474357	
MLE 90% Quantile	0.60325	
MLE 95% Quantile	0.734361	
MLE 99% Quantile	1.06532	
MVU Estimate of Median	0.287939	
MVU Estimate of Mean	0.333569	
MVU Estimate of Standard Deviation	0.178315	
MVU Estimate of SE of Mean	0.089099	
95% H-UCL	1.733034	
95% Chebyshev (MVUE) UCL	0.721944	
97.5% Chebyshev (MVUE) UCL	0.889994	
99% Chebyshev (MVUE) UCL	1.220096	
Non-parametric Statisitics		
95% CLT UCL	0.480693	
95% Adjusted-CLT UCL	0.520565	
95% Modified-t UCL	0.550207	
95% Jackknife UCL	0.543988	
95% Chebyshev (Mean, Sd) UCL	0.723152	
97.5% Chebyshev (Mean, Sd) UCL	0.891646	
99% Chebyshev (Mean, Sd) UCL	1.222621	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.543988	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Aroclor 1260	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.011	
Maximum	0.058	
Mean	0.035167	
Standard Deviation	0.023528	
Variance	0.000554	
Coefficient of Variation	0.669053	
Skewness	-0.254193	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-4.50986	
Maximum of log data	-2.847312	
Mean of log data	-3.555872	
Standard Deviation of log data	0.858017	
Variance of log data	0.736193	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.041264	
MLE Standard Deviation	0.04304	
MLE Coefficient of Variation	1.043058	
MLE Skewness	4.263992	
MLE Median	0.028556	
MLE 80% Quantile	0.058963	
MLE 90% Quantile	0.086008	
MLE 95% Quantile	0.117134	
MLE 99% Quantile	0.21011	
MVU Estimate of Median	0.025159	
MVU Estimate of Mean	0.036006	
MVU Estimate of Standard Deviation	0.028407	
MVU Estimate of SE of Mean	0.016378	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	0.475	
Maximum	68	
Mean	9.303409	
Standard Deviation	14.71499	
Variance	216.531	
Coefficient of Variation	1.581677	
Skewness	3.334089	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.585975	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	14.7018	
Gamma Statistics		
k hat	0.733173	
k star (bias corrected)	0.663497	
Theta hat	12.68925	
Theta star	14.02177	
nu hat	32.25959	
nu star	29.19389	
5% Approximate Chi Square Value	17.85833	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	17.19672	
Anderson-Darling Test Statistic	0.496439	
Anderson-Darling 5% Critical Value	0.784402	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.134329	
Kolmogrov-Smirnov 5% Critical Value	0.192895	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	15.20874	
95% Adjusted Gamma UCL	15.79387	
Lognormal Statistics		
Minimum of log data	-0.74444	
Maximum of log data	4.219508	
Mean of log data	1.411354	
Standard Deviation of log data	1.338475	
Variance of log data	1.791517	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973929	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	10.04538	
MLE Standard Deviation	22.45887	
MLE Coefficient of Variation	2.235742	
MLE Skewness	17.88268	
MLE Median	4.101505	
MLE 80% Quantile	12.7097	
MLE 90% Quantile	22.90362	
MLE 95% Quantile	37.08254	
MLE 99% Quantile	92.26344	
MVU Estimate of Median	3.937576	
MVU Estimate of Mean	9.367068	
MVU Estimate of Standard Deviation	16.53954	
MVU Estimate of SE of Mean	3.174436	
95% H-UCL	24.38771	
95% Chebyshev (MVUE) UCL	23.20412	
97.5% Chebyshev (MVUE) UCL	29.19142	
99% Chebyshev (MVUE) UCL	40.95231	
Non-parametric Statisitics		
95% CLT UCL	14.46372	
95% Adjusted-CLT UCL	16.84656	
95% Modified-t UCL	15.07348	
95% Jackknife UCL	14.7018	
95% Chebyshev (Mean, Sd) UCL	22.97835	
97.5% Chebyshev (Mean, Sd) UCL	28.89551	
99% Chebyshev (Mean, Sd) UCL	40.51862	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	14.4178	
95% Bootstrap-t UCL	22.34881	
95% Hall's Bootstrap UCL	33.76487	
95% Percentile Bootstrap UCL	14.87045	
95% BCA Bootstrap UCL	18.90341	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	15.20874	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - nt-2.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	23	
Minimum	6.6	
Maximum	3230	
Mean	310.938	
Standard Deviation	728.8697	
Variance	531251	
Coefficient of Variation	2.3441	
Skewness	3.253579	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.46562	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	560.34	
Gamma Statistics		
k hat	0.414386	
k star (bias corrected)	0.391326	
Theta hat	750.3586	
Theta star	794.5749	
nu hat	20.71929	
nu star	19.56631	
5% Approximate Chi Square Value	10.53059	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	10.07911	
Anderson-Darling Test Statistic	2.455074	
Anderson-Darling 5% Critical Value	0.82611	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.258787	
Kolmogrov-Smirnov 5% Critical Value	0.186623	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	577.7366	
95% Adjusted Gamma UCL	603.6159	
Lognormal Statistics		
Minimum of log data	1.88707	
Maximum of log data	8.080237	
Mean of log data	4.160606	
Standard Deviation of log data	1.636549	
Variance of log data	2.678291	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.916902	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	244.6312	
MLE Standard Deviation	900.8343	
MLE Coefficient of Variation	3.682417	
MLE Skewness	60.98155	
MLE Median	64.11038	
MLE 80% Quantile	255.5683	
MLE 90% Quantile	525.0908	
MLE 95% Quantile	946.46	
MLE 99% Quantile	2884.822	
MVU Estimate of Median	60.75987	
MVU Estimate of Mean	219.0568	
MVU Estimate of Standard Deviation	553.6832	
MVU Estimate of SE of Mean	89.98788	
95% H-UCL	768.6737	
95% Chebyshev (MVUE) UCL	611.3048	
97.5% Chebyshev (MVUE) UCL	781.0309	
99% Chebyshev (MVUE) UCL	1114.425	
Non-parametric Statisitics		
95% CLT UCL	550.7148	
95% Adjusted-CLT UCL	652.0713	
95% Modified-t UCL	576.1496	
95% Jackknife UCL	560.34	
95% Chebyshev (Mean, Sd) UCL	946.3519	
97.5% Chebyshev (Mean, Sd) UCL	1221.296	
99% Chebyshev (Mean, Sd) UCL	1761.37	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	541.3806	
95% Bootstrap-t UCL	828.0047	
95% Hall's Bootstrap UCL	580.3265	
95% Percentile Bootstrap UCL	566.26	
95% BCA Bootstrap UCL	725.272	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1761.37	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	25	
Minimum	14.1	
Maximum	177	
Mean	72.716	
Standard Deviation	41.04746	
Variance	1684.894	
Coefficient of Variation	0.56449	
Skewness	0.696729	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.953499	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	86.76147	
Gamma Statistics		
k hat	2.890397	
k star (bias corrected)	2.570216	
Theta hat	25.15779	
Theta star	28.29178	
nu hat	144.5199	
nu star	128.5108	
5% Approximate Chi Square Value	103.3207	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	101.7816	
Anderson-Darling Test Statistic	0.289748	
Anderson-Darling 5% Critical Value	0.751832	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.124733	
Kolmogrov-Smirnov 5% Critical Value	0.175964	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	90.44452	
95% Adjusted Gamma UCL	91.81217	
Lognormal Statistics		
Minimum of log data	2.646175	
Maximum of log data	5.17615	
Mean of log data	4.103713	
Standard Deviation of log data	0.664823	
Variance of log data	0.44199	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.945754	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	75.54347	
MLE Standard Deviation	56.31915	
MLE Coefficient of Variation	0.74552	
MLE Skewness	2.650919	
MLE Median	60.56477	
MLE 80% Quantile	106.2175	
MLE 90% Quantile	142.3105	
MLE 95% Quantile	180.792	
MLE 99% Quantile	284.3176	
MVU Estimate of Median	60.03157	
MVU Estimate of Mean	74.75165	
MVU Estimate of Standard Deviation	53.64751	
MVU Estimate of SE of Mean	10.62521	
95% H-UCL	100.7117	
95% Chebyshev (MVUE) UCL	121.0659	
97.5% Chebyshev (MVUE) UCL	141.1061	
99% Chebyshev (MVUE) UCL	180.4711	
Non-parametric Statisitics		
95% CLT UCL	86.21941	
95% Adjusted-CLT UCL	87.44175	
95% Modified-t UCL	86.95213	
95% Jackknife UCL	86.76147	
95% Chebyshev (Mean, Sd) UCL	108.5003	
97.5% Chebyshev (Mean, Sd) UCL	123.9843	
99% Chebyshev (Mean, Sd) UCL	154.3994	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	85.65602	
95% Bootstrap-t UCL	88.29066	
95% Hall's Bootstrap UCL	89.19434	
95% Percentile Bootstrap UCL	86.816	
95% BCA Bootstrap UCL	83.124	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	86.76147	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	24	
Minimum	0.46	
Maximum	12.3	
Mean	5.1376	
Standard Deviation	3.307349	
Variance	10.93856	
Coefficient of Variation	0.643754	
Skewness	0.553937	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.951935	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	6.269297	
Gamma Statistics		
k hat	1.870538	
k star (bias corrected)	1.67274	
Theta hat	2.746589	
Theta star	3.071367	
nu hat	93.52691	
nu star	83.63701	
5% Approximate Chi Square Value	63.55568	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	62.36217	
Anderson-Darling Test Statistic	0.386112	
Anderson-Darling 5% Critical Value	0.757785	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.133226	
Kolmogrov-Smirnov 5% Critical Value	0.176979	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	6.760899	
95% Adjusted Gamma UCL	6.890292	
Lognormal Statistics		
Minimum of log data	-0.776529	
Maximum of log data	2.509599	
Mean of log data	1.346074	
Standard Deviation of log data	0.902016	
Variance of log data	0.813632	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.895902	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	5.771256	
MLE Standard Deviation	6.468154	
MLE Coefficient of Variation	1.120753	
MLE Skewness	4.770024	
MLE Median	3.84231	
MLE 80% Quantile	8.234041	
MLE 90% Quantile	12.24556	
MLE 95% Quantile	16.94359	
MLE 99% Quantile	31.31703	
MVU Estimate of Median	3.780252	
MVU Estimate of Mean	5.646064	
MVU Estimate of Standard Deviation	5.854016	
MVU Estimate of SE of Mean	1.136673	
95% H-UCL	8.954377	
95% Chebyshev (MVUE) UCL	10.60071	
97.5% Chebyshev (MVUE) UCL	12.74459	
99% Chebyshev (MVUE) UCL	16.95582	
Non-parametric Statisitics		
95% CLT UCL	6.225621	
95% Adjusted-CLT UCL	6.303925	
95% Modified-t UCL	6.281511	
95% Jackknife UCL	6.269297	
95% Chebyshev (Mean, Sd) UCL	8.02088	
97.5% Chebyshev (Mean, Sd) UCL	9.268478	
99% Chebyshev (Mean, Sd) UCL	11.71914	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	6.209401	
95% Bootstrap-t UCL	6.365924	
95% Hall's Bootstrap UCL	6.295363	
95% Percentile Bootstrap UCL	6.2324	
95% BCA Bootstrap UCL	6.6816	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	6.269297	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	25	
Minimum	14.3	
Maximum	2570	
Mean	584.636	
Standard Deviation	734.512	
Variance	539507.9	
Coefficient of Variation	1.256358	
Skewness	1.66196	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.736611	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	835.9687	
Gamma Statistics		
k hat	0.722552	
k star (bias corrected)	0.662512	
Theta hat	809.1268	
Theta star	882.4531	
nu hat	36.12759	
nu star	33.12561	
5% Approximate Chi Square Value	20.96455	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	20.30459	
Anderson-Darling Test Statistic	0.409974	
Anderson-Darling 5% Critical Value	0.786036	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.116568	
Kolmogrov-Smirnov 5% Critical Value	0.181648	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	923.7703	
95% Adjusted Gamma UCL	953.7956	
Lognormal Statistics		
Minimum of log data	2.66026	
Maximum of log data	7.851661	
Mean of log data	5.538257	
Standard Deviation of log data	1.463231	
Variance of log data	2.141044	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963645	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	741.5766	
MLE Standard Deviation	2032.016	
MLE Coefficient of Variation	2.74013	
MLE Skewness	28.79415	
MLE Median	254.2344	
MLE 80% Quantile	875.4048	
MLE 90% Quantile	1666.545	
MLE 95% Quantile	2822.197	
MLE 99% Quantile	7644.417	
MVU Estimate of Median	243.5604	
MVU Estimate of Mean	684.6171	
MVU Estimate of Standard Deviation	1425.574	
MVU Estimate of SE of Mean	245.916	
95% H-UCL	1906.514	
95% Chebyshev (MVUE) UCL	1756.54	
97.5% Chebyshev (MVUE) UCL	2220.362	
99% Chebyshev (MVUE) UCL	3131.45	
Non-parametric Statisitics		
95% CLT UCL	826.2689	
95% Adjusted-CLT UCL	878.4436	
95% Modified-t UCL	844.1068	
95% Jackknife UCL	835.9687	
95% Chebyshev (Mean, Sd) UCL	1224.969	
97.5% Chebyshev (Mean, Sd) UCL	1502.041	
99% Chebyshev (Mean, Sd) UCL	2046.296	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	825.6398	
95% Bootstrap-t UCL	950.2677	
95% Hall's Bootstrap UCL	850.2535	
95% Percentile Bootstrap UCL	833.484	
95% BCA Bootstrap UCL	959.184	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	923.7703	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	25	
Minimum	18.8	
Maximum	2080	
Mean	509.316	
Standard Deviation	493.1409	
Variance	243188	
Coefficient of Variation	0.968242	
Skewness	1.565956	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.855311	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	678.0572	
Gamma Statistics		
k hat	0.969793	
k star (bias corrected)	0.880084	
Theta hat	525.1802	
Theta star	578.7127	
nu hat	48.48964	
nu star	44.00422	
5% Approximate Chi Square Value	29.78843	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	28.99051	
Anderson-Darling Test Statistic	0.238073	
Anderson-Darling 5% Critical Value	0.774325	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level.
Kolmogrov-Smirnov Test Statistic	0.102493	
Kolmogrov-Smirnov 5% Critical Value	0.179779	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	752.3743	
95% Adjusted Gamma UCL	773.0823	
Lognormal Statistics		
Minimum of log data	2.933857	
Maximum of log data	7.640123	
Mean of log data	5.635709	
Standard Deviation of log data	1.309683	
Variance of log data	1.71527	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.929738	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	660.7295	
MLE Standard Deviation	1410.65	
MLE Coefficient of Variation	2.134989	
MLE Skewness	16.13662	
MLE Median	280.2577	
MLE 80% Quantile	847.5855	
MLE 90% Quantile	1508.17	
MLE 95% Quantile	2416.652	
MLE 99% Quantile	5896.019	
MVU Estimate of Median	270.7941	
MVU Estimate of Mean	623.1707	
MVU Estimate of Standard Deviation	1086.505	
MVU Estimate of SE of Mean	195.7716	
95% H-UCL	1447.721	
95% Chebyshev (MVUE) UCL	1476.519	
97.5% Chebyshev (MVUE) UCL	1845.764	
99% Chebyshev (MVUE) UCL	2571.074	
Non-parametric Statisitics		
95% CLT UCL	671.5449	
95% Adjusted-CLT UCL	704.5508	
95% Modified-t UCL	683.2054	
95% Jackknife UCL	678.0572	
95% Chebyshev (Mean, Sd) UCL	939.2263	
97.5% Chebyshev (Mean, Sd) UCL	1125.249	
99% Chebyshev (Mean, Sd) UCL	1490.654	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	665.573	
95% Bootstrap-t UCL	732.6123	
95% Hall's Bootstrap UCL	756.8363	
95% Percentile Bootstrap UCL	669.44	
95% BCA Bootstrap UCL	776.344	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	752.3743	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	25	
Minimum	16.8	
Maximum	1240	
Mean	419.804	
Standard Deviation	304.7388	
Variance	92865.75	
Coefficient of Variation	0.725907	
Skewness	0.679586	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.939441	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	524.0784	
Gamma Statistics		
k hat	1.335143	
k star (bias corrected)	1.201593	
Theta hat	314.4262	
Theta star	349.3729	
nu hat	66.75717	
nu star	60.07964	
5% Approximate Chi Square Value	43.25249	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	42.27868	
Anderson-Darling Test Statistic	0.606149	
Anderson-Darling 5% Critical Value	0.765328	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.175996	
Kolmogrov-Smirnov 5% Critical Value	0.17831	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	583.1265	
95% Adjusted Gamma UCL	596.5578	
Lognormal Statistics		
Minimum of log data	2.821379	
Maximum of log data	7.122867	
Mean of log data	5.620697	
Standard Deviation of log data	1.134294	
Variance of log data	1.286622	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.882078	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	525.3201	
MLE Standard Deviation	850.3919	
MLE Coefficient of Variation	1.618807	
MLE Skewness	9.098564	
MLE Median	276.0817	
MLE 80% Quantile	719.945	
MLE 90% Quantile	1185.908	
MLE 95% Quantile	1783.994	
MLE 99% Quantile	3862.477	
MVU Estimate of Median	269.0612	
MVU Estimate of Mean	504.9234	
MVU Estimate of Standard Deviation	711.7224	
MVU Estimate of SE of Mean	133.3693	
95% H-UCL	978.2721	
95% Chebyshev (MVUE) UCL	1086.267	
97.5% Chebyshev (MVUE) UCL	1337.814	
99% Chebyshev (MVUE) UCL	1831.931	
Non-parametric Statisitics		
95% CLT UCL	520.0542	
95% Adjusted-CLT UCL	528.9056	
95% Modified-t UCL	525.4591	
95% Jackknife UCL	524.0784	
95% Chebyshev (Mean, Sd) UCL	685.4692	
97.5% Chebyshev (Mean, Sd) UCL	800.4227	
99% Chebyshev (Mean, Sd) UCL	1026.227	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	515.8911	
95% Bootstrap-t UCL	529.8336	
95% Hall's Bootstrap UCL	537.0872	
95% Percentile Bootstrap UCL	519.944	
95% BCA Bootstrap UCL	498.5	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	524.0784	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	25	
Minimum	89.5	
Maximum	1910	
Mean	654.116	
Standard Deviation	564.0053	
Variance	318102	
Coefficient of Variation	0.862241	
Skewness	0.996741	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.851532	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	847.1053	
Gamma Statistics		
k hat	1.401058	
k star (bias corrected)	1.259598	
Theta hat	466.8728	
Theta star	519.3054	
nu hat	70.05291	
nu star	62.9799	
5% Approximate Chi Square Value	45.72102	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	44.71809	
Anderson-Darling Test Statistic	0.713736	
Anderson-Darling 5% Critical Value	0.763806	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.193203	
Kolmogrov-Smirnov 5% Critical Value	0.178062	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	901.0332	
95% Adjusted Gamma UCL	921.2414	
Lognormal Statistics		
Minimum of log data	4.494239	
Maximum of log data	7.554859	
Mean of log data	6.085757	
Standard Deviation of log data	0.949343	
Variance of log data	0.901252	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.933844	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	689.7869	
MLE Standard Deviation	834.2385	
MLE Coefficient of Variation	1.209415	
MLE Skewness	5.397236	
MLE Median	439.5524	
MLE 80% Quantile	980.3911	
MLE 90% Quantile	1488.706	
MLE 95% Quantile	2095.245	
MLE 99% Quantile	3999.515	
MVU Estimate of Median	431.695	
MVU Estimate of Mean	672.7953	
MVU Estimate of Standard Deviation	744.9787	
MVU Estimate of SE of Mean	143.8121	
95% H-UCL	1107.603	
95% Chebyshev (MVUE) UCL	1299.658	
97.5% Chebyshev (MVUE) UCL	1570.902	
99% Chebyshev (MVUE) UCL	2103.708	
Non-parametric Statisitics		
95% CLT UCL	839.6572	
95% Adjusted-CLT UCL	863.6846	
95% Modified-t UCL	850.8531	
95% Jackknife UCL	847.1053	
95% Chebyshev (Mean, Sd) UCL	1145.804	
97.5% Chebyshev (Mean, Sd) UCL	1358.558	
99% Chebyshev (Mean, Sd) UCL	1776.472	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	836.7008	
95% Bootstrap-t UCL	877.1611	
95% Hall's Bootstrap UCL	855.1759	
95% Percentile Bootstrap UCL	834.8	
95% BCA Bootstrap UCL	803.756	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	901.0332	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	25	
Minimum	0.045	
Maximum	27.5	
Mean	2.4664	
Standard Deviation	5.735581	
Variance	32.89689	
Coefficient of Variation	2.325487	
Skewness	3.915106	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.433402	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	4.42898	
Gamma Statistics		
k hat	0.527571	
k star (bias corrected)	0.490929	
Theta hat	4.675008	
Theta star	5.023941	
nu hat	26.37856	
nu star	24.54647	
5% Approximate Chi Square Value	14.26324	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	13.72881	
Anderson-Darling Test Statistic	1.831871	
Anderson-Darling 5% Critical Value	0.804333	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.26	
Kolmogrov-Smirnov 5% Critical Value	0.18412	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	4.244576	
95% Adjusted Gamma UCL	4.409806	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	3.314186	
Mean of log data	-0.291294	
Standard Deviation of log data	1.440051	
Variance of log data	2.073746	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.968416	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.107661	
MLE Standard Deviation	5.558221	
MLE Coefficient of Variation	2.637151	
MLE Skewness	26.25169	
MLE Median	0.747296	
MLE 80% Quantile	2.523252	
MLE 90% Quantile	4.754878	
MLE 95% Quantile	7.985196	
MLE 99% Quantile	21.29056	
MVU Estimate of Median	0.716888	
MVU Estimate of Mean	1.952692	
MVU Estimate of Standard Deviation	3.960129	
MVU Estimate of SE of Mean	0.688026	
95% H-UCL	5.283506	
95% Chebyshev (MVUE) UCL	4.951728	
97.5% Chebyshev (MVUE) UCL	6.249413	
99% Chebyshev (MVUE) UCL	8.798464	
Non-parametric Statisitics		
95% CLT UCL	4.353238	
95% Adjusted-CLT UCL	5.312995	
95% Modified-t UCL	4.578683	
95% Jackknife UCL	4.42898	
95% Chebyshev (Mean, Sd) UCL	7.466564	
97.5% Chebyshev (Mean, Sd) UCL	9.630138	
99% Chebyshev (Mean, Sd) UCL	13.88006	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.311589	
95% Bootstrap-t UCL	11.19828	
95% Hall's Bootstrap UCL	11.62046	
95% Percentile Bootstrap UCL	4.5754	
95% BCA Bootstrap UCL	5.8532	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	5.283506	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable	Nickel	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	24	
Minimum	4.8	
Maximum	79.2	
Mean	26.096	
Standard Deviation	16.74105	
Variance	280.2629	
Coefficient of Variation	0.641518	
Skewness	1.188611	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904545	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	31.82439	
Gamma Statistics		
k hat	2.331356	
k star (bias corrected)	2.07826	
Theta hat	11.19349	
Theta star	12.55666	
nu hat	116.5678	
nu star	103.913	
5% Approximate Chi Square Value	81.38634	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	80.02749	
Anderson-Darling Test Statistic	0.467542	
Anderson-Darling 5% Critical Value	0.75475	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.127804	
Kolmogrov-Smirnov 5% Critical Value	0.176445	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	33.31903	
95% Adjusted Gamma UCL	33.88477	
Lognormal Statistics		
Minimum of log data	1.568616	
Maximum of log data	4.371976	
Mean of log data	3.032244	
Standard Deviation of log data	0.749271	
Variance of log data	0.561408	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.926983	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	27.46596	
MLE Standard Deviation	23.83594	
MLE Coefficient of Variation	0.867836	
MLE Skewness	3.257108	
MLE Median	20.74372	
MLE 80% Quantile	39.0709	
MLE 90% Quantile	54.32896	
MLE 95% Quantile	71.15034	
MLE 99% Quantile	118.5161	
MVU Estimate of Median	20.51201	
MVU Estimate of Mean	27.08542	
MVU Estimate of Standard Deviation	22.3576	
MVU Estimate of SE of Mean	4.404156	
95% H-UCL	38.50111	
95% Chebyshev (MVUE) UCL	46.28269	
97.5% Chebyshev (MVUE) UCL	54.58937	
99% Chebyshev (MVUE) UCL	70.90622	
Non-parametric Statisitics		
95% CLT UCL	31.60332	
95% Adjusted-CLT UCL	32.45379	
95% Modified-t UCL	31.95705	
95% Jackknife UCL	31.82439	
95% Chebyshev (Mean, Sd) UCL	40.69051	
97.5% Chebyshev (Mean, Sd) UCL	47.00557	
99% Chebyshev (Mean, Sd) UCL	59.41028	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	31.5067	
95% Bootstrap-t UCL	32.97148	
95% Hall's Bootstrap UCL	34.1237	
95% Percentile Bootstrap UCL	31.656	
95% BCA Bootstrap UCL	30.516	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	33.31903	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	24	
Number of Missing Data	0	
Number of Valid Observations	24	
Number of Distinct Observations	21	
Minimum	0.115	
Maximum	1.4	
Mean	0.427083	
Standard Deviation	0.296508	
Variance	0.087917	
Coefficient of Variation	0.694263	
Skewness	1.493498	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.855788	
Shapiro-Wilk 5% Critical Value	0.916	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.530815	
Gamma Statistics		
k hat	2.283995	
k star (bias corrected)	2.026273	
Theta hat	0.18699	
Theta star	0.210773	
nu hat	109.6318	
nu star	97.26112	
5% Approximate Chi Square Value	75.50789	
Adjusted Level of Significance	0.0392	
Adjusted Chi Square Value	74.16033	
Anderson-Darling Test Statistic	0.663368	
Anderson-Darling 5% Critical Value	0.753938	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.173772	
Kolmogrov-Smirnov 5% Critical Value	0.179916	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.550123	
95% Adjusted Gamma UCL	0.560119	
Lognormal Statistics		
Minimum of log data	-2.162823	
Maximum of log data	0.336472	
Mean of log data	-1.085383	
Standard Deviation of log data	0.726144	
Variance of log data	0.527285	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.911533	
Shapiro-Wilk 5% Critical Value	0.916	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.439666	
MLE Standard Deviation	0.366357	
MLE Coefficient of Variation	0.833262	
MLE Skewness	3.078341	
MLE Median	0.337772	
MLE 80% Quantile	0.623884	
MLE 90% Quantile	0.858741	
MLE 95% Quantile	1.1153	
MLE 99% Quantile	1.828741	
MVU Estimate of Median	0.334081	
MVU Estimate of Mean	0.43378	
MVU Estimate of Standard Deviation	0.344428	
MVU Estimate of SE of Mean	0.069376	
95% H-UCL	0.612764	
95% Chebyshev (MVUE) UCL	0.736185	
97.5% Chebyshev (MVUE) UCL	0.867036	
99% Chebyshev (MVUE) UCL	1.124067	
Non-parametric Statisitics		
95% CLT UCL	0.526637	
95% Adjusted-CLT UCL	0.546353	
95% Modified-t UCL	0.53389	
95% Jackknife UCL	0.530815	
95% Chebyshev (Mean, Sd) UCL	0.690904	
97.5% Chebyshev (Mean, Sd) UCL	0.805059	
99% Chebyshev (Mean, Sd) UCL	1.029295	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.523431	
95% Bootstrap-t UCL	0.554872	
95% Hall's Bootstrap UCL	0.593405	
95% Percentile Bootstrap UCL	0.524375	
95% BCA Bootstrap UCL	0.57375	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.550123	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	25	
Minimum	10.3	
Maximum	107	
Mean	52.232	
Standard Deviation	31.32433	
Variance	981.2137	
Coefficient of Variation	0.599715	
Skewness	0.330729	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915696	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	62.95045	
Gamma Statistics		
k hat	2.485867	
k star (bias corrected)	2.21423	
Theta hat	21.01158	
Theta star	23.58924	
nu hat	124.2934	
nu star	110.7115	
5% Approximate Chi Square Value	87.41965	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	86.00903	
Anderson-Darling Test Statistic	0.554903	
Anderson-Darling 5% Critical Value	0.753944	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.152908	
Kolmogrov-Smirnov 5% Critical Value	0.176312	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	66.14855	
95% *Adjusted Gamma* UCL	67.23343	
Lognormal Statistics		
Minimum of log data	2.332144	
Maximum of log data	4.672829	
Mean of log data	3.741277	
Standard Deviation of log data	0.71539	
Variance of log data	0.511782	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.926133	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	54.44373	
MLE Standard Deviation	44.50628	
MLE Coefficient of Variation	0.817473	
MLE Skewness	2.998705	
MLE Median	42.15177	
MLE 80% Quantile	77.15226	
MLE 90% Quantile	105.6944	
MLE 95% Quantile	136.7415	
MLE 99% Quantile	222.577	
MVU Estimate of Median	41.72235	
MVU Estimate of Mean	53.76721	
MVU Estimate of Standard Deviation	42.01938	
MVU Estimate of SE of Mean	8.296905	
95% H-UCL	74.76073	
95% Chebyshev (MVUE) UCL	89.93258	
97.5% Chebyshev (MVUE) UCL	105.5814	
99% Chebyshev (MVUE) UCL	136.3204	
Non-parametric Statisitics		
95% CLT UCL	62.53679	
95% Adjusted-CLT UCL	62.97957	
95% Modified-t UCL	63.01951	
95% Jackknife UCL	62.95045	
95% Chebyshev (Mean, Sd) UCL	79.53992	
97.5% Chebyshev (Mean, Sd) UCL	91.35608	
99% Chebyshev (Mean, Sd) UCL	114.5666	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	62.15123	
95% Bootstrap-t UCL	63.58881	
95% Hall's Bootstrap UCL	62.54478	
95% Percentile Bootstrap UCL	62.02	
95% BCA Bootstrap UCL	60.332	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	66.14855	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-2.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	25	
Number of Missing Data	0	
Number of Valid Observations	25	
Number of Distinct Observations	25	
Minimum	80.1	
Maximum	2640	
Mean	1033.324	
Standard Deviation	696.6819	
Variance	485365.7	
Coefficient of Variation	0.674214	
Skewness	0.684253	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.940294	
Shapiro-Wilk 5% Critical Value	0.918	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1271.712	
Gamma Statistics		
k hat	1.786355	
k star (bias corrected)	1.598659	
Theta hat	578.4539	
Theta star	646.3692	
nu hat	89.31775	
nu star	79.93295	
5% Approximate Chi Square Value	60.32945	
Adjusted Level of Significance	0.0395	
Adjusted Chi Square Value	59.16822	
Anderson-Darling Test Statistic	0.309379	
Anderson-Darling 5% Critical Value	0.758634	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.09943	
Kolmogrov-Smirnov 5% Critical Value	0.17714	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1369.093	
95% Adjusted Gamma UCL	1395.963	
Lognormal Statistics		
Minimum of log data	4.383276	
Maximum of log data	7.878534	
Mean of log data	6.635245	
Standard Deviation of log data	0.92463	
Variance of log data	0.854941	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898686	
Shapiro-Wilk 5% Critical Value	0.918	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1167.612	
MLE Standard Deviation	1357.262	
MLE Coefficient of Variation	1.162426	
MLE Skewness	5.05799	
MLE Median	761.4657	
MLE 80% Quantile	1663.298	
MLE 90% Quantile	2498.372	
MLE 95% Quantile	3485.133	
MLE 99% Quantile	6541.584	
MVU Estimate of Median	748.5478	
MVU Estimate of Mean	1140.681	
MVU Estimate of Standard Deviation	1220.733	
MVU Estimate of SE of Mean	236.3909	
95% H-UCL	1841.238	
95% Chebyshev (MVUE) UCL	2171.085	
97.5% Chebyshev (MVUE) UCL	2616.941	
99% Chebyshev (MVUE) UCL	3492.74	
Non-parametric Statisitics		
95% CLT UCL	1262.512	
95% Adjusted-CLT UCL	1282.887	
95% Modified-t UCL	1274.89	
95% Jackknife UCL	1271.712	
95% Chebyshev (Mean, Sd) UCL	1640.677	
97.5% Chebyshev (Mean, Sd) UCL	1903.479	
99% Chebyshev (Mean, Sd) UCL	2419.704	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1251.964	
95% Bootstrap-t UCL	1301.639	
95% Hall's Bootstrap UCL	1307.222	
95% Percentile Bootstrap UCL	1268.32	
95% BCA Bootstrap UCL	1394.76	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1271.712	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Trichloroethene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.042	
Maximum	0.053	
Mean	0.0475	
Standard Deviation	0.007778	
Variance	6.05E-05	
Coefficient of Variation	0.163751	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.170086	
Maximum of log data	-2.937463	
Mean of log data	-3.053775	
Standard Deviation of log data	0.164489	
Variance of log data	0.027057	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	1.7E+269	
MLE Coefficient of Variation	1.7E+269	
MLE Skewness	0	
MLE Median	1.7E+269	
MLE 80% Quantile	1.7E-305	
MLE 90% Quantile	-5E+138	
MLE 95% Quantile	2.6E-308	
MLE 99% Quantile	2.6E-308	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.0475	
MVU Estimate of Standard Deviation	0.007778	
MVU Estimate of SE of Mean	0.0055	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.13	
Maximum	0.56	
Mean	0.345	
Standard Deviation	0.304056	
Variance	0.09245	
Coefficient of Variation	0.881321	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-2.040221	
Maximum of log data	-0.579818	
Mean of log data	-1.31002	
Standard Deviation of log data	1.03266	
Variance of log data	1.066387	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	2.5E-304	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	8.6E-174	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.345	
MVU Estimate of Standard Deviation	0.304056	
MVU Estimate of SE of Mean	0.215	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.16	
Maximum	1	
Mean	0.58	
Standard Deviation	0.59397	
Variance	0.3528	
Coefficient of Variation	1.024086	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	0	
Mean of log data	-0.916291	
Standard Deviation of log data	1.295831	
Variance of log data	1.679177	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	3.6E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-3.2E-241	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.58	
MVU Estimate of Standard Deviation	0.59397	
MVU Estimate of SE of Mean	0.42	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.29	
Maximum	1.5	
Mean	0.895	
Standard Deviation	0.855599	
Variance	0.73205	
Coefficient of Variation	0.955977	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.237874	
Maximum of log data	0.405465	
Mean of log data	-0.416205	
Standard Deviation of log data	1.162016	
Variance of log data	1.350282	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	1.8E-306	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	4E-270	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.895	
MVU Estimate of Standard Deviation	0.855599	
MVU Estimate of SE of Mean	0.605	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.2	
Maximum	0.72	
Mean	0.46	
Standard Deviation	0.367696	
Variance	0.1352	
Coefficient of Variation	0.799338	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.609438	
Maximum of log data	-0.328504	
Mean of log data	-0.968971	
Standard Deviation of log data	0.905757	
Variance of log data	0.820396	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	2.8E-306	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	7.7E-304	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.46	
MVU Estimate of Standard Deviation	0.367696	
MVU Estimate of SE of Mean	0.26	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.046	
Maximum	0.32	
Mean	0.183	
Standard Deviation	0.193747	
Variance	0.037538	
Coefficient of Variation	1.058728	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.079114	
Maximum of log data	-1.139434	
Mean of log data	-2.109274	
Standard Deviation of log data	1.371561	
Variance of log data	1.881178	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	2.1E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-2.4E-159	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.183	
MVU Estimate of Standard Deviation	0.193747	
MVU Estimate of SE of Mean	0.137	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.14	
Maximum	0.74	
Mean	0.44	
Standard Deviation	0.424264	
Variance	0.18	
Coefficient of Variation	0.964237	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	-0.301105	
Mean of log data	-1.133609	
Standard Deviation of log data	1.177338	
Variance of log data	1.386125	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	4.1E-306	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	4E-270	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.44	
MVU Estimate of Standard Deviation	0.424264	
MVU Estimate of SE of Mean	0.3	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable:	Phenanthrene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.16	
Maximum	0.57	
Mean	0.365	
Standard Deviation	0.289914	
Variance	0.08405	
Coefficient of Variation	0.794284	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	-0.562119	
Mean of log data	-1.19735	
Standard Deviation of log data	0.898353	
Variance of log data	0.807038	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	2.6E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-2.4E-159	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.365	
MVU Estimate of Standard Deviation	0.289914	
MVU Estimate of SE of Mean	0.205	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable:	Aroclor 1260	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.011	
Maximum	0.058	
Mean	0.0345	
Standard Deviation	0.033234	
Variance	0.001105	
Coefficient of Variation	0.963305	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-4.50986	
Maximum of log data	-2.847312	
Mean of log data	-3.678586	
Standard Deviation of log data	1.175599	
Variance of log data	1.382032	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	3.4E-306	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	4E-270	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.0345	
MVU Estimate of Standard Deviation	0.033234	
MVU Estimate of SE of Mean	0.0235	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	20	
Number of Missing Data	0	
Number of Valid Observations	20	
Number of Distinct Observations	20	
Minimum	0.5	
Maximum	68	
Mean	9.09	
Standard Deviation	15.03816	
Variance	226.1462	
Coefficient of Variation	1.654363	
Skewness	3.507928	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.545597	
Shapiro-Wilk 5% Critical Value	0.905	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	14.90444	
Gamma Statistics		
k hat	0.771561	
k star (bias corrected)	0.68916	
Theta hat	11.78131	
Theta star	13.18997	
nu hat	30.86243	
nu star	27.5664	
5% Approximate Chi Square Value	16.58897	
Adjusted Level of Significance	0.038	
Adjusted Chi Square Value	15.91665	
Anderson-Darling Test Statistic	0.599746	
Anderson-Darling 5% Critical Value	0.778512	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.139957	
Kolmogrov-Smirnov 5% Critical Value	0.201187	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	15.10513	
95% Adjusted Gamma UCL	15.74318	
Lognormal Statistics		
Minimum of log data	-0.693147	
Maximum of log data	4.219508	
Mean of log data	1.434258	
Standard Deviation of log data	1.258272	
Variance of log data	1.583247	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.977066	
Shapiro-Wilk 5% Critical Value	0.905	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	9.261648	
MLE Standard Deviation	18.22156	
MLE Coefficient of Variation	1.967421	
MLE Skewness	13.51765	
MLE Median	4.196532	
MLE 80% Quantile	12.15205	
MLE 90% Quantile	21.13937	
MLE 95% Quantile	33.25201	
MLE 99% Quantile	78.33527	
MVU Estimate of Median	4.03337	
MVU Estimate of Mean	8.683966	
MVU Estimate of Standard Deviation	13.7823	
MVU Estimate of SE of Mean	2.838917	
95% H-UCL	21.86465	
95% Chebyshev (MVUE) UCL	21.05852	
97.5% Chebyshev (MVUE) UCL	26.41299	
99% Chebyshev (MVUE) UCL	36.93083	
Non-parametric Statisitics		
95% CLT UCL	14.62104	
95% Adjusted-CLT UCL	17.4394	
95% Modified-t UCL	15.34405	
95% Jackknife UCL	14.90444	
95% Chebyshev (Mean, Sd) UCL	23.74738	
97.5% Chebyshev (Mean, Sd) UCL	30.08965	
99% Chebyshev (Mean, Sd) UCL	42.54779	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	14.51955	
95% Bootstrap-t UCL	25.72979	
95% Hall's Bootstrap UCL	38.06299	
95% Percentile Bootstrap UCL	15.4225	
95% BCA Bootstrap UCL	19.9375	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	15.10513	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	20	
Minimum	6.6	
Maximum	3230	
Mean	277.0023	
Standard Deviation	726.8898	
Variance	528368.8	
Coefficient of Variation	2.624129	
Skewness	3.698819	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.407514	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	543.6716	
Gamma Statistics		
k hat	0.408531	
k star (bias corrected)	0.383126	
Theta hat	678.044	
Theta star	723.0064	
nu hat	17.97538	
nu star	16.85753	
5% Approximate Chi Square Value	8.569209	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	8.129519	
Anderson-Darling Test Statistic	2.321221	
Anderson-Darling 5% Critical Value	0.824076	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.264859	
Kolmogrov-Smirnov 5% Critical Value	0.19828	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	544.9247	
95% Adjusted Gamma UCL	574.3972	
Lognormal Statistics		
Minimum of log data	1.88707	
Maximum of log data	8.080237	
Mean of log data	4.018747	
Standard Deviation of log data	1.592563	
Variance of log data	2.536256	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.91565	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	197.7246	
MLE Standard Deviation	674.3622	
MLE Coefficient of Variation	3.410614	
MLE Skewness	49.90507	
MLE Median	55.63137	
MLE 80% Quantile	213.6764	
MLE 90% Quantile	430.6046	
MLE 95% Quantile	763.958	
MLE 99% Quantile	2259.837	
MVU Estimate of Median	52.50769	
MVU Estimate of Mean	176.3678	
MVU Estimate of Standard Deviation	411.4614	
MVU Estimate of SE of Mean	73.33706	
95% H-UCL	652.2779	
95% Chebyshev (MVUE) UCL	496.0366	
97.5% Chebyshev (MVUE) UCL	634.3576	
99% Chebyshev (MVUE) UCL	906.0624	
Non-parametric Statisitics		
95% CLT UCL	531.9109	
95% Adjusted-CLT UCL	662.4947	
95% Modified-t UCL	564.0401	
95% Jackknife UCL	543.6716	
95% Chebyshev (Mean, Sd) UCL	952.5158	
97.5% Chebyshev (Mean, Sd) UCL	1244.811	
99% Chebyshev (Mean, Sd) UCL	1818.968	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	536.659	
95% Bootstrap-t UCL	2147.585	
95% Hall's Bootstrap UCL	1662.042	
95% Percentile Bootstrap UCL	564.375	
95% BCA Bootstrap UCL	770.3045	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	496.0366	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	14.1	
Maximum	177	
Mean	78.6	
Standard Deviation	40.13678	
Variance	1610.961	
Coefficient of Variation	0.510646	
Skewness	0.596288	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.965604	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	93.32472	
Gamma Statistics		
k hat	3.358824	
k star (bias corrected)	2.931105	
Theta hat	23.40105	
Theta star	26.81582	
nu hat	147.7882	
nu star	128.9686	
5% Approximate Chi Square Value	103.7315	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	102.043	
Anderson-Darling Test Statistic	0.358273	
Anderson-Darling 5% Critical Value	0.748408	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.136943	
Kolmogrov-Smirnov 5% Critical Value	0.18651	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	97.72281	
95% Adjusted Gamma UCL	99.33986	
Lognormal Statistics		
Minimum of log data	2.646175	
Maximum of log data	5.17615	
Mean of log data	4.208186	
Standard Deviation of log data	0.629215	
Variance of log data	0.395911	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.920169	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	81.95269	
MLE Standard Deviation	57.11684	
MLE Coefficient of Variation	0.696949	
MLE Skewness	2.429381	
MLE Median	67.23449	
MLE 80% Quantile	114.4197	
MLE 90% Quantile	150.9166	
MLE 95% Quantile	189.2833	
MLE 99% Quantile	290.5397	
MVU Estimate of Median	66.632	
MVU Estimate of Mean	81.09507	
MVU Estimate of Standard Deviation	54.43297	
MVU Estimate of SE of Mean	11.51788	
95% H-UCL	109.448	
95% Chebyshev (MVUE) UCL	131.3004	
97.5% Chebyshev (MVUE) UCL	153.0242	
99% Chebyshev (MVUE) UCL	195.6965	
Non-parametric Statisitics		
95% CLT UCL	92.67532	
95% Adjusted-CLT UCL	93.83773	
95% Modified-t UCL	93.50603	
95% Jackknife UCL	93.32472	
95% Chebyshev (Mean, Sd) UCL	115.8999	
97.5% Chebyshev (Mean, Sd) UCL	132.0396	
99% Chebyshev (Mean, Sd) UCL	163.743	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	92.38024	
95% Bootstrap-t UCL	94.60415	
95% Hall's Bootstrap UCL	94.75241	
95% Percentile Bootstrap UCL	92.86818	
95% BCA Bootstrap UCL	89.72273	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	93.32472	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	0.46	
Maximum	12.3	
Mean	5.506364	
Standard Deviation	3.329435	
Variance	11.08514	
Coefficient of Variation	0.604652	
Skewness	0.395083	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963215	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	6.727812	
Gamma Statistics		
k hat	1.934814	
k star (bias corrected)	1.701279	
Theta hat	2.84594	
Theta star	3.236603	
nu hat	85.1318	
nu star	74.85626	
5% Approximate Chi Square Value	55.92612	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	54.70477	
Anderson-Darling Test Statistic	0.577031	
Anderson-Darling 5% Critical Value	0.756471	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.136497	
Kolmogrov-Smirnov 5% Critical Value	0.187957	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	7.370183	
95% Adjusted Gamma UCL	7.534732	
Lognormal Statistics		
Minimum of log data	-0.776529	
Maximum of log data	2.509599	
Mean of log data	1.425755	
Standard Deviation of log data	0.916259	
Variance of log data	0.839531	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.849157	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	6.331392	
MLE Standard Deviation	7.261199	
MLE Coefficient of Variation	1.146857	
MLE Skewness	4.949008	
MLE Median	4.160997	
MLE 80% Quantile	9.024957	
MLE 90% Quantile	13.50618	
MLE 95% Quantile	18.78392	
MLE 99% Quantile	35.05693	
MVU Estimate of Median	4.082292	
MVU Estimate of Mean	6.170266	
MVU Estimate of Standard Deviation	6.468193	
MVU Estimate of SE of Mean	1.338852	
95% H-UCL	10.31379	
95% Chebyshev (MVUE) UCL	12.00619	
97.5% Chebyshev (MVUE) UCL	14.5314	
99% Chebyshev (MVUE) UCL	19.49168	
Non-parametric Statisitics		
95% CLT UCL	6.673943	
95% Adjusted-CLT UCL	6.737831	
95% Modified-t UCL	6.737777	
95% Jackknife UCL	6.727812	
95% Chebyshev (Mean, Sd) UCL	8.600476	
97.5% Chebyshev (Mean, Sd) UCL	9.9393	
99% Chebyshev (Mean, Sd) UCL	12.56916	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	6.646701	
95% Bootstrap-t UCL	6.746376	
95% Hall's Bootstrap UCL	6.813857	
95% Percentile Bootstrap UCL	6.661364	
95% BCA Bootstrap UCL	7.092727	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	6.727812	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	14.3	
Maximum	2570	
Mean	631.8545	
Standard Deviation	768.8219	
Variance	591087.1	
Coefficient of Variation	1.21677	
Skewness	1.501041	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.756563	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	913.9073	
Gamma Statistics		
k hat	0.718796	
k star (bias corrected)	0.651082	
Theta hat	879.0455	
Theta star	970.4692	
nu hat	31.62703	
nu star	28.64759	
5% Approximate Chi Square Value	17.43108	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	16.77819	
Anderson-Darling Test Statistic	0.371851	
Anderson-Darling 5% Critical Value	0.785626	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.120324	
Kolmogrov-Smirnov 5% Critical Value	0.193078	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1038.438	
95% Adjusted Gamma UCL	1078.847	
Lognormal Statistics		
Minimum of log data	2.66026	
Maximum of log data	7.851661	
Mean of log data	5.610974	
Standard Deviation of log data	1.49994	
Variance of log data	2.249819	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955761	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	842.0867	
MLE Standard Deviation	2453.063	
MLE Coefficient of Variation	2.913077	
MLE Skewness	33.45965	
MLE Median	273.4103	
MLE 80% Quantile	971.0933	
MLE 90% Quantile	1878.814	
MLE 95% Quantile	3223.987	
MLE 99% Quantile	8953.798	
MVU Estimate of Median	259.7519	
MVU Estimate of Mean	764.803	
MVU Estimate of Standard Deviation	1615.163	
MVU Estimate of SE of Mean	296.4976	
95% H-UCL	2469.888	
95% Chebyshev (MVUE) UCL	2057.206	
97.5% Chebyshev (MVUE) UCL	2616.43	
99% Chebyshev (MVUE) UCL	3714.917	
Non-parametric Statisitics		
95% CLT UCL	901.4681	
95% Adjusted-CLT UCL	957.5181	
95% Modified-t UCL	922.65	
95% Jackknife UCL	913.9073	
95% Chebyshev (Mean, Sd) UCL	1346.336	
97.5% Chebyshev (Mean, Sd) UCL	1655.493	
99% Chebyshev (Mean, Sd) UCL	2262.772	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	903.6521	
95% Bootstrap-t UCL	1019.834	
95% Hall's Bootstrap UCL	928.6304	
95% Percentile Bootstrap UCL	911.3045	
95% BCA Bootstrap UCL	1015.677	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1038.438	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	18.8	
Maximum	2080	
Mean	555.3545	
Standard Deviation	505.7036	
Variance	255736.1	
Coefficient of Variation	0.910596	
Skewness	1.453302	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.873043	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	740.8788	
Gamma Statistics		
k hat	1.039228	
k star (bias corrected)	0.927818	
Theta hat	534.3912	
Theta star	598.5595	
nu hat	45.72605	
nu star	40.82401	
5% Approximate Chi Square Value	27.17935	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	26.34816	
Anderson-Darling Test Statistic	0.290633	
Anderson-Darling 5% Critical Value	0.769849	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.126723	
Kolmogrov-Smirnov 5% Critical Value	0.190577	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	834.1553	
95% Adjusted Gamma UCL	860.47	
Lognormal Statistics		
Minimum of log data	2.933857	
Maximum of log data	7.640123	
Mean of log data	5.766654	
Standard Deviation of log data	1.295446	
Variance of log data	1.678181	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.905515	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	739.3301	
MLE Standard Deviation	1543.024	
MLE Coefficient of Variation	2.087057	
MLE Skewness	15.35199	
MLE Median	319.467	
MLE 80% Quantile	954.613	
MLE 90% Quantile	1688.005	
MLE 95% Quantile	2690.987	
MLE 99% Quantile	6501.981	
MVU Estimate of Median	307.4922	
MVU Estimate of Mean	693.5725	
MVU Estimate of Standard Deviation	1165.957	
MVU Estimate of SE of Mean	226.1164	
95% H-UCL	1712.787	
95% Chebyshev (MVUE) UCL	1679.191	
97.5% Chebyshev (MVUE) UCL	2105.669	
99% Chebyshev (MVUE) UCL	2943.402	
Non-parametric Statisitics		
95% CLT UCL	732.6967	
95% Adjusted-CLT UCL	768.3919	
95% Modified-t UCL	746.4465	
95% Jackknife UCL	740.8788	
95% Chebyshev (Mean, Sd) UCL	1025.315	
97.5% Chebyshev (Mean, Sd) UCL	1228.668	
99% Chebyshev (Mean, Sd) UCL	1628.114	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	730.4487	
95% Bootstrap-t UCL	793.5888	
95% Hall's Bootstrap UCL	812.9711	
95% Percentile Bootstrap UCL	729.2727	
95% BCA Bootstrap UCL	828.7182	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	834.1553	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	23.9	
Maximum	1240	
Mean	465.5182	
Standard Deviation	295.0337	
Variance	87044.9	
Coefficient of Variation	0.633775	
Skewness	0.615618	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.952464	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	573.7553	
Gamma Statistics		
k hat	1.837464	
k star (bias corrected)	1.617204	
Theta hat	253.3482	
Theta star	287.8538	
nu hat	80.84842	
nu star	71.15697	
5% Approximate Chi Square Value	52.73209	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	51.54811	
Anderson-Darling Test Statistic	0.587405	
Anderson-Darling 5% Critical Value	0.756966	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.182581	
Kolmogrov-Smirnov 5% Critical Value	0.188088	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	628.1727	
95% Adjusted Gamma UCL	642.6009	
Lognormal Statistics		
Minimum of log data	3.173878	
Maximum of log data	7.122867	
Mean of log data	5.847005	
Standard Deviation of log data	0.938218	
Variance of log data	0.880253	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.877502	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	537.6087	
MLE Standard Deviation	638.7164	
MLE Coefficient of Variation	1.188069	
MLE Skewness	5.241178	
MLE Median	346.1959	
MLE 80% Quantile	764.9411	
MLE 90% Quantile	1155.877	
MLE 95% Quantile	1620.31	
MLE 99% Quantile	3069.59	
MVU Estimate of Median	339.3329	
MVU Estimate of Mean	523.1018	
MVU Estimate of Standard Deviation	565.0512	
MVU Estimate of SE of Mean	116.6615	
95% H-UCL	891.1977	
95% Chebyshev (MVUE) UCL	1031.617	
97.5% Chebyshev (MVUE) UCL	1251.653	
99% Chebyshev (MVUE) UCL	1683.869	
Non-parametric Statisitics		
95% CLT UCL	568.9818	
95% Adjusted-CLT UCL	577.8033	
95% Modified-t UCL	575.1313	
95% Jackknife UCL	573.7553	
95% Chebyshev (Mean, Sd) UCL	739.699	
97.5% Chebyshev (Mean, Sd) UCL	858.3373	
99% Chebyshev (Mean, Sd) UCL	1091.379	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	566.3706	
95% Bootstrap-t UCL	581.6353	
95% Hall's Bootstrap UCL	592.4393	
95% Percentile Bootstrap UCL	567.45	
95% BCA Bootstrap UCL	549.0864	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	573.7553	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	89.5	
Maximum	1910	
Mean	705.6318	
Standard Deviation	582.635	
Variance	339463.5	
Coefficient of Variation	0.825693	
Skewness	0.801541	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.879198	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	919.3794	
Gamma Statistics		
k hat	1.378871	
k star (bias corrected)	1.221147	
Theta hat	511.7459	
Theta star	577.8437	
nu hat	60.67034	
nu star	53.73045	
5% Approximate Chi Square Value	37.88667	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	36.89338	
Anderson-Darling Test Statistic	0.610451	
Anderson-Darling 5% Critical Value	0.761616	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.194621	
Kolmogrov-Smirnov 5% Critical Value	0.189075	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	1000.719	
95% Adjusted Gamma UCL	1027.662	
Lognormal Statistics		
Minimum of log data	4.494239	
Maximum of log data	7.554859	
Mean of log data	6.154556	
Standard Deviation of log data	0.988621	
Variance of log data	0.977372	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924952	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	767.5791	
MLE Standard Deviation	988.2004	
MLE Coefficient of Variation	1.287425	
MLE Skewness	5.996133	
MLE Median	470.8576	
MLE 80% Quantile	1085.657	
MLE 90% Quantile	1677.289	
MLE 95% Quantile	2394.279	
MLE 99% Quantile	4694.226	
MVU Estimate of Median	460.5038	
MVU Estimate of Mean	743.9767	
MVU Estimate of Standard Deviation	859.5688	
MVU Estimate of SE of Mean	176.3363	
95% H-UCL	1326.204	
95% Chebyshev (MVUE) UCL	1512.609	
97.5% Chebyshev (MVUE) UCL	1845.197	
99% Chebyshev (MVUE) UCL	2498.501	
Non-parametric Statisitics		
95% CLT UCL	909.9526	
95% Adjusted-CLT UCL	932.6345	
95% Modified-t UCL	922.9173	
95% Jackknife UCL	919.3794	
95% Chebyshev (Mean, Sd) UCL	1247.086	
97.5% Chebyshev (Mean, Sd) UCL	1481.374	
99% Chebyshev (Mean, Sd) UCL	1941.587	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	904.6418	
95% Bootstrap-t UCL	951.7335	
95% Hall's Bootstrap UCL	924.6744	
95% Percentile Bootstrap UCL	910.5682	
95% BCA Bootstrap UCL	865.5227	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1000.719	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	0.045	
Maximum	27.5	
Mean	2.553182	
Standard Deviation	6.080653	
Variance	36.97434	
Coefficient of Variation	2.381598	
Skewness	3.754853	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.422714	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	4.783952	
Gamma Statistics		
k hat	0.51137	
k star (bias corrected)	0.471941	
Theta hat	4.992825	
Theta star	5.40996	
nu hat	22.50029	
nu star	20.7654	
5% Approximate Chi Square Value	11.41578	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	10.89915	
Anderson-Darling Test Statistic	1.904955	
Anderson-Darling 5% Critical Value	0.803282	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.280961	
Kolmogrov-Smirnov 5% Critical Value	0.195725	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	4.64426	
95% Adjusted Gamma UCL	4.864402	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	3.314186	
Mean of log data	-0.300463	
Standard Deviation of log data	1.445626	
Variance of log data	2.089834	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956459	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.105292	
MLE Standard Deviation	5.603232	
MLE Coefficient of Variation	2.661499	
MLE Skewness	26.83743	
MLE Median	0.740475	
MLE 80% Quantile	2.512029	
MLE 90% Quantile	4.745356	
MLE 95% Quantile	7.985215	
MLE 99% Quantile	21.3716	
MVU Estimate of Median	0.706058	
MVU Estimate of Mean	1.930436	
MVU Estimate of Standard Deviation	3.841804	
MVU Estimate of SE of Mean	0.716593	
95% H-UCL	5.780573	
95% Chebyshev (MVUE) UCL	5.053991	
97.5% Chebyshev (MVUE) UCL	6.405556	
99% Chebyshev (MVUE) UCL	9.060444	
Non-parametric Statisitics		
95% CLT UCL	4.685569	
95% Adjusted-CLT UCL	5.794491	
95% Modified-t UCL	4.956921	
95% Jackknife UCL	4.783952	
95% Chebyshev (Mean, Sd) UCL	8.204057	
97.5% Chebyshev (Mean, Sd) UCL	10.64919	
99% Chebyshev (Mean, Sd) UCL	15.4522	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.634457	
95% Bootstrap-t UCL	15.46947	
95% Hall's Bootstrap UCL	13.32163	
95% Percentile Bootstrap UCL	4.897273	
95% BCA Bootstrap UCL	7.059545	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	5.053991	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	21	
Minimum	4.8	
Maximum	79.2	
Mean	28.30455	
Standard Deviation	16.62083	
Variance	276.2519	
Coefficient of Variation	0.587214	
Skewness	1.126769	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909605	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	34.40212	
Gamma Statistics		
k hat	2.643433	
k star (bias corrected)	2.313268	
Theta hat	10.70749	
Theta star	12.23574	
nu hat	116.3111	
nu star	101.7838	
5% Approximate Chi Square Value	79.50193	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	78.03243	
Anderson-Darling Test Statistic	0.581394	
Anderson-Darling 5% Critical Value	0.751816	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.154764	
Kolmogrov-Smirnov 5% Critical Value	0.187117	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	36.23741	
95% Adjusted Gamma UCL	36.91983	
Lognormal Statistics		
Minimum of log data	1.568616	
Maximum of log data	4.371976	
Mean of log data	3.142109	
Standard Deviation of log data	0.717816	
Variance of log data	0.51526	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.900704	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	29.95628	
MLE Standard Deviation	24.5947	
MLE Coefficient of Variation	0.82102	
MLE Skewness	3.016487	
MLE Median	23.15265	
MLE 80% Quantile	42.4643	
MLE 90% Quantile	58.23595	
MLE 95% Quantile	75.40824	
MLE 99% Quantile	122.9465	
MVU Estimate of Median	22.88297	
MVU Estimate of Mean	29.53175	
MVU Estimate of Standard Deviation	23.04906	
MVU Estimate of SE of Mean	4.854023	
95% H-UCL	42.29311	
95% Chebyshev (MVUE) UCL	50.68995	
97.5% Chebyshev (MVUE) UCL	59.84511	
99% Chebyshev (MVUE) UCL	77.82867	
Non-parametric Statisitics		
95% CLT UCL	34.1332	
95% Adjusted-CLT UCL	35.04279	
95% Modified-t UCL	34.544	
95% Jackknife UCL	34.40212	
95% Chebyshev (Mean, Sd) UCL	43.75062	
97.5% Chebyshev (Mean, Sd) UCL	50.43415	
99% Chebyshev (Mean, Sd) UCL	63.56264	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	33.93297	
95% Bootstrap-t UCL	35.22321	
95% Hall's Bootstrap UCL	37.29757	
95% Percentile Bootstrap UCL	34.25909	
95% BCA Bootstrap UCL	33.10455	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	36.23741	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	20	
Minimum	0.115	
Maximum	0.75	
Mean	0.370455	
Standard Deviation	0.210498	
Variance	0.044309	
Coefficient of Variation	0.568215	
Skewness	0.233897	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.908933	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.447679	
Gamma Statistics		
k hat	2.785489	
k star (bias corrected)	2.435953	
Theta hat	0.132994	
Theta star	0.152078	
nu hat	122.5615	
nu star	107.1819	
5% Approximate Chi Square Value	84.28429	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	82.76917	
Anderson-Darling Test Statistic	0.904348	
Anderson-Darling 5% Critical Value	0.750862	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.200149	
Kolmogrov-Smirnov 5% Critical Value	0.186951	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.471096	
95% Adjusted Gamma UCL	0.47972	
Lognormal Statisitics		
Minimum of log data	-2.162823	
Maximum of log data	-0.287682	
Mean of log data	-1.183136	
Standard Deviation of log data	0.667784	
Variance of log data	0.445935	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.874242	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.382829	
MLE Standard Deviation	0.286981	
MLE Coefficient of Variation	0.749633	
MLE Skewness	2.670157	
MLE Median	0.306317	
MLE 80% Quantile	0.538559	
MLE 90% Quantile	0.722503	
MLE 95% Quantile	0.918851	
MLE 99% Quantile	1.447922	
MVU Estimate of Median	0.303227	
MVU Estimate of Mean	0.378239	
MVU Estimate of Standard Deviation	0.271614	
MVU Estimate of SE of Mean	0.057365	
95% H-UCL	0.52348	
95% Chebyshev (MVUE) UCL	0.628289	
97.5% Chebyshev (MVUE) UCL	0.736486	
99% Chebyshev (MVUE) UCL	0.949017	
Non-parametric Statisitics		
95% CLT UCL	0.444273	
95% Adjusted-CLT UCL	0.446664	
95% Modified-t UCL	0.448051	
95% Jackknife UCL	0.447679	
95% Chebyshev (Mean, Sd) UCL	0.566074	
97.5% Chebyshev (Mean, Sd) UCL	0.650719	
99% Chebyshev (Mean, Sd) UCL	0.816988	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.442136	
95% Bootstrap-t UCL	0.449768	
95% Hall's Bootstrap UCL	0.448542	
95% Percentile Bootstrap UCL	0.443636	
95% BCA Bootstrap UCL	0.467045	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.566074	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	10.3	
Maximum	107	
Mean	56.35	
Standard Deviation	31.04029	
Variance	963.4995	
Coefficient of Variation	0.550848	
Skewness	0.131468	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.934384	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	67.73755	
Gamma Statistics		
k hat	2.793217	
k star (bias corrected)	2.442627	
Theta hat	20.17387	
Theta star	23.06943	
nu hat	122.9015	
nu star	107.4756	
5% Approximate Chi Square Value	84.5449	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	83.02733	
Anderson-Darling Test Statistic	0.534559	
Anderson-Darling 5% Critical Value	0.75081	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.169185	
Kolmogrov-Smirnov 5% Critical Value	0.186942	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	71.63351	
95% Adjusted Gamma UCL	72.94283	
Lognormal Statistics		
Minimum of log data	2.332144	
Maximum of log data	4.672829	
Mean of log data	3.842026	
Standard Deviation of log data	0.683719	
Variance of log data	0.467472	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.921017	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	58.89533	
MLE Standard Deviation	45.46609	
MLE Coefficient of Variation	0.771981	
MLE Skewness	2.77601	
MLE Median	46.61982	
MLE 80% Quantile	83.07706	
MLE 90% Quantile	112.2362	
MLE 95% Quantile	143.5587	
MLE 99% Quantile	228.6877	
MVU Estimate of Median	46.1269	
MVU Estimate of Mean	58.14984	
MVU Estimate of Standard Deviation	42.90132	
MVU Estimate of SE of Mean	9.053063	
95% H-UCL	81.3441	
95% Chebyshev (MVUE) UCL	97.61122	
97.5% Chebyshev (MVUE) UCL	114.6862	
99% Chebyshev (MVUE) UCL	148.2267	
Non-parametric Statisitics		
95% CLT UCL	67.23533	
95% Adjusted-CLT UCL	67.43353	
95% Modified-t UCL	67.76847	
95% Jackknife UCL	67.73755	
95% Chebyshev (Mean, Sd) UCL	85.19637	
97.5% Chebyshev (Mean, Sd) UCL	97.67822	
99% Chebyshev (Mean, Sd) UCL	122.1964	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	66.96271	
95% Bootstrap-t UCL	67.69612	
95% Hall's Bootstrap UCL	66.80603	
95% Percentile Bootstrap UCL	66.875	
95% BCA Bootstrap UCL	64.72955	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	67.73755	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - nt-3.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	22	
Number of Missing Data	0	
Number of Valid Observations	22	
Number of Distinct Observations	22	
Minimum	80.1	
Maximum	2640	
Mean	946.9591	
Standard Deviation	682.7133	
Variance	466097.4	
Coefficient of Variation	0.720953	
Skewness	0.957783	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.91583	
Shapiro-Wilk 5% Critical Value	0.911	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1197.422	
Gamma Statistics		
k hat	1.704762	
k star (bias corrected)	1.502597	
Theta hat	555.4788	
Theta star	630.2147	
nu hat	75.00953	
nu star	66.11429	
5% Approximate Chi Square Value	48.39995	
Adjusted Level of Significance	0.0386	
Adjusted Chi Square Value	47.2685	
Anderson-Darling Test Statistic	0.304317	
Anderson-Darling 5% Critical Value	0.75764	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.100088	
Kolmogrov-Smirnov 5% Critical Value	0.188266	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1293.545	
95% Adjusted Gamma UCL	1324.509	
Lognormal Statistics		
Minimum of log data	4.383276	
Maximum of log data	7.878534	
Mean of log data	6.532149	
Standard Deviation of log data	0.936391	
Variance of log data	0.876829	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.910892	
Shapiro-Wilk 5% Critical Value	0.911	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1064.822	
MLE Standard Deviation	1261.384	
MLE Coefficient of Variation	1.184595	
MLE Skewness	5.216089	
MLE Median	686.8726	
MLE 80% Quantile	1515.347	
MLE 90% Quantile	2287.95	
MLE 95% Quantile	3205.145	
MLE 99% Quantile	6064.426	
MVU Estimate of Median	673.3085	
MVU Estimate of Mean	1036.227	
MVU Estimate of Standard Deviation	1116.556	
MVU Estimate of SE of Mean	230.5765	
95% H-UCL	1762.577	
95% Chebyshev (MVUE) UCL	2041.287	
97.5% Chebyshev (MVUE) UCL	2476.177	
99% Chebyshev (MVUE) UCL	3330.434	
Non-parametric Statisitics		
95% CLT UCL	1186.376	
95% Adjusted-CLT UCL	1218.134	
95% Modified-t UCL	1202.375	
95% Jackknife UCL	1197.422	
95% Chebyshev (Mean, Sd) UCL	1581.418	
97.5% Chebyshev (Mean, Sd) UCL	1855.95	
99% Chebyshev (Mean, Sd) UCL	2395.213	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1186.003	
95% Bootstrap-t UCL	1257.059	
95% Hall's Bootstrap UCL	1225.318	
95% Percentile Bootstrap UCL	1184.364	
95% BCA Bootstrap UCL	1290.818	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1197.422	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Tetrachloroethene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.1185	
Maximum	0.1545	
Mean	0.1365	
Standard Deviation	0.025456	
Variance	0.000648	
Coefficient of Variation	0.18649	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-2.132842	
Maximum of log data	-1.867561	
Mean of log data	-2.000202	
Standard Deviation of log data	0.187582	
Variance of log data	0.035187	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	1.7E+269	
MLE Coefficient of Variation	1.7E+269	
MLE Skewness	0	
MLE Median	1.7E+269	
MLE 80% Quantile	2.6E-307	
MLE 90% Quantile	-5E+138	
MLE 95% Quantile	2.6E-308	
MLE 99% Quantile	2.6E-308	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.1365	
MVU Estimate of Standard Deviation	0.025456	
MVU Estimate of SE of Mean	0.018	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Trichloroethene	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.042	
Maximum	0.053	
Mean	0.0475	
Standard Deviation	0.007778	
Variance	6.05E-05	
Coefficient of Variation	0.163751	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.170086	
Maximum of log data	-2.937463	
Mean of log data	-3.053775	
Standard Deviation of log data	0.164489	
Variance of log data	0.027057	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	5.3E-308	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	7.7E-304	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	0.0475	
MVU Estimate of Standard Deviation	0.007778	
MVU Estimate of SE of Mean	0.0055	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.13	
Maximum	0.56	
Mean	0.28375	
Standard Deviation	0.190148	
Variance	0.036156	
Coefficient of Variation	0.670125	
Skewness	1.629241	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.846647	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.507494	
Gamma Statistics		
k hat	3.506159	
k star (bias corrected)	1.043206	
Theta hat	0.080929	
Theta star	0.271998	
nu hat	28.04927	
nu star	8.345652	
5% Approximate Chi Square Value	2.936069	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.337314	
Anderson-Darling 5% Critical Value	0.659142	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.284773	
Kolmogrov-Smirnov 5% Critical Value	0.396358	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.806547	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.040221	
Maximum of log data	-0.579818	
Mean of log data	-1.408994	
Standard Deviation of log data	0.612689	
Variance of log data	0.375388	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956041	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.294847	
MLE Standard Deviation	0.199006	
MLE Coefficient of Variation	0.674949	
MLE Skewness	2.332323	
MLE Median	0.244389	
MLE 80% Quantile	0.410134	
MLE 90% Quantile	0.537037	
MLE 95% Quantile	0.66957	
MLE 99% Quantile	1.016252	
MVU Estimate of Median	0.233082	
MVU Estimate of Mean	0.280274	
MVU Estimate of Standard Deviation	0.167129	
MVU Estimate of SE of Mean	0.083481	
95% H-UCL	2.177996	
95% Chebyshev (MVUE) UCL	0.644158	
97.5% Chebyshev (MVUE) UCL	0.801611	
99% Chebyshev (MVUE) UCL	1.110896	
Non-parametric Statisitics		
95% CLT UCL	0.440133	
95% Adjusted-CLT UCL	0.522888	
95% Modified-t UCL	0.520402	
95% Jackknife UCL	0.507494	
95% Chebyshev (Mean, Sd) UCL	0.698168	
97.5% Chebyshev (Mean, Sd) UCL	0.877487	
99% Chebyshev (Mean, Sd) UCL	1.229724	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.507494	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.16	
Maximum	1	
Mean	0.41625	
Standard Deviation	0.393136	
Variance	0.154556	
Coefficient of Variation	0.944472	
Skewness	1.882089	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.75458	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.878846	
Gamma Statistics		
k hat	1.955077	
k star (bias corrected)	0.655436	
Theta hat	0.212907	
Theta star	0.635074	
nu hat	15.64061	
nu star	5.243487	
5% Approximate Chi Square Value	1.265893	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.492481	
Anderson-Darling 5% Critical Value	0.660714	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.332712	
Kolmogrov-Smirnov 5% Critical Value	0.398043	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.72416	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	0	
Mean of log data	-1.153502	
Standard Deviation of log data	0.808705	
Variance of log data	0.654003	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.883159	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.437578	
MLE Standard Deviation	0.420445	
MLE Coefficient of Variation	0.960846	
MLE Skewness	3.769614	
MLE Median	0.31553	
MLE 80% Quantile	0.624911	
MLE 90% Quantile	0.891975	
MLE 95% Quantile	1.193413	
MLE 99% Quantile	2.069992	
MVU Estimate of Median	0.29036	
MVU Estimate of Mean	0.398811	
MVU Estimate of Standard Deviation	0.308033	
MVU Estimate of SE of Mean	0.153584	
95% H-UCL	13.35146	
95% Chebyshev (MVUE) UCL	1.068269	
97.5% Chebyshev (MVUE) UCL	1.357944	
99% Chebyshev (MVUE) UCL	1.926955	
Non-parametric Statisitics		
95% CLT UCL	0.739576	
95% Adjusted-CLT UCL	0.937229	
95% Modified-t UCL	0.909676	
95% Jackknife UCL	0.878846	
95% Chebyshev (Mean, Sd) UCL	1.273071	
97.5% Chebyshev (Mean, Sd) UCL	1.643818	
99% Chebyshev (Mean, Sd) UCL	2.372079	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.878846	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.29	
Maximum	1.5	
Mean	0.78375	
Standard Deviation	0.553585	
Variance	0.306456	
Coefficient of Variation	0.706328	
Skewness	0.779359	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.91974	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.435143	
Gamma Statistics		
k hat	2.603915	
k star (bias corrected)	0.817645	
Theta hat	0.300989	
Theta star	0.958545	
nu hat	20.83132	
nu star	6.541163	
5% Approximate Chi Square Value	1.921832	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.290703	
Anderson-Darling 5% Critical Value	0.659862	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.266255	
Kolmogrov-Smirnov 5% Critical Value	0.397091	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.667578	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.237874	
Maximum of log data	0.405465	
Mean of log data	-0.447804	
Standard Deviation of log data	0.751462	
Variance of log data	0.564695	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.948412	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.847507	
MLE Standard Deviation	0.73831	
MLE Coefficient of Variation	0.871155	
MLE Skewness	3.274595	
MLE Median	0.63903	
MLE 80% Quantile	1.205846	
MLE 90% Quantile	1.678373	
MLE 95% Quantile	2.199766	
MLE 99% Quantile	3.669651	
MVU Estimate of Median	0.594868	
MVU Estimate of Mean	0.783213	
MVU Estimate of Standard Deviation	0.565463	
MVU Estimate of SE of Mean	0.282124	
95% H-UCL	16.40561	
95% Chebyshev (MVUE) UCL	2.012964	
97.5% Chebyshev (MVUE) UCL	2.545078	
99% Chebyshev (MVUE) UCL	3.590313	
Non-parametric Statisitics		
95% CLT UCL	1.239033	
95% Adjusted-CLT UCL	1.354283	
95% Modified-t UCL	1.45312	
95% Jackknife UCL	1.435143	
95% Chebyshev (Mean, Sd) UCL	1.99026	
97.5% Chebyshev (Mean, Sd) UCL	2.512318	
99% Chebyshev (Mean, Sd) UCL	3.5378	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.435143	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.2	
Maximum	0.91	
Mean	0.5575	
Standard Deviation	0.317949	
Variance	0.101092	
Coefficient of Variation	0.570312	
Skewness	-0.031244	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.967124	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.931625	
Gamma Statistics		
k hat	3.429029	
k star (bias corrected)	1.023924	
Theta hat	0.162582	
Theta star	0.544474	
nu hat	27.43223	
nu star	8.191392	
5% Approximate Chi Square Value	2.845649	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.260747	
Anderson-Darling 5% Critical Value	0.659183	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.24919	
Kolmogrov-Smirnov 5% Critical Value	0.396388	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.604801	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.609438	
Maximum of log data	-0.094311	
Mean of log data	-0.737136	
Standard Deviation of log data	0.676563	
Variance of log data	0.457737	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.946008	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.601537	
MLE Standard Deviation	0.458312	
MLE Coefficient of Variation	0.761901	
MLE Skewness	2.727983	
MLE Median	0.478482	
MLE 80% Quantile	0.84752	
MLE 90% Quantile	1.141391	
MLE 95% Quantile	1.45617	
MLE 99% Quantile	2.308387	
MVU Estimate of Median	0.451571	
MVU Estimate of Mean	0.564949	
MVU Estimate of Standard Deviation	0.369896	
MVU Estimate of SE of Mean	0.184679	
95% H-UCL	6.754754	
95% Chebyshev (MVUE) UCL	1.369945	
97.5% Chebyshev (MVUE) UCL	1.718267	
99% Chebyshev (MVUE) UCL	2.402479	
Non-parametric Statisitics		
95% CLT UCL	0.81899	
95% Adjusted-CLT UCL	0.816336	
95% Modified-t UCL	0.931211	
95% Jackknife UCL	0.931625	
95% Chebyshev (Mean, Sd) UCL	1.250454	
97.5% Chebyshev (Mean, Sd) UCL	1.550296	
99% Chebyshev (Mean, Sd) UCL	2.139277	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.931625	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.046	
Maximum	0.32	
Mean	0.188667	
Standard Deviation	0.137351	
Variance	0.018865	
Coefficient of Variation	0.72801	
Skewness	-0.368783	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.079114	
Maximum of log data	-1.139434	
Mean of log data	-1.942662	
Standard Deviation of log data	1.011864	
Variance of log data	1.023868	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.239135	
MLE Standard Deviation	0.319399	
MLE Coefficient of Variation	1.335643	
MLE Skewness	6.389639	
MLE Median	0.143322	
MLE 80% Quantile	0.337012	
MLE 90% Quantile	0.526019	
MLE 95% Quantile	0.757186	
MLE 99% Quantile	1.508224	
MVU Estimate of Median	0.119889	
MVU Estimate of Mean	0.196571	
MVU Estimate of Standard Deviation	0.17766	
MVU Estimate of SE of Mean	0.10231	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.14	
Maximum	0.74	
Mean	0.315	
Standard Deviation	0.284429	
Variance	0.0809	
Coefficient of Variation	0.90295	
Skewness	1.953471	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.711928	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.649683	
Gamma Statistics		
k hat	2.212603	
k star (bias corrected)	0.719817	
Theta hat	0.142366	
Theta star	0.437611	
nu hat	17.70082	
nu star	5.758539	
5% Approximate Chi Square Value	1.517266	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.644232	
Anderson-Darling 5% Critical Value	0.660308	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.403579	
Kolmogrov-Smirnov 5% Critical Value	0.397615	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.195532	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	-0.301105	
Mean of log data	-1.397864	
Standard Deviation of log data	0.746324	
Variance of log data	0.556999	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.807855	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.326487	
MLE Standard Deviation	0.281883	
MLE Coefficient of Variation	0.863381	
MLE Skewness	3.233731	
MLE Median	0.247124	
MLE 80% Quantile	0.464302	
MLE 90% Quantile	0.644786	
MLE 95% Quantile	0.843529	
MLE 99% Quantile	1.402261	
MVU Estimate of Median	0.230274	
MVU Estimate of Mean	0.302075	
MVU Estimate of Standard Deviation	0.216712	
MVU Estimate of SE of Mean	0.108129	
95% H-UCL	6.077107	
95% Chebyshev (MVUE) UCL	0.7734	
97.5% Chebyshev (MVUE) UCL	0.977342	
99% Chebyshev (MVUE) UCL	1.377948	
Non-parametric Statisitics		
95% CLT UCL	0.548922	
95% Adjusted-CLT UCL	0.697345	
95% Modified-t UCL	0.672834	
95% Jackknife UCL	0.649683	
95% Chebyshev (Mean, Sd) UCL	0.934899	
97.5% Chebyshev (Mean, Sd) UCL	1.20313	
99% Chebyshev (Mean, Sd) UCL	1.730018	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.195532	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Phenanthrene	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.16	
Maximum	0.57	
Mean	0.31	
Standard Deviation	0.226053	
Variance	0.0511	
Coefficient of Variation	0.729204	
Skewness	1.671239	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	-0.562119	
Mean of log data	-1.334713	
Standard Deviation of log data	0.678325	
Variance of log data	0.460124	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.331327	
MLE Standard Deviation	0.253258	
MLE Coefficient of Variation	0.764376	
MLE Skewness	2.739731	
MLE Median	0.263234	
MLE 80% Quantile	0.466952	
MLE 90% Quantile	0.629351	
MLE 95% Quantile	0.803427	
MLE 99% Quantile	1.275158	
MVU Estimate of Median	0.243431	
MVU Estimate of Mean	0.305182	
MVU Estimate of Standard Deviation	0.196088	
MVU Estimate of SE of Mean	0.113145	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning?		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Aroclor 1254	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	2	
Minimum	0.00165	
Maximum	0.0155	
Mean	0.006267	
Standard Deviation	0.007996	
Variance	6.39E-05	
Coefficient of Variation	1.276006	
Skewness	1.732051	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-6.40698	
Maximum of log data	-4.166915	
Mean of log data	-5.660292	
Standard Deviation of log data	1.293302	
Variance of log data	1.67263	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.008035	
MLE Standard Deviation	0.016712	
MLE Coefficient of Variation	2.079942	
MLE Skewness	15.23798	
MLE Median	0.003482	
MLE 80% Quantile	0.010384	
MLE 90% Quantile	0.018345	
MLE 95% Quantile	0.029223	
MLE 99% Quantile	0.070505	
MVU Estimate of Median	0.002577	
MVU Estimate of Mean	0.005711	
MVU Estimate of Standard Deviation	0.006217	
MVU Estimate of SE of Mean	0.003568	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Aroclor 1260	
Raw Statistics		
Number of Observations	3	
Number of Missing Data	0	
Number of Valid Observations	3	
Number of Distinct Observations	3	
Minimum	0.011	
Maximum	0.058	
Mean	0.028167	
Standard Deviation	0.025934	
Variance	0.000673	
Coefficient of Variation	0.920741	
Skewness	1.673568	
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-4.50986	
Maximum of log data	-2.847312	
Mean of log data	-3.841363	
Standard Deviation of log data	0.877784	
Variance of log data	0.770505	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0.031552	
MLE Standard Deviation	0.033995	
MLE Coefficient of Variation	1.077431	
MLE Skewness	4.483034	
MLE Median	0.021464	
MLE 80% Quantile	0.045066	
MLE 90% Quantile	0.06631	
MLE 95% Quantile	0.090953	
MLE 99% Quantile	0.165359	
MVU Estimate of Median	0.018795	
MVU Estimate of Mean	0.027341	
MVU Estimate of Standard Deviation	0.021989	
MVU Estimate of SE of Mean	0.012676	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	30	
Number of Missing Data	0	
Number of Valid Observations	30	
Number of Distinct Observations	30	
Minimum	0.5	
Maximum	68	
Mean	9.991667	
Standard Deviation	12.87038	
Variance	165.6467	
Coefficient of Variation	1.288112	
Skewness	3.367425	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.649397	
Shapiro-Wilk 5% Critical Value	0.927	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	13.98427	
Gamma Statistics		
k hat	0.887665	
k star (bias corrected)	0.821121	
Theta hat	11.25612	
Theta star	12.16833	
nu hat	53.25991	
nu star	49.26725	
5% Approximate Chi Square Value	34.15029	
Adjusted Level of Significance	0.041	
Adjusted Chi Square Value	33.4239	
Anderson-Darling Test Statistic	0.50413	
Anderson-Darling 5% Critical Value	0.781011	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.104051	
Kolmogrov-Smirnov 5% Critical Value	0.165464	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	14.41458	
95% Adjusted Gamma UCL	14.72784	
Lognormal Statistics		
Minimum of log data	-0.693147	
Maximum of log data	4.219508	
Mean of log data	1.642024	
Standard Deviation of log data	1.271383	
Variance of log data	1.616415	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.944662	
Shapiro-Wilk 5% Critical Value	0.927	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	11.59103	
MLE Standard Deviation	23.28328	
MLE Coefficient of Variation	2.008733	
MLE Skewness	14.13145	
MLE Median	5.165615	
MLE 80% Quantile	15.12491	
MLE 90% Quantile	26.4631	
MLE 95% Quantile	41.82312	
MLE 99% Quantile	99.41084	
MVU Estimate of Median	5.028192	
MVU Estimate of Mean	11.07565	
MVU Estimate of Standard Deviation	18.91263	
MVU Estimate of SE of Mean	3.116748	
95% H-UCL	22.36553	
95% Chebyshev (MVUE) UCL	24.66124	
97.5% Chebyshev (MVUE) UCL	30.53973	
99% Chebyshev (MVUE) UCL	42.0869	
Non-parametric Statisitics		
95% CLT UCL	13.85674	
95% Adjusted-CLT UCL	15.40039	
95% Modified-t UCL	14.22505	
95% Jackknife UCL	13.98427	
95% Chebyshev (Mean, Sd) UCL	20.23421	
97.5% Chebyshev (Mean, Sd) UCL	24.66616	
99% Chebyshev (Mean, Sd) UCL	33.37188	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	13.82622	
95% Bootstrap-t UCL	17.28198	
95% Hall's Bootstrap UCL	31.07056	
95% Percentile Bootstrap UCL	13.93667	
95% BCA Bootstrap UCL	16.86	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	14.41458	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	30	
Minimum	6.6	
Maximum	4250	
Mean	643.0016	
Standard Deviation	1102.33	
Variance	1215132	
Coefficient of Variation	1.714351	
Skewness	2.373377	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.618068	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	973.401	
Gamma Statistics		
k hat	0.427702	
k star (bias corrected)	0.408438	
Theta hat	1503.388	
Theta star	1574.294	
nu hat	27.37291	
nu star	26.14003	
5% Approximate Chi Square Value	15.4854	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	15.0457	
Anderson-Darling Test Statistic	1.175493	
Anderson-Darling 5% Critical Value	0.826463	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.181023	
Kolmogrov-Smirnov 5% Critical Value	0.165931	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1085.415	
95% Adjusted Gamma UCL	1117.135	
Lognormal Statistics		
Minimum of log data	1.88707	
Maximum of log data	8.354674	
Mean of log data	4.944045	
Standard Deviation of log data	1.955027	
Variance of log data	3.82213	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.932737	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	948.7161	
MLE Standard Deviation	6343.033	
MLE Coefficient of Variation	6.685913	
MLE Skewness	318.9277	
MLE Median	140.3367	
MLE 80% Quantile	732.1917	
MLE 90% Quantile	1730.653	
MLE 95% Quantile	3498.41	
MLE 99% Quantile	13245.82	
MVU Estimate of Median	132.1867	
MVU Estimate of Mean	815.5704	
MVU Estimate of Standard Deviation	3183.843	
MVU Estimate of SE of Mean	381.4983	
95% H-UCL	3514.979	
95% Chebyshev (MVUE) UCL	2478.483	
97.5% Chebyshev (MVUE) UCL	3198.027	
99% Chebyshev (MVUE) UCL	4611.431	
Non-parametric Statisitics		
95% CLT UCL	963.5282	
95% Adjusted-CLT UCL	1050.887	
95% Modified-t UCL	987.0273	
95% Jackknife UCL	973.401	
95% Chebyshev (Mean, Sd) UCL	1492.404	
97.5% Chebyshev (Mean, Sd) UCL	1859.941	
99% Chebyshev (Mean, Sd) UCL	2581.897	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	954.4617	
95% Bootstrap-t UCL	1170.947	
95% Hall's Bootstrap UCL	1022.946	
95% Percentile Bootstrap UCL	963.2625	
95% BCA Bootstrap UCL	1159.645	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	2478.483	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	14.1	
Maximum	205	
Mean	92.72031	
Standard Deviation	47.83401	
Variance	2288.092	
Coefficient of Variation	0.515896	
Skewness	0.626861	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.950053	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	107.0575	
Gamma Statistics		
k hat	3.37364	
k star (bias corrected)	3.078195	
Theta hat	27.48376	
Theta star	30.12165	
nu hat	215.913	
nu star	197.0045	
5% Approximate Chi Square Value	165.5243	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	163.982	
Anderson-Darling Test Statistic	0.344308	
Anderson-Darling 5% Critical Value	0.752122	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.097756	
Kolmogrov-Smirnov 5% Critical Value	0.156407	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	110.3543	
95% Adjusted Gamma UCL	111.3922	
Lognormal Statistics		
Minimum of log data	2.646175	
Maximum of log data	5.32301	
Mean of log data	4.37412	
Standard Deviation of log data	0.61926	
Variance of log data	0.383483	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.926837	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	96.14535	
MLE Standard Deviation	65.73041	
MLE Coefficient of Variation	0.683657	
MLE Skewness	2.370502	
MLE Median	79.36994	
MLE 80% Quantile	133.9403	
MLE 90% Quantile	175.8917	
MLE 95% Quantile	219.8185	
MLE 99% Quantile	335.1299	
MVU Estimate of Median	78.8957	
MVU Estimate of Mean	95.4725	
MVU Estimate of Standard Deviation	63.59473	
MVU Estimate of SE of Mean	11.15073	
95% H-UCL	120.4137	
95% Chebyshev (MVUE) UCL	144.0774	
97.5% Chebyshev (MVUE) UCL	165.1088	
99% Chebyshev (MVUE) UCL	206.4208	
Non-parametric Statisitics		
95% CLT UCL	106.6291	
95% Adjusted-CLT UCL	107.6303	
95% Modified-t UCL	107.2137	
95% Jackknife UCL	107.0575	
95% Chebyshev (Mean, Sd) UCL	129.5789	
97.5% Chebyshev (Mean, Sd) UCL	145.5276	
99% Chebyshev (Mean, Sd) UCL	176.8558	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	106.5428	
95% Bootstrap-t UCL	107.7565	
95% Hall's Bootstrap UCL	108.2466	
95% Percentile Bootstrap UCL	107.6031	
95% BCA Bootstrap UCL	103.0594	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	107.0575	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning'	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	0.46	
Maximum	15.2	
Mean	7.312188	
Standard Deviation	4.111383	
Variance	16.90347	
Coefficient of Variation	0.562264	
Skewness	0.07539	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.959126	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	8.544485	
Gamma Statistics		
k hat	2.06668	
k star (bias corrected)	1.893762	
Theta hat	3.538132	
Theta star	3.861196	
nu hat	132.2675	
nu star	121.2008	
5% Approximate Chi Square Value	96.77321	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	95.60551	
Anderson-Darling Test Statistic	0.812072	
Anderson-Darling 5% Critical Value	0.758568	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.108147	
Kolmogrov-Smirnov 5% Critical Value	0.157481	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	9.157935	
95% Adjusted Gamma UCL	9.269788	
Lognormal Statistics		
Minimum of log data	-0.776529	
Maximum of log data	2.721295	
Mean of log data	1.728513	
Standard Deviation of log data	0.893006	
Variance of log data	0.79746	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.829144	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	8.391698	
MLE Standard Deviation	9.268537	
MLE Coefficient of Variation	1.104489	
MLE Skewness	4.660827	
MLE Median	5.632272	
MLE 80% Quantile	11.97838	
MLE 90% Quantile	17.74362	
MLE 95% Quantile	24.47147	
MLE 99% Quantile	44.95425	
MVU Estimate of Median	5.562501	
MVU Estimate of Mean	8.251453	
MVU Estimate of Standard Deviation	8.569704	
MVU Estimate of SE of Mean	1.468261	
95% H-UCL	12.12976	
95% Chebyshev (MVUE) UCL	14.65145	
97.5% Chebyshev (MVUE) UCL	17.42074	
99% Chebyshev (MVUE) UCL	22.86046	
Non-parametric Statisitics		
95% CLT UCL	8.507662	
95% Adjusted-CLT UCL	8.518012	
95% Modified-t UCL	8.546099	
95% Jackknife UCL	8.544485	
95% Chebyshev (Mean, Sd) UCL	10.48022	
97.5% Chebyshev (Mean, Sd) UCL	11.85103	
99% Chebyshev (Mean, Sd) UCL	14.54372	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.474327	
95% Bootstrap-t UCL	8.633541	
95% Hall's Bootstrap UCL	8.562587	
95% Percentile Bootstrap UCL	8.5075	
95% BCA Bootstrap UCL	8.883125	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	8.544485	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	14.3	
Maximum	5500	
Mean	1045.963	
Standard Deviation	1163.041	
Variance	1352664	
Coefficient of Variation	1.111933	
Skewness	1.998719	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.794464	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1394.559	
Gamma Statistics		
k hat	0.763508	
k star (bias corrected)	0.712762	
Theta hat	1369.944	
Theta star	1467.478	
nu hat	48.86449	
nu star	45.61678	
5% Approximate Chi Square Value	31.11936	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	30.47756	
Anderson-Darling Test Statistic	0.281979	
Anderson-Darling 5% Critical Value	0.787088	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.093058	
Kolmogrov-Smirnov 5% Critical Value	0.161512	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1533.24	
95% Adjusted Gamma UCL	1565.527	
Lognormal Statistics		
Minimum of log data	2.66026	
Maximum of log data	8.612503	
Mean of log data	6.170523	
Standard Deviation of log data	1.530108	
Variance of log data	2.341232	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.933211	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1542.468	
MLE Standard Deviation	4727.614	
MLE Coefficient of Variation	3.064968	
MLE Skewness	37.9873	
MLE Median	478.4363	
MLE 80% Quantile	1743.177	
MLE 90% Quantile	3417.663	
MLE 95% Quantile	5928.647	
MLE 99% Quantile	16807.07	
MVU Estimate of Median	461.2318	
MVU Estimate of Mean	1434.552	
MVU Estimate of Standard Deviation	3389.175	
MVU Estimate of SE of Mean	495.8219	
95% H-UCL	3625.004	
95% Chebyshev (MVUE) UCL	3595.789	
97.5% Chebyshev (MVUE) UCL	4530.959	
99% Chebyshev (MVUE) UCL	6367.917	
Non-parametric Statisitics		
95% CLT UCL	1384.142	
95% Adjusted-CLT UCL	1461.763	
95% Modified-t UCL	1406.666	
95% Jackknife UCL	1394.559	
95% Chebyshev (Mean, Sd) UCL	1942.146	
97.5% Chebyshev (Mean, Sd) UCL	2329.925	
99% Chebyshev (Mean, Sd) UCL	3091.642	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1383.572	
95% Bootstrap-t UCL	1503.303	
95% Hall's Bootstrap UCL	1606.135	
95% Percentile Bootstrap UCL	1413.156	
95% BCA Bootstrap UCL	1571.572	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1533.24	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	31	
Minimum	18.8	
Maximum	2080	
Mean	629.7125	
Standard Deviation	465.206	
Variance	216416.6	
Coefficient of Variation	0.738759	
Skewness	1.055874	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92269	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	769.1478	
Gamma Statistics		
k hat	1.339539	
k star (bias corrected)	1.23479	
Theta hat	470.0965	
Theta star	509.9752	
nu hat	85.73049	
nu star	79.02659	
5% Approximate Chi Square Value	59.5417	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	58.63611	
Anderson-Darling Test Statistic	0.68406	
Anderson-Darling 5% Critical Value	0.768015	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.169185	
Kolmogrov-Smirnov 5% Critical Value	0.158877	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	835.7846	
95% Adjusted Gamma UCL	848.6926	
Lognormal Statistics		
Minimum of log data	2.933857	
Maximum of log data	7.640123	
Mean of log data	6.027681	
Standard Deviation of log data	1.15761	
Variance of log data	1.340062	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.854271	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	810.5494	
MLE Standard Deviation	1360.97	
MLE Coefficient of Variation	1.679071	
MLE Skewness	9.770982	
MLE Median	414.7523	
MLE 80% Quantile	1103.081	
MLE 90% Quantile	1835.754	
MLE 95% Quantile	2784.853	
MLE 99% Quantile	6125.913	
MVU Estimate of Median	406.1529	
MVU Estimate of Mean	784.1488	
MVU Estimate of Standard Deviation	1168.063	
MVU Estimate of SE of Mean	191.1947	
95% H-UCL	1394.217	
95% Chebyshev (MVUE) UCL	1617.547	
97.5% Chebyshev (MVUE) UCL	1978.16	
99% Chebyshev (MVUE) UCL	2686.512	
Non-parametric Statisitics		
95% CLT UCL	764.9813	
95% Adjusted-CLT UCL	781.3829	
95% Modified-t UCL	771.7061	
95% Jackknife UCL	769.1478	
95% Chebyshev (Mean, Sd) UCL	988.1778	
97.5% Chebyshev (Mean, Sd) UCL	1143.286	
99% Chebyshev (Mean, Sd) UCL	1447.966	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	765.9336	
95% Bootstrap-t UCL	792.743	
95% Hall's Bootstrap UCL	798.1702	
95% Percentile Bootstrap UCL	771.4438	
95% BCA Bootstrap UCL	830.3375	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	835.7846	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	23.9	
Maximum	1240	
Mean	468.4344	
Standard Deviation	254.2232	
Variance	64629.44	
Coefficient of Variation	0.542708	
Skewness	0.578618	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.958143	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	544.6322	
Gamma Statistics		
k hat	2.438091	
k star (bias corrected)	2.230353	
Theta hat	192.1316	
Theta star	210.027	
nu hat	156.0378	
nu star	142.7426	
5% Approximate Chi Square Value	116.128	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	114.8441	
Anderson-Darling Test Statistic	1.014276	
Anderson-Darling 5% Critical Value	0.756326	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.185787	
Kolmogrov-Smirnov 5% Critical Value	0.157111	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	575.7919	
95% Adjusted Gamma UCL	582.2286	
Lognormal Statistics		
Minimum of log data	3.173878	
Maximum of log data	7.122867	
Mean of log data	5.930518	
Standard Deviation of log data	0.804933	
Variance of log data	0.647917	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.847397	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	520.337	
MLE Standard Deviation	496.794	
MLE Coefficient of Variation	0.954754	
MLE Skewness	3.734575	
MLE Median	376.3494	
MLE 80% Quantile	742.993	
MLE 90% Quantile	1058.764	
MLE 95% Quantile	1414.644	
MLE 99% Quantile	2447.427	
MVU Estimate of Median	372.5574	
MVU Estimate of Mean	513.5963	
MVU Estimate of Standard Deviation	467.4651	
MVU Estimate of SE of Mean	80.87662	
95% H-UCL	715.4475	
95% Chebyshev (MVUE) UCL	866.1293	
97.5% Chebyshev (MVUE) UCL	1018.671	
99% Chebyshev (MVUE) UCL	1318.309	
Non-parametric Statisitics		
95% CLT UCL	542.3553	
95% Adjusted-CLT UCL	547.2671	
95% Modified-t UCL	545.3984	
95% Jackknife UCL	544.6322	
95% Chebyshev (Mean, Sd) UCL	664.3265	
97.5% Chebyshev (Mean, Sd) UCL	749.0892	
99% Chebyshev (Mean, Sd) UCL	915.5891	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	540.8426	
95% Bootstrap-t UCL	549.8178	
95% Hall's Bootstrap UCL	549.3974	
95% Percentile Bootstrap UCL	541.3781	
95% BCA Bootstrap UCL	528.2969	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	544.6322	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	31	
Minimum	89.5	
Maximum	2020	
Mean	828.1531	
Standard Deviation	580.8321	
Variance	337366	
Coefficient of Variation	0.701358	
Skewness	0.486343	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922525	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1002.245	
Gamma Statistics		
k hat	1.651563	
k star (bias corrected)	1.517562	
Theta hat	501.4361	
Theta star	545.7129	
nu hat	105.7	
nu star	97.12397	
5% Approximate Chi Square Value	75.38696	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	74.362	
Anderson-Darling Test Statistic	0.60229	
Anderson-Darling 5% Critical Value	0.762786	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.13741	
Kolmogrov-Smirnov 5% Critical Value	0.158079	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1066.942	
95% Adjusted Gamma UCL	1081.648	
Lognormal Statistics		
Minimum of log data	4.494239	
Maximum of log data	7.610853	
Mean of log data	6.386876	
Standard Deviation of log data	0.924609	
Variance of log data	0.854902	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.91281	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	910.8035	
MLE Standard Deviation	1058.707	
MLE Coefficient of Variation	1.162388	
MLE Skewness	5.057717	
MLE Median	593.998	
MLE 80% Quantile	1297.469	
MLE 90% Quantile	1948.858	
MLE 95% Quantile	2718.562	
MLE 99% Quantile	5102.66	
MVU Estimate of Median	586.1131	
MVU Estimate of Mean	894.2009	
MVU Estimate of Standard Deviation	971.9725	
MVU Estimate of SE of Mean	165.8458	
95% H-UCL	1341.558	
95% Chebyshev (MVUE) UCL	1617.106	
97.5% Chebyshev (MVUE) UCL	1929.907	
99% Chebyshev (MVUE) UCL	2544.345	
Non-parametric Statisitics		
95% CLT UCL	997.0427	
95% Adjusted-CLT UCL	1006.475	
95% Modified-t UCL	1003.716	
95% Jackknife UCL	1002.245	
95% Chebyshev (Mean, Sd) UCL	1275.714	
97.5% Chebyshev (Mean, Sd) UCL	1469.374	
99% Chebyshev (Mean, Sd) UCL	1849.782	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	994.7058	
95% Bootstrap-t UCL	1014.03	
95% Hall's Bootstrap UCL	1009.445	
95% Percentile Bootstrap UCL	992.9344	
95% BCA Bootstrap UCL	1051.141	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1066.942	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	30	
Minimum	0.045	
Maximum	27.5	
Mean	3.163281	
Standard Deviation	5.501886	
Variance	30.27075	
Coefficient of Variation	1.739297	
Skewness	3.268623	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.583947	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	4.812351	
Gamma Statistics		
k hat	0.583534	
k star (bias corrected)	0.549661	
Theta hat	5.420901	
Theta star	5.754965	
nu hat	37.34619	
nu star	35.17832	
5% Approximate Chi Square Value	22.60598	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	22.06561	
Anderson-Darling Test Statistic	0.784407	
Anderson-Darling 5% Critical Value	0.802821	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.160891	
Kolmogrov-Smirnov 5% Critical Value	0.163438	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4.922544	
95% Adjusted Gamma UCL	5.043092	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	3.314186	
Mean of log data	0.088383	
Standard Deviation of log data	1.558251	
Variance of log data	2.428145	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.987065	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	3.678317	
MLE Standard Deviation	11.82671	
MLE Coefficient of Variation	3.21525	
MLE Skewness	42.88446	
MLE Median	1.092406	
MLE 80% Quantile	4.075954	
MLE 90% Quantile	8.09086	
MLE 95% Quantile	14.17819	
MLE 99% Quantile	40.97138	
MVU Estimate of Median	1.051691	
MVU Estimate of Mean	3.407421	
MVU Estimate of Standard Deviation	8.326438	
MVU Estimate of SE of Mean	1.204922	
95% H-UCL	8.879252	
95% Chebyshev (MVUE) UCL	8.659556	
97.5% Chebyshev (MVUE) UCL	10.93216	
99% Chebyshev (MVUE) UCL	15.39625	
Non-parametric Statisitics		
95% CLT UCL	4.763075	
95% Adjusted-CLT UCL	5.363566	
95% Modified-t UCL	4.906016	
95% Jackknife UCL	4.812351	
95% Chebyshev (Mean, Sd) UCL	7.402769	
97.5% Chebyshev (Mean, Sd) UCL	9.237199	
99% Chebyshev (Mean, Sd) UCL	12.84058	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.716161	
95% Bootstrap-t UCL	6.538577	
95% Hall's Bootstrap UCL	10.27466	
95% Percentile Bootstrap UCL	4.989688	
95% BCA Bootstrap UCL	5.882813	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	4.922544	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	30	
Minimum	0.4	
Maximum	79.2	
Mean	29.2625	
Standard Deviation	15.2405	
Variance	232.2729	
Coefficient of Variation	0.52082	
Skewness	0.632915	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.927749	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	33.83051	
Gamma Statistics		
k hat	2.154651	
k star (bias corrected)	1.973486	
Theta hat	13.58109	
Theta star	14.82782	
nu hat	137.8977	
nu star	126.3031	
5% Approximate Chi Square Value	101.3409	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	100.1449	
Anderson-Darling Test Statistic	1.943842	
Anderson-Darling 5% Critical Value	0.758037	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.221366	
Kolmogrov-Smirnov 5% Critical Value	0.157394	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	36.4704	
95% Adjusted Gamma UCL	36.90598	
Lognormal Statistics		
Minimum of log data	-0.916291	
Maximum of log data	4.371976	
Mean of log data	3.126654	
Standard Deviation of log data	0.965616	
Variance of log data	0.932414	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.714447	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	36.33789	
MLE Standard Deviation	45.10342	
MLE Coefficient of Variation	1.241223	
MLE Skewness	5.635937	
MLE Median	22.79758	
MLE 80% Quantile	51.55244	
MLE 90% Quantile	78.84394	
MLE 95% Quantile	111.6191	
MLE 99% Quantile	215.4387	
MVU Estimate of Median	22.4677	
MVU Estimate of Mean	35.59889	
MVU Estimate of Standard Deviation	41.00204	
MVU Estimate of SE of Mean	6.95528	
95% H-UCL	54.88654	
95% Chebyshev (MVUE) UCL	65.91625	
97.5% Chebyshev (MVUE) UCL	79.0346	
99% Chebyshev (MVUE) UCL	104.803	
Non-parametric Statisitics		
95% CLT UCL	33.69401	
95% Adjusted-CLT UCL	34.0161	
95% Modified-t UCL	33.88075	
95% Jackknife UCL	33.83051	
95% Chebyshev (Mean, Sd) UCL	41.0061	
97.5% Chebyshev (Mean, Sd) UCL	46.08756	
99% Chebyshev (Mean, Sd) UCL	56.06911	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	33.71687	
95% Bootstrap-t UCL	34.18088	
95% Hall's Bootstrap UCL	34.68567	
95% Percentile Bootstrap UCL	33.59219	
95% BCA Bootstrap UCL	32.63125	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	41.0061	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	31	
Number of Missing Data	0	
Number of Valid Observations	31	
Number of Distinct Observations	29	
Minimum	0.115	
Maximum	18.1	
Mean	2.717742	
Standard Deviation	4.682787	
Variance	21.9285	
Coefficient of Variation	1.723043	
Skewness	2.093169	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.614623	
Shapiro-Wilk 5% Critical Value	0.929	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	4.145229	
Gamma Statistics		
k hat	0.486856	
k star (bias corrected)	0.461247	
Theta hat	5.582226	
Theta star	5.892167	
nu hat	30.18509	
nu star	28.59729	
5% Approximate Chi Square Value	17.39181	
Adjusted Level of Significance	0.0413	
Adjusted Chi Square Value	16.90532	
Anderson-Darling Test Statistic	2.95045	
Anderson-Darling 5% Critical Value	0.812697	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.33507	
Kolmogrov-Smirnov 5% Critical Value	0.16706	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	4.468774	
95% Adjusted Gamma UCL	4.597373	
Lognormal Statistics		
Minimum of log data	-2.162823	
Maximum of log data	2.895912	
Mean of log data	-0.310275	
Standard Deviation of log data	1.587814	
Variance of log data	2.521153	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858797	
Shapiro-Wilk 5% Critical Value	0.929	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	2.586489	
MLE Standard Deviation	8.74942	
MLE Coefficient of Variation	3.382741	
MLE Skewness	48.8567	
MLE Median	0.733245	
MLE 80% Quantile	2.805067	
MLE 90% Quantile	5.641024	
MLE 95% Quantile	9.990939	
MLE 99% Quantile	29.45842	
MVU Estimate of Median	0.70399	
MVU Estimate of Mean	2.379956	
MVU Estimate of Standard Deviation	5.984315	
MVU Estimate of SE of Mean	0.871946	
95% H-UCL	6.542384	
95% Chebyshev (MVUE) UCL	6.180682	
97.5% Chebyshev (MVUE) UCL	7.825259	
99% Chebyshev (MVUE) UCL	11.05571	
Non-parametric Statisitics		
95% CLT UCL	4.101152	
95% Adjusted-CLT UCL	4.439005	
95% Modified-t UCL	4.197927	
95% Jackknife UCL	4.145229	
95% Chebyshev (Mean, Sd) UCL	6.383809	
97.5% Chebyshev (Mean, Sd) UCL	7.970119	
99% Chebyshev (Mean, Sd) UCL	11.08612	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.061807	
95% Bootstrap-t UCL	4.729065	
95% Hall's Bootstrap UCL	4.416809	
95% Percentile Bootstrap UCL	4.204516	
95% BCA Bootstrap UCL	5.012419	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	6.383809	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	10.3	
Maximum	107	
Mean	60.65781	
Standard Deviation	28.54584	
Variance	814.8649	
Coefficient of Variation	0.470604	
Skewness	-0.163366	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.942233	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	69.2138	
Gamma Statistics		
k hat	3.489732	
k star (bias corrected)	3.183403	
Theta hat	17.38179	
Theta star	19.05439	
nu hat	223.3429	
nu star	203.7378	
5% Approximate Chi Square Value	171.7036	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	170.1319	
Anderson-Darling Test Statistic	0.934963	
Anderson-Darling 5% Critical Value	0.751869	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.181672	
Kolmogrov-Smirnov 5% Critical Value	0.156363	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	71.97456	
95% Adjusted Gamma UCL	72.63948	
Lognormal Statistics		
Minimum of log data	2.332144	
Maximum of log data	4.672829	
Mean of log data	3.955182	
Standard Deviation of log data	0.615763	
Variance of log data	0.379164	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.889013	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	63.10275	
MLE Standard Deviation	42.84777	
MLE Coefficient of Variation	0.679016	
MLE Skewness	2.350116	
MLE Median	52.20521	
MLE 80% Quantile	87.83868	
MLE 90% Quantile	115.1733	
MLE 95% Quantile	143.7553	
MLE 99% Quantile	218.6444	
MVU Estimate of Median	51.89678	
MVU Estimate of Mean	62.6668	
MVU Estimate of Standard Deviation	41.47301	
MVU Estimate of SE of Mean	7.273146	
95% H-UCL	78.9034	
95% Chebyshev (MVUE) UCL	94.36971	
97.5% Chebyshev (MVUE) UCL	108.0876	
99% Chebyshev (MVUE) UCL	135.0337	
Non-parametric Statisitics		
95% CLT UCL	68.95814	
95% Adjusted-CLT UCL	68.80242	
95% Modified-t UCL	69.18951	
95% Jackknife UCL	69.2138	
95% Chebyshev (Mean, Sd) UCL	82.65386	
97.5% Chebyshev (Mean, Sd) UCL	92.17156	
99% Chebyshev (Mean, Sd) UCL	110.8673	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	68.94146	
95% Bootstrap-t UCL	68.8418	
95% Hall's Bootstrap UCL	69.39082	
95% Percentile Bootstrap UCL	68.79688	
95% BCA Bootstrap UCL	66.75469	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	69.2138	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	32	
Number of Missing Data	0	
Number of Valid Observations	32	
Number of Distinct Observations	32	
Minimum	80.1	
Maximum	3770	
Mean	1372.128	
Standard Deviation	942.4868	
Variance	888281.5	
Coefficient of Variation	0.68688	
Skewness	0.681586	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.940725	
Shapiro-Wilk 5% Critical Value	0.93	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1654.618	
Gamma Statistics		
k hat	1.67643	
k star (bias corrected)	1.540098	
Theta hat	818.482	
Theta star	890.9354	
nu hat	107.2915	
nu star	98.56629	
5% Approximate Chi Square Value	76.65926	
Adjusted Level of Significance	0.0416	
Adjusted Chi Square Value	75.62528	
Anderson-Darling Test Statistic	0.382076	
Anderson-Darling 5% Critical Value	0.762514	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.13102	
Kolmogrov-Smirnov 5% Critical Value	0.158041	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1764.243	
95% Adjusted Gamma UCL	1788.365	
Lognormal Statistics		
Minimum of log data	4.383276	
Maximum of log data	8.23483	
Mean of log data	6.897133	
Standard Deviation of log data	0.961138	
Variance of log data	0.923786	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.900055	
Shapiro-Wilk 5% Critical Value	0.93	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1570.307	
MLE Standard Deviation	1935.246	
MLE Coefficient of Variation	1.2324	
MLE Skewness	5.56898	
MLE Median	989.4343	
MLE 80% Quantile	2228.97	
MLE 90% Quantile	3402.262	
MLE 95% Quantile	4808.812	
MLE 99% Quantile	9253.346	
MVU Estimate of Median	975.249	
MVU Estimate of Mean	1538.746	
MVU Estimate of Standard Deviation	1761.231	
MVU Estimate of SE of Mean	298.9616	
95% H-UCL	2365.27	
95% Chebyshev (MVUE) UCL	2841.889	
97.5% Chebyshev (MVUE) UCL	3405.761	
99% Chebyshev (MVUE) UCL	4513.377	
Non-parametric Statisitics		
95% CLT UCL	1646.177	
95% Adjusted-CLT UCL	1667.627	
95% Modified-t UCL	1657.964	
95% Jackknife UCL	1654.618	
95% Chebyshev (Mean, Sd) UCL	2098.363	
97.5% Chebyshev (Mean, Sd) UCL	2412.605	
99% Chebyshev (Mean, Sd) UCL	3029.874	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1638.17	
95% Bootstrap-t UCL	1678.284	
95% Hall's Bootstrap UCL	1673.179	
95% Percentile Bootstrap UCL	1638.409	
95% BCA Bootstrap UCL	1764.316	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1654.618	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - bw.xls	
Variable:	Chromium VI	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	2.325	
Maximum	13.5	
Mean	5.7748	
Standard Deviation	4.678883	
Variance	21.89195	
Coefficient of Variation	0.810224	
Skewness	1.541776	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.815656	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	10.2356	
Gamma Statistics		
k hat	2.307384	
k star (bias corrected)	1.056287	
Theta hat	2.502748	
Theta star	5.467076	
nu hat	23.07384	
nu star	10.56287	
5% Approximate Chi Square Value	4.295664	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	2.735907	
Anderson-Darling Test Statistic	0.400839	
Anderson-Darling 5% Critical Value	0.683891	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.271191	
Kolmogrov-Smirnov 5% Critical Value	0.360147	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	14.2	
95% Adjusted Gamma UCL	22.29552	
Lognormal Statistics		
Minimum of log data	0.84372	
Maximum of log data	2.60269	
Mean of log data	1.521427	
Standard Deviation of log data	0.736089	
Variance of log data	0.541827	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906942	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	6.003488	
MLE Standard Deviation	5.091101	
MLE Coefficient of Variation	0.848024	
MLE Skewness	3.153923	
MLE Median	4.578756	
MLE 80% Quantile	8.528575	
MLE 90% Quantile	11.79059	
MLE 95% Quantile	15.36809	
MLE 99% Quantile	25.37006	
MVU Estimate of Median	4.335107	
MVU Estimate of Mean	5.645451	
MVU Estimate of Standard Deviation	4.081691	
MVU Estimate of SE of Mean	1.819489	
95% H-UCL	24.34161	
95% Chebyshev (MVUE) UCL	13.57642	
97.5% Chebyshev (MVUE) UCL	17.00816	
99% Chebyshev (MVUE) UCL	23.74914	
Non-parametric Statisitics		
95% CLT UCL	9.216591	
95% Adjusted-CLT UCL	10.7582	
95% Modified-t UCL	10.47606	
95% Jackknife UCL	10.2356	
95% Chebyshev (Mean, Sd) UCL	14.89562	
97.5% Chebyshev (Mean, Sd) UCL	18.84221	
99% Chebyshev (Mean, Sd) UCL	26.59452	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.897762	
95% Bootstrap-t UCL	28.01135	
95% Hall's Bootstrap UCL	37.31197	
95% Percentile Bootstrap UCL	9.0871	
95% BCA Bootstrap UCL	11.5165	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	10.2356	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLS\G&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable	Trichloroethene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.042	
Maximum	0.042	
Mean	0.042	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.170086	
Maximum of log data	-3.170086	
Mean of log data	-3.170086	
Standard Deviation of log data	1.7E+269	
Variance of log data	1.9E-305	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	1.7E+269	
MLE Coefficient of Variation	1.7E+269	
MLE Skewness	0	
MLE Median	1.7E+269	
MLE 80% Quantile	1.9E-305	
MLE 90% Quantile	-5E+138	
MLE 95% Quantile	2.6E-308	
MLE 99% Quantile	2.6E-308	
MVU Estimate of Median	0	
MVU Estimate of Mean	0	
MVU Estimate of Standard Deviation	0	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.13	
Maximum	0.13	
Mean	0.13	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-2.040221	
Maximum of log data	-2.040221	
Mean of log data	-2.040221	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	2.1E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-2.4E-159	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.16	
Maximum	0.16	
Mean	0.16	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	-1.832581	
Mean of log data	-1.832581	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	8E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	9.4E-280	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.29	
Maximum	0.29	
Mean	0.29	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.237874	
Maximum of log data	-1.237874	
Mean of log data	-1.237874	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	4E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-2.4E-159	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.2	
Maximum	0.2	
Mean	0.2	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.609438	
Maximum of log data	-1.609438	
Mean of log data	-1.609438	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	5.2E-306	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	7.7E-304	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.046	
Maximum	0.046	
Mean	0.046	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-3.079114	
Maximum of log data	-3.079114	
Mean of log data	-3.079114	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	1.4E-304	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	7.7E-304	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.14	
Maximum	0.14	
Mean	0.14	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	-1.966113	
Mean of log data	-1.966113	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	1E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	8.6E-174	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Phenanthrene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.16	
Maximum	0.16	
Mean	0.16	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	-1.832581	
Mean of log data	-1.832581	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	2.1E-304	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	9.4E-280	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable	Aroclor 1260	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.011	
Maximum	0.011	
Mean	0.011	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	*Too Few Observations To Calculate UCLs*
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-4.50986	
Maximum of log data	-4.50986	
Mean of log data	-4.50986	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	4.6E-305	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-3.2E-241	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	*Too Few Observations To Calculate UCLs*
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	19	
Number of Missing Data	0	
Number of Valid Observations	19	
Number of Distinct Observations	19	
Minimum	0.5	
Maximum	24.5	
Mean	5.989474	
Standard Deviation	5.980235	
Variance	35.76322	
Coefficient of Variation	0.998458	
Skewness	1.774968	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.817913	
Shapiro-Wilk 5% Critical Value	0.901	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	8.36854	
Gamma Statistics		
k hat	1.132949	
k star (bias corrected)	0.98915	
Theta hat	5.28662	
Theta star	6.05517	
nu hat	43.05208	
nu star	37.58772	
5% Approximate Chi Square Value	24.54783	
Adjusted Level of Significance	0.03687	
Adjusted Chi Square Value	23.6275	
Anderson-Darling Test Statistic	0.28954	
Anderson-Darling 5% Critical Value	0.765962	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.124472	
Kolmogrov-Smirnov 5% Critical Value	0.203719	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	9.171101	
95% Adjusted Gamma UCL	9.528331	
Lognormal Statistics		
Minimum of log data	-0.693147	
Maximum of log data	3.198673	
Mean of log data	1.287666	
Standard Deviation of log data	1.103424	
Variance of log data	1.217544	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963955	
Shapiro-Wilk 5% Critical Value	0.901	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	6.662123	
MLE Standard Deviation	10.2754	
MLE Coefficient of Variation	1.542361	
MLE Skewness	8.296173	
MLE Median	3.624319	
MLE 80% Quantile	9.207877	
MLE 90% Quantile	14.96278	
MLE 95% Quantile	22.26015	
MLE 99% Quantile	47.19226	
MVU Estimate of Median	3.509853	
MVU Estimate of Mean	6.352399	
MVU Estimate of Standard Deviation	8.353233	
MVU Estimate of SE of Mean	1.819396	
95% H-UCL	13.71267	
95% Chebyshev (MVUE) UCL	14.28296	
97.5% Chebyshev (MVUE) UCL	17.71452	
99% Chebyshev (MVUE) UCL	24.45516	
Non-parametric Statisitics		
95% CLT UCL	8.246147	
95% Adjusted-CLT UCL	8.843094	
95% Modified-t UCL	8.461651	
95% Jackknife UCL	8.36854	
95% Chebyshev (Mean, Sd) UCL	11.96971	
97.5% Chebyshev (Mean, Sd) UCL	14.55736	
99% Chebyshev (Mean, Sd) UCL	19.6403	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.20562	
95% Bootstrap-t UCL	9.33198	
95% Hall's Bootstrap UCL	10.22155	
95% Percentile Bootstrap UCL	8.307895	
95% BCA Bootstrap UCL	9.463158	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	9.171101	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	19	
Minimum	6.6	
Maximum	1450	
Mean	136.3833	
Standard Deviation	313.0736	
Variance	98015.06	
Coefficient of Variation	2.295541	
Skewness	4.061086	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.421129	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	254.2131	
Gamma Statistics		
k hat	0.570986	
k star (bias corrected)	0.521162	
Theta hat	238.856	
Theta star	261.6907	
nu hat	23.98139	
nu star	21.88881	
5% Approximate Chi Square Value	12.25337	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	11.70041	
Anderson-Darling Test Statistic	1.522292	
Anderson-Darling 5% Critical Value	0.79891	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.234692	
Kolmogrov-Smirnov 5% Critical Value	0.199383	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	243.6284	
95% Adjusted Gamma UCL	255.1424	
Lognormal Statistics		
Minimum of log data	1.88707	
Maximum of log data	7.279319	
Mean of log data	3.825343	
Standard Deviation of log data	1.341271	
Variance of log data	1.799008	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.946423	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	112.7133	
MLE Standard Deviation	253.1322	
MLE Coefficient of Variation	2.245807	
MLE Skewness	18.06449	
MLE Median	45.84852	
MLE 80% Quantile	142.411	
MLE 90% Quantile	256.9487	
MLE 95% Quantile	416.4364	
MLE 99% Quantile	1038.092	
MVU Estimate of Median	43.92245	
MVU Estimate of Mean	104.7399	
MVU Estimate of Standard Deviation	184.033	
MVU Estimate of SE of Mean	36.2189	
95% H-UCL	282.3031	
95% Chebyshev (MVUE) UCL	262.6145	
97.5% Chebyshev (MVUE) UCL	330.9269	
99% Chebyshev (MVUE) UCL	465.1135	
Non-parametric Statisitics		
95% CLT UCL	248.7569	
95% Adjusted-CLT UCL	313.4487	
95% Modified-t UCL	264.3037	
95% Jackknife UCL	254.2131	
95% Chebyshev (Mean, Sd) UCL	434.1757	
97.5% Chebyshev (Mean, Sd) UCL	563.0307	
99% Chebyshev (Mean, Sd) UCL	816.1414	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	248.6699	
95% Bootstrap-t UCL	551.781	
95% Hall's Bootstrap UCL	607.587	
95% Percentile Bootstrap UCL	259.9714	
95% BCA Bootstrap UCL	362.1048	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	262.6145	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	14.1	
Maximum	177	
Mean	78.59048	
Standard Deviation	41.12793	
Variance	1691.507	
Coefficient of Variation	0.52332	
Skewness	0.58547	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.968674	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	94.06956	
Gamma Statistics		
k hat	3.212862	
k star (bias corrected)	2.785628	
Theta hat	24.4612	
Theta star	28.21284	
nu hat	134.9402	
nu star	116.9964	
5% Approximate Chi Square Value	93.01788	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	91.37605	
Anderson-Darling Test Statistic	0.285797	
Anderson-Darling 5% Critical Value	0.748969	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.126136	
Kolmogrov-Smirnov 5% Critical Value	0.1908	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	98.84983	
95% Adjusted Gamma UCL	100.6259	
Lognormal Statistics		
Minimum of log data	2.646175	
Maximum of log data	5.17615	
Mean of log data	4.200628	
Standard Deviation of log data	0.643729	
Variance of log data	0.414387	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.927557	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	82.09045	
MLE Standard Deviation	58.82187	
MLE Coefficient of Variation	0.71655	
MLE Skewness	2.517556	
MLE Median	66.72822	
MLE 80% Quantile	114.9594	
MLE 90% Quantile	152.6	
MLE 95% Quantile	192.3973	
MLE 99% Quantile	298.253	
MVU Estimate of Median	66.0728	
MVU Estimate of Mean	81.14382	
MVU Estimate of Standard Deviation	55.79674	
MVU Estimate of SE of Mean	12.07823	
95% H-UCL	111.5459	
95% Chebyshev (MVUE) UCL	133.7916	
97.5% Chebyshev (MVUE) UCL	156.5723	
99% Chebyshev (MVUE) UCL	201.3207	
Non-parametric Statisitics		
95% CLT UCL	93.35279	
95% Adjusted-CLT UCL	94.57798	
95% Modified-t UCL	94.26067	
95% Jackknife UCL	94.06956	
95% Chebyshev (Mean, Sd) UCL	117.7109	
97.5% Chebyshev (Mean, Sd) UCL	134.6384	
99% Chebyshev (Mean, Sd) UCL	167.8891	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	92.6563	
95% Bootstrap-t UCL	95.33293	
95% Hall's Bootstrap UCL	95.86612	
95% Percentile Bootstrap UCL	93.3381	
95% BCA Bootstrap UCL	90.30952	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	94.06956	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	0.46	
Maximum	12.3	
Mean	5.211429	
Standard Deviation	3.103225	
Variance	9.630003	
Coefficient of Variation	0.595465	
Skewness	0.391543	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.970563	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	6.379372	
Gamma Statistics		
k hat	1.973024	
k star (bias corrected)	1.72291	
Theta hat	2.64134	
Theta star	3.024783	
nu hat	82.86703	
nu star	72.36221	
5% Approximate Chi Square Value	53.7713	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	52.54015	
Anderson-Darling Test Statistic	0.635912	
Anderson-Darling 5% Critical Value	0.754047	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.147009	
Kolmogrov-Smirnov 5% Critical Value	0.191804	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	7.01323	
95% Adjusted Gamma UCL	7.177567	
Lognormal Statistics		
Minimum of log data	-0.776529	
Maximum of log data	2.509599	
Mean of log data	1.376525	
Standard Deviation of log data	0.908582	
Variance of log data	0.825522	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.844355	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	5.985175	
MLE Standard Deviation	6.779572	
MLE Coefficient of Variation	1.132728	
MLE Skewness	4.851554	
MLE Median	3.961111	
MLE 80% Quantile	8.535865	
MLE 90% Quantile	12.73116	
MLE 95% Quantile	17.65718	
MLE 99% Quantile	32.78225	
MVU Estimate of Median	3.883946	
MVU Estimate of Mean	5.829296	
MVU Estimate of Standard Deviation	6.025831	
MVU Estimate of SE of Mean	1.278535	
95% H-UCL	9.831869	
95% Chebyshev (MVUE) UCL	11.4023	
97.5% Chebyshev (MVUE) UCL	13.81374	
99% Chebyshev (MVUE) UCL	18.55056	
Non-parametric Statisitics		
95% CLT UCL	6.325289	
95% Adjusted-CLT UCL	6.387113	
95% Modified-t UCL	6.389015	
95% Jackknife UCL	6.379372	
95% Chebyshev (Mean, Sd) UCL	8.163184	
97.5% Chebyshev (Mean, Sd) UCL	9.440411	
99% Chebyshev (Mean, Sd) UCL	11.94928	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	6.288496	
95% Bootstrap-t UCL	6.428648	
95% Hall's Bootstrap UCL	6.438671	
95% Percentile Bootstrap UCL	6.295238	
95% BCA Bootstrap UCL	6.7	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	6.379372	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	14.3	
Maximum	2570	
Mean	560.9905	
Standard Deviation	710.38	
Variance	504639.8	
Coefficient of Variation	1.266296	
Skewness	1.831396	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.735238	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	828.3522	
Gamma Statistics		
k hat	0.735355	
k star (bias corrected)	0.662051	
Theta hat	762.8836	
Theta star	847.3529	
nu hat	30.88492	
nu star	27.80612	
5% Approximate Chi Square Value	16.77528	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	16.11745	
Anderson-Darling Test Statistic	0.321237	
Anderson-Darling 5% Critical Value	0.784136	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.119964	
Kolmogrov-Smirnov 5% Critical Value	0.197122	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	929.8783	
95% Adjusted Gamma UCL	967.8311	
Lognormal Statistics		
Minimum of log data	2.66026	
Maximum of log data	7.851661	
Mean of log data	5.51344	
Standard Deviation of log data	1.463751	
Variance of log data	2.142566	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.962649	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	723.9506	
MLE Standard Deviation	1985.43	
MLE Coefficient of Variation	2.742494	
MLE Skewness	28.85453	
MLE Median	248.0029	
MLE 80% Quantile	854.3232	
MLE 90% Quantile	1626.783	
MLE 95% Quantile	2755.378	
MLE 99% Quantile	7466.071	
MVU Estimate of Median	235.6406	
MVU Estimate of Mean	659.2284	
MVU Estimate of Standard Deviation	1325.216	
MVU Estimate of SE of Mean	252.5449	
95% H-UCL	2099.441	
95% Chebyshev (MVUE) UCL	1760.046	
97.5% Chebyshev (MVUE) UCL	2236.371	
99% Chebyshev (MVUE) UCL	3172.018	
Non-parametric Statisitics		
95% CLT UCL	815.9718	
95% Adjusted-CLT UCL	882.1682	
95% Modified-t UCL	838.6775	
95% Jackknife UCL	828.3522	
95% Chebyshev (Mean, Sd) UCL	1236.697	
97.5% Chebyshev (Mean, Sd) UCL	1529.075	
99% Chebyshev (Mean, Sd) UCL	2103.396	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	810.1077	
95% Bootstrap-t UCL	943.9504	
95% Hall's Bootstrap UCL	856.5065	
95% Percentile Bootstrap UCL	837.7667	
95% BCA Bootstrap UCL	946.1571	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	929.8783	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	18.8	
Maximum	1330	
Mean	482.7524	
Standard Deviation	383.0941	
Variance	146761.1	
Coefficient of Variation	0.793562	
Skewness	0.679584	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.928577	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	626.9354	
Gamma Statistics		
k hat	1.133508	
k star (bias corrected)	1.003324	
Theta hat	425.8925	
Theta star	481.153	
nu hat	47.60732	
nu star	42.13961	
5% Approximate Chi Square Value	28.25606	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	27.3826	
Anderson-Darling Test Statistic	0.433154	
Anderson-Darling 5% Critical Value	0.766571	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.152607	
Kolmogrov-Smirnov 5% Critical Value	0.194321	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	719.9518	
95% Adjusted Gamma UCL	742.917	
Lognormal Statistics		
Minimum of log data	2.933857	
Maximum of log data	7.192934	
Mean of log data	5.677441	
Standard Deviation of log data	1.25628	
Variance of log data	1.578239	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.879796	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	643.2675	
MLE Standard Deviation	1261.594	
MLE Coefficient of Variation	1.961228	
MLE Skewness	13.42738	
MLE Median	292.2007	
MLE 80% Quantile	844.7135	
MLE 90% Quantile	1468.153	
MLE 95% Quantile	2307.734	
MLE 99% Quantile	5429.206	
MVU Estimate of Median	281.4063	
MVU Estimate of Mean	605.0091	
MVU Estimate of Standard Deviation	965.2566	
MVU Estimate of SE of Mean	193.7015	
95% H-UCL	1466.02	
95% Chebyshev (MVUE) UCL	1449.334	
97.5% Chebyshev (MVUE) UCL	1814.674	
99% Chebyshev (MVUE) UCL	2532.314	
Non-parametric Statisitics		
95% CLT UCL	620.2588	
95% Adjusted-CLT UCL	633.5056	
95% Modified-t UCL	629.0016	
95% Jackknife UCL	626.9354	
95% Chebyshev (Mean, Sd) UCL	847.1476	
97.5% Chebyshev (Mean, Sd) UCL	1004.822	
99% Chebyshev (Mean, Sd) UCL	1314.542	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	618.8798	
95% Bootstrap-t UCL	632.8355	
95% Hall's Bootstrap UCL	639.086	
95% Percentile Bootstrap UCL	616.9048	
95% BCA Bootstrap UCL	680.7286	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	626.9354	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	23.9	
Maximum	810	
Mean	428.6381	
Standard Deviation	244.9038	
Variance	59977.89	
Coefficient of Variation	0.571353	
Skewness	-0.108936	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.949066	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	520.8112	
Gamma Statistics		
k hat	1.972796	
k star (bias corrected)	1.722714	
Theta hat	217.2744	
Theta star	248.8156	
nu hat	82.85743	
nu star	72.35399	
5% Approximate Chi Square Value	53.76421	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	52.53315	
Anderson-Darling Test Statistic	0.801095	
Anderson-Darling 5% Critical Value	0.754049	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.204022	
Kolmogrov-Smirnov 5% Critical Value	0.191805	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	576.8462	
95% Adjusted Gamma UCL	590.364	
Lognormal Statistics		
Minimum of log data	3.173878	
Maximum of log data	6.697034	
Mean of log data	5.786249	
Standard Deviation of log data	0.915968	
Variance of log data	0.838998	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.841889	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	495.5898	
MLE Standard Deviation	568.1041	
MLE Coefficient of Variation	1.146319	
MLE Skewness	4.945275	
MLE Median	325.7889	
MLE 80% Quantile	706.4432	
MLE 90% Quantile	1057.083	
MLE 95% Quantile	1470	
MLE 99% Quantile	2742.958	
MVU Estimate of Median	319.3396	
MVU Estimate of Mean	482.423	
MVU Estimate of Standard Deviation	503.7632	
MVU Estimate of SE of Mean	106.7998	
95% H-UCL	818.9999	
95% Chebyshev (MVUE) UCL	947.9528	
97.5% Chebyshev (MVUE) UCL	1149.388	
99% Chebyshev (MVUE) UCL	1545.068	
Non-parametric Statisitics		
95% CLT UCL	516.543	
95% Adjusted-CLT UCL	515.1856	
95% Modified-t UCL	520.5994	
95% Jackknife UCL	520.8112	
95% Chebyshev (Mean, Sd) UCL	661.5881	
97.5% Chebyshev (Mean, Sd) UCL	762.3858	
99% Chebyshev (Mean, Sd) UCL	960.3833	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	515.3754	
95% Bootstrap-t UCL	516.0363	
95% Hall's Bootstrap UCL	509.601	
95% Percentile Bootstrap UCL	512.7333	
95% BCA Bootstrap UCL	495.2381	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	520.8112	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	89.5	
Maximum	1910	
Mean	702.281	
Standard Deviation	596.8059	
Variance	356177.3	
Coefficient of Variation	0.849811	
Skewness	0.805352	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.870303	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	926.8974	
Gamma Statistics		
k hat	1.322286	
k star (bias corrected)	1.165134	
Theta hat	531.1112	
Theta star	602.7468	
nu hat	55.53602	
nu star	48.93564	
5% Approximate Chi Square Value	33.87398	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	32.91116	
Anderson-Darling Test Statistic	0.639561	
Anderson-Darling 5% Critical Value	0.762259	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.204357	
Kolmogrov-Smirnov 5% Critical Value	0.193517	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	1014.542	
95% Adjusted Gamma UCL	1044.222	
Lognormal Statistics		
Minimum of log data	4.494239	
Maximum of log data	7.554859	
Mean of log data	6.130765	
Standard Deviation of log data	1.006562	
Variance of log data	1.013166	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924027	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	763.069	
MLE Standard Deviation	1010.687	
MLE Coefficient of Variation	1.324503	
MLE Skewness	6.297095	
MLE Median	459.7879	
MLE 80% Quantile	1076.327	
MLE 90% Quantile	1676.053	
MLE 95% Quantile	2408.018	
MLE 99% Quantile	4779.196	
MVU Estimate of Median	448.8173	
MVU Estimate of Mean	737.4329	
MVU Estimate of Standard Deviation	868.5235	
MVU Estimate of SE of Mean	182.0833	
95% H-UCL	1361.633	
95% Chebyshev (MVUE) UCL	1531.116	
97.5% Chebyshev (MVUE) UCL	1874.543	
99% Chebyshev (MVUE) UCL	2549.139	
Non-parametric Statisitics		
95% CLT UCL	916.4964	
95% Adjusted-CLT UCL	940.9521	
95% Modified-t UCL	930.712	
95% Jackknife UCL	926.8974	
95% Chebyshev (Mean, Sd) UCL	1269.957	
97.5% Chebyshev (Mean, Sd) UCL	1515.59	
99% Chebyshev (Mean, Sd) UCL	1998.09	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	909.1348	
95% Bootstrap-t UCL	957.7414	
95% Hall's Bootstrap UCL	936.1212	
95% Percentile Bootstrap UCL	919.881	
95% BCA Bootstrap UCL	884.4	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1014.542	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	0.045	
Maximum	11.6	
Mean	1.365238	
Standard Deviation	2.494815	
Variance	6.224104	
Coefficient of Variation	1.827385	
Skewness	3.80744	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.483093	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.304198	
Gamma Statistics		
k hat	0.762007	
k star (bias corrected)	0.684895	
Theta hat	1.791635	
Theta star	1.993355	
nu hat	32.00428	
nu star	28.76558	
5% Approximate Chi Square Value	17.52326	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	16.8495	
Anderson-Darling Test Statistic	0.958861	
Anderson-Darling 5% Critical Value	0.782186	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.214099	
Kolmogrov-Smirnov 5% Critical Value	0.196823	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	2.241127	
95% Adjusted Gamma UCL	2.330744	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	2.451005	
Mean of log data	-0.472589	
Standard Deviation of log data	1.228793	
Variance of log data	1.509933	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.979278	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.326279	
MLE Standard Deviation	2.490591	
MLE Coefficient of Variation	1.877878	
MLE Skewness	12.25584	
MLE Median	0.623386	
MLE 80% Quantile	1.760752	
MLE 90% Quantile	3.023485	
MLE 95% Quantile	4.705706	
MLE 99% Quantile	10.86541	
MVU Estimate of Median	0.601338	
MVU Estimate of Mean	1.251856	
MVU Estimate of Standard Deviation	1.934694	
MVU Estimate of SE of Mean	0.390495	
95% H-UCL	2.935009	
95% Chebyshev (MVUE) UCL	2.953986	
97.5% Chebyshev (MVUE) UCL	3.690499	
99% Chebyshev (MVUE) UCL	5.137236	
Non-parametric Statisitics		
95% CLT UCL	2.260718	
95% Adjusted-CLT UCL	2.744036	
95% Modified-t UCL	2.379585	
95% Jackknife UCL	2.304198	
95% Chebyshev (Mean, Sd) UCL	3.738281	
97.5% Chebyshev (Mean, Sd) UCL	4.765098	
99% Chebyshev (Mean, Sd) UCL	6.782082	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.249539	
95% Bootstrap-t UCL	4.206354	
95% Hall's Bootstrap UCL	5.198587	
95% Percentile Bootstrap UCL	2.381429	
95% BCA Bootstrap UCL	3.003571	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	2.953986	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	20	
Minimum	4.8	
Maximum	79.2	
Mean	28.30476	
Standard Deviation	17.03128	
Variance	290.0645	
Coefficient of Variation	0.601711	
Skewness	1.104833	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.911969	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	34.71473	
Gamma Statistics		
k hat	2.529736	
k star (bias corrected)	2.200092	
Theta hat	11.18882	
Theta star	12.86527	
nu hat	106.2489	
nu star	92.40384	
5% Approximate Chi Square Value	71.23231	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	69.80456	
Anderson-Darling Test Statistic	0.510104	
Anderson-Darling 5% Critical Value	0.751484	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.146984	
Kolmogrov-Smirnov 5% Critical Value	0.191321	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	36.71745	
95% Adjusted Gamma UCL	37.46845	
Lognormal Statistics		
Minimum of log data	1.568616	
Maximum of log data	4.371976	
Mean of log data	3.13255	
Standard Deviation of log data	0.734106	
Variance of log data	0.538912	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.907407	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	30.02425	
MLE Standard Deviation	25.37254	
MLE Coefficient of Variation	0.845068	
MLE Skewness	3.138702	
MLE Median	22.93237	
MLE 80% Quantile	42.64326	
MLE 90% Quantile	58.90205	
MLE 95% Quantile	76.71936	
MLE 99% Quantile	126.4795	
MVU Estimate of Median	22.63983	
MVU Estimate of Mean	29.5553	
MVU Estimate of Standard Deviation	23.6289	
MVU Estimate of SE of Mean	5.089292	
95% H-UCL	43.29211	
95% Chebyshev (MVUE) UCL	51.73901	
97.5% Chebyshev (MVUE) UCL	61.33792	
99% Chebyshev (MVUE) UCL	80.19311	
Non-parametric Statisitics		
95% CLT UCL	34.41791	
95% Adjusted-CLT UCL	35.37534	
95% Modified-t UCL	34.86407	
95% Jackknife UCL	34.71473	
95% Chebyshev (Mean, Sd) UCL	44.50474	
97.5% Chebyshev (Mean, Sd) UCL	51.51448	
99% Chebyshev (Mean, Sd) UCL	65.28377	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	34.34885	
95% Bootstrap-t UCL	36.10932	
95% Hall's Bootstrap UCL	38.46282	
95% Percentile Bootstrap UCL	34.3	
95% BCA Bootstrap UCL	33.07143	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	34.71473	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	19	
Minimum	0.115	
Maximum	0.75	
Mean	0.359524	
Standard Deviation	0.2092	
Variance	0.043765	
Coefficient of Variation	0.581882	
Skewness	0.351797	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.908759	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.438259	
Gamma Statistics		
k hat	2.757111	
k star (bias corrected)	2.394984	
Theta hat	0.130399	
Theta star	0.150115	
nu hat	115.7987	
nu star	100.5893	
5% Approximate Chi Square Value	78.44593	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	76.94408	
Anderson-Darling Test Statistic	0.823269	
Anderson-Darling 5% Critical Value	0.750486	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.20616	
Kolmogrov-Smirnov 5% Critical Value	0.191137	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.461009	
95% Adjusted Gamma UCL	0.470007	
Lognormal Statistics		
Minimum of log data	-2.162823	
Maximum of log data	-0.287682	
Mean of log data	-1.21515	
Standard Deviation of log data	0.66675	
Variance of log data	0.444556	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.882128	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.370511	
MLE Standard Deviation	0.277215	
MLE Coefficient of Variation	0.748196	
MLE Skewness	2.663426	
MLE Median	0.296665	
MLE 80% Quantile	0.521135	
MLE 90% Quantile	0.69881	
MLE 95% Quantile	0.888388	
MLE 99% Quantile	1.398934	
MVU Estimate of Median	0.29354	
MVU Estimate of Mean	0.365881	
MVU Estimate of Standard Deviation	0.261816	
MVU Estimate of SE of Mean	0.056611	
95% H-UCL	0.510872	
95% Chebyshev (MVUE) UCL	0.612644	
97.5% Chebyshev (MVUE) UCL	0.719418	
99% Chebyshev (MVUE) UCL	0.929156	
Non-parametric Statisitics		
95% CLT UCL	0.434613	
95% Adjusted-CLT UCL	0.438358	
95% Modified-t UCL	0.438843	
95% Jackknife UCL	0.438259	
95% Chebyshev (Mean, Sd) UCL	0.558513	
97.5% Chebyshev (Mean, Sd) UCL	0.644616	
99% Chebyshev (Mean, Sd) UCL	0.813748	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.43334	
95% Bootstrap-t UCL	0.44398	
95% Hall's Bootstrap UCL	0.433697	
95% Percentile Bootstrap UCL	0.432857	
95% BCA Bootstrap UCL	0.462381	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.438259	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	10.3	
Maximum	104.35	
Mean	53.9381	
Standard Deviation	29.61917	
Variance	877.2952	
Coefficient of Variation	0.549133	
Skewness	0.153925	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.936778	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	65.08569	
Gamma Statistics		
k hat	2.852993	
k star (bias corrected)	2.477169	
Theta hat	18.90579	
Theta star	21.77409	
nu hat	119.8257	
nu star	104.0411	
5% Approximate Chi Square Value	81.49979	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	79.96759	
Anderson-Darling Test Statistic	0.510866	
Anderson-Darling 5% Critical Value	0.750065	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.173052	
Kolmogrov-Smirnov 5% Critical Value	0.191059	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	68.85635	
95% Adjusted Gamma UCL	70.17565	
Lognormal Statistics		
Minimum of log data	2.332144	
Maximum of log data	4.647751	
Mean of log data	3.802464	
Standard Deviation of log data	0.674308	
Variance of log data	0.454691	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.925247	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	56.25017	
MLE Standard Deviation	42.67925	
MLE Coefficient of Variation	0.75874	
MLE Skewness	2.713016	
MLE Median	44.81145	
MLE 80% Quantile	79.22197	
MLE 90% Quantile	106.5857	
MLE 95% Quantile	135.8702	
MLE 99% Quantile	215.057	
MVU Estimate of Median	44.3287	
MVU Estimate of Mean	55.5288	
MVU Estimate of Standard Deviation	40.24901	
MVU Estimate of SE of Mean	8.699463	
95% H-UCL	77.93829	
95% Chebyshev (MVUE) UCL	93.44888	
97.5% Chebyshev (MVUE) UCL	109.8569	
99% Chebyshev (MVUE) UCL	142.0874	
Non-parametric Statisitics		
95% CLT UCL	64.5695	
95% Adjusted-CLT UCL	64.80147	
95% Modified-t UCL	65.12188	
95% Jackknife UCL	65.08569	
95% Chebyshev (Mean, Sd) UCL	82.11155	
97.5% Chebyshev (Mean, Sd) UCL	94.30222	
99% Chebyshev (Mean, Sd) UCL	118.2484	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	64.30506	
95% Bootstrap-t UCL	65.59338	
95% Hall's Bootstrap UCL	64.5646	
95% Percentile Bootstrap UCL	64.40476	
95% BCA Bootstrap UCL	62.00714	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	65.08569	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - wg.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	21	
Number of Missing Data	0	
Number of Valid Observations	21	
Number of Distinct Observations	21	
Minimum	80.1	
Maximum	2080	
Mean	866.3381	
Standard Deviation	582.4587	
Variance	339258.2	
Coefficient of Variation	0.672323	
Skewness	0.732066	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.926517	
Shapiro-Wilk 5% Critical Value	0.908	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1085.555	
Gamma Statistics		
k hat	1.836925	
k star (bias corrected)	1.606253	
Theta hat	471.6242	
Theta star	539.3535	
nu hat	77.15083	
nu star	67.46262	
5% Approximate Chi Square Value	49.5557	
Adjusted Level of Significance	0.0383	
Adjusted Chi Square Value	48.37661	
Anderson-Darling Test Statistic	0.370553	
Anderson-Darling 5% Critical Value	0.755242	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.109743	
Kolmogrov-Smirnov 5% Critical Value	0.192079	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1179.389	
95% Adjusted Gamma UCL	1208.134	
Lognormal Statistics		
Minimum of log data	4.383276	
Maximum of log data	7.640123	
Mean of log data	6.468035	
Standard Deviation of log data	0.908689	
Variance of log data	0.825716	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892822	
Shapiro-Wilk 5% Critical Value	0.908	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	973.4957	
MLE Standard Deviation	1102.896	
MLE Coefficient of Variation	1.132924	
MLE Skewness	4.852897	
MLE Median	644.2167	
MLE 80% Quantile	1388.359	
MLE 90% Quantile	2070.822	
MLE 95% Quantile	2872.188	
MLE 99% Quantile	5332.88	
MVU Estimate of Median	631.664	
MVU Estimate of Mean	948.1345	
MVU Estimate of Standard Deviation	980.2452	
MVU Estimate of SE of Mean	207.9818	
95% H-UCL	1599.304	
95% Chebyshev (MVUE) UCL	1854.706	
97.5% Chebyshev (MVUE) UCL	2246.98	
99% Chebyshev (MVUE) UCL	3017.527	
Non-parametric Statisitics		
95% CLT UCL	1075.404	
95% Adjusted-CLT UCL	1097.1	
95% Modified-t UCL	1088.939	
95% Jackknife UCL	1085.555	
95% Chebyshev (Mean, Sd) UCL	1420.367	
97.5% Chebyshev (Mean, Sd) UCL	1660.096	
99% Chebyshev (Mean, Sd) UCL	2130.996	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1066.74	
95% Bootstrap-t UCL	1111.134	
95% Hall's Bootstrap UCL	1094.643	
95% Percentile Bootstrap UCL	1078	
95% BCA Bootstrap UCL	1184.957	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1085.555	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	*J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls*	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.33	
Maximum	0.33	
Mean	0.33	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	*Shapiro Wilk method yields a more accurate result*
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-1.108663	
Maximum of log data	-1.108663	
Mean of log data	-1.108663	
Standard Deviation of log data	1.7E+269	
Variance of log data	3.6E-304	
Lilliefors Test Statisitic	N/A	*Too Few Distinct Observations To Calculate UCLs*
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	1.7E+269	
MLE Coefficient of Variation	1.7E+269	
MLE Skewness	0	
MLE Median	1.7E+269	
MLE 80% Quantile	3.6E-304	
MLE 90% Quantile	-5E+138	
MLE 95% Quantile	2.6E-308	
MLE 99% Quantile	2.6E-308	
MVU Estimate of Median	0	
MVU Estimate of Mean	0	
MVU Estimate of Standard Deviation	0	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	1	
Number of Missing Data	0	
Number of Valid Observations	1	
Constant Data	1	
Minimum	0.61	
Maximum	0.61	
Mean	0.61	
Standard Deviation	N/A	Too few observations to calculate
Variance	N/A	Too few observations to calculate
Coefficient of Variation	0	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	*Shapiro Wilk method yields a more accurate result*
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	N/A	
k star (bias corrected)	N/A	
Theta hat	N/A	
Theta star	N/A	
nu hat	N/A	
nu star	N/A	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	N/A	
Anderson-Darling 5% Critical Value	N/A	
Anderson-Darling 5% Gamma Test Result	N/A	
Kolmogrov-Smirnov Test Statistic	N/A	
Kolmogrov-Smirnov 5% Critical Value	N/A	
Kolmogrov-Smirnov 5% Gamma Test Result	N/A	
5% Gamma Test Result	N/A	
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-0.494296	
Maximum of log data	-0.494296	
Mean of log data	-0.494296	
Standard Deviation of log data	2.2E-307	
Variance of log data	0	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	5.7E-306	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	8.6E-174	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	6.9E-306	
MVU Estimate of Standard Deviation	1.7E+269	
MVU Estimate of SE of Mean	0	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	Too Few Observations To Calculate UCLs
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	2	
Number of Missing Data	0	
Number of Valid Observations	2	
Number of Distinct Observations	2	
Minimum	0.5	
Maximum	57.3	
Mean	28.9	
Standard Deviation	40.16367	
Variance	1613.12	
Coefficient of Variation	1.389746	
Skewness	N/A	Too few observations to calculate
Too Few Distinct Observations?	YES	Too Few Observations To Calculate UCLs
Normal Statistics		
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Normality Test Result		
95% Student's-t UCL	N/A	Too Few Observations To Calculate UCLs
Gamma Statistics		
k hat	0	
k star (bias corrected)	0	
Theta hat	0	
Theta star	0	
nu hat	0	
nu star	0	
5% Approximate Chi Square Value	N/A	
Adjusted Level of Significance	0	
Adjusted Chi Square Value	0	
Anderson-Darling Test Statistic	0	
Anderson-Darling 5% Critical Value	0	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0	
Kolmogrov-Smirnov 5% Critical Value	0	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted Gamma UCL	N/A	Too Few Observations To Calculate UCLs
Lognormal Statistics		
Minimum of log data	-0.693147	
Maximum of log data	4.048301	
Mean of log data	1.677577	
Standard Deviation of log data	3.35271	
Variance of log data	11.24066	
Lilliefors Test Statisitic	N/A	Too Few Distinct Observations To Calculate UCLs
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic		
Shapiro-Wilk 5% Critical Value		
5% Lognormality Test Result		
MLE Mean	0	
MLE Standard Deviation	0	
MLE Coefficient of Variation	3.3E-304	
MLE Skewness	1.7E+269	
MLE Median	2.2E-307	
MLE 80% Quantile	4E+129	
MLE 90% Quantile	-3.2E-241	
MLE 95% Quantile	0	
MLE 99% Quantile	1.2E-306	
MVU Estimate of Median	0	
MVU Estimate of Mean	28.9	
MVU Estimate of Standard Deviation	40.16367	
MVU Estimate of SE of Mean	28.4	
95% H-UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (MVUE) UCL	N/A	Too Few Observations To Calculate UCLs
Non-parametric Statisitics		
95% CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Adjusted-CLT UCL	N/A	Too Few Observations To Calculate UCLs
95% Modified-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Jackknife UCL	N/A	Too Few Observations To Calculate UCLs
95% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
97.5% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
99% Chebyshev (Mean, Sd) UCL	N/A	Too Few Observations To Calculate UCLs
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Bootstrap-t UCL	N/A	Too Few Observations To Calculate UCLs
95% Hall's Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% Percentile Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
95% BCA Bootstrap UCL	N/A	Too Few Observations To Calculate UCLs
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution		
1st Recommended UCL	N/A	*Too Few Observations To Calculate UCLs*
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!		
Alternative UCL		

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	4.4	
Maximum	54.6	
Mean	40.81071	
Standard Deviation	12.58339	
Variance	158.3416	
Coefficient of Variation	0.308335	
Skewness	-2.011604	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.81163	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	46.76645	
Gamma Statistics		
k hat	4.688559	
k star (bias corrected)	3.731487	
Theta hat	8.704319	
Theta star	10.93685	
nu hat	131.2796	
nu star	104.4816	
5% Approximate Chi Square Value	81.89003	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	79.2395	
Anderson-Darling Test Statistic	1.96697	
Anderson-Darling 5% Critical Value	0.738656	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.34496	
Kolmogrov-Smirnov 5% Critical Value	0.22945	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	52.06946	
95% Adjusted Gamma UCL	53.81117	
Lognormal Statistics		
Minimum of log data	1.481605	
Maximum of log data	4.000034	
Mean of log data	3.598528	
Standard Deviation of log data	0.632948	
Variance of log data	0.400623	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.541519	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	44.64933	
MLE Standard Deviation	31.34223	
MLE Coefficient of Variation	0.701964	
MLE Skewness	2.451788	
MLE Median	36.5444	
MLE 80% Quantile	62.38774	
MLE 90% Quantile	82.42309	
MLE 95% Quantile	103.5161	
MLE 99% Quantile	159.296	
MVU Estimate of Median	36.02476	
MVU Estimate of Mean	43.91649	
MVU Estimate of Standard Deviation	29.15564	
MVU Estimate of SE of Mean	7.745219	
95% H-UCL	66.30822	
95% Chebyshev (MVUE) UCL	77.67711	
97.5% Chebyshev (MVUE) UCL	92.28536	
99% Chebyshev (MVUE) UCL	120.9804	
Non-parametric Statisitics		
95% CLT UCL	46.34244	
95% Adjusted-CLT UCL	44.41051	
95% Modified-t UCL	46.46511	
95% Jackknife UCL	46.76645	
95% Chebyshev (Mean, Sd) UCL	55.46992	
97.5% Chebyshev (Mean, Sd) UCL	61.81296	
99% Chebyshev (Mean, Sd) UCL	74.27265	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	46.15206	
95% Bootstrap-t UCL	45.40778	
95% Hall's Bootstrap UCL	44.98239	
95% Percentile Bootstrap UCL	45.78929	
95% BCA Bootstrap UCL	44.42143	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	55.46992	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	124	
Maximum	3420	
Mean	444.1071	
Standard Deviation	864.4128	
Variance	747209.5	
Coefficient of Variation	1.946406	
Skewness	3.62952	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.393366	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	853.2353	
Gamma Statistics		
k hat	0.937613	
k star (bias corrected)	0.784315	
Theta hat	473.6573	
Theta star	566.2358	
nu hat	26.25316	
nu star	21.96082	
5% Approximate Chi Square Value	12.30731	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	11.35759	
Anderson-Darling Test Statistic	2.501899	
Anderson-Darling 5% Critical Value	0.76262	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.378433	
Kolmogrov-Smirnov 5% Critical Value	0.235744	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	792.4521	
95% Adjusted Gamma UCL	858.717	
Lognormal Statistics		
Minimum of log data	4.820282	
Maximum of log data	8.137396	
Mean of log data	5.475687	
Standard Deviation of log data	0.870572	
Variance of log data	0.757896	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.698011	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	348.8478	
MLE Standard Deviation	371.4504	
MLE Coefficient of Variation	1.064792	
MLE Skewness	4.40162	
MLE Median	238.8146	
MLE 80% Quantile	498.3592	
MLE 90% Quantile	730.9704	
MLE 95% Quantile	1000.024	
MLE 99% Quantile	1809.198	
MVU Estimate of Median	232.4257	
MVU Estimate of Mean	336.884	
MVU Estimate of Standard Deviation	320.0978	
MVU Estimate of SE of Mean	83.92679	
95% H-UCL	652.3654	
95% Chebyshev (MVUE) UCL	702.7124	
97.5% Chebyshev (MVUE) UCL	861.0067	
99% Chebyshev (MVUE) UCL	1171.945	
Non-parametric Statisitics		
95% CLT UCL	824.1079	
95% Adjusted-CLT UCL	1063.562	
95% Modified-t UCL	890.5853	
95% Jackknife UCL	853.2353	
95% Chebyshev (Mean, Sd) UCL	1451.118	
97.5% Chebyshev (Mean, Sd) UCL	1886.852	
99% Chebyshev (Mean, Sd) UCL	2742.767	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	817.7106	
95% Bootstrap-t UCL	4611.371	
95% Hall's Bootstrap UCL	2636.943	
95% Percentile Bootstrap UCL	897.6071	
95% BCA Bootstrap UCL	845.6071	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1451.118	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - ww.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	13	
Minimum	0.024	
Maximum	9.6	
Mean	4.023143	
Standard Deviation	2.080885	
Variance	4.330083	
Coefficient of Variation	0.517229	
Skewness	1.09964	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.864781	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	5.00803	
Gamma Statistics		
k hat	1.563811	
k star (bias corrected)	1.276328	
Theta hat	2.572653	
Theta star	3.152123	
nu hat	43.78671	
nu star	35.73718	
5% Approximate Chi Square Value	23.05498	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	21.71018	
Anderson-Darling Test Statistic	1.883476	
Anderson-Darling 5% Critical Value	0.750048	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.368426	
Kolmogrov-Smirnov 5% Critical Value	0.232591	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	6.236212	
95% Adjusted Gamma UCL	6.622504	
Lognormal Statistics		
Minimum of log data	-3.729701	
Maximum of log data	2.261763	
Mean of log data	1.03945	
Standard Deviation of log data	1.410128	
Variance of log data	1.988462	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.512901	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	7.642164	
MLE Standard Deviation	19.18821	
MLE Coefficient of Variation	2.510835	
MLE Skewness	23.36155	
MLE Median	2.82766	
MLE 80% Quantile	9.309247	
MLE 90% Quantile	17.31312	
MLE 95% Quantile	28.76361	
MLE 99% Quantile	75.14416	
MVU Estimate of Median	2.632919	
MVU Estimate of Mean	6.772001	
MVU Estimate of Standard Deviation	11.77122	
MVU Estimate of SE of Mean	2.864524	
95% H-UCL	30.45086	
95% Chebyshev (MVUE) UCL	19.25817	
97.5% Chebyshev (MVUE) UCL	24.66095	
99% Chebyshev (MVUE) UCL	35.27365	
Non-parametric Statisitics		
95% CLT UCL	4.937912	
95% Adjusted-CLT UCL	5.112555	
95% Modified-t UCL	5.03527	
95% Jackknife UCL	5.00803	
95% Chebyshev (Mean, Sd) UCL	6.447301	
97.5% Chebyshev (Mean, Sd) UCL	7.496236	
99% Chebyshev (Mean, Sd) UCL	9.556665	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.878761	
95% Bootstrap-t UCL	5.270996	
95% Hall's Bootstrap UCL	6.151029	
95% Percentile Bootstrap UCL	4.944571	
95% BCA Bootstrap UCL	5.392857	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	9.556665	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	3670	
Maximum	24600	
Mean	12364.64	
Standard Deviation	6566.121	
Variance	43113940	
Coefficient of Variation	0.53104	
Skewness	0.705782	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.911089	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	15472.4	
Gamma Statistics		
k hat	3.859605	
k star (bias corrected)	3.080166	
Theta hat	3203.603	
Theta star	4014.278	
nu hat	108.0689	
nu star	86.24465	
5% Approximate Chi Square Value	65.83328	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	63.47084	
Anderson-Darling Test Statistic	0.332793	
Anderson-Darling 5% Critical Value	0.740466	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.14814	
Kolmogrov-Smirnov 5% Critical Value	0.229864	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	16198.26	
95% Adjusted Gamma UCL	16801.17	
Lognormal Statistics		
Minimum of log data	8.207947	
Maximum of log data	10.1105	
Mean of log data	9.287492	
Standard Deviation of log data	0.55018	
Variance of log data	0.302698	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.959459	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	12567.14	
MLE Standard Deviation	7471.97	
MLE Coefficient of Variation	0.594564	
MLE Skewness	1.993874	
MLE Median	10802.05	
MLE 80% Quantile	17195.35	
MLE 90% Quantile	21905.07	
MLE 95% Quantile	26703.19	
MLE 99% Quantile	38840.21	
MVU Estimate of Median	10685.82	
MVU Estimate of Mean	12416.01	
MVU Estimate of Standard Deviation	7084.198	
MVU Estimate of SE of Mean	1886.573	
95% H-UCL	17447.32	
95% Chebyshev (MVUE) UCL	20639.39	
97.5% Chebyshev (MVUE) UCL	24197.65	
99% Chebyshev (MVUE) UCL	31187.17	
Non-parametric Statisitics		
95% CLT UCL	15251.15	
95% Adjusted-CLT UCL	15604.84	
95% Modified-t UCL	15527.57	
95% Jackknife UCL	15472.4	
95% Chebyshev (Mean, Sd) UCL	20013.94	
97.5% Chebyshev (Mean, Sd) UCL	23323.8	
99% Chebyshev (Mean, Sd) UCL	29825.37	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	15123.36	
95% Bootstrap-t UCL	16048.06	
95% Hall's Bootstrap UCL	15563.43	
95% Percentile Bootstrap UCL	15276.07	
95% BCA Bootstrap UCL	14648.21	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	15472.4	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	178	
Maximum	598	
Mean	349.2143	
Standard Deviation	138.1845	
Variance	19094.95	
Coefficient of Variation	0.395701	
Skewness	0.88467	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.878768	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	414.6172	
Gamma Statistics		
k hat	7.525369	
k star (bias corrected)	5.960409	
Theta hat	46.40494	
Theta star	58.58898	
nu hat	210.7103	
nu star	166.8914	
5% Approximate Chi Square Value	138.0139	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	134.5317	
Anderson-Darling Test Statistic	0.443689	
Anderson-Darling 5% Critical Value	0.736242	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.154073	
Kolmogrov-Smirnov 5% Critical Value	0.228982	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	422.2827	
95% Adjusted Gamma UCL	433.2131	
Lognormal Statistics		
Minimum of log data	5.181784	
Maximum of log data	6.393591	
Mean of log data	5.787775	
Standard Deviation of log data	0.37761	
Variance of log data	0.14259	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.945229	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	350.398	
MLE Standard Deviation	137.1737	
MLE Coefficient of Variation	0.39148	
MLE Skewness	1.234436	
MLE Median	326.2862	
MLE 80% Quantile	448.9249	
MLE 90% Quantile	530.0674	
MLE 95% Quantile	607.252	
MLE 99% Quantile	785.324	
MVU Estimate of Median	324.6282	
MVU Estimate of Mean	348.5173	
MVU Estimate of Standard Deviation	133.9145	
MVU Estimate of SE of Mean	35.75996	
95% H-UCL	430.5059	
95% Chebyshev (MVUE) UCL	504.3914	
97.5% Chebyshev (MVUE) UCL	571.8382	
99% Chebyshev (MVUE) UCL	704.3245	
Non-parametric Statisitics		
95% CLT UCL	409.961	
95% Adjusted-CLT UCL	419.2912	
95% Modified-t UCL	416.0726	
95% Jackknife UCL	414.6172	
95% Chebyshev (Mean, Sd) UCL	510.1943	
97.5% Chebyshev (Mean, Sd) UCL	579.8505	
99% Chebyshev (Mean, Sd) UCL	716.6766	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	408.7465	
95% Bootstrap-t UCL	430.5832	
95% Hall's Bootstrap UCL	412.0247	
95% Percentile Bootstrap UCL	406.3571	
95% BCA Bootstrap UCL	438.1429	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	414.6172	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	147	
Maximum	495	
Mean	301.0714	
Standard Deviation	97.64099	
Variance	9533.764	
Coefficient of Variation	0.324312	
Skewness	0.217154	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.974021	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	347.2851	
Gamma Statistics		
k hat	9.678199	
k star (bias corrected)	7.651918	
Theta hat	31.10821	
Theta star	39.34588	
nu hat	270.9896	
nu star	214.2537	
5% Approximate Chi Square Value	181.3723	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	177.3598	
Anderson-Darling Test Statistic	0.242749	
Anderson-Darling 5% Critical Value	0.734753	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level.
Kolmogrov-Smirnov Test Statistic	0.169656	
Kolmogrov-Smirnov 5% Critical Value	0.228702	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	355.6534	
95% Adjusted Gamma UCL	363.6996	
Lognormal Statistics		
Minimum of log data	4.990433	
Maximum of log data	6.204558	
Mean of log data	5.654796	
Standard Deviation of log data	0.344791	
Variance of log data	0.118881	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.965129	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	303.1527	
MLE Standard Deviation	107.709	
MLE Coefficient of Variation	0.355296	
MLE Skewness	1.11074	
MLE Median	285.6583	
MLE 80% Quantile	382.2766	
MLE 90% Quantile	444.9012	
MLE 95% Quantile	503.698	
MLE 99% Quantile	637.0061	
MVU Estimate of Median	284.4477	
MVU Estimate of Mean	301.8075	
MVU Estimate of Standard Deviation	105.5851	
MVU Estimate of SE of Mean	28.2021	
95% H-UCL	364.8003	
95% Chebyshev (MVUE) UCL	424.7376	
97.5% Chebyshev (MVUE) UCL	477.9296	
99% Chebyshev (MVUE) UCL	582.4149	
Non-parametric Statisitics		
95% CLT UCL	343.995	
95% Adjusted-CLT UCL	345.6132	
95% Modified-t UCL	347.5375	
95% Jackknife UCL	347.2851	
95% Chebyshev (Mean, Sd) UCL	414.8197	
97.5% Chebyshev (Mean, Sd) UCL	464.0387	
99% Chebyshev (Mean, Sd) UCL	560.7199	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	342.45	
95% Bootstrap-t UCL	348.6895	
95% Hall's Bootstrap UCL	347.8433	
95% Percentile Bootstrap UCL	344	
95% BCA Bootstrap UCL	334.2143	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	347.2851	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	95.4	
Maximum	803	
Mean	329.2071	
Standard Deviation	201.7807	
Variance	40715.43	
Coefficient of Variation	0.612929	
Skewness	1.002546	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	*N/R*	*Shapiro Wilk method yields a more accurate result*
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.90555	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	424.7103	
Gamma Statistics		
k hat	3.018608	
k star (bias corrected)	2.419383	
Theta hat	109.0592	
Theta star	136.0707	
nu hat	84.52103	
nu star	67.74271	
5% Approximate Chi Square Value	49.79603	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	47.75887	
Anderson-Darling Test Statistic	0.29822	
Anderson-Darling 5% Critical Value	0.742476	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.163952	
Kolmogrov-Smirnov 5% Critical Value	0.230486	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	447.8547	
95% Adjusted Gamma UCL	466.9579	
Lognormal Statistics		
Minimum of log data	4.558079	
Maximum of log data	6.688355	
Mean of log data	5.621998	
Standard Deviation of log data	0.621884	
Variance of log data	0.38674	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.968417	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	335.4149	
MLE Standard Deviation	230.4801	
MLE Coefficient of Variation	0.687149	
MLE Skewness	2.385902	
MLE Median	276.4412	
MLE 80% Quantile	467.5426	
MLE 90% Quantile	614.6909	
MLE 95% Quantile	768.9285	
MLE 99% Quantile	1174.387	
MVU Estimate of Median	272.6457	
MVU Estimate of Mean	330.1229	
MVU Estimate of Standard Deviation	214.9908	
MVU Estimate of SE of Mean	57.13438	
95% H-UCL	493.4807	
95% Chebyshev (MVUE) UCL	579.1659	
97.5% Chebyshev (MVUE) UCL	686.927	
99% Chebyshev (MVUE) UCL	898.6028	
Non-parametric Statisitics		
95% CLT UCL	417.9111	
95% Adjusted-CLT UCL	433.3507	
95% Modified-t UCL	427.1186	
95% Jackknife UCL	424.7103	
95% Chebyshev (Mean, Sd) UCL	564.2745	
97.5% Chebyshev (Mean, Sd) UCL	665.9883	
99% Chebyshev (Mean, Sd) UCL	865.7854	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	413.5893	
95% Bootstrap-t UCL	453.1821	
95% Hall's Bootstrap UCL	448.2509	
95% Percentile Bootstrap UCL	419.1786	
95% BCA Bootstrap UCL	456.2429	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	424.7103	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	11	
Minimum	0.045	
Maximum	1.8	
Mean	0.9825	
Standard Deviation	0.44558	
Variance	0.198541	
Coefficient of Variation	0.453516	
Skewness	-0.295084	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.982372	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.193394	
Gamma Statistics		
k hat	2.525299	
k star (bias corrected)	2.031783	
Theta hat	0.389063	
Theta star	0.483565	
nu hat	70.70839	
nu star	56.88992	
5% Approximate Chi Square Value	40.54988	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	38.72447	
Anderson-Darling Test Statistic	0.916286	
Anderson-Darling 5% Critical Value	0.744139	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.241766	
Kolmogrov-Smirnov 5% Critical Value	0.231041	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1.37841	
95% Adjusted Gamma UCL	1.443386	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	0.587787	
Mean of log data	-0.228527	
Standard Deviation of log data	0.901024	
Variance of log data	0.811844	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.675646	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.194102	
MLE Standard Deviation	1.336145	
MLE Coefficient of Variation	1.118953	
MLE Skewness	4.757853	
MLE Median	0.795705	
MLE 80% Quantile	1.703761	
MLE 90% Quantile	2.532706	
MLE 95% Quantile	3.50313	
MLE 99% Quantile	6.470505	
MVU Estimate of Median	0.772921	
MVU Estimate of Mean	1.149641	
MVU Estimate of Standard Deviation	1.137145	
MVU Estimate of SE of Mean	0.29742	
95% H-UCL	2.309888	
95% Chebyshev (MVUE) UCL	2.446066	
97.5% Chebyshev (MVUE) UCL	3.007031	
99% Chebyshev (MVUE) UCL	4.108937	
Non-parametric Statisitics		
95% CLT UCL	1.178379	
95% Adjusted-CLT UCL	1.168344	
95% Modified-t UCL	1.191828	
95% Jackknife UCL	1.193394	
95% Chebyshev (Mean, Sd) UCL	1.501585	
97.5% Chebyshev (Mean, Sd) UCL	1.726193	
99% Chebyshev (Mean, Sd) UCL	2.167393	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.173946	
95% Bootstrap-t UCL	1.186271	
95% Hall's Bootstrap UCL	1.175653	
95% Percentile Bootstrap UCL	1.170714	
95% BCA Bootstrap UCL	1.227143	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.193394	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	13	
Minimum	18.9	
Maximum	28.9	
Mean	23.44643	
Standard Deviation	3.457126	
Variance	11.95172	
Coefficient of Variation	0.147448	
Skewness	0.493317	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.897191	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	25.08269	
Gamma Statistics		
k hat	50.98915	
k star (bias corrected)	40.11053	
Theta hat	0.459832	
Theta star	0.584546	
nu hat	1427.696	
nu star	1123.095	
5% Approximate Chi Square Value	1046.276	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	1036.436	
Anderson-Darling Test Statistic	0.568624	
Anderson-Darling 5% Critical Value	0.732978	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.168138	
Kolmogrov-Smirnov 5% Critical Value	0.228038	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	25.16789	
95% Adjusted Gamma UCL	25.40683	
Lognormal Statistics		
Minimum of log data	2.939162	
Maximum of log data	3.363842	
Mean of log data	3.14488	
Standard Deviation of log data	0.144647	
Variance of log data	0.020923	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.912159	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	23.46105	
MLE Standard Deviation	3.411404	
MLE Coefficient of Variation	0.145407	
MLE Skewness	0.439296	
MLE Median	23.21689	
MLE 80% Quantile	26.23533	
MLE 90% Quantile	27.95935	
MLE 95% Quantile	29.45386	
MLE 99% Quantile	32.50291	
MVU Estimate of Median	23.19955	
MVU Estimate of Mean	23.44338	
MVU Estimate of Standard Deviation	3.399797	
MVU Estimate of SE of Mean	0.908617	
95% H-UCL	25.20163	
95% Chebyshev (MVUE) UCL	27.40394	
97.5% Chebyshev (MVUE) UCL	29.11769	
99% Chebyshev (MVUE) UCL	32.484	
Non-parametric Statisitics		
95% CLT UCL	24.9662	
95% Adjusted-CLT UCL	25.09637	
95% Modified-t UCL	25.103	
95% Jackknife UCL	25.08269	
95% Chebyshev (Mean, Sd) UCL	27.47386	
97.5% Chebyshev (Mean, Sd) UCL	29.21653	
99% Chebyshev (Mean, Sd) UCL	32.63967	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	24.89696	
95% Bootstrap-t UCL	25.28398	
95% Hall's Bootstrap UCL	24.87452	
95% Percentile Bootstrap UCL	24.94286	
95% BCA Bootstrap UCL	25.47143	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	25.08269	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	13	
Minimum	0.325	
Maximum	2.7	
Mean	1.202143	
Standard Deviation	0.69098	
Variance	0.477453	
Coefficient of Variation	0.57479	
Skewness	0.800213	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.939463	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.529185	
Gamma Statistics		
k hat	3.093364	
k star (bias corrected)	2.478119	
Theta hat	0.38862	
Theta star	0.485103	
nu hat	86.61418	
nu star	69.38733	
5% Approximate Chi Square Value	51.20883	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	49.1411	
Anderson-Darling Test Statistic	0.178562	
Anderson-Darling 5% Critical Value	0.742297	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.107273	
Kolmogrov-Smirnov 5% Critical Value	0.230431	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.628889	
95% Adjusted Gamma UCL	1.697428	
Lognormal Statistics		
Minimum of log data	-1.12393	
Maximum of log data	0.993252	
Mean of log data	0.013847	
Standard Deviation of log data	0.637013	
Variance of log data	0.405786	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	*Shapiro Wilk method yields a more accurate result*
Shapiro-Wilk Test Statisitic	0.954413	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.242022	
MLE Standard Deviation	0.878664	
MLE Coefficient of Variation	0.707447	
MLE Skewness	2.476404	
MLE Median	1.013944	
MLE 80% Quantile	1.736938	
MLE 90% Quantile	2.298851	
MLE 95% Quantile	2.89138	
MLE 99% Quantile	4.461745	
MVU Estimate of Median	0.999341	
MVU Estimate of Mean	1.221341	
MVU Estimate of Standard Deviation	0.816525	
MVU Estimate of SE of Mean	0.216879	
95% H-UCL	1.85092	
95% Chebyshev (MVUE) UCL	2.166694	
97.5% Chebyshev (MVUE) UCL	2.57575	
99% Chebyshev (MVUE) UCL	3.37926	
Non-parametric Statisitics		
95% CLT UCL	1.505901	
95% Adjusted-CLT UCL	1.548102	
95% Modified-t UCL	1.535767	
95% *Jackknife* UCL	1.529185	
95% Chebyshev (Mean, Sd) UCL	2.00711	
97.5% Chebyshev (Mean, Sd) UCL	2.355419	
99% Chebyshev (Mean, Sd) UCL	3.039607	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.492251	
95% Bootstrap-t UCL	1.60718	
95% Hall's Bootstrap UCL	1.634459	
95% Percentile Bootstrap UCL	1.501786	
95% BCA Bootstrap UCL	1.441429	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.529185	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	39.8	
Maximum	103	
Mean	68.29643	
Standard Deviation	16.50462	
Variance	272.4025	
Coefficient of Variation	0.241662	
Skewness	0.409602	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.971135	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	76.1081	
Gamma Statistics		
k hat	18.35488	
k star (bias corrected)	14.46931	
Theta hat	3.720887	
Theta star	4.720089	
nu hat	513.9366	
nu star	405.1406	
5% Approximate Chi Square Value	359.474	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	353.7669	
Anderson-Darling Test Statistic	0.220403	
Anderson-Darling 5% Critical Value	0.734079	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.1074	
Kolmogrov-Smirnov 5% Critical Value	0.228334	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	76.97262	
95% Adjusted Gamma UCL	78.21438	
Lognormal Statistics		
Minimum of log data	3.683867	
Maximum of log data	4.634729	
Mean of log data	4.196369	
Standard Deviation of log data	0.245434	
Variance of log data	0.060238	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.976091	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	68.47635	
MLE Standard Deviation	17.06272	
MLE Coefficient of Variation	0.249177	
MLE Skewness	0.763002	
MLE Median	66.44466	
MLE 80% Quantile	81.75779	
MLE 90% Quantile	91.08125	
MLE 95% Quantile	99.49508	
MLE 99% Quantile	117.5953	
MVU Estimate of Median	66.30185	
MVU Estimate of Mean	68.32564	
MVU Estimate of Standard Deviation	16.8942	
MVU Estimate of SE of Mean	4.514463	
95% H-UCL	77.68432	
95% Chebyshev (MVUE) UCL	88.00373	
97.5% Chebyshev (MVUE) UCL	96.51845	
99% Chebyshev (MVUE) UCL	113.244	
Non-parametric Statisitics		
95% CLT UCL	75.55195	
95% Adjusted-CLT UCL	76.06792	
95% Modified-t UCL	76.18858	
95% Jackknife UCL	76.1081	
95% Chebyshev (Mean, Sd) UCL	87.52373	
97.5% Chebyshev (Mean, Sd) UCL	95.8434	
99% Chebyshev (Mean, Sd) UCL	112.1858	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	75.57653	
95% Bootstrap-t UCL	76.60664	
95% Hall's Bootstrap UCL	76.88956	
95% Percentile Bootstrap UCL	75.32143	
95% BCA Bootstrap UCL	78.06071	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	76.1081	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	888	
Maximum	1890	
Mean	1209.536	
Standard Deviation	275.2553	
Variance	75765.48	
Coefficient of Variation	0.227571	
Skewness	1.078465	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904215	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1339.815	
Gamma Statistics		
k hat	22.65868	
k star (bias corrected)	17.85086	
Theta hat	53.38069	
Theta star	67.75783	
nu hat	634.4429	
nu star	499.8242	
5% Approximate Chi Square Value	448.9696	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	442.5744	
Anderson-Darling Test Statistic	0.368263	
Anderson-Darling 5% Critical Value	0.7339	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.178383	
Kolmogrov-Smirnov 5% Critical Value	0.22825	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1346.539	
95% Adjusted Gamma UCL	1365.997	
Lognormal Statistics		
Minimum of log data	6.788972	
Maximum of log data	7.544332	
Mean of log data	7.075763	
Standard Deviation of log data	0.21522	
Variance of log data	0.04632	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.943022	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1210.662	
MLE Standard Deviation	263.6053	
MLE Coefficient of Variation	0.217736	
MLE Skewness	0.663532	
MLE Median	1182.946	
MLE 80% Quantile	1418.881	
MLE 90% Quantile	1559.812	
MLE 95% Quantile	1685.47	
MLE 99% Quantile	1951.522	
MVU Estimate of Median	1180.99	
MVU Estimate of Mean	1208.624	
MVU Estimate of Standard Deviation	261.6091	
MVU Estimate of SE of Mean	69.9115	
95% H-UCL	1350.491	
95% Chebyshev (MVUE) UCL	1513.361	
97.5% Chebyshev (MVUE) UCL	1645.221	
99% Chebyshev (MVUE) UCL	1904.235	
Non-parametric Statisitics		
95% CLT UCL	1330.539	
95% Adjusted-CLT UCL	1353.196	
95% Modified-t UCL	1343.349	
95% Jackknife UCL	1339.815	
95% Chebyshev (Mean, Sd) UCL	1530.198	
97.5% Chebyshev (Mean, Sd) UCL	1668.949	
99% Chebyshev (Mean, Sd) UCL	1941.499	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1327.967	
95% Bootstrap-t UCL	1371.346	
95% Hall's Bootstrap UCL	1384.103	
95% Percentile Bootstrap UCL	1331.107	
95% BCA Bootstrap UCL	1307	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1339.815	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ww.xls	
Variable:	Chromium VI	
Raw Statistics		
Number of Observations	14	
Number of Missing Data	0	
Number of Valid Observations	14	
Number of Distinct Observations	14	
Minimum	4.771	
Maximum	31.98	
Mean	16.07404	
Standard Deviation	8.535957	
Variance	72.86256	
Coefficient of Variation	0.53104	
Skewness	0.705782	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.911089	
Shapiro-Wilk 5% Critical Value	0.874	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	20.11412	
Gamma Statistics		
k hat	3.859605	
k star (bias corrected)	3.080166	
Theta hat	4.164684	
Theta star	5.218562	
nu hat	108.0689	
nu star	86.24465	
5% Approximate Chi Square Value	65.83328	
Adjusted Level of Significance	0.03122	
Adjusted Chi Square Value	63.47084	
Anderson-Darling Test Statistic	0.332793	
Anderson-Darling 5% Critical Value	0.740466	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.14814	
Kolmogrov-Smirnov 5% Critical Value	0.229864	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	21.05773	
95% Adjusted Gamma UCL	21.84152	
Lognormal Statistics		
Minimum of log data	1.562556	
Maximum of log data	3.465111	
Mean of log data	2.642101	
Standard Deviation of log data	0.55018	
Variance of log data	0.302698	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.959459	
Shapiro-Wilk 5% Critical Value	0.874	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	16.33728	
MLE Standard Deviation	9.713561	
MLE Coefficient of Variation	0.594564	
MLE Skewness	1.993874	
MLE Median	14.04267	
MLE 80% Quantile	22.35395	
MLE 90% Quantile	28.47659	
MLE 95% Quantile	34.71415	
MLE 99% Quantile	50.49227	
MVU Estimate of Median	13.89157	
MVU Estimate of Mean	16.14081	
MVU Estimate of Standard Deviation	9.209458	
MVU Estimate of SE of Mean	2.452545	
95% H-UCL	22.68152	
95% Chebyshev (MVUE) UCL	26.8312	
97.5% Chebyshev (MVUE) UCL	31.45694	
99% Chebyshev (MVUE) UCL	40.54332	
Non-parametric Statisitics		
95% CLT UCL	19.82649	
95% Adjusted-CLT UCL	20.2863	
95% Modified-t UCL	20.18584	
95% Jackknife UCL	20.11412	
95% Chebyshev (Mean, Sd) UCL	26.01812	
97.5% Chebyshev (Mean, Sd) UCL	30.32094	
99% Chebyshev (Mean, Sd) UCL	38.77299	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	19.62582	
95% Bootstrap-t UCL	20.62097	
95% Hall's Bootstrap UCL	20.00192	
95% Percentile Bootstrap UCL	19.74654	
95% BCA Bootstrap UCL	18.73114	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	20.11412	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable	Aroclor 1254	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.095	
Maximum	2.6	
Mean	0.906	
Standard Deviation	0.79355	
Variance	0.629721	
Coefficient of Variation	0.875883	
Skewness	1.121319	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.882883	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.366006	
Gamma Statistics		
k hat	1.344194	
k star (bias corrected)	1.007602	
Theta hat	0.67401	
Theta star	0.899164	
nu hat	26.88388	
nu star	20.15205	
5% Approximate Chi Square Value	10.9618	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	9.803755	
Anderson-Darling Test Statistic	0.267577	
Anderson-Darling 5% Critical Value	0.742047	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.176202	
Kolmogrov-Smirnov 5% Critical Value	0.27194	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.665579	
95% Adjusted Gamma UCL	1.862323	
Lognormal Statistics		
Minimum of log data	-2.353878	
Maximum of log data	0.955511	
Mean of log data	-0.514711	
Standard Deviation of log data	1.040438	
Variance of log data	1.082511	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.957651	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.0269	
MLE Standard Deviation	1.434753	
MLE Coefficient of Variation	1.39717	
MLE Skewness	6.918901	
MLE Median	0.597673	
MLE 80% Quantile	1.439735	
MLE 90% Quantile	2.275618	
MLE 95% Quantile	3.30954	
MLE 99% Quantile	6.721743	
MVU Estimate of Median	0.566031	
MVU Estimate of Mean	0.953862	
MVU Estimate of Standard Deviation	1.07096	
MVU Estimate of SE of Mean	0.329645	
95% H-UCL	3.10076	
95% Chebyshev (MVUE) UCL	2.390752	
97.5% Chebyshev (MVUE) UCL	3.012496	
99% Chebyshev (MVUE) UCL	4.233792	
Non-parametric Statisitics		
95% CLT UCL	1.318764	
95% Adjusted-CLT UCL	1.413842	
95% Modified-t UCL	1.380836	
95% Jackknife UCL	1.366006	
95% Chebyshev (Mean, Sd) UCL	1.999833	
97.5% Chebyshev (Mean, Sd) UCL	2.473135	
99% Chebyshev (Mean, Sd) UCL	3.402846	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.307209	
95% Bootstrap-t UCL	1.546107	
95% Hall's Bootstrap UCL	1.602095	
95% Percentile Bootstrap UCL	1.337	
95% BCA Bootstrap UCL	1.2545	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.366006	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NB\WELLSG&HVOU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable	Aroclor 1260	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.095	
Maximum	2.4	
Mean	0.99	
Standard Deviation	0.830873	
Variance	0.69035	
Coefficient of Variation	0.839266	
Skewness	0.59561	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.875935	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.471641	
Gamma Statistics		
k hat	1.311212	
k star (bias corrected)	0.984515	
Theta hat	0.755027	
Theta star	1.005571	
nu hat	26.22424	
nu star	19.6903	
5% Approximate Chi Square Value	10.62168	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	9.484266	
Anderson-Darling Test Statistic	0.404415	
Anderson-Darling 5% Critical Value	0.742643	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.201828	
Kolmogrov-Smirnov 5% Critical Value	0.272113	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.835246	
95% Adjusted Gamma UCL	2.05534	
Lognormal Statistics		
Minimum of log data	-2.353878	
Maximum of log data	0.875469	
Mean of log data	-0.437551	
Standard Deviation of log data	1.068382	
Variance of log data	1.14144	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.927184	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.142443	
MLE Standard Deviation	1.667839	
MLE Coefficient of Variation	1.459888	
MLE Skewness	7.491085	
MLE Median	0.645616	
MLE 80% Quantile	1.592383	
MLE 90% Quantile	2.548029	
MLE 95% Quantile	3.743187	
MLE 99% Quantile	7.748548	
MVU Estimate of Median	0.609618	
MVU Estimate of Mean	1.05585	
MVU Estimate of Standard Deviation	1.221675	
MVU Estimate of SE of Mean	0.375101	
95% H-UCL	3.628251	
95% Chebyshev (MVUE) UCL	2.690879	
97.5% Chebyshev (MVUE) UCL	3.398358	
99% Chebyshev (MVUE) UCL	4.788062	
Non-parametric Statisitics		
95% CLT UCL	1.422177	
95% Adjusted-CLT UCL	1.475056	
95% Modified-t UCL	1.479889	
95% Jackknife UCL	1.471641	
95% Chebyshev (Mean, Sd) UCL	2.135279	
97.5% Chebyshev (Mean, Sd) UCL	2.630843	
99% Chebyshev (Mean, Sd) UCL	3.604281	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.402362	
95% Bootstrap-t UCL	1.56625	
95% Hall's Bootstrap UCL	1.387372	
95% Percentile Bootstrap UCL	1.3975	
95% BCA Bootstrap UCL	1.347	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.471641	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - jy.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	8	
Minimum	0.9	
Maximum	19.5	
Mean	5.405	
Standard Deviation	6.306938	
Variance	39.77747	
Coefficient of Variation	1.166871	
Skewness	1.485567	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.774885	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	9.061013	
Gamma Statistics		
k hat	0.884153	
k star (bias corrected)	0.685574	
Theta hat	6.113195	
Theta star	7.883907	
nu hat	17.68306	
nu star	13.71148	
5% Approximate Chi Square Value	6.373178	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	5.527307	
Anderson-Darling Test Statistic	0.803652	
Anderson-Darling 5% Critical Value	0.752301	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.296556	
Kolmogrov-Smirnov 5% Critical Value	0.274783	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	11.6285	
95% Adjusted Gamma UCL	13.40807	
Lognormal Statistics		
Minimum of log data	-0.105361	
Maximum of log data	2.970414	
Mean of log data	1.024648	
Standard Deviation of log data	1.236454	
Variance of log data	1.528818	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.823679	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	5.983805	
MLE Standard Deviation	11.37351	
MLE Coefficient of Variation	1.900716	
MLE Skewness	12.56891	
MLE Median	2.786113	
MLE 80% Quantile	7.920474	
MLE 90% Quantile	13.6466	
MLE 95% Quantile	21.29802	
MLE 99% Quantile	49.43403	
MVU Estimate of Median	2.579684	
MVU Estimate of Mean	5.337489	
MVU Estimate of Standard Deviation	7.309681	
MVU Estimate of SE of Mean	2.20465	
95% H-UCL	26.48026	
95% Chebyshev (MVUE) UCL	14.94734	
97.5% Chebyshev (MVUE) UCL	19.10552	
99% Chebyshev (MVUE) UCL	27.27348	
Non-parametric Statisitics		
95% CLT UCL	8.685544	
95% Adjusted-CLT UCL	9.686675	
95% Modified-t UCL	9.21717	
95% Jackknife UCL	9.061013	
95% Chebyshev (Mean, Sd) UCL	14.09851	
97.5% Chebyshev (Mean, Sd) UCL	17.86021	
99% Chebyshev (Mean, Sd) UCL	25.24932	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.528449	
95% Bootstrap-t UCL	12.16395	
95% Hall's Bootstrap UCL	12.00854	
95% Percentile Bootstrap UCL	8.885	
95% BCA Bootstrap UCL	10.525	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	25.24932	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&HVOU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	13.7	
Maximum	482	
Mean	144.785	
Standard Deviation	160.2799	
Variance	25689.65	
Coefficient of Variation	1.10702	
Skewness	1.663956	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.711189	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	237.6962	
Gamma Statistics		
k hat	1.1357	
k star (bias corrected)	0.861657	
Theta hat	127.4852	
Theta star	168.0309	
nu hat	22.71401	
nu star	17.23314	
5% Approximate Chi Square Value	8.837696	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	7.814213	
Anderson-Darling Test Statistic	0.642507	
Anderson-Darling 5% Critical Value	0.745817	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.300666	
Kolmogrov-Smirnov 5% Critical Value	0.273036	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	282.3247	
95% Adjusted Gamma UCL	319.3028	
Lognormal Statistics		
Minimum of log data	2.617396	
Maximum of log data	6.177944	
Mean of log data	4.474262	
Standard Deviation of log data	1.076291	
Variance of log data	1.158401	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.930741	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	156.5636	
MLE Standard Deviation	231.4198	
MLE Coefficient of Variation	1.47812	
MLE Skewness	7.663812	
MLE Median	87.72981	
MLE 80% Quantile	217.8327	
MLE 90% Quantile	349.7768	
MLE 95% Quantile	515.3054	
MLE 99% Quantile	1072.464	
MVU Estimate of Median	82.7673	
MVU Estimate of Mean	144.4842	
MVU Estimate of Standard Deviation	168.5858	
MVU Estimate of SE of Mean	51.72464	
95% H-UCL	504.4997	
95% Chebyshev (MVUE) UCL	369.9467	
97.5% Chebyshev (MVUE) UCL	467.5045	
99% Chebyshev (MVUE) UCL	659.1379	
Non-parametric Statisitics		
95% CLT UCL	228.1543	
95% Adjusted-CLT UCL	256.6515	
95% Modified-t UCL	242.1412	
95% Jackknife UCL	237.6962	
95% Chebyshev (Mean, Sd) UCL	365.7156	
97.5% Chebyshev (Mean, Sd) UCL	461.3125	
99% Chebyshev (Mean, Sd) UCL	649.094	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	224.9243	
95% Bootstrap-t UCL	502.3301	
95% Hall's Bootstrap UCL	915.6769	
95% Percentile Bootstrap UCL	230.67	
95% BCA Bootstrap UCL	279.83	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	282.3247	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	20	
Maximum	353	
Mean	126.68	
Standard Deviation	95.33767	
Variance	9089.271	
Coefficient of Variation	0.752587	
Skewness	1.563796	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.867507	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	181.9454	
Gamma Statistics		
k hat	2.084191	
k star (bias corrected)	1.525601	
Theta hat	60.78137	
Theta star	83.03615	
nu hat	41.68383	
nu star	30.51201	
5% Approximate Chi Square Value	18.89375	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	17.32116	
Anderson-Darling Test Statistic	0.198741	
Anderson-Darling 5% Critical Value	0.735294	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.115526	
Kolmogrov-Smirnov 5% Critical Value	0.269695	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	204.5788	
95% Adjusted Gamma UCL	223.1526	
Lognormal Statistics		
Minimum of log data	2.995732	
Maximum of log data	5.866468	
Mean of log data	4.582981	
Standard Deviation of log data	0.800893	
Variance of log data	0.641429	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.96888	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	134.7869	
MLE Standard Deviation	127.8128	
MLE Coefficient of Variation	0.948258	
MLE Skewness	3.697441	
MLE Median	97.80548	
MLE 80% Quantile	192.4305	
MLE 90% Quantile	273.726	
MLE 95% Quantile	365.2014	
MLE 99% Quantile	630.0864	
MVU Estimate of Median	94.70957	
MVU Estimate of Mean	129.6019	
MVU Estimate of Standard Deviation	108.8715	
MVU Estimate of SE of Mean	34.05374	
95% H-UCL	277.9967	
95% Chebyshev (MVUE) UCL	278.0387	
97.5% Chebyshev (MVUE) UCL	342.2674	
99% Chebyshev (MVUE) UCL	468.4323	
Non-parametric Statisitics		
95% CLT UCL	176.2697	
95% Adjusted-CLT UCL	192.2001	
95% Modified-t UCL	184.4303	
95% Jackknife UCL	181.9454	
95% Chebyshev (Mean, Sd) UCL	258.0939	
97.5% Chebyshev (Mean, Sd) UCL	314.9568	
99% Chebyshev (Mean, Sd) UCL	426.653	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	173.1161	
95% Bootstrap-t UCL	212.2146	
95% Hall's Bootstrap UCL	423.6649	
95% Percentile Bootstrap UCL	177.47	
95% BCA Bootstrap UCL	208.14	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	181.9454	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning'	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	1.4	
Maximum	21	
Mean	11.11	
Standard Deviation	5.912031	
Variance	34.95211	
Coefficient of Variation	0.532136	
Skewness	-0.234362	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.957429	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	14.53709	
Gamma Statistics		
k hat	2.420262	
k star (bias corrected)	1.76085	
Theta hat	4.590412	
Theta star	6.309452	
nu hat	48.40524	
nu star	35.217	
5% Approximate Chi Square Value	22.63703	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	20.89929	
Anderson-Darling Test Statistic	0.59667	
Anderson-Darling 5% Critical Value	0.734151	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.21669	
Kolmogrov-Smirnov 5% Critical Value	0.269238	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	17.28411	
95% Adjusted Gamma UCL	18.72126	
Lognormal Statistics		
Minimum of log data	0.336472	
Maximum of log data	3.044522	
Mean of log data	2.187256	
Standard Deviation of log data	0.828364	
Variance of log data	0.686187	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.82865	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	12.55789	
MLE Standard Deviation	12.47048	
MLE Coefficient of Variation	0.99304	
MLE Skewness	3.958382	
MLE Median	8.910728	
MLE 80% Quantile	17.94342	
MLE 90% Quantile	25.83431	
MLE 95% Quantile	34.81035	
MLE 99% Quantile	61.19286	
MVU Estimate of Median	8.609264	
MVU Estimate of Mean	12.03574	
MVU Estimate of Standard Deviation	10.48906	
MVU Estimate of SE of Mean	3.276301	
95% H-UCL	26.93112	
95% Chebyshev (MVUE) UCL	26.31681	
97.5% Chebyshev (MVUE) UCL	32.49624	
99% Chebyshev (MVUE) UCL	44.63453	
Non-parametric Statisitics		
95% CLT UCL	14.18513	
95% Adjusted-CLT UCL	14.03708	
95% Modified-t UCL	14.514	
95% Jackknife UCL	14.53709	
95% Chebyshev (Mean, Sd) UCL	19.25917	
97.5% Chebyshev (Mean, Sd) UCL	22.78533	
99% Chebyshev (Mean, Sd) UCL	29.71177	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	13.99102	
95% Bootstrap-t UCL	14.36584	
95% Hall's Bootstrap UCL	14.15817	
95% Percentile Bootstrap UCL	14.12	
95% BCA Bootstrap UCL	15.13	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	14.53709	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	69.6	
Maximum	1710	
Mean	838.56	
Standard Deviation	572.1575	
Variance	327364.2	
Coefficient of Variation	0.68231	
Skewness	-0.065039	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924628	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1170.229	
Gamma Statistics		
k hat	1.444035	
k star (bias corrected)	1.077491	
Theta hat	580.706	
Theta star	778.2522	
nu hat	28.88071	
nu star	21.54983	
5% Approximate Chi Square Value	11.99983	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.78065	
Anderson-Darling Test Statistic	0.532998	
Anderson-Darling 5% Critical Value	0.740242	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.242458	
Kolmogrov-Smirnov 5% Critical Value	0.271414	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1505.924	
95% Adjusted Gamma UCL	1676.228	
Lognormal Statistics		
Minimum of log data	4.242765	
Maximum of log data	7.444249	
Mean of log data	6.347078	
Standard Deviation of log data	1.101694	
Variance of log data	1.21373	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.857857	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1047.271	
MLE Standard Deviation	1610.899	
MLE Coefficient of Variation	1.538186	
MLE Skewness	8.253936	
MLE Median	570.8224	
MLE 80% Quantile	1448.103	
MLE 90% Quantile	2351.374	
MLE 95% Quantile	3495.967	
MLE 99% Quantile	7402.841	
MVU Estimate of Median	537.0293	
MVU Estimate of Mean	961.7975	
MVU Estimate of Standard Deviation	1152.531	
MVU Estimate of SE of Mean	352.7611	
95% H-UCL	3538.331	
95% Chebyshev (MVUE) UCL	2499.448	
97.5% Chebyshev (MVUE) UCL	3164.79	
99% Chebyshev (MVUE) UCL	4471.726	
Non-parametric Statisitics		
95% CLT UCL	1136.167	
95% Adjusted-CLT UCL	1132.191	
95% Modified-t UCL	1169.609	
95% Jackknife UCL	1170.229	
95% Chebyshev (Mean, Sd) UCL	1627.225	
97.5% Chebyshev (Mean, Sd) UCL	1968.48	
99% Chebyshev (Mean, Sd) UCL	2638.811	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1121.882	
95% Bootstrap-t UCL	1157.871	
95% Hall's Bootstrap UCL	1115.148	
95% Percentile Bootstrap UCL	1127.86	
95% BCA Bootstrap UCL	1248	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1170.229	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	122	
Maximum	741	
Mean	377.55	
Standard Deviation	214.48	
Variance	46001.69	
Coefficient of Variation	0.568084	
Skewness	0.718515	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.888167	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	501.88	
Gamma Statistics		
k hat	3.463738	
k star (bias corrected)	2.491283	
Theta hat	109.0008	
Theta star	151.5484	
nu hat	69.27475	
nu star	49.82566	
5% Approximate Chi Square Value	34.61599	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	32.42498	
Anderson-Darling Test Statistic	0.372336	
Anderson-Darling 5% Critical Value	0.730886	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.195639	
Kolmogrov-Smirnov 5% Critical Value	0.268158	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	543.4389	
95% Adjusted Gamma UCL	580.1601	
Lognormal Statistics		
Minimum of log data	4.804021	
Maximum of log data	6.608001	
Mean of log data	5.78246	
Standard Deviation of log data	0.591558	
Variance of log data	0.349941	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.942953	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	386.6155	
MLE Standard Deviation	250.2522	
MLE Coefficient of Variation	0.64729	
MLE Skewness	2.213073	
MLE Median	324.5567	
MLE 80% Quantile	535.0321	
MLE 90% Quantile	694.0975	
MLE 95% Quantile	858.832	
MLE 99% Quantile	1284.885	
MVU Estimate of Median	318.9184	
MVU Estimate of Mean	379.0808	
MVU Estimate of Standard Deviation	230.4149	
MVU Estimate of SE of Mean	72.60061	
95% H-UCL	615.0934	
95% Chebyshev (MVUE) UCL	695.5395	
97.5% Chebyshev (MVUE) UCL	832.4714	
99% Chebyshev (MVUE) UCL	1101.448	
Non-parametric Statisitics		
95% CLT UCL	489.1115	
95% Adjusted-CLT UCL	505.578	
95% Modified-t UCL	504.4485	
95% Jackknife UCL	501.88	
95% Chebyshev (Mean, Sd) UCL	673.1903	
97.5% Chebyshev (Mean, Sd) UCL	801.1142	
99% Chebyshev (Mean, Sd) UCL	1052.396	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	484.7575	
95% Bootstrap-t UCL	539.2063	
95% Hall's Bootstrap UCL	498.4195	
95% Percentile Bootstrap UCL	480.3	
95% BCA Bootstrap UCL	533.15	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	501.88	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	47.6	
Maximum	1210	
Mean	523.31	
Standard Deviation	355.0963	
Variance	126093.4	
Coefficient of Variation	0.678558	
Skewness	0.931141	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.902601	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	729.1526	
Gamma Statistics		
k hat	1.994409	
k star (bias corrected)	1.462753	
Theta hat	262.3885	
Theta star	357.7569	
nu hat	39.88818	
nu star	29.25506	
5% Approximate Chi Square Value	17.90624	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	16.37984	
Anderson-Darling Test Statistic	0.379666	
Anderson-Darling 5% Critical Value	0.735621	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.181499	
Kolmogrov-Smirnov 5% Critical Value	0.269825	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	854.9794	
95% Adjusted Gamma UCL	934.6529	
Lognormal Statistics		
Minimum of log data	3.862833	
Maximum of log data	7.098376	
Mean of log data	5.988998	
Standard Deviation of log data	0.897646	
Variance of log data	0.805768	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.867941	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	596.9793	
MLE Standard Deviation	664.3431	
MLE Coefficient of Variation	1.112841	
MLE Skewness	4.716683	
MLE Median	399.0148	
MLE 80% Quantile	851.9341	
MLE 90% Quantile	1264.552	
MLE 95% Quantile	1746.949	
MLE 99% Quantile	3219.311	
MVU Estimate of Median	383.2016	
MVU Estimate of Mean	567.0543	
MVU Estimate of Standard Deviation	539.7726	
MVU Estimate of SE of Mean	167.9264	
95% H-UCL	1420.558	
95% Chebyshev (MVUE) UCL	1299.029	
97.5% Chebyshev (MVUE) UCL	1615.754	
99% Chebyshev (MVUE) UCL	2237.901	
Non-parametric Statisitics		
95% CLT UCL	708.0128	
95% Adjusted-CLT UCL	743.3426	
95% Modified-t UCL	734.6634	
95% Jackknife UCL	729.1526	
95% Chebyshev (Mean, Sd) UCL	1012.776	
97.5% Chebyshev (Mean, Sd) UCL	1224.569	
99% Chebyshev (Mean, Sd) UCL	1640.594	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	700.7953	
95% Bootstrap-t UCL	839.44	
95% Hall's Bootstrap UCL	921.8771	
95% Percentile Bootstrap UCL	708.1	
95% BCA Bootstrap UCL	797.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	729.1526	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	103	
Maximum	555	
Mean	292.85	
Standard Deviation	124.8737	
Variance	15593.45	
Coefficient of Variation	0.426408	
Skewness	0.708373	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.958499	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	365.2369	
Gamma Statistics		
k hat	5.76041	
k star (bias corrected)	4.098953	
Theta hat	50.8384	
Theta star	71.44507	
nu hat	115.2082	
nu star	81.97907	
5% Approximate Chi Square Value	62.11027	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	59.11269	
Anderson-Darling Test Statistic	0.224566	
Anderson-Darling 5% Critical Value	0.728782	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.172367	
Kolmogrov-Smirnov 5% Critical Value	0.267308	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	386.5314	
95% Adjusted Gamma UCL	406.1323	
Lognormal Statistics		
Minimum of log data	4.634729	
Maximum of log data	6.318968	
Mean of log data	5.590357	
Standard Deviation of log data	0.465328	
Variance of log data	0.216531	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.957391	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	298.456	
MLE Standard Deviation	146.7484	
MLE Coefficient of Variation	0.491692	
MLE Skewness	1.593948	
MLE Median	267.8313	
MLE 80% Quantile	396.8506	
MLE 90% Quantile	487.0196	
MLE 95% Quantile	575.8358	
MLE 99% Quantile	790.536	
MVU Estimate of Median	264.9444	
MVU Estimate of Mean	294.9924	
MVU Estimate of Standard Deviation	139.6391	
MVU Estimate of SE of Mean	44.09343	
95% H-UCL	418.044	
95% Chebyshev (MVUE) UCL	487.1912	
97.5% Chebyshev (MVUE) UCL	570.3558	
99% Chebyshev (MVUE) UCL	733.7165	
Non-parametric Statisitics		
95% CLT UCL	357.8029	
95% Adjusted-CLT UCL	367.2546	
95% Modified-t UCL	366.7112	
95% Jackknife UCL	365.2369	
95% Chebyshev (Mean, Sd) UCL	464.9766	
97.5% Chebyshev (Mean, Sd) UCL	539.4558	
99% Chebyshev (Mean, Sd) UCL	685.756	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	352.9722	
95% Bootstrap-t UCL	380.8594	
95% Hall's Bootstrap UCL	413.135	
95% Percentile Bootstrap UCL	355.4	
95% BCA Bootstrap UCL	383.25	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	365.2369	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.025	
Maximum	2.3	
Mean	0.765	
Standard Deviation	0.837596	
Variance	0.701567	
Coefficient of Variation	1.094896	
Skewness	0.911014	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.832785	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.250538	
Gamma Statistics		
k hat	0.710099	
k star (bias corrected)	0.563736	
Theta hat	1.077315	
Theta star	1.357018	
nu hat	14.20198	
nu star	11.27472	
5% Approximate Chi Square Value	4.752335	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	4.042045	
Anderson-Darling Test Statistic	0.337866	
Anderson-Darling 5% Critical Value	0.760165	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.196921	
Kolmogrov-Smirnov 5% Critical Value	0.276757	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.814931	
95% Adjusted Gamma UCL	2.133861	
Lognormal Statistics		
Minimum of log data	-3.688879	
Maximum of log data	0.832909	
Mean of log data	-1.117255	
Standard Deviation of log data	1.583418	
Variance of log data	2.507211	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.935146	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.146084	
MLE Standard Deviation	3.847611	
MLE Coefficient of Variation	3.357181	
MLE Skewness	47.9092	
MLE Median	0.327177	
MLE 80% Quantile	1.24699	
MLE 90% Quantile	2.502867	
MLE 95% Quantile	4.425871	
MLE 99% Quantile	13.01073	
MVU Estimate of Median	0.288205	
MVU Estimate of Mean	0.919538	
MVU Estimate of Standard Deviation	1.695445	
MVU Estimate of SE of Mean	0.485175	
95% H-UCL	11.69558	
95% Chebyshev (MVUE) UCL	3.034367	
97.5% Chebyshev (MVUE) UCL	3.949455	
99% Chebyshev (MVUE) UCL	5.746968	
Non-parametric Statisitics		
95% CLT UCL	1.200674	
95% Adjusted-CLT UCL	1.282208	
95% Modified-t UCL	1.263256	
95% Jackknife UCL	1.250538	
95% Chebyshev (Mean, Sd) UCL	1.919546	
97.5% Chebyshev (Mean, Sd) UCL	2.419119	
99% Chebyshev (Mean, Sd) UCL	3.400434	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.186451	
95% Bootstrap-t UCL	1.407833	
95% Hall's Bootstrap UCL	1.183993	
95% Percentile Bootstrap UCL	1.205	
95% BCA Bootstrap UCL	1.3945	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.814931	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	8.7	
Maximum	150	
Mean	51.75	
Standard Deviation	40.67632	
Variance	1654.563	
Coefficient of Variation	0.786016	
Skewness	1.734877	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.844439	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	75.3293	
Gamma Statistics		
k hat	2.066587	
k star (bias corrected)	1.513277	
Theta hat	25.04129	
Theta star	34.1973	
nu hat	41.33173	
nu star	30.26555	
5% Approximate Chi Square Value	18.69967	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	17.13606	
Anderson-Darling Test Statistic	0.183259	
Anderson-Darling 5% Critical Value	0.735354	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.119541	
Kolmogrov-Smirnov 5% Critical Value	0.269719	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	83.75774	
95% Adjusted Gamma UCL	91.40035	
Lognormal Statistics		
Minimum of log data	2.163323	
Maximum of log data	5.010635	
Mean of log data	3.685382	
Standard Deviation of log data	0.788317	
Variance of log data	0.621443	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.985167	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	54.38585	
MLE Standard Deviation	50.48264	
MLE Coefficient of Variation	0.928231	
MLE Skewness	3.58447	
MLE Median	39.86035	
MLE 80% Quantile	77.59554	
MLE 90% Quantile	109.768	
MLE 95% Quantile	145.7894	
MLE 99% Quantile	249.3873	
MVU Estimate of Median	38.63744	
MVU Estimate of Mean	52.36837	
MVU Estimate of Standard Deviation	43.24214	
MVU Estimate of SE of Mean	13.53375	
95% H-UCL	110.2293	
95% Chebyshev (MVUE) UCL	111.3606	
97.5% Chebyshev (MVUE) UCL	136.8866	
99% Chebyshev (MVUE) UCL	187.0275	
Non-parametric Statisitics		
95% CLT UCL	72.90772	
95% Adjusted-CLT UCL	80.44806	
95% Modified-t UCL	76.50544	
95% Jackknife UCL	75.3293	
95% Chebyshev (Mean, Sd) UCL	107.8184	
97.5% Chebyshev (Mean, Sd) UCL	132.0793	
99% Chebyshev (Mean, Sd) UCL	179.735	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	71.42093	
95% Bootstrap-t UCL	94.39206	
95% Hall's Bootstrap UCL	181.2037	
95% Percentile Bootstrap UCL	73.61	
95% BCA Bootstrap UCL	85.09	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	75.3293	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	0.75	
Maximum	6.9	
Mean	2.527778	
Standard Deviation	1.856595	
Variance	3.446944	
Coefficient of Variation	0.734477	
Skewness	1.839357	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.809754	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	3.678587	
Gamma Statistics		
k hat	2.539052	
k star (bias corrected)	1.766776	
Theta hat	0.99556	
Theta star	1.430729	
nu hat	45.70294	
nu star	31.80196	
5% Approximate Chi Square Value	19.91298	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	17.95509	
Anderson-Darling Test Statistic	0.358298	
Anderson-Darling 5% Critical Value	0.728169	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.201103	
Kolmogrov-Smirnov 5% Critical Value	0.281865	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4.03698	
95% Adjusted Gamma UCL	4.477186	
Lognormal Statistics		
Minimum of log data	-0.287682	
Maximum of log data	1.931521	
Mean of log data	0.717678	
Standard Deviation of log data	0.688031	
Variance of log data	0.473386	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.941298	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.597037	
MLE Standard Deviation	2.020724	
MLE Coefficient of Variation	0.778088	
MLE Skewness	2.805336	
MLE Median	2.049668	
MLE 80% Quantile	3.665864	
MLE 90% Quantile	4.961943	
MLE 95% Quantile	6.356567	
MLE 99% Quantile	10.15572	
MVU Estimate of Median	1.996327	
MVU Estimate of Mean	2.518947	
MVU Estimate of Standard Deviation	1.784159	
MVU Estimate of SE of Mean	0.591331	
95% H-UCL	4.927332	
95% Chebyshev (MVUE) UCL	5.096501	
97.5% Chebyshev (MVUE) UCL	6.21181	
99% Chebyshev (MVUE) UCL	8.40262	
Non-parametric Statisitics		
95% CLT UCL	3.54572	
95% Adjusted-CLT UCL	3.951155	
95% Modified-t UCL	3.741827	
95% Jackknife UCL	3.678587	
95% Chebyshev (Mean, Sd) UCL	5.225348	
97.5% Chebyshev (Mean, Sd) UCL	6.392588	
99% Chebyshev (Mean, Sd) UCL	8.685406	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	3.478452	
95% Bootstrap-t UCL	4.784655	
95% Hall's Bootstrap UCL	9.090484	
95% Percentile Bootstrap UCL	3.555556	
95% BCA Bootstrap UCL	4.133333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	4.03698	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	10.2	
Maximum	90.6	
Mean	48.87	
Standard Deviation	26.5227	
Variance	703.4534	
Coefficient of Variation	0.542719	
Skewness	0.096781	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.971644	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	64.24471	
Gamma Statistics		
k hat	2.959788	
k star (bias corrected)	2.138518	
Theta hat	16.51132	
Theta star	22.85227	
nu hat	59.19576	
nu star	42.77036	
5% Approximate Chi Square Value	28.77361	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	26.79191	
Anderson-Darling Test Statistic	0.227994	
Anderson-Darling 5% Critical Value	0.732317	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.140283	
Kolmogrov-Smirnov 5% Critical Value	0.268505	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	72.64253	
95% Adjusted Gamma UCL	78.01563	
Lognormal Statistics		
Minimum of log data	2.322388	
Maximum of log data	4.506454	
Mean of log data	3.710823	
Standard Deviation of log data	0.690778	
Variance of log data	0.477175	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.928281	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	51.90478	
MLE Standard Deviation	40.58924	
MLE Coefficient of Variation	0.781994	
MLE Skewness	2.824184	
MLE Median	40.88746	
MLE 80% Quantile	73.29784	
MLE 90% Quantile	99.33258	
MLE 95% Quantile	127.3773	
MLE 99% Quantile	203.8886	
MVU Estimate of Median	39.92141	
MVU Estimate of Mean	50.47789	
MVU Estimate of Standard Deviation	36.1588	
MVU Estimate of SE of Mean	11.36131	
95% H-UCL	92.64651	
95% Chebyshev (MVUE) UCL	100.0007	
97.5% Chebyshev (MVUE) UCL	121.4292	
99% Chebyshev (MVUE) UCL	163.5215	
Non-parametric Statisitics		
95% CLT UCL	62.66574	
95% Adjusted-CLT UCL	62.94002	
95% Modified-t UCL	64.28749	
95% Jackknife UCL	64.24471	
95% Chebyshev (Mean, Sd) UCL	85.42901	
97.5% Chebyshev (Mean, Sd) UCL	101.2481	
99% Chebyshev (Mean, Sd) UCL	132.3217	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	61.9064	
95% Bootstrap-t UCL	64.5317	
95% Hall's Bootstrap UCL	62.48352	
95% Percentile Bootstrap UCL	62.09	
95% BCA Bootstrap UCL	66.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	64.24471	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	308	
Maximum	2850	
Mean	1819.5	
Standard Deviation	917.5723	
Variance	841938.9	
Coefficient of Variation	0.504299	
Skewness	-0.639927	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904911	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2351.399	
Gamma Statistics		
k hat	2.597199	
k star (bias corrected)	1.884706	
Theta hat	700.5623	
Theta star	965.4024	
nu hat	51.94399	
nu star	37.69413	
5% Approximate Chi Square Value	24.63395	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	22.81359	
Anderson-Darling Test Statistic	0.766079	
Anderson-Darling 5% Critical Value	0.73355	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.203136	
Kolmogrov-Smirnov 5% Critical Value	0.268998	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	2784.144	
95% Adjusted Gamma UCL	3006.298	
Lognormal Statistics		
Minimum of log data	5.7301	
Maximum of log data	7.955074	
Mean of log data	7.30162	
Standard Deviation of log data	0.790498	
Variance of log data	0.624887	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.783288	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	2026.495	
MLE Standard Deviation	1888.052	
MLE Coefficient of Variation	0.931683	
MLE Skewness	3.603783	
MLE Median	1482.7	
MLE 80% Quantile	2891.672	
MLE 90% Quantile	4094.538	
MLE 95% Quantile	5442.471	
MLE 99% Quantile	9323.723	
MVU Estimate of Median	1436.962	
MVU Estimate of Mean	1950.843	
MVU Estimate of Standard Deviation	1615.706	
MVU Estimate of SE of Mean	505.6253	
95% H-UCL	4119.679	
95% Chebyshev (MVUE) UCL	4154.813	
97.5% Chebyshev (MVUE) UCL	5108.472	
99% Chebyshev (MVUE) UCL	6981.752	
Non-parametric Statisitics		
95% CLT UCL	2296.774	
95% Adjusted-CLT UCL	2234.033	
95% Modified-t UCL	2341.613	
95% Jackknife UCL	2351.399	
95% Chebyshev (Mean, Sd) UCL	3084.286	
97.5% Chebyshev (Mean, Sd) UCL	3631.56	
99% Chebyshev (Mean, Sd) UCL	4706.574	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2279.359	
95% Bootstrap-t UCL	2288.067	
95% Hall's Bootstrap UCL	2215.979	
95% Percentile Bootstrap UCL	2254	
95% BCA Bootstrap UCL	2397	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2351.399	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - jy.xls	
Variable:	Chromium VI	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.09048	
Maximum	2.223	
Mean	1.090128	
Standard Deviation	0.743805	
Variance	0.553245	
Coefficient of Variation	0.68231	
Skewness	-0.065039	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924628	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.521298	
Gamma Statistics		
k hat	1.444035	
k star (bias corrected)	1.077491	
Theta hat	0.754918	
Theta star	1.011728	
nu hat	28.88071	
nu star	21.54983	
5% Approximate Chi Square Value	11.99983	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.78065	
Anderson-Darling Test Statistic	0.532998	
Anderson-Darling 5% Critical Value	0.740242	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.242458	
Kolmogrov-Smirnov 5% Critical Value	0.271414	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.957701	
95% Adjusted Gamma UCL	2.179097	
Lognormal Statistics		
Minimum of log data	-2.402626	
Maximum of log data	0.798858	
Mean of log data	-0.298313	
Standard Deviation of log data	1.101694	
Variance of log data	1.21373	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.857857	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.361453	
MLE Standard Deviation	2.094168	
MLE Coefficient of Variation	1.538186	
MLE Skewness	8.253936	
MLE Median	0.742069	
MLE 80% Quantile	1.882534	
MLE 90% Quantile	3.056787	
MLE 95% Quantile	4.544757	
MLE 99% Quantile	9.623693	
MVU Estimate of Median	0.698138	
MVU Estimate of Mean	1.250337	
MVU Estimate of Standard Deviation	1.498291	
MVU Estimate of SE of Mean	0.458589	
95% H-UCL	4.59983	
95% Chebyshev (MVUE) UCL	3.249282	
97.5% Chebyshev (MVUE) UCL	4.114227	
99% Chebyshev (MVUE) UCL	5.813244	
Non-parametric Statisitics		
95% CLT UCL	1.477017	
95% Adjusted-CLT UCL	1.471848	
95% Modified-t UCL	1.520491	
95% Jackknife UCL	1.521298	
95% Chebyshev (Mean, Sd) UCL	2.115392	
97.5% Chebyshev (Mean, Sd) UCL	2.559025	
99% Chebyshev (Mean, Sd) UCL	3.430455	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.456658	
95% Bootstrap-t UCL	1.501237	
95% Hall's Bootstrap UCL	1.448761	
95% Percentile Bootstrap UCL	1.432158	
95% BCA Bootstrap UCL	1.578928	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.521298	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	1.2	
Maximum	7.2	
Mean	3.95	
Standard Deviation	1.714157	
Variance	2.938333	
Coefficient of Variation	0.433964	
Skewness	0.259178	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.971235	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	4.943664	
Gamma Statistics		
k hat	5.036721	
k star (bias corrected)	3.592372	
Theta hat	0.78424	
Theta star	1.099552	
nu hat	100.7344	
nu star	71.84743	
5% Approximate Chi Square Value	53.32727	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	50.56346	
Anderson-Darling Test Statistic	0.285732	
Anderson-Darling 5% Critical Value	0.729418	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.192074	
Kolmogrov-Smirnov 5% Critical Value	0.267424	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	5.321806	
95% Adjusted Gamma UCL	5.612696	
Lognormal Statistics		
Minimum of log data	0.182322	
Maximum of log data	1.974081	
Mean of log data	1.271172	
Standard Deviation of log data	0.510674	
Variance of log data	0.260788	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.928852	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	4.061556	
MLE Standard Deviation	2.216999	
MLE Coefficient of Variation	0.54585	
MLE Skewness	1.800186	
MLE Median	3.56503	
MLE 80% Quantile	5.488701	
MLE 90% Quantile	6.871539	
MLE 95% Quantile	8.258398	
MLE 99% Quantile	11.6931	
MVU Estimate of Median	3.518791	
MVU Estimate of Mean	4.004041	
MVU Estimate of Standard Deviation	2.087078	
MVU Estimate of SE of Mean	0.658622	
95% H-UCL	5.941822	
95% Chebyshev (MVUE) UCL	6.874907	
97.5% Chebyshev (MVUE) UCL	8.117133	
99% Chebyshev (MVUE) UCL	10.55725	
Non-parametric Statisitics		
95% CLT UCL	4.841616	
95% Adjusted-CLT UCL	4.889087	
95% Modified-t UCL	4.951069	
95% Jackknife UCL	4.943664	
95% Chebyshev (Mean, Sd) UCL	6.312802	
97.5% Chebyshev (Mean, Sd) UCL	7.335188	
99% Chebyshev (Mean, Sd) UCL	9.343468	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.802029	
95% Bootstrap-t UCL	5.010997	
95% Hall's Bootstrap UCL	4.976006	
95% Percentile Bootstrap UCL	4.8	
95% BCA Bootstrap UCL	4.64	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	4.943664	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	17.7	
Maximum	339	
Mean	167.91	
Standard Deviation	100.9646	
Variance	10193.85	
Coefficient of Variation	0.601302	
Skewness	-0.067252	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.949851	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	226.4373	
Gamma Statistics		
k hat	1.91829	
k star (bias corrected)	1.40947	
Theta hat	87.53109	
Theta star	119.1299	
nu hat	38.3658	
nu star	28.18939	
5% Approximate Chi Square Value	17.07364	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	15.58716	
Anderson-Darling Test Statistic	0.549027	
Anderson-Darling 5% Critical Value	0.736176	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.271874	
Kolmogrov-Smirnov 5% Critical Value	0.270024	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	277.2274	
95% Adjusted Gamma UCL	303.6653	
Lognormal Statistics		
Minimum of log data	2.873565	
Maximum of log data	5.826	
Mean of log data	4.840685	
Standard Deviation of log data	0.937799	
Variance of log data	0.879467	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.851188	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	196.4521	
MLE Standard Deviation	233.2421	
MLE Coefficient of Variation	1.187272	
MLE Skewness	5.235413	
MLE Median	126.556	
MLE 80% Quantile	279.5344	
MLE 90% Quantile	422.3172	
MLE 95% Quantile	591.9158	
MLE 99% Quantile	1121.033	
MVU Estimate of Median	121.09	
MVU Estimate of Mean	185.5373	
MVU Estimate of Standard Deviation	185.3924	
MVU Estimate of SE of Mean	57.52326	
95% H-UCL	498.2003	
95% Chebyshev (MVUE) UCL	436.2754	
97.5% Chebyshev (MVUE) UCL	544.77	
99% Chebyshev (MVUE) UCL	757.8865	
Non-parametric Statisitics		
95% CLT UCL	220.4266	
95% Adjusted-CLT UCL	219.701	
95% Modified-t UCL	226.3241	
95% Jackknife UCL	226.4373	
95% Chebyshev (Mean, Sd) UCL	307.0801	
97.5% Chebyshev (Mean, Sd) UCL	367.2991	
99% Chebyshev (Mean, Sd) UCL	485.5876	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	217.619	
95% Bootstrap-t UCL	223.008	
95% Hall's Bootstrap UCL	219.0222	
95% Percentile Bootstrap UCL	216.4	
95% BCA Bootstrap UCL	207.76	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	226.4373	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	60.8	
Maximum	200	
Mean	119.285	
Standard Deviation	35.95029	
Variance	1292.423	
Coefficient of Variation	0.301381	
Skewness	0.901043	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.910761	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	140.1247	
Gamma Statistics		
k hat	12.38035	
k star (bias corrected)	8.732913	
Theta hat	9.635025	
Theta star	13.65924	
nu hat	247.607	
nu star	174.6583	
5% Approximate Chi Square Value	145.0883	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	140.4053	
Anderson-Darling Test Statistic	0.402172	
Anderson-Darling 5% Critical Value	0.724939	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.1951	
Kolmogrov-Smirnov 5% Critical Value	0.266521	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	143.5961	
95% Adjusted Gamma UCL	148.3855	
Lognormal Statistics		
Minimum of log data	4.10759	
Maximum of log data	5.298317	
Mean of log data	4.740586	
Standard Deviation of log data	0.306129	
Variance of log data	0.093715	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.933017	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	119.9942	
MLE Standard Deviation	37.61134	
MLE Coefficient of Variation	0.313443	
MLE Skewness	0.971124	
MLE Median	114.5012	
MLE 80% Quantile	148.3041	
MLE 90% Quantile	169.688	
MLE 95% Quantile	189.4581	
MLE 99% Quantile	233.3738	
MVU Estimate of Median	113.9657	
MVU Estimate of Mean	119.4141	
MVU Estimate of Standard Deviation	36.83326	
MVU Estimate of SE of Mean	11.64436	
95% H-UCL	146.9123	
95% Chebyshev (MVUE) UCL	170.1707	
97.5% Chebyshev (MVUE) UCL	192.1331	
99% Chebyshev (MVUE) UCL	235.274	
Non-parametric Statisitics		
95% CLT UCL	137.9845	
95% Adjusted-CLT UCL	141.4457	
95% Modified-t UCL	140.6646	
95% Jackknife UCL	140.1247	
95% Chebyshev (Mean, Sd) UCL	168.8391	
97.5% Chebyshev (Mean, Sd) UCL	190.2811	
99% Chebyshev (Mean, Sd) UCL	232.3999	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	137.1358	
95% Bootstrap-t UCL	143.8635	
95% Hall's Bootstrap UCL	162.8245	
95% Percentile Bootstrap UCL	138.43	
95% BCA Bootstrap UCL	146.44	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	140.1247	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	1.3	
Maximum	16.7	
Mean	8.095	
Standard Deviation	4.51531	
Variance	20.38803	
Coefficient of Variation	0.55779	
Skewness	0.488652	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.981407	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	10.71244	
Gamma Statistics		
k hat	2.809378	
k star (bias corrected)	2.033231	
Theta hat	2.881421	
Theta star	3.981348	
nu hat	56.18756	
nu star	40.66462	
5% Approximate Chi Square Value	27.04917	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	25.13319	
Anderson-Darling Test Statistic	0.201576	
Anderson-Darling 5% Critical Value	0.732828	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.155282	
Kolmogrov-Smirnov 5% Critical Value	0.268709	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	12.16969	
95% Adjusted Gamma UCL	13.09743	
Lognormal Statistics		
Minimum of log data	0.262364	
Maximum of log data	2.815409	
Mean of log data	1.902839	
Standard Deviation of log data	0.727282	
Variance of log data	0.528939	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915419	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	8.734747	
MLE Standard Deviation	7.293023	
MLE Coefficient of Variation	0.834944	
MLE Skewness	3.086897	
MLE Median	6.704905	
MLE 80% Quantile	12.39623	
MLE 90% Quantile	17.07127	
MLE 95% Quantile	22.18061	
MLE 99% Quantile	36.39741	
MVU Estimate of Median	6.529488	
MVU Estimate of Mean	8.465073	
MVU Estimate of Standard Deviation	6.407557	
MVU Estimate of SE of Mean	2.010633	
95% H-UCL	16.32294	
95% Chebyshev (MVUE) UCL	17.22922	
97.5% Chebyshev (MVUE) UCL	21.02147	
99% Chebyshev (MVUE) UCL	28.47062	
Non-parametric Statisitics		
95% CLT UCL	10.44363	
95% Adjusted-CLT UCL	10.67939	
95% Modified-t UCL	10.74921	
95% Jackknife UCL	10.71244	
95% Chebyshev (Mean, Sd) UCL	14.31893	
97.5% Chebyshev (Mean, Sd) UCL	17.01202	
99% Chebyshev (Mean, Sd) UCL	22.30209	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	10.33145	
95% Bootstrap-t UCL	11.0962	
95% Hall's Bootstrap UCL	11.44376	
95% Percentile Bootstrap UCL	10.295	
95% BCA Bootstrap UCL	11.365	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	10.71244	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	67.7	
Maximum	1320	
Mean	504	
Standard Deviation	386.2363	
Variance	149178.5	
Coefficient of Variation	0.766342	
Skewness	0.967822	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.921474	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	727.8939	
Gamma Statistics		
k hat	1.553171	
k star (bias corrected)	1.153886	
Theta hat	324.4974	
Theta star	436.7848	
nu hat	31.06342	
nu star	23.07773	
5% Approximate Chi Square Value	13.14782	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	11.86395	
Anderson-Darling Test Statistic	0.29132	
Anderson-Darling 5% Critical Value	0.738842	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.162526	
Kolmogrov-Smirnov 5% Critical Value	0.270981	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	884.6468	
95% Adjusted Gamma UCL	980.3795	
Lognormal Statistics		
Minimum of log data	4.215086	
Maximum of log data	7.185387	
Mean of log data	5.867335	
Standard Deviation of log data	1.002153	
Variance of log data	1.004311	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.900366	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	583.7601	
MLE Standard Deviation	767.8222	
MLE Coefficient of Variation	1.315304	
MLE Skewness	6.221424	
MLE Median	353.306	
MLE 80% Quantile	823.9864	
MLE 90% Quantile	1280.622	
MLE 95% Quantile	1836.977	
MLE 99% Quantile	3634.922	
MVU Estimate of Median	335.9248	
MVU Estimate of Mean	545.7982	
MVU Estimate of Standard Deviation	587.4107	
MVU Estimate of SE of Mean	181.3855	
95% H-UCL	1648.341	
95% Chebyshev (MVUE) UCL	1336.439	
97.5% Chebyshev (MVUE) UCL	1678.55	
99% Chebyshev (MVUE) UCL	2350.561	
Non-parametric Statisitics		
95% CLT UCL	704.9002	
95% Adjusted-CLT UCL	744.8421	
95% Modified-t UCL	734.124	
95% Jackknife UCL	727.8939	
95% Chebyshev (Mean, Sd) UCL	1036.39	
97.5% Chebyshev (Mean, Sd) UCL	1266.756	
99% Chebyshev (Mean, Sd) UCL	1719.264	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	694.7476	
95% Bootstrap-t UCL	778.9845	
95% Hall's Bootstrap UCL	895.6787	
95% Percentile Bootstrap UCL	694.7	
95% BCA Bootstrap UCL	663.47	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	727.8939	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	68	
Maximum	686	
Mean	306.26	
Standard Deviation	185.9998	
Variance	34595.92	
Coefficient of Variation	0.607326	
Skewness	0.654966	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.94088	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	414.0806	
Gamma Statistics		
k hat	2.581361	
k star (bias corrected)	1.873619	
Theta hat	118.6428	
Theta star	163.459	
nu hat	51.62722	
nu star	37.47239	
5% Approximate Chi Square Value	24.45453	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	22.64146	
Anderson-Darling Test Statistic	0.309589	
Anderson-Darling 5% Critical Value	0.733603	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.206123	
Kolmogrov-Smirnov 5% Critical Value	0.269019	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	469.2911	
95% Adjusted Gamma UCL	506.8707	
Lognormal Statistics		
Minimum of log data	4.219508	
Maximum of log data	6.530878	
Mean of log data	5.518408	
Standard Deviation of log data	0.732062	
Variance of log data	0.535914	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92778	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	325.8266	
MLE Standard Deviation	274.3549	
MLE Coefficient of Variation	0.842028	
MLE Skewness	3.123089	
MLE Median	249.2379	
MLE 80% Quantile	462.6636	
MLE 90% Quantile	638.4909	
MLE 95% Quantile	831.0165	
MLE 99% Quantile	1368.108	
MVU Estimate of Median	242.6322	
MVU Estimate of Mean	315.6167	
MVU Estimate of Standard Deviation	240.5905	
MVU Estimate of SE of Mean	75.4811	
95% H-UCL	612.6413	
95% Chebyshev (MVUE) UCL	644.6312	
97.5% Chebyshev (MVUE) UCL	786.9961	
99% Chebyshev (MVUE) UCL	1066.644	
Non-parametric Statisitics		
95% CLT UCL	403.0075	
95% Adjusted-CLT UCL	416.0245	
95% Modified-t UCL	416.111	
95% Jackknife UCL	414.0806	
95% Chebyshev (Mean, Sd) UCL	562.643	
97.5% Chebyshev (Mean, Sd) UCL	673.5801	
99% Chebyshev (Mean, Sd) UCL	891.4947	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	397.0917	
95% Bootstrap-t UCL	426.9488	
95% Hall's Bootstrap UCL	439.0393	
95% Percentile Bootstrap UCL	399.7	
95% BCA Bootstrap UCL	379.5	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	414.0806	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	165	
Maximum	490	
Mean	294.8	
Standard Deviation	124.2084	
Variance	15427.73	
Coefficient of Variation	0.421331	
Skewness	0.54261	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.880543	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	366.8013	
Gamma Statistics		
k hat	6.399118	
k star (bias corrected)	4.546049	
Theta hat	46.06885	
Theta star	64.84752	
nu hat	127.9824	
nu star	90.92099	
5% Approximate Chi Square Value	69.93008	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	66.73784	
Anderson-Darling Test Statistic	0.458446	
Anderson-Darling 5% Critical Value	0.728222	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.203224	
Kolmogrov-Smirnov 5% Critical Value	0.267206	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	383.2901	
95% Adjusted Gamma UCL	401.6238	
Lognormal Statistics		
Minimum of log data	5.105945	
Maximum of log data	6.194405	
Mean of log data	5.606131	
Standard Deviation of log data	0.422683	
Variance of log data	0.178661	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.895617	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	297.5141	
MLE Standard Deviation	131.5856	
MLE Coefficient of Variation	0.442284	
MLE Skewness	1.413368	
MLE Median	272.0895	
MLE 80% Quantile	388.8906	
MLE 90% Quantile	468.3793	
MLE 95% Quantile	545.3589	
MLE 99% Quantile	727.2651	
MVU Estimate of Median	269.6678	
MVU Estimate of Mean	294.6978	
MVU Estimate of Standard Deviation	126.3464	
MVU Estimate of SE of Mean	39.914	
95% H-UCL	400.9118	
95% Chebyshev (MVUE) UCL	468.6789	
97.5% Chebyshev (MVUE) UCL	543.9606	
99% Chebyshev (MVUE) UCL	691.8371	
Non-parametric Statisitics		
95% CLT UCL	359.4068	
95% Adjusted-CLT UCL	366.6083	
95% Modified-t UCL	367.9246	
95% Jackknife UCL	366.8013	
95% Chebyshev (Mean, Sd) UCL	466.0095	
97.5% Chebyshev (Mean, Sd) UCL	540.092	
99% Chebyshev (Mean, Sd) UCL	685.6127	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	355.2896	
95% Bootstrap-t UCL	383.3798	
95% Hall's Bootstrap UCL	369.5817	
95% Percentile Bootstrap UCL	356.3	
95% BCA Bootstrap UCL	343.9	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	366.8013	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	413	
Maximum	1420	
Mean	1036	
Standard Deviation	308.2704	
Variance	95030.67	
Coefficient of Variation	0.297558	
Skewness	-0.943372	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.930804	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1214.699	
Gamma Statistics		
k hat	9.503428	
k star (bias corrected)	6.719066	
Theta hat	109.0133	
Theta star	154.1881	
nu hat	190.0686	
nu star	134.3813	
5% Approximate Chi Square Value	108.5945	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	104.5693	
Anderson-Darling Test Statistic	0.580667	
Anderson-Darling 5% Critical Value	0.725496	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.224188	
Kolmogrov-Smirnov 5% Critical Value	0.266709	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1282.009	
95% Adjusted Gamma UCL	1331.357	
Lognormal Statistics		
Minimum of log data	6.023448	
Maximum of log data	7.258412	
Mean of log data	6.889588	
Standard Deviation of log data	0.374071	
Variance of log data	0.139929	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.835966	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1053.162	
MLE Standard Deviation	408.1491	
MLE Coefficient of Variation	0.387546	
MLE Skewness	1.220845	
MLE Median	981.9969	
MLE 80% Quantile	1347.058	
MLE 90% Quantile	1588.061	
MLE 95% Quantile	1816.986	
MLE 99% Quantile	2344.147	
MVU Estimate of Median	975.146	
MVU Estimate of Mean	1045.448	
MVU Estimate of Standard Deviation	395.4747	
MVU Estimate of SE of Mean	124.9816	
95% H-UCL	1361.331	
95% Chebyshev (MVUE) UCL	1590.23	
97.5% Chebyshev (MVUE) UCL	1825.957	
99% Chebyshev (MVUE) UCL	2288.999	
Non-parametric Statisitics		
95% CLT UCL	1196.346	
95% Adjusted-CLT UCL	1165.273	
95% Modified-t UCL	1209.852	
95% Jackknife UCL	1214.699	
95% Chebyshev (Mean, Sd) UCL	1460.921	
97.5% Chebyshev (Mean, Sd) UCL	1644.785	
99% Chebyshev (Mean, Sd) UCL	2005.95	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1185.503	
95% Bootstrap-t UCL	1181.881	
95% Hall's Bootstrap UCL	1169.554	
95% Percentile Bootstrap UCL	1180.4	
95% BCA Bootstrap UCL	1150.6	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1214.699	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	8	
Minimum	0.22	
Maximum	1.8	
Mean	0.98	
Standard Deviation	0.576962	
Variance	0.332886	
Coefficient of Variation	0.588737	
Skewness	-0.001636	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.949859	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.366469	
Gamma Statistics		
k hat	2.526316	
k star (bias corrected)	1.662281	
Theta hat	0.387917	
Theta star	0.589551	
nu hat	40.42106	
nu star	26.59649	
5% Approximate Chi Square Value	15.83761	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	13.78124	
Anderson-Darling Test Statistic	0.313991	
Anderson-Darling 5% Critical Value	0.722654	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.205733	
Kolmogrov-Smirnov 5% Critical Value	0.296849	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.645738	
95% Adjusted Gamma UCL	1.891308	
Lognormal Statistics		
Minimum of log data	-1.514128	
Maximum of log data	0.587787	
Mean of log data	-0.230985	
Standard Deviation of log data	0.759978	
Variance of log data	0.577567	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.911246	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.059501	
MLE Standard Deviation	0.936744	
MLE Coefficient of Variation	0.884137	
MLE Skewness	3.343538	
MLE Median	0.793751	
MLE 80% Quantile	1.508622	
MLE 90% Quantile	2.107678	
MLE 95% Quantile	2.770919	
MLE 99% Quantile	4.649335	
MVU Estimate of Median	0.765498	
MVU Estimate of Mean	1.015123	
MVU Estimate of Standard Deviation	0.790854	
MVU Estimate of SE of Mean	0.277597	
95% H-UCL	2.446771	
95% Chebyshev (MVUE) UCL	2.225139	
97.5% Chebyshev (MVUE) UCL	2.748713	
99% Chebyshev (MVUE) UCL	3.777175	
Non-parametric Statisitics		
95% CLT UCL	1.315529	
95% Adjusted-CLT UCL	1.315403	
95% Modified-t UCL	1.36645	
95% Jackknife UCL	1.366469	
95% Chebyshev (Mean, Sd) UCL	1.869159	
97.5% Chebyshev (Mean, Sd) UCL	2.253899	
99% Chebyshev (Mean, Sd) UCL	3.009645	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.293189	
95% Bootstrap-t UCL	1.346412	
95% Hall's Bootstrap UCL	1.301849	
95% Percentile Bootstrap UCL	1.29625	
95% BCA Bootstrap UCL	1.2275	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.366469	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	17.4	
Maximum	46.3	
Mean	30.135	
Standard Deviation	10.49529	
Variance	110.1511	
Coefficient of Variation	0.348276	
Skewness	0.146577	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.916915	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	36.21892	
Gamma Statistics		
k hat	8.798255	
k star (bias corrected)	6.225445	
Theta hat	3.425111	
Theta star	4.840618	
nu hat	175.9651	
nu star	124.5089	
5% Approximate Chi Square Value	99.73348	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	95.88406	
Anderson-Darling Test Statistic	0.421256	
Anderson-Darling 5% Critical Value	0.726115	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.183355	
Kolmogrov-Smirnov 5% Critical Value	0.266822	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	37.62103	
95% Adjusted Gamma UCL	39.13138	
Lognormal Statistics		
Minimum of log data	2.85647	
Maximum of log data	3.835142	
Mean of log data	3.347783	
Standard Deviation of log data	0.364088	
Variance of log data	0.13256	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909336	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	30.38845	
MLE Standard Deviation	11.44105	
MLE Coefficient of Variation	0.376493	
MLE Skewness	1.182847	
MLE Median	28.4396	
MLE 80% Quantile	38.68441	
MLE 90% Quantile	45.40559	
MLE 95% Quantile	51.76462	
MLE 99% Quantile	66.33054	
MVU Estimate of Median	28.25162	
MVU Estimate of Mean	30.17806	
MVU Estimate of Standard Deviation	11.10476	
MVU Estimate of SE of Mean	3.509649	
95% H-UCL	38.958	
95% Chebyshev (MVUE) UCL	45.47626	
97.5% Chebyshev (MVUE) UCL	52.0958	
99% Chebyshev (MVUE) UCL	65.09862	
Non-parametric Statisitics		
95% CLT UCL	35.59411	
95% Adjusted-CLT UCL	35.75849	
95% Modified-t UCL	36.24456	
95% Jackknife UCL	36.21892	
95% Chebyshev (Mean, Sd) UCL	44.60176	
97.5% Chebyshev (Mean, Sd) UCL	50.86154	
99% Chebyshev (Mean, Sd) UCL	63.15766	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	35.28287	
95% Bootstrap-t UCL	36.43986	
95% Hall's Bootstrap UCL	35.11138	
95% Percentile Bootstrap UCL	35.345	
95% BCA Bootstrap UCL	34.02	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	36.21892	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.115	
Maximum	2.2	
Mean	0.7575	
Standard Deviation	0.59829	
Variance	0.357951	
Coefficient of Variation	0.789822	
Skewness	1.614057	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.850209	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.104318	
Gamma Statistics		
k hat	1.750298	
k star (bias corrected)	1.291875	
Theta hat	0.432784	
Theta star	0.586357	
nu hat	35.00595	
nu star	25.8375	
5% Approximate Chi Square Value	15.25247	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	13.8568	
Anderson-Darling Test Statistic	0.357622	
Anderson-Darling 5% Critical Value	0.737403	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.20041	
Kolmogrov-Smirnov 5% Critical Value	0.270464	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.283195	
95% Adjusted Gamma UCL	1.412441	
Lognormal Statistics		
Minimum of log data	-2.162823	
Maximum of log data	0.788457	
Mean of log data	-0.589818	
Standard Deviation of log data	0.911724	
Variance of log data	0.831241	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.905577	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.840131	
MLE Standard Deviation	0.956483	
MLE Coefficient of Variation	1.138493	
MLE Skewness	4.891154	
MLE Median	0.554428	
MLE 80% Quantile	1.197923	
MLE 90% Quantile	1.789162	
MLE 95% Quantile	2.484244	
MLE 99% Quantile	4.622114	
MVU Estimate of Median	0.531773	
MVU Estimate of Mean	0.796452	
MVU Estimate of Standard Deviation	0.7713	
MVU Estimate of SE of Mean	0.239739	
95% H-UCL	2.043704	
95% Chebyshev (MVUE) UCL	1.84145	
97.5% Chebyshev (MVUE) UCL	2.293622	
99% Chebyshev (MVUE) UCL	3.181825	
Non-parametric Statisitics		
95% CLT UCL	1.0687	
95% Adjusted-CLT UCL	1.171884	
95% Modified-t UCL	1.120412	
95% Jacknife UCL	1.104318	
95% Chebyshev (Mean, Sd) UCL	1.582186	
97.5% Chebyshev (Mean, Sd) UCL	1.939029	
99% Chebyshev (Mean, Sd) UCL	2.639977	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.056714	
95% Bootstrap-t UCL	1.291043	
95% Hall's Bootstrap UCL	2.672161	
95% Percentile Bootstrap UCL	1.076	
95% BCA Bootstrap UCL	1.19	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.104318	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	22.2	
Maximum	56.1	
Mean	37.365	
Standard Deviation	12.97746	
Variance	168.4145	
Coefficient of Variation	0.347316	
Skewness	0.145869	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904092	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	44.88779	
Gamma Statistics		
k hat	8.882547	
k star (bias corrected)	6.284449	
Theta hat	4.206564	
Theta star	5.945628	
nu hat	177.6509	
nu star	125.689	
5% Approximate Chi Square Value	100.7906	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	96.91981	
Anderson-Darling Test Statistic	0.451646	
Anderson-Darling 5% Critical Value	0.726041	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.194897	
Kolmogrov-Smirnov 5% Critical Value	0.266809	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	46.59531	
95% Adjusted Gamma UCL	48.45623	
Lognormal Statistics		
Minimum of log data	3.100092	
Maximum of log data	4.027136	
Mean of log data	3.563389	
Standard Deviation of log data	0.361736	
Variance of log data	0.130853	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.895935	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	37.66818	
MLE Standard Deviation	14.08407	
MLE Coefficient of Variation	0.373898	
MLE Skewness	1.173966	
MLE Median	35.28258	
MLE 80% Quantile	47.89716	
MLE 90% Quantile	56.16085	
MLE 95% Quantile	63.97196	
MLE 99% Quantile	81.84171	
MVU Estimate of Median	35.05236	
MVU Estimate of Mean	37.41089	
MVU Estimate of Standard Deviation	13.6755	
MVU Estimate of SE of Mean	4.322191	
95% H-UCL	48.1976	
95% Chebyshev (MVUE) UCL	56.25088	
97.5% Chebyshev (MVUE) UCL	64.40296	
99% Chebyshev (MVUE) UCL	80.41614	
Non-parametric Statisitics		
95% CLT UCL	44.1152	
95% Adjusted-CLT UCL	44.31748	
95% Modified-t UCL	44.91934	
95% Jackknife UCL	44.88779	
95% Chebyshev (Mean, Sd) UCL	55.25319	
97.5% Chebyshev (Mean, Sd) UCL	62.99343	
99% Chebyshev (Mean, Sd) UCL	78.19763	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	43.74393	
95% Bootstrap-t UCL	45.21419	
95% Hall's Bootstrap UCL	43.11374	
95% Percentile Bootstrap UCL	43.57	
95% BCA Bootstrap UCL	42.46	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	44.88779	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	299	
Maximum	3440	
Mean	1541.5	
Standard Deviation	867.382	
Variance	752351.6	
Coefficient of Variation	0.562687	
Skewness	0.944909	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.940557	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2044.305	
Gamma Statistics		
k hat	3.110595	
k star (bias corrected)	2.244084	
Theta hat	495.5643	
Theta star	686.9174	
nu hat	62.21191	
nu star	44.88167	
5% Approximate Chi Square Value	30.51201	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	28.46599	
Anderson-Darling Test Statistic	0.238708	
Anderson-Darling 5% Critical Value	0.731871	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.150019	
Kolmogrov-Smirnov 5% Critical Value	0.26838	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2267.471	
95% Adjusted Gamma UCL	2430.447	
Lognormal Statistics		
Minimum of log data	5.700444	
Maximum of log data	8.143227	
Mean of log data	7.171243	
Standard Deviation of log data	0.669729	
Variance of log data	0.448538	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.931059	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1628.658	
MLE Standard Deviation	1225.31	
MLE Coefficient of Variation	0.752343	
MLE Skewness	2.682871	
MLE Median	1301.461	
MLE 80% Quantile	2291.964	
MLE 90% Quantile	3077.415	
MLE 95% Quantile	3916.477	
MLE 99% Quantile	6179.753	
MVU Estimate of Median	1272.54	
MVU Estimate of Mean	1586.883	
MVU Estimate of Standard Deviation	1099.846	
MVU Estimate of SE of Mean	345.8158	
95% H-UCL	2833.601	
95% Chebyshev (MVUE) UCL	3094.259	
97.5% Chebyshev (MVUE) UCL	3746.501	
99% Chebyshev (MVUE) UCL	5027.706	
Non-parametric Statisitics		
95% CLT UCL	1992.667	
95% Adjusted-CLT UCL	2080.242	
95% Modified-t UCL	2057.965	
95% Jackknife UCL	2044.305	
95% Chebyshev (Mean, Sd) UCL	2737.104	
97.5% Chebyshev (Mean, Sd) UCL	3254.442	
99% Chebyshev (Mean, Sd) UCL	4270.654	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1957.401	
95% Bootstrap-t UCL	2159.36	
95% Hall's Bootstrap UCL	2390.437	
95% Percentile Bootstrap UCL	2014.6	
95% BCA Bootstrap UCL	1921.5	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2044.305	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - ws.xls	
Variable:	Chromium VI	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.08801	
Maximum	1.716	
Mean	0.6552	
Standard Deviation	0.502107	
Variance	0.252112	
Coefficient of Variation	0.766342	
Skewness	0.967822	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.921474	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.946262	
Gamma Statistics		
k hat	1.553171	
k star (bias corrected)	1.153886	
Theta hat	0.421847	
Theta star	0.56782	
nu hat	31.06342	
nu star	23.07773	
5% Approximate Chi Square Value	13.14782	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	11.86395	
Anderson-Darling Test Statistic	0.29132	
Anderson-Darling 5% Critical Value	0.738842	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.162526	
Kolmogrov-Smirnov 5% Critical Value	0.270981	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.150041	
95% Adjusted Gamma UCL	1.274493	
Lognormal Statistics		
Minimum of log data	-2.430305	
Maximum of log data	0.539996	
Mean of log data	-0.778056	
Standard Deviation of log data	1.002153	
Variance of log data	1.004311	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.900366	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.758888	
MLE Standard Deviation	0.998169	
MLE Coefficient of Variation	1.315304	
MLE Skewness	6.221424	
MLE Median	0.459298	
MLE 80% Quantile	1.071182	
MLE 90% Quantile	1.664809	
MLE 95% Quantile	2.38807	
MLE 99% Quantile	4.725399	
MVU Estimate of Median	0.436702	
MVU Estimate of Mean	0.709538	
MVU Estimate of Standard Deviation	0.763634	
MVU Estimate of SE of Mean	0.235801	
95% H-UCL	2.142843	
95% Chebyshev (MVUE) UCL	1.737371	
97.5% Chebyshev (MVUE) UCL	2.182115	
99% Chebyshev (MVUE) UCL	3.055729	
Non-parametric Statisitics		
95% CLT UCL	0.91637	
95% Adjusted-CLT UCL	0.968295	
95% Modified-t UCL	0.954361	
95% Jackknife UCL	0.946262	
95% Chebyshev (Mean, Sd) UCL	1.347307	
97.5% Chebyshev (Mean, Sd) UCL	1.646782	
99% Chebyshev (Mean, Sd) UCL	2.235043	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.905381	
95% Bootstrap-t UCL	1.058587	
95% Hall's Bootstrap UCL	1.131768	
95% Percentile Bootstrap UCL	0.90714	
95% BCA Bootstrap UCL	0.866359	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.946262	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	8	
Minimum	0.285	
Maximum	4	
Mean	1.244	
Standard Deviation	1.103806	
Variance	1.218388	
Coefficient of Variation	0.887304	
Skewness	2.020657	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.757394	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.883856	
Gamma Statistics		
k hat	1.945264	
k star (bias corrected)	1.428352	
Theta hat	0.639502	
Theta star	0.870934	
nu hat	38.90528	
nu star	28.56703	
5% Approximate Chi Square Value	17.36818	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	15.86748	
Anderson-Darling Test Statistic	0.521904	
Anderson-Darling 5% Critical Value	0.73598	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.244459	
Kolmogrov-Smirnov 5% Critical Value	0.269953	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.04612	
95% Adjusted Gamma UCL	2.239637	
Lognormal Statistics		
Minimum of log data	-1.255266	
Maximum of log data	1.386294	
Mean of log data	-0.060202	
Standard Deviation of log data	0.762509	
Variance of log data	0.58142	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.949922	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.25924	
MLE Standard Deviation	1.118228	
MLE Coefficient of Variation	0.888018	
MLE Skewness	3.364326	
MLE Median	0.941575	
MLE 80% Quantile	1.79341	
MLE 90% Quantile	2.508344	
MLE 95% Quantile	3.300671	
MLE 99% Quantile	5.547762	
MVU Estimate of Median	0.914525	
MVU Estimate of Mean	1.215952	
MVU Estimate of Standard Deviation	0.968512	
MVU Estimate of SE of Mean	0.303473	
95% H-UCL	2.464354	
95% Chebyshev (MVUE) UCL	2.53876	
97.5% Chebyshev (MVUE) UCL	3.111141	
99% Chebyshev (MVUE) UCL	4.235471	
Non-parametric Statisitics		
95% CLT UCL	1.818143	
95% Adjusted-CLT UCL	2.056466	
95% Modified-t UCL	1.921029	
95% Jackknife UCL	1.883856	
95% Chebyshev (Mean, Sd) UCL	2.765492	
97.5% Chebyshev (Mean, Sd) UCL	3.423842	
99% Chebyshev (Mean, Sd) UCL	4.717045	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.779706	
95% Bootstrap-t UCL	2.51143	
95% Hall's Bootstrap UCL	4.092064	
95% Percentile Bootstrap UCL	1.839	
95% BCA Bootstrap UCL	1.71	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2.04612	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	8.2	
Maximum	98.7	
Mean	41.265	
Standard Deviation	28.79904	
Variance	829.3845	
Coefficient of Variation	0.697905	
Skewness	1.038992	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.895232	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	57.95926	
Gamma Statistics		
k hat	2.218456	
k star (bias corrected)	1.619586	
Theta hat	18.60077	
Theta star	25.47873	
nu hat	44.36912	
nu star	32.39172	
5% Approximate Chi Square Value	20.38081	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	18.74084	
Anderson-Darling Test Statistic	0.243736	
Anderson-Darling 5% Critical Value	0.734837	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.15875	
Kolmogrov-Smirnov 5% Critical Value	0.269513	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	65.58346	
95% Adjusted Gamma UCL	71.32252	
Lognormal Statistics		
Minimum of log data	2.104134	
Maximum of log data	4.592085	
Mean of log data	3.478016	
Standard Deviation of log data	0.775579	
Variance of log data	0.601522	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956207	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	43.76251	
MLE Standard Deviation	39.74673	
MLE Coefficient of Variation	0.908237	
MLE Skewness	3.473911	
MLE Median	32.3954	
MLE 80% Quantile	62.38846	
MLE 90% Quantile	87.76256	
MLE 95% Quantile	116.0294	
MLE 99% Quantile	196.7654	
MVU Estimate of Median	31.43298	
MVU Estimate of Mean	42.19857	
MVU Estimate of Standard Deviation	34.23483	
MVU Estimate of SE of Mean	10.72094	
95% H-UCL	87.16574	
95% Chebyshev (MVUE) UCL	88.93008	
97.5% Chebyshev (MVUE) UCL	109.1508	
99% Chebyshev (MVUE) UCL	148.8706	
Non-parametric Statisitics		
95% CLT UCL	56.24477	
95% Adjusted-CLT UCL	59.44198	
95% Modified-t UCL	58.45796	
95% Jackknife UCL	57.95926	
95% Chebyshev (Mean, Sd) UCL	80.96173	
97.5% Chebyshev (Mean, Sd) UCL	98.13854	
99% Chebyshev (Mean, Sd) UCL	131.8791	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	55.59036	
95% Bootstrap-t UCL	67.04191	
95% Hall's Bootstrap UCL	156.2984	
95% Percentile Bootstrap UCL	56.17	
95% BCA Bootstrap UCL	64.99	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	57.95926	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	6.95	
Maximum	105	
Mean	40.225	
Standard Deviation	32.63516	
Variance	1065.053	
Coefficient of Variation	0.811315	
Skewness	1.1424	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.870325	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	59.14299	
Gamma Statistics		
k hat	1.688017	
k star (bias corrected)	1.248279	
Theta hat	23.82973	
Theta star	32.22437	
nu hat	33.76035	
nu star	24.96558	
5% Approximate Chi Square Value	14.58351	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	13.22251	
Anderson-Darling Test Statistic	0.227727	
Anderson-Darling 5% Critical Value	0.737857	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.126644	
Kolmogrov-Smirnov 5% Critical Value	0.270627	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	68.86135	
95% Adjusted Gamma UCL	75.94932	
Lognormal Statistics		
Minimum of log data	1.938742	
Maximum of log data	4.65396	
Mean of log data	3.369933	
Standard Deviation of log data	0.897082	
Variance of log data	0.804756	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.953306	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	43.48044	
MLE Standard Deviation	48.34256	
MLE Coefficient of Variation	1.111823	
MLE Skewness	4.70985	
MLE Median	29.07659	
MLE 80% Quantile	62.05167	
MLE 90% Quantile	92.08237	
MLE 95% Quantile	127.1838	
MLE 99% Quantile	234.2867	
MVU Estimate of Median	27.92569	
MVU Estimate of Mean	41.30409	
MVU Estimate of Standard Deviation	39.2896	
MVU Estimate of SE of Mean	12.22366	
95% H-UCL	103.374	
95% Chebyshev (MVUE) UCL	94.58578	
97.5% Chebyshev (MVUE) UCL	117.6408	
99% Chebyshev (MVUE) UCL	162.928	
Non-parametric Statisitics		
95% CLT UCL	57.20012	
95% Adjusted-CLT UCL	61.1838	
95% Modified-t UCL	59.76436	
95% Jackknife UCL	59.14299	
95% Chebyshev (Mean, Sd) UCL	85.20946	
97.5% Chebyshev (Mean, Sd) UCL	104.6743	
99% Chebyshev (Mean, Sd) UCL	142.9091	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	56.61612	
95% Bootstrap-t UCL	71.12524	
95% Hall's Bootstrap UCL	111.1784	
95% Percentile Bootstrap UCL	57.43	
95% BCA Bootstrap UCL	53.77	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	59.14299	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	1.1	
Maximum	16.1	
Mean	5.17	
Standard Deviation	4.880813	
Variance	23.82233	
Coefficient of Variation	0.944064	
Skewness	1.476523	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.805777	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	7.999315	
Gamma Statistics		
k hat	1.451812	
k star (bias corrected)	1.082935	
Theta hat	3.561068	
Theta star	4.774064	
nu hat	29.03623	
nu star	21.6587	
5% Approximate Chi Square Value	12.08118	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.85732	
Anderson-Darling Test Statistic	0.584527	
Anderson-Darling 5% Critical Value	0.740101	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.283932	
Kolmogrov-Smirnov 5% Critical Value	0.271373	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	9.268585	
95% Adjusted Gamma UCL	10.31336	
Lognormal Statistics		
Minimum of log data	0.09531	
Maximum of log data	2.778819	
Mean of log data	1.260515	
Standard Deviation of log data	0.9202	
Variance of log data	0.846767	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.902001	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	5.386512	
MLE Standard Deviation	6.21692	
MLE Coefficient of Variation	1.154164	
MLE Skewness	4.99995	
MLE Median	3.527236	
MLE 80% Quantile	7.675881	
MLE 90% Quantile	11.50718	
MLE 95% Quantile	16.02649	
MLE 99% Quantile	29.99104	
MVU Estimate of Median	3.38046	
MVU Estimate of Mean	5.100303	
MVU Estimate of Standard Deviation	4.990167	
MVU Estimate of SE of Mean	1.550199	
95% H-UCL	13.28013	
95% Chebyshev (MVUE) UCL	11.85746	
97.5% Chebyshev (MVUE) UCL	14.78129	
99% Chebyshev (MVUE) UCL	20.52459	
Non-parametric Statisitics		
95% CLT UCL	7.708747	
95% Adjusted-CLT UCL	8.478786	
95% Modified-t UCL	8.119426	
95% Jackknife UCL	7.999315	
95% Chebyshev (Mean, Sd) UCL	11.89774	
97.5% Chebyshev (Mean, Sd) UCL	14.80883	
99% Chebyshev (Mean, Sd) UCL	20.52712	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	7.569736	
95% Bootstrap-t UCL	10.41851	
95% Hall's Bootstrap UCL	19.91368	
95% Percentile Bootstrap UCL	7.76	
95% BCA Bootstrap UCL	7.23	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	9.268585	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	27.5	
Maximum	584	
Mean	217.25	
Standard Deviation	198.5759	
Variance	39432.39	
Coefficient of Variation	0.914043	
Skewness	0.899687	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.862791	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	332.3607	
Gamma Statistics		
k hat	1.233414	
k star (bias corrected)	0.930057	
Theta hat	176.1371	
Theta star	233.5879	
nu hat	24.66828	
nu star	18.60113	
5% Approximate Chi Square Value	9.825281	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	8.737484	
Anderson-Darling Test Statistic	0.369805	
Anderson-Darling 5% Critical Value	0.74405	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.226155	
Kolmogrov-Smirnov 5% Critical Value	0.272522	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	411.2957	
95% Adjusted Gamma UCL	462.5011	
Lognormal Statistics		
Minimum of log data	3.314186	
Maximum of log data	6.369901	
Mean of log data	4.923766	
Standard Deviation of log data	1.068839	
Variance of log data	1.142416	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.937252	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	243.4652	
MLE Standard Deviation	355.6869	
MLE Coefficient of Variation	1.460936	
MLE Skewness	7.50093	
MLE Median	137.5195	
MLE 80% Quantile	339.3169	
MLE 90% Quantile	543.062	
MLE 95% Quantile	797.9177	
MLE 99% Quantile	1652.236	
MVU Estimate of Median	129.8454	
MVU Estimate of Mean	224.9923	
MVU Estimate of Standard Deviation	260.4549	
MVU Estimate of SE of Mean	79.96638	
95% H-UCL	773.8606	
95% Chebyshev (MVUE) UCL	573.5577	
97.5% Chebyshev (MVUE) UCL	724.3822	
99% Chebyshev (MVUE) UCL	1020.648	
Non-parametric Statisitics		
95% CLT UCL	320.5389	
95% Adjusted-CLT UCL	339.6286	
95% Modified-t UCL	335.3383	
95% Jackknife UCL	332.3607	
95% Chebyshev (Mean, Sd) UCL	490.968	
97.5% Chebyshev (Mean, Sd) UCL	609.406	
99% Chebyshev (Mean, Sd) UCL	842.0545	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	315.6847	
95% Bootstrap-t UCL	384.961	
95% Hall's Bootstrap UCL	350.2501	
95% Percentile Bootstrap UCL	325.04	
95% BCA Bootstrap UCL	365.95	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	332.3607	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	58.1	
Maximum	1090	
Mean	389.02	
Standard Deviation	382.0925	
Variance	145994.7	
Coefficient of Variation	0.982192	
Skewness	1.112545	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.807872	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	610.5118	
Gamma Statistics		
k hat	1.174593	
k star (bias corrected)	0.888882	
Theta hat	331.1957	
Theta star	437.6511	
nu hat	23.49185	
nu star	17.77763	
5% Approximate Chi Square Value	9.228993	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	8.179633	
Anderson-Darling Test Statistic	0.555151	
Anderson-Darling 5% Critical Value	0.745113	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.264481	
Kolmogrov-Smirnov 5% Critical Value	0.272832	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	749.3617	
95% Adjusted Gamma UCL	845.4969	
Lognormal Statistics		
Minimum of log data	4.062166	
Maximum of log data	6.993933	
Mean of log data	5.480983	
Standard Deviation of log data	1.067462	
Variance of log data	1.139476	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.902124	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	424.4188	
MLE Standard Deviation	618.7104	
MLE Coefficient of Variation	1.457783	
MLE Skewness	7.471327	
MLE Median	240.0825	
MLE 80% Quantile	591.6933	
MLE 90% Quantile	946.4063	
MLE 95% Quantile	1389.86	
MLE 99% Quantile	2875.266	
MVU Estimate of Median	226.7188	
MVU Estimate of Mean	392.3158	
MVU Estimate of Standard Deviation	453.4861	
MVU Estimate of SE of Mean	139.2494	
95% H-UCL	1345.634	
95% Chebyshev (MVUE) UCL	999.29	
97.5% Chebyshev (MVUE) UCL	1261.928	
99% Chebyshev (MVUE) UCL	1777.83	
Non-parametric Statisitics		
95% CLT UCL	587.7648	
95% Adjusted-CLT UCL	633.1868	
95% Modified-t UCL	617.5967	
95% Jackknife UCL	610.5118	
95% Chebyshev (Mean, Sd) UCL	915.6981	
97.5% Chebyshev (Mean, Sd) UCL	1143.592	
99% Chebyshev (Mean, Sd) UCL	1591.246	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	574.3826	
95% Bootstrap-t UCL	759.6026	
95% Hall's Bootstrap UCL	786.1213	
95% Percentile Bootstrap UCL	582.61	
95% BCA Bootstrap UCL	678.97	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	749.3617	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	75	
Maximum	648	
Mean	317.41	
Standard Deviation	216.8139	
Variance	47008.28	
Coefficient of Variation	0.683072	
Skewness	0.409909	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.873468	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	443.093	
Gamma Statistics		
k hat	2.131557	
k star (bias corrected)	1.558757	
Theta hat	148.9099	
Theta star	203.6302	
nu hat	42.63115	
nu star	31.17514	
5% Approximate Chi Square Value	19.417	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	17.82041	
Anderson-Darling Test Statistic	0.445953	
Anderson-Darling 5% Critical Value	0.735133	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.217307	
Kolmogrov-Smirnov 5% Critical Value	0.269631	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	509.6206	
95% Adjusted Gamma UCL	555.279	
Lognormal Statistics		
Minimum of log data	4.317488	
Maximum of log data	6.473891	
Mean of log data	5.507652	
Standard Deviation of log data	0.787327	
Variance of log data	*0.619884*	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.914175	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	336.1622	
MLE Standard Deviation	311.5106	
MLE Coefficient of Variation	0.926668	
MLE Skewness	3.575745	
MLE Median	246.5714	
MLE 80% Quantile	479.5956	
MLE 90% Quantile	678.1491	
MLE 95% Quantile	900.3693	
MLE 99% Quantile	1539.134	
MVU Estimate of Median	239.0253	
MVU Estimate of Mean	323.7279	
MVU Estimate of Standard Deviation	266.9479	
MVU Estimate of SE of Mean	83.55212	
95% H-UCL	680.4058	
95% Chebyshev (MVUE) UCL	687.9232	
97.5% Chebyshev (MVUE) UCL	845.5107	
99% Chebyshev (MVUE) UCL	1155.061	
Non-parametric Statisitics		
95% CLT UCL	430.1854	
95% Adjusted-CLT UCL	439.6817	
95% Modified-t UCL	444.5742	
95% Jackknife UCL	443.093	
95% Chebyshev (Mean, Sd) UCL	616.2674	
97.5% Chebyshev (Mean, Sd) UCL	745.5832	
99% Chebyshev (Mean, Sd) UCL	999.5991	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	422.9703	
95% Bootstrap-t UCL	462.7257	
95% Hall's Bootstrap UCL	413.6669	
95% Percentile Bootstrap UCL	425.02	
95% BCA Bootstrap UCL	463.71	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	443.093	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	51.5	
Maximum	1260	
Mean	338.345	
Standard Deviation	400.521	
Variance	160417.1	
Coefficient of Variation	1.183765	
Skewness	1.66288	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.73827	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	570.5195	
Gamma Statistics		
k hat	1.017233	
k star (bias corrected)	0.77873	
Theta hat	332.6132	
Theta star	434.4833	
nu hat	20.34466	
nu star	15.57459	
5% Approximate Chi Square Value	7.661688	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.719503	
Anderson-Darling Test Statistic	0.719801	
Anderson-Darling 5% Critical Value	0.747958	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.281801	
Kolmogrov-Smirnov 5% Critical Value	0.273659	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	687.7838	
95% Adjusted Gamma UCL	784.2225	
Lognormal Statistics		
Minimum of log data	3.941582	
Maximum of log data	7.138867	
Mean of log data	5.25776	
Standard Deviation of log data	1.088845	
Variance of log data	1.185584	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906367	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	347.426	
MLE Standard Deviation	523.7495	
MLE Coefficient of Variation	1.507514	
MLE Skewness	7.948514	
MLE Median	192.0508	
MLE 80% Quantile	481.9469	
MLE 90% Quantile	778.1552	
MLE 95% Quantile	1151.603	
MLE 99% Quantile	2417.318	
MVU Estimate of Median	180.9385	
MVU Estimate of Mean	319.8617	
MVU Estimate of Standard Deviation	378.1878	
MVU Estimate of SE of Mean	115.8969	
95% H-UCL	1145.879	
95% Chebyshev (MVUE) UCL	825.0447	
97.5% Chebyshev (MVUE) UCL	1043.638	
99% Chebyshev (MVUE) UCL	1473.022	
Non-parametric Statisitics		
95% CLT UCL	546.6754	
95% Adjusted-CLT UCL	617.8404	
95% Modified-t UCL	581.6198	
95% Jackknife UCL	570.5195	
95% Chebyshev (Mean, Sd) UCL	890.4251	
97.5% Chebyshev (Mean, Sd) UCL	1129.311	
99% Chebyshev (Mean, Sd) UCL	1598.555	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	535.1434	
95% Bootstrap-t UCL	750.6387	
95% Hall's Bootstrap UCL	544.7428	
95% Percentile Bootstrap UCL	528.9	
95% BCA Bootstrap UCL	504.81	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	687.7838	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.28	
Maximum	4.8	
Mean	1.532	
Standard Deviation	1.551399	
Variance	2.40684	
Coefficient of Variation	1.012663	
Skewness	1.351213	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.813871	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.431317	
Gamma Statistics		
k hat	1.180823	
k star (bias corrected)	0.893243	
Theta hat	1.2974	
Theta star	1.7151	
nu hat	23.61646	
nu star	17.86485	
5% Approximate Chi Square Value	9.291898	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	8.238427	
Anderson-Darling Test Statistic	0.430557	
Anderson-Darling 5% Critical Value	0.745001	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.186179	
Kolmogrov-Smirnov 5% Critical Value	0.272799	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.945464	
95% Adjusted Gamma UCL	3.322109	
Lognormal Statistics		
Minimum of log data	-1.272966	
Maximum of log data	1.568616	
Mean of log data	-0.053258	
Standard Deviation of log data	1.054538	
Variance of log data	1.11205	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.913663	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.65329	
MLE Standard Deviation	2.36171	
MLE Coefficient of Variation	1.428491	
MLE Skewness	7.200432	
MLE Median	0.948136	
MLE 80% Quantile	2.311339	
MLE 90% Quantile	3.675994	
MLE 95% Quantile	5.373381	
MLE 99% Quantile	11.01874	
MVU Estimate of Median	0.896601	
MVU Estimate of Mean	1.531842	
MVU Estimate of Standard Deviation	1.746345	
MVU Estimate of SE of Mean	0.536866	
95% H-UCL	5.120125	
95% Chebyshev (MVUE) UCL	3.871986	
97.5% Chebyshev (MVUE) UCL	4.884568	
99% Chebyshev (MVUE) UCL	6.87359	
Non-parametric Statisitics		
95% CLT UCL	2.338958	
95% Adjusted-CLT UCL	2.562947	
95% Modified-t UCL	2.466255	
95% Jackknife UCL	2.431317	
95% Chebyshev (Mean, Sd) UCL	3.670456	
97.5% Chebyshev (Mean, Sd) UCL	4.595768	
99% Chebyshev (Mean, Sd) UCL	6.413364	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.313053	
95% Bootstrap-t UCL	3.364893	
95% Hall's Bootstrap UCL	4.347664	
95% Percentile Bootstrap UCL	2.309	
95% BCA Bootstrap UCL	2.734	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2.945464	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	4	
Maximum	31.8	
Mean	9.175	
Standard Deviation	8.167662	
Variance	66.71069	
Coefficient of Variation	0.890208	
Skewness	2.868769	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.573004	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	13.90964	
Gamma Statistics		
k hat	2.690768	
k star (bias corrected)	1.950204	
Theta hat	3.409807	
Theta star	4.704636	
nu hat	53.81536	
nu star	39.00408	
5% Approximate Chi Square Value	25.6964	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	23.83344	
Anderson-Darling Test Statistic	1.198041	
Anderson-Darling 5% Critical Value	0.733231	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.320772	
Kolmogrov-Smirnov 5% Critical Value	0.268871	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	13.92656	
95% Adjusted Gamma UCL	15.01514	
Lognormal Statistics		
Minimum of log data	1.386294	
Maximum of log data	3.459466	
Mean of log data	2.019302	
Standard Deviation of log data	0.573243	
Variance of log data	0.328608	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.803169	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	8.878262	
MLE Standard Deviation	5.537596	
MLE Coefficient of Variation	0.623725	
MLE Skewness	2.113825	
MLE Median	7.533064	
MLE 80% Quantile	12.22756	
MLE 90% Quantile	15.7355	
MLE 95% Quantile	19.34216	
MLE 99% Quantile	28.57882	
MVU Estimate of Median	7.410121	
MVU Estimate of Mean	8.716742	
MVU Estimate of Standard Deviation	5.126148	
MVU Estimate of SE of Mean	1.615828	
95% H-UCL	13.84883	
95% Chebyshev (MVUE) UCL	15.75997	
97.5% Chebyshev (MVUE) UCL	18.80759	
99% Chebyshev (MVUE) UCL	24.79403	
Non-parametric Statisitics		
95% CLT UCL	13.4234	
95% Adjusted-CLT UCL	15.92705	
95% Modified-t UCL	14.30016	
95% Jackknife UCL	13.90964	
95% Chebyshev (Mean, Sd) UCL	20.43334	
97.5% Chebyshev (Mean, Sd) UCL	25.30484	
99% Chebyshev (Mean, Sd) UCL	34.87395	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	13.18807	
95% Bootstrap-t UCL	29.37589	
95% Hall's Bootstrap UCL	34.32006	
95% Percentile Bootstrap UCL	14.01	
95% BCA Bootstrap UCL	16.7	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	20.43334	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.29	
Maximum	3.1	
Mean	1.0455	
Standard Deviation	1.059086	
Variance	1.121664	
Coefficient of Variation	1.012995	
Skewness	1.427716	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.732861	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.659432	
Gamma Statistics		
k hat	1.38458	
k star (bias corrected)	1.035873	
Theta hat	0.755103	
Theta star	1.009294	
nu hat	27.6916	
nu star	20.71745	
5% Approximate Chi Square Value	11.3802	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.19719	
Anderson-Darling Test Statistic	0.829581	
Anderson-Darling 5% Critical Value	0.741317	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.282136	
Kolmogrov-Smirnov 5% Critical Value	0.271727	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1.903314	
95% Adjusted Gamma UCL	2.124124	
Lognormal Statistics		
Minimum of log data	-1.237874	
Maximum of log data	1.131402	
Mean of log data	-0.358216	
Standard Deviation of log data	0.906956	
Variance of log data	0.822568	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.851358	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.054502	
MLE Standard Deviation	1.191325	
MLE Coefficient of Variation	1.129752	
MLE Skewness	4.831201	
MLE Median	0.698922	
MLE 80% Quantile	1.50405	
MLE 90% Quantile	2.241672	
MLE 95% Quantile	3.107213	
MLE 99% Quantile	5.76245	
MVU Estimate of Median	0.670656	
MVU Estimate of Mean	1.000348	
MVU Estimate of Standard Deviation	0.963148	
MVU Estimate of SE of Mean	0.299463	
95% H-UCL	2.54603	
95% Chebyshev (MVUE) UCL	2.305677	
97.5% Chebyshev (MVUE) UCL	2.870494	
99% Chebyshev (MVUE) UCL	3.979967	
Non-parametric Statisitics		
95% CLT UCL	1.596382	
95% Adjusted-CLT UCL	1.757949	
95% Modified-t UCL	1.684634	
95% Jackknife UCL	1.659432	
95% Chebyshev (Mean, Sd) UCL	2.50535	
97.5% Chebyshev (Mean, Sd) UCL	3.137028	
99% Chebyshev (Mean, Sd) UCL	4.377837	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.566866	
95% Bootstrap-t UCL	2.642285	
95% Hall's Bootstrap UCL	3.430016	
95% Percentile Bootstrap UCL	1.583	
95% BCA Bootstrap UCL	1.525	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	2.54603	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	21.9	
Maximum	114	
Mean	53.55	
Standard Deviation	34.4679	
Variance	1188.036	
Coefficient of Variation	0.643658	
Skewness	1.044629	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.819269	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	73.53039	
Gamma Statistics		
k hat	3.004578	
k star (bias corrected)	2.169871	
Theta hat	17.8228	
Theta star	24.67889	
nu hat	60.09155	
nu star	43.39742	
5% Approximate Chi Square Value	29.28896	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	27.288	
Anderson-Darling Test Statistic	0.552176	
Anderson-Darling 5% Critical Value	0.732167	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.190562	
Kolmogrov-Smirnov 5% Critical Value	0.268447	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	79.34498	
95% Adjusted Gamma UCL	85.16315	
Lognormal Statistics		
Minimum of log data	3.086487	
Maximum of log data	4.736198	
Mean of log data	3.805069	
Standard Deviation of log data	0.617137	
Variance of log data	0.380859	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892399	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	54.35294	
MLE Standard Deviation	37.00556	
MLE Coefficient of Variation	0.680838	
MLE Skewness	2.358111	
MLE Median	44.92837	
MLE 80% Quantile	75.68277	
MLE 90% Quantile	99.29458	
MLE 95% Quantile	123.9974	
MLE 99% Quantile	188.7703	
MVU Estimate of Median	44.07944	
MVU Estimate of Mean	53.19026	
MVU Estimate of Standard Deviation	33.80483	
MVU Estimate of SE of Mean	10.64486	
95% H-UCL	88.95883	
95% Chebyshev (MVUE) UCL	99.59015	
97.5% Chebyshev (MVUE) UCL	119.6674	
99% Chebyshev (MVUE) UCL	159.1053	
Non-parametric Statisitics		
95% CLT UCL	71.47842	
95% Adjusted-CLT UCL	75.32573	
95% Modified-t UCL	74.1305	
95% Jackknife UCL	73.53039	
95% Chebyshev (Mean, Sd) UCL	101.0607	
97.5% Chebyshev (Mean, Sd) UCL	121.6186	
99% Chebyshev (Mean, Sd) UCL	162.0007	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	70.68876	
95% Bootstrap-t UCL	89.99076	
95% Hall's Bootstrap UCL	94.86644	
95% Percentile Bootstrap UCL	72.4	
95% BCA Bootstrap UCL	79.81	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	79.34498	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb01.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	58.4	
Maximum	1190	
Mean	422.06	
Standard Deviation	373.0581	
Variance	139172.4	
Coefficient of Variation	0.883898	
Skewness	1.125084	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.869756	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	638.3148	
Gamma Statistics		
k hat	1.421863	
k star (bias corrected)	1.06197	
Theta hat	296.836	
Theta star	397.431	
nu hat	28.43725	
nu star	21.23941	
5% Approximate Chi Square Value	11.76825	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.56248	
Anderson-Darling Test Statistic	0.21899	
Anderson-Darling 5% Critical Value	0.740643	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.142303	
Kolmogrov-Smirnov 5% Critical Value	0.271531	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	761.7363	
95% Adjusted Gamma UCL	848.6932	
Lognormal Statistics		
Minimum of log data	4.067316	
Maximum of log data	7.081709	
Mean of log data	5.653979	
Standard Deviation of log data	0.98115	
Variance of log data	0.962655	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.972273	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	461.8806	
MLE Standard Deviation	587.6313	
MLE Coefficient of Variation	1.272258	
MLE Skewness	5.876101	
MLE Median	285.4249	
MLE 80% Quantile	653.9629	
MLE 90% Quantile	1007.026	
MLE 95% Quantile	1433.638	
MLE 99% Quantile	2796.527	
MVU Estimate of Median	271.9541	
MVU Estimate of Mean	433.3209	
MVU Estimate of Standard Deviation	455.3957	
MVU Estimate of SE of Mean	140.8526	
95% H-UCL	1258.311	
95% Chebyshev (MVUE) UCL	1047.283	
97.5% Chebyshev (MVUE) UCL	1312.945	
99% Chebyshev (MVUE) UCL	1834.786	
Non-parametric Statisitics		
95% CLT UCL	616.1056	
95% Adjusted-CLT UCL	660.9535	
95% Modified-t UCL	645.3101	
95% Jackknife UCL	638.3148	
95% Chebyshev (Mean, Sd) UCL	936.2851	
97.5% Chebyshev (Mean, Sd) UCL	1158.791	
99% Chebyshev (Mean, Sd) UCL	1595.86	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	607.454	
95% Bootstrap-t UCL	728.2854	
95% Hall's Bootstrap UCL	642.4698	
95% Percentile Bootstrap UCL	611.57	
95% BCA Bootstrap UCL	726.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	638.3148	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	8	
Minimum	0.89	
Maximum	2	
Mean	1.539	
Standard Deviation	0.441826	
Variance	0.19521	
Coefficient of Variation	0.287086	
Skewness	-0.2949	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.87552	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.795118	
Gamma Statistics		
k hat	12.27676	
k star (bias corrected)	8.660396	
Theta hat	0.125359	
Theta star	0.177706	
nu hat	245.5351	
nu star	173.2079	
5% Approximate Chi Square Value	143.7661	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	139.1053	
Anderson-Darling Test Statistic	0.550082	
Anderson-Darling 5% Critical Value	0.724944	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.204771	
Kolmogrov-Smirnov 5% Critical Value	0.266525	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.854172	
95% Adjusted Gamma UCL	1.916296	
Lognormal Statistics		
Minimum of log data	-0.116534	
Maximum of log data	0.693147	
Mean of log data	0.389853	
Standard Deviation of log data	0.311082	
Variance of log data	0.096772	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.873514	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.549975	
MLE Standard Deviation	0.494074	
MLE Coefficient of Variation	0.318762	
MLE Skewness	0.988676	
MLE Median	1.476764	
MLE 80% Quantile	1.920753	
MLE 90% Quantile	2.202501	
MLE 95% Quantile	2.463501	
MLE 99% Quantile	3.044785	
MVU Estimate of Median	1.469632	
MVU Estimate of Mean	1.54223	
MVU Estimate of Standard Deviation	0.483515	
MVU Estimate of SE of Mean	0.152854	
95% H-UCL	1.904934	
95% Chebyshev (MVUE) UCL	2.208506	
97.5% Chebyshev (MVUE) UCL	2.496805	
99% Chebyshev (MVUE) UCL	3.063111	
Non-parametric Statisitics		
95% CLT UCL	1.768815	
95% Adjusted-CLT UCL	1.754893	
95% Modified-t UCL	1.792946	
95% Jackknife UCL	1.795118	
95% Chebyshev (Mean, Sd) UCL	2.148015	
97.5% Chebyshev (Mean, Sd) UCL	2.411536	
99% Chebyshev (Mean, Sd) UCL	2.929172	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.758164	
95% Bootstrap-t UCL	1.778239	
95% Hall's Bootstrap UCL	1.735548	
95% Percentile Bootstrap UCL	1.75	
95% BCA Bootstrap UCL	1.79	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.795118	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	7.55	
Maximum	56.2	
Mean	27.105	
Standard Deviation	18.26692	
Variance	333.6803	
Coefficient of Variation	0.673932	
Skewness	0.868162	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.836946	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	37.69399	
Gamma Statistics		
k hat	2.603019	
k star (bias corrected)	1.88878	
Theta hat	10.41291	
Theta star	14.35053	
nu hat	52.06038	
nu star	37.7756	
5% Approximate Chi Square Value	24.6999	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	22.87688	
Anderson-Darling Test Statistic	0.443266	
Anderson-Darling 5% Critical Value	0.73353	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.175274	
Kolmogrov-Smirnov 5% Critical Value	0.26899	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	41.45392	
95% Adjusted Gamma UCL	44.75732	
Lognormal Statistics		
Minimum of log data	2.021548	
Maximum of log data	4.028917	
Mean of log data	3.095505	
Standard Deviation of log data	0.677987	
Variance of log data	0.459666	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.939309	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	27.8084	
MLE Standard Deviation	21.24287	
MLE Coefficient of Variation	0.763901	
MLE Skewness	2.737474	
MLE Median	22.0984	
MLE 80% Quantile	39.1893	
MLE 90% Quantile	52.81092	
MLE 95% Quantile	67.40999	
MLE 99% Quantile	106.9651	
MVU Estimate of Median	21.59525	
MVU Estimate of Mean	27.0753	
MVU Estimate of Standard Deviation	19.01198	
MVU Estimate of SE of Mean	5.97621	
95% H-UCL	48.86638	
95% Chebyshev (MVUE) UCL	53.12499	
97.5% Chebyshev (MVUE) UCL	64.39672	
99% Chebyshev (MVUE) UCL	86.53784	
Non-parametric Statisitics		
95% CLT UCL	36.60651	
95% Adjusted-CLT UCL	38.30103	
95% Modified-t UCL	37.9583	
95% Jackknife UCL	37.69399	
95% Chebyshev (Mean, Sd) UCL	52.28421	
97.5% Chebyshev (Mean, Sd) UCL	63.17927	
99% Chebyshev (Mean, Sd) UCL	84.58051	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	36.28423	
95% Bootstrap-t UCL	41.01883	
95% Hall's Bootstrap UCL	36.28712	
95% Percentile Bootstrap UCL	36.365	
95% BCA Bootstrap UCL	39.46	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	41.45392	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	13.6	
Maximum	389	
Mean	78.5	
Standard Deviation	113.8947	
Variance	12972.01	
Coefficient of Variation	1.450888	
Skewness	2.729562	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.591873	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	144.5226	
Gamma Statistics		
k hat	1.009699	
k star (bias corrected)	0.773456	
Theta hat	77.74592	
Theta star	101.4925	
nu hat	20.19399	
nu star	15.46912	
5% Approximate Chi Square Value	7.587774	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.650892	
Anderson-Darling Test Statistic	0.802889	
Anderson-Darling 5% Critical Value	0.748095	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.293149	
Kolmogrov-Smirnov 5% Critical Value	0.273699	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	160.0372	
95% Adjusted Gamma UCL	182.5809	
Lognormal Statistics		
Minimum of log data	2.61007	
Maximum of log data	5.963579	
Mean of log data	3.792073	
Standard Deviation of log data	1.014209	
Variance of log data	1.02862	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.910776	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	74.17172	
MLE Standard Deviation	99.43447	
MLE Coefficient of Variation	1.340598	
MLE Skewness	6.431121	
MLE Median	44.34824	
MLE 80% Quantile	104.4888	
MLE 90% Quantile	163.258	
MLE 95% Quantile	235.2025	
MLE 99% Quantile	469.2442	
MVU Estimate of Median	42.11479	
MVU Estimate of Mean	69.20877	
MVU Estimate of Standard Deviation	75.49528	
MVU Estimate of SE of Mean	23.28924	
95% H-UCL	213.8508	
95% Chebyshev (MVUE) UCL	170.7242	
97.5% Chebyshev (MVUE) UCL	214.65	
99% Chebyshev (MVUE) UCL	300.9338	
Non-parametric Statisitics		
95% CLT UCL	137.7422	
95% Adjusted-CLT UCL	170.9604	
95% Modified-t UCL	149.704	
95% Jackknife UCL	144.5226	
95% Chebyshev (Mean, Sd) UCL	235.4931	
97.5% Chebyshev (Mean, Sd) UCL	303.4241	
99% Chebyshev (Mean, Sd) UCL	436.8615	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	135.5593	
95% Bootstrap-t UCL	386.1234	
95% Hall's Bootstrap UCL	403.6888	
95% Percentile Bootstrap UCL	142.28	
95% BCA Bootstrap UCL	189.11	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	170.7242	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.91	
Maximum	5.8	
Mean	3.091	
Standard Deviation	1.289715	
Variance	1.663366	
Coefficient of Variation	0.417249	
Skewness	0.596775	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.948363	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	3.838624	
Gamma Statistics		
k hat	5.560893	
k star (bias corrected)	3.959292	
Theta hat	0.555846	
Theta star	0.780695	
nu hat	111.2179	
nu star	79.18584	
5% Approximate Chi Square Value	59.68005	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	56.74542	
Anderson-Darling Test Statistic	0.381818	
Anderson-Darling 5% Critical Value	0.728958	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.21672	
Kolmogrov-Smirnov 5% Critical Value	0.26734	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	4.10126	
95% Adjusted Gamma UCL	4.31336	
Lognormal Statistics		
Minimum of log data	-0.094311	
Maximum of log data	1.757858	
Mean of log data	1.035895	
Standard Deviation of log data	0.488367	
Variance of log data	0.238502	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.896753	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	3.174486	
MLE Standard Deviation	1.647513	
MLE Coefficient of Variation	0.518986	
MLE Skewness	1.696744	
MLE Median	2.817626	
MLE 80% Quantile	4.256999	
MLE 90% Quantile	5.277465	
MLE 95% Quantile	6.291866	
MLE 99% Quantile	8.774373	
MVU Estimate of Median	2.784189	
MVU Estimate of Mean	3.133642	
MVU Estimate of Standard Deviation	1.559405	
MVU Estimate of SE of Mean	0.492263	
95% H-UCL	4.544406	
95% Chebyshev (MVUE) UCL	5.279369	
97.5% Chebyshev (MVUE) UCL	6.207826	
99% Chebyshev (MVUE) UCL	8.031602	
Non-parametric Statisitics		
95% CLT UCL	3.761843	
95% Adjusted-CLT UCL	3.844084	
95% Modified-t UCL	3.851452	
95% Jackknife UCL	3.838624	
95% Chebyshev (Mean, Sd) UCL	4.86875	
97.5% Chebyshev (Mean, Sd) UCL	5.637984	
99% Chebyshev (Mean, Sd) UCL	7.148994	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	3.740571	
95% Bootstrap-t UCL	3.958582	
95% Hall's Bootstrap UCL	4.315324	
95% Percentile Bootstrap UCL	3.745	
95% BCA Bootstrap UCL	4.02	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	3.838624	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	17.9	
Maximum	248	
Mean	106.06	
Standard Deviation	64.71164	
Variance	4187.596	
Coefficient of Variation	0.610142	
Skewness	1.057526	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.934479	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	143.5721	
Gamma Statistics		
k hat	2.717149	
k star (bias corrected)	1.968671	
Theta hat	39.03356	
Theta star	53.87391	
nu hat	54.34298	
nu star	39.37342	
5% Approximate Chi Square Value	25.99672	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	24.12187	
Anderson-Darling Test Statistic	0.186263	
Anderson-Darling 5% Critical Value	0.733142	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.113374	
Kolmogrov-Smirnov 5% Critical Value	0.268835	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	160.6335	
95% Adjusted Gamma UCL	173.1186	
Lognormal Statistics		
Minimum of log data	2.884801	
Maximum of log data	5.513429	
Mean of log data	4.468845	
Standard Deviation of log data	0.719507	
Variance of log data	0.51769	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.939183	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	113.0342	
MLE Standard Deviation	93.0833	
MLE Coefficient of Variation	0.823497	
MLE Skewness	3.028942	
MLE Median	87.25592	
MLE 80% Quantile	160.265	
MLE 90% Quantile	219.9525	
MLE 95% Quantile	284.9843	
MLE 99% Quantile	465.1772	
MVU Estimate of Median	85.02112	
MVU Estimate of Mean	109.6282	
MVU Estimate of Standard Deviation	82.03017	
MVU Estimate of SE of Mean	25.74793	
95% H-UCL	209.143	
95% Chebyshev (MVUE) UCL	221.8608	
97.5% Chebyshev (MVUE) UCL	270.424	
99% Chebyshev (MVUE) UCL	365.8169	
Non-parametric Statisitics		
95% CLT UCL	139.7197	
95% Adjusted-CLT UCL	147.032	
95% Modified-t UCL	144.7127	
95% Jackknife UCL	143.5721	
95% Chebyshev (Mean, Sd) UCL	195.2588	
97.5% Chebyshev (Mean, Sd) UCL	233.8552	
99% Chebyshev (Mean, Sd) UCL	309.6704	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	138.1185	
95% Bootstrap-t UCL	155.5083	
95% Hall's Bootstrap UCL	170.7464	
95% Percentile Bootstrap UCL	139.76	
95% BCA Bootstrap UCL	155.23	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	143.5721	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	38.3	
Maximum	168	
Mean	75.275	
Standard Deviation	36.06725	
Variance	1300.846	
Coefficient of Variation	0.47914	
Skewness	2.155951	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.761384	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	96.1825	
Gamma Statistics		
k hat	6.521985	
k star (bias corrected)	4.632057	
Theta hat	11.54173	
Theta star	16.25088	
nu hat	130.4397	
nu star	92.64113	
5% Approximate Chi Square Value	71.44083	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	68.21226	
Anderson-Darling Test Statistic	0.630103	
Anderson-Darling 5% Critical Value	0.728114	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.217609	
Kolmogrov-Smirnov 5% Critical Value	0.267186	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	97.61311	
95% Adjusted Gamma UCL	102.2333	
Lognormal Statistics		
Minimum of log data	3.64545	
Maximum of log data	5.123964	
Mean of log data	4.24253	
Standard Deviation of log data	0.39539	
Variance of log data	0.156334	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.907929	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	75.24102	
MLE Standard Deviation	30.95107	
MLE Coefficient of Variation	0.411359	
MLE Skewness	1.303685	
MLE Median	69.58366	
MLE 80% Quantile	97.18678	
MLE 90% Quantile	115.6544	
MLE 95% Quantile	133.346	
MLE 99% Quantile	174.5494	
MVU Estimate of Median	69.04148	
MVU Estimate of Mean	74.62207	
MVU Estimate of Standard Deviation	29.87531	
MVU Estimate of SE of Mean	9.440051	
95% H-UCL	99.01717	
95% Chebyshev (MVUE) UCL	115.7703	
97.5% Chebyshev (MVUE) UCL	133.5752	
99% Chebyshev (MVUE) UCL	168.5494	
Non-parametric Statisitics		
95% CLT UCL	94.03532	
95% Adjusted-CLT UCL	102.344	
95% Modified-t UCL	97.47849	
95% Jackknife UCL	96.1825	
95% Chebyshev (Mean, Sd) UCL	124.9903	
97.5% Chebyshev (Mean, Sd) UCL	146.5021	
99% Chebyshev (Mean, Sd) UCL	188.7579	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	93.14836	
95% Bootstrap-t UCL	117.2706	
95% Hall's Bootstrap UCL	178.5933	
95% Percentile Bootstrap UCL	95.315	
95% BCA Bootstrap UCL	109.34	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	97.61311	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	67	
Maximum	342	
Mean	118.855	
Standard Deviation	86.56994	
Variance	7494.355	
Coefficient of Variation	0.728366	
Skewness	2.340571	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.646103	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	169.038	
Gamma Statistics		
k hat	3.381697	
k star (bias corrected)	2.433854	
Theta hat	35.14656	
Theta star	48.83407	
nu hat	67.63393	
nu star	48.67709	
5% Approximate Chi Square Value	33.65867	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	31.50069	
Anderson-Darling Test Statistic	1.197456	
Anderson-Darling 5% Critical Value	0.731115	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.313251	
Kolmogrov-Smirnov 5% Critical Value	0.26821	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	171.8878	
95% Adjusted Gamma UCL	183.6631	
Lognormal Statistics		
Minimum of log data	4.204693	
Maximum of log data	5.834811	
Mean of log data	4.622824	
Standard Deviation of log data	0.526605	
Variance of log data	0.277313	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.777093	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	116.9189	
MLE Standard Deviation	66.0958	
MLE Coefficient of Variation	0.565313	
MLE Skewness	1.876603	
MLE Median	101.781	
MLE 80% Quantile	158.8253	
MLE 90% Quantile	200.2389	
MLE 95% Quantile	242.0366	
MLE 99% Quantile	346.4391	
MVU Estimate of Median	100.3778	
MVU Estimate of Mean	115.1498	
MVU Estimate of Standard Deviation	61.97055	
MVU Estimate of SE of Mean	19.55111	
95% H-UCL	173.7797	
95% Chebyshev (MVUE) UCL	200.3711	
97.5% Chebyshev (MVUE) UCL	237.2464	
99% Chebyshev (MVUE) UCL	309.6809	
Non-parametric Statisitics		
95% CLT UCL	163.8842	
95% Adjusted-CLT UCL	185.5348	
95% Modified-t UCL	172.415	
95% Jackknife UCL	169.038	
95% Chebyshev (Mean, Sd) UCL	238.1834	
97.5% Chebyshev (Mean, Sd) UCL	289.8169	
99% Chebyshev (Mean, Sd) UCL	391.241	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	162.5143	
95% Bootstrap-t UCL	356.6729	
95% Hall's Bootstrap UCL	367.1876	
95% Percentile Bootstrap UCL	164.365	
95% BCA Bootstrap UCL	194.88	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	238.1834	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	34.5	
Maximum	108	
Mean	55.99	
Standard Deviation	24.52253	
Variance	601.3543	
Coefficient of Variation	0.43798	
Skewness	1.354105	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.837061	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	70.20525	
Gamma Statistics		
k hat	6.946191	
k star (bias corrected)	4.929001	
Theta hat	8.060532	
Theta star	11.3593	
nu hat	138.9238	
nu star	98.58001	
5% Approximate Chi Square Value	76.67137	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	73.31986	
Anderson-Darling Test Statistic	0.498577	
Anderson-Darling 5% Critical Value	0.727741	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.200468	
Kolmogrov-Smirnov 5% Critical Value	0.267119	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	71.98899	
95% Adjusted Gamma UCL	75.27967	
Lognormal Statistics		
Minimum of log data	3.540959	
Maximum of log data	4.682131	
Mean of log data	3.951468	
Standard Deviation of log data	0.389864	
Variance of log data	0.151994	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906723	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	56.11845	
MLE Standard Deviation	22.73686	
MLE Coefficient of Variation	0.405158	
MLE Skewness	1.281983	
MLE Median	52.01164	
MLE 80% Quantile	72.30569	
MLE 90% Quantile	85.83639	
MLE 95% Quantile	98.77002	
MLE 99% Quantile	128.804	
MVU Estimate of Median	51.6176	
MVU Estimate of Mean	55.67023	
MVU Estimate of Standard Deviation	21.9689	
MVU Estimate of SE of Mean	6.942057	
95% H-UCL	73.50622	
95% Chebyshev (MVUE) UCL	85.92996	
97.5% Chebyshev (MVUE) UCL	99.02336	
99% Chebyshev (MVUE) UCL	124.7428	
Non-parametric Statisitics		
95% CLT UCL	68.74535	
95% Adjusted-CLT UCL	72.29347	
95% Modified-t UCL	70.75868	
95% Jackknife UCL	70.20525	
95% Chebyshev (Mean, Sd) UCL	89.79197	
97.5% Chebyshev (Mean, Sd) UCL	104.4181	
99% Chebyshev (Mean, Sd) UCL	133.1483	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	68.05129	
95% Bootstrap-t UCL	80.38292	
95% Hall's Bootstrap UCL	128.8937	
95% Percentile Bootstrap UCL	68.85	
95% BCA Bootstrap UCL	75.35	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	71.98899	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.12	
Maximum	0.58	
Mean	0.2405	
Standard Deviation	0.137163	
Variance	0.018814	
Coefficient of Variation	0.570323	
Skewness	1.97281	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.770429	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.320011	
Gamma Statistics		
k hat	4.679935	
k star (bias corrected)	3.342621	
Theta hat	0.05139	
Theta star	0.07195	
nu hat	93.5987	
nu star	66.85242	
5% Approximate Chi Square Value	49.03241	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	46.38989	
Anderson-Darling Test Statistic	0.623846	
Anderson-Darling 5% Critical Value	0.729431	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.251893	
Kolmogrov-Smirnov 5% Critical Value	0.267555	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.327906	
95% Adjusted Gamma UCL	0.346584	
Lognormal Statistics		
Minimum of log data	-2.120264	
Maximum of log data	-0.544727	
Mean of log data	-1.535662	
Standard Deviation of log data	0.465783	
Variance of log data	0.216954	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909423	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.239984	
MLE Standard Deviation	0.118126	
MLE Coefficient of Variation	0.492227	
MLE Skewness	1.595941	
MLE Median	0.215313	
MLE 80% Quantile	0.319156	
MLE 90% Quantile	0.39175	
MLE 95% Quantile	0.463269	
MLE 99% Quantile	0.636195	
MVU Estimate of Median	0.212988	
MVU Estimate of Mean	0.237193	
MVU Estimate of Standard Deviation	0.112392	
MVU Estimate of SE of Mean	0.03549	
95% H-UCL	0.336285	
95% Chebyshev (MVUE) UCL	0.391888	
97.5% Chebyshev (MVUE) UCL	0.458825	
99% Chebyshev (MVUE) UCL	0.590309	
Non-parametric Statisitics		
95% CLT UCL	0.311845	
95% Adjusted-CLT UCL	0.340759	
95% Modified-t UCL	0.324521	
95% Jackknife UCL	0.320011	
95% Chebyshev (Mean, Sd) UCL	0.429566	
97.5% Chebyshev (Mean, Sd) UCL	0.511375	
99% Chebyshev (Mean, Sd) UCL	0.672072	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.307416	
95% Bootstrap-t UCL	0.397715	
95% Hall's Bootstrap UCL	0.576025	
95% Percentile Bootstrap UCL	0.315	
95% BCA Bootstrap UCL	0.3675	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.327906	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	2.1	
Maximum	12.8	
Mean	8.275	
Standard Deviation	2.943472	
Variance	8.664028	
Coefficient of Variation	0.355707	
Skewness	-0.66563	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.957115	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	9.981275	
Gamma Statistics		
k hat	5.914116	
k star (bias corrected)	4.206548	
Theta hat	1.399195	
Theta star	1.967171	
nu hat	118.2823	
nu star	84.13096	
5% Approximate Chi Square Value	63.98672	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	60.94137	
Anderson-Darling Test Statistic	0.593113	
Anderson-Darling 5% Critical Value	0.728647	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.223155	
Kolmogrov-Smirnov 5% Critical Value	0.267284	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	10.88013	
95% Adjusted Gamma UCL	11.42383	
Lognormal Statistics		
Minimum of log data	0.741937	
Maximum of log data	2.549445	
Mean of log data	2.02632	
Standard Deviation of log data	0.500755	
Variance of log data	0.250756	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.785717	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	8.599444	
MLE Standard Deviation	4.590817	
MLE Coefficient of Variation	0.53385	
MLE Skewness	1.753697	
MLE Median	7.586115	
MLE 80% Quantile	11.58207	
MLE 90% Quantile	14.43694	
MLE 95% Quantile	17.28886	
MLE 99% Quantile	24.31459	
MVU Estimate of Median	7.491488	
MVU Estimate of Mean	8.482695	
MVU Estimate of Standard Deviation	4.332383	
MVU Estimate of SE of Mean	1.36738	
95% H-UCL	12.45887	
95% Chebyshev (MVUE) UCL	14.44297	
97.5% Chebyshev (MVUE) UCL	17.02198	
99% Chebyshev (MVUE) UCL	22.08795	
Non-parametric Statisitics		
95% CLT UCL	9.806042	
95% Adjusted-CLT UCL	9.596692	
95% Modified-t UCL	9.948621	
95% Jackknife UCL	9.981275	
95% Chebyshev (Mean, Sd) UCL	12.3323	
97.5% Chebyshev (Mean, Sd) UCL	14.08789	
99% Chebyshev (Mean, Sd) UCL	17.53642	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	9.741691	
95% Bootstrap-t UCL	9.773245	
95% Hall's Bootstrap UCL	9.807531	
95% Percentile Bootstrap UCL	9.69	
95% BCA Bootstrap UCL	9.41	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	9.981275	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	18.5	
Maximum	45.6	
Mean	26.65	
Standard Deviation	9.075792	
Variance	82.37	
Coefficient of Variation	0.340555	
Skewness	1.198789	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.854166	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	31.91107	
Gamma Statistics		
k hat	10.97823	
k star (bias corrected)	7.751427	
Theta hat	2.427532	
Theta star	3.438076	
nu hat	219.5646	
nu star	155.0285	
5% Approximate Chi Square Value	127.2405	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	122.8674	
Anderson-Darling Test Statistic	0.518253	
Anderson-Darling 5% Critical Value	0.72501	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.189488	
Kolmogrov-Smirnov 5% Critical Value	0.266585	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	32.47009	
95% Adjusted Gamma UCL	33.62577	
Lognormal Statistics		
Minimum of log data	2.917771	
Maximum of log data	3.819908	
Mean of log data	3.236554	
Standard Deviation of log data	0.311357	
Variance of log data	0.096943	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.896	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	26.70966	
MLE Standard Deviation	8.521915	
MLE Coefficient of Variation	0.319057	
MLE Skewness	0.989652	
MLE Median	25.44587	
MLE 80% Quantile	33.10387	
MLE 90% Quantile	37.96433	
MLE 95% Quantile	42.46735	
MLE 99% Quantile	52.49771	
MVU Estimate of Median	25.32278	
MVU Estimate of Mean	26.57595	
MVU Estimate of Standard Deviation	8.339476	
MVU Estimate of SE of Mean	2.636365	
95% H-UCL	32.83338	
95% Chebyshev (MVUE) UCL	38.0676	
97.5% Chebyshev (MVUE) UCL	43.04004	
99% Chebyshev (MVUE) UCL	52.80745	
Non-parametric Statisitics		
95% CLT UCL	31.37076	
95% Adjusted-CLT UCL	32.5333	
95% Modified-t UCL	32.0924	
95% Jackknife UCL	31.91107	
95% Chebyshev (Mean, Sd) UCL	39.16012	
97.5% Chebyshev (Mean, Sd) UCL	44.57325	
99% Chebyshev (Mean, Sd) UCL	55.20631	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	31.03311	
95% Bootstrap-t UCL	34.5248	
95% Hall's Bootstrap UCL	34.12965	
95% Percentile Bootstrap UCL	31.745	
95% BCA Bootstrap UCL	30.425	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	31.91107	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb02.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	132	
Maximum	450	
Mean	249.95	
Standard Deviation	110.5879	
Variance	12229.69	
Coefficient of Variation	0.44244	
Skewness	0.777001	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.901399	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	314.0557	
Gamma Statistics		
k hat	5.962993	
k star (bias corrected)	4.240762	
Theta hat	41.91687	
Theta star	58.93988	
nu hat	119.2599	
nu star	84.81524	
5% Approximate Chi Square Value	64.58415	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	61.52374	
Anderson-Darling Test Statistic	0.316174	
Anderson-Darling 5% Critical Value	0.728604	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.168517	
Kolmogrov-Smirnov 5% Critical Value	0.267276	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	328.2472	
95% Adjusted Gamma UCL	344.5754	
Lognormal Statistics		
Minimum of log data	4.882802	
Maximum of log data	6.109248	
Mean of log data	5.435073	
Standard Deviation of log data	0.437377	
Variance of log data	0.191299	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.93071	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	252.3262	
MLE Standard Deviation	115.8561	
MLE Coefficient of Variation	0.459152	
MLE Skewness	1.474256	
MLE Median	229.3096	
MLE 80% Quantile	331.8413	
MLE 90% Quantile	402.2616	
MLE 95% Quantile	470.8588	
MLE 99% Quantile	634.2301	
MVU Estimate of Median	227.1249	
MVU Estimate of Mean	249.7588	
MVU Estimate of Standard Deviation	110.9103	
MVU Estimate of SE of Mean	35.03263	
95% H-UCL	344.501	
95% Chebyshev (MVUE) UCL	402.4625	
97.5% Chebyshev (MVUE) UCL	468.5375	
99% Chebyshev (MVUE) UCL	598.329	
Non-parametric Statisitics		
95% CLT UCL	307.4721	
95% Adjusted-CLT UCL	316.6536	
95% Modified-t UCL	315.4879	
95% Jackknife UCL	314.0557	
95% Chebyshev (Mean, Sd) UCL	402.385	
97.5% Chebyshev (Mean, Sd) UCL	468.3437	
99% Chebyshev (Mean, Sd) UCL	597.9068	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	303.5624	
95% Bootstrap-t UCL	328.7993	
95% Hall's Bootstrap UCL	351.4986	
95% Percentile Bootstrap UCL	303.55	
95% BCA Bootstrap UCL	328	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	314.0557	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&HOU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - cb03.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	0.215	
Maximum	4.8	
Mean	1.532083	
Standard Deviation	1.839609	
Variance	3.384161	
Coefficient of Variation	1.200724	
Skewness	1.184648	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.698413	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.485787	
Gamma Statistics		
k hat	0.868444	
k star (bias corrected)	0.706889	
Theta hat	1.76417	
Theta star	2.167361	
nu hat	20.84267	
nu star	16.96533	
5% Approximate Chi Square Value	8.646145	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	7.755352	
Anderson-Darling Test Statistic	1.119192	
Anderson-Darling 5% Critical Value	0.761402	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.292341	
Kolmogrov-Smirnov 5% Critical Value	0.253645	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	3.00623	
95% Adjusted Gamma UCL	3.351531	
Lognormal Statistics		
Minimum of log data	-1.537117	
Maximum of log data	1.568616	
Mean of log data	-0.249561	
Standard Deviation of log data	1.191576	
Variance of log data	1.419854	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.844657	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.584655	
MLE Standard Deviation	2.806458	
MLE Coefficient of Variation	1.771022	
MLE Skewness	10.86791	
MLE Median	0.779143	
MLE 80% Quantile	2.132557	
MLE 90% Quantile	3.602453	
MLE 95% Quantile	5.532184	
MLE 99% Quantile	12.45405	
MVU Estimate of Median	0.734186	
MVU Estimate of Mean	1.450515	
MVU Estimate of Standard Deviation	1.966845	
MVU Estimate of SE of Mean	0.540503	
95% H-UCL	5.138189	
95% Chebyshev (MVUE) UCL	3.806515	
97.5% Chebyshev (MVUE) UCL	4.825958	
99% Chebyshev (MVUE) UCL	6.828456	
Non-parametric Statisitics		
95% CLT UCL	2.405582	
95% Adjusted-CLT UCL	2.599632	
95% Modified-t UCL	2.516055	
95% Jackknife UCL	2.485787	
95% Chebyshev (Mean, Sd) UCL	3.846874	
97.5% Chebyshev (Mean, Sd) UCL	4.848486	
99% Chebyshev (Mean, Sd) UCL	6.815958	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.395195	
95% Bootstrap-t UCL	2.800519	
95% Hall's Bootstrap UCL	2.168065	
95% Percentile Bootstrap UCL	2.420833	
95% BCA Bootstrap UCL	2.92125	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	6.815958	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	9.1	
Maximum	1410	
Mean	272.4833	
Standard Deviation	396.1096	
Variance	156902.8	
Coefficient of Variation	1.453702	
Skewness	2.491637	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.673506	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	477.8373	
Gamma Statistics		
k hat	0.665204	
k star (bias corrected)	0.554459	
Theta hat	409.6235	
Theta star	491.4402	
nu hat	15.9649	
nu star	13.30701	
5% Approximate Chi Square Value	6.098653	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	5.371491	
Anderson-Darling Test Statistic	0.292071	
Anderson-Darling 5% Critical Value	0.77216	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.134754	
Kolmogrov-Smirnov 5% Critical Value	0.256123	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	594.5475	
95% Adjusted Gamma UCL	675.034	
Lognormal Statistics		
Minimum of log data	2.208274	
Maximum of log data	7.251345	
Mean of log data	4.692516	
Standard Deviation of log data	1.543414	
Variance of log data	2.382128	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963638	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	359.0924	
MLE Standard Deviation	1125.737	
MLE Coefficient of Variation	3.134952	
MLE Skewness	40.21491	
MLE Median	109.1274	
MLE 80% Quantile	402.1001	
MLE 90% Quantile	792.9842	
MLE 95% Quantile	1382.201	
MLE 99% Quantile	3954.058	
MVU Estimate of Median	98.73988	
MVU Estimate of Mean	300.9537	
MVU Estimate of Standard Deviation	567.5509	
MVU Estimate of SE of Mean	146.9312	
95% H-UCL	2294.99	
95% Chebyshev (MVUE) UCL	941.412	
97.5% Chebyshev (MVUE) UCL	1218.539	
99% Chebyshev (MVUE) UCL	1762.901	
Non-parametric Statisitics		
95% CLT UCL	460.5674	
95% Adjusted-CLT UCL	548.4493	
95% Modified-t UCL	491.5451	
95% Jackknife UCL	477.8373	
95% Chebyshev (Mean, Sd) UCL	770.9103	
97.5% Chebyshev (Mean, Sd) UCL	986.5801	
99% Chebyshev (Mean, Sd) UCL	1410.222	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	454.174	
95% Bootstrap-t UCL	738.6991	
95% Hall's Bootstrap UCL	1108.791	
95% Percentile Bootstrap UCL	457.5583	
95% BCA Bootstrap UCL	600.5833	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	594.5475	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	20.7	
Maximum	95.5	
Mean	51.5125	
Standard Deviation	29.06418	
Variance	844.7264	
Coefficient of Variation	0.564216	
Skewness	0.44011	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.870746	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	66.58016	
Gamma Statistics		
k hat	3.30825	
k star (bias corrected)	2.536743	
Theta hat	15.57092	
Theta star	20.30655	
nu hat	79.398	
nu star	60.88183	
5% Approximate Chi Square Value	43.93424	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	41.74457	
Anderson-Darling Test Statistic	0.541374	
Anderson-Darling 5% Critical Value	0.738024	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.166994	
Kolmogrov-Smirnov 5% Critical Value	0.247099	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	71.3834	
95% Adjusted Gamma UCL	75.12774	
Lognormal Statistics		
Minimum of log data	3.030134	
Maximum of log data	4.559126	
Mean of log data	3.78314	
Standard Deviation of log data	0.600681	
Variance of log data	0.360818	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.886559	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	52.64382	
MLE Standard Deviation	34.70113	
MLE Coefficient of Variation	0.659168	
MLE Skewness	2.263915	
MLE Median	43.95383	
MLE 80% Quantile	73.0187	
MLE 90% Quantile	95.10822	
MLE 95% Quantile	118.068	
MLE 99% Quantile	177.7405	
MVU Estimate of Median	43.29721	
MVU Estimate of Mean	51.75239	
MVU Estimate of Standard Deviation	32.24382	
MVU Estimate of SE of Mean	9.266588	
95% H-UCL	79.4417	
95% Chebyshev (MVUE) UCL	92.14451	
97.5% Chebyshev (MVUE) UCL	109.6222	
99% Chebyshev (MVUE) UCL	143.9538	
Non-parametric Statisitics		
95% CLT UCL	65.313	
95% Adjusted-CLT UCL	66.45198	
95% Modified-t UCL	66.75782	
95% Jackknife UCL	66.58016	
95% Chebyshev (Mean, Sd) UCL	88.08412	
97.5% Chebyshev (Mean, Sd) UCL	103.9087	
99% Chebyshev (Mean, Sd) UCL	134.993	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	64.71829	
95% Bootstrap-t UCL	67.42645	
95% Hall's Bootstrap UCL	64.62988	
95% Percentile Bootstrap UCL	64.975	
95% BCA Bootstrap UCL	61.65417	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	66.58016	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	0.77	
Maximum	23.1	
Mean	7.389167	
Standard Deviation	7.044311	
Variance	49.62232	
Coefficient of Variation	0.95333	
Skewness	1.272407	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.856103	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	11.04113	
Gamma Statistics		
k hat	1.180644	
k star (bias corrected)	0.941039	
Theta hat	6.258589	
Theta star	7.85214	
nu hat	28.33546	
nu star	22.58493	
5% Approximate Chi Square Value	12.77611	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	11.66367	
Anderson-Darling Test Statistic	0.21647	
Anderson-Darling 5% Critical Value	0.752683	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.132214	
Kolmogrov-Smirnov 5% Critical Value	0.251328	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	13.06217	
95% Adjusted Gamma UCL	14.308	
Lognormal Statistics		
Minimum of log data	-0.261365	
Maximum of log data	3.139833	
Mean of log data	1.520103	
Standard Deviation of log data	1.101985	
Variance of log data	1.21437	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955269	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	8.392077	
MLE Standard Deviation	12.91446	
MLE Coefficient of Variation	1.538887	
MLE Skewness	8.26101	
MLE Median	4.572695	
MLE 80% Quantile	11.60319	
MLE 90% Quantile	18.84322	
MLE 95% Quantile	28.01858	
MLE 99% Quantile	59.34212	
MVU Estimate of Median	4.346215	
MVU Estimate of Mean	7.806491	
MVU Estimate of Standard Deviation	9.628224	
MVU Estimate of SE of Mean	2.675321	
95% H-UCL	23.52985	
95% Chebyshev (MVUE) UCL	19.46794	
97.5% Chebyshev (MVUE) UCL	24.51386	
99% Chebyshev (MVUE) UCL	34.42559	
Non-parametric Statisitics		
95% CLT UCL	10.73401	
95% Adjusted-CLT UCL	11.53212	
95% Modified-t UCL	11.16562	
95% Jackknife UCL	11.04113	
95% Chebyshev (Mean, Sd) UCL	16.25306	
97.5% Chebyshev (Mean, Sd) UCL	20.08848	
99% Chebyshev (Mean, Sd) UCL	27.62241	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	10.52899	
95% Bootstrap-t UCL	12.8667	
95% Hall's Bootstrap UCL	13.02276	
95% Percentile Bootstrap UCL	10.8225	
95% BCA Bootstrap UCL	11.725	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	13.06217	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - cb03.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	38.7	
Maximum	768	
Mean	456.7292	
Standard Deviation	300.6963	
Variance	90418.25	
Coefficient of Variation	0.658369	
Skewness	-0.51834	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.821362	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	612.6183	
Gamma Statistics		
k hat	1.273779	
k star (bias corrected)	1.01089	
Theta hat	358.5623	
Theta star	451.809	
nu hat	30.5707	
nu star	24.26136	
5% Approximate Chi Square Value	14.04586	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	12.87259	
Anderson-Darling Test Statistic	1.23704	
Anderson-Darling 5% Critical Value	0.750591	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.259852	
Kolmogrov-Smirnov 5% Critical Value	0.2508	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	788.9066	
95% Adjusted Gamma UCL	860.8115	
Lognormal Statistics		
Minimum of log data	3.65584	
Maximum of log data	6.64379	
Mean of log data	5.682751	
Standard Deviation of log data	1.199602	
Variance of log data	1.439045	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.756454	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	603.215	
MLE Standard Deviation	1081.871	
MLE Coefficient of Variation	1.793507	
MLE Skewness	11.14964	
MLE Median	293.7565	
MLE 80% Quantile	809.4985	
MLE 90% Quantile	1372.295	
MLE 95% Quantile	2113.492	
MLE 99% Quantile	4783.968	
MVU Estimate of Median	276.5831	
MVU Estimate of Mean	551.2946	
MVU Estimate of Standard Deviation	753.7162	
MVU Estimate of SE of Mean	206.9047	
95% H-UCL	1982.636	
95% Chebyshev (MVUE) UCL	1453.171	
97.5% Chebyshev (MVUE) UCL	1843.414	
99% Chebyshev (MVUE) UCL	2609.971	
Non-parametric Statisitics		
95% CLT UCL	599.5083	
95% Adjusted-CLT UCL	585.6298	
95% Modified-t UCL	610.4535	
95% Jackknife UCL	612.6183	
95% Chebyshev (Mean, Sd) UCL	835.097	
97.5% Chebyshev (Mean, Sd) UCL	998.8171	
99% Chebyshev (Mean, Sd) UCL	1320.413	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	593.2412	
95% Bootstrap-t UCL	592.0945	
95% Hall's Bootstrap UCL	576.0426	
95% Percentile Bootstrap UCL	584.5833	
95% BCA Bootstrap UCL	632.0833	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1320.413	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	29.2	
Maximum	670	
Mean	269.0042	
Standard Deviation	207.1801	
Variance	42923.61	
Coefficient of Variation	0.770174	
Skewness	0.677516	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924821	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	376.412	
Gamma Statistics		
k hat	1.368695	
k star (bias corrected)	1.082076	
Theta hat	196.5407	
Theta star	248.6	
nu hat	32.84867	
nu star	25.96984	
5% Approximate Chi Square Value	15.35431	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	14.12111	
Anderson-Darling Test Statistic	0.38949	
Anderson-Darling 5% Critical Value	0.748459	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.165803	
Kolmogrov-Smirnov 5% Critical Value	0.250263	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	454.9858	
95% Adjusted Gamma UCL	494.7199	
Lognormal Statistics		
Minimum of log data	3.374169	
Maximum of log data	6.507278	
Mean of log data	5.186891	
Standard Deviation of log data	1.082899	
Variance of log data	1.17267	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.884664	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	321.5737	
MLE Standard Deviation	480.2774	
MLE Coefficient of Variation	1.493522	
MLE Skewness	7.812029	
MLE Median	178.9115	
MLE 80% Quantile	446.7241	
MLE 90% Quantile	719.3995	
MLE 95% Quantile	1062.373	
MLE 99% Quantile	2221.004	
MVU Estimate of Median	170.3483	
MVU Estimate of Mean	300.0769	
MVU Estimate of Standard Deviation	362.4441	
MVU Estimate of SE of Mean	100.9253	
95% H-UCL	875.4024	
95% Chebyshev (MVUE) UCL	740	
97.5% Chebyshev (MVUE) UCL	930.3551	
99% Chebyshev (MVUE) UCL	1304.271	
Non-parametric Statisitics		
95% CLT UCL	367.3792	
95% Adjusted-CLT UCL	379.8779	
95% Modified-t UCL	378.3616	
95% Jackknife UCL	376.412	
95% Chebyshev (Mean, Sd) UCL	529.7001	
97.5% Chebyshev (Mean, Sd) UCL	642.5035	
99% Chebyshev (Mean, Sd) UCL	864.0838	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	363.0177	
95% Bootstrap-t UCL	394.937	
95% Hall's Bootstrap UCL	409.0607	
95% Percentile Bootstrap UCL	364.6167	
95% BCA Bootstrap UCL	406.9417	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	376.412	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	24.4	
Maximum	443	
Mean	196.4083	
Standard Deviation	149.3598	
Variance	22308.36	
Coefficient of Variation	0.760456	
Skewness	0.486437	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.905061	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	273.8405	
Gamma Statistics		
k hat	1.390935	
k star (bias corrected)	1.098757	
Theta hat	141.206	
Theta star	178.7551	
nu hat	33.38244	
nu star	26.37016	
5% Approximate Chi Square Value	15.66286	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	14.41589	
Anderson-Darling Test Statistic	0.458207	
Anderson-Darling 5% Critical Value	0.74796	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.173533	
Kolmogrov-Smirnov 5% Critical Value	0.250137	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	330.6753	
95% Adjusted Gamma UCL	359.2785	
Lognormal Statistics		
Minimum of log data	3.194583	
Maximum of log data	6.09357	
Mean of log data	4.879499	
Standard Deviation of log data	1.065971	
Variance of log data	1.136294	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.867509	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	232.211	
MLE Standard Deviation	337.7216	
MLE Coefficient of Variation	1.454374	
MLE Skewness	7.439416	
MLE Median	131.5648	
MLE 80% Quantile	323.8385	
MLE 90% Quantile	517.6359	
MLE 95% Quantile	759.7745	
MLE 99% Quantile	1570.184	
MVU Estimate of Median	125.4591	
MVU Estimate of Mean	217.2755	
MVU Estimate of Standard Deviation	257.5516	
MVU Estimate of SE of Mean	71.84895	
95% H-UCL	616.0518	
95% Chebyshev (MVUE) UCL	530.4578	
97.5% Chebyshev (MVUE) UCL	665.972	
99% Chebyshev (MVUE) UCL	932.1635	
Non-parametric Statisitics		
95% CLT UCL	267.3286	
95% Adjusted-CLT UCL	273.7979	
95% Modified-t UCL	274.8496	
95% Jackknife UCL	273.8405	
95% Chebyshev (Mean, Sd) UCL	384.3487	
97.5% Chebyshev (Mean, Sd) UCL	465.6706	
99% Chebyshev (Mean, Sd) UCL	625.4118	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	264.5934	
95% Bootstrap-t UCL	286.7929	
95% Hall's Bootstrap UCL	272.7888	
95% Percentile Bootstrap UCL	266.9	
95% BCA Bootstrap UCL	294.4	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	273.8405	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	43.6	
Maximum	986	
Mean	283.05	
Standard Deviation	268.6257	
Variance	72159.75	
Coefficient of Variation	0.94904	
Skewness	1.886393	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.790516	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	422.3129	
Gamma Statistics		
k hat	1.53495	
k star (bias corrected)	1.206768	
Theta hat	184.4035	
Theta star	234.5522	
nu hat	36.83879	
nu star	28.96243	
5% Approximate Chi Square Value	17.67717	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	16.34343	
Anderson-Darling Test Statistic	0.332658	
Anderson-Darling 5% Critical Value	0.745231	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.174815	
Kolmogrov-Smirnov 5% Critical Value	0.249452	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	463.7515	
95% Adjusted Gamma UCL	501.597	
Lognormal Statistics		
Minimum of log data	3.775057	
Maximum of log data	6.893656	
Mean of log data	5.285791	
Standard Deviation of log data	0.889867	
Variance of log data	0.791863	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.974013	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	293.4543	
MLE Standard Deviation	322.4667	
MLE Coefficient of Variation	1.098865	
MLE Skewness	4.62348	
MLE Median	197.5103	
MLE 80% Quantile	418.9401	
MLE 90% Quantile	619.7209	
MLE 95% Quantile	853.7353	
MLE 99% Quantile	1564.968	
MVU Estimate of Median	191.0838	
MVU Estimate of Mean	281.2375	
MVU Estimate of Standard Deviation	270.1732	
MVU Estimate of SE of Mean	76.56386	
95% H-UCL	608.8832	
95% Chebyshev (MVUE) UCL	614.9716	
97.5% Chebyshev (MVUE) UCL	759.3786	
99% Chebyshev (MVUE) UCL	1043.038	
Non-parametric Statisitics		
95% CLT UCL	410.6011	
95% Adjusted-CLT UCL	455.7221	
95% Modified-t UCL	429.3508	
95% Jackknife UCL	422.3129	
95% Chebyshev (Mean, Sd) UCL	621.0632	
97.5% Chebyshev (Mean, Sd) UCL	767.3218	
99% Chebyshev (Mean, Sd) UCL	1054.618	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	403.9	
95% Bootstrap-t UCL	527.2171	
95% Hall's Bootstrap UCL	1056.367	
95% Percentile Bootstrap UCL	410.9667	
95% BCA Bootstrap UCL	396.1333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	463.7515	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	0.058	
Maximum	3.6	
Mean	1.217792	
Standard Deviation	1.246107	
Variance	1.552782	
Coefficient of Variation	1.023251	
Skewness	0.971289	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.838481	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.863807	
Gamma Statistics		
k hat	0.81238	
k star (bias corrected)	0.664841	
Theta hat	1.499042	
Theta star	1.831705	
nu hat	19.49712	
nu star	15.95617	
5% Approximate Chi Square Value	7.93001	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	7.082548	
Anderson-Darling Test Statistic	0.333024	
Anderson-Darling 5% Critical Value	0.763389	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.146352	
Kolmogrov-Smirnov 5% Critical Value	0.254196	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	2.450349	
95% Adjusted Gamma UCL	2.743545	
Lognormal Statistics		
Minimum of log data	-2.847312	
Maximum of log data	1.280934	
Mean of log data	-0.53205	
Standard Deviation of log data	1.469845	
Variance of log data	2.160446	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.908803	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.730089	
MLE Standard Deviation	4.793004	
MLE Coefficient of Variation	2.770379	
MLE Skewness	29.5738	
MLE Median	0.5874	
MLE 80% Quantile	2.03393	
MLE 90% Quantile	3.883364	
MLE 95% Quantile	6.591929	
MLE 99% Quantile	17.93602	
MVU Estimate of Median	0.536493	
MVU Estimate of Mean	1.482327	
MVU Estimate of Standard Deviation	2.621149	
MVU Estimate of SE of Mean	0.688559	
95% H-UCL	9.458424	
95% Chebyshev (MVUE) UCL	4.483688	
97.5% Chebyshev (MVUE) UCL	5.78238	
99% Chebyshev (MVUE) UCL	8.333408	
Non-parametric Statisitics		
95% CLT UCL	1.809478	
95% Adjusted-CLT UCL	1.91725	
95% Modified-t UCL	1.880617	
95% Jackknife UCL	1.863807	
95% Chebyshev (Mean, Sd) UCL	2.785775	
97.5% Chebyshev (Mean, Sd) UCL	3.464242	
99% Chebyshev (Mean, Sd) UCL	4.796961	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.797741	
95% Bootstrap-t UCL	2.071307	
95% Hall's Bootstrap UCL	1.780625	
95% Percentile Bootstrap UCL	1.791542	
95% BCA Bootstrap UCL	1.650042	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2.450349	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	8.7	
Maximum	78.3	
Mean	25.55	
Standard Deviation	19.31695	
Variance	373.1445	
Coefficient of Variation	0.756045	
Skewness	2.056624	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.778166	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	35.56443	
Gamma Statistics		
k hat	2.627458	
k star (bias corrected)	2.026149	
Theta hat	9.724229	
Theta star	12.61013	
nu hat	63.05899	
nu star	48.62757	
5% Approximate Chi Square Value	33.61746	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	31.7215	
Anderson-Darling Test Statistic	0.402848	
Anderson-Darling 5% Critical Value	0.739945	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.19834	
Kolmogrov-Smirnov 5% Critical Value	0.247835	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	36.95802	
95% Adjusted Gamma UCL	39.16695	
Lognormal Statistics		
Minimum of log data	2.163323	
Maximum of log data	4.360548	
Mean of log data	3.038432	
Standard Deviation of log data	0.637109	
Variance of log data	0.405908	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955317	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	25.56915	
MLE Standard Deviation	18.09214	
MLE Coefficient of Variation	0.707577	
MLE Skewness	2.476989	
MLE Median	20.8725	
MLE 80% Quantile	35.75856	
MLE 90% Quantile	47.32875	
MLE 95% Quantile	59.52981	
MLE 99% Quantile	91.86762	
MVU Estimate of Median	20.522	
MVU Estimate of Mean	25.07561	
MVU Estimate of Standard Deviation	16.64292	
MVU Estimate of SE of Mean	4.777814	
95% H-UCL	39.94639	
95% Chebyshev (MVUE) UCL	45.90162	
97.5% Chebyshev (MVUE) UCL	54.91305	
99% Chebyshev (MVUE) UCL	72.61426	
Non-parametric Statisitics		
95% CLT UCL	34.72224	
95% Adjusted-CLT UCL	38.2597	
95% Modified-t UCL	36.11621	
95% Jackknife UCL	35.56443	
95% Chebyshev (Mean, Sd) UCL	49.85663	
97.5% Chebyshev (Mean, Sd) UCL	60.37413	
99% Chebyshev (Mean, Sd) UCL	81.03371	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	34.2413	
95% Bootstrap-t UCL	44.36177	
95% Hall's Bootstrap UCL	73.74248	
95% Percentile Bootstrap UCL	35.49167	
95% BCA Bootstrap UCL	41.5	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	36.95802	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	11	
Number of Missing Data	0	
Number of Valid Observations	11	
Number of Distinct Observations	10	
Minimum	0.24	
Maximum	1.5	
Mean	0.705455	
Standard Deviation	0.480273	
Variance	0.230662	
Coefficient of Variation	0.6808	
Skewness	0.648495	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.853829	
Shapiro-Wilk 5% Critical Value	0.85	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.967913	
Gamma Statistics		
k hat	2.37187	
k star (bias corrected)	1.785602	
Theta hat	0.297426	
Theta star	0.395079	
nu hat	52.18113	
nu star	39.28325	
5% Approximate Chi Square Value	25.92337	
Adjusted Level of Significance	0.02783	
Adjusted Chi Square Value	24.16594	
Anderson-Darling Test Statistic	0.570246	
Anderson-Darling 5% Critical Value	0.736906	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.197183	
Kolmogrov-Smirnov 5% Critical Value	0.257945	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.069018	
95% Adjusted Gamma UCL	1.146761	
Lognormal Statistics		
Minimum of log data	-1.427116	
Maximum of log data	0.405465	
Mean of log data	-0.574286	
Standard Deviation of log data	0.714432	
Variance of log data	0.510413	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.88538	
Shapiro-Wilk 5% Critical Value	0.85	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.726818	
MLE Standard Deviation	0.593139	
MLE Coefficient of Variation	0.816076	
MLE Skewness	2.991718	
MLE Median	0.563107	
MLE 80% Quantile	1.029846	
MLE 90% Quantile	1.41024	
MLE 95% Quantile	1.823861	
MLE 99% Quantile	2.9668	
MVU Estimate of Median	0.550168	
MVU Estimate of Mean	0.707104	
MVU Estimate of Standard Deviation	0.528524	
MVU Estimate of SE of Mean	0.158105	
95% H-UCL	1.277476	
95% Chebyshev (MVUE) UCL	1.396269	
97.5% Chebyshev (MVUE) UCL	1.694471	
99% Chebyshev (MVUE) UCL	2.280231	
Non-parametric Statisitics		
95% CLT UCL	0.943642	
95% Adjusted-CLT UCL	0.973896	
95% Modified-t UCL	0.972632	
95% Jackknife UCL	0.967913	
95% Chebyshev (Mean, Sd) UCL	1.336657	
97.5% Chebyshev (Mean, Sd) UCL	1.609779	
99% Chebyshev (Mean, Sd) UCL	2.146274	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.933513	
95% Bootstrap-t UCL	1.010997	
95% Hall's Bootstrap UCL	0.934803	
95% Percentile Bootstrap UCL	0.935455	
95% BCA Bootstrap UCL	1.034091	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.967913	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	13.5	
Maximum	97.4	
Mean	47.02917	
Standard Deviation	29.66972	
Variance	880.292	
Coefficient of Variation	0.630879	
Skewness	0.662133	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.894698	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	62.41076	
Gamma Statistics		
k hat	2.65325	
k star (bias corrected)	2.045493	
Theta hat	17.72511	
Theta star	22.9916	
nu hat	63.67801	
nu star	49.09184	
5% Approximate Chi Square Value	34.00411	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	32.0964	
Anderson-Darling Test Statistic	0.323019	
Anderson-Darling 5% Critical Value	0.73988	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.158434	
Kolmogrov-Smirnov 5% Critical Value	0.247805	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	67.89616	
95% Adjusted Gamma UCL	71.9317	
Lognormal Statistics		
Minimum of log data	2.60269	
Maximum of log data	4.578826	
Mean of log data	3.65064	
Standard Deviation of log data	0.681607	
Variance of log data	0.464588	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.939692	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	48.56653	
MLE Standard Deviation	37.34759	
MLE Coefficient of Variation	0.768999	
MLE Skewness	2.76175	
MLE Median	38.49932	
MLE 80% Quantile	68.48388	
MLE 90% Quantile	92.43499	
MLE 95% Quantile	118.1416	
MLE 99% Quantile	187.9279	
MVU Estimate of Median	37.76013	
MVU Estimate of Mean	47.47555	
MVU Estimate of Standard Deviation	33.90025	
MVU Estimate of SE of Mean	9.716771	
95% H-UCL	79.31564	
95% Chebyshev (MVUE) UCL	89.82997	
97.5% Chebyshev (MVUE) UCL	108.1568	
99% Chebyshev (MVUE) UCL	144.1562	
Non-parametric Statisitics		
95% CLT UCL	61.11719	
95% Adjusted-CLT UCL	62.86646	
95% Modified-t UCL	62.68361	
95% Jackknife UCL	62.41076	
95% Chebyshev (Mean, Sd) UCL	84.36274	
97.5% Chebyshev (Mean, Sd) UCL	100.517	
99% Chebyshev (Mean, Sd) UCL	132.2489	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	60.46185	
95% Bootstrap-t UCL	64.74248	
95% Hall's Bootstrap UCL	64.74486	
95% Percentile Bootstrap UCL	60.72083	
95% BCA Bootstrap UCL	66.67083	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	62.41076	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - cb03 xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	135	
Maximum	5270	
Mean	1147.75	
Standard Deviation	1444.971	
Variance	2087940	
Coefficient of Variation	1.258959	
Skewness	2.479108	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.674072	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1896.862	
Gamma Statistics		
k hat	1.062805	
k star (bias corrected)	0.852659	
Theta hat	1079.926	
Theta star	1346.083	
nu hat	25.50731	
nu star	20.46382	
5% Approximate Chi Square Value	11.19226	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	10.15998	
Anderson-Darling Test Statistic	0.513493	
Anderson-Darling 5% Critical Value	0.755329	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.208201	
Kolmogrov-Smirnov 5% Critical Value	0.251995	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2098.535	
95% Adjusted Gamma UCL	2311.751	
Lognormal Statistics		
Minimum of log data	4.905275	
Maximum of log data	8.569786	
Mean of log data	6.506253	
Standard Deviation of log data	1.068939	
Variance of log data	1.142631	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.95399	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1185.083	
MLE Standard Deviation	1731.603	
MLE Coefficient of Variation	1.461166	
MLE Skewness	7.503092	
MLE Median	669.3137	
MLE 80% Quantile	1651.611	
MLE 90% Quantile	2643.448	
MLE 95% Quantile	3884.143	
MLE 99% Quantile	8043.383	
MVU Estimate of Median	638.0823	
MVU Estimate of Mean	1108.34	
MVU Estimate of Standard Deviation	1318.145	
MVU Estimate of SE of Mean	367.605	
95% H-UCL	3158.155	
95% Chebyshev (MVUE) UCL	2710.693	
97.5% Chebyshev (MVUE) UCL	3404.032	
99% Chebyshev (MVUE) UCL	4765.963	
Non-parametric Statisitics		
95% CLT UCL	1833.863	
95% Adjusted-CLT UCL	2152.836	
95% Modified-t UCL	1946.615	
95% Jackknife UCL	1896.862	
95% Chebyshev (Mean, Sd) UCL	2965.965	
97.5% Chebyshev (Mean, Sd) UCL	3752.708	
99% Chebyshev (Mean, Sd) UCL	5298.112	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1796.529	
95% Bootstrap-t UCL	3299.638	
95% Hall's Bootstrap UCL	4913.88	
95% Percentile Bootstrap UCL	1864.833	
95% BCA Bootstrap UCL	2337.417	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2098.535	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.67	
Maximum	7.2	
Mean	3.552	
Standard Deviation	2.102231	
Variance	4.419373	
Coefficient of Variation	0.591844	
Skewness	0.625019	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924508	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	4.770623	
Gamma Statistics		
k hat	2.711022	
k star (bias corrected)	1.964382	
Theta hat	1.310207	
Theta star	1.808202	
nu hat	54.22045	
nu star	39.28765	
5% Approximate Chi Square Value	25.92695	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	24.05485	
Anderson-Darling Test Statistic	0.302775	
Anderson-Darling 5% Critical Value	0.733163	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.204755	
Kolmogrov-Smirnov 5% Critical Value	0.268843	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	5.38242	
95% Adjusted Gamma UCL	5.801312	
Lognormal Statistics		
Minimum of log data	-0.400478	
Maximum of log data	1.974081	
Mean of log data	1.071886	
Standard Deviation of log data	0.719937	
Variance of log data	0.518309	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922905	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	3.784978	
MLE Standard Deviation	3.119303	
MLE Coefficient of Variation	0.824127	
MLE Skewness	3.032117	
MLE Median	2.920882	
MLE 80% Quantile	5.366802	
MLE 90% Quantile	7.366954	
MLE 95% Quantile	9.546566	
MLE 99% Quantile	15.58733	
MVU Estimate of Median	2.845984	
MVU Estimate of Mean	3.670773	
MVU Estimate of Standard Deviation	2.748446	
MVU Estimate of SE of Mean	0.862678	
95% H-UCL	7.007036	
95% Chebyshev (MVUE) UCL	7.431101	
97.5% Chebyshev (MVUE) UCL	9.058197	
99% Chebyshev (MVUE) UCL	12.25431	
Non-parametric Statisitics		
95% CLT UCL	4.645472	
95% Adjusted-CLT UCL	4.785868	
95% Modified-t UCL	4.792522	
95% Jackknife UCL	4.770623	
95% Chebyshev (Mean, Sd) UCL	6.449725	
97.5% Chebyshev (Mean, Sd) UCL	7.703573	
99% Chebyshev (Mean, Sd) UCL	10.16651	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.603468	
95% Bootstrap-t UCL	5.112999	
95% Hall's Bootstrap UCL	5.837533	
95% Percentile Bootstrap UCL	4.565	
95% BCA Bootstrap UCL	5.042	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	4.770623	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	16.5	
Maximum	325.5	
Mean	111.5	
Standard Deviation	86.92611	
Variance	7556.149	
Coefficient of Variation	0.779606	
Skewness	1.781958	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.835024	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	161.8894	
Gamma Statistics		
k hat	2.014207	
k star (bias corrected)	1.476611	
Theta hat	55.35679	
Theta star	75.51074	
nu hat	40.28413	
nu star	29.53222	
5% Approximate Chi Square Value	18.12349	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	16.58683	
Anderson-Darling Test Statistic	0.240184	
Anderson-Darling 5% Critical Value	0.735532	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.146876	
Kolmogrov-Smirnov 5% Critical Value	0.269791	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	181.6892	
95% Adjusted Gamma UCL	198.5216	
Lognormal Statistics		
Minimum of log data	2.80336	
Maximum of log data	5.785362	
Mean of log data	4.445705	
Standard Deviation of log data	0.817036	
Variance of log data	0.667548	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.961887	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	119.0424	
MLE Standard Deviation	115.9946	
MLE Coefficient of Variation	0.974398	
MLE Skewness	3.848337	
MLE Median	85.25999	
MLE 80% Quantile	170.0514	
MLE 90% Quantile	243.6169	
MLE 95% Quantile	326.9246	
MLE 99% Quantile	570.2822	
MVU Estimate of Median	82.45279	
MVU Estimate of Mean	114.2476	
MVU Estimate of Standard Deviation	98.08115	
MVU Estimate of SE of Mean	30.654	
95% H-UCL	251.1811	
95% Chebyshev (MVUE) UCL	247.8653	
97.5% Chebyshev (MVUE) UCL	305.6818	
99% Chebyshev (MVUE) UCL	419.2511	
Non-parametric Statisitics		
95% CLT UCL	156.7145	
95% Adjusted-CLT UCL	173.2656	
95% Modified-t UCL	164.4711	
95% Jackknife UCL	161.8894	
95% Chebyshev (Mean, Sd) UCL	231.3194	
97.5% Chebyshev (Mean, Sd) UCL	283.1653	
99% Chebyshev (Mean, Sd) UCL	385.0066	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	154.1205	
95% Bootstrap-t UCL	193.1109	
95% Hall's Bootstrap UCL	364.3304	
95% Percentile Bootstrap UCL	155.21	
95% BCA Bootstrap UCL	146.56	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	181.6892	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	20.9	
Maximum	109	
Mean	61.155	
Standard Deviation	26.69141	
Variance	712.4314	
Coefficient of Variation	0.436455	
Skewness	0.176658	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.94909	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	76.62751	
Gamma Statistics		
k hat	5.105969	
k star (bias corrected)	3.640845	
Theta hat	11.97716	
Theta star	16.79693	
nu hat	102.1194	
nu star	72.8169	
5% Approximate Chi Square Value	54.16371	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	51.37686	
Anderson-Darling Test Statistic	0.407864	
Anderson-Darling 5% Critical Value	0.729357	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.239259	
Kolmogrov-Smirnov 5% Critical Value	0.267413	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	82.21589	
95% Adjusted Gamma UCL	86.67555	
Lognormal Statistics		
Minimum of log data	3.039749	
Maximum of log data	4.691348	
Mean of log data	4.012303	
Standard Deviation of log data	0.4996	
Variance of log data	0.2496	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924658	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	62.62114	
MLE Standard Deviation	33.34318	
MLE Coefficient of Variation	0.532459	
MLE Skewness	1.748335	
MLE Median	55.274	
MLE 80% Quantile	84.307	
MLE 90% Quantile	105.0345	
MLE 95% Quantile	125.731	
MLE 99% Quantile	176.6858	
MVU Estimate of Median	54.58769	
MVU Estimate of Mean	61.77518	
MVU Estimate of Standard Deviation	31.47502	
MVU Estimate of SE of Mean	9.934264	
95% H-UCL	90.6235	
95% Chebyshev (MVUE) UCL	105.0776	
97.5% Chebyshev (MVUE) UCL	123.8146	
99% Chebyshev (MVUE) UCL	160.6199	
Non-parametric Statisitics		
95% CLT UCL	75.03849	
95% Adjusted-CLT UCL	75.54233	
95% Modified-t UCL	76.7061	
95% Jackknife UCL	76.62751	
95% Chebyshev (Mean, Sd) UCL	97.94657	
97.5% Chebyshev (Mean, Sd) UCL	113.8663	
99% Chebyshev (Mean, Sd) UCL	145.1376	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	74.47526	
95% Bootstrap-t UCL	77.35776	
95% Hall's Bootstrap UCL	75.51599	
95% Percentile Bootstrap UCL	74.66	
95% BCA Bootstrap UCL	71.32	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	76.62751	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.41	
Maximum	8.9	
Mean	3.954	
Standard Deviation	3.038308	
Variance	9.231316	
Coefficient of Variation	0.768414	
Skewness	0.447734	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904072	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	5.71525	
Gamma Statistics		
k hat	1.447277	
k star (bias corrected)	1.079761	
Theta hat	2.732027	
Theta star	3.661923	
nu hat	28.94554	
nu star	21.59521	
5% Approximate Chi Square Value	12.03373	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.8126	
Anderson-Darling Test Statistic	0.306857	
Anderson-Darling 5% Critical Value	0.740183	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.177483	
Kolmogrov-Smirnov 5% Critical Value	0.271397	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	7.095675	
95% Adjusted Gamma UCL	7.897034	
Lognormal Statistics		
Minimum of log data	-0.891598	
Maximum of log data	2.186051	
Mean of log data	0.991061	
Standard Deviation of log data	1.040015	
Variance of log data	1.081632	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.920448	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	4.626853	
MLE Standard Deviation	6.460203	
MLE Coefficient of Variation	1.396241	
MLE Skewness	6.910682	
MLE Median	2.694091	
MLE 80% Quantile	6.487478	
MLE 90% Quantile	10.25208	
MLE 95% Quantile	14.90783	
MLE 99% Quantile	30.26939	
MVU Estimate of Median	2.551574	
MVU Estimate of Mean	4.298088	
MVU Estimate of Standard Deviation	4.823512	
MVU Estimate of SE of Mean	1.484749	
95% H-UCL	13.96042	
95% Chebyshev (MVUE) UCL	10.76996	
97.5% Chebyshev (MVUE) UCL	13.57034	
99% Chebyshev (MVUE) UCL	19.07116	
Non-parametric Statisitics		
95% CLT UCL	5.534371	
95% Adjusted-CLT UCL	5.679727	
95% Modified-t UCL	5.737922	
95% Jackknife UCL	5.71525	
95% Chebyshev (Mean, Sd) UCL	8.142019	
97.5% Chebyshev (Mean, Sd) UCL	9.954178	
99% Chebyshev (Mean, Sd) UCL	13.51381	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	5.470836	
95% Bootstrap-t UCL	5.840504	
95% Hall's Bootstrap UCL	5.427854	
95% Percentile Bootstrap UCL	5.493	
95% BCA Bootstrap UCL	5.175	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	5.71525	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	35.2	
Maximum	568	
Mean	167.14	
Standard Deviation	151.8836	
Variance	23068.62	
Coefficient of Variation	0.908721	
Skewness	2.396135	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.71453	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	255.184	
Gamma Statistics		
k hat	2.015626	
k star (bias corrected)	1.477605	
Theta hat	82.92212	
Theta star	113.1155	
nu hat	40.31252	
nu star	29.5521	
5% Approximate Chi Square Value	18.13908	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	16.60169	
Anderson-Darling Test Statistic	0.458743	
Anderson-Darling 5% Critical Value	0.735527	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.232449	
Kolmogrov-Smirnov 5% Critical Value	0.269789	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	272.3036	
95% Adjusted Gamma UCL	297.5203	
Lognormal Statistics		
Minimum of log data	3.561046	
Maximum of log data	6.342121	
Mean of log data	4.850715	
Standard Deviation of log data	0.743752	
Variance of log data	0.553167	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963704	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	168.5611	
MLE Standard Deviation	144.8792	
MLE Coefficient of Variation	0.859506	
MLE Skewness	3.213477	
MLE Median	127.8318	
MLE 80% Quantile	239.6514	
MLE 90% Quantile	332.4322	
MLE 95% Quantile	434.4959	
MLE 99% Quantile	721.0305	
MVU Estimate of Median	124.3359	
MVU Estimate of Mean	163.0859	
MVU Estimate of Standard Deviation	126.4555	
MVU Estimate of SE of Mean	39.65469	
95% H-UCL	321.7919	
95% Chebyshev (MVUE) UCL	335.9367	
97.5% Chebyshev (MVUE) UCL	410.7294	
99% Chebyshev (MVUE) UCL	557.6452	
Non-parametric Statisitics		
95% CLT UCL	246.142	
95% Adjusted-CLT UCL	285.0288	
95% Modified-t UCL	261.2496	
95% Jackknife UCL	255.184	
95% Chebyshev (Mean, Sd) UCL	376.4971	
97.5% Chebyshev (Mean, Sd) UCL	467.086	
99% Chebyshev (Mean, Sd) UCL	645.0305	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	241.9773	
95% Bootstrap-t UCL	369.9794	
95% Hall's Bootstrap UCL	554.2847	
95% Percentile Bootstrap UCL	253.71	
95% BCA Bootstrap UCL	306.02	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	272.3036	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	47.7	
Maximum	358	
Mean	184.6	
Standard Deviation	102.9918	
Variance	10607.31	
Coefficient of Variation	0.557919	
Skewness	0.463704	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.94675	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	244.3024	
Gamma Statistics		
k hat	3.091065	
k star (bias corrected)	2.230412	
Theta hat	59.72051	
Theta star	82.76496	
nu hat	61.82131	
nu star	44.60825	
5% Approximate Chi Square Value	30.28637	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	28.2486	
Anderson-Darling Test Statistic	0.235038	
Anderson-Darling 5% Critical Value	0.731926	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.136886	
Kolmogrov-Smirnov 5% Critical Value	0.268393	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	271.894	
95% Adjusted Gamma UCL	291.5076	
Lognormal Statistics		
Minimum of log data	3.864931	
Maximum of log data	5.880533	
Mean of log data	5.0478	
Standard Deviation of log data	0.659653	
Variance of log data	0.435142	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.931705	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	193.5181	
MLE Standard Deviation	142.8869	
MLE Coefficient of Variation	0.738364	
MLE Skewness	2.617637	
MLE Median	155.6796	
MLE 80% Quantile	271.8381	
MLE 90% Quantile	363.3818	
MLE 95% Quantile	460.7838	
MLE 99% Quantile	722.092	
MVU Estimate of Median	152.3225	
MVU Estimate of Mean	188.7195	
MVU Estimate of Standard Deviation	128.7072	
MVU Estimate of SE of Mean	40.48092	
95% H-UCL	332.668	
95% Chebyshev (MVUE) UCL	365.1717	
97.5% Chebyshev (MVUE) UCL	441.5227	
99% Chebyshev (MVUE) UCL	591.4995	
Non-parametric Statisitics		
95% CLT UCL	238.171	
95% Adjusted-CLT UCL	243.274	
95% Modified-t UCL	245.0984	
95% Jackknife UCL	244.3024	
95% Chebyshev (Mean, Sd) UCL	326.5644	
97.5% Chebyshev (Mean, Sd) UCL	387.9925	
99% Chebyshev (Mean, Sd) UCL	508.6561	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	234.6158	
95% Bootstrap-t UCL	251.2687	
95% Hall's Bootstrap UCL	263.77	
95% Percentile Bootstrap UCL	235.6	
95% BCA Bootstrap UCL	259.17	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	244.3024	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning'	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	59.6	
Maximum	409	
Mean	208.46	
Standard Deviation	115.7264	
Variance	13392.6	
Coefficient of Variation	0.555149	
Skewness	0.564448	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.940433	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	275.5444	
Gamma Statistics		
k hat	3.417273	
k star (bias corrected)	2.458758	
Theta hat	61.00186	
Theta star	84.78265	
nu hat	68.34546	
nu star	49.17516	
5% Approximate Chi Square Value	34.07353	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	31.90118	
Anderson-Darling Test Statistic	0.201961	
Anderson-Darling 5% Critical Value	0.731016	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.160626	
Kolmogrov-Smirnov 5% Critical Value	0.268187	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	300.8509	
95% Adjusted Gamma UCL	321.3378	
Lognormal Statistics		
Minimum of log data	4.087656	
Maximum of log data	6.013715	
Mean of log data	5.186354	
Standard Deviation of log data	0.606321	
Variance of log data	0.367625	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.965655	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	214.8988	
MLE Standard Deviation	143.2427	
MLE Coefficient of Variation	0.666559	
MLE Skewness	2.295829	
MLE Median	178.8155	
MLE 80% Quantile	298.4778	
MLE 90% Quantile	389.7389	
MLE 95% Quantile	484.8078	
MLE 99% Quantile	732.642	
MVU Estimate of Median	175.5532	
MVU Estimate of Mean	210.4775	
MVU Estimate of Standard Deviation	131.2965	
MVU Estimate of SE of Mean	41.35535	
95% H-UCL	347.4969	
95% Chebyshev (MVUE) UCL	390.7413	
97.5% Chebyshev (MVUE) UCL	468.7416	
99% Chebyshev (MVUE) UCL	621.958	
Non-parametric Statisitics		
95% CLT UCL	268.6549	
95% Adjusted-CLT UCL	275.6346	
95% Modified-t UCL	276.6331	
95% Jackknife UCL	275.5444	
95% Chebyshev (Mean, Sd) UCL	367.9779	
97.5% Chebyshev (Mean, Sd) UCL	437.0014	
99% Chebyshev (Mean, Sd) UCL	572.5847	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	266.962	
95% Bootstrap-t UCL	289.9437	
95% Hall's Bootstrap UCL	279.5651	
95% Percentile Bootstrap UCL	270.8	
95% BCA Bootstrap UCL	292.36	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	275.5444	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	72.5	
Maximum	2410	
Mean	403.9	
Standard Deviation	708.4401	
Variance	501887.4	
Coefficient of Variation	1.753999	
Skewness	3.103507	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.45931	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	814.5694	
Gamma Statistics		
k hat	0.94253	
k star (bias corrected)	0.726438	
Theta hat	428.5274	
Theta star	556.0008	
nu hat	18.8506	
nu star	14.52876	
5% Approximate Chi Square Value	6.933766	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.044942	
Anderson-Darling Test Statistic	1.598857	
Anderson-Darling 5% Critical Value	0.75027	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.35604	
Kolmogrov-Smirnov 5% Critical Value	0.274263	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	846.3171	
95% Adjusted Gamma UCL	970.7562	
Lognormal Statistics		
Minimum of log data	4.283587	
Maximum of log data	7.787382	
Mean of log data	5.384417	
Standard Deviation of log data	0.94019	
Variance of log data	0.883958	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.788963	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	339.1344	
MLE Standard Deviation	404.1908	
MLE Coefficient of Variation	1.191831	
MLE Skewness	5.268442	
MLE Median	217.9831	
MLE 80% Quantile	482.4505	
MLE 90% Quantile	729.6479	
MLE 95% Quantile	1023.548	
MLE 99% Quantile	1941.663	
MVU Estimate of Median	208.5211	
MVU Estimate of Mean	320.1786	
MVU Estimate of Standard Deviation	320.8366	
MVU Estimate of SE of Mean	99.5321	
95% H-UCL	863.3774	
95% Chebyshev (MVUE) UCL	754.029	
97.5% Chebyshev (MVUE) UCL	941.7564	
99% Chebyshev (MVUE) UCL	1310.511	
Non-parametric Statisitics		
95% CLT UCL	772.394	
95% Adjusted-CLT UCL	1007.323	
95% Modified-t UCL	851.2135	
95% Jackknife UCL	814.5694	
95% Chebyshev (Mean, Sd) UCL	1380.417	
97.5% Chebyshev (Mean, Sd) UCL	1802.957	
99% Chebyshev (Mean, Sd) UCL	2632.955	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	736.0551	
95% Bootstrap-t UCL	3473.236	
95% Hall's Bootstrap UCL	2546.559	
95% Percentile Bootstrap UCL	844.2	
95% BCA Bootstrap UCL	1075.3	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1380.417	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.18	
Maximum	2.2	
Mean	0.727	
Standard Deviation	0.623094	
Variance	0.388246	
Coefficient of Variation	0.857075	
Skewness	1.658683	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.82072	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.088196	
Gamma Statistics		
k hat	1.860757	
k star (bias corrected)	1.369196	
Theta hat	0.390701	
Theta star	0.530968	
nu hat	37.21514	
nu star	27.38393	
5% Approximate Chi Square Value	16.44731	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	14.99151	
Anderson-Darling Test Statistic	0.314126	
Anderson-Darling 5% Critical Value	0.736596	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.199285	
Kolmogrov-Smirnov 5% Critical Value	0.270175	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.210417	
95% Adjusted Gamma UCL	1.32796	
Lognormal Statistics		
Minimum of log data	-1.714798	
Maximum of log data	0.788457	
Mean of log data	-0.610985	
Standard Deviation of log data	0.796659	
Variance of log data	0.634666	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.966813	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.745536	
MLE Standard Deviation	0.70191	
MLE Coefficient of Variation	0.941484	
MLE Skewness	3.658977	
MLE Median	0.542816	
MLE 80% Quantile	1.064167	
MLE 90% Quantile	1.510925	
MLE 95% Quantile	2.012785	
MLE 99% Quantile	3.462686	
MVU Estimate of Median	0.525812	
MVU Estimate of Mean	0.717203	
MVU Estimate of Standard Deviation	0.599024	
MVU Estimate of SE of Mean	0.187406	
95% H-UCL	1.528608	
95% Chebyshev (MVUE) UCL	1.534087	
97.5% Chebyshev (MVUE) UCL	1.887553	
99% Chebyshev (MVUE) UCL	2.581868	
Non-parametric Statisitics		
95% CLT UCL	1.051101	
95% Adjusted-CLT UCL	1.161534	
95% Modified-t UCL	1.105421	
95% Jackknife UCL	1.088196	
95% Chebyshev (Mean, Sd) UCL	1.585875	
97.5% Chebyshev (Mean, Sd) UCL	1.957511	
99% Chebyshev (Mean, Sd) UCL	2.687518	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.038456	
95% Bootstrap-t UCL	1.353263	
95% Hall's Bootstrap UCL	2.092055	
95% Percentile Bootstrap UCL	1.059	
95% BCA Bootstrap UCL	1.274	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.210417	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	10.1	
Maximum	177	
Mean	41.315	
Standard Deviation	50.48805	
Variance	2549.043	
Coefficient of Variation	1.222027	
Skewness	2.582024	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.642328	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	70.58197	
Gamma Statistics		
k hat	1.304937	
k star (bias corrected)	0.980123	
Theta hat	31.66052	
Theta star	42.15288	
nu hat	26.09875	
nu star	19.60246	
5% Approximate Chi Square Value	10.55714	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	9.423678	
Anderson-Darling Test Statistic	0.680124	
Anderson-Darling 5% Critical Value	0.742757	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.250725	
Kolmogrov-Smirnov 5% Critical Value	0.272146	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	76.71356	
95% Adjusted Gamma UCL	85.94049	
Lognormal Statistics		
Minimum of log data	2.312535	
Maximum of log data	5.17615	
Mean of log data	3.291465	
Standard Deviation of log data	0.89191	
Variance of log data	0.795504	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909885	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	40.01353	
MLE Standard Deviation	44.11585	
MLE Coefficient of Variation	1.102524	
MLE Skewness	4.647752	
MLE Median	26.88223	
MLE 80% Quantile	57.1186	
MLE 90% Quantile	84.56922	
MLE 95% Quantile	116.5894	
MLE 99% Quantile	214.0157	
MVU Estimate of Median	25.83022	
MVU Estimate of Mean	38.03763	
MVU Estimate of Standard Deviation	35.95214	
MVU Estimate of SE of Mean	11.18894	
95% H-UCL	94.36968	
95% Chebyshev (MVUE) UCL	86.8091	
97.5% Chebyshev (MVUE) UCL	107.9126	
99% Chebyshev (MVUE) UCL	149.3662	
Non-parametric Statisitics		
95% CLT UCL	67.57628	
95% Adjusted-CLT UCL	81.50558	
95% Modified-t UCL	72.75466	
95% Jackknife UCL	70.58197	
95% Chebyshev (Mean, Sd) UCL	110.908	
97.5% Chebyshev (Mean, Sd) UCL	141.0209	
99% Chebyshev (Mean, Sd) UCL	200.1719	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	65.46882	
95% Bootstrap-t UCL	127.3687	
95% Hall's Bootstrap UCL	160.8114	
95% Percentile Bootstrap UCL	69.75	
95% BCA Bootstrap UCL	89.92	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	76.71356	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - cb04.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	7	
Minimum	0.29	
Maximum	5.3	
Mean	1.1295	
Standard Deviation	1.706506	
Variance	2.912164	
Coefficient of Variation	1.510851	
Skewness	2.128128	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.582179	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.11873	
Gamma Statistics		
k hat	0.833004	
k star (bias corrected)	0.649769	
Theta hat	1.355936	
Theta star	1.73831	
nu hat	16.66007	
nu star	12.99538	
5% Approximate Chi Square Value	5.888528	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	5.081272	
Anderson-Darling Test Statistic	1.908039	
Anderson-Darling 5% Critical Value	0.754081	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.422386	
Kolmogrov-Smirnov 5% Critical Value	0.27524	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	2.492692	
95% Adjusted Gamma UCL	2.888703	
Lognormal Statistics		
Minimum of log data	-1.237874	
Maximum of log data	1.667707	
Mean of log data	-0.586949	
Standard Deviation of log data	1.09835	
Variance of log data	1.206372	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.648895	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.016369	
MLE Standard Deviation	1.55519	
MLE Coefficient of Variation	1.530144	
MLE Skewness	8.173016	
MLE Median	0.556021	
MLE 80% Quantile	1.406573	
MLE 90% Quantile	2.28058	
MLE 95% Quantile	3.386631	
MLE 99% Quantile	7.155002	
MVU Estimate of Median	0.523299	
MVU Estimate of Mean	0.934024	
MVU Estimate of Standard Deviation	1.115363	
MVU Estimate of SE of Mean	0.341496	
95% H-UCL	3.412364	
95% Chebyshev (MVUE) UCL	2.422569	
97.5% Chebyshev (MVUE) UCL	3.066663	
99% Chebyshev (MVUE) UCL	4.331862	
Non-parametric Statisitics		
95% CLT UCL	2.017136	
95% Adjusted-CLT UCL	2.405185	
95% Modified-t UCL	2.179257	
95% Jackknife UCL	2.11873	
95% Chebyshev (Mean, Sd) UCL	3.481757	
97.5% Chebyshev (Mean, Sd) UCL	4.49958	
99% Chebyshev (Mean, Sd) UCL	6.498897	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.987107	
95% Bootstrap-t UCL	9.523025	
95% Hall's Bootstrap UCL	12.33319	
95% Percentile Bootstrap UCL	2.079	
95% BCA Bootstrap UCL	2.63	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	6.498897	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	18.5	
Maximum	85.4	
Mean	55.305	
Standard Deviation	22.55956	
Variance	508.9336	
Coefficient of Variation	0.407912	
Skewness	-0.29779	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92541	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	68.38235	
Gamma Statistics		
k hat	5.429777	
k star (bias corrected)	3.867511	
Theta hat	10.1855	
Theta star	14.2999	
nu hat	108.5955	
nu star	77.35022	
5% Approximate Chi Square Value	58.08651	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	55.19384	
Anderson-Darling Test Statistic	0.503555	
Anderson-Darling 5% Critical Value	0.729073	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.194269	
Kolmogrov-Smirnov 5% Critical Value	0.267361	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	73.64625	
95% Adjusted Gamma UCL	77.506	
Lognormal Statistics		
Minimum of log data	2.917771	
Maximum of log data	4.447346	
Mean of log data	3.917961	
Standard Deviation of log data	0.490803	
Variance of log data	0.240888	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.884831	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	56.73579	
MLE Standard Deviation	29.61032	
MLE Coefficient of Variation	0.521898	
MLE Skewness	1.707849	
MLE Median	50.2978	
MLE 80% Quantile	76.14885	
MLE 90% Quantile	94.50411	
MLE 95% Quantile	112.768	
MLE 99% Quantile	157.5227	
MVU Estimate of Median	49.69497	
MVU Estimate of Mean	55.99799	
MVU Estimate of Standard Deviation	28.01058	
MVU Estimate of SE of Mean	8.84191	
95% H-UCL	81.41004	
95% Chebyshev (MVUE) UCL	94.53898	
97.5% Chebyshev (MVUE) UCL	111.2157	
99% Chebyshev (MVUE) UCL	143.9739	
Non-parametric Statisitics		
95% CLT UCL	67.03932	
95% Adjusted-CLT UCL	66.32149	
95% Modified-t UCL	68.27038	
95% Jackknife UCL	68.38235	
95% Chebyshev (Mean, Sd) UCL	86.4012	
97.5% Chebyshev (Mean, Sd) UCL	99.85655	
99% Chebyshev (Mean, Sd) UCL	126.287	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	66.14506	
95% Bootstrap-t UCL	67.45979	
95% Hall's Bootstrap UCL	65.64746	
95% Percentile Bootstrap UCL	65.5	
95% BCA Bootstrap UCL	70.97	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	68.38235	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb04.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	112	
Maximum	8750	
Mean	1397.45	
Standard Deviation	2604.441	
Variance	6783114	
Coefficient of Variation	1.86371	
Skewness	3.067879	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.487409	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2907.196	
Gamma Statistics		
k hat	0.74542	
k star (bias corrected)	0.588461	
Theta hat	1874.714	
Theta star	2374.754	
nu hat	14.90841	
nu star	11.76922	
5% Approximate Chi Square Value	5.074427	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	4.335623	
Anderson-Darling Test Statistic	0.991081	
Anderson-Darling 5% Critical Value	0.757337	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.316081	
Kolmogrov-Smirnov 5% Critical Value	0.276069	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	3241.133	
95% Adjusted Gamma UCL	3793.433	
Lognormal Statistics		
Minimum of log data	4.718499	
Maximum of log data	9.076809	
Mean of log data	6.438654	
Standard Deviation of log data	1.176954	
Variance of log data	1.385222	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.925074	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1250.457	
MLE Standard Deviation	2164.307	
MLE Coefficient of Variation	1.730812	
MLE Skewness	10.37745	
MLE Median	625.5641	
MLE 80% Quantile	1691.177	
MLE 90% Quantile	2838.526	
MLE 95% Quantile	4336.157	
MLE 99% Quantile	9664.839	
MVU Estimate of Median	583.445	
MVU Estimate of Mean	1130.682	
MVU Estimate of Standard Deviation	1462.033	
MVU Estimate of SE of Mean	444.0075	
95% H-UCL	4892.839	
95% Chebyshev (MVUE) UCL	3066.066	
97.5% Chebyshev (MVUE) UCL	3903.509	
99% Chebyshev (MVUE) UCL	5548.502	
Non-parametric Statisitics		
95% CLT UCL	2752.146	
95% Adjusted-CLT UCL	3605.901	
95% Modified-t UCL	3040.364	
95% Jackknife UCL	2907.196	
95% Chebyshev (Mean, Sd) UCL	4987.424	
97.5% Chebyshev (Mean, Sd) UCL	6540.809	
99% Chebyshev (Mean, Sd) UCL	9592.133	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2686.674	
95% Bootstrap-t UCL	9494.277	
95% Hall's Bootstrap UCL	9107.356	
95% Percentile Bootstrap UCL	2994.15	
95% BCA Bootstrap UCL	3874.6	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	3066.066	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	5	
Minimum	0.85	
Maximum	7.8	
Mean	1.72	
Standard Deviation	2.175137	
Variance	4.731222	
Coefficient of Variation	1.264615	
Skewness	2.975116	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.460289	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.980886	
Gamma Statistics		
k hat	1.605557	
k star (bias corrected)	1.190557	
Theta hat	1.071279	
Theta star	1.444702	
nu hat	32.11115	
nu star	23.81114	
5% Approximate Chi Square Value	13.70341	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	12.38923	
Anderson-Darling Test Statistic	2.394523	
Anderson-Darling 5% Critical Value	0.738459	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.458527	
Kolmogrov-Smirnov 5% Critical Value	0.270843	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	2.988682	
95% Adjusted Gamma UCL	3.305706	
Lognormal Statistics		
Minimum of log data	-0.162519	
Maximum of log data	2.054124	
Mean of log data	0.199661	
Standard Deviation of log data	0.710093	
Variance of log data	0.504233	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.548611	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.571101	
MLE Standard Deviation	1.272218	
MLE Coefficient of Variation	0.809762	
MLE Skewness	2.960259	
MLE Median	1.220988	
MLE 80% Quantile	2.22485	
MLE 90% Quantile	3.04083	
MLE 95% Quantile	3.926562	
MLE 99% Quantile	6.368334	
MVU Estimate of Median	1.190521	
MVU Estimate of Mean	1.525147	
MVU Estimate of Standard Deviation	1.125207	
MVU Estimate of SE of Mean	0.353307	
95% H-UCL	2.872544	
95% Chebyshev (MVUE) UCL	3.065176	
97.5% Chebyshev (MVUE) UCL	3.731547	
99% Chebyshev (MVUE) UCL	5.040506	
Non-parametric Statisitics		
95% CLT UCL	2.851394	
95% Adjusted-CLT UCL	3.54286	
95% Modified-t UCL	3.088741	
95% Jackknife UCL	2.980886	
95% Chebyshev (Mean, Sd) UCL	4.71822	
97.5% Chebyshev (Mean, Sd) UCL	6.015552	
99% Chebyshev (Mean, Sd) UCL	8.56391	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.772689	
95% Bootstrap-t UCL	77.39227	
95% Hall's Bootstrap UCL	19.92711	
95% Percentile Bootstrap UCL	2.975	
95% BCA Bootstrap UCL	3.665	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	4.71822	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	22.4	
Maximum	257	
Mean	98.04	
Standard Deviation	72.0231	
Variance	5187.327	
Coefficient of Variation	0.73463	
Skewness	1.255465	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.895131	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	139.7904	
Gamma Statistics		
k hat	2.115573	
k star (bias corrected)	1.547567	
Theta hat	46.34207	
Theta star	63.35104	
nu hat	42.31145	
nu star	30.95135	
5% Approximate Chi Square Value	19.24024	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	17.65173	
Anderson-Darling Test Statistic	0.182708	
Anderson-Darling 5% Critical Value	0.735187	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.115717	
Kolmogrov-Smirnov 5% Critical Value	0.269653	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	157.7147	
95% Adjusted Gamma UCL	171.9078	
Lognormal Statistics		
Minimum of log data	3.109061	
Maximum of log data	5.549076	
Mean of log data	4.330793	
Standard Deviation of log data	0.784627	
Variance of log data	0.615639	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.962682	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	103.4008	
MLE Standard Deviation	95.37785	
MLE Coefficient of Variation	0.922409	
MLE Skewness	3.55205	
MLE Median	76.00454	
MLE 80% Quantile	147.4962	
MLE 90% Quantile	208.3123	
MLE 95% Quantile	276.3046	
MLE 99% Quantile	471.4602	
MVU Estimate of Median	73.69422	
MVU Estimate of Mean	99.60611	
MVU Estimate of Standard Deviation	81.83027	
MVU Estimate of SE of Mean	25.6153	
95% H-UCL	208.512	
95% Chebyshev (MVUE) UCL	211.2606	
97.5% Chebyshev (MVUE) UCL	259.5736	
99% Chebyshev (MVUE) UCL	354.4751	
Non-parametric Statisitics		
95% CLT UCL	135.5027	
95% Adjusted-CLT UCL	145.1645	
95% Modified-t UCL	141.2975	
95% Jackknife UCL	139.7904	
95% Chebyshev (Mean, Sd) UCL	197.317	
97.5% Chebyshev (Mean, Sd) UCL	240.2742	
99% Chebyshev (Mean, Sd) UCL	324.6554	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	133.3669	
95% Bootstrap-t UCL	159.9272	
95% Hall's Bootstrap UCL	206.4159	
95% Percentile Bootstrap UCL	133.8	
95% BCA Bootstrap UCL	154.63	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	139.7904	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	8.4	
Maximum	59.5	
Mean	40.295	
Standard Deviation	18.58818	
Variance	345.5203	
Coefficient of Variation	0.461302	
Skewness	-0.645975	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898321	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	51.07022	
Gamma Statistics		
k hat	3.443989	
k star (bias corrected)	2.477459	
Theta hat	11.7001	
Theta star	16.26465	
nu hat	68.87978	
nu star	49.54918	
5% Approximate Chi Square Value	34.38535	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	32.20225	
Anderson-Darling Test Statistic	0.642449	
Anderson-Darling 5% Critical Value	0.730941	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.233356	
Kolmogrov-Smirnov 5% Critical Value	0.26817	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	58.06497	
95% Adjusted Gamma UCL	62.00139	
Lognormal Statistics		
Minimum of log data	2.128232	
Maximum of log data	4.085976	
Mean of log data	3.544078	
Standard Deviation of log data	0.660734	
Variance of log data	0.436569	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.820327	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	43.05002	
MLE Standard Deviation	31.85087	
MLE Coefficient of Variation	0.739857	
MLE Skewness	2.624562	
MLE Median	34.60777	
MLE 80% Quantile	60.48516	
MLE 90% Quantile	80.89248	
MLE 95% Quantile	102.6151	
MLE 99% Quantile	160.926	
MVU Estimate of Median	33.85905	
MVU Estimate of Mean	41.97861	
MVU Estimate of Standard Deviation	28.67936	
MVU Estimate of SE of Mean	9.019927	
95% H-UCL	74.10022	
95% Chebyshev (MVUE) UCL	81.29555	
97.5% Chebyshev (MVUE) UCL	98.30803	
99% Chebyshev (MVUE) UCL	131.7257	
Non-parametric Statisitics		
95% CLT UCL	49.96361	
95% Adjusted-CLT UCL	48.68059	
95% Modified-t UCL	50.87009	
95% Jackknife UCL	51.07022	
95% Chebyshev (Mean, Sd) UCL	65.91703	
97.5% Chebyshev (Mean, Sd) UCL	77.0037	
99% Chebyshev (Mean, Sd) UCL	98.78133	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	49.48214	
95% Bootstrap-t UCL	49.95587	
95% Hall's Bootstrap UCL	48.17656	
95% Percentile Bootstrap UCL	49.145	
95% BCA Bootstrap UCL	51.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	51.07022	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.88	
Maximum	34.6	
Mean	8.583	
Standard Deviation	9.966377	
Variance	99.32867	
Coefficient of Variation	1.161176	
Skewness	2.292825	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.717126	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	14.36032	
Gamma Statistics		
k hat	1.062875	
k star (bias corrected)	0.810679	
Theta hat	8.075266	
Theta star	10.58742	
nu hat	21.2575	
nu star	16.21359	
5% Approximate Chi Square Value	8.1118	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	7.137832	
Anderson-Darling Test Statistic	0.350434	
Anderson-Darling 5% Critical Value	0.747133	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.175334	
Kolmogrov-Smirnov 5% Critical Value	0.273419	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	17.1554	
95% Adjusted Gamma UCL	19.49628	
Lognormal Statistics		
Minimum of log data	-0.127833	
Maximum of log data	3.543854	
Mean of log data	1.610517	
Standard Deviation of log data	1.143788	
Variance of log data	1.308252	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.947648	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	9.627689	
MLE Standard Deviation	15.81903	
MLE Coefficient of Variation	1.643076	
MLE Skewness	9.365043	
MLE Median	5.0054	
MLE 80% Quantile	13.15785	
MLE 90% Quantile	21.76461	
MLE 95% Quantile	32.8532	
MLE 99% Quantile	71.59098	
MVU Estimate of Median	4.686615	
MVU Estimate of Mean	8.767318	
MVU Estimate of Standard Deviation	10.96823	
MVU Estimate of SE of Mean	3.342868	
95% H-UCL	35.26916	
95% Chebyshev (MVUE) UCL	23.33854	
97.5% Chebyshev (MVUE) UCL	29.64352	
99% Chebyshev (MVUE) UCL	42.02843	
Non-parametric Statisitics		
95% CLT UCL	13.76699	
95% Adjusted-CLT UCL	16.20867	
95% Modified-t UCL	14.74117	
95% Jackknife UCL	14.36032	
95% Chebyshev (Mean, Sd) UCL	22.3207	
97.5% Chebyshev (Mean, Sd) UCL	28.26502	
99% Chebyshev (Mean, Sd) UCL	39.94147	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	13.52473	
95% Bootstrap-t UCL	19.74013	
95% Hall's Bootstrap UCL	33.29326	
95% Percentile Bootstrap UCL	14.266	
95% BCA Bootstrap UCL	17.768	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	17.1554	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NB\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	31.8	
Maximum	969	
Mean	280.29	
Standard Deviation	266.8435	
Variance	71205.47	
Coefficient of Variation	0.952027	
Skewness	2.187306	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.763661	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	434.9742	
Gamma Statistics		
k hat	1.501945	
k star (bias corrected)	1.118028	
Theta hat	186.618	
Theta star	250.7003	
nu hat	30.0389	
nu star	22.36056	
5% Approximate Chi Square Value	12.60733	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	11.35356	
Anderson-Darling Test Statistic	0.311317	
Anderson-Darling 5% Critical Value	0.739216	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.14646	
Kolmogrov-Smirnov 5% Critical Value	0.271115	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	497.1269	
95% Adjusted Gamma UCL	552.0244	
Lognormal Statistics		
Minimum of log data	3.459466	
Maximum of log data	6.876265	
Mean of log data	5.26737	
Standard Deviation of log data	0.957177	
Variance of log data	0.916188	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.953089	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	306.5756	
MLE Standard Deviation	375.4447	
MLE Coefficient of Variation	1.22464	
MLE Skewness	5.510564	
MLE Median	193.9054	
MLE 80% Quantile	435.3651	
MLE 90% Quantile	663.3766	
MLE 95% Quantile	936.2913	
MLE 99% Quantile	1796.803	
MVU Estimate of Median	185.1874	
MVU Estimate of Mean	288.6989	
MVU Estimate of Standard Deviation	295.125	
MVU Estimate of SE of Mean	91.44484	
95% H-UCL	802.4665	
95% Chebyshev (MVUE) UCL	687.2977	
97.5% Chebyshev (MVUE) UCL	859.7717	
99% Chebyshev (MVUE) UCL	1198.564	
Non-parametric Statisitics		
95% CLT UCL	419.0882	
95% Adjusted-CLT UCL	481.454	
95% Modified-t UCL	444.702	
95% Jackknife UCL	434.9742	
95% Chebyshev (Mean, Sd) UCL	648.1084	
97.5% Chebyshev (Mean, Sd) UCL	807.2637	
99% Chebyshev (Mean, Sd) UCL	1119.894	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	411.5675	
95% Bootstrap-t UCL	592.3136	
95% Hall's Bootstrap UCL	1098.379	
95% Percentile Bootstrap UCL	428.71	
95% BCA Bootstrap UCL	535.61	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	497.1269	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	39.9	
Maximum	386	
Mean	179.6	
Standard Deviation	97.3556	
Variance	9478.113	
Coefficient of Variation	0.542069	
Skewness	0.627691	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.919824	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	236.0352	
Gamma Statistics		
k hat	3.041908	
k star (bias corrected)	2.196002	
Theta hat	59.04189	
Theta star	81.78497	
nu hat	60.83816	
nu star	43.92005	
5% Approximate Chi Square Value	29.71911	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	27.7022	
Anderson-Darling Test Statistic	0.566315	
Anderson-Darling 5% Critical Value	0.732063	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.247033	
Kolmogrov-Smirnov 5% Critical Value	0.268424	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	265.4198	
95% Adjusted Gamma UCL	284.7442	
Lognormal Statistics		
Minimum of log data	3.686376	
Maximum of log data	5.955837	
Mean of log data	5.017449	
Standard Deviation of log data	0.687049	
Variance of log data	0.472037	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.864858	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	191.2281	
MLE Standard Deviation	148.526	
MLE Coefficient of Variation	0.776696	
MLE Skewness	2.798633	
MLE Median	151.0255	
MLE 80% Quantile	269.8875	
MLE 90% Quantile	365.1495	
MLE 95% Quantile	467.6146	
MLE 99% Quantile	746.5965	
MVU Estimate of Median	147.4952	
MVU Estimate of Mean	186.0346	
MVU Estimate of Standard Deviation	132.4942	
MVU Estimate of SE of Mean	41.63571	
95% H-UCL	339.7689	
95% Chebyshev (MVUE) UCL	367.5204	
97.5% Chebyshev (MVUE) UCL	446.0495	
99% Chebyshev (MVUE) UCL	600.3046	
Non-parametric Statisitics		
95% CLT UCL	230.2394	
95% Adjusted-CLT UCL	236.769	
95% Modified-t UCL	237.0537	
95% Jackknife UCL	236.0352	
95% Chebyshev (Mean, Sd) UCL	313.7954	
97.5% Chebyshev (Mean, Sd) UCL	371.8619	
99% Chebyshev (Mean, Sd) UCL	485.9223	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	227.345	
95% Bootstrap-t UCL	240.9736	
95% Hall's Bootstrap UCL	261.401	
95% Percentile Bootstrap UCL	229.12	
95% BCA Bootstrap UCL	218.19	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	236.0352	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	19.9	
Maximum	328	
Mean	136.96	
Standard Deviation	90.36974	
Variance	8166.689	
Coefficient of Variation	0.659826	
Skewness	0.914277	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.941195	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	189.3456	
Gamma Statistics		
k hat	2.165511	
k star (bias corrected)	1.582524	
Theta hat	63.24605	
Theta star	86.54528	
nu hat	43.31021	
nu star	31.65048	
5% Approximate Chi Square Value	19.793	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	18.17936	
Anderson-Darling Test Statistic	0.22202	
Anderson-Darling 5% Critical Value	0.735017	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.17378	
Kolmogrov-Smirnov 5% Critical Value	0.269585	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	219.0093	
95% Adjusted Gamma UCL	238.4489	
Lognormal Statistics		
Minimum of log data	2.99072	
Maximum of log data	5.793014	
Mean of log data	4.671373	
Standard Deviation of log data	0.825774	
Variance of log data	0.681903	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.934032	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	150.2536	
MLE Standard Deviation	148.564	
MLE Coefficient of Variation	0.988755	
MLE Skewness	3.932909	
MLE Median	106.8443	
MLE 80% Quantile	214.6807	
MLE 90% Quantile	308.7378	
MLE 95% Quantile	415.6199	
MLE 99% Quantile	729.3277	
MVU Estimate of Median	103.2519	
MVU Estimate of Mean	144.0512	
MVU Estimate of Standard Deviation	125.111	
MVU Estimate of SE of Mean	39.08423	
95% H-UCL	321.0273	
95% Chebyshev (MVUE) UCL	314.4154	
97.5% Chebyshev (MVUE) UCL	388.1321	
99% Chebyshev (MVUE) UCL	532.9343	
Non-parametric Statisitics		
95% CLT UCL	183.9657	
95% Adjusted-CLT UCL	192.7941	
95% Modified-t UCL	190.7227	
95% Jackknife UCL	189.3456	
95% Chebyshev (Mean, Sd) UCL	261.5261	
97.5% Chebyshev (Mean, Sd) UCL	315.4259	
99% Chebyshev (Mean, Sd) UCL	421.3017	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	181.0107	
95% Bootstrap-t UCL	202.1063	
95% Hall's Bootstrap UCL	239.8264	
95% Percentile Bootstrap UCL	185.33	
95% BCA Bootstrap UCL	209.1	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	189.3456	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	50	
Maximum	133	
Mean	78.815	
Standard Deviation	25.65316	
Variance	658.0845	
Coefficient of Variation	0.325486	
Skewness	1.148924	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906617	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	93.68565	
Gamma Statistics		
k hat	11.76879	
k star (bias corrected)	8.304819	
Theta hat	6.696951	
Theta star	9.490273	
nu hat	235.3758	
nu star	166.0964	
5% Approximate Chi Square Value	137.2906	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	132.7405	
Anderson-Darling Test Statistic	0.282509	
Anderson-Darling 5% Critical Value	0.72497	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.173178	
Kolmogrov-Smirnov 5% Critical Value	0.266549	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	95.35166	
95% Adjusted Gamma UCL	98.62014	
Lognormal Statistics		
Minimum of log data	3.912023	
Maximum of log data	4.890349	
Mean of log data	4.324017	
Standard Deviation of log data	0.302689	
Variance of log data	0.091621	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963991	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	79.02997	
MLE Standard Deviation	24.48002	
MLE Coefficient of Variation	0.309756	
MLE Skewness	0.958989	
MLE Median	75.49126	
MLE 80% Quantile	97.49381	
MLE 90% Quantile	111.3827	
MLE 95% Quantile	124.2058	
MLE 99% Quantile	152.6383	
MVU Estimate of Median	75.14608	
MVU Estimate of Mean	78.6567	
MVU Estimate of Standard Deviation	23.98503	
MVU Estimate of SE of Mean	7.58265	
95% H-UCL	96.50374	
95% Chebyshev (MVUE) UCL	111.7087	
97.5% Chebyshev (MVUE) UCL	126.0103	
99% Chebyshev (MVUE) UCL	154.1031	
Non-parametric Statisitics		
95% CLT UCL	92.15845	
95% Adjusted-CLT UCL	95.30774	
95% Modified-t UCL	94.17688	
95% Jackknife UCL	93.68565	
95% Chebyshev (Mean, Sd) UCL	114.1754	
97.5% Chebyshev (Mean, Sd) UCL	129.4759	
99% Chebyshev (Mean, Sd) UCL	159.5308	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	91.6549	
95% Bootstrap-t UCL	101.4432	
95% Hall's Bootstrap UCL	103.7625	
95% Percentile Bootstrap UCL	91.48	
95% BCA Bootstrap UCL	89.055	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	93.68565	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.02	
Maximum	0.56	
Mean	0.231	
Standard Deviation	0.186872	
Variance	0.034921	
Coefficient of Variation	0.808969	
Skewness	0.936545	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.884627	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.339326	
Gamma Statistics		
k hat	1.464392	
k star (bias corrected)	1.091741	
Theta hat	0.157745	
Theta star	0.211589	
nu hat	29.28783	
nu star	21.83482	
5% Approximate Chi Square Value	12.21294	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.98153	
Anderson-Darling Test Statistic	0.184615	
Anderson-Darling 5% Critical Value	0.739874	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.122711	
Kolmogrov-Smirnov 5% Critical Value	0.271307	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.412992	
95% Adjusted Gamma UCL	0.459302	
Lognormal Statistics		
Minimum of log data	-3.912023	
Maximum of log data	-0.579818	
Mean of log data	-1.844111	
Standard Deviation of log data	1.03095	
Variance of log data	1.062858	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.942748	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.269097	
MLE Standard Deviation	0.370401	
MLE Coefficient of Variation	1.376456	
MLE Skewness	6.737245	
MLE Median	0.158166	
MLE 80% Quantile	0.377963	
MLE 90% Quantile	0.594913	
MLE 95% Quantile	0.862261	
MLE 99% Quantile	1.739989	
MVU Estimate of Median	0.149941	
MVU Estimate of Mean	0.250373	
MVU Estimate of Standard Deviation	0.278211	
MVU Estimate of SE of Mean	0.085704	
95% H-UCL	0.798976	
95% Chebyshev (MVUE) UCL	0.623948	
97.5% Chebyshev (MVUE) UCL	0.785595	
99% Chebyshev (MVUE) UCL	1.103118	
Non-parametric Statisitics		
95% CLT UCL	0.328201	
95% Adjusted-CLT UCL	0.346902	
95% Modified-t UCL	0.342243	
95% Jackknife UCL	0.339326	
95% Chebyshev (Mean, Sd) UCL	0.488585	
97.5% Chebyshev (Mean, Sd) UCL	0.600042	
99% Chebyshev (Mean, Sd) UCL	0.818979	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.324284	
95% Bootstrap-t UCL	0.397597	
95% Hall's Bootstrap UCL	0.435495	
95% Percentile Bootstrap UCL	0.325	
95% BCA Bootstrap UCL	0.31	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.339326	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	6.2	
Maximum	49.4	
Mean	18.625	
Standard Deviation	12.40657	
Variance	153.9229	
Coefficient of Variation	0.666124	
Skewness	1.825212	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.819529	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	25.81685	
Gamma Statistics		
k hat	3.043372	
k star (bias corrected)	2.197027	
Theta hat	6.119856	
Theta star	8.477364	
nu hat	60.86745	
nu star	43.94055	
5% Approximate Chi Square Value	29.73599	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	27.71846	
Anderson-Darling Test Statistic	0.323573	
Anderson-Darling 5% Critical Value	0.732059	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.147827	
Kolmogrov-Smirnov 5% Critical Value	0.268423	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	27.52196	
95% Adjusted Gamma UCL	29.52519	
Lognormal Statistics		
Minimum of log data	1.824549	
Maximum of log data	3.89995	
Mean of log data	2.751309	
Standard Deviation of log data	0.61739	
Variance of log data	0.381171	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955055	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	18.95171	
MLE Standard Deviation	12.90941	
MLE Coefficient of Variation	0.681174	
MLE Skewness	2.359585	
MLE Median	15.66312	
MLE 80% Quantile	26.39049	
MLE 90% Quantile	34.62775	
MLE 95% Quantile	43.24649	
MLE 99% Quantile	65.84866	
MVU Estimate of Median	15.36692	
MVU Estimate of Mean	18.54594	
MVU Estimate of Standard Deviation	11.79189	
MVU Estimate of SE of Mean	3.713146	
95% H-UCL	31.02688	
95% Chebyshev (MVUE) UCL	34.73117	
97.5% Chebyshev (MVUE) UCL	41.73454	
99% Chebyshev (MVUE) UCL	55.49128	
Non-parametric Statisitics		
95% CLT UCL	25.07826	
95% Adjusted-CLT UCL	27.49787	
95% Modified-t UCL	26.19426	
95% Jackknife UCL	25.81685	
95% Chebyshev (Mean, Sd) UCL	35.72627	
97.5% Chebyshev (Mean, Sd) UCL	43.12601	
99% Chebyshev (Mean, Sd) UCL	57.66135	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	24.66399	
95% Bootstrap-t UCL	30.03059	
95% Hall's Bootstrap UCL	56.33815	
95% Percentile Bootstrap UCL	24.87	
95% BCA Bootstrap UCL	29.21	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	27.52196	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.75	
Maximum	6.1	
Mean	3.215	
Standard Deviation	1.583254	
Variance	2.506694	
Coefficient of Variation	0.492459	
Skewness	0.434459	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.960795	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	4.132783	
Gamma Statistics		
k hat	3.883525	
k star (bias corrected)	2.785134	
Theta hat	0.827856	
Theta star	1.154343	
nu hat	77.6705	
nu star	55.70268	
5% Approximate Chi Square Value	39.54746	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	37.19303	
Anderson-Darling Test Statistic	0.265037	
Anderson-Darling 5% Critical Value	0.729715	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.153619	
Kolmogrov-Smirnov 5% Critical Value	0.267893	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4.528335	
95% Adjusted Gamma UCL	4.814992	
Lognormal Statistics		
Minimum of log data	-0.287682	
Maximum of log data	1.808289	
Mean of log data	1.033588	
Standard Deviation of log data	0.593393	
Variance of log data	0.352116	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.918998	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	3.352299	
MLE Standard Deviation	2.177892	
MLE Coefficient of Variation	0.649671	
MLE Skewness	2.223223	
MLE Median	2.811135	
MLE 80% Quantile	4.641352	
MLE 90% Quantile	6.026092	
MLE 95% Quantile	7.46123	
MLE 99% Quantile	11.17659	
MVU Estimate of Median	2.761998	
MVU Estimate of Mean	3.28652	
MVU Estimate of Standard Deviation	2.004148	
MVU Estimate of SE of Mean	0.631453	
95% H-UCL	5.344102	
95% Chebyshev (MVUE) UCL	6.03896	
97.5% Chebyshev (MVUE) UCL	7.229943	
99% Chebyshev (MVUE) UCL	9.569399	
Non-parametric Statisitics		
95% CLT UCL	4.038527	
95% Adjusted-CLT UCL	4.112026	
95% Modified-t UCL	4.144247	
95% Jackknife UCL	4.132783	
95% Chebyshev (Mean, Sd) UCL	5.397366	
97.5% Chebyshev (Mean, Sd) UCL	6.341677	
99% Chebyshev (Mean, Sd) UCL	8.196594	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	3.982181	
95% Bootstrap-t UCL	4.207179	
95% Hall's Bootstrap UCL	4.30067	
95% Percentile Bootstrap UCL	3.98	
95% BCA Bootstrap UCL	4.35	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	4.132783	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	10.4	
Maximum	103	
Mean	53.025	
Standard Deviation	33.18208	
Variance	1101.051	
Coefficient of Variation	0.625782	
Skewness	0.201495	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.935598	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	72.26003	
Gamma Statistics		
k hat	2.243299	
k star (bias corrected)	1.636976	
Theta hat	23.63706	
Theta star	32.39204	
nu hat	44.86598	
nu star	32.73952	
5% Approximate Chi Square Value	20.65724	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	19.00502	
Anderson-Darling Test Statistic	0.293111	
Anderson-Darling 5% Critical Value	0.734753	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.1585	
Kolmogrov-Smirnov 5% Critical Value	0.269479	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	84.03897	
95% Adjusted Gamma UCL	91.345	
Lognormal Statistics		
Minimum of log data	2.341806	
Maximum of log data	4.634729	
Mean of log data	3.731621	
Standard Deviation of log data	0.797348	
Variance of log data	0.635763	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.918459	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	57.36891	
MLE Standard Deviation	54.07497	
MLE Coefficient of Variation	0.942583	
MLE Skewness	3.6652	
MLE Median	41.74672	
MLE 80% Quantile	81.89023	
MLE 90% Quantile	116.3046	
MLE 95% Quantile	154.9741	
MLE 99% Quantile	266.7339	
MVU Estimate of Median	40.4368	
MVU Estimate of Mean	55.1844	
MVU Estimate of Standard Deviation	46.13447	
MVU Estimate of SE of Mean	14.43279	
95% H-UCL	117.739	
95% Chebyshev (MVUE) UCL	118.0955	
97.5% Chebyshev (MVUE) UCL	145.3172	
99% Chebyshev (MVUE) UCL	198.7889	
Non-parametric Statisitics		
95% CLT UCL	70.28461	
95% Adjusted-CLT UCL	70.99902	
95% Modified-t UCL	72.37146	
95% Jackknife UCL	72.26003	
95% Chebyshev (Mean, Sd) UCL	98.76335	
97.5% Chebyshev (Mean, Sd) UCL	118.5544	
99% Chebyshev (Mean, Sd) UCL	157.43	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	69.46763	
95% Bootstrap-t UCL	73.45278	
95% Hall's Bootstrap UCL	68.8935	
95% Percentile Bootstrap UCL	69.105	
95% BCA Bootstrap UCL	74.73	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	72.26003	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	250	
Maximum	3840	
Mean	1420.5	
Standard Deviation	1130.775	
Variance	1278652	
Coefficient of Variation	0.79604	
Skewness	1.101455	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.903865	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2075.989	
Gamma Statistics		
k hat	1.682544	
k star (bias corrected)	1.244448	
Theta hat	844.2572	
Theta star	1141.47	
nu hat	33.65088	
nu star	24.88895	
5% Approximate Chi Square Value	14.52489	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	13.16696	
Anderson-Darling Test Statistic	0.172404	
Anderson-Darling 5% Critical Value	0.737897	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.129897	
Kolmogrov-Smirnov 5% Critical Value	0.270642	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2434.08	
95% Adjusted Gamma UCL	2685.111	
Lognormal Statistics		
Minimum of log data	5.521461	
Maximum of log data	8.253228	
Mean of log data	6.933066	
Standard Deviation of log data	0.904149	
Variance of log data	0.817485	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.961763	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1543.5	
MLE Standard Deviation	1735.869	
MLE Coefficient of Variation	1.124632	
MLE Skewness	4.796325	
MLE Median	1025.633	
MLE 80% Quantile	2201.89	
MLE 90% Quantile	3277.698	
MLE 95% Quantile	4538.674	
MLE 99% Quantile	8401.079	
MVU Estimate of Median	984.4058	
MVU Estimate of Mean	1464.808	
MVU Estimate of Standard Deviation	1405.508	
MVU Estimate of SE of Mean	437.0808	
95% H-UCL	3710.346	
95% Chebyshev (MVUE) UCL	3369.999	
97.5% Chebyshev (MVUE) UCL	4194.377	
99% Chebyshev (MVUE) UCL	5813.707	
Non-parametric Statisitics		
95% CLT UCL	2008.671	
95% Adjusted-CLT UCL	2141.754	
95% Modified-t UCL	2096.747	
95% Jackknife UCL	2075.989	
95% Chebyshev (Mean, Sd) UCL	2979.166	
97.5% Chebyshev (Mean, Sd) UCL	3653.602	
99% Chebyshev (Mean, Sd) UCL	4978.4	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1980.657	
95% Bootstrap-t UCL	2337.742	
95% Hall's Bootstrap UCL	2372.929	
95% Percentile Bootstrap UCL	2009.3	
95% BCA Bootstrap UCL	2328.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2075.989	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb06.xls	
Variable:	Chromium VI	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.04134	
Maximum	1.2597	
Mean	0.364377	
Standard Deviation	0.346897	
Variance	0.120337	
Coefficient of Variation	0.952027	
Skewness	2.187306	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.763661	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.565466	
Gamma Statistics		
k hat	1.501945	
k star (bias corrected)	1.118028	
Theta hat	0.242603	
Theta star	0.32591	
nu hat	30.0389	
nu star	22.36056	
5% Approximate Chi Square Value	12.60733	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	11.35356	
Anderson-Darling Test Statistic	0.311317	
Anderson-Darling 5% Critical Value	0.739216	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.14646	
Kolmogrov-Smirnov 5% Critical Value	0.271115	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.646265	
95% Adjusted Gamma UCL	0.717632	
Lognormal Statistics		
Minimum of log data	-3.185925	
Maximum of log data	0.230874	
Mean of log data	-1.378021	
Standard Deviation of log data	0.957177	
Variance of log data	0.916188	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.953089	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.398548	
MLE Standard Deviation	0.488078	
MLE Coefficient of Variation	1.22464	
MLE Skewness	5.510564	
MLE Median	0.252077	
MLE 80% Quantile	0.565975	
MLE 90% Quantile	0.86239	
MLE 95% Quantile	1.217179	
MLE 99% Quantile	2.335844	
MVU Estimate of Median	0.240744	
MVU Estimate of Mean	0.375309	
MVU Estimate of Standard Deviation	0.383662	
MVU Estimate of SE of Mean	0.118878	
95% H-UCL	1.043206	
95% Chebyshev (MVUE) UCL	0.893487	
97.5% Chebyshev (MVUE) UCL	1.117703	
99% Chebyshev (MVUE) UCL	1.558133	
Non-parametric Statisitics		
95% CLT UCL	0.544815	
95% Adjusted-CLT UCL	0.62589	
95% Modified-t UCL	0.578113	
95% Jackknife UCL	0.565466	
95% Chebyshev (Mean, Sd) UCL	0.842541	
97.5% Chebyshev (Mean, Sd) UCL	1.049443	
99% Chebyshev (Mean, Sd) UCL	1.455862	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.53685	
95% Bootstrap-t UCL	0.800786	
95% Hall's Bootstrap UCL	1.433146	
95% Percentile Bootstrap UCL	0.562978	
95% BCA Bootstrap UCL	0.680667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.646265	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	13.3	
Maximum	234	
Mean	91.1	
Standard Deviation	102.5243	
Variance	10511.23	
Coefficient of Variation	1.125404	
Skewness	1.293522	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858426	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	211.7385	
Gamma Statistics		
k hat	0.956947	
k star (bias corrected)	0.405903	
Theta hat	95.19859	
Theta star	224.4376	
nu hat	7.655575	
nu star	3.247227	
5% Approximate Chi Square Value	0.449073	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.330954	
Anderson-Darling 5% Critical Value	0.667245	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.291496	
Kolmogrov-Smirnov 5% Critical Value	0.402887	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	658.7397	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.587764	
Maximum of log data	5.455321	
Mean of log data	3.905612	
Standard Deviation of log data	1.340958	
Variance of log data	1.79817	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924773	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	122.0824	
MLE Standard Deviation	274.0359	
MLE Coefficient of Variation	2.244679	
MLE Skewness	18.04404	
MLE Median	49.68047	
MLE 80% Quantile	154.2727	
MLE 90% Quantile	278.3122	
MLE 95% Quantile	451.0095	
MLE 99% Quantile	1124.036	
MVU Estimate of Median	39.24299	
MVU Estimate of Mean	90.64846	
MVU Estimate of Standard Deviation	108.4533	
MVU Estimate of SE of Mean	53.37087	
95% H-UCL	1285456	
95% Chebyshev (MVUE) UCL	323.2867	
97.5% Chebyshev (MVUE) UCL	423.9495	
99% Chebyshev (MVUE) UCL	621.682	
Non-parametric Statisitics		
95% CLT UCL	175.4187	
95% Adjusted-CLT UCL	210.8447	
95% Modified-t UCL	217.2642	
95% Jackknife UCL	211.7385	
95% Chebyshev (Mean, Sd) UCL	314.5465	
97.5% Chebyshev (Mean, Sd) UCL	411.232	
99% Chebyshev (Mean, Sd) UCL	601.152	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	211.7385	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	13.4	
Maximum	56.8	
Mean	31.925	
Standard Deviation	20.55649	
Variance	422.5692	
Coefficient of Variation	0.643899	
Skewness	0.479675	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.90292	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	56.11344	
Gamma Statistics		
k hat	3.050182	
k star (bias corrected)	0.929212	
Theta hat	10.46659	
Theta star	34.35706	
nu hat	24.40146	
nu star	7.433698	
5% Approximate Chi Square Value	2.410996	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.365603	
Anderson-Darling 5% Critical Value	0.659383	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.291741	
Kolmogrov-Smirnov 5% Critical Value	0.39654	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	98.43269	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.595255	
Maximum of log data	4.039536	
Mean of log data	3.2906	
Standard Deviation of log data	0.692177	
Variance of log data	0.479109	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.905607	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	34.12922	
MLE Standard Deviation	26.75684	
MLE Coefficient of Variation	0.783986	
MLE Skewness	2.833824	
MLE Median	26.85896	
MLE 80% Quantile	48.20626	
MLE 90% Quantile	65.3689	
MLE 95% Quantile	83.86683	
MLE 99% Quantile	134.3707	
MVU Estimate of Median	25.27907	
MVU Estimate of Mean	31.95147	
MVU Estimate of Standard Deviation	21.37158	
MVU Estimate of SE of Mean	10.66884	
95% H-UCL	427.3199	
95% Chebyshev (MVUE) UCL	78.45589	
97.5% Chebyshev (MVUE) UCL	98.57838	
99% Chebyshev (MVUE) UCL	138.1051	
Non-parametric Statisitics		
95% CLT UCL	48.83121	
95% Adjusted-CLT UCL	51.46521	
95% Modified-t UCL	56.52429	
95% Jackknife UCL	56.11344	
95% Chebyshev (Mean, Sd) UCL	76.72683	
97.5% Chebyshev (Mean, Sd) UCL	96.11261	
99% Chebyshev (Mean, Sd) UCL	134.1922	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	56.11344	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.25	
Maximum	5.6	
Mean	1.9575	
Standard Deviation	2.488351	
Variance	6.191892	
Coefficient of Variation	1.271188	
Skewness	1.731982	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.796947	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	4.885497	
Gamma Statistics		
k hat	0.875939	
k star (bias corrected)	0.385651	
Theta hat	2.234744	
Theta star	5.075826	
nu hat	7.007515	
nu star	3.085212	
5% Approximate Chi Square Value	0.397919	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.308271	
Anderson-Darling 5% Critical Value	0.668441	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.252965	
Kolmogrov-Smirnov 5% Critical Value	0.40371	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	15.17723	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.386294	
Maximum of log data	1.722767	
Mean of log data	0.001992	
Standard Deviation of log data	1.365386	
Variance of log data	1.864278	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.968715	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.545001	
MLE Standard Deviation	5.94206	
MLE Coefficient of Variation	2.334797	
MLE Skewness	19.73201	
MLE Median	1.001994	
MLE 80% Quantile	3.176382	
MLE 90% Quantile	5.792202	
MLE 95% Quantile	9.469266	
MLE 99% Quantile	23.9958	
MVU Estimate of Median	0.784286	
MVU Estimate of Mean	1.86497	
MVU Estimate of Standard Deviation	2.263894	
MVU Estimate of SE of Mean	1.113039	
95% H-UCL	37562.5	
95% Chebyshev (MVUE) UCL	6.716594	
97.5% Chebyshev (MVUE) UCL	8.815895	
99% Chebyshev (MVUE) UCL	12.93957	
Non-parametric Statisitics		
95% CLT UCL	4.003987	
95% Adjusted-CLT UCL	5.155252	
95% Modified-t UCL	5.065071	
95% Jackknife UCL	4.885497	
95% Chebyshev (Mean, Sd) UCL	7.380736	
97.5% Chebyshev (Mean, Sd) UCL	9.727374	
99% Chebyshev (Mean, Sd) UCL	14.33689	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	4.885497	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	53.1	
Maximum	784	
Mean	327.275	
Standard Deviation	326.819	
Variance	106810.6	
Coefficient of Variation	0.998607	
Skewness	1.292248	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.895969	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	711.8369	
Gamma Statistics		
k hat	1.253495	
k star (bias corrected)	0.48004	
Theta hat	261.0901	
Theta star	681.7657	
nu hat	10.02796	
nu star	3.840322	
5% Approximate Chi Square Value	0.659369	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.213699	
Anderson-Darling 5% Critical Value	0.66446	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.205888	
Kolmogrov-Smirnov 5% Critical Value	0.400949	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1906.128	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.972177	
Maximum of log data	6.664409	
Mean of log data	5.341588	
Standard Deviation of log data	1.159777	
Variance of log data	1.345083	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.993029	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	409.1694	
MLE Standard Deviation	689.3629	
MLE Coefficient of Variation	1.684786	
MLE Skewness	9.83663	
MLE Median	208.8441	
MLE 80% Quantile	556.4624	
MLE 90% Quantile	926.9517	
MLE 95% Quantile	1407.29	
MLE 99% Quantile	3100.223	
MVU Estimate of Median	175.4592	
MVU Estimate of Mean	331.3252	
MVU Estimate of Standard Deviation	351.6447	
MVU Estimate of SE of Mean	174.0889	
95% H-UCL	425039.6	
95% Chebyshev (MVUE) UCL	1090.161	
97.5% Chebyshev (MVUE) UCL	1418.51	
99% Chebyshev (MVUE) UCL	2063.488	
Non-parametric Statisitics		
95% CLT UCL	596.0597	
95% Adjusted-CLT UCL	708.8764	
95% Modified-t UCL	729.434	
95% Jackknife UCL	711.8369	
95% Chebyshev (Mean, Sd) UCL	1039.56	
97.5% Chebyshev (Mean, Sd) UCL	1347.767	
99% Chebyshev (Mean, Sd) UCL	1953.179	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	711.8369	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	56.5	
Maximum	437	
Mean	164.525	
Standard Deviation	183.0822	
Variance	33519.1	
Coefficient of Variation	1.112793	
Skewness	1.909775	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.721894	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	379.9545	
Gamma Statistics		
k hat	1.422504	
k star (bias corrected)	0.522293	
Theta hat	115.6587	
Theta star	315.0054	
nu hat	11.38003	
nu star	4.178342	
5% Approximate Chi Square Value	0.793086	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.575153	
Anderson-Darling 5% Critical Value	0.663027	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.328356	
Kolmogrov-Smirnov 5% Critical Value	0.399949	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	866.7929	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.034241	
Maximum of log data	6.079933	
Mean of log data	4.712087	
Standard Deviation of log data	0.956413	
Variance of log data	0.914726	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.825608	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	175.8181	
MLE Standard Deviation	215.0516	
MLE Coefficient of Variation	1.223148	
MLE Skewness	5.499386	
MLE Median	111.2842	
MLE 80% Quantile	249.699	
MLE 90% Quantile	380.3446	
MLE 95% Quantile	536.6717	
MLE 99% Quantile	1029.372	
MVU Estimate of Median	98.98925	
MVU Estimate of Mean	153.5835	
MVU Estimate of Standard Deviation	137.9593	
MVU Estimate of SE of Mean	68.62751	
95% H-UCL	20277.96	
95% Chebyshev (MVUE) UCL	452.7238	
97.5% Chebyshev (MVUE) UCL	582.1621	
99% Chebyshev (MVUE) UCL	836.4185	
Non-parametric Statisitics		
95% CLT UCL	315.0967	
95% Adjusted-CLT UCL	408.4972	
95% Modified-t UCL	394.5231	
95% Jackknife UCL	379.9545	
95% Chebyshev (Mean, Sd) UCL	563.5435	
97.5% Chebyshev (Mean, Sd) UCL	736.1991	
99% Chebyshev (Mean, Sd) UCL	1075.348	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	866.7929	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	26.2	
Maximum	377	
Mean	149.025	
Standard Deviation	158.5422	
Variance	25135.62	
Coefficient of Variation	1.063863	
Skewness	1.549135	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.85331	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	335.5786	
Gamma Statistics		
k hat	1.223934	
k star (bias corrected)	0.47265	
Theta hat	121.759	
Theta star	315.2966	
nu hat	9.791474	
nu star	3.781202	
5% Approximate Chi Square Value	0.636941	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.24362	
Anderson-Darling 5% Critical Value	0.664711	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.215253	
Kolmogrov-Smirnov 5% Critical Value	0.401124	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	884.6877	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.265759	
Maximum of log data	5.932245	
Mean of log data	4.542921	
Standard Deviation of log data	1.140978	
Variance of log data	1.301831	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.993963	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	180.1585	
MLE Standard Deviation	294.7133	
MLE Coefficient of Variation	1.635855	
MLE Skewness	9.285153	
MLE Median	93.96491	
MLE 80% Quantile	246.4226	
MLE 90% Quantile	407.108	
MLE 95% Quantile	613.8992	
MLE 99% Quantile	1335.201	
MVU Estimate of Median	79.40345	
MVU Estimate of Mean	147.0437	
MVU Estimate of Standard Deviation	153.92	
MVU Estimate of SE of Mean	76.24142	
95% H-UCL	150025.5	
95% Chebyshev (MVUE) UCL	479.3724	
97.5% Chebyshev (MVUE) UCL	623.1713	
99% Chebyshev (MVUE) UCL	905.6363	
Non-parametric Statisitics		
95% CLT UCL	279.4143	
95% Adjusted-CLT UCL	345.022	
95% Modified-t UCL	345.8121	
95% Jackknife UCL	335.5786	
95% Chebyshev (Mean, Sd) UCL	494.5596	
97.5% Chebyshev (Mean, Sd) UCL	644.0727	
99% Chebyshev (Mean, Sd) UCL	937.7623	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	335.5786	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	84.3	
Maximum	645	
Mean	334.325	
Standard Deviation	284.2995	
Variance	80826.22	
Coefficient of Variation	0.850369	
Skewness	0.199496	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.846536	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	668.855	
Gamma Statistics		
k hat	1.483952	
k star (bias corrected)	0.537655	
Theta hat	225.2936	
Theta star	621.821	
nu hat	11.87162	
nu star	4.301238	
5% Approximate Chi Square Value	0.84387	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.509662	
Anderson-Darling 5% Critical Value	0.662506	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.319624	
Kolmogrov-Smirnov 5% Critical Value	0.399585	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1704.067	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.434382	
Maximum of log data	6.46925	
Mean of log data	5.438785	
Standard Deviation of log data	1.057281	
Variance of log data	1.117842	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.828591	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	402.5046	
MLE Standard Deviation	577.4572	
MLE Coefficient of Variation	1.43466	
MLE Skewness	7.256866	
MLE Median	230.1625	
MLE 80% Quantile	562.3855	
MLE 90% Quantile	895.508	
MLE 95% Quantile	1310.301	
MLE 99% Quantile	2691.948	
MVU Estimate of Median	199.3233	
MVU Estimate of Mean	339.5304	
MVU Estimate of Standard Deviation	332.9626	
MVU Estimate of SE of Mean	165.2793	
95% H-UCL	130939.5	
95% Chebyshev (MVUE) UCL	1059.966	
97.5% Chebyshev (MVUE) UCL	1371.699	
99% Chebyshev (MVUE) UCL	1984.039	
Non-parametric Statisitics		
95% CLT UCL	568.1406	
95% Adjusted-CLT UCL	583.2912	
95% Modified-t UCL	671.2182	
95% Jackknife UCL	668.855	
95% Chebyshev (Mean, Sd) UCL	953.9415	
97.5% Chebyshev (Mean, Sd) UCL	1222.05	
99% Chebyshev (Mean, Sd) UCL	1748.697	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	668.855	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.09	
Maximum	1.4	
Mean	0.5625	
Standard Deviation	0.618621	
Variance	0.382692	
Coefficient of Variation	1.09977	
Skewness	1.081166	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.860852	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.29042	
Gamma Statistics		
k hat	0.935394	
k star (bias corrected)	0.400515	
Theta hat	0.601351	
Theta star	1.404441	
nu hat	7.483151	
nu star	3.204121	
5% Approximate Chi Square Value	0.435173	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.420126	
Anderson-Darling 5% Critical Value	0.667564	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.322955	
Kolmogrov-Smirnov 5% Critical Value	0.403106	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4.141609	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.407946	
Maximum of log data	0.336472	
Mean of log data	-1.197393	
Standard Deviation of log data	1.372463	
Variance of log data	1.883654	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858381	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.774478	
MLE Standard Deviation	1.829062	
MLE Coefficient of Variation	2.361672	
MLE Skewness	20.25723	
MLE Median	0.30198	
MLE 80% Quantile	0.963038	
MLE 90% Quantile	1.761598	
MLE 95% Quantile	2.88726	
MLE 99% Quantile	7.351872	
MVU Estimate of Median	0.235734	
MVU Estimate of Mean	0.565333	
MVU Estimate of Standard Deviation	0.689107	
MVU Estimate of SE of Mean	0.338704	
95% H-UCL	12620.08	
95% Chebyshev (MVUE) UCL	2.04171	
97.5% Chebyshev (MVUE) UCL	2.680539	
99% Chebyshev (MVUE) UCL	3.935396	
Non-parametric Statisitics		
95% CLT UCL	1.07127	
95% Adjusted-CLT UCL	1.249934	
95% Modified-t UCL	1.318288	
95% Jacklknife UCL	1.29042	
95% Chebyshev (Mean, Sd) UCL	1.910753	
97.5% Chebyshev (Mean, Sd) UCL	2.494143	
99% Chebyshev (Mean, Sd) UCL	3.6401	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.29042	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable	Nickel	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	7.8	
Maximum	23.3	
Mean	13.775	
Standard Deviation	6.911524	
Variance	47.76917	
Coefficient of Variation	0.501744	
Skewness	1.177876	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.910527	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	21.90766	
Gamma Statistics		
k hat	5.772268	
k star (bias corrected)	1.609734	
Theta hat	2.38641	
Theta star	8.557316	
nu hat	46.17815	
nu star	12.87787	
5% Approximate Chi Square Value	5.809614	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.274569	
Anderson-Darling 5% Critical Value	0.658732	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.243178	
Kolmogrov-Smirnov 5% Critical Value	0.395742	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	30.53433	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.054124	
Maximum of log data	3.148453	
Mean of log data	2.533741	
Standard Deviation of log data	0.4804	
Variance of log data	0.230784	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.964355	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	14.14177	
MLE Standard Deviation	7.205197	
MLE Coefficient of Variation	0.509498	
MLE Skewness	1.660752	
MLE Median	12.60055	
MLE 80% Quantile	18.90977	
MLE 90% Quantile	23.3607	
MLE 95% Quantile	27.77119	
MLE 99% Quantile	38.51901	
MVU Estimate of Median	12.24018	
MVU Estimate of Mean	13.71972	
MVU Estimate of Standard Deviation	6.480471	
MVU Estimate of SE of Mean	3.238949	
95% H-UCL	50.07588	
95% Chebyshev (MVUE) UCL	27.83797	
97.5% Chebyshev (MVUE) UCL	33.94695	
99% Chebyshev (MVUE) UCL	45.94686	
Non-parametric Statisitics		
95% CLT UCL	19.45922	
95% Adjusted-CLT UCL	21.63389	
95% Modified-t UCL	22.24687	
95% Jackknife UCL	21.90766	
95% Chebyshev (Mean, Sd) UCL	28.83832	
97.5% Chebyshev (Mean, Sd) UCL	35.35623	
99% Chebyshev (Mean, Sd) UCL	48.1594	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	21.90766	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	15.8	
Maximum	102	
Mean	46.65	
Standard Deviation	38.18285	
Variance	1457.93	
Coefficient of Variation	0.818496	
Skewness	1.609438	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.852083	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	91.57906	
Gamma Statistics		
k hat	2.292902	
k star (bias corrected)	0.739892	
Theta hat	20.34539	
Theta star	63.04972	
nu hat	18.34322	
nu star	5.919138	
5% Approximate Chi Square Value	1.598194	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.290741	
Anderson-Darling 5% Critical Value	0.660216	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.253859	
Kolmogrov-Smirnov 5% Critical Value	0.397508	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	172.7749	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.76001	
Maximum of log data	4.624973	
Mean of log data	3.609036	
Standard Deviation of log data	0.778248	
Variance of log data	0.60567	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.980402	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	49.99243	
MLE Standard Deviation	45.61326	
MLE Coefficient of Variation	0.912403	
MLE Skewness	3.496768	
MLE Median	36.93045	
MLE 80% Quantile	71.28287	
MLE 90% Quantile	100.3923	
MLE 95% Quantile	132.8545	
MLE 99% Quantile	225.7079	
MVU Estimate of Median	34.19731	
MVU Estimate of Mean	45.90876	
MVU Estimate of Standard Deviation	34.23288	
MVU Estimate of SE of Mean	17.07465	
95% H-UCL	1192.34	
95% Chebyshev (MVUE) UCL	120.3354	
97.5% Chebyshev (MVUE) UCL	152.5399	
99% Chebyshev (MVUE) UCL	215.7993	
Non-parametric Statisitics		
95% CLT UCL	78.0526	
95% Adjusted-CLT UCL	94.46843	
95% Modified-t UCL	94.1396	
95% Jackknife UCL	91.57906	
95% Chebyshev (Mean, Sd) UCL	129.8676	
97.5% Chebyshev (Mean, Sd) UCL	165.8759	
99% Chebyshev (Mean, Sd) UCL	236.6073	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	91.57906	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - cb07.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	74.6	
Maximum	671	
Mean	304.4	
Standard Deviation	266.535	
Variance	71040.91	
Coefficient of Variation	0.875608	
Skewness	1.165241	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909915	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	618.0268	
Gamma Statistics		
k hat	1.703121	
k star (bias corrected)	0.592447	
Theta hat	178.7306	
Theta star	513.8012	
nu hat	13.62497	
nu star	4.739576	
5% Approximate Chi Square Value	1.033452	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.228441	
Anderson-Darling 5% Critical Value	0.661631	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.222904	
Kolmogrov-Smirnov 5% Critical Value	0.398844	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1396.026	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.312141	
Maximum of log data	6.508769	
Mean of log data	5.396901	
Standard Deviation of log data	0.956381	
Variance of log data	0.914664	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.987244	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	348.7073	
MLE Standard Deviation	426.4986	
MLE Coefficient of Variation	1.223085	
MLE Skewness	5.498912	
MLE Median	220.7213	
MLE 80% Quantile	495.24	
MLE 90% Quantile	754.3452	
MLE 95% Quantile	1064.379	
MLE 99% Quantile	2041.505	
MVU Estimate of Median	196.3372	
MVU Estimate of Mean	304.6116	
MVU Estimate of Standard Deviation	273.615	
MVU Estimate of SE of Mean	136.1092	
95% H-UCL	40205.39	
95% Chebyshev (MVUE) UCL	897.8978	
97.5% Chebyshev (MVUE) UCL	1154.613	
99% Chebyshev (MVUE) UCL	1658.881	
Non-parametric Statisitics		
95% CLT UCL	523.6055	
95% Adjusted-CLT UCL	606.5697	
95% Modified-t UCL	630.9676	
95% Jackknife UCL	618.0268	
95% Chebyshev (Mean, Sd) UCL	885.2996	
97.5% Chebyshev (Mean, Sd) UCL	1136.655	
99% Chebyshev (Mean, Sd) UCL	1630.395	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	618.0268	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	0.11	
Maximum	0.42	
Mean	0.2375	
Standard Deviation	0.13048	
Variance	0.017025	
Coefficient of Variation	0.549389	
Skewness	1.189667	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.888549	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.391033	
Gamma Statistics		
k hat	4.647311	
k star (bias corrected)	1.328494	
Theta hat	0.051105	
Theta star	0.178774	
nu hat	37.17849	
nu star	10.62795	
5% Approximate Chi Square Value	4.337058	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.347663	
Anderson-Darling 5% Critical Value	0.658977	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.291062	
Kolmogrov-Smirnov 5% Critical Value	0.395985	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.581993	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.207275	
Maximum of log data	-0.867501	
Mean of log data	-1.549018	
Standard Deviation of log data	0.547125	
Variance of log data	0.299346	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.943919	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.246759	
MLE Standard Deviation	0.145771	
MLE Coefficient of Variation	0.590742	
MLE Skewness	1.978382	
MLE Median	0.212457	
MLE 80% Quantile	0.337329	
MLE 90% Quantile	0.429145	
MLE 95% Quantile	0.52257	
MLE 99% Quantile	0.758506	
MVU Estimate of Median	0.204596	
MVU Estimate of Mean	0.237122	
MVU Estimate of Standard Deviation	0.126941	
MVU Estimate of SE of Mean	0.063429	
95% H-UCL	1.237762	
95% Chebyshev (MVUE) UCL	0.513602	
97.5% Chebyshev (MVUE) UCL	0.633235	
99% Chebyshev (MVUE) UCL	0.868231	
Non-parametric Statisitics		
95% CLT UCL	0.34481	
95% Adjusted-CLT UCL	0.386276	
95% Modified-t UCL	0.397501	
95% Jackknife UCL	0.391033	
95% Chebyshev (Mean, Sd) UCL	0.521874	
97.5% Chebyshev (Mean, Sd) UCL	0.644923	
99% Chebyshev (Mean, Sd) UCL	0.886629	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.391033	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	0.14	
Maximum	0.42	
Mean	0.245	
Standard Deviation	0.121244	
Variance	0.0147	
Coefficient of Variation	0.494872	
Skewness	1.539601	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.839545	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.387665	
Gamma Statistics		
k hat	6.242426	
k star (bias corrected)	1.727273	
Theta hat	0.039248	
Theta star	0.141842	
nu hat	49.9394	
nu star	13.81818	
5% Approximate Chi Square Value	6.445934	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.426119	
Anderson-Darling 5% Critical Value	0.65855	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.344827	
Kolmogrov-Smirnov 5% Critical Value	0.395651	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.525208	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.966113	
Maximum of log data	-0.867501	
Mean of log data	-1.488727	
Standard Deviation of log data	0.45613	
Variance of log data	0.208055	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.913179	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.250399	
MLE Standard Deviation	0.120421	
MLE Coefficient of Variation	0.480917	
MLE Skewness	1.553977	
MLE Median	0.22566	
MLE 80% Quantile	0.331775	
MLE 90% Quantile	0.405514	
MLE 95% Quantile	0.477881	
MLE 99% Quantile	0.651963	
MVU Estimate of Median	0.219837	
MVU Estimate of Mean	0.243683	
MVU Estimate of Standard Deviation	0.109466	
MVU Estimate of SE of Mean	0.054715	
95% H-UCL	0.790091	
95% Chebyshev (MVUE) UCL	0.482181	
97.5% Chebyshev (MVUE) UCL	0.585379	
99% Chebyshev (MVUE) UCL	0.788092	
Non-parametric Statisitics		
95% CLT UCL	0.344714	
95% Adjusted-CLT UCL	0.394578	
95% Modified-t UCL	0.395443	
95% Jackknife UCL	0.387665	
95% Chebyshev (Mean, Sd) UCL	0.509244	
97.5% Chebyshev (Mean, Sd) UCL	0.623583	
99% Chebyshev (Mean, Sd) UCL	0.848179	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.387665	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.045	
Maximum	0.42	
Mean	0.23375	
Standard Deviation	0.154455	
Variance	0.023856	
Coefficient of Variation	0.660769	
Skewness	-0.046857	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.989276	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.415494	
Gamma Statistics		
k hat	2.033621	
k star (bias corrected)	0.675072	
Theta hat	0.114943	
Theta star	0.346259	
nu hat	16.26897	
nu star	5.400576	
5% Approximate Chi Square Value	1.341177	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.328305	
Anderson-Darling 5% Critical Value	0.660512	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.284914	
Kolmogrov-Smirnov 5% Critical Value	0.397855	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.941251	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	-0.867501	
Mean of log data	-1.719079	
Standard Deviation of log data	0.965857	
Variance of log data	0.932879	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.881582	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.28575	
MLE Standard Deviation	0.354815	
MLE Coefficient of Variation	1.241699	
MLE Skewness	5.639568	
MLE Median	0.179231	
MLE 80% Quantile	0.40538	
MLE 90% Quantile	0.620051	
MLE 95% Quantile	0.877881	
MLE 99% Quantile	1.694696	
MVU Estimate of Median	0.15905	
MVU Estimate of Mean	0.248851	
MVU Estimate of Standard Deviation	0.225485	
MVU Estimate of SE of Mean	0.112147	
95% H-UCL	36.15615	
95% Chebyshev (MVUE) UCL	0.737688	
97.5% Chebyshev (MVUE) UCL	0.949208	
99% Chebyshev (MVUE) UCL	1.364699	
Non-parametric Statisitics		
95% CLT UCL	0.360778	
95% Adjusted-CLT UCL	0.358844	
95% Modified-t UCL	0.415192	
95% Jackknife UCL	0.415494	
95% Chebyshev (Mean, Sd) UCL	0.570376	
97.5% Chebyshev (Mean, Sd) UCL	0.716035	
99% Chebyshev (Mean, Sd) UCL	1.002152	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.415494	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.045	
Maximum	0.42	
Mean	0.1935	
Standard Deviation	0.165889	
Variance	0.027519	
Coefficient of Variation	0.857305	
Skewness	1.096114	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924813	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.388698	
Gamma Statistics		
k hat	1.7202	
k star (bias corrected)	0.596717	
Theta hat	0.112487	
Theta star	0.324274	
nu hat	13.7616	
nu star	4.773734	
5% Approximate Chi Square Value	1.048743	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.208864	
Anderson-Darling 5% Critical Value	0.661568	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.199514	
Kolmogrov-Smirnov 5% Critical Value	0.39879	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.880785	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	-0.867501	
Mean of log data	-1.960469	
Standard Deviation of log data	0.962545	
Variance of log data	0.926494	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.992642	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.223751	
MLE Standard Deviation	0.27637	
MLE Coefficient of Variation	1.235167	
MLE Skewness	5.589919	
MLE Median	0.140792	
MLE 80% Quantile	0.317551	
MLE 90% Quantile	0.485004	
MLE 95% Quantile	0.68586	
MLE 99% Quantile	1.32103	
MVU Estimate of Median	0.125044	
MVU Estimate of Mean	0.195068	
MVU Estimate of Standard Deviation	0.176217	
MVU Estimate of SE of Mean	0.087648	
95% H-UCL	27.4036	
95% Chebyshev (MVUE) UCL	0.577118	
97.5% Chebyshev (MVUE) UCL	0.742432	
99% Chebyshev (MVUE) UCL	1.067158	
Non-parametric Statisitics		
95% CLT UCL	0.329931	
95% Adjusted-CLT UCL	0.378504	
95% Modified-t UCL	0.396274	
95% Jackknife UCL	0.388698	
95% Chebyshev (Mean, Sd) UCL	0.555046	
97.5% Chebyshev (Mean, Sd) UCL	0.711487	
99% Chebyshev (Mean, Sd) UCL	1.018785	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.388698	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	0.06	
Maximum	0.42	
Mean	0.225	
Standard Deviation	0.147986	
Variance	0.0219	
Coefficient of Variation	0.657718	
Skewness	0.599833	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.931549	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.399133	
Gamma Statistics		
k hat	2.547841	
k star (bias corrected)	0.803627	
Theta hat	0.08831	
Theta star	0.279981	
nu hat	20.38272	
nu star	6.429014	
5% Approximate Chi Square Value	1.86235	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.347912	
Anderson-Darling 5% Critical Value	0.659925	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.290886	
Kolmogrov-Smirnov 5% Critical Value	0.397166	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.776722	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.813411	
Maximum of log data	-0.867501	
Mean of log data	-1.700552	
Standard Deviation of log data	0.810674	
Variance of log data	0.657192	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906982	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.25361	
MLE Standard Deviation	0.24449	
MLE Coefficient of Variation	0.964037	
MLE Skewness	3.788054	
MLE Median	0.182583	
MLE 80% Quantile	0.36221	
MLE 90% Quantile	0.517453	
MLE 95% Quantile	0.692814	
MLE 99% Quantile	1.203309	
MVU Estimate of Median	0.167949	
MVU Estimate of Mean	0.231026	
MVU Estimate of Standard Deviation	0.178837	
MVU Estimate of SE of Mean	0.089165	
95% H-UCL	7.864952	
95% Chebyshev (MVUE) UCL	0.619688	
97.5% Chebyshev (MVUE) UCL	0.787862	
99% Chebyshev (MVUE) UCL	1.118207	
Non-parametric Statisitics		
95% CLT UCL	0.346708	
95% Adjusted-CLT UCL	0.37042	
95% Modified-t UCL	0.402832	
95% Jackknife UCL	0.399133	
95% Chebyshev (Mean, Sd) UCL	0.547529	
97.5% Chebyshev (Mean, Sd) UCL	0.687088	
99% Chebyshev (Mean, Sd) UCL	0.961223	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.399133	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Phenanthrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	0.13	
Maximum	0.42	
Mean	0.2425	
Standard Deviation	0.124197	
Variance	0.015425	
Coefficient of Variation	0.512154	
Skewness	1.426729	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858254	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.388641	
Gamma Statistics		
k hat	5.686263	
k star (bias corrected)	1.588232	
Theta hat	0.042647	
Theta star	0.152685	
nu hat	45.4901	
nu star	12.70586	
5% Approximate Chi Square Value	5.694433	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.391843	
Anderson-Darling 5% Critical Value	0.658765	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.326588	
Kolmogrov-Smirnov 5% Critical Value	0.395758	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.541085	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.040221	
Maximum of log data	-0.867501	
Mean of log data	-1.507254	
Standard Deviation of log data	0.482715	
Variance of log data	0.233013	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92908	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.248889	
MLE Standard Deviation	0.127493	
MLE Coefficient of Variation	0.512248	
MLE Skewness	1.671158	
MLE Median	0.221517	
MLE 80% Quantile	0.333084	
MLE 90% Quantile	0.411904	
MLE 95% Quantile	0.490079	
MLE 99% Quantile	0.680818	
MVU Estimate of Median	0.215121	
MVU Estimate of Mean	0.241387	
MVU Estimate of Standard Deviation	0.11455	
MVU Estimate of SE of Mean	0.057252	
95% H-UCL	0.891393	
95% Chebyshev (MVUE) UCL	0.490941	
97.5% Chebyshev (MVUE) UCL	0.598924	
99% Chebyshev (MVUE) UCL	0.811034	
Non-parametric Statisitics		
95% CLT UCL	0.344643	
95% Adjusted-CLT UCL	0.391977	
95% Modified-t UCL	0.396024	
95% Jackknife UCL	0.388641	
95% Chebyshev (Mean, Sd) UCL	0.513182	
97.5% Chebyshev (Mean, Sd) UCL	0.630306	
99% Chebyshev (Mean, Sd) UCL	0.860374	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.388641	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	0.17	
Maximum	9.1	
Mean	3.415714	
Standard Deviation	3.373949	
Variance	11.38353	
Coefficient of Variation	0.987772	
Skewness	0.688341	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.896199	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	5.89372	
Gamma Statistics		
k hat	0.759008	
k star (bias corrected)	0.528957	
Theta hat	4.500236	
Theta star	6.457454	
nu hat	10.62611	
nu star	7.405396	
5% Approximate Chi Square Value	2.395084	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	1.62694	
Anderson-Darling Test Statistic	0.41785	
Anderson-Darling 5% Critical Value	0.735829	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.229796	
Kolmogrov-Smirnov 5% Critical Value	0.32255	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	10.5611	
95% Adjusted Gamma UCL	15.54741	
Lognormal Statistics		
Minimum of log data	-1.771957	
Maximum of log data	2.208274	
Mean of log data	0.440953	
Standard Deviation of log data	1.608272	
Variance of log data	2.586539	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.87993	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	5.664523	
MLE Standard Deviation	19.8531	
MLE Coefficient of Variation	3.504814	
MLE Skewness	53.5666	
MLE Median	1.554188	
MLE 80% Quantile	6.049302	
MLE 90% Quantile	12.27522	
MLE 95% Quantile	21.90162	
MLE 99% Quantile	65.48323	
MVU Estimate of Median	1.286222	
MVU Estimate of Mean	4.176229	
MVU Estimate of Standard Deviation	6.967031	
MVU Estimate of SE of Mean	2.453051	
95% H-UCL	212.1116	
95% Chebyshev (MVUE) UCL	14.86883	
97.5% Chebyshev (MVUE) UCL	19.49553	
99% Chebyshev (MVUE) UCL	28.58378	
Non-parametric Statisitics		
95% CLT UCL	5.513285	
95% Adjusted-CLT UCL	5.867792	
95% Modified-t UCL	5.949016	
95% Jackknife UCL	5.89372	
95% Chebyshev (Mean, Sd) UCL	8.974325	
97.5% Chebyshev (Mean, Sd) UCL	11.37954	
99% Chebyshev (Mean, Sd) UCL	16.10412	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	5.351629	
95% Bootstrap-t UCL	6.839204	
95% Hall's Bootstrap UCL	5.995034	
95% Percentile Bootstrap UCL	5.42	
95% BCA Bootstrap UCL	5.02	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	5.89372	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	6.4	
Maximum	288	
Mean	142.3857	
Standard Deviation	127.9853	
Variance	16380.23	
Coefficient of Variation	0.898863	
Skewness	-0.097159	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.821133	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	236.3849	
Gamma Statistics		
k hat	0.722353	
k star (bias corrected)	0.508011	
Theta hat	197.1138	
Theta star	280.2807	
nu hat	10.11294	
nu star	7.112156	
5% Approximate Chi Square Value	2.231704	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	1.498987	
Anderson-Darling Test Statistic	0.791923	
Anderson-Darling 5% Critical Value	0.737843	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.296431	
Kolmogrov-Smirnov 5% Critical Value	0.323166	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	453.7651	
95% Adjusted Gamma UCL	675.5693	
Lognormal Statistics		
Minimum of log data	1.856298	
Maximum of log data	5.66296	
Mean of log data	4.125546	
Standard Deviation of log data	1.698104	
Variance of log data	2.883558	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.789297	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	261.733	
MLE Standard Deviation	1075.266	
MLE Coefficient of Variation	4.108256	
MLE Skewness	81.66297	
MLE Median	61.90159	
MLE 80% Quantile	259.9382	
MLE 90% Quantile	548.7318	
MLE 95% Quantile	1011.235	
MLE 99% Quantile	3214.208	
MVU Estimate of Median	50.09704	
MVU Estimate of Mean	184.1229	
MVU Estimate of Standard Deviation	325.0256	
MVU Estimate of SE of Mean	113.1072	
95% H-UCL	14565.14	
95% Chebyshev (MVUE) UCL	677.1458	
97.5% Chebyshev (MVUE) UCL	890.4771	
99% Chebyshev (MVUE) UCL	1309.525	
Non-parametric Statisitics		
95% CLT UCL	221.9537	
95% Adjusted-CLT UCL	220.0555	
95% Modified-t UCL	236.0888	
95% Jackknife UCL	236.3849	
95% Chebyshev (Mean, Sd) UCL	353.2426	
97.5% Chebyshev (Mean, Sd) UCL	444.4805	
99% Chebyshev (Mean, Sd) UCL	623.6998	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	216.0487	
95% Bootstrap-t UCL	231.2317	
95% Hall's Bootstrap UCL	195.1058	
95% Percentile Bootstrap UCL	215.9571	
95% BCA Bootstrap UCL	194.9571	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	236.3849	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	10.6	
Maximum	78.4	
Mean	41.81429	
Standard Deviation	28.12226	
Variance	790.8614	
Coefficient of Variation	0.672551	
Skewness	0.162531	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.899784	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	62.46876	
Gamma Statistics		
k hat	2.093405	
k star (bias corrected)	1.291469	
Theta hat	19.9743	
Theta star	32.3773	
nu hat	29.30767	
nu star	18.08057	
5% Approximate Chi Square Value	9.447737	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	7.639129	
Anderson-Darling Test Statistic	0.384625	
Anderson-Darling 5% Critical Value	0.714648	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.184581	
Kolmogrov-Smirnov 5% Critical Value	0.31498	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	80.02193	
95% Adjusted Gamma UCL	98.96758	
Lognormal Statistics		
Minimum of log data	2.360854	
Maximum of log data	4.361824	
Mean of log data	3.475772	
Standard Deviation of log data	0.831094	
Variance of log data	0.690717	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.888438	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	45.6558	
MLE Standard Deviation	45.54486	
MLE Coefficient of Variation	0.99757	
MLE Skewness	3.985438	
MLE Median	32.32277	
MLE 80% Quantile	65.23828	
MLE 90% Quantile	94.04071	
MLE 95% Quantile	126.8394	
MLE 99% Quantile	223.385	
MVU Estimate of Median	30.75728	
MVU Estimate of Mean	43.01844	
MVU Estimate of Standard Deviation	36.2906	
MVU Estimate of SE of Mean	13.60107	
95% H-UCL	136.8722	
95% Chebyshev (MVUE) UCL	102.3041	
97.5% Chebyshev (MVUE) UCL	127.9571	
99% Chebyshev (MVUE) UCL	178.3474	
Non-parametric Statisitics		
95% CLT UCL	59.29779	
95% Adjusted-CLT UCL	59.99549	
95% Modified-t UCL	62.57759	
95% Jackknife UCL	62.46876	
95% Chebyshev (Mean, Sd) UCL	88.14596	
97.5% Chebyshev (Mean, Sd) UCL	108.1937	
99% Chebyshev (Mean, Sd) UCL	147.5736	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	58.10809	
95% Bootstrap-t UCL	63.0644	
95% Hall's Bootstrap UCL	56.63166	
95% Percentile Bootstrap UCL	58.51429	
95% BCA Bootstrap UCL	54.78571	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	62.46876	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	0.1	
Maximum	7.4	
Mean	3.26	
Standard Deviation	3.180273	
Variance	10.11413	
Coefficient of Variation	0.975544	
Skewness	0.2101	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.847689	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	5.59576	
Gamma Statistics		
k hat	0.634746	
k star (bias corrected)	0.45795	
Theta hat	5.135913	
Theta star	7.11868	
nu hat	8.886443	
nu star	6.411301	
5% Approximate Chi Square Value	1.852998	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	1.207131	
Anderson-Darling Test Statistic	0.572403	
Anderson-Darling 5% Critical Value	0.74324	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.239145	
Kolmogrov-Smirnov 5% Critical Value	0.324771	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	11.27947	
95% Adjusted Gamma UCL	17.31448	
Lognormal Statistics		
Minimum of log data	-2.302585	
Maximum of log data	2.00148	
Mean of log data	0.216282	
Standard Deviation of log data	1.851064	
Variance of log data	3.426437	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.840807	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	6.886067	
MLE Standard Deviation	37.56969	
MLE Coefficient of Variation	5.455899	
MLE Skewness	178.7725	
MLE Median	1.241452	
MLE 80% Quantile	5.93241	
MLE 90% Quantile	13.39523	
MLE 95% Quantile	26.08294	
MLE 99% Quantile	92.0062	
MVU Estimate of Median	0.964174	
MVU Estimate of Mean	4.424843	
MVU Estimate of Standard Deviation	8.544614	
MVU Estimate of SE of Mean	2.909212	
95% H-UCL	790.6508	
95% Chebyshev (MVUE) UCL	17.1058	
97.5% Chebyshev (MVUE) UCL	22.59287	
99% Chebyshev (MVUE) UCL	33.37114	
Non-parametric Statisitics		
95% CLT UCL	5.237163	
95% Adjusted-CLT UCL	5.339157	
95% Modified-t UCL	5.611669	
95% Jackknife UCL	5.59576	
95% Chebyshev (Mean, Sd) UCL	8.499527	
97.5% Chebyshev (Mean, Sd) UCL	10.76668	
99% Chebyshev (Mean, Sd) UCL	15.22005	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	5.088939	
95% Bootstrap-t UCL	5.688364	
95% Hall's Bootstrap UCL	4.639981	
95% Percentile Bootstrap UCL	5.042857	
95% BCA Bootstrap UCL	4.805714	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	5.59576	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&HOU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	3.3	
Maximum	2200	
Mean	572.8	
Standard Deviation	775.9201	
Variance	602052.1	
Coefficient of Variation	1.354609	
Skewness	1.899929	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.765785	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1142.677	
Gamma Statistics		
k hat	0.457603	
k star (bias corrected)	0.356725	
Theta hat	1251.741	
Theta star	1605.717	
nu hat	6.406436	
nu star	4.994154	
5% Approximate Chi Square Value	1.149085	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	0.688795	
Anderson-Darling Test Statistic	0.28575	
Anderson-Darling 5% Critical Value	0.758442	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.201503	
Kolmogrov-Smirnov 5% Critical Value	0.328904	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	2489.504	
95% Adjusted Gamma UCL	4153.127	
Lognormal Statistics		
Minimum of log data	1.193922	
Maximum of log data	7.696213	
Mean of log data	4.943082	
Standard Deviation of log data	2.343759	
Variance of log data	5.493208	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922876	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2185.688	
MLE Standard Deviation	34003.83	
MLE Coefficient of Variation	15.5575	
MLE Skewness	3812.141	
MLE Median	140.2017	
MLE 80% Quantile	1015.929	
MLE 90% Quantile	2849.255	
MLE 95% Quantile	6624.738	
MLE 99% Quantile	32684.83	
MVU Estimate of Median	92.67972	
MVU Estimate of Mean	948.7365	
MVU Estimate of Standard Deviation	2343.641	
MVU Estimate of SE of Mean	733.4998	
95% H-UCL	3954148	
95% Chebyshev (MVUE) UCL	4145.988	
97.5% Chebyshev (MVUE) UCL	5529.441	
99% Chebyshev (MVUE) UCL	8246.968	
Non-parametric Statisitics		
95% CLT UCL	1055.187	
95% Adjusted-CLT UCL	1280.215	
95% Modified-t UCL	1177.777	
95% Jackknife UCL	1142.677	
95% Chebyshev (Mean, Sd) UCL	1851.135	
97.5% Chebyshev (Mean, Sd) UCL	2404.272	
99% Chebyshev (Mean, Sd) UCL	3490.802	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1015.588	
95% Bootstrap-t UCL	1637.587	
95% Hall's Bootstrap UCL	2972.649	
95% Percentile Bootstrap UCL	1095.9	
95% BCA Bootstrap UCL	947.2571	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	4153.127	95% Adjusted Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	7.1	
Maximum	489	
Mean	241.9143	
Standard Deviation	217.0626	
Variance	47116.17	
Coefficient of Variation	0.897271	
Skewness	-0.063132	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.823714	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	401.3365	
Gamma Statistics		
k hat	0.7228	
k star (bias corrected)	0.508266	
Theta hat	334.6907	
Theta star	475.9596	
nu hat	10.11919	
nu star	7.115729	
5% Approximate Chi Square Value	2.233679	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	1.500526	
Anderson-Darling Test Statistic	0.654956	
Anderson-Darling 5% Critical Value	0.737816	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.259006	
Kolmogrov-Smirnov 5% Critical Value	0.323158	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	770.6555	
95% Adjusted Gamma UCL	1147.195	
Lognormal Statistics		
Minimum of log data	1.960095	
Maximum of log data	6.192362	
Mean of log data	4.656175	
Standard Deviation of log data	1.732712	
Variance of log data	3.00229	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.832669	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	472.1611	
MLE Standard Deviation	2065.217	
MLE Coefficient of Variation	4.373966	
MLE Skewness	96.80279	
MLE Median	105.2328	
MLE 80% Quantile	455.0087	
MLE 90% Quantile	975.2655	
MLE 95% Quantile	1819.807	
MLE 99% Quantile	5922.196	
MVU Estimate of Median	84.40475	
MVU Estimate of Mean	325.8093	
MVU Estimate of Standard Deviation	587.3391	
MVU Estimate of SE of Mean	203.4247	
95% H-UCL	30789.06	
95% Chebyshev (MVUE) UCL	1212.517	
97.5% Chebyshev (MVUE) UCL	1596.196	
99% Chebyshev (MVUE) UCL	2349.859	
Non-parametric Statisitics		
95% CLT UCL	376.8613	
95% Adjusted-CLT UCL	374.7695	
95% Modified-t UCL	401.0103	
95% Jackknife UCL	401.3365	
95% Chebyshev (Mean, Sd) UCL	599.5269	
97.5% Chebyshev (Mean, Sd) UCL	754.2661	
99% Chebyshev (Mean, Sd) UCL	1058.221	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	370.447	
95% Bootstrap-t UCL	408.5807	
95% Hall's Bootstrap UCL	337.6011	
95% Percentile Bootstrap UCL	372.1143	
95% BCA Bootstrap UCL	340.9429	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	401.3365	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	1.9	
Maximum	285	
Mean	116.9143	
Standard Deviation	110.9738	
Variance	12315.19	
Coefficient of Variation	0.94919	
Skewness	0.313883	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.891116	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	198.4193	
Gamma Statistics		
k hat	0.643793	
k star (bias corrected)	0.46312	
Theta hat	181.6024	
Theta star	252.4494	
nu hat	9.013097	
nu star	6.483675	
5% Approximate Chi Square Value	1.891282	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	1.236299	
Anderson-Darling Test Statistic	0.493762	
Anderson-Darling 5% Critical Value	0.742682	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.287095	
Kolmogrov-Smirnov 5% Critical Value	0.324606	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	400.8045	
95% Adjusted Gamma UCL	613.1479	
Lognormal Statistics		
Minimum of log data	0.641854	
Maximum of log data	5.652489	
Mean of log data	3.811506	
Standard Deviation of log data	1.915381	
Variance of log data	3.668683	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.866138	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	283.1132	
MLE Standard Deviation	1749.819	
MLE Coefficient of Variation	6.180634	
MLE Skewness	254.6436	
MLE Median	45.21846	
MLE 80% Quantile	228.1497	
MLE 90% Quantile	529.9431	
MLE 95% Quantile	1056.067	
MLE 99% Quantile	3892.009	
MVU Estimate of Median	34.47437	
MVU Estimate of Mean	174.3932	
MVU Estimate of Standard Deviation	348.9594	
MVU Estimate of SE of Mean	117.6454	
95% H-UCL	44909.69	
95% Chebyshev (MVUE) UCL	687.1974	
97.5% Chebyshev (MVUE) UCL	909.0882	
99% Chebyshev (MVUE) UCL	1344.95	
Non-parametric Statisitics		
95% CLT UCL	185.9063	
95% Adjusted-CLT UCL	191.2233	
95% Modified-t UCL	199.2487	
95% Jackknife UCL	198.4193	
95% Chebyshev (Mean, Sd) UCL	299.7446	
97.5% Chebyshev (Mean, Sd) UCL	378.8555	
99% Chebyshev (Mean, Sd) UCL	534.2534	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	180.9653	
95% Bootstrap-t UCL	196.0629	
95% Hall's Bootstrap UCL	183.1586	
95% Percentile Bootstrap UCL	179.4286	
95% BCA Bootstrap UCL	168.0714	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	198.4193	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	84	
Maximum	776	
Mean	387.1857	
Standard Deviation	332.4105	
Variance	110496.7	
Coefficient of Variation	0.85853	
Skewness	0.368219	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.752854	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	631.3256	
Gamma Statistics		
k hat	1.380446	
k star (bias corrected)	0.884064	
Theta hat	280.4788	
Theta star	437.9611	
nu hat	19.32624	
nu star	12.3769	
5% Approximate Chi Square Value	5.475266	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	4.172886	
Anderson-Darling Test Statistic	0.790105	
Anderson-Darling 5% Critical Value	0.722737	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.302024	
Kolmogrov-Smirnov 5% Critical Value	0.317629	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	875.2375	
95% Adjusted Gamma UCL	1148.404	
Lognormal Statistics		
Minimum of log data	4.430817	
Maximum of log data	6.654153	
Mean of log data	5.554872	
Standard Deviation of log data	1.011089	
Variance of log data	1.022301	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.810061	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	430.963	
MLE Standard Deviation	574.9088	
MLE Coefficient of Variation	1.33401	
MLE Skewness	6.376009	
MLE Median	258.4939	
MLE 80% Quantile	607.433	
MLE 90% Quantile	947.7787	
MLE 95% Quantile	1363.913	
MLE 99% Quantile	2715.318	
MVU Estimate of Median	240.1276	
MVU Estimate of Mean	392.0781	
MVU Estimate of Standard Deviation	404.5273	
MVU Estimate of SE of Mean	150.373	
95% H-UCL	2008.978	
95% Chebyshev (MVUE) UCL	1047.539	
97.5% Chebyshev (MVUE) UCL	1331.157	
99% Chebyshev (MVUE) UCL	1888.27	
Non-parametric Statisitics		
95% CLT UCL	593.8441	
95% Adjusted-CLT UCL	612.5278	
95% Modified-t UCL	634.2398	
95% Jackknife UCL	631.3256	
95% Chebyshev (Mean, Sd) UCL	934.835	
97.5% Chebyshev (Mean, Sd) UCL	1171.803	
99% Chebyshev (Mean, Sd) UCL	1637.282	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	577.3555	
95% Bootstrap-t UCL	656.5531	
95% Hall's Bootstrap UCL	502.8224	
95% Percentile Bootstrap UCL	571.4714	
95% BCA Bootstrap UCL	559.6143	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	875.2375	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	0.023	
Maximum	5.6	
Mean	1.874714	
Standard Deviation	2.099701	
Variance	4.408742	
Coefficient of Variation	1.120011	
Skewness	1.069165	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.871209	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	3.416845	
Gamma Statistics		
k hat	0.596969	
k star (bias corrected)	0.436363	
Theta hat	3.140386	
Theta star	4.296222	
nu hat	8.357572	
nu star	6.109088	
5% Approximate Chi Square Value	1.695357	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	1.087925	
Anderson-Darling Test Statistic	0.183219	
Anderson-Darling 5% Critical Value	0.745567	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.129517	
Kolmogrov-Smirnov 5% Critical Value	0.325464	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	6.755389	
95% Adjusted Gamma UCL	10.52719	
Lognormal Statistics		
Minimum of log data	-3.772261	
Maximum of log data	1.722767	
Mean of log data	-0.407339	
Standard Deviation of log data	1.978336	
Variance of log data	3.913814	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.933987	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	4.709434	
MLE Standard Deviation	32.99618	
MLE Coefficient of Variation	7.0064	
MLE Skewness	364.9609	
MLE Median	0.665418	
MLE 80% Quantile	3.540807	
MLE 90% Quantile	8.455547	
MLE 95% Quantile	17.23641	
MLE 99% Quantile	66.30536	
MVU Estimate of Median	0.497844	
MVU Estimate of Mean	2.776422	
MVU Estimate of Standard Deviation	5.746021	
MVU Estimate of SE of Mean	1.917863	
95% H-UCL	1036.253	
95% Chebyshev (MVUE) UCL	11.13619	
97.5% Chebyshev (MVUE) UCL	14.75347	
99% Chebyshev (MVUE) UCL	21.85892	
Non-parametric Statisitics		
95% CLT UCL	3.18009	
95% Adjusted-CLT UCL	3.522767	
95% Modified-t UCL	3.470296	
95% Jackknife UCL	3.416845	
95% Chebyshev (Mean, Sd) UCL	5.33399	
97.5% Chebyshev (Mean, Sd) UCL	6.830821	
99% Chebyshev (Mean, Sd) UCL	9.771056	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	3.078841	
95% Bootstrap-t UCL	4.911499	
95% Hall's Bootstrap UCL	5.172464	
95% Percentile Bootstrap UCL	3.147143	
95% BCA Bootstrap UCL	2.903286	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	3.416845	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	1.6	
Maximum	22	
Mean	10.12857	
Standard Deviation	7.226505	
Variance	52.22238	
Coefficient of Variation	0.713477	
Skewness	0.637385	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955217	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	15.4361	
Gamma Statistics		
k hat	1.907431	
k star (bias corrected)	1.185199	
Theta hat	5.310059	
Theta star	8.545884	
nu hat	26.70404	
nu star	16.59278	
5% Approximate Chi Square Value	8.380705	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	6.696065	
Anderson-Darling Test Statistic	0.149079	
Anderson-Darling 5% Critical Value	0.716074	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.121383	
Kolmogrov-Smirnov 5% Critical Value	0.315462	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	20.05335	
95% Adjusted Gamma UCL	25.0985	
Lognormal Statistics		
Minimum of log data	0.470004	
Maximum of log data	3.091042	
Mean of log data	2.030887	
Standard Deviation of log data	0.896071	
Variance of log data	0.802943	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.959308	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	11.3857	
MLE Standard Deviation	12.63814	
MLE Coefficient of Variation	1.110001	
MLE Skewness	4.697635	
MLE Median	7.620842	
MLE 80% Quantile	16.24958	
MLE 90% Quantile	24.10305	
MLE 95% Quantile	33.27891	
MLE 99% Quantile	61.26129	
MVU Estimate of Median	7.193056	
MVU Estimate of Mean	10.60605	
MVU Estimate of Standard Deviation	9.665172	
MVU Estimate of SE of Mean	3.613098	
95% H-UCL	39.62879	
95% Chebyshev (MVUE) UCL	26.35518	
97.5% Chebyshev (MVUE) UCL	33.16984	
99% Chebyshev (MVUE) UCL	46.55592	
Non-parametric Statisitics		
95% CLT UCL	14.62126	
95% Adjusted-CLT UCL	15.32436	
95% Modified-t UCL	15.54577	
95% Jackknife UCL	15.4361	
95% Chebyshev (Mean, Sd) UCL	22.0343	
97.5% Chebyshev (Mean, Sd) UCL	27.18592	
99% Chebyshev (Mean, Sd) UCL	37.30528	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	14.34619	
95% Bootstrap-t UCL	17.22726	
95% Hall's Bootstrap UCL	17.14659	
95% Percentile Bootstrap UCL	14.38571	
95% BCA Bootstrap UCL	13.45714	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	15.4361	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	4.2	
Maximum	42.2	
Mean	20.17143	
Standard Deviation	14.12371	
Variance	199.479	
Coefficient of Variation	0.700184	
Skewness	0.416709	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.941829	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	30.54462	
Gamma Statistics		
k hat	1.979767	
k star (bias corrected)	1.226533	
Theta hat	10.18879	
Theta star	16.44589	
nu hat	27.71674	
nu star	17.17147	
5% Approximate Chi Square Value	8.793531	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	7.060083	
Anderson-Darling Test Statistic	0.24655	
Anderson-Darling 5% Critical Value	0.715157	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.171742	
Kolmogrov-Smirnov 5% Critical Value	0.315187	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	39.38953	
95% Adjusted Gamma UCL	49.06076	
Lognormal Statistics		
Minimum of log data	1.435085	
Maximum of log data	3.74242	
Mean of log data	2.73094	
Standard Deviation of log data	0.860018	
Variance of log data	0.739631	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.940723	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	22.21473	
MLE Standard Deviation	23.24772	
MLE Coefficient of Variation	1.0465	
MLE Skewness	4.285588	
MLE Median	15.34731	
MLE 80% Quantile	31.74246	
MLE 90% Quantile	46.34268	
MLE 95% Quantile	63.15991	
MLE 99% Quantile	113.4477	
MVU Estimate of Median	14.55239	
MVU Estimate of Mean	20.82861	
MVU Estimate of Standard Deviation	18.19796	
MVU Estimate of SE of Mean	6.812892	
95% H-UCL	71.07468	
95% Chebyshev (MVUE) UCL	50.52531	
97.5% Chebyshev (MVUE) UCL	63.3751	
99% Chebyshev (MVUE) UCL	88.61602	
Non-parametric Statisitics		
95% CLT UCL	28.95208	
95% Adjusted-CLT UCL	29.85047	
95% Modified-t UCL	30.68475	
95% Jackknife UCL	30.54462	
95% Chebyshev (Mean, Sd) UCL	43.44036	
97.5% Chebyshev (Mean, Sd) UCL	53.50884	
99% Chebyshev (Mean, Sd) UCL	73.28643	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	28.19604	
95% Bootstrap-t UCL	33.66595	
95% Hall's Bootstrap UCL	28.10073	
95% Percentile Bootstrap UCL	28.47143	
95% BCA Bootstrap UCL	26.97143	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	30.54462	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	36.4	
Maximum	1090	
Mean	575.8429	
Standard Deviation	486.5025	
Variance	236684.7	
Coefficient of Variation	0.844853	
Skewness	-0.024331	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.813999	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	933.156	
Gamma Statistics		
k hat	0.960357	
k star (bias corrected)	0.644013	
Theta hat	599.6136	
Theta star	894.1475	
nu hat	13.44499	
nu star	9.016186	
5% Approximate Chi Square Value	3.335968	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	2.38198	
Anderson-Darling Test Statistic	0.581224	
Anderson-Darling 5% Critical Value	0.72887	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.262671	
Kolmogrov-Smirnov 5% Critical Value	0.320085	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1556.342	
95% Adjusted Gamma UCL	2179.66	
Lognormal Statistics		
Minimum of log data	3.594569	
Maximum of log data	6.993933	
Mean of log data	5.7519	
Standard Deviation of log data	1.407266	
Variance of log data	1.980399	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.846543	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	847.3375	
MLE Standard Deviation	2117.603	
MLE Coefficient of Variation	2.499126	
MLE Skewness	23.106	
MLE Median	314.7881	
MLE 80% Quantile	1033.845	
MLE 90% Quantile	1920.301	
MLE 95% Quantile	3187.056	
MLE 99% Quantile	8309.888	
MVU Estimate of Median	272.5555	
MVU Estimate of Mean	683.0814	
MVU Estimate of Standard Deviation	992.0093	
MVU Estimate of SE of Mean	357.3944	
95% H-UCL	14141.01	
95% Chebyshev (MVUE) UCL	2240.927	
97.5% Chebyshev (MVUE) UCL	2915.009	
99% Chebyshev (MVUE) UCL	4239.11	
Non-parametric Statisitics		
95% CLT UCL	878.2996	
95% Adjusted-CLT UCL	876.4928	
95% Modified-t UCL	932.8742	
95% Jackknife UCL	933.156	
95% Chebyshev (Mean, Sd) UCL	1377.36	
97.5% Chebyshev (Mean, Sd) UCL	1724.177	
99% Chebyshev (Mean, Sd) UCL	2405.432	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	859.7545	
95% Bootstrap-t UCL	939.0557	
95% Hall's Bootstrap UCL	778.5736	
95% Percentile Bootstrap UCL	854.2143	
95% BCA Bootstrap UCL	780.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	933.156	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 16-tt-33.xls	
Variable:	Chromium VI	
Raw Statistics		
Number of Observations	7	
Number of Missing Data	0	
Number of Valid Observations	7	
Number of Distinct Observations	7	
Minimum	0.00429	
Maximum	2.86	
Mean	0.74464	
Standard Deviation	1.008696	
Variance	1.017468	
Coefficient of Variation	1.354609	
Skewness	1.899929	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.765785	
Shapiro-Wilk 5% Critical Value	0.803	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.48548	
Gamma Statistics		
k hat	0.457603	
k star (bias corrected)	0.356725	
Theta hat	1.627264	
Theta star	2.087433	
nu hat	6.406436	
nu star	4.994154	
5% Approximate Chi Square Value	1.149085	
Adjusted Level of Significance	0.01584	
Adjusted Chi Square Value	0.688795	
Anderson-Darling Test Statistic	0.28575	
Anderson-Darling 5% Critical Value	0.758442	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.201503	
Kolmogrov-Smirnov 5% Critical Value	0.328904	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	3.236355	
95% Adjusted Gamma UCL	5.399066	
Lognormal Statistics		
Minimum of log data	-5.451469	
Maximum of log data	1.050822	
Mean of log data	-1.702309	
Standard Deviation of log data	2.343759	
Variance of log data	5.493208	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922876	
Shapiro-Wilk 5% Critical Value	0.803	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.841395	
MLE Standard Deviation	44.20499	
MLE Coefficient of Variation	15.5575	
MLE Skewness	3812.141	
MLE Median	0.182262	
MLE 80% Quantile	1.320708	
MLE 90% Quantile	3.704031	
MLE 95% Quantile	8.61216	
MLE 99% Quantile	42.49028	
MVU Estimate of Median	0.120484	
MVU Estimate of Mean	1.233357	
MVU Estimate of Standard Deviation	3.046733	
MVU Estimate of SE of Mean	0.95355	
95% H-UCL	5140.392	
95% Chebyshev (MVUE) UCL	5.389784	
97.5% Chebyshev (MVUE) UCL	7.188274	
99% Chebyshev (MVUE) UCL	10.72106	
Non-parametric Statisitics		
95% CLT UCL	1.371743	
95% Adjusted-CLT UCL	1.664279	
95% Modified-t UCL	1.53111	
95% Jackknife UCL	1.48548	
95% Chebyshev (Mean, Sd) UCL	2.406476	
97.5% Chebyshev (Mean, Sd) UCL	3.125554	
99% Chebyshev (Mean, Sd) UCL	4.538043	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.321768	
95% Bootstrap-t UCL	2.17995	
95% Hall's Bootstrap UCL	3.864634	
95% Percentile Bootstrap UCL	1.388029	
95% BCA Bootstrap UCL	1.231137	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	5.399066	95% Adjusted Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.04	
Maximum	1	
Mean	0.2122	
Standard Deviation	0.284563	
Variance	0.080976	
Coefficient of Variation	1.341014	
Skewness	2.860483	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.57721	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.377156	
Gamma Statistics		
k hat	1.240964	
k star (bias corrected)	0.935341	
Theta hat	0.170996	
Theta star	0.226869	
nu hat	24.81928	
nu star	18.70683	
5% Approximate Chi Square Value	9.902189	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	8.809518	
Anderson-Darling Test Statistic	0.797999	
Anderson-Darling 5% Critical Value	0.743913	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.276267	
Kolmogrov-Smirnov 5% Critical Value	0.272483	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.40088	
95% Adjusted Gamma UCL	0.450602	
Lognormal Statistics		
Minimum of log data	-3.218876	
Maximum of log data	0	
Mean of log data	-2.004442	
Standard Deviation of log data	0.895518	
Variance of log data	0.801952	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92478	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.201198	
MLE Standard Deviation	0.223129	
MLE Coefficient of Variation	1.109004	
MLE Skewness	4.690965	
MLE Median	0.134735	
MLE 80% Quantile	0.287156	
MLE 90% Quantile	0.425836	
MLE 95% Quantile	0.587832	
MLE 99% Quantile	1.081699	
MVU Estimate of Median	0.129421	
MVU Estimate of Mean	0.191168	
MVU Estimate of Standard Deviation	0.181494	
MVU Estimate of SE of Mean	0.056472	
95% H-UCL	0.477181	
95% Chebyshev (MVUE) UCL	0.437322	
97.5% Chebyshev (MVUE) UCL	0.543833	
99% Chebyshev (MVUE) UCL	0.753053	
Non-parametric Statisitics		
95% CLT UCL	0.360215	
95% Adjusted-CLT UCL	0.447191	
95% Modified-t UCL	0.390722	
95% Jackknife UCL	0.377156	
95% Chebyshev (Mean, Sd) UCL	0.604443	
97.5% Chebyshev (Mean, Sd) UCL	0.774167	
99% Chebyshev (Mean, Sd) UCL	1.107557	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.352406	
95% Bootstrap-t UCL	0.867963	
95% Hall's Bootstrap UCL	0.930438	
95% Percentile Bootstrap UCL	0.3842	
95% BCA Bootstrap UCL	0.4709	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	0.477181	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.045	
Maximum	1.1	
Mean	0.209	
Standard Deviation	0.320745	
Variance	0.102878	
Coefficient of Variation	1.534667	
Skewness	2.900714	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.545041	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.39493	
Gamma Statistics		
k hat	1.017167	
k star (bias corrected)	0.778684	
Theta hat	0.205473	
Theta star	0.268402	
nu hat	20.34335	
nu star	15.57368	
5% Approximate Chi Square Value	7.661046	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.718906	
Anderson-Darling Test Statistic	1.033923	
Anderson-Darling 5% Critical Value	0.74796	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.293841	
Kolmogrov-Smirnov 5% Critical Value	0.27366	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.424863	
95% Adjusted Gamma UCL	0.484439	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	0.09531	
Mean of log data	-2.131768	
Standard Deviation of log data	0.96641	
Variance of log data	0.933948	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.864346	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.18923	
MLE Standard Deviation	0.235173	
MLE Coefficient of Variation	1.242794	
MLE Skewness	5.647921	
MLE Median	0.118627	
MLE 80% Quantile	0.268434	
MLE 90% Quantile	0.410684	
MLE 95% Quantile	0.58157	
MLE 99% Quantile	1.12311	
MVU Estimate of Median	0.113192	
MVU Estimate of Mean	0.177942	
MVU Estimate of Standard Deviation	0.183864	
MVU Estimate of SE of Mean	0.056932	
95% H-UCL	0.502944	
95% Chebyshev (MVUE) UCL	0.426102	
97.5% Chebyshev (MVUE) UCL	0.533481	
99% Chebyshev (MVUE) UCL	0.744407	
Non-parametric Statisitics		
95% CLT UCL	0.375835	
95% Adjusted-CLT UCL	0.475249	
95% Modified-t UCL	0.410437	
95% Jackknife UCL	0.39493	
95% Chebyshev (Mean, Sd) UCL	0.651117	
97.5% Chebyshev (Mean, Sd) UCL	0.842421	
99% Chebyshev (Mean, Sd) UCL	1.218202	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.366483	
95% Bootstrap-t UCL	1.045179	
95% Hall's Bootstrap UCL	0.955371	
95% Percentile Bootstrap UCL	0.3884	
95% BCA Bootstrap UCL	0.526	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	0.502944	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.076	
Maximum	2.3	
Mean	0.3961	
Standard Deviation	0.671834	
Variance	0.451361	
Coefficient of Variation	1.696122	
Skewness	3.111463	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.455334	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.78555	
Gamma Statistics		
k hat	1.002657	
k star (bias corrected)	0.768527	
Theta hat	0.39505	
Theta star	0.515402	
nu hat	20.05315	
nu star	15.37054	
5% Approximate Chi Square Value	7.518782	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.586873	
Anderson-Darling Test Statistic	1.635025	
Anderson-Darling 5% Critical Value	0.748222	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.406156	
Kolmogrov-Smirnov 5% Critical Value	0.273736	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.809741	
95% Adjusted Gamma UCL	0.924303	
Lognormal Statistics		
Minimum of log data	-2.577022	
Maximum of log data	0.832909	
Mean of log data	-1.501595	
Standard Deviation of log data	0.913493	
Variance of log data	0.83447	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.780002	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.338118	
MLE Standard Deviation	0.386046	
MLE Coefficient of Variation	1.14175	
MLE Skewness	4.913625	
MLE Median	0.222774	
MLE 80% Quantile	0.482057	
MLE 90% Quantile	0.720538	
MLE 95% Quantile	1.001101	
MLE 99% Quantile	1.864867	
MVU Estimate of Median	0.213637	
MVU Estimate of Mean	0.320459	
MVU Estimate of Standard Deviation	0.311006	
MVU Estimate of SE of Mean	0.096657	
95% H-UCL	0.824804	
95% Chebyshev (MVUE) UCL	0.741777	
97.5% Chebyshev (MVUE) UCL	0.924082	
99% Chebyshev (MVUE) UCL	1.282185	
Non-parametric Statisitics		
95% CLT UCL	0.745553	
95% Adjusted-CLT UCL	0.968914	
95% Modified-t UCL	0.820389	
95% Jackknife UCL	0.78555	
95% Chebyshev (Mean, Sd) UCL	1.322159	
97.5% Chebyshev (Mean, Sd) UCL	1.722866	
99% Chebyshev (Mean, Sd) UCL	2.509976	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.727962	
95% Bootstrap-t UCL	3.222918	
95% Hall's Bootstrap UCL	2.990218	
95% Percentile Bootstrap UCL	0.8151	
95% BCA Bootstrap UCL	1.043	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1.322159	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&HOU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.069	
Maximum	2.1	
Mean	0.3614	
Standard Deviation	0.614174	
Variance	0.37721	
Coefficient of Variation	1.69943	
Skewness	3.099236	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.464703	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.717425	
Gamma Statistics		
k hat	0.988331	
k star (bias corrected)	0.758498	
Theta hat	0.365667	
Theta star	0.476468	
nu hat	19.76662	
nu star	15.16997	
5% Approximate Chi Square Value	7.378726	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.456981	
Anderson-Darling Test Statistic	1.511272	
Anderson-Darling 5% Critical Value	0.748676	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.385499	
Kolmogrov-Smirnov 5% Critical Value	0.273854	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.743005	
95% Adjusted Gamma UCL	0.84907	
Lognormal Statistics		
Minimum of log data	-2.673649	
Maximum of log data	0.741937	
Mean of log data	-1.602608	
Standard Deviation of log data	0.923479	
Variance of log data	0.852814	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.802112	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.308448	
MLE Standard Deviation	0.357885	
MLE Coefficient of Variation	1.160276	
MLE Skewness	5.042839	
MLE Median	0.201371	
MLE 80% Quantile	0.439434	
MLE 90% Quantile	0.659722	
MLE 95% Quantile	0.919905	
MLE 99% Quantile	1.725307	
MVU Estimate of Median	0.192932	
MVU Estimate of Mean	0.291921	
MVU Estimate of Standard Deviation	0.286747	
MVU Estimate of SE of Mean	0.089059	
95% H-UCL	0.764441	
95% Chebyshev (MVUE) UCL	0.680119	
97.5% Chebyshev (MVUE) UCL	0.848093	
99% Chebyshev (MVUE) UCL	1.178045	
Non-parametric Statisitics		
95% CLT UCL	0.680862	
95% Adjusted-CLT UCL	0.88425	
95% Modified-t UCL	0.74915	
95% Jackknife UCL	0.717425	
95% Chebyshev (Mean, Sd) UCL	1.20798	
97.5% Chebyshev (Mean, Sd) UCL	1.574296	
99% Chebyshev (Mean, Sd) UCL	2.293853	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.668391	
95% Bootstrap-t UCL	2.715538	
95% Hall's Bootstrap UCL	2.292066	
95% Percentile Bootstrap UCL	0.7419	
95% BCA Bootstrap UCL	0.9475	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1.20798	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	6	
Minimum	0.08	
Maximum	0.26	
Mean	0.205	
Standard Deviation	0.050662	
Variance	0.002567	
Coefficient of Variation	0.247133	
Skewness	-1.701489	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.804436	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.234368	
Gamma Statistics		
k hat	12.40491	
k star (bias corrected)	8.750102	
Theta hat	0.016526	
Theta star	0.023428	
nu hat	248.0981	
nu star	175.002	
5% Approximate Chi Square Value	145.4018	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	140.7135	
Anderson-Darling Test Statistic	1.155753	
Anderson-Darling 5% Critical Value	0.724937	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.368326	
Kolmogrov-Smirnov 5% Critical Value	0.266519	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.246733	
95% Adjusted Gamma UCL	0.254954	
Lognormal Statistics		
Minimum of log data	-2.525729	
Maximum of log data	-1.347074	
Mean of log data	-1.625593	
Standard Deviation of log data	0.335474	
Variance of log data	0.112543	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.673303	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.208186	
MLE Standard Deviation	0.071853	
MLE Coefficient of Variation	0.345137	
MLE Skewness	1.076525	
MLE Median	0.196795	
MLE 80% Quantile	0.261292	
MLE 90% Quantile	0.302852	
MLE 95% Quantile	0.341728	
MLE 99% Quantile	0.429436	
MVU Estimate of Median	0.19569	
MVU Estimate of Mean	0.20697	
MVU Estimate of Standard Deviation	0.070064	
MVU Estimate of SE of Mean	0.022147	
95% H-UCL	0.260799	
95% Chebyshev (MVUE) UCL	0.303507	
97.5% Chebyshev (MVUE) UCL	0.345279	
99% Chebyshev (MVUE) UCL	0.427331	
Non-parametric Statisitics		
95% CLT UCL	0.231352	
95% Adjusted-CLT UCL	0.222141	
95% Modified-t UCL	0.232931	
95% Jackknife UCL	0.234368	
95% Chebyshev (Mean, Sd) UCL	0.274833	
97.5% Chebyshev (Mean, Sd) UCL	0.30505	
99% Chebyshev (Mean, Sd) UCL	0.364405	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.230411	
95% Bootstrap-t UCL	0.228009	
95% Hall's Bootstrap UCL	0.225593	
95% Percentile Bootstrap UCL	0.2275	
95% BCA Bootstrap UCL	0.2325	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.234368	95% Student's-t UCL
2nd Recommended UCL	0.232931	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.021	
Maximum	0.37	
Mean	0.1875	
Standard Deviation	0.110909	
Variance	0.012301	
Coefficient of Variation	0.591513	
Skewness	-0.242103	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915027	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.251792	
Gamma Statistics		
k hat	1.915476	
k star (bias corrected)	1.4075	
Theta hat	0.097887	
Theta star	0.133215	
nu hat	38.30951	
nu star	28.14999	
5% Approximate Chi Square Value	17.04294	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	15.55796	
Anderson-Darling Test Statistic	0.808554	
Anderson-Darling 5% Critical Value	0.736197	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.316761	
Kolmogrov-Smirnov 5% Critical Value	0.270031	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.309696	
95% Adjusted Gamma UCL	0.339256	
Lognormal Statistics		
Minimum of log data	-3.863233	
Maximum of log data	-0.994252	
Mean of log data	-1.957166	
Standard Deviation of log data	0.93641	
Variance of log data	0.876864	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.818812	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.218989	
MLE Standard Deviation	0.259421	
MLE Coefficient of Variation	1.184631	
MLE Skewness	5.216346	
MLE Median	0.141258	
MLE 80% Quantile	0.311642	
MLE 90% Quantile	0.470538	
MLE 95% Quantile	0.659172	
MLE 99% Quantile	1.247228	
MVU Estimate of Median	0.135175	
MVU Estimate of Mean	0.206864	
MVU Estimate of Standard Deviation	0.206362	
MVU Estimate of SE of Mean	0.064036	
95% H-UCL	0.554108	
95% Chebyshev (MVUE) UCL	0.485991	
97.5% Chebyshev (MVUE) UCL	0.606769	
99% Chebyshev (MVUE) UCL	0.844014	
Non-parametric Statisitics		
95% CLT UCL	0.245189	
95% Adjusted-CLT UCL	0.24232	
95% Modified-t UCL	0.251344	
95% Jackknife UCL	0.251792	
95% Chebyshev (Mean, Sd) UCL	0.340377	
97.5% Chebyshev (Mean, Sd) UCL	0.406527	
99% Chebyshev (Mean, Sd) UCL	0.536466	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.24159	
95% Bootstrap-t UCL	0.248896	
95% Hall's Bootstrap UCL	0.242273	
95% Percentile Bootstrap UCL	0.2436	
95% BCA Bootstrap UCL	0.2294	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.251792	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - 09.xls	
Variable	Phenanthrene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.062	
Maximum	1.9	
Mean	0.306	
Standard Deviation	0.563675	
Variance	0.31773	
Coefficient of Variation	1.842075	
Skewness	3.088523	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.465821	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.632752	
Gamma Statistics		
k hat	0.841504	
k star (bias corrected)	0.655719	
Theta hat	0.363635	
Theta star	0.466663	
nu hat	16.83008	
nu star	13.11439	
5% Approximate Chi Square Value	5.968625	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	5.154885	
Anderson-Darling Test Statistic	1.454101	
Anderson-Darling 5% Critical Value	0.753786	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.310461	
Kolmogrov-Smirnov 5% Critical Value	0.275164	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.67235	
95% Adjusted Gamma UCL	0.778485	
Lognormal Statistics		
Minimum of log data	-2.780621	
Maximum of log data	0.641854	
Mean of log data	-1.884818	
Standard Deviation of log data	1.009828	
Variance of log data	1.019752	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.797821	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.252854	
MLE Standard Deviation	0.336639	
MLE Coefficient of Variation	1.331356	
MLE Skewness	6.353906	
MLE Median	0.151857	
MLE 80% Quantile	0.356467	
MLE 90% Quantile	0.555888	
MLE 95% Quantile	0.799594	
MLE 99% Quantile	1.590489	
MVU Estimate of Median	0.144273	
MVU Estimate of Mean	0.236109	
MVU Estimate of Standard Deviation	0.256303	
MVU Estimate of SE of Mean	0.079094	
95% H-UCL	0.7235	
95% Chebyshev (MVUE) UCL	0.580873	
97.5% Chebyshev (MVUE) UCL	0.730052	
99% Chebyshev (MVUE) UCL	1.023086	
Non-parametric Statisitics		
95% CLT UCL	0.599195	
95% Adjusted-CLT UCL	0.785215	
95% Modified-t UCL	0.661767	
95% Jackknife UCL	0.632752	
95% Chebyshev (Mean, Sd) UCL	1.082972	
97.5% Chebyshev (Mean, Sd) UCL	1.419169	
99% Chebyshev (Mean, Sd) UCL	2.079562	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.577336	
95% Bootstrap-t UCL	2.70164	
95% Hall's Bootstrap UCL	1.830365	
95% Percentile Bootstrap UCL	0.6509	
95% BCA Bootstrap UCL	0.8424	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	2.079562	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.255	
Maximum	1.3	
Mean	0.814999	
Standard Deviation	0.3391	
Variance	0.114989	
Coefficient of Variation	0.416074	
Skewness	-0.636802	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922745	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.011569	
Gamma Statistics		
k hat	4.534134	
k star (bias corrected)	3.240561	
Theta hat	0.179747	
Theta star	0.251499	
nu hat	90.68268	
nu star	64.81121	
5% Approximate Chi Square Value	47.28487	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	44.69321	
Anderson-Darling Test Statistic	0.729943	
Anderson-Darling 5% Critical Value	0.729422	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.244606	
Kolmogrov-Smirnov 5% Critical Value	0.267612	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.117082	
95% Adjusted Gamma UCL	1.181859	
Lognormal Statistics		
Minimum of log data	-1.366492	
Maximum of log data	0.262364	
Mean of log data	-0.318877	
Standard Deviation of log data	0.558664	
Variance of log data	0.312106	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.814077	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.84974	
MLE Standard Deviation	0.514286	
MLE Coefficient of Variation	0.605227	
MLE Skewness	2.037374	
MLE Median	0.726965	
MLE 80% Quantile	1.165551	
MLE 90% Quantile	1.490343	
MLE 95% Quantile	1.822348	
MLE 99% Quantile	2.665992	
MVU Estimate of Median	0.715692	
MVU Estimate of Mean	0.835126	
MVU Estimate of Standard Deviation	0.478045	
MVU Estimate of SE of Mean	0.150731	
95% H-UCL	1.30522	
95% Chebyshev (MVUE) UCL	1.492146	
97.5% Chebyshev (MVUE) UCL	1.776439	
99% Chebyshev (MVUE) UCL	2.334878	
Non-parametric Statisitics		
95% CLT UCL	0.991381	
95% Adjusted-CLT UCL	0.968308	
95% Modified-t UCL	1.00797	
95% Jackknife UCL	1.011569	
95% Chebyshev (Mean, Sd) UCL	1.282416	
97.5% Chebyshev (Mean, Sd) UCL	1.484667	
99% Chebyshev (Mean, Sd) UCL	1.881951	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.985795	
95% Bootstrap-t UCL	0.982794	
95% Hall's Bootstrap UCL	0.96666	
95% Percentile Bootstrap UCL	0.9785	
95% BCA Bootstrap UCL	0.942499	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.011569	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	18.1	
Maximum	48.5	
Mean	29.27	
Standard Deviation	9.657243	
Variance	93.26233	
Coefficient of Variation	0.329937	
Skewness	0.954765	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.902903	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	34.86812	
Gamma Statistics		
k hat	11.13382	
k star (bias corrected)	7.860344	
Theta hat	2.628926	
Theta star	3.723756	
nu hat	222.6765	
nu star	157.2069	
5% Approximate Chi Square Value	129.2157	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	124.8073	
Anderson-Darling Test Statistic	0.374276	
Anderson-Darling 5% Critical Value	0.725002	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.232568	
Kolmogrov-Smirnov 5% Critical Value	0.266578	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	35.61057	
95% Adjusted Gamma UCL	36.86841	
Lognormal Statistics		
Minimum of log data	2.895912	
Maximum of log data	3.881564	
Mean of log data	3.330983	
Standard Deviation of log data	0.313616	
Variance of log data	0.098355	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.947913	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	29.37549	
MLE Standard Deviation	9.443863	
MLE Coefficient of Variation	0.321488	
MLE Skewness	0.997691	
MLE Median	27.96582	
MLE 80% Quantile	36.45172	
MLE 90% Quantile	41.84531	
MLE 95% Quantile	46.84675	
MLE 99% Quantile	58.00064	
MVU Estimate of Median	27.82857	
MVU Estimate of Mean	29.22623	
MVU Estimate of Standard Deviation	9.238708	
MVU Estimate of SE of Mean	2.920615	
95% H-UCL	36.1736	
95% Chebyshev (MVUE) UCL	41.95689	
97.5% Chebyshev (MVUE) UCL	47.46546	
99% Chebyshev (MVUE) UCL	58.28597	
Non-parametric Statisitics		
95% CLT UCL	34.2932	
95% Adjusted-CLT UCL	35.27841	
95% Modified-t UCL	35.02179	
95% Jackknife UCL	34.86812	
95% Chebyshev (Mean, Sd) UCL	42.58159	
97.5% Chebyshev (Mean, Sd) UCL	48.34153	
99% Chebyshev (Mean, Sd) UCL	59.6558	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	34.06442	
95% Bootstrap-t UCL	36.94451	
95% Hall's Bootstrap UCL	37.03663	
95% Percentile Bootstrap UCL	34.33	
95% BCA Bootstrap UCL	33.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	34.86812	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&HYOU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	6	
Maximum	73.9	
Mean	21	
Standard Deviation	19.35855	
Variance	374.7533	
Coefficient of Variation	0.921836	
Skewness	2.714351	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.633826	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	32.22179	
Gamma Statistics		
k hat	2.264515	
k star (bias corrected)	1.651827	
Theta hat	9.273508	
Theta star	12.71319	
nu hat	45.29031	
nu star	33.03655	
5% Approximate Chi Square Value	20.89362	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	19.23097	
Anderson-Darling Test Statistic	0.780293	
Anderson-Darling 5% Critical Value	0.734681	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.254439	
Kolmogrov-Smirnov 5% Critical Value	0.26945	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	33.20476	
95% Adjusted Gamma UCL	36.07553	
Lognormal Statistics		
Minimum of log data	1.791759	
Maximum of log data	4.302713	
Mean of log data	2.807766	
Standard Deviation of log data	0.664217	
Variance of log data	0.441184	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.908982	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	20.66327	
MLE Standard Deviation	15.3875	
MLE Coefficient of Variation	0.744679	
MLE Skewness	2.646994	
MLE Median	16.57286	
MLE 80% Quantile	29.05031	
MLE 90% Quantile	38.91129	
MLE 95% Quantile	49.42233	
MLE 99% Quantile	77.69057	
MVU Estimate of Median	16.21055	
MVU Estimate of Mean	20.14295	
MVU Estimate of Standard Deviation	13.83859	
MVU Estimate of SE of Mean	4.351901	
95% H-UCL	35.71449	
95% Chebyshev (MVUE) UCL	39.11245	
97.5% Chebyshev (MVUE) UCL	47.32056	
99% Chebyshev (MVUE) UCL	63.44382	
Non-parametric Statisitics		
95% CLT UCL	31.06932	
95% Adjusted-CLT UCL	36.68392	
95% Modified-t UCL	33.09755	
95% Jackknife UCL	32.22179	
95% Chebyshev (Mean, Sd) UCL	47.68392	
97.5% Chebyshev (Mean, Sd) UCL	59.23007	
99% Chebyshev (Mean, Sd) UCL	81.91025	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	30.81446	
95% Bootstrap-t UCL	56.74535	
95% Hall's Bootstrap UCL	79.83297	
95% Percentile Bootstrap UCL	32.5	
95% BCA Bootstrap UCL	29.56	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	33.20476	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.19	
Maximum	1.2	
Mean	0.485	
Standard Deviation	0.293277	
Variance	0.086011	
Coefficient of Variation	0.604694	
Skewness	1.869526	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.803539	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.655007	
Gamma Statistics		
k hat	3.962246	
k star (bias corrected)	2.840239	
Theta hat	0.122405	
Theta star	0.17076	
nu hat	79.24492	
nu star	56.80478	
5% Approximate Chi Square Value	40.47793	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	38.09383	
Anderson-Darling Test Statistic	0.439702	
Anderson-Darling 5% Critical Value	0.729495	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.209483	
Kolmogrov-Smirnov 5% Critical Value	0.267844	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.680626	
95% Adjusted Gamma UCL	0.723223	
Lognormal Statistics		
Minimum of log data	-1.660731	
Maximum of log data	0.182322	
Mean of log data	-0.855073	
Standard Deviation of log data	0.520497	
Variance of log data	0.270917	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956591	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.48694	
MLE Standard Deviation	0.271627	
MLE Coefficient of Variation	0.557823	
MLE Skewness	1.847045	
MLE Median	0.425252	
MLE 80% Quantile	0.660174	
MLE 90% Quantile	0.83008	
MLE 95% Quantile	1.001146	
MLE 99% Quantile	1.427042	
MVU Estimate of Median	0.419524	
MVU Estimate of Mean	0.479756	
MVU Estimate of Standard Deviation	0.255074	
MVU Estimate of SE of Mean	0.080482	
95% H-UCL	0.719339	
95% Chebyshev (MVUE) UCL	0.830567	
97.5% Chebyshev (MVUE) UCL	0.982363	
99% Chebyshev (MVUE) UCL	1.280538	
Non-parametric Statisitics		
95% CLT UCL	0.637547	
95% Adjusted-CLT UCL	0.696133	
95% Modified-t UCL	0.664145	
95% Jackknife UCL	0.655007	
95% Chebyshev (Mean, Sd) UCL	0.889254	
97.5% Chebyshev (Mean, Sd) UCL	1.064175	
99% Chebyshev (Mean, Sd) UCL	1.407773	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.63174	
95% Bootstrap-t UCL	0.869514	
95% Hall's Bootstrap UCL	1.531159	
95% Percentile Bootstrap UCL	0.64	
95% BCA Bootstrap UCL	0.6165	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.680626	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	9.3	
Maximum	91.8	
Mean	44.64	
Standard Deviation	24.59504	
Variance	604.916	
Coefficient of Variation	0.550964	
Skewness	0.673314	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.954883	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	58.89728	
Gamma Statistics		
k hat	3.208709	
k star (bias corrected)	2.312763	
Theta hat	13.91214	
Theta star	19.30159	
nu hat	64.17417	
nu star	46.25525	
5% Approximate Chi Square Value	31.64772	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	29.56066	
Anderson-Darling Test Statistic	0.202979	
Anderson-Darling 5% Critical Value	0.731598	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.162636	
Kolmogrov-Smirnov 5% Critical Value	0.268319	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	65.24434	
95% Adjusted Gamma UCL	69.85075	
Lognormal Statistics		
Minimum of log data	2.230014	
Maximum of log data	4.519612	
Mean of log data	3.634786	
Standard Deviation of log data	0.653929	
Variance of log data	0.427623	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.94099	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	46.9272	
MLE Standard Deviation	34.27961	
MLE Coefficient of Variation	0.730485	
MLE Skewness	2.581248	
MLE Median	37.89373	
MLE 80% Quantile	65.84845	
MLE 90% Quantile	87.80204	
MLE 95% Quantile	111.1076	
MLE 99% Quantile	173.4388	
MVU Estimate of Median	37.09057	
MVU Estimate of Mean	45.78592	
MVU Estimate of Standard Deviation	30.93845	
MVU Estimate of SE of Mean	9.732412	
95% H-UCL	80.12684	
95% Chebyshev (MVUE) UCL	88.20852	
97.5% Chebyshev (MVUE) UCL	106.5648	
99% Chebyshev (MVUE) UCL	142.6222	
Non-parametric Statisitics		
95% CLT UCL	57.43307	
95% Adjusted-CLT UCL	59.20255	
95% Modified-t UCL	59.17328	
95% Jackknife UCL	58.89728	
95% Chebyshev (Mean, Sd) UCL	78.54192	
97.5% Chebyshev (Mean, Sd) UCL	93.21131	
99% Chebyshev (Mean, Sd) UCL	122.0265	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	56.87261	
95% Bootstrap-t UCL	62.01817	
95% Hall's Bootstrap UCL	69.67695	
95% Percentile Bootstrap UCL	56.54	
95% BCA Bootstrap UCL	62.75	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	58.89728	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	4.2	
Maximum	102	
Mean	46.71	
Standard Deviation	28.28146	
Variance	799.841	
Coefficient of Variation	0.605469	
Skewness	0.529678	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.97559	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	63.10423	
Gamma Statistics		
k hat	2.115066	
k star (bias corrected)	1.547213	
Theta hat	22.08441	
Theta star	30.18977	
nu hat	42.30133	
nu star	30.94426	
5% Approximate Chi Square Value	19.23465	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	17.64639	
Anderson-Darling Test Statistic	0.303514	
Anderson-Darling 5% Critical Value	0.735189	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.175552	
Kolmogrov-Smirnov 5% Critical Value	0.269654	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	75.14597	
95% Adjusted Gamma UCL	81.90947	
Lognormal Statistics		
Minimum of log data	1.435085	
Maximum of log data	4.624973	
Mean of log data	3.589311	
Standard Deviation of log data	0.897206	
Variance of log data	0.804979	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.860718	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	54.15228	
MLE Standard Deviation	60.21991	
MLE Coefficient of Variation	1.112048	
MLE Skewness	4.711356	
MLE Median	36.20911	
MLE 80% Quantile	77.28114	
MLE 90% Quantile	114.6886	
MLE 95% Quantile	158.4145	
MLE 99% Quantile	291.8419	
MVU Estimate of Median	34.7755	
MVU Estimate of Mean	51.44088	
MVU Estimate of Standard Deviation	48.9395	
MVU Estimate of SE of Mean	15.22579	
95% H-UCL	128.7711	
95% Chebyshev (MVUE) UCL	117.8085	
97.5% Chebyshev (MVUE) UCL	146.5259	
99% Chebyshev (MVUE) UCL	202.9355	
Non-parametric Statisitics		
95% CLT UCL	61.42056	
95% Adjusted-CLT UCL	63.0212	
95% Modified-t UCL	63.3539	
95% Jackknife UCL	63.10423	
95% Chebyshev (Mean, Sd) UCL	85.6933	
97.5% Chebyshev (Mean, Sd) UCL	102.5614	
99% Chebyshev (Mean, Sd) UCL	135.6955	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	60.87235	
95% Bootstrap-t UCL	65.01623	
95% Hall's Bootstrap UCL	66.5194	
95% Percentile Bootstrap UCL	61.73	
95% BCA Bootstrap UCL	67.77	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	63.10423	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	2.4	
Maximum	86.8	
Mean	30.21	
Standard Deviation	23.11909	
Variance	534.4921	
Coefficient of Variation	0.765279	
Skewness	1.738054	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.847756	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	43.6117	
Gamma Statistics		
k hat	1.809111	
k star (bias corrected)	1.333044	
Theta hat	16.69881	
Theta star	22.66241	
nu hat	36.18222	
nu star	26.66089	
5% Approximate Chi Square Value	15.88737	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	14.45947	
Anderson-Darling Test Statistic	0.329381	
Anderson-Darling 5% Critical Value	0.736973	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.1587	
Kolmogrov-Smirnov 5% Critical Value	0.27031	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	50.69595	
95% Adjusted Gamma UCL	55.70229	
Lognormal Statistics		
Minimum of log data	0.875469	
Maximum of log data	4.463607	
Mean of log data	3.107022	
Standard Deviation of log data	0.940876	
Variance of log data	0.885248	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.88266	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	34.80099	
MLE Standard Deviation	41.5225	
MLE Coefficient of Variation	1.193141	
MLE Skewness	5.277963	
MLE Median	22.35437	
MLE 80% Quantile	49.50444	
MLE 90% Quantile	74.89206	
MLE 95% Quantile	105.0843	
MLE 99% Quantile	199.4373	
MVU Estimate of Median	21.38265	
MVU Estimate of Mean	32.85246	
MVU Estimate of Standard Deviation	32.94671	
MVU Estimate of SE of Mean	10.22046	
95% H-UCL	88.69591	
95% Chebyshev (MVUE) UCL	77.40242	
97.5% Chebyshev (MVUE) UCL	96.67922	
99% Chebyshev (MVUE) UCL	134.5448	
Non-parametric Statisitics		
95% CLT UCL	42.23536	
95% Adjusted-CLT UCL	46.52888	
95% Modified-t UCL	44.2814	
95% Jackknife UCL	43.6117	
95% Chebyshev (Mean, Sd) UCL	62.07746	
97.5% Chebyshev (Mean, Sd) UCL	75.86654	
99% Chebyshev (Mean, Sd) UCL	102.9525	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	41.97113	
95% Bootstrap-t UCL	52.2262	
95% *Hall's Bootstrap* UCL	101.8814	
95% Percentile Bootstrap UCL	42.23	
95% BCA Bootstrap UCL	40.83	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	43.6117	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Sed stat - 09.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	43.2	
Maximum	2640	
Mean	364.82	
Standard Deviation	801.4987	
Variance	642400.2	
Coefficient of Variation	2.19697	
Skewness	3.131973	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.429492	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	829.4337	
Gamma Statistics		
k hat	0.62661	
k star (bias corrected)	0.505293	
Theta hat	582.2126	
Theta star	721.9964	
nu hat	12.53219	
nu star	10.10587	
5% Approximate Chi Square Value	4.007189	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	3.366598	
Anderson-Darling Test Statistic	1.731082	
Anderson-Darling 5% Critical Value	0.766851	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.362474	
Kolmogrov-Smirnov 5% Critical Value	0.278384	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	920.0521	
95% Adjusted Gamma UCL	1095.118	
Lognormal Statistics		
Minimum of log data	3.76584	
Maximum of log data	7.878534	
Mean of log data	4.91959	
Standard Deviation of log data	1.156303	
Variance of log data	1.337037	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.778515	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	267.2296	
MLE Standard Deviation	447.7785	
MLE Coefficient of Variation	1.675632	
MLE Skewness	9.731641	
MLE Median	136.9465	
MLE 80% Quantile	363.8225	
MLE 90% Quantile	605.1276	
MLE 95% Quantile	917.5513	
MLE 99% Quantile	2016.565	
MVU Estimate of Median	128.0379	
MVU Estimate of Mean	242.7102	
MVU Estimate of Standard Deviation	307.4754	
MVU Estimate of SE of Mean	93.58756	
95% H-UCL	1003.365	
95% Chebyshev (MVUE) UCL	650.6489	
97.5% Chebyshev (MVUE) UCL	827.1644	
99% Chebyshev (MVUE) UCL	1173.895	
Non-parametric Statisitics		
95% CLT UCL	781.7183	
95% Adjusted-CLT UCL	1049.944	
95% Modified-t UCL	871.2716	
95% Jackknife UCL	829.4337	
95% Chebyshev (Mean, Sd) UCL	1469.61	
97.5% Chebyshev (Mean, Sd) UCL	1947.653	
99% Chebyshev (Mean, Sd) UCL	2886.677	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	764.1891	
95% Bootstrap-t UCL	5869.552	
95% Hall's Bootstrap UCL	3363.569	
95% Percentile Bootstrap UCL	861.38	
95% BCA Bootstrap UCL	657.76	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	2886.677	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.0245	
Maximum	0.68	
Mean	0.25815	
Standard Deviation	0.219144	
Variance	0.048024	
Coefficient of Variation	0.8489	
Skewness	0.780688	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.908802	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.385183	
Gamma Statistics		
k hat	1.094118	
k star (bias corrected)	0.832549	
Theta hat	0.235944	
Theta star	0.310072	
nu hat	21.88235	
nu star	16.65098	
5% Approximate Chi Square Value	8.422089	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	7.426705	
Anderson-Darling Test Statistic	0.502461	
Anderson-Darling 5% Critical Value	0.746568	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.209607	
Kolmogrov-Smirnov 5% Critical Value	0.273255	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.510378	
95% Adjusted Gamma UCL	0.578783	
Lognormal Statistics		
Minimum of log data	-3.709082	
Maximum of log data	-0.385662	
Mean of log data	-1.876381	
Standard Deviation of log data	1.259728	
Variance of log data	1.586914	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.846829	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.338604	
MLE Standard Deviation	0.667714	
MLE Coefficient of Variation	1.971963	
MLE Skewness	13.58414	
MLE Median	0.153143	
MLE 80% Quantile	0.444009	
MLE 90% Quantile	0.77288	
MLE 95% Quantile	1.21637	
MLE 99% Quantile	2.868374	
MVU Estimate of Median	0.141379	
MVU Estimate of Mean	0.300327	
MVU Estimate of Standard Deviation	0.420391	
MVU Estimate of SE of Mean	0.12643	
95% H-UCL	1.574841	
95% Chebyshev (MVUE) UCL	0.851423	
97.5% Chebyshev (MVUE) UCL	1.089882	
99% Chebyshev (MVUE) UCL	1.55829	
Non-parametric Statisitics		
95% CLT UCL	0.372137	
95% Adjusted-CLT UCL	0.390418	
95% Modified-t UCL	0.388035	
95% Jackknife UCL	0.385183	
95% Chebyshev (Mean, Sd) UCL	0.560219	
97.5% Chebyshev (Mean, Sd) UCL	0.690924	
99% Chebyshev (Mean, Sd) UCL	0.947669	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.365223	
95% Bootstrap-t UCL	0.428245	
95% Hall's Bootstrap UCL	0.443825	
95% Percentile Bootstrap UCL	0.37915	
95% BCA Bootstrap UCL	0.415	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.385183	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	5.7	
Maximum	12.5	
Mean	8.01	
Standard Deviation	2.532653	
Variance	6.414333	
Coefficient of Variation	0.316186	
Skewness	0.850633	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.837419	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	9.478131	
Gamma Statistics		
k hat	12.17064	
k star (bias corrected)	8.586116	
Theta hat	0.658141	
Theta star	0.932901	
nu hat	243.4128	
nu star	171.7223	
5% Approximate Chi Square Value	142.4122	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	137.7744	
Anderson-Darling Test Statistic	0.7012	
Anderson-Darling 5% Critical Value	0.724949	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.260528	
Kolmogrov-Smirnov 5% Critical Value	0.26653	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	9.65855	
95% Adjusted Gamma UCL	9.98368	
Lognormal Statistics		
Minimum of log data	1.740466	
Maximum of log data	2.525729	
Mean of log data	2.039046	
Standard Deviation of log data	0.298154	
Variance of log data	0.088896	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858292	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	8.032486	
MLE Standard Deviation	2.449142	
MLE Coefficient of Variation	0.304905	
MLE Skewness	0.94306	
MLE Median	7.683276	
MLE 80% Quantile	9.884682	
MLE 90% Quantile	11.27034	
MLE 95% Quantile	12.54735	
MLE 99% Quantile	15.37207	
MVU Estimate of Median	7.649188	
MVU Estimate of Mean	7.995708	
MVU Estimate of Standard Deviation	2.401108	
MVU Estimate of SE of Mean	0.759101	
95% H-UCL	9.77459	
95% Chebyshev (MVUE) UCL	11.30455	
97.5% Chebyshev (MVUE) UCL	12.73629	
99% Chebyshev (MVUE) UCL	15.54866	
Non-parametric Statisitics		
95% CLT UCL	9.327356	
95% Adjusted-CLT UCL	9.557552	
95% Modified-t UCL	9.514037	
95% Jackknife UCL	9.478131	
95% Chebyshev (Mean, Sd) UCL	11.50102	
97.5% Chebyshev (Mean, Sd) UCL	13.01159	
99% Chebyshev (Mean, Sd) UCL	15.97881	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	9.25573	
95% Bootstrap-t UCL	9.983131	
95% Hall's Bootstrap UCL	9.25652	
95% Percentile Bootstrap UCL	9.4	
95% BCA Bootstrap UCL	9.77	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	9.65855	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.26	
Maximum	2.4	
Mean	0.916	
Standard Deviation	0.646498	
Variance	0.41796	
Coefficient of Variation	0.705784	
Skewness	1.417515	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.874335	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.290763	
Gamma Statistics		
k hat	2.527244	
k star (bias corrected)	1.835737	
Theta hat	0.36245	
Theta star	0.498982	
nu hat	50.54487	
nu star	36.71474	
5% Approximate Chi Square Value	23.84246	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	22.05444	
Anderson-Darling Test Statistic	0.203432	
Anderson-Darling 5% Critical Value	0.733787	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.143553	
Kolmogrov-Smirnov 5% Critical Value	0.269093	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.410538	
95% Adjusted Gamma UCL	1.524895	
Lognormal Statistics		
Minimum of log data	-1.347074	
Maximum of log data	0.875469	
Mean of log data	-0.298439	
Standard Deviation of log data	0.68726	
Variance of log data	0.472326	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.981565	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.939623	
MLE Standard Deviation	0.730082	
MLE Coefficient of Variation	0.776994	
MLE Skewness	2.80007	
MLE Median	0.741975	
MLE 80% Quantile	1.32617	
MLE 90% Quantile	1.794434	
MLE 95% Quantile	2.298147	
MLE 99% Quantile	3.669762	
MVU Estimate of Median	0.724621	
MVU Estimate of Mean	0.914087	
MVU Estimate of Standard Deviation	0.651228	
MVU Estimate of SE of Mean	0.204644	
95% H-UCL	1.669928	
95% Chebyshev (MVUE) UCL	1.806109	
97.5% Chebyshev (MVUE) UCL	2.192087	
99% Chebyshev (MVUE) UCL	2.950267	
Non-parametric Statisitics		
95% CLT UCL	1.252275	
95% Adjusted-CLT UCL	1.350196	
95% Modified-t UCL	1.306037	
95% Jackknife UCL	1.290763	
95% Chebyshev (Mean, Sd) UCL	1.807136	
97.5% Chebyshev (Mean, Sd) UCL	2.192732	
99% Chebyshev (Mean, Sd) UCL	2.950159	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.23956	
95% Bootstrap-t UCL	1.452206	
95% Hall's Bootstrap UCL	1.717645	
95% Percentile Bootstrap UCL	1.252	
95% BCA Bootstrap UCL	1.204	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.290763	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	6.5	
Maximum	19.3	
Mean	11.34	
Standard Deviation	3.99394	
Variance	15.95156	
Coefficient of Variation	0.352199	
Skewness	0.895421	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.931609	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	13.65521	
Gamma Statistics		
k hat	9.568093	
k star (bias corrected)	6.764332	
Theta hat	1.185189	
Theta star	1.676441	
nu hat	191.3619	
nu star	135.2866	
5% Approximate Chi Square Value	109.4089	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	105.368	
Anderson-Darling Test Statistic	0.202948	
Anderson-Darling 5% Critical Value	0.725439	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.121291	
Kolmogrov-Smirnov 5% Critical Value	0.266699	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	14.02217	
95% Adjusted Gamma UCL	14.55993	
Lognormal Statistics		
Minimum of log data	1.871802	
Maximum of log data	2.960105	
Mean of log data	2.37517	
Standard Deviation of log data	0.341555	
Variance of log data	0.11666	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973765	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	11.39871	
MLE Standard Deviation	4.009646	
MLE Coefficient of Variation	0.351763	
MLE Skewness	1.098816	
MLE Median	10.75284	
MLE 80% Quantile	14.35049	
MLE 90% Quantile	16.67764	
MLE 95% Quantile	18.85972	
MLE 99% Quantile	23.79862	
MVU Estimate of Median	10.69027	
MVU Estimate of Mean	11.3296	
MVU Estimate of Standard Deviation	3.906112	
MVU Estimate of SE of Mean	1.234677	
95% H-UCL	14.34875	
95% Chebyshev (MVUE) UCL	16.71144	
97.5% Chebyshev (MVUE) UCL	19.04016	
99% Chebyshev (MVUE) UCL	23.61449	
Non-parametric Statisitics		
95% CLT UCL	13.41744	
95% Adjusted-CLT UCL	13.79957	
95% Modified-t UCL	13.71482	
95% Jackknife UCL	13.65521	
95% Chebyshev (Mean, Sd) UCL	16.84527	
97.5% Chebyshev (Mean, Sd) UCL	19.2274	
99% Chebyshev (Mean, Sd) UCL	23.90664	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	13.31183	
95% Bootstrap-t UCL	14.88728	
95% Hall's Bootstrap UCL	15.76312	
95% Percentile Bootstrap UCL	13.44	
95% BCA Bootstrap UCL	13	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	13.65521	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 09.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	57.1	
Maximum	479	
Mean	156.45	
Standard Deviation	123.7781	
Variance	15321.02	
Coefficient of Variation	0.791167	
Skewness	2.331672	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.70913	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	228.2018	
Gamma Statistics		
k hat	2.708463	
k star (bias corrected)	1.962591	
Theta hat	57.76338	
Theta star	79.71605	
nu hat	54.16927	
nu star	39.25182	
5% Approximate Chi Square Value	25.89781	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	24.02687	
Anderson-Darling Test Statistic	0.632547	
Anderson-Darling 5% Critical Value	0.733171	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.280624	
Kolmogrov-Smirnov 5% Critical Value	0.268846	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	237.1223	
95% Adjusted Gamma UCL	255.5867	
Lognormal Statistics		
Minimum of log data	4.044804	
Maximum of log data	6.171701	
Mean of log data	4.856916	
Standard Deviation of log data	0.615511	
Variance of log data	0.378854	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.918041	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	155.4529	
MLE Standard Deviation	105.5032	
MLE Coefficient of Variation	0.678682	
MLE Skewness	2.348655	
MLE Median	128.6269	
MLE 80% Quantile	216.3772	
MLE 90% Quantile	283.6803	
MLE 95% Quantile	354.0478	
MLE 99% Quantile	538.3964	
MVU Estimate of Median	126.2092	
MVU Estimate of Mean	152.1469	
MVU Estimate of Standard Deviation	96.42738	
MVU Estimate of SE of Mean	30.36545	
95% H-UCL	253.9635	
95% Chebyshev (MVUE) UCL	284.5068	
97.5% Chebyshev (MVUE) UCL	341.7791	
99% Chebyshev (MVUE) UCL	454.2793	
Non-parametric Statisitics		
95% CLT UCL	220.833	
95% Adjusted-CLT UCL	251.6714	
95% Modified-t UCL	233.012	
95% Jackknife UCL	228.2018	
95% Chebyshev (Mean, Sd) UCL	327.0663	
97.5% Chebyshev (Mean, Sd) UCL	400.8921	
99% Chebyshev (Mean, Sd) UCL	545.9087	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	215.7287	
95% Bootstrap-t UCL	373.1235	
95% Hall's Bootstrap UCL	571.4204	
95% Percentile Bootstrap UCL	221.44	
95% BCA Bootstrap UCL	214.21	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	237.1223	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	11.7	
Maximum	90.4	
Mean	38.14	
Standard Deviation	23.4761	
Variance	551.1271	
Coefficient of Variation	0.615524	
Skewness	1.111001	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.903877	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	51.74865	
Gamma Statistics		
k hat	2.932375	
k star (bias corrected)	2.119329	
Theta hat	13.00652	
Theta star	17.99626	
nu hat	58.6475	
nu star	42.38658	
5% Approximate Chi Square Value	28.4586	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	26.48876	
Anderson-Darling Test Statistic	0.291952	
Anderson-Darling 5% Critical Value	0.73241	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.151968	
Kolmogrov-Smirnov 5% Critical Value	0.268542	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	56.80617	
95% Adjusted Gamma UCL	61.03058	
Lognormal Statistics		
Minimum of log data	2.459589	
Maximum of log data	4.504244	
Mean of log data	3.461169	
Standard Deviation of log data	0.656502	
Variance of log data	0.430995	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.939397	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	39.51447	
MLE Standard Deviation	29.0045	
MLE Coefficient of Variation	0.734022	
MLE Skewness	2.597549	
MLE Median	31.8542	
MLE 80% Quantile	55.47396	
MLE 90% Quantile	74.05254	
MLE 95% Quantile	93.79539	
MLE 99% Quantile	146.6713	
MVU Estimate of Median	31.17377	
MVU Estimate of Mean	38.54503	
MVU Estimate of Standard Deviation	26.15447	
MVU Estimate of SE of Mean	8.226871	
95% H-UCL	67.6748	
95% Chebyshev (MVUE) UCL	74.40513	
97.5% Chebyshev (MVUE) UCL	89.92182	
99% Chebyshev (MVUE) UCL	120.4014	
Non-parametric Statisitics		
95% CLT UCL	50.35105	
95% Adjusted-CLT UCL	53.13795	
95% Modified-t UCL	52.18335	
95% Jackknife UCL	51.74865	
95% Chebyshev (Mean, Sd) UCL	70.49957	
97.5% Chebyshev (Mean, Sd) UCL	84.50158	
99% Chebyshev (Mean, Sd) UCL	112.0058	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	49.38966	
95% Bootstrap-t UCL	55.54236	
95% Hall's Bootstrap UCL	61.84676	
95% Percentile Bootstrap UCL	50.97	
95% BCA Bootstrap UCL	55.4	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	51.74865	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	15.9	
Maximum	54.7	
Mean	33.1	
Standard Deviation	13.36937	
Variance	178.74	
Coefficient of Variation	0.403908	
Skewness	0.069468	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924821	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	40.84997	
Gamma Statistics		
k hat	6.220926	
k star (bias corrected)	4.421315	
Theta hat	5.320751	
Theta star	7.486461	
nu hat	124.4185	
nu star	88.4263	
5% Approximate Chi Square Value	67.74264	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	64.60372	
Anderson-Darling Test Statistic	0.447792	
Anderson-Darling 5% Critical Value	0.728378	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.232247	
Kolmogrov-Smirnov 5% Critical Value	0.267235	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	43.20632	
95% Adjusted Gamma UCL	45.3056	
Lognormal Statistics		
Minimum of log data	2.766319	
Maximum of log data	4.001864	
Mean of log data	3.417012	
Standard Deviation of log data	0.441695	
Variance of log data	0.195095	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906702	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	33.6011	
MLE Standard Deviation	15.59561	
MLE Coefficient of Variation	0.46414	
MLE Skewness	1.492408	
MLE Median	30.4782	
MLE 80% Quantile	44.2672	
MLE 90% Quantile	53.76323	
MLE 95% Quantile	63.02932	
MLE 99% Quantile	85.14829	
MVU Estimate of Median	30.18207	
MVU Estimate of Mean	33.25203	
MVU Estimate of Standard Deviation	14.91636	
MVU Estimate of SE of Mean	4.711342	
95% H-UCL	46.0546	
95% Chebyshev (MVUE) UCL	53.78829	
97.5% Chebyshev (MVUE) UCL	62.67435	
99% Chebyshev (MVUE) UCL	80.12929	
Non-parametric Statisitics		
95% CLT UCL	40.05406	
95% Adjusted-CLT UCL	40.15329	
95% Modified-t UCL	40.86545	
95% Jackknife UCL	40.84997	
95% Chebyshev (Mean, Sd) UCL	51.5284	
97.5% Chebyshev (Mean, Sd) UCL	59.50239	
99% Chebyshev (Mean, Sd) UCL	75.16573	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	39.65549	
95% Bootstrap-t UCL	40.47053	
95% Hall's Bootstrap UCL	39.85463	
95% Percentile Bootstrap UCL	40.08	
95% BCA Bootstrap UCL	38.54	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	40.84997	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.06	
Maximum	1.1	
Mean	0.5565	
Standard Deviation	0.438723	
Variance	0.192478	
Coefficient of Variation	0.788362	
Skewness	0.102236	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.819965	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.81082	
Gamma Statistics		
k hat	1.294838	
k star (bias corrected)	0.973053	
Theta hat	0.429783	
Theta star	0.571911	
nu hat	25.89676	
nu star	19.46107	
5% Approximate Chi Square Value	10.45337	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	9.326286	
Anderson-Darling Test Statistic	0.750906	
Anderson-Darling 5% Critical Value	0.742939	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.271264	
Kolmogrov-Smirnov 5% Critical Value	0.272199	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.036038	
95% Adjusted Gamma UCL	1.161243	
Lognormal Statistics		
Minimum of log data	-2.813411	
Maximum of log data	0.09531	
Mean of log data	-1.019536	
Standard Deviation of log data	1.090442	
Variance of log data	1.189064	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.861775	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.653767	
MLE Standard Deviation	0.988034	
MLE Coefficient of Variation	1.511293	
MLE Skewness	7.985679	
MLE Median	0.360762	
MLE 80% Quantile	0.906547	
MLE 90% Quantile	1.464747	
MLE 95% Quantile	2.168947	
MLE 99% Quantile	4.557766	
MVU Estimate of Median	0.339829	
MVU Estimate of Mean	0.601715	
MVU Estimate of Standard Deviation	0.712628	
MVU Estimate of SE of Mean	0.218354	
95% H-UCL	2.162685	
95% Chebyshev (MVUE) UCL	1.553498	
97.5% Chebyshev (MVUE) UCL	1.965335	
99% Chebyshev (MVUE) UCL	2.77431	
Non-parametric Statisitics		
95% CLT UCL	0.784701	
95% Adjusted-CLT UCL	0.789494	
95% Modified-t UCL	0.811567	
95% Jackknife UCL	0.81082	
95% Chebyshev (Mean, Sd) UCL	1.161238	
97.5% Chebyshev (Mean, Sd) UCL	1.422909	
99% Chebyshev (Mean, Sd) UCL	1.93691	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.772847	
95% Bootstrap-t UCL	0.81314	
95% Hall's Bootstrap UCL	0.736901	
95% Percentile Bootstrap UCL	0.788	
95% BCA Bootstrap UCL	0.7335	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.036038	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	20.8	
Maximum	113	
Mean	67.41	
Standard Deviation	35.09246	
Variance	1231.481	
Coefficient of Variation	0.520582	
Skewness	-0.270861	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904705	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	87.75244	
Gamma Statistics		
k hat	3.097592	
k star (bias corrected)	2.234981	
Theta hat	21.76206	
Theta star	30.16133	
nu hat	61.95185	
nu star	44.69963	
5% Approximate Chi Square Value	30.36176	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	28.32123	
Anderson-Darling Test Statistic	0.620312	
Anderson-Darling 5% Critical Value	0.731908	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.197435	
Kolmogrov-Smirnov 5% Critical Value	0.268389	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	99.24331	
95% Adjusted Gamma UCL	106.3937	
Lognormal Statistics		
Minimum of log data	3.034953	
Maximum of log data	4.727388	
Mean of log data	4.040779	
Standard Deviation of log data	0.66835	
Variance of log data	0.446692	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.840779	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	71.10267	
MLE Standard Deviation	53.35696	
MLE Coefficient of Variation	0.750421	
MLE Skewness	2.673851	
MLE Median	56.87063	
MLE 80% Quantile	100.0365	
MLE 90% Quantile	134.2373	
MLE 95% Quantile	170.7524	
MLE 99% Quantile	269.1748	
MVU Estimate of Median	55.612	
MVU Estimate of Mean	69.28727	
MVU Estimate of Standard Deviation	47.91678	
MVU Estimate of SE of Mean	15.06674	
95% H-UCL	123.5027	
95% Chebyshev (MVUE) UCL	134.9617	
97.5% Chebyshev (MVUE) UCL	163.379	
99% Chebyshev (MVUE) UCL	219.1994	
Non-parametric Statisitics		
95% CLT UCL	85.66329	
95% Adjusted-CLT UCL	84.64765	
95% Modified-t UCL	87.59402	
95% Jackknife UCL	87.75244	
95% Chebyshev (Mean, Sd) UCL	115.7816	
97.5% Chebyshev (Mean, Sd) UCL	136.7121	
99% Chebyshev (Mean, Sd) UCL	177.8259	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	84.64558	
95% Bootstrap-t UCL	86.23952	
95% Hall's Bootstrap UCL	83.24071	
95% Percentile Bootstrap UCL	85.02	
95% BCA Bootstrap UCL	80.53	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	87.75244	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	21.9	
Maximum	185	
Mean	79.46	
Standard Deviation	56.01375	
Variance	3137.54	
Coefficient of Variation	0.70493	
Skewness	0.868314	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892112	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	111.9301	
Gamma Statistics		
k hat	2.197108	
k star (bias corrected)	1.604642	
Theta hat	36.16573	
Theta star	49.51883	
nu hat	43.94216	
nu star	32.09284	
5% Approximate Chi Square Value	20.14358	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	18.51419	
Anderson-Darling Test Statistic	0.315787	
Anderson-Darling 5% Critical Value	0.73491	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.166897	
Kolmogrov-Smirnov 5% Critical Value	0.269542	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	126.596	
95% Adjusted Gamma UCL	137.7374	
Lognormal Statistics		
Minimum of log data	3.086487	
Maximum of log data	5.220356	
Mean of log data	4.130747	
Standard Deviation of log data	0.762691	
Variance of log data	0.581698	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.929604	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	83.229	
MLE Standard Deviation	73.93215	
MLE Coefficient of Variation	0.888298	
MLE Skewness	3.365826	
MLE Median	62.22438	
MLE 80% Quantile	118.5365	
MLE 90% Quantile	165.8038	
MLE 95% Quantile	218.1917	
MLE 99% Quantile	366.7816	
MVU Estimate of Median	60.43598	
MVU Estimate of Mean	80.36632	
MVU Estimate of Standard Deviation	64.02868	
MVU Estimate of SE of Mean	20.06256	
95% H-UCL	162.9202	
95% Chebyshev (MVUE) UCL	167.817	
97.5% Chebyshev (MVUE) UCL	205.657	
99% Chebyshev (MVUE) UCL	279.9863	
Non-parametric Statisitics		
95% CLT UCL	108.5955	
95% Adjusted-CLT UCL	113.7925	
95% Modified-t UCL	112.7407	
95% Jackknife UCL	111.9301	
95% Chebyshev (Mean, Sd) UCL	156.6696	
97.5% Chebyshev (Mean, Sd) UCL	190.0783	
99% Chebyshev (Mean, Sd) UCL	255.7032	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	107.2331	
95% Bootstrap-t UCL	126.6228	
95% Hall's Bootstrap UCL	133.2518	
95% Percentile Bootstrap UCL	106.89	
95% BCA Bootstrap UCL	120.56	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	111.9301	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	31.6	
Maximum	171	
Mean	96.77	
Standard Deviation	50.7332	
Variance	2573.858	
Coefficient of Variation	0.524266	
Skewness	0.057602	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.931234	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	126.1791	
Gamma Statistics		
k hat	3.406969	
k star (bias corrected)	2.451545	
Theta hat	28.40355	
Theta star	39.47307	
nu hat	68.13938	
nu star	49.0309	
5% Approximate Chi Square Value	33.95333	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	31.78513	
Anderson-Darling Test Statistic	0.378369	
Anderson-Darling 5% Critical Value	0.731045	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.168702	
Kolmogrov-Smirnov 5% Critical Value	0.268194	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	139.7424	
95% Adjusted Gamma UCL	149.2748	
Lognormal Statistics		
Minimum of log data	3.453157	
Maximum of log data	5.141664	
Mean of log data	4.418459	
Standard Deviation of log data	0.619648	
Variance of log data	0.383963	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904892	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	100.5284	
MLE Standard Deviation	68.77874	
MLE Coefficient of Variation	0.684172	
MLE Skewness	2.372771	
MLE Median	82.96835	
MLE 80% Quantile	140.0587	
MLE 90% Quantile	183.9578	
MLE 95% Quantile	229.931	
MLE 99% Quantile	350.6398	
MVU Estimate of Median	81.38797	
MVU Estimate of Mean	98.35867	
MVU Estimate of Standard Deviation	62.77986	
MVU Estimate of SE of Mean	19.76759	
95% H-UCL	164.9997	
95% Chebyshev (MVUE) UCL	184.5236	
97.5% Chebyshev (MVUE) UCL	221.8073	
99% Chebyshev (MVUE) UCL	295.0437	
Non-parametric Statisitics		
95% CLT UCL	123.1588	
95% Adjusted-CLT UCL	123.471	
95% Modified-t UCL	126.2278	
95% Jackknife UCL	126.1791	
95% Chebyshev (Mean, Sd) UCL	166.7009	
97.5% Chebyshev (Mean, Sd) UCL	196.96	
99% Chebyshev (Mean, Sd) UCL	256.3983	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	122.2285	
95% Bootstrap-t UCL	126.4934	
95% Hall's Bootstrap UCL	122.1296	
95% Percentile Bootstrap UCL	122.98	
95% BCA Bootstrap UCL	116.99	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	126.1791	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	83.5	
Maximum	503	
Mean	294.15	
Standard Deviation	119.1125	
Variance	14187.78	
Coefficient of Variation	0.404938	
Skewness	0.048159	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.984171	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	363.1973	
Gamma Statistics		
k hat	5.448608	
k star (bias corrected)	3.880693	
Theta hat	53.98626	
Theta star	75.79833	
nu hat	108.9722	
nu star	77.61385	
5% Approximate Chi Square Value	58.3152	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	55.41648	
Anderson-Darling Test Statistic	0.286538	
Anderson-Darling 5% Critical Value	0.729056	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.158572	
Kolmogrov-Smirnov 5% Critical Value	0.267358	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	391.4951	
95% Adjusted Gamma UCL	411.9734	
Lognormal Statistics		
Minimum of log data	4.424847	
Maximum of log data	6.22059	
Mean of log data	5.589526	
Standard Deviation of log data	0.499858	
Variance of log data	0.249858	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.896005	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	303.2187	
MLE Standard Deviation	161.5455	
MLE Coefficient of Variation	0.532769	
MLE Skewness	1.749529	
MLE Median	267.6086	
MLE 80% Quantile	408.2604	
MLE 90% Quantile	508.692	
MLE 95% Quantile	608.9837	
MLE 99% Quantile	855.9351	
MVU Estimate of Median	264.2825	
MVU Estimate of Mean	299.118	
MVU Estimate of Standard Deviation	152.4849	
MVU Estimate of SE of Mean	48.12766	
95% H-UCL	438.9194	
95% Chebyshev (MVUE) UCL	508.9016	
97.5% Chebyshev (MVUE) UCL	599.6751	
99% Chebyshev (MVUE) UCL	777.9822	
Non-parametric Statisitics		
95% CLT UCL	356.1062	
95% Adjusted-CLT UCL	356.7191	
95% Modified-t UCL	363.2929	
95% Jackknife UCL	363.1973	
95% Chebyshev (Mean, Sd) UCL	458.3352	
97.5% Chebyshev (Mean, Sd) UCL	529.3783	
99% Chebyshev (Mean, Sd) UCL	668.9286	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	353.2251	
95% Bootstrap-t UCL	366.654	
95% Hall's Bootstrap UCL	367.104	
95% Percentile Bootstrap UCL	352.4	
95% BCA Bootstrap UCL	381.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	363.1973	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.1	
Maximum	1.6	
Mean	0.505	
Standard Deviation	0.459764	
Variance	0.211383	
Coefficient of Variation	0.910425	
Skewness	1.630357	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.822358	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.771517	
Gamma Statistics		
k hat	1.5288	
k star (bias corrected)	1.136827	
Theta hat	0.330324	
Theta star	0.444219	
nu hat	30.576	
nu star	22.73653	
5% Approximate Chi Square Value	12.89033	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	11.62072	
Anderson-Darling Test Statistic	0.323374	
Anderson-Darling 5% Critical Value	0.73902	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.189272	
Kolmogrov-Smirnov 5% Critical Value	0.271045	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.890742	
95% Adjusted Gamma UCL	0.988058	
Lognormal Statistics		
Minimum of log data	-2.302585	
Maximum of log data	0.470004	
Mean of log data	-1.044606	
Standard Deviation of log data	0.912847	
Variance of log data	0.833289	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.951426	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.533679	
MLE Standard Deviation	0.608692	
MLE Coefficient of Variation	1.140558	
MLE Skewness	4.905398	
MLE Median	0.35183	
MLE 80% Quantile	0.760902	
MLE 90% Quantile	1.13701	
MLE 95% Quantile	1.579371	
MLE 99% Quantile	2.940781	
MVU Estimate of Median	0.337419	
MVU Estimate of Mean	0.505852	
MVU Estimate of Standard Deviation	0.490546	
MVU Estimate of SE of Mean	0.152462	
95% H-UCL	1.300527	
95% Chebyshev (MVUE) UCL	1.17042	
97.5% Chebyshev (MVUE) UCL	1.457979	
99% Chebyshev (MVUE) UCL	2.022834	
Non-parametric Statisitics		
95% CLT UCL	0.744146	
95% Adjusted-CLT UCL	0.824239	
95% Modified-t UCL	0.78401	
95% Jackknife UCL	0.771517	
95% Chebyshev (Mean, Sd) UCL	1.138742	
97.5% Chebyshev (Mean, Sd) UCL	1.412962	
99% Chebyshev (Mean, Sd) UCL	1.951615	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.740199	
95% Bootstrap-t UCL	0.938455	
95% Hall's Bootstrap UCL	1.10309	
95% Percentile Bootstrap UCL	0.731	
95% BCA Bootstrap UCL	0.707	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.890742	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	1.25	
Maximum	12.6	
Mean	6.73	
Standard Deviation	3.954126	
Variance	15.63511	
Coefficient of Variation	0.587537	
Skewness	-0.112254	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.945658	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	9.022132	
Gamma Statistics		
k hat	2.242342	
k star (bias corrected)	1.636306	
Theta hat	3.001327	
Theta star	4.112923	
nu hat	44.84684	
nu star	32.72612	
5% Approximate Chi Square Value	20.64658	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	18.99483	
Anderson-Darling Test Statistic	0.478994	
Anderson-Darling 5% Critical Value	0.734756	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.203856	
Kolmogrov-Smirnov 5% Critical Value	0.26948	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	10.66747	
95% Adjusted Gamma UCL	11.59509	
Lognormal Statistics		
Minimum of log data	0.223144	
Maximum of log data	2.533697	
Mean of log data	1.667324	
Standard Deviation of log data	0.821453	
Variance of log data	0.674785	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.868139	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.423988	
MLE Standard Deviation	7.287661	
MLE Coefficient of Variation	0.981637	
MLE Skewness	3.890827	
MLE Median	5.29797	
MLE 80% Quantile	10.60634	
MLE 90% Quantile	15.22427	
MLE 95% Quantile	20.46291	
MLE 99% Quantile	35.80271	
MVU Estimate of Median	5.121669	
MVU Estimate of Mean	7.121221	
MVU Estimate of Standard Deviation	6.149596	
MVU Estimate of SE of Mean	1.921542	
95% H-UCL	15.76383	
95% Chebyshev (MVUE) UCL	15.49703	
97.5% Chebyshev (MVUE) UCL	19.12125	
99% Chebyshev (MVUE) UCL	26.24033	
Non-parametric Statisitics		
95% CLT UCL	8.786732	
95% Adjusted-CLT UCL	8.739304	
95% Modified-t UCL	9.014734	
95% Jackknife UCL	9.022132	
95% Chebyshev (Mean, Sd) UCL	12.18039	
97.5% Chebyshev (Mean, Sd) UCL	14.53877	
99% Chebyshev (Mean, Sd) UCL	19.17137	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.678111	
95% Bootstrap-t UCL	8.969388	
95% Hall's Bootstrap UCL	8.487765	
95% Percentile Bootstrap UCL	8.675	
95% BCA Bootstrap UCL	8.235	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	9.022132	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	9.1	
Maximum	29.6	
Mean	18.79	
Standard Deviation	7.338248	
Variance	53.84989	
Coefficient of Variation	0.39054	
Skewness	0.025053	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.929833	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	23.04384	
Gamma Statistics		
k hat	6.652585	
k star (bias corrected)	4.723476	
Theta hat	2.824466	
Theta star	3.978002	
nu hat	133.0517	
nu star	94.46953	
5% Approximate Chi Square Value	73.04878	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	69.78195	
Anderson-Darling Test Statistic	0.399951	
Anderson-Darling 5% Critical Value	0.727999	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.183557	
Kolmogrov-Smirnov 5% Critical Value	0.267166	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	24.29996	
95% Adjusted Gamma UCL	25.43756	
Lognormal Statistics		
Minimum of log data	2.208274	
Maximum of log data	3.387774	
Mean of log data	2.856287	
Standard Deviation of log data	0.42643	
Variance of log data	0.181842	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.911046	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	19.05269	
MLE Standard Deviation	8.508371	
MLE Coefficient of Variation	0.44657	
MLE Skewness	1.428769	
MLE Median	17.39682	
MLE 80% Quantile	24.94368	
MLE 90% Quantile	30.09171	
MLE 95% Quantile	35.08468	
MLE 99% Quantile	46.90683	
MVU Estimate of Median	17.23923	
MVU Estimate of Mean	18.86895	
MVU Estimate of Standard Deviation	8.163449	
MVU Estimate of SE of Mean	2.57882	
95% H-UCL	25.75953	
95% Chebyshev (MVUE) UCL	30.10977	
97.5% Chebyshev (MVUE) UCL	34.97368	
99% Chebyshev (MVUE) UCL	44.52788	
Non-parametric Statisitics		
95% CLT UCL	22.60698	
95% Adjusted-CLT UCL	22.62662	
95% Modified-t UCL	23.04691	
95% Jackknife UCL	23.04384	
95% Chebyshev (Mean, Sd) UCL	28.90508	
97.5% Chebyshev (Mean, Sd) UCL	33.28188	
99% Chebyshev (Mean, Sd) UCL	41.87926	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	22.42892	
95% Bootstrap-t UCL	23.17239	
95% Hall's Bootstrap UCL	22.33703	
95% Percentile Bootstrap UCL	22.49	
95% BCA Bootstrap UCL	21.59	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	23.04384	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - kf-sd.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	115	
Maximum	461	
Mean	280.5	
Standard Deviation	118.636	
Variance	14074.5	
Coefficient of Variation	0.422945	
Skewness	-0.055201	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.942481	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	349.2711	
Gamma Statistics		
k hat	5.418991	
k star (bias corrected)	3.859961	
Theta hat	51.7624	
Theta star	72.66913	
nu hat	108.3798	
nu star	77.19921	
5% Approximate Chi Square Value	57.95555	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	55.06635	
Anderson-Darling Test Statistic	0.389243	
Anderson-Darling 5% Critical Value	0.729082	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.186485	
Kolmogrov-Smirnov 5% Critical Value	0.267363	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	373.6377	
95% Adjusted Gamma UCL	393.2416	
Lognormal Statistics		
Minimum of log data	4.744932	
Maximum of log data	6.133398	
Mean of log data	5.541477	
Standard Deviation of log data	0.480527	
Variance of log data	0.230907	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915157	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	286.2686	
MLE Standard Deviation	145.8964	
MLE Coefficient of Variation	0.509649	
MLE Skewness	1.661323	
MLE Median	255.0545	
MLE 80% Quantile	382.804	
MLE 90% Quantile	472.9337	
MLE 95% Quantile	562.2491	
MLE 99% Quantile	779.9145	
MVU Estimate of Median	252.1237	
MVU Estimate of Mean	282.7107	
MVU Estimate of Standard Deviation	138.3482	
MVU Estimate of SE of Mean	43.67748	
95% H-UCL	406.7491	
95% Chebyshev (MVUE) UCL	473.0964	
97.5% Chebyshev (MVUE) UCL	555.4765	
99% Chebyshev (MVUE) UCL	717.2961	
Non-parametric Statisitics		
95% CLT UCL	342.2083	
95% Adjusted-CLT UCL	341.5086	
95% Modified-t UCL	349.1619	
95% Jackknife UCL	349.2711	
95% Chebyshev (Mean, Sd) UCL	444.0284	
97.5% Chebyshev (Mean, Sd) UCL	514.7873	
99% Chebyshev (Mean, Sd) UCL	653.7795	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	340.0475	
95% Bootstrap-t UCL	352.3293	
95% Hall's Bootstrap UCL	336.0954	
95% Percentile Bootstrap UCL	337.5	
95% BCA Bootstrap UCL	329.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	349.2711	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable	Trichloroethene	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	7	
Minimum	0.0065	
Maximum	0.035	
Mean	0.014944	
Standard Deviation	0.009238	
Variance	8.53E-05	
Coefficient of Variation	0.618155	
Skewness	1.47962	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.825368	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.020671	
Gamma Statistics		
k hat	3.524069	
k star (bias corrected)	2.423453	
Theta hat	0.004241	
Theta star	0.006167	
nu hat	63.43324	
nu star	43.62216	
5% Approximate Chi Square Value	29.47386	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	27.04313	
Anderson-Darling Test Statistic	0.468688	
Anderson-Darling 5% Critical Value	0.725836	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.254535	
Kolmogrov-Smirnov 5% Critical Value	0.280863	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.022118	
95% Adjusted Gamma UCL	0.024106	
Lognormal Statistics		
Minimum of log data	-5.035953	
Maximum of log data	-3.352407	
Mean of log data	-4.351955	
Standard Deviation of log data	0.566245	
Variance of log data	0.320633	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915734	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.015121	
MLE Standard Deviation	0.009297	
MLE Coefficient of Variation	0.614817	
MLE Skewness	2.076852	
MLE Median	0.012882	
MLE 80% Quantile	0.020786	
MLE 90% Quantile	0.026667	
MLE 95% Quantile	0.032697	
MLE 99% Quantile	0.048081	
MVU Estimate of Median	0.012654	
MVU Estimate of Mean	0.014825	
MVU Estimate of Standard Deviation	0.008566	
MVU Estimate of SE of Mean	0.002847	
95% H-UCL	0.024502	
95% Chebyshev (MVUE) UCL	0.027237	
97.5% Chebyshev (MVUE) UCL	0.032607	
99% Chebyshev (MVUE) UCL	0.043156	
Non-parametric Statisitics		
95% CLT UCL	0.020009	
95% Adjusted-CLT UCL	0.021632	
95% Modified-t UCL	0.020924	
95% Jackknife UCL	0.020671	
95% Chebyshev (Mean, Sd) UCL	0.028367	
97.5% Chebyshev (Mean, Sd) UCL	0.034175	
99% Chebyshev (Mean, Sd) UCL	0.045583	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.019665	
95% Bootstrap-t UCL	0.025801	
95% Hall's Bootstrap UCL	0.05286	
95% Percentile Bootstrap UCL	0.020056	
95% BCA Bootstrap UCL	0.019222	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.022118	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.415	
Maximum	9.6	
Mean	3.8405	
Standard Deviation	3.014814	
Variance	9.089103	
Coefficient of Variation	0.785006	
Skewness	0.7186	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.920246	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	5.588131	
Gamma Statistics		
k hat	1.477786	
k star (bias corrected)	1.101117	
Theta hat	2.598819	
Theta star	3.487821	
nu hat	29.55573	
nu star	22.02234	
5% Approximate Chi Square Value	12.35343	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	11.11402	
Anderson-Darling Test Statistic	0.231606	
Anderson-Darling 5% Critical Value	0.739632	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.144873	
Kolmogrov-Smirnov 5% Critical Value	0.271237	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	6.846423	
95% Adjusted Gamma UCL	7.609924	
Lognormal Statistics		
Minimum of log data	-0.879477	
Maximum of log data	2.261763	
Mean of log data	0.970575	
Standard Deviation of log data	1.016519	
Variance of log data	1.033311	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.942608	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	4.424824	
MLE Standard Deviation	5.953579	
MLE Coefficient of Variation	1.345495	
MLE Skewness	6.472311	
MLE Median	2.639461	
MLE 80% Quantile	6.23098	
MLE 90% Quantile	9.745466	
MLE 95% Quantile	14.05178	
MLE 99% Quantile	28.07835	
MVU Estimate of Median	2.50594	
MVU Estimate of Mean	4.127139	
MVU Estimate of Standard Deviation	4.513589	
MVU Estimate of SE of Mean	1.392114	
95% H-UCL	12.80904	
95% Chebyshev (MVUE) UCL	10.19522	
97.5% Chebyshev (MVUE) UCL	12.82089	
99% Chebyshev (MVUE) UCL	17.9785	
Non-parametric Statisitics		
95% CLT UCL	5.408651	
95% Adjusted-CLT UCL	5.640138	
95% Modified-t UCL	5.624238	
95% Jackknife UCL	5.588131	
95% Chebyshev (Mean, Sd) UCL	7.996134	
97.5% Chebyshev (Mean, Sd) UCL	9.79428	
99% Chebyshev (Mean, Sd) UCL	13.32639	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	5.315161	
95% Bootstrap-t UCL	6.110952	
95% Hall's Bootstrap UCL	5.646294	
95% Percentile Bootstrap UCL	5.439	
95% BCA Bootstrap UCL	5.043	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	5.588131	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.49	
Maximum	10	
Mean	3.768	
Standard Deviation	3.068911	
Variance	9.418218	
Coefficient of Variation	0.814467	
Skewness	0.862519	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904948	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	5.54699	
Gamma Statistics		
k hat	1.438398	
k star (bias corrected)	1.073545	
Theta hat	2.619581	
Theta star	3.509866	
nu hat	28.76796	
nu star	21.4709	
5% Approximate Chi Square Value	11.9409	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.72511	
Anderson-Darling Test Statistic	0.285313	
Anderson-Darling 5% Critical Value	0.740344	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.182508	
Kolmogrov-Smirnov 5% Critical Value	0.271444	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	6.775235	
95% Adjusted Gamma UCL	7.543264	
Lognormal Statistics		
Minimum of log data	-0.71335	
Maximum of log data	2.302585	
Mean of log data	0.940289	
Standard Deviation of log data	1.013103	
Variance of log data	1.026377	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.935969	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	4.277966	
MLE Standard Deviation	5.725027	
MLE Coefficient of Variation	1.338259	
MLE Skewness	6.411515	
MLE Median	2.560721	
MLE 80% Quantile	6.027673	
MLE 90% Quantile	9.413325	
MLE 95% Quantile	13.55619	
MLE 99% Quantile	27.02511	
MVU Estimate of Median	2.432035	
MVU Estimate of Mean	3.992465	
MVU Estimate of Standard Deviation	4.349763	
MVU Estimate of SE of Mean	1.341963	
95% H-UCL	12.31046	
95% Chebyshev (MVUE) UCL	9.841947	
97.5% Chebyshev (MVUE) UCL	12.37302	
99% Chebyshev (MVUE) UCL	17.34483	
Non-parametric Statisitics		
95% CLT UCL	5.364289	
95% Adjusted-CLT UCL	5.647125	
95% Modified-t UCL	5.591107	
95% Jackknife UCL	5.54699	
95% Chebyshev (Mean, Sd) UCL	7.998203	
97.5% Chebyshev (Mean, Sd) UCL	9.828615	
99% Chebyshev (Mean, Sd) UCL	13.4241	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	5.255347	
95% Bootstrap-t UCL	5.958948	
95% Hall's Bootstrap UCL	5.786261	
95% Percentile Bootstrap UCL	5.258	
95% BCA Bootstrap UCL	5.059	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	5.54699	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.555	
Maximum	16	
Mean	6.5955	
Standard Deviation	5.075889	
Variance	25.76465	
Coefficient of Variation	0.769599	
Skewness	0.634385	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.938628	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	9.537897	
Gamma Statistics		
k hat	1.425861	
k star (bias corrected)	1.06477	
Theta hat	4.625625	
Theta star	6.194297	
nu hat	28.51723	
nu star	21.29539	
5% Approximate Chi Square Value	11.80997	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.60178	
Anderson-Darling Test Statistic	0.207508	
Anderson-Darling 5% Critical Value	0.74057	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.126027	
Kolmogrov-Smirnov 5% Critical Value	0.27151	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	11.89281	
95% Adjusted Gamma UCL	13.24814	
Lognormal Statistics		
Minimum of log data	-0.588787	
Maximum of log data	2.772589	
Mean of log data	1.496418	
Standard Deviation of log data	1.06699	
Variance of log data	1.138468	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.93148	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.890444	
MLE Standard Deviation	11.49403	
MLE Coefficient of Variation	1.456702	
MLE Skewness	7.461201	
MLE Median	4.465667	
MLE 80% Quantile	11.00143	
MLE 90% Quantile	17.59299	
MLE 95% Quantile	25.83208	
MLE 99% Quantile	53.42279	
MVU Estimate of Median	4.217308	
MVU Estimate of Mean	7.294246	
MVU Estimate of Standard Deviation	8.427327	
MVU Estimate of SE of Mean	2.587844	
95% H-UCL	24.99533	
95% Chebyshev (MVUE) UCL	18.5744	
97.5% Chebyshev (MVUE) UCL	23.45533	
99% Chebyshev (MVUE) UCL	33.04297	
Non-parametric Statisitics		
95% CLT UCL	9.235715	
95% Adjusted-CLT UCL	9.579784	
95% Modified-t UCL	9.591565	
95% Jackknife UCL	9.537897	
95% Chebyshev (Mean, Sd) UCL	13.59213	
97.5% Chebyshev (Mean, Sd) UCL	16.61958	
99% Chebyshev (Mean, Sd) UCL	22.56641	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	9.098238	
95% Bootstrap-t UCL	9.934421	
95% Hall's Bootstrap UCL	9.623129	
95% Percentile Bootstrap UCL	9.1055	
95% BCA Bootstrap UCL	8.5655	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	9.537897	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.48	
Maximum	14	
Mean	4.988	
Standard Deviation	4.594066	
Variance	21.10544	
Coefficient of Variation	0.921024	
Skewness	1.239716	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.829195	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	7.651093	
Gamma Statistics		
k hat	1.339874	
k star (bias corrected)	1.004578	
Theta hat	3.722739	
Theta star	4.965268	
nu hat	26.79747	
nu star	20.09156	
5% Approximate Chi Square Value	10.91717	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	9.761811	
Anderson-Darling Test Statistic	0.329275	
Anderson-Darling 5% Critical Value	0.742125	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.187578	
Kolmogrov-Smirnov 5% Critical Value	0.271962	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	9.179734	
95% Adjusted Gamma UCL	10.2662	
Lognormal Statistics		
Minimum of log data	-0.733969	
Maximum of log data	2.639057	
Mean of log data	1.189568	
Standard Deviation of log data	1.025549	
Variance of log data	1.051751	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.953	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	5.559137	
MLE Standard Deviation	7.587069	
MLE Coefficient of Variation	1.364793	
MLE Skewness	6.63652	
MLE Median	3.28566	
MLE 80% Quantile	7.815871	
MLE 90% Quantile	12.27295	
MLE 95% Quantile	17.75373	
MLE 99% Quantile	35.69443	
MVU Estimate of Median	3.116548	
MVU Estimate of Mean	5.177152	
MVU Estimate of Standard Deviation	5.71872	
MVU Estimate of SE of Mean	1.762483	
95% H-UCL	16.34918	
95% Chebyshev (MVUE) UCL	12.85964	
97.5% Chebyshev (MVUE) UCL	16.18385	
99% Chebyshev (MVUE) UCL	22.71363	
Non-parametric Statisitics		
95% CLT UCL	7.377596	
95% Adjusted-CLT UCL	7.986151	
95% Modified-t UCL	7.746016	
95% Jackknife UCL	7.651093	
95% Chebyshev (Mean, Sd) UCL	11.32048	
97.5% Chebyshev (Mean, Sd) UCL	14.06055	
99% Chebyshev (Mean, Sd) UCL	19.44289	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	7.238885	
95% Bootstrap-t UCL	9.987966	
95% Hall's Bootstrap UCL	20.60845	
95% Percentile Bootstrap UCL	7.33	
95% BCA Bootstrap UCL	8.59	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	9.179734	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Dibenz(a,h)anthracene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.082	
Maximum	2	
Mean	0.5522	
Standard Deviation	0.637541	
Variance	0.406458	
Coefficient of Variation	1.154547	
Skewness	1.772034	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.728007	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.92177	
Gamma Statistics		
k hat	1.117128	
k star (bias corrected)	0.848656	
Theta hat	0.494303	
Theta star	0.650676	
nu hat	22.34256	
nu star	16.97313	
5% Approximate Chi Square Value	8.65171	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	7.640721	
Anderson-Darling Test Statistic	0.566352	
Anderson-Darling 5% Critical Value	0.746152	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.229526	
Kolmogrov-Smirnov 5% Critical Value	0.273134	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.083319	
95% Adjusted Gamma UCL	1.226659	
Lognormal Statistics		
Minimum of log data	-2.501036	
Maximum of log data	0.693147	
Mean of log data	-1.104081	
Standard Deviation of log data	1.037323	
Variance of log data	1.076038	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.939416	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.567757	
MLE Standard Deviation	0.789373	
MLE Coefficient of Variation	1.390337	
MLE Skewness	6.85858	
MLE Median	0.331515	
MLE 80% Quantile	0.796488	
MLE 90% Quantile	1.257189	
MLE 95% Quantile	1.826341	
MLE 99% Quantile	3.701475	
MVU Estimate of Median	0.314067	
MVU Estimate of Mean	0.527664	
MVU Estimate of Standard Deviation	0.590434	
MVU Estimate of SE of Mean	0.181787	
95% H-UCL	1.704878	
95% Chebyshev (MVUE) UCL	1.320053	
97.5% Chebyshev (MVUE) UCL	1.662921	
99% Chebyshev (MVUE) UCL	2.336418	
Non-parametric Statisitics		
95% CLT UCL	0.883816	
95% Adjusted-CLT UCL	1.004531	
95% Modified-t UCL	0.9406	
95% Jackknife UCL	0.92177	
95% Chebyshev (Mean, Sd) UCL	1.430989	
97.5% Chebyshev (Mean, Sd) UCL	1.811242	
99% Chebyshev (Mean, Sd) UCL	2.558176	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.870166	
95% Bootstrap-t UCL	1.774921	
95% Hall's Bootstrap UCL	2.906168	
95% Percentile Bootstrap UCL	0.8812	
95% BCA Bootstrap UCL	0.847	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.083319	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.22	
Maximum	6.9	
Mean	1.8665	
Standard Deviation	2.177573	
Variance	4.741823	
Coefficient of Variation	1.166661	
Skewness	1.672949	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.777628	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	3.128798	
Gamma Statistics		
k hat	0.968957	
k star (bias corrected)	0.744937	
Theta hat	1.926298	
Theta star	2.505582	
nu hat	19.37914	
nu star	14.89873	
5% Approximate Chi Square Value	7.189977	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.282077	
Anderson-Darling Test Statistic	0.406282	
Anderson-Darling 5% Critical Value	0.74935	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.211434	
Kolmogrov-Smirnov 5% Critical Value	0.274027	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	3.867674	
95% Adjusted Gamma UCL	4.426639	
Lognormal Statistics		
Minimum of log data	-1.514128	
Maximum of log data	1.931521	
Mean of log data	0.026129	
Standard Deviation of log data	1.164176	
Variance of log data	1.355305	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.952138	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.021382	
MLE Standard Deviation	3.429175	
MLE Coefficient of Variation	1.69645	
MLE Skewness	9.971641	
MLE Median	1.026473	
MLE 80% Quantile	2.74521	
MLE 90% Quantile	4.581813	
MLE 95% Quantile	6.967093	
MLE 99% Quantile	15.39437	
MVU Estimate of Median	0.958813	
MVU Estimate of Mean	1.832832	
MVU Estimate of Standard Deviation	2.340187	
MVU Estimate of SE of Mean	0.71169	
95% H-UCL	7.709303	
95% Chebyshev (MVUE) UCL	4.935016	
97.5% Chebyshev (MVUE) UCL	6.277333	
99% Chebyshev (MVUE) UCL	8.914055	
Non-parametric Statisitics		
95% CLT UCL	2.999161	
95% Adjusted-CLT UCL	3.388417	
95% Modified-t UCL	3.189514	
95% Jackknife UCL	3.128798	
95% Chebyshev (Mean, Sd) UCL	4.868077	
97.5% Chebyshev (Mean, Sd) UCL	6.166861	
99% Chebyshev (Mean, Sd) UCL	8.718072	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.947661	
95% Bootstrap-t UCL	4.182932	
95% Hall's Bootstrap UCL	7.393811	
95% Percentile Bootstrap UCL	3.0255	
95% BCA Bootstrap UCL	2.82	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	3.867674	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable	Phenanthrene	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.4	
Maximum	12	
Mean	3.72	
Standard Deviation	3.488648	
Variance	12.17067	
Coefficient of Variation	0.937809	
Skewness	1.630821	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.840763	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	5.742304	
Gamma Statistics		
k hat	1.347827	
k star (bias corrected)	1.010145	
Theta hat	2.759999	
Theta star	3.682638	
nu hat	26.95653	
nu star	20.20291	
5% Approximate Chi Square Value	10.99936	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	9.839047	
Anderson-Darling Test Statistic	0.163033	
Anderson-Darling 5% Critical Value	0.741981	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.123613	
Kolmogrov-Smirnov 5% Critical Value	0.27192	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	6.832657	
95% Adjusted Gamma UCL	7.638424	
Lognormal Statistics		
Minimum of log data	-0.916291	
Maximum of log data	2.484907	
Mean of log data	0.898959	
Standard Deviation of log data	1.022061	
Variance of log data	1.044609	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.984078	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	4.142349	
MLE Standard Deviation	5.622444	
MLE Coefficient of Variation	1.357308	
MLE Skewness	6.572475	
MLE Median	2.457043	
MLE 80% Quantile	5.82757	
MLE 90% Quantile	9.13677	
MLE 95% Quantile	13.20042	
MLE 99% Quantile	26.47689	
MVU Estimate of Median	2.33142	
MVU Estimate of Mean	3.860024	
MVU Estimate of Standard Deviation	4.247439	
MVU Estimate of SE of Mean	1.309424	
95% H-UCL	12.10808	
95% Chebyshev (MVUE) UCL	9.567668	
97.5% Chebyshev (MVUE) UCL	12.03737	
99% Chebyshev (MVUE) UCL	16.88862	
Non-parametric Statisitics		
95% CLT UCL	5.534615	
95% Adjusted-CLT UCL	6.142531	
95% Modified-t UCL	5.837126	
95% Jackknife UCL	5.742304	
95% Chebyshev (Mean, Sd) UCL	8.52877	
97.5% Chebyshev (Mean, Sd) UCL	10.60953	
99% Chebyshev (Mean, Sd) UCL	14.69678	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	5.459205	
95% Bootstrap-t UCL	7.126007	
95% Hall's Bootstrap UCL	12.75188	
95% Percentile Bootstrap UCL	5.62	
95% BCA Bootstrap UCL	5.18	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	6.832657	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Aroclor 1260	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	0.021	
Maximum	0.105	
Mean	0.050722	
Standard Deviation	0.025187	
Variance	0.000634	
Coefficient of Variation	0.496566	
Skewness	1.328185	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.861764	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.066334	
Gamma Statistics		
k hat	5.093569	
k star (bias corrected)	3.469787	
Theta hat	0.009958	
Theta star	0.014618	
nu hat	91.68424	
nu star	62.45616	
5% Approximate Chi Square Value	45.27449	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	42.20613	
Anderson-Darling Test Statistic	0.453138	
Anderson-Darling 5% Critical Value	0.722741	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.231521	
Kolmogrov-Smirnov 5% Critical Value	0.27983	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.069971	
95% Adjusted Gamma UCL	0.075058	
Lognormal Statistics		
Minimum of log data	-3.863233	
Maximum of log data	-2.253795	
Mean of log data	-3.082754	
Standard Deviation of log data	0.476586	
Variance of log data	0.227135	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.937756	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.051345	
MLE Standard Deviation	0.025928	
MLE Coefficient of Variation	0.504974	
MLE Skewness	1.64369	
MLE Median	0.045833	
MLE 80% Quantile	0.068561	
MLE 90% Quantile	0.084556	
MLE 95% Quantile	0.100382	
MLE 99% Quantile	0.13887	
MVU Estimate of Median	0.045257	
MVU Estimate of Mean	0.050651	
MVU Estimate of Standard Deviation	0.024493	
MVU Estimate of SE of Mean	0.008152	
95% H-UCL	0.075205	
95% Chebyshev (MVUE) UCL	0.086186	
97.5% Chebyshev (MVUE) UCL	0.101563	
99% Chebyshev (MVUE) UCL	0.131766	
Non-parametric Statisitics		
95% CLT UCL	0.064532	
95% Adjusted-CLT UCL	0.068503	
95% Modified-t UCL	0.066954	
95% Jackknife UCL	0.066334	
95% Chebyshev (Mean, Sd) UCL	0.087318	
97.5% Chebyshev (Mean, Sd) UCL	0.103153	
99% Chebyshev (Mean, Sd) UCL	0.134258	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.063778	
95% Bootstrap-t UCL	0.080043	
95% Hall's Bootstrap UCL	0.165262	
95% Percentile Bootstrap UCL	0.064333	
95% BCA Bootstrap UCL	0.072167	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.066334	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.72	
Maximum	3.1	
Mean	1.8655	
Standard Deviation	0.79664	
Variance	0.634636	
Coefficient of Variation	0.427039	
Skewness	0.06261	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.964185	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.327297	
Gamma Statistics		
k hat	5.374324	
k star (bias corrected)	3.828693	
Theta hat	0.347113	
Theta star	0.487242	
nu hat	107.4865	
nu star	76.57387	
5% Approximate Chi Square Value	57.41341	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	54.53864	
Anderson-Darling Test Statistic	0.243907	
Anderson-Darling 5% Critical Value	0.729121	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.174079	
Kolmogrov-Smirnov 5% Critical Value	0.26737	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.488069	
95% Adjusted Gamma UCL	2.619217	
Lognormal Statistics		
Minimum of log data	-0.328504	
Maximum of log data	1.131402	
Mean of log data	0.527619	
Standard Deviation of log data	0.482976	
Variance of log data	0.233266	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.944267	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.904561	
MLE Standard Deviation	0.976201	
MLE Coefficient of Variation	0.512559	
MLE Skewness	1.672337	
MLE Median	1.694892	
MLE 80% Quantile	2.549083	
MLE 90% Quantile	3.152649	
MLE 95% Quantile	3.751345	
MLE 99% Quantile	5.2123	
MVU Estimate of Median	1.675218	
MVU Estimate of Mean	1.880632	
MVU Estimate of Standard Deviation	0.925167	
MVU Estimate of SE of Mean	0.292072	
95% H-UCL	2.712438	
95% Chebyshev (MVUE) UCL	3.153746	
97.5% Chebyshev (MVUE) UCL	3.704623	
99% Chebyshev (MVUE) UCL	4.786715	
Non-parametric Statisitics		
95% CLT UCL	2.279871	
95% Adjusted-CLT UCL	2.285201	
95% Modified-t UCL	2.328129	
95% Jackknife UCL	2.327297	
95% Chebyshev (Mean, Sd) UCL	2.963593	
97.5% Chebyshev (Mean, Sd) UCL	3.438739	
99% Chebyshev (Mean, Sd) UCL	4.37207	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.27385	
95% Bootstrap-t UCL	2.33202	
95% Hall's Bootstrap UCL	2.266379	
95% Percentile Bootstrap UCL	2.27	
95% BCA Bootstrap UCL	2.18	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.327297	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	10.3	
Maximum	129	
Mean	57.015	
Standard Deviation	39.53137	
Variance	1562.729	
Coefficient of Variation	0.69335	
Skewness	0.578315	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92503	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	79.93059	
Gamma Statistics		
k hat	2.043677	
k star (bias corrected)	1.49724	
Theta hat	27.89825	
Theta star	38.08006	
nu hat	40.87354	
nu star	29.94481	
5% Approximate Chi Square Value	18.44742	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	16.89556	
Anderson-Darling Test Statistic	0.280279	
Anderson-Darling 5% Critical Value	0.735431	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.185567	
Kolmogrov-Smirnov 5% Critical Value	0.269751	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	92.54969	
95% Adjusted Gamma UCL	101.0504	
Lognormal Statistics		
Minimum of log data	2.332144	
Maximum of log data	4.859812	
Mean of log data	3.779138	
Standard Deviation of log data	0.81789	
Variance of log data	0.668945	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.950254	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	61.16716	
MLE Standard Deviation	59.68661	
MLE Coefficient of Variation	0.975795	
MLE Skewness	3.856513	
MLE Median	43.77829	
MLE 80% Quantile	87.37904	
MLE 90% Quantile	125.2269	
MLE 95% Quantile	168.1015	
MLE 99% Quantile	293.4041	
MVU Estimate of Median	42.33391	
MVU Estimate of Mean	58.69752	
MVU Estimate of Standard Deviation	50.44906	
MVU Estimate of SE of Mean	15.76652	
95% H-UCL	129.2208	
95% Chebyshev (MVUE) UCL	127.4222	
97.5% Chebyshev (MVUE) UCL	157.1594	
99% Chebyshev (MVUE) UCL	215.5724	
Non-parametric Statisitics		
95% CLT UCL	77.57718	
95% Adjusted-CLT UCL	80.01997	
95% Modified-t UCL	80.31162	
95% Jackknife UCL	79.93059	
95% Chebyshev (Mean, Sd) UCL	111.5052	
97.5% Chebyshev (Mean, Sd) UCL	135.0832	
99% Chebyshev (Mean, Sd) UCL	181.3975	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	76.41596	
95% Bootstrap-t UCL	83.70659	
95% Hall's Bootstrap UCL	78.22122	
95% Percentile Bootstrap UCL	77.235	
95% BCA Bootstrap UCL	72.95	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	79.93059	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable	Barium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	21.35	
Maximum	118	
Mean	63.645	
Standard Deviation	35.95323	
Variance	1292.635	
Coefficient of Variation	0.564903	
Skewness	0.215475	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.911185	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	84.48641	
Gamma Statistics		
k hat	3.070423	
k star (bias corrected)	2.215963	
Theta hat	20.72842	
Theta star	28.72115	
nu hat	61.40846	
nu star	44.31925	
5% Approximate Chi Square Value	30.04804	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	28.01902	
Anderson-Darling Test Statistic	0.408142	
Anderson-Darling 5% Critical Value	0.731984	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.179617	
Kolmogrov-Smirnov 5% Critical Value	0.268406	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	93.87296	
95% Adjusted Gamma UCL	100.6709	
Lognormal Statistics		
Minimum of log data	3.061052	
Maximum of log data	4.770685	
Mean of log data	3.981727	
Standard Deviation of log data	0.646626	
Variance of log data	0.418125	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904501	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	66.07492	
MLE Standard Deviation	47.60652	
MLE Coefficient of Variation	0.720493	
MLE Skewness	2.535494	
MLE Median	53.60953	
MLE 80% Quantile	92.58485	
MLE 90% Quantile	123.0562	
MLE 95% Quantile	155.3105	
MLE 99% Quantile	241.2366	
MVU Estimate of Median	52.49829	
MVU Estimate of Mean	64.5076	
MVU Estimate of Standard Deviation	43.07274	
MVU Estimate of SE of Mean	13.55242	
95% H-UCL	111.8597	
95% Chebyshev (MVUE) UCL	123.5812	
97.5% Chebyshev (MVUE) UCL	149.1424	
99% Chebyshev (MVUE) UCL	199.3525	
Non-parametric Statisitics		
95% CLT UCL	82.34601	
95% Adjusted-CLT UCL	83.17379	
95% Modified-t UCL	84.61553	
95% Jackknife UCL	84.48641	
95% Chebyshev (Mean, Sd) UCL	113.2031	
97.5% Chebyshev (Mean, Sd) UCL	134.6469	
99% Chebyshev (Mean, Sd) UCL	176.7692	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	81.73928	
95% Bootstrap-t UCL	86.54571	
95% Hall's Bootstrap UCL	80.3345	
95% Percentile Bootstrap UCL	81.36	
95% BCA Bootstrap UCL	78.975	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	84.48641	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.23	
Maximum	10.3	
Mean	3.2675	
Standard Deviation	3.172422	
Variance	10.06426	
Coefficient of Variation	0.970902	
Skewness	1.282948	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.8573	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	5.106493	
Gamma Statistics		
k hat	1.1022	
k star (bias corrected)	0.838207	
Theta hat	2.964525	
Theta star	3.898203	
nu hat	22.044	
nu star	16.76414	
5% Approximate Chi Square Value	8.502642	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	7.50176	
Anderson-Darling Test Statistic	0.278423	
Anderson-Darling 5% Critical Value	0.746422	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.202474	
Kolmogrov-Smirnov 5% Critical Value	0.273212	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	6.442328	
95% Adjusted Gamma UCL	7.301861	
Lognormal Statistics		
Minimum of log data	-1.469676	
Maximum of log data	2.332144	
Mean of log data	0.666111	
Standard Deviation of log data	1.176268	
Variance of log data	1.383606	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.958379	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	3.888073	
MLE Standard Deviation	6.722274	
MLE Coefficient of Variation	1.728947	
MLE Skewness	10.35511	
MLE Median	1.946652	
MLE 80% Quantile	5.259611	
MLE 90% Quantile	8.825231	
MLE 95% Quantile	13.47817	
MLE 99% Quantile	30.02737	
MVU Estimate of Median	1.815733	
MVU Estimate of Mean	3.516183	
MVU Estimate of Standard Deviation	4.543539	
MVU Estimate of SE of Mean	1.37994	
95% H-UCL	15.19236	
95% Chebyshev (MVUE) UCL	9.531203	
97.5% Chebyshev (MVUE) UCL	12.13391	
99% Chebyshev (MVUE) UCL	17.24641	
Non-parametric Statisitics		
95% CLT UCL	4.91763	
95% Adjusted-CLT UCL	5.352521	
95% Modified-t UCL	5.174328	
95% Jackknife UCL	5.106493	
95% Chebyshev (Mean, Sd) UCL	7.640382	
97.5% Chebyshev (Mean, Sd) UCL	9.532532	
99% Chebyshev (Mean, Sd) UCL	13.24929	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.82141	
95% Bootstrap-t UCL	6.086575	
95% Hall's Bootstrap UCL	5.625773	
95% Percentile Bootstrap UCL	4.8945	
95% BCA Bootstrap UCL	4.689	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	5.106493	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	31.9	
Maximum	442	
Mean	177.26	
Standard Deviation	122.402	
Variance	14982.26	
Coefficient of Variation	0.690523	
Skewness	1.048459	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922595	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	248.2142	
Gamma Statistics		
k hat	2.212312	
k star (bias corrected)	1.615285	
Theta hat	80.12431	
Theta star	109.7391	
nu hat	44.24624	
nu star	32.3057	
5% Approximate Chi Square Value	20.31251	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	18.67558	
Anderson-Darling Test Statistic	0.184649	
Anderson-Darling 5% Critical Value	0.734858	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.145053	
Kolmogrov-Smirnov 5% Critical Value	0.269521	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	281.9203	
95% Adjusted Gamma UCL	306.6308	
Lognormal Statistics		
Minimum of log data	3.462606	
Maximum of log data	6.09131	
Mean of log data	4.934903	
Standard Deviation of log data	0.782465	
Variance of log data	0.612252	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.967841	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	188.8643	
MLE Standard Deviation	173.5683	
MLE Coefficient of Variation	0.919011	
MLE Skewness	3.533212	
MLE Median	139.0596	
MLE 80% Quantile	269.37	
MLE 90% Quantile	380.0758	
MLE 95% Quantile	503.739	
MLE 99% Quantile	858.2687	
MVU Estimate of Median	134.8556	
MVU Estimate of Mean	181.9769	
MVU Estimate of Standard Deviation	149.0547	
MVU Estimate of SE of Mean	46.66318	
95% H-UCL	379.7265	
95% Chebyshev (MVUE) UCL	385.377	
97.5% Chebyshev (MVUE) UCL	473.3884	
99% Chebyshev (MVUE) UCL	646.2697	
Non-parametric Statisitics		
95% CLT UCL	240.9272	
95% Adjusted-CLT UCL	254.6398	
95% Modified-t UCL	250.353	
95% Jackknife UCL	248.2142	
95% Chebyshev (Mean, Sd) UCL	345.9796	
97.5% Chebyshev (Mean, Sd) UCL	418.9847	
99% Chebyshev (Mean, Sd) UCL	562.389	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	237.5752	
95% Bootstrap-t UCL	268.6843	
95% Hall's Bootstrap UCL	283.5913	
95% Percentile Bootstrap UCL	239.06	
95% BCA Bootstrap UCL	227.05	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	248.2142	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	23.4	
Maximum	380	
Mean	164.74	
Standard Deviation	119.8793	
Variance	14371.04	
Coefficient of Variation	0.727688	
Skewness	0.621117	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.930434	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	234.2318	
Gamma Statistics		
k hat	1.810354	
k star (bias corrected)	1.333914	
Theta hat	90.99878	
Theta star	123.5012	
nu hat	36.20708	
nu star	26.67829	
5% Approximate Chi Square Value	15.90082	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	14.47224	
Anderson-Darling Test Statistic	0.18619	
Anderson-Darling 5% Critical Value	0.736964	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.124318	
Kolmogrov-Smirnov 5% Critical Value	0.270307	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	276.3996	
95% Adjusted Gamma UCL	303.6835	
Lognormal Statistics		
Minimum of log data	3.152736	
Maximum of log data	5.940171	
Mean of log data	4.80344	
Standard Deviation of log data	0.887404	
Variance of log data	0.787486	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.959936	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	180.7624	
MLE Standard Deviation	197.839	
MLE Coefficient of Variation	1.09447	
MLE Skewness	4.594438	
MLE Median	121.9292	
MLE 80% Quantile	258.087	
MLE 90% Quantile	381.3642	
MLE 95% Quantile	524.9066	
MLE 99% Quantile	960.5851	
MVU Estimate of Median	117.2049	
MVU Estimate of Mean	171.9414	
MVU Estimate of Standard Deviation	161.6084	
MVU Estimate of SE of Mean	50.30942	
95% H-UCL	423.3578	
95% Chebyshev (MVUE) UCL	391.2351	
97.5% Chebyshev (MVUE) UCL	486.1236	
99% Chebyshev (MVUE) UCL	672.5138	
Non-parametric Statisitics		
95% CLT UCL	227.095	
95% Adjusted-CLT UCL	235.0511	
95% Modified-t UCL	235.4727	
95% Jackknife UCL	234.2318	
95% Chebyshev (Mean, Sd) UCL	329.9822	
97.5% Chebyshev (Mean, Sd) UCL	401.4826	
99% Chebyshev (Mean, Sd) UCL	541.9313	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	225.5312	
95% Bootstrap-t UCL	246.1973	
95% Hall's Bootstrap UCL	229.9397	
95% Percentile Bootstrap UCL	226.11	
95% BCA Bootstrap UCL	213.47	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	234.2318	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	41.2	
Maximum	480	
Mean	250.59	
Standard Deviation	163.967	
Variance	26885.16	
Coefficient of Variation	0.654324	
Skewness	0.286651	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.912073	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	345.6386	
Gamma Statistics		
k hat	2.106734	
k star (bias corrected)	1.541381	
Theta hat	118.9471	
Theta star	162.575	
nu hat	42.13469	
nu star	30.82761	
5% Approximate Chi Square Value	19.14259	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	17.55855	
Anderson-Darling Test Statistic	0.284895	
Anderson-Darling 5% Critical Value	0.735217	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.137354	
Kolmogrov-Smirnov 5% Critical Value	0.269665	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	403.5552	
95% Adjusted Gamma UCL	439.9619	
Lognormal Statistics		
Minimum of log data	3.718438	
Maximum of log data	6.173786	
Mean of log data	5.268094	
Standard Deviation of log data	0.822671	
Variance of log data	0.676787	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.929425	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	272.1865	
MLE Standard Deviation	267.7334	
MLE Coefficient of Variation	0.98364	
MLE Skewness	3.902636	
MLE Median	194.0457	
MLE 80% Quantile	388.8721	
MLE 90% Quantile	558.4839	
MLE 95% Quantile	750.9862	
MLE 99% Quantile	1315.045	
MVU Estimate of Median	187.5695	
MVU Estimate of Mean	261.048	
MVU Estimate of Standard Deviation	225.7951	
MVU Estimate of SE of Mean	70.54896	
95% H-UCL	578.96	
95% Chebyshev (MVUE) UCL	568.5638	
97.5% Chebyshev (MVUE) UCL	701.6262	
99% Chebyshev (MVUE) UCL	963.0013	
Non-parametric Statisitics		
95% CLT UCL	335.8771	
95% Adjusted-CLT UCL	340.8993	
95% Modified-t UCL	346.4219	
95% Jackknife UCL	345.6386	
95% Chebyshev (Mean, Sd) UCL	476.6028	
97.5% Chebyshev (Mean, Sd) UCL	574.3988	
99% Chebyshev (Mean, Sd) UCL	766.5	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	332.5889	
95% Bootstrap-t UCL	358.1241	
95% Hall's Bootstrap UCL	326.2194	
95% Percentile Bootstrap UCL	332.49	
95% BCA Bootstrap UCL	314.6	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	345.6386	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	108.55	
Maximum	595	
Mean	315.055	
Standard Deviation	174.9884	
Variance	30620.95	
Coefficient of Variation	0.555422	
Skewness	0.266853	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.900131	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	416.4925	
Gamma Statistics		
k hat	3.282805	
k star (bias corrected)	2.36463	
Theta hat	95.97127	
Theta star	133.2365	
nu hat	65.65611	
nu star	47.29261	
5% Approximate Chi Square Value	32.50778	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	30.39013	
Anderson-Darling Test Statistic	0.502156	
Anderson-Darling 5% Critical Value	0.731391	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.231452	
Kolmogrov-Smirnov 5% Critical Value	0.268272	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	458.3448	
95% Adjusted Gamma UCL	490.2833	
Lognormal Statistics		
Minimum of log data	4.687211	
Maximum of log data	6.388561	
Mean of log data	5.592775	
Standard Deviation of log data	0.617474	
Variance of log data	0.381274	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904987	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	324.8656	
MLE Standard Deviation	221.3258	
MLE Coefficient of Variation	0.681284	
MLE Skewness	2.360069	
MLE Median	268.4795	
MLE 80% Quantile	452.3878	
MLE 90% Quantile	593.6133	
MLE 95% Quantile	741.3839	
MLE 99% Quantile	1128.922	
MVU Estimate of Median	263.4011	
MVU Estimate of Mean	317.9079	
MVU Estimate of Standard Deviation	202.1611	
MVU Estimate of SE of Mean	63.65833	
95% H-UCL	531.9049	
95% Chebyshev (MVUE) UCL	595.3882	
97.5% Chebyshev (MVUE) UCL	715.4541	
99% Chebyshev (MVUE) UCL	951.3003	
Non-parametric Statisitics		
95% CLT UCL	406.075	
95% Adjusted-CLT UCL	411.0645	
95% Modified-t UCL	417.2708	
95% Jackknife UCL	416.4925	
95% Chebyshev (Mean, Sd) UCL	556.2599	
97.5% Chebyshev (Mean, Sd) UCL	660.6295	
99% Chebyshev (Mean, Sd) UCL	865.6433	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	401.9335	
95% Bootstrap-t UCL	421.4166	
95% Hall's Bootstrap UCL	395.2713	
95% Percentile Bootstrap UCL	398	
95% BCA Bootstrap UCL	390	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	416.4925	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.055	
Maximum	5.7	
Mean	1.385499	
Standard Deviation	1.619058	
Variance	2.621348	
Coefficient of Variation	1.168574	
Skewness	2.48358	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.693812	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.324036	
Gamma Statistics		
k hat	1.052432	
k star (bias corrected)	0.803369	
Theta hat	1.316474	
Theta star	1.724611	
nu hat	21.04864	
nu star	16.06738	
5% Approximate Chi Square Value	8.008471	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	7.041722	
Anderson-Darling Test Statistic	0.374256	
Anderson-Darling 5% Critical Value	0.747322	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.196159	
Kolmogrov-Smirnov 5% Critical Value	0.273474	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.779724	
95% Adjusted Gamma UCL	3.161349	
Lognormal Statistics		
Minimum of log data	-2.900422	
Maximum of log data	1.740466	
Mean of log data	-0.219168	
Standard Deviation of log data	1.229661	
Variance of log data	1.512065	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92553	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.710635	
MLE Standard Deviation	3.216763	
MLE Coefficient of Variation	1.880449	
MLE Skewness	12.29079	
MLE Median	0.803187	
MLE 80% Quantile	2.270262	
MLE 90% Quantile	3.899881	
MLE 95% Quantile	6.071611	
MLE 99% Quantile	14.02755	
MVU Estimate of Median	0.744309	
MVU Estimate of Mean	1.528335	
MVU Estimate of Standard Deviation	2.079607	
MVU Estimate of SE of Mean	0.627737	
95% H-UCL	7.462094	
95% Chebyshev (MVUE) UCL	4.264578	
97.5% Chebyshev (MVUE) UCL	5.448552	
99% Chebyshev (MVUE) UCL	7.77424	
Non-parametric Statisitics		
95% CLT UCL	2.227649	
95% Adjusted-CLT UCL	2.657305	
95% Modified-t UCL	2.391054	
95% Jackknife UCL	2.324036	
95% Chebyshev (Mean, Sd) UCL	3.617216	
97.5% Chebyshev (Mean, Sd) UCL	4.582882	
99% Chebyshev (Mean, Sd) UCL	6.479745	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.181698	
95% Bootstrap-t UCL	3.854625	
95% Hall's Bootstrap UCL	5.752777	
95% Percentile Bootstrap UCL	2.296499	
95% BCA Bootstrap UCL	2.180998	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2.779724	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	8.2	
Maximum	37.5	
Mean	21.935	
Standard Deviation	9.540442	
Variance	91.02003	
Coefficient of Variation	0.434941	
Skewness	0.077313	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.958893	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	27.46541	
Gamma Statistics		
k hat	5.186321	
k star (bias corrected)	3.697091	
Theta hat	4.229395	
Theta star	5.933042	
nu hat	103.7264	
nu star	73.94183	
5% Approximate Chi Square Value	55.1354	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	52.32199	
Anderson-Darling Test Statistic	0.314339	
Anderson-Darling 5% Critical Value	0.729286	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.169163	
Kolmogrov-Smirnov 5% Critical Value	0.2674	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	29.41693	
95% Adjusted Gamma UCL	30.99871	
Lognormal Statistics		
Minimum of log data	2.104134	
Maximum of log data	3.624341	
Mean of log data	2.988589	
Standard Deviation of log data	0.491761	
Variance of log data	0.241829	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.938565	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	22.40992	
MLE Standard Deviation	11.7214	
MLE Coefficient of Variation	0.523045	
MLE Skewness	1.712228	
MLE Median	19.85765	
MLE 80% Quantile	30.08802	
MLE 90% Quantile	37.35632	
MLE 95% Quantile	44.59117	
MLE 99% Quantile	62.32889	
MVU Estimate of Median	19.61873	
MVU Estimate of Mean	22.11728	
MVU Estimate of Standard Deviation	11.0856	
MVU Estimate of SE of Mean	3.499269	
95% H-UCL	32.18562	
95% Chebyshev (MVUE) UCL	37.37024	
97.5% Chebyshev (MVUE) UCL	43.9702	
99% Chebyshev (MVUE) UCL	56.93456	
Non-parametric Statisitics		
95% CLT UCL	26.89745	
95% Adjusted-CLT UCL	26.97626	
95% Modified-t UCL	27.47771	
95% Jackknife UCL	27.46541	
95% Chebyshev (Mean, Sd) UCL	35.08559	
97.5% Chebyshev (Mean, Sd) UCL	40.77586	
99% Chebyshev (Mean, Sd) UCL	51.9533	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	26.68071	
95% Bootstrap-t UCL	27.4973	
95% Hall's Bootstrap UCL	26.90242	
95% Percentile Bootstrap UCL	26.64	
95% BCA Bootstrap UCL	25.79	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	27.46541	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.22	
Maximum	3.8	
Mean	1.5695	
Standard Deviation	1.102226	
Variance	1.214903	
Coefficient of Variation	0.702279	
Skewness	0.864365	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.937683	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.20844	
Gamma Statistics		
k hat	1.918839	
k star (bias corrected)	1.409854	
Theta hat	0.817942	
Theta star	1.113236	
nu hat	38.37678	
nu star	28.19708	
5% Approximate Chi Square Value	17.07963	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	15.59287	
Anderson-Darling Test Statistic	0.196392	
Anderson-Darling 5% Critical Value	0.736172	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.171988	
Kolmogrov-Smirnov 5% Critical Value	0.270023	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	2.591117	
95% Adjusted Gamma UCL	2.838177	
Lognormal Statistics		
Minimum of log data	-1.514128	
Maximum of log data	1.335001	
Mean of log data	0.168101	
Standard Deviation of log data	0.87756	
Variance of log data	0.770111	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.94189	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.738733	
MLE Standard Deviation	1.872678	
MLE Coefficient of Variation	1.077036	
MLE Skewness	4.480476	
MLE Median	1.183056	
MLE 80% Quantile	2.483426	
MLE 90% Quantile	3.653791	
MLE 95% Quantile	5.011257	
MLE 99% Quantile	9.109383	
MVU Estimate of Median	1.138213	
MVU Estimate of Mean	1.656068	
MVU Estimate of Standard Deviation	1.537522	
MVU Estimate of SE of Mean	0.478924	
95% H-UCL	4.011197	
95% Chebyshev (MVUE) UCL	3.743648	
97.5% Chebyshev (MVUE) UCL	4.646946	
99% Chebyshev (MVUE) UCL	6.421299	
Non-parametric Statisitics		
95% CLT UCL	2.142821	
95% Adjusted-CLT UCL	2.244621	
95% Modified-t UCL	2.224318	
95% Jackknife UCL	2.20844	
95% Chebyshev (Mean, Sd) UCL	3.088814	
97.5% Chebyshev (Mean, Sd) UCL	3.746222	
99% Chebyshev (Mean, Sd) UCL	5.037574	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.121894	
95% Bootstrap-t UCL	2.442514	
95% Hall's Bootstrap UCL	2.642687	
95% Percentile Bootstrap UCL	2.156	
95% BCA Bootstrap UCL	2.4415	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.20844	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	17.2	
Maximum	79.2	
Mean	39.83	
Standard Deviation	20.80444	
Variance	432.8246	
Coefficient of Variation	0.522331	
Skewness	0.683902	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915081	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	51.88994	
Gamma Statistics		
k hat	4.11971	
k star (bias corrected)	2.950464	
Theta hat	9.668156	
Theta star	13.49957	
nu hat	82.3942	
nu star	59.00928	
5% Approximate Chi Square Value	42.3441	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	39.90147	
Anderson-Darling Test Statistic	0.359028	
Anderson-Darling 5% Critical Value	0.729397	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.220408	
Kolmogrov-Smirnov 5% Critical Value	0.267773	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	55.50571	
95% Adjusted Gamma UCL	58.90358	
Lognormal Statistics		
Minimum of log data	2.844909	
Maximum of log data	4.371976	
Mean of log data	3.558371	
Standard Deviation of log data	0.53562	
Variance of log data	0.286889	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.928808	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	40.52078	
MLE Standard Deviation	23.35754	
MLE Coefficient of Variation	0.576434	
MLE Skewness	1.920836	
MLE Median	35.10595	
MLE 80% Quantile	55.20036	
MLE 90% Quantile	69.8704	
MLE 95% Quantile	84.72962	
MLE 99% Quantile	122.0246	
MVU Estimate of Median	34.60532	
MVU Estimate of Mean	39.88476	
MVU Estimate of Standard Deviation	21.84804	
MVU Estimate of SE of Mean	6.891779	
95% H-UCL	60.7786	
95% Chebyshev (MVUE) UCL	69.92533	
97.5% Chebyshev (MVUE) UCL	82.92391	
99% Chebyshev (MVUE) UCL	108.4571	
Non-parametric Statisitics		
95% CLT UCL	50.65139	
95% Adjusted-CLT UCL	52.1717	
95% Modified-t UCL	52.12708	
95% Jackknife UCL	51.88994	
95% Chebyshev (Mean, Sd) UCL	68.50694	
97.5% Chebyshev (Mean, Sd) UCL	80.91547	
99% Chebyshev (Mean, Sd) UCL	105.2896	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	50.19956	
95% Bootstrap-t UCL	55.15267	
95% Hall's Bootstrap UCL	51.81986	
95% Percentile Bootstrap UCL	50.82	
95% BCA Bootstrap UCL	48.02	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	51.88994	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - 07.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	106	
Maximum	2490	
Mean	929.95	
Standard Deviation	707.4648	
Variance	500506.5	
Coefficient of Variation	0.760756	
Skewness	1.145408	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898711	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1340.054	
Gamma Statistics		
k hat	1.752409	
k star (bias corrected)	1.293353	
Theta hat	530.6694	
Theta star	719.0224	
nu hat	35.04819	
nu star	25.86707	
5% Approximate Chi Square Value	15.27522	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	13.87838	
Anderson-Darling Test Statistic	0.249734	
Anderson-Darling 5% Critical Value	0.737387	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.170619	
Kolmogrov-Smirnov 5% Critical Value	0.270459	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1574.778	
95% Adjusted Gamma UCL	1733.277	
Lognormal Statistics		
Minimum of log data	4.663439	
Maximum of log data	7.820038	
Mean of log data	6.523451	
Standard Deviation of log data	0.915521	
Variance of log data	0.838179	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.947004	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1035.397	
MLE Standard Deviation	1186.04	
MLE Coefficient of Variation	1.145492	
MLE Skewness	4.939538	
MLE Median	680.9242	
MLE 80% Quantile	1475.964	
MLE 90% Quantile	2208.118	
MLE 95% Quantile	3070.155	
MLE 99% Quantile	5727.035	
MVU Estimate of Median	652.872	
MVU Estimate of Mean	981.0376	
MVU Estimate of Standard Deviation	954.4427	
MVU Estimate of SE of Mean	296.5903	
95% H-UCL	2533.85	
95% Chebyshev (MVUE) UCL	2273.845	
97.5% Chebyshev (MVUE) UCL	2833.244	
99% Chebyshev (MVUE) UCL	3932.074	
Non-parametric Statisitics		
95% CLT UCL	1297.937	
95% Adjusted-CLT UCL	1384.522	
95% Modified-t UCL	1353.56	
95% Jackknife UCL	1340.054	
95% Chebyshev (Mean, Sd) UCL	1905.123	
97.5% Chebyshev (Mean, Sd) UCL	2327.081	
99% Chebyshev (Mean, Sd) UCL	3155.936	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1273.842	
95% Bootstrap-t UCL	1481.505	
95% Hall's Bootstrap UCL	1533.868	
95% Percentile Bootstrap UCL	1281.35	
95% BCA Bootstrap UCL	1235.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1340.054	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	6	
Minimum	0.85	
Maximum	5.1	
Mean	1.304167	
Standard Deviation	1.201979	
Variance	1.444754	
Coefficient of Variation	0.921645	
Skewness	3.398465	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.405157	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.927305	
Gamma Statistics		
k hat	3.013209	
k star (bias corrected)	2.315462	
Theta hat	0.432817	
Theta star	0.563242	
nu hat	72.31702	
nu star	55.5711	
5% Approximate Chi Square Value	39.43647	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	37.37012	
Anderson-Darling Test Statistic	2.871126	
Anderson-Darling 5% Critical Value	0.738968	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.377257	
Kolmogrov-Smirnov 5% Critical Value	0.247397	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1.83774	
95% Adjusted Gamma UCL	1.939356	
Lognormal Statistics		
Minimum of log data	-0.162519	
Maximum of log data	1.629241	
Mean of log data	0.090546	
Standard Deviation of log data	0.499006	
Variance of log data	0.249007	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.51228	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.239924	
MLE Standard Deviation	0.659322	
MLE Coefficient of Variation	0.531744	
MLE Skewness	1.745583	
MLE Median	1.094772	
MLE 80% Quantile	1.66897	
MLE 90% Quantile	2.078756	
MLE 95% Quantile	2.487832	
MLE 99% Quantile	3.494657	
MVU Estimate of Median	1.083463	
MVU Estimate of Mean	1.225921	
MVU Estimate of Standard Deviation	0.627574	
MVU Estimate of SE of Mean	0.180764	
95% H-UCL	1.710854	
95% Chebyshev (MVUE) UCL	2.013854	
97.5% Chebyshev (MVUE) UCL	2.354793	
99% Chebyshev (MVUE) UCL	3.024503	
Non-parametric Statisitics		
95% CLT UCL	1.8749	
95% Adjusted-CLT UCL	2.23863	
95% Modified-t UCL	1.98404	
95% Jackknife UCL	1.927305	
95% Chebyshev (Mean, Sd) UCL	2.816624	
97.5% Chebyshev (Mean, Sd) UCL	3.471065	
99% Chebyshev (Mean, Sd) UCL	4.756589	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.846796	
95% Bootstrap-t UCL	8.239648	
95% Hall's Bootstrap UCL	5.036858	
95% Percentile Bootstrap UCL	1.975	
95% BCA Bootstrap UCL	2.345833	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1.927305	95% Student's-t UCL
2nd Recommended UCL	1.98404	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	5.4	
Maximum	485	
Mean	71.44167	
Standard Deviation	132.4723	
Variance	17548.9	
Coefficient of Variation	1.854272	
Skewness	3.261938	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.492569	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	140.1189	
Gamma Statistics		
k hat	0.732078	
k star (bias corrected)	0.604614	
Theta hat	97.58757	
Theta star	118.1608	
nu hat	17.56986	
nu star	14.51073	
5% Approximate Chi Square Value	6.92132	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	6.138233	
Anderson-Darling Test Statistic	0.831189	
Anderson-Darling 5% Critical Value	0.766986	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.223303	
Kolmogrov-Smirnov 5% Critical Value	0.255087	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	149.7793	
95% Adjusted Gamma UCL	168.8875	
Lognormal Statistics		
Minimum of log data	1.686399	
Maximum of log data	6.184149	
Mean of log data	3.448461	
Standard Deviation of log data	1.22571	
Variance of log data	1.502365	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.947333	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	66.66259	
MLE Standard Deviation	124.5771	
MLE Coefficient of Variation	1.86877	
MLE Skewness	12.13262	
MLE Median	31.45196	
MLE 80% Quantile	88.60483	
MLE 90% Quantile	151.942	
MLE 95% Quantile	236.2178	
MLE 99% Quantile	544.2796	
MVU Estimate of Median	29.53447	
MVU Estimate of Mean	60.60888	
MVU Estimate of Standard Deviation	85.0898	
MVU Estimate of SE of Mean	23.27472	
95% H-UCL	229.1443	
95% Chebyshev (MVUE) UCL	162.061	
97.5% Chebyshev (MVUE) UCL	205.9595	
99% Chebyshev (MVUE) UCL	292.1894	
Non-parametric Statisitics		
95% CLT UCL	134.3433	
95% Adjusted-CLT UCL	172.8201	
95% Modified-t UCL	146.1205	
95% Jackknife UCL	140.1189	
95% Chebyshev (Mean, Sd) UCL	238.1323	
97.5% Chebyshev (Mean, Sd) UCL	310.2595	
99% Chebyshev (Mean, Sd) UCL	451.9393	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	130.3766	
95% Bootstrap-t UCL	369.2997	
95% Hall's Bootstrap UCL	379.2566	
95% Percentile Bootstrap UCL	143.0458	
95% BCA Bootstrap UCL	187.3458	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	149.7793	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	11.2	
Maximum	68.9	
Mean	32.09167	
Standard Deviation	16.52312	
Variance	273.0136	
Coefficient of Variation	0.514873	
Skewness	1.034533	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92897	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	40.6577	
Gamma Statistics		
k hat	4.387625	
k star (bias corrected)	3.346275	
Theta hat	7.314131	
Theta star	9.590267	
nu hat	105.303	
nu star	80.31059	
5% Approximate Chi Square Value	60.65787	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	58.05729	
Anderson-Darling Test Statistic	0.140717	
Anderson-Darling 5% Critical Value	0.734329	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.11321	
Kolmogrov-Smirnov 5% Critical Value	0.246218	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	42.48914	
95% Adjusted Gamma UCL	44.39237	
Lognormal Statistics		
Minimum of log data	2.415914	
Maximum of log data	4.232656	
Mean of log data	3.350333	
Standard Deviation of log data	0.512489	
Variance of log data	0.262645	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.994062	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	32.51349	
MLE Standard Deviation	17.8192	
MLE Coefficient of Variation	0.548055	
MLE Skewness	1.808783	
MLE Median	28.51222	
MLE 80% Quantile	43.96465	
MLE 90% Quantile	55.08519	
MLE 95% Quantile	66.24613	
MLE 99% Quantile	93.91423	
MVU Estimate of Median	28.20164	
MVU Estimate of Mean	32.12454	
MVU Estimate of Standard Deviation	16.91246	
MVU Estimate of SE of Mean	4.870253	
95% H-UCL	45.37073	
95% Chebyshev (MVUE) UCL	53.35348	
97.5% Chebyshev (MVUE) UCL	62.53926	
99% Chebyshev (MVUE) UCL	80.58295	
Non-parametric Statisitics		
95% CLT UCL	39.93731	
95% Adjusted-CLT UCL	41.45939	
95% Modified-t UCL	40.89512	
95% Jackknife UCL	40.6577	
95% Chebyshev (Mean, Sd) UCL	52.88281	
97.5% Chebyshev (Mean, Sd) UCL	61.87915	
99% Chebyshev (Mean, Sd) UCL	79.55072	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	39.65018	
95% Bootstrap-t UCL	43.05807	
95% Hall's Bootstrap UCL	44.16875	
95% Percentile Bootstrap UCL	40.3	
95% BCA Bootstrap UCL	43.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	40.6577	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	0.06	
Maximum	5.6	
Mean	1.959167	
Standard Deviation	1.802253	
Variance	3.248117	
Coefficient of Variation	0.919908	
Skewness	0.653969	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.908152	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.893504	
Gamma Statistics		
k hat	0.746498	
k star (bias corrected)	0.615429	
Theta hat	2.624475	
Theta star	3.183414	
nu hat	17.91596	
nu star	14.77031	
5% Approximate Chi Square Value	7.100875	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	6.306014	
Anderson-Darling Test Statistic	0.50381	
Anderson-Darling 5% Critical Value	0.765871	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.152503	
Kolmogrov-Smirnov 5% Critical Value	0.254864	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4.075201	
95% Adjusted Gamma UCL	4.588872	
Lognormal Statistics		
Minimum of log data	-2.813411	
Maximum of log data	1.722767	
Mean of log data	-0.129913	
Standard Deviation of log data	1.664876	
Variance of log data	2.771813	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858023	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	3.511325	
MLE Standard Deviation	13.59368	
MLE Coefficient of Variation	3.871382	
MLE Skewness	69.63685	
MLE Median	0.878172	
MLE 80% Quantile	3.585534	
MLE 90% Quantile	7.459236	
MLE 95% Quantile	13.58286	
MLE 99% Quantile	42.20714	
MVU Estimate of Median	0.781568	
MVU Estimate of Mean	2.824248	
MVU Estimate of Standard Deviation	5.898032	
MVU Estimate of SE of Mean	1.487058	
95% H-UCL	29.5112	
95% Chebyshev (MVUE) UCL	9.306182	
97.5% Chebyshev (MVUE) UCL	12.11092	
99% Chebyshev (MVUE) UCL	17.62028	
Non-parametric Statisitics		
95% CLT UCL	2.814928	
95% Adjusted-CLT UCL	2.919875	
95% Modified-t UCL	2.909874	
95% Jackknife UCL	2.893504	
95% Chebyshev (Mean, Sd) UCL	4.226953	
97.5% Chebyshev (Mean, Sd) UCL	5.208225	
99% Chebyshev (Mean, Sd) UCL	7.135746	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.785765	
95% Bootstrap-t UCL	3.028898	
95% Hall's Bootstrap UCL	2.926022	
95% Percentile Bootstrap UCL	2.828333	
95% BCA Bootstrap UCL	3.1925	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.893504	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	8.2	
Maximum	134	
Mean	54.1125	
Standard Deviation	44.35596	
Variance	1967.451	
Coefficient of Variation	0.819699	
Skewness	0.979666	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.837304	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	77.10784	
Gamma Statistics		
k hat	1.615657	
k star (bias corrected)	1.267298	
Theta hat	33.49256	
Theta star	42.6991	
nu hat	38.77577	
nu star	30.41516	
5% Approximate Chi Square Value	18.81746	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	17.43674	
Anderson-Darling Test Statistic	0.362847	
Anderson-Darling 5% Critical Value	0.744587	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.155746	
Kolmogrov-Smirnov 5% Critical Value	0.249296	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	87.46347	
95% Adjusted Gamma UCL	94.38921	
Lognormal Statistics		
Minimum of log data	2.104134	
Maximum of log data	4.89784	
Mean of log data	3.650726	
Standard Deviation of log data	0.909124	
Variance of log data	0.826507	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.940264	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	58.20546	
MLE Standard Deviation	65.9887	
MLE Coefficient of Variation	1.13372	
MLE Skewness	4.858355	
MLE Median	38.50261	
MLE 80% Quantile	83.0079	
MLE 90% Quantile	123.835	
MLE 95% Quantile	171.7835	
MLE 99% Quantile	319.0502	
MVU Estimate of Median	37.19582	
MVU Estimate of Mean	55.65589	
MVU Estimate of Standard Deviation	54.79111	
MVU Estimate of SE of Mean	15.50499	
95% H-UCL	123.8189	
95% Chebyshev (MVUE) UCL	123.2406	
97.5% Chebyshev (MVUE) UCL	152.4845	
99% Chebyshev (MVUE) UCL	209.9285	
Non-parametric Statisitics		
95% CLT UCL	75.17397	
95% Adjusted-CLT UCL	79.04324	
95% Modified-t UCL	77.71136	
95% Jackknife UCL	77.10784	
95% Chebyshev (Mean, Sd) UCL	109.9259	
97.5% Chebyshev (Mean, Sd) UCL	134.0763	
99% Chebyshev (Mean, Sd) UCL	181.5153	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	74.19497	
95% Bootstrap-t UCL	83.5268	
95% Hall's Bootstrap UCL	74.52439	
95% Percentile Bootstrap UCL	74.62083	
95% BCA Bootstrap UCL	86.3625	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	87.46347	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	6.6	
Maximum	1560	
Mean	204.25	
Standard Deviation	433.1821	
Variance	187646.7	
Coefficient of Variation	2.120842	
Skewness	3.293129	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.470411	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	428.8234	
Gamma Statistics		
k hat	0.553496	
k star (bias corrected)	0.470677	
Theta hat	369.0182	
Theta star	433.9491	
nu hat	13.2839	
nu star	11.29626	
5% Approximate Chi Square Value	4.766283	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	4.138009	
Anderson-Darling Test Statistic	0.854986	
Anderson-Darling 5% Critical Value	0.780802	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.246094	
Kolmogrov-Smirnov 5% Critical Value	0.257852	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	484.0796	
95% Adjusted Gamma UCL	557.5773	
Lognormal Statistics		
Minimum of log data	1.88707	
Maximum of log data	7.352441	
Mean of log data	4.189494	
Standard Deviation of log data	1.476484	
Variance of log data	2.180004	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.961979	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	196.271	
MLE Standard Deviation	549.7811	
MLE Coefficient of Variation	2.801133	
MLE Skewness	30.38206	
MLE Median	65.98939	
MLE 80% Quantile	229.7801	
MLE 90% Quantile	440.0004	
MLE 95% Quantile	748.6786	
MLE 99% Quantile	2046.314	
MVU Estimate of Median	60.22065	
MVU Estimate of Mean	167.8432	
MVU Estimate of Standard Deviation	298.5463	
MVU Estimate of SE of Mean	78.32653	
95% H-UCL	1087.947	
95% Chebyshev (MVUE) UCL	509.2606	
97.5% Chebyshev (MVUE) UCL	656.9922	
99% Chebyshev (MVUE) UCL	947.1823	
Non-parametric Statisitics		
95% CLT UCL	409.9371	
95% Adjusted-CLT UCL	536.959	
95% Modified-t UCL	448.6362	
95% Jackknife UCL	428.8234	
95% Chebyshev (Mean, Sd) UCL	749.3255	
97.5% Chebyshev (Mean, Sd) UCL	985.1801	
99% Chebyshev (Mean, Sd) UCL	1448.471	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	402.7387	
95% Bootstrap-t UCL	1300.029	
95% Hall's Bootstrap UCL	1162.271	
95% Percentile Bootstrap UCL	443.4958	
95% BCA Bootstrap UCL	567.9458	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	484.0796	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	6.4	
Maximum	400	
Mean	82.39167	
Standard Deviation	112.1132	
Variance	12569.38	
Coefficient of Variation	1.360735	
Skewness	2.475719	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.659791	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	140.5142	
Gamma Statistics		
k hat	0.901033	
k star (bias corrected)	0.73133	
Theta hat	91.44136	
Theta star	112.66	
nu hat	21.62479	
nu star	17.55192	
5% Approximate Chi Square Value	9.066495	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	8.151072	
Anderson-Darling Test Statistic	0.457809	
Anderson-Darling 5% Critical Value	0.760247	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.197757	
Kolmogrov-Smirnov 5% Critical Value	0.253324	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	159.5029	
95% Adjusted Gamma UCL	177.4162	
Lognormal Statistics		
Minimum of log data	1.856298	
Maximum of log data	5.991465	
Mean of log data	3.762755	
Standard Deviation of log data	1.202804	
Variance of log data	1.446737	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.962539	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	88.77663	
MLE Standard Deviation	160.0253	
MLE Coefficient of Variation	1.802561	
MLE Skewness	11.26462	
MLE Median	43.06691	
MLE 80% Quantile	119.0001	
MLE 90% Quantile	202.0182	
MLE 95% Quantile	311.49	
MLE 99% Quantile	706.6084	
MVU Estimate of Median	40.53605	
MVU Estimate of Mean	81.08456	
MVU Estimate of Standard Deviation	111.2203	
MVU Estimate of SE of Mean	30.51824	
95% H-UCL	293.3813	
95% Chebyshev (MVUE) UCL	214.1105	
97.5% Chebyshev (MVUE) UCL	271.6709	
99% Chebyshev (MVUE) UCL	384.7372	
Non-parametric Statisitics		
95% CLT UCL	135.6262	
95% Adjusted-CLT UCL	160.341	
95% Modified-t UCL	144.3692	
95% Jackknife UCL	140.5142	
95% Chebyshev (Mean, Sd) UCL	223.4644	
97.5% Chebyshev (Mean, Sd) UCL	284.5067	
99% Chebyshev (Mean, Sd) UCL	404.4124	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	133.6377	
95% Bootstrap-t UCL	280.9192	
95% Hall's Bootstrap UCL	404.4231	
95% Percentile Bootstrap UCL	136.6292	
95% BCA Bootstrap UCL	184.0917	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	159.5029	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	47.5	
Maximum	333	
Mean	167.8333	
Standard Deviation	80.53298	
Variance	6485.561	
Coefficient of Variation	0.479839	
Skewness	0.644013	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.946587	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	209.5838	
Gamma Statistics		
k hat	4.478575	
k star (bias corrected)	3.414487	
Theta hat	37.47472	
Theta star	49.15331	
nu hat	107.4858	
nu star	81.94768	
5% Approximate Chi Square Value	62.08293	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	59.45011	
Anderson-Darling Test Statistic	0.276161	
Anderson-Darling 5% Critical Value	0.733982	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.136048	
Kolmogrov-Smirnov 5% Critical Value	0.246175	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	221.5352	
95% Adjusted Gamma UCL	231.3461	
Lognormal Statistics		
Minimum of log data	3.86073	
Maximum of log data	5.808142	
Mean of log data	5.007194	
Standard Deviation of log data	0.52582	
Variance of log data	0.276487	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.948277	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	171.6466	
MLE Standard Deviation	96.86864	
MLE Coefficient of Variation	0.564349	
MLE Skewness	1.872787	
MLE Median	149.4847	
MLE 80% Quantile	233.1105	
MLE 90% Quantile	293.7925	
MLE 95% Quantile	355.0182	
MLE 99% Quantile	507.8838	
MVU Estimate of Median	147.771	
MVU Estimate of Mean	169.4757	
MVU Estimate of Standard Deviation	91.66977	
MVU Estimate of SE of Mean	26.39138	
95% H-UCL	242.2494	
95% Chebyshev (MVUE) UCL	284.513	
97.5% Chebyshev (MVUE) UCL	334.2898	
99% Chebyshev (MVUE) UCL	432.0665	
Non-parametric Statisitics		
95% CLT UCL	206.0727	
95% Adjusted-CLT UCL	210.6908	
95% Modified-t UCL	210.3042	
95% Jackknife UCL	209.5838	
95% Chebyshev (Mean, Sd) UCL	269.1684	
97.5% Chebyshev (Mean, Sd) UCL	313.0162	
99% Chebyshev (Mean, Sd) UCL	399.1467	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	204.5552	
95% Bootstrap-t UCL	216.7597	
95% Hall's Bootstrap UCL	216.1726	
95% Percentile Bootstrap UCL	205.2083	
95% BCA Bootstrap UCL	219.75	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	209.5838	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	0.045	
Maximum	1.4	
Mean	0.4575	
Standard Deviation	0.433776	
Variance	0.188161	
Coefficient of Variation	0.948144	
Skewness	1.139076	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.847023	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.682381	
Gamma Statistics		
k hat	1.17544	
k star (bias corrected)	0.937136	
Theta hat	0.389216	
Theta star	0.48819	
nu hat	28.21057	
nu star	22.49126	
5% Approximate Chi Square Value	12.70562	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	11.59663	
Anderson-Darling Test Statistic	0.364292	
Anderson-Darling 5% Critical Value	0.7528	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.218264	
Kolmogrov-Smirnov 5% Critical Value	0.251357	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.809859	
95% Adjusted Gamma UCL	0.887305	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	0.336472	
Mean of log data	-1.264241	
Standard Deviation of log data	1.106607	
Variance of log data	1.224579	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.93814	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.521028	
MLE Standard Deviation	0.807632	
MLE Coefficient of Variation	1.550075	
MLE Skewness	8.374638	
MLE Median	0.282453	
MLE 80% Quantile	0.719529	
MLE 90% Quantile	1.170871	
MLE 95% Quantile	1.743905	
MLE 99% Quantile	3.705158	
MVU Estimate of Median	0.268349	
MVU Estimate of Mean	0.484295	
MVU Estimate of Standard Deviation	0.600319	
MVU Estimate of SE of Mean	0.166718	
95% H-UCL	1.47146	
95% Chebyshev (MVUE) UCL	1.211001	
97.5% Chebyshev (MVUE) UCL	1.525447	
99% Chebyshev (MVUE) UCL	2.143116	
Non-parametric Statisitics		
95% CLT UCL	0.663469	
95% Adjusted-CLT UCL	0.707465	
95% Modified-t UCL	0.689244	
95% Jackknife UCL	0.682381	
95% Chebyshev (Mean, Sd) UCL	1.003322	
97.5% Chebyshev (Mean, Sd) UCL	1.2395	
99% Chebyshev (Mean, Sd) UCL	1.703426	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.658576	
95% Bootstrap-t UCL	0.751789	
95% Hall's Bootstrap UCL	0.689636	
95% Percentile Bootstrap UCL	0.668333	
95% BCA Bootstrap UCL	0.781667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.809859	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable	Nickel	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	0.59	
Maximum	30.6	
Mean	10.36167	
Standard Deviation	7.893501	
Variance	62.30736	
Coefficient of Variation	0.761798	
Skewness	1.55185	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.8714	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	14.45387	
Gamma Statistics		
k hat	1.643462	
k star (bias corrected)	1.288152	
Theta hat	6.304781	
Theta star	8.043823	
nu hat	39.44309	
nu star	30.91565	
5% Approximate Chi Square Value	19.21206	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	17.81542	
Anderson-Darling Test Statistic	0.338702	
Anderson-Darling 5% Critical Value	0.744365	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.182237	
Kolmogrov-Smirnov 5% Critical Value	0.249242	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	16.67378	
95% Adjusted Gamma UCL	17.98092	
Lognormal Statistics		
Minimum of log data	-0.527633	
Maximum of log data	3.421	
Mean of log data	2.004015	
Standard Deviation of log data	1.007044	
Variance of log data	1.014138	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.881778	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	12.31827	
MLE Standard Deviation	16.32803	
MLE Coefficient of Variation	1.325513	
MLE Skewness	6.305446	
MLE Median	7.418783	
MLE 80% Quantile	17.37387	
MLE 90% Quantile	27.06027	
MLE 95% Quantile	38.88476	
MLE 99% Quantile	77.2	
MVU Estimate of Median	7.110844	
MVU Estimate of Mean	11.62842	
MVU Estimate of Standard Deviation	12.88866	
MVU Estimate of SE of Mean	3.616946	
95% H-UCL	29.96556	
95% Chebyshev (MVUE) UCL	27.39432	
97.5% Chebyshev (MVUE) UCL	34.21624	
99% Chebyshev (MVUE) UCL	47.61657	
Non-parametric Statisitics		
95% CLT UCL	14.10972	
95% Adjusted-CLT UCL	15.20046	
95% Modified-t UCL	14.62401	
95% Jackknife UCL	14.45387	
95% Chebyshev (Mean, Sd) UCL	20.2941	
97.5% Chebyshev (Mean, Sd) UCL	24.59188	
99% Chebyshev (Mean, Sd) UCL	33.03402	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	13.86498	
95% Bootstrap-t UCL	16.17449	
95% Hall's Bootstrap UCL	32.57432	
95% Percentile Bootstrap UCL	14.02917	
95% BCA Bootstrap UCL	16.50333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	14.45387	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	10	
Minimum	0.85	
Maximum	2.9	
Mean	1.53125	
Standard Deviation	0.731524	
Variance	0.535128	
Coefficient of Variation	0.47773	
Skewness	0.793897	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.851216	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.910492	
Gamma Statistics		
k hat	5.220231	
k star (bias corrected)	3.970729	
Theta hat	0.29333	
Theta star	0.385635	
nu hat	125.2855	
nu star	95.29749	
5% Approximate Chi Square Value	73.77762	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	70.89302	
Anderson-Darling Test Statistic	0.673996	
Anderson-Darling 5% Critical Value	0.731916	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.214341	
Kolmogrov-Smirnov 5% Critical Value	0.245906	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.977894	
95% Adjusted Gamma UCL	2.058373	
Lognormal Statistics		
Minimum of log data	-0.162519	
Maximum of log data	1.064711	
Mean of log data	0.327256	
Standard Deviation of log data	0.457295	
Variance of log data	0.209119	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.879056	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.540051	
MLE Standard Deviation	0.742731	
MLE Coefficient of Variation	0.482277	
MLE Skewness	1.559004	
MLE Median	1.387157	
MLE 80% Quantile	2.04147	
MLE 90% Quantile	2.496476	
MLE 95% Quantile	2.943226	
MLE 99% Quantile	4.018561	
MVU Estimate of Median	1.375115	
MVU Estimate of Mean	1.52563	
MVU Estimate of Standard Deviation	0.712867	
MVU Estimate of SE of Mean	0.205461	
95% H-UCL	2.05438	
95% Chebyshev (MVUE) UCL	2.421212	
97.5% Chebyshev (MVUE) UCL	2.808731	
99% Chebyshev (MVUE) UCL	3.569938	
Non-parametric Statisitics		
95% CLT UCL	1.878598	
95% Adjusted-CLT UCL	1.930311	
95% Modified-t UCL	1.918558	
95% Jackknife UCL	1.910492	
95% Chebyshev (Mean, Sd) UCL	2.451731	
97.5% Chebyshev (Mean, Sd) UCL	2.850024	
99% Chebyshev (Mean, Sd) UCL	3.632394	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.873644	
95% Bootstrap-t UCL	2.020941	
95% Hall's Bootstrap UCL	1.85993	
95% Percentile Bootstrap UCL	1.86875	
95% BCA Bootstrap UCL	2.052083	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.977894	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	11	
Minimum	6.5	
Maximum	39.8	
Mean	17.59167	
Standard Deviation	10.05577	
Variance	101.1186	
Coefficient of Variation	0.571621	
Skewness	1.300107	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.862827	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	22.80485	
Gamma Statistics		
k hat	3.827961	
k star (bias corrected)	2.926526	
Theta hat	4.595571	
Theta star	6.011109	
nu hat	91.87106	
nu star	70.23663	
5% Approximate Chi Square Value	51.9395	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	49.54493	
Anderson-Darling Test Statistic	0.344096	
Anderson-Darling 5% Critical Value	0.736361	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.154736	
Kolmogrov-Smirnov 5% Critical Value	0.246574	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	23.78882	
95% Adjusted Gamma UCL	24.93856	
Lognormal Statistics		
Minimum of log data	1.871802	
Maximum of log data	3.683867	
Mean of log data	2.731158	
Standard Deviation of log data	0.541821	
Variance of log data	0.29357	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.960429	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	17.77767	
MLE Standard Deviation	10.38446	
MLE Coefficient of Variation	0.584129	
MLE Skewness	1.951697	
MLE Median	15.35065	
MLE 80% Quantile	24.26407	
MLE 90% Quantile	30.79641	
MLE 95% Quantile	37.42929	
MLE 99% Quantile	54.13245	
MVU Estimate of Median	15.16385	
MVU Estimate of Mean	17.53766	
MVU Estimate of Standard Deviation	9.791331	
MVU Estimate of SE of Mean	2.817972	
95% H-UCL	25.43921	
95% Chebyshev (MVUE) UCL	29.82092	
97.5% Chebyshev (MVUE) UCL	35.13589	
99% Chebyshev (MVUE) UCL	45.57613	
Non-parametric Statisitics		
95% CLT UCL	22.36643	
95% Adjusted-CLT UCL	23.53054	
95% Modified-t UCL	22.98643	
95% Jackknife UCL	22.80485	
95% Chebyshev (Mean, Sd) UCL	30.2449	
97.5% Chebyshev (Mean, Sd) UCL	35.71997	
99% Chebyshev (Mean, Sd) UCL	46.47467	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	22.14878	
95% Bootstrap-t UCL	26.20442	
95% Hall's Bootstrap UCL	51.03974	
95% Percentile Bootstrap UCL	22.64167	
95% BCA Bootstrap UCL	25.575	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	22.80485	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-c.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	12	
Number of Missing Data	0	
Number of Valid Observations	12	
Number of Distinct Observations	12	
Minimum	15.2	
Maximum	2800	
Mean	781.325	
Standard Deviation	928.7164	
Variance	862514.2	
Coefficient of Variation	1.188643	
Skewness	1.490798	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.786535	
Shapiro-Wilk 5% Critical Value	0.859	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1262.797	
Gamma Statistics		
k hat	0.671167	
k star (bias corrected)	0.558931	
Theta hat	1164.128	
Theta star	1397.891	
nu hat	16.10802	
nu star	13.41435	
5% Approximate Chi Square Value	6.17131	
Adjusted Level of Significance	0.02896	
Adjusted Chi Square Value	5.439069	
Anderson-Darling Test Statistic	0.205334	
Anderson-Darling 5% Critical Value	0.771698	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.110752	
Kolmogrov-Smirnov 5% Critical Value	0.25603	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1698.337	
95% Adjusted Gamma UCL	1926.978	
Lognormal Statistics		
Minimum of log data	2.721295	
Maximum of log data	7.937375	
Mean of log data	5.755209	
Standard Deviation of log data	1.682863	
Variance of log data	2.832028	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.936123	
Shapiro-Wilk 5% Critical Value	0.859	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1301.436	
MLE Standard Deviation	5202.466	
MLE Coefficient of Variation	3.997483	
MLE Skewness	75.8717	
MLE Median	315.8315	
MLE 80% Quantile	1309.274	
MLE 90% Quantile	2745.417	
MLE 95% Quantile	5031.729	
MLE 99% Quantile	15828.2	
MVU Estimate of Median	280.371	
MVU Estimate of Mean	1039.879	
MVU Estimate of Standard Deviation	2203.774	
MVU Estimate of SE of Mean	553.3263	
95% H-UCL	11411.03	
95% Chebyshev (MVUE) UCL	3451.773	
97.5% Chebyshev (MVUE) UCL	4495.401	
99% Chebyshev (MVUE) UCL	6545.407	
Non-parametric Statisitics		
95% CLT UCL	1222.306	
95% Adjusted-CLT UCL	1345.588	
95% Modified-t UCL	1282.026	
95% Jackknife UCL	1262.797	
95% Chebyshev (Mean, Sd) UCL	1949.934	
97.5% Chebyshev (Mean, Sd) UCL	2455.592	
99% Chebyshev (Mean, Sd) UCL	3448.86	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1203.381	
95% Bootstrap-t UCL	1719.517	
95% Hall's Bootstrap UCL	2335.208	
95% Percentile Bootstrap UCL	1223.525	
95% BCA Bootstrap UCL	1520.733	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1698.337	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	6	
Minimum	0.85	
Maximum	5.1	
Mean	1.22	
Standard Deviation	1.079649	
Variance	1.165643	
Coefficient of Variation	0.884959	
Skewness	3.798537	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.359004	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.71099	
Gamma Statistics		
k hat	3.462562	
k star (bias corrected)	2.814494	
Theta hat	0.35234	
Theta star	0.43347	
nu hat	103.8769	
nu star	84.43483	
5% Approximate Chi Square Value	64.25198	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	62.08687	
Anderson-Darling Test Statistic	3.764744	
Anderson-Darling 5% Critical Value	0.742438	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.403812	
Kolmogrov-Smirnov 5% Critical Value	0.222942	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1.603227	
95% Adjusted Gamma UCL	1.659135	
Lognormal Statistics		
Minimum of log data	-0.162519	
Maximum of log data	1.629241	
Mean of log data	0.047554	
Standard Deviation of log data	0.45136	
Variance of log data	0.203726	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.463505	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.161157	
MLE Standard Deviation	0.551961	
MLE Coefficient of Variation	0.475354	
MLE Skewness	1.533475	
MLE Median	1.048703	
MLE 80% Quantile	1.535649	
MLE 90% Quantile	1.873019	
MLE 95% Quantile	2.203487	
MLE 99% Quantile	2.996416	
MVU Estimate of Median	1.041603	
MVU Estimate of Mean	1.152656	
MVU Estimate of Standard Deviation	0.534106	
MVU Estimate of SE of Mean	0.137663	
95% H-UCL	1.481127	
95% Chebyshev (MVUE) UCL	1.752717	
97.5% Chebyshev (MVUE) UCL	2.012364	
99% Chebyshev (MVUE) UCL	2.522391	
Non-parametric Statisitics		
95% CLT UCL	1.678526	
95% Adjusted-CLT UCL	1.970665	
95% Modified-t UCL	1.756558	
95% Jackknife UCL	1.71099	
95% Chebyshev (Mean, Sd) UCL	2.435105	
97.5% Chebyshev (Mean, Sd) UCL	2.960882	
99% Chebyshev (Mean, Sd) UCL	3.99367	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.657486	
95% Bootstrap-t UCL	6.615669	
95% Hall's Bootstrap UCL	4.569485	
95% Percentile Bootstrap UCL	1.77	
95% BCA Bootstrap UCL	2.11	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1.71099	95% Student's-t UCL
2nd Recommended UCL	1.756558	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	15	
Minimum	5.4	
Maximum	505	
Mean	69.94667	
Standard Deviation	123.1293	
Variance	15160.81	
Coefficient of Variation	1.76033	
Skewness	3.581538	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.475481	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	125.9419	
Gamma Statistics		
k hat	0.840724	
k star (bias corrected)	0.717024	
Theta hat	83.19814	
Theta star	97.55142	
nu hat	25.22172	
nu star	21.51071	
5% Approximate Chi Square Value	11.97061	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	11.10161	
Anderson-Darling Test Statistic	0.882697	
Anderson-Darling 5% Critical Value	0.770726	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.237873	
Kolmogrov-Smirnov 5% Critical Value	0.229385	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	125.6913	
95% Adjusted Gamma UCL	135.5301	
Lognormal Statistics		
Minimum of log data	1.686399	
Maximum of log data	6.224558	
Mean of log data	3.546351	
Standard Deviation of log data	1.138877	
Variance of log data	1.297042	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.945241	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	66.34526	
MLE Standard Deviation	108.1745	
MLE Coefficient of Variation	1.630478	
MLE Skewness	9.22599	
MLE Median	34.68653	
MLE 80% Quantile	90.80395	
MLE 90% Quantile	149.8761	
MLE 95% Quantile	225.835	
MLE 99% Quantile	490.4779	
MVU Estimate of Median	33.21492	
MVU Estimate of Mean	62.21407	
MVU Estimate of Standard Deviation	82.61857	
MVU Estimate of SE of Mean	20.29147	
95% H-UCL	163.8974	
95% Chebyshev (MVUE) UCL	150.6626	
97.5% Chebyshev (MVUE) UCL	188.9343	
99% Chebyshev (MVUE) UCL	264.1117	
Non-parametric Statisitics		
95% CLT UCL	122.2396	
95% Adjusted-CLT UCL	153.6533	
95% Modified-t UCL	130.8419	
95% Jackknife UCL	125.9419	
95% Chebyshev (Mean, Sd) UCL	208.5241	
97.5% Chebyshev (Mean, Sd) UCL	268.4866	
99% Chebyshev (Mean, Sd) UCL	386.2714	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	120.4437	
95% Bootstrap-t UCL	269.3959	
95% Hall's Bootstrap UCL	323.0525	
95% Percentile Bootstrap UCL	129.4233	
95% BCA Bootstrap UCL	165.92	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	150.6626	95% Chebyshev (MVUE) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	15	
Minimum	11.2	
Maximum	68.9	
Mean	30.05333	
Standard Deviation	15.50331	
Variance	240.3527	
Coefficient of Variation	0.51586	
Skewness	1.257792	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.902867	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	37.10375	
Gamma Statistics		
k hat	4.556558	
k star (bias corrected)	3.689691	
Theta hat	6.595621	
Theta star	8.145216	
nu hat	136.6968	
nu star	110.6907	
5% Approximate Chi Square Value	87.40119	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	84.8553	
Anderson-Darling Test Statistic	0.186071	
Anderson-Darling 5% Critical Value	0.739206	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.126491	
Kolmogrov-Smirnov 5% Critical Value	0.222288	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	38.06156	
95% Adjusted Gamma UCL	39.20351	
Lognormal Statistics		
Minimum of log data	2.415914	
Maximum of log data	4.232656	
Mean of log data	3.289247	
Standard Deviation of log data	0.490649	
Variance of log data	0.240736	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.992118	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	30.25359	
MLE Standard Deviation	15.78372	
MLE Coefficient of Variation	0.521714	
MLE Skewness	1.707145	
MLE Median	26.82265	
MLE 80% Quantile	40.60313	
MLE 90% Quantile	50.38687	
MLE 95% Quantile	60.1213	
MLE 99% Quantile	83.97306	
MVU Estimate of Median	26.60817	
MVU Estimate of Mean	29.98852	
MVU Estimate of Standard Deviation	15.17606	
MVU Estimate of SE of Mean	3.908978	
95% H-UCL	39.62621	
95% Chebyshev (MVUE) UCL	47.02735	
97.5% Chebyshev (MVUE) UCL	54.40007	
99% Chebyshev (MVUE) UCL	68.88235	
Non-parametric Statisitics		
95% CLT UCL	36.63758	
95% Adjusted-CLT UCL	38.02664	
95% Modified-t UCL	37.32041	
95% Jackknife UCL	37.10375	
95% Chebyshev (Mean, Sd) UCL	47.50173	
97.5% Chebyshev (Mean, Sd) UCL	55.05167	
99% Chebyshev (Mean, Sd) UCL	69.88206	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	36.52882	
95% Bootstrap-t UCL	39.467	
95% Hall's Bootstrap UCL	41.86903	
95% Percentile Bootstrap UCL	36.88667	
95% BCA Bootstrap UCL	39.98	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	37.10375	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	14	
Minimum	0.06	
Maximum	5.6	
Mean	1.900667	
Standard Deviation	1.620434	
Variance	2.625807	
Coefficient of Variation	0.852561	
Skewness	0.794561	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.921939	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.637589	
Gamma Statistics		
k hat	0.895565	
k star (bias corrected)	0.760897	
Theta hat	2.122309	
Theta star	2.49793	
nu hat	26.86696	
nu star	22.8269	
5% Approximate Chi Square Value	12.95846	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	12.04994	
Anderson-Darling Test Statistic	0.533134	
Anderson-Darling 5% Critical Value	0.768076	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.191099	
Kolmogrov-Smirnov 5% Critical Value	0.228881	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	3.348108	
95% Adjusted Gamma UCL	3.600544	
Lognormal Statistics		
Minimum of log data	-2.813411	
Maximum of log data	1.722767	
Mean of log data	-0.01098	
Standard Deviation of log data	1.502464	
Variance of log data	2.257398	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.85027	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	3.057872	
MLE Standard Deviation	8.945612	
MLE Coefficient of Variation	2.925437	
MLE Skewness	33.81274	
MLE Median	0.98908	
MLE 80% Quantile	3.520498	
MLE 90% Quantile	6.81882	
MLE 95% Quantile	11.71153	
MLE 99% Quantile	32.58172	
MVU Estimate of Median	0.917058	
MVU Estimate of Mean	2.670186	
MVU Estimate of Standard Deviation	5.157743	
MVU Estimate of SE of Mean	1.182163	
95% H-UCL	13.06499	
95% Chebyshev (MVUE) UCL	7.823116	
97.5% Chebyshev (MVUE) UCL	10.05279	
99% Chebyshev (MVUE) UCL	14.43256	
Non-parametric Statisitics		
95% CLT UCL	2.588864	
95% Adjusted-CLT UCL	2.680581	
95% Modified-t UCL	2.651895	
95% Jackknife UCL	2.637589	
95% Chebyshev (Mean, Sd) UCL	3.724405	
97.5% Chebyshev (Mean, Sd) UCL	4.513538	
99% Chebyshev (Mean, Sd) UCL	6.063637	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.562959	
95% Bootstrap-t UCL	2.7788	
95% Hall's Bootstrap UCL	2.771587	
95% Percentile Bootstrap UCL	2.58	
95% BCA Bootstrap UCL	2.993333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.637589	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&HOU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	15	
Minimum	8.2	
Maximum	134	
Mean	52.46333	
Standard Deviation	40.412	
Variance	1633.129	
Coefficient of Variation	0.77029	
Skewness	1.086527	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.855592	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	70.84143	
Gamma Statistics		
k hat	1.853525	
k star (bias corrected)	1.527264	
Theta hat	28.30463	
Theta star	34.35118	
nu hat	55.60574	
nu star	45.81793	
5% Approximate Chi Square Value	31.28573	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	29.81139	
Anderson-Darling Test Statistic	0.293173	
Anderson-Darling 5% Critical Value	0.748876	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.120986	
Kolmogrov-Smirnov 5% Critical Value	0.224697	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	76.8325	
95% Adjusted Gamma UCL	80.63231	
Lognormal Statistics		
Minimum of log data	2.104134	
Maximum of log data	4.89784	
Mean of log data	3.666731	
Standard Deviation of log data	0.832972	
Variance of log data	0.693842	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955273	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	55.34861	
MLE Standard Deviation	55.38706	
MLE Coefficient of Variation	1.000695	
MLE Skewness	4.004169	
MLE Median	39.12379	
MLE 80% Quantile	79.09042	
MLE 90% Quantile	114.1027	
MLE 95% Quantile	154.0025	
MLE 99% Quantile	271.5708	
MVU Estimate of Median	38.22804	
MVU Estimate of Mean	53.74588	
MVU Estimate of Standard Deviation	48.78476	
MVU Estimate of SE of Mean	12.382	
95% H-UCL	96.35218	
95% Chebyshev (MVUE) UCL	107.7178	
97.5% Chebyshev (MVUE) UCL	131.0714	
99% Chebyshev (MVUE) UCL	176.9452	
Non-parametric Statisitics		
95% CLT UCL	69.62628	
95% Adjusted-CLT UCL	72.75409	
95% Modified-t UCL	71.3293	
95% Jackknife UCL	70.84143	
95% Chebyshev (Mean, Sd) UCL	97.94553	
97.5% Chebyshev (Mean, Sd) UCL	117.6257	
99% Chebyshev (Mean, Sd) UCL	156.2836	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	68.89913	
95% Bootstrap-t UCL	75.89094	
95% Hall's Bootstrap UCL	69.87522	
95% Percentile Bootstrap UCL	69.61	
95% BCA Bootstrap UCL	78.84333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	76.8325	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	15	
Minimum	6.6	
Maximum	1560	
Mean	187.2467	
Standard Deviation	385.9859	
Variance	148985.1	
Coefficient of Variation	2.061376	
Skewness	3.664922	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.441446	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	362.7808	
Gamma Statistics		
k hat	0.651317	
k star (bias corrected)	0.565498	
Theta hat	287.4893	
Theta star	331.1181	
nu hat	19.53951	
nu star	16.96494	
5% Approximate Chi Square Value	8.645867	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	7.923217	
Anderson-Darling Test Statistic	0.958571	
Anderson-Darling 5% Critical Value	0.782168	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.206973	
Kolmogrov-Smirnov 5% Critical Value	0.231637	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	367.4159	
95% Adjusted Gamma UCL	400.9267	
Lognormal Statistics		
Minimum of log data	1.88707	
Maximum of log data	7.352441	
Mean of log data	4.295033	
Standard Deviation of log data	1.338297	
Variance of log data	1.791038	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955536	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	179.5676	
MLE Standard Deviation	401.3515	
MLE Coefficient of Variation	2.2351	
MLE Skewness	17.87113	
MLE Median	73.3346	
MLE 80% Quantile	227.2142	
MLE 90% Quantile	409.4209	
MLE 95% Quantile	662.838	
MLE 99% Quantile	1648.977	
MVU Estimate of Median	69.06904	
MVU Estimate of Mean	162.6919	
MVU Estimate of Standard Deviation	267.3254	
MVU Estimate of SE of Mean	63.47699	
95% H-UCL	588.3793	
95% Chebyshev (MVUE) UCL	439.3817	
97.5% Chebyshev (MVUE) UCL	559.1056	
99% Chebyshev (MVUE) UCL	794.2799	
Non-parametric Statisitics		
95% CLT UCL	351.1746	
95% Adjusted-CLT UCL	451.9432	
95% Modified-t UCL	378.4987	
95% Jackknife UCL	362.7808	
95% Chebyshev (Mean, Sd) UCL	621.6594	
97.5% Chebyshev (Mean, Sd) UCL	809.6302	
99% Chebyshev (Mean, Sd) UCL	1178.862	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	342.2956	
95% Bootstrap-t UCL	972.8353	
95% Hall's Bootstrap UCL	986.6114	
95% Percentile Bootstrap UCL	370.93	
95% BCA Bootstrap UCL	504.33	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	367.4159	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&HOU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	14	
Minimum	6.4	
Maximum	400	
Mean	82.81333	
Standard Deviation	101.175	
Variance	10236.38	
Coefficient of Variation	1.221723	
Skewness	2.523135	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.698233	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	128.8245	
Gamma Statistics		
k hat	1.034878	
k star (bias corrected)	0.872346	
Theta hat	80.02235	
Theta star	94.9317	
nu hat	31.04633	
nu star	26.17039	
5% Approximate Chi Square Value	15.5088	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	14.50457	
Anderson-Darling Test Statistic	0.302908	
Anderson-Darling 5% Critical Value	0.762385	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.13443	
Kolmogrov-Smirnov 5% Critical Value	0.227752	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	139.7437	
95% Adjusted Gamma UCL	149.4189	
Lognormal Statistics		
Minimum of log data	1.856298	
Maximum of log data	5.991465	
Mean of log data	3.861044	
Standard Deviation of log data	1.128587	
Variance of log data	1.273709	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.974747	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	89.82815	
MLE Standard Deviation	144.1199	
MLE Coefficient of Variation	1.604396	
MLE Skewness	8.943038	
MLE Median	47.51492	
MLE 80% Quantile	123.3098	
MLE 90% Quantile	202.6091	
MLE 95% Quantile	304.1649	
MLE 99% Quantile	655.9849	
MVU Estimate of Median	45.53464	
MVU Estimate of Mean	84.36116	
MVU Estimate of Standard Deviation	110.738	
MVU Estimate of SE of Mean	27.2377	
95% H-UCL	218.9567	
95% Chebyshev (MVUE) UCL	203.0875	
97.5% Chebyshev (MVUE) UCL	254.4605	
99% Chebyshev (MVUE) UCL	355.3728	
Non-parametric Statisitics		
95% CLT UCL	125.7823	
95% Adjusted-CLT UCL	143.9669	
95% Modified-t UCL	131.6609	
95% Jackknife UCL	128.8245	
95% Chebyshev (Mean, Sd) UCL	196.682	
97.5% Chebyshev (Mean, Sd) UCL	245.9531	
99% Chebyshev (Mean, Sd) UCL	342.7366	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	124.2513	
95% Bootstrap-t UCL	186.5345	
95% Hall's Bootstrap UCL	317.7062	
95% Percentile Bootstrap UCL	128.2733	
95% BCA Bootstrap UCL	155.4133	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	139.7437	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	15	
Minimum	47.5	
Maximum	333	
Mean	171.8533	
Standard Deviation	79.96822	
Variance	6394.916	
Coefficient of Variation	0.465328	
Skewness	0.425381	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.95852	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	208.2203	
Gamma Statistics		
k hat	4.538057	
k star (bias corrected)	3.67489	
Theta hat	37.86936	
Theta star	46.76421	
nu hat	136.1417	
nu star	110.2467	
5% Approximate Chi Square Value	87.0064	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	84.46655	
Anderson-Darling Test Statistic	0.275486	
Anderson-Darling 5% Critical Value	0.739234	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.143542	
Kolmogrov-Smirnov 5% Critical Value	0.222297	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	217.7571	
95% Adjusted Gamma UCL	224.3049	
Lognormal Statistics		
Minimum of log data	3.86073	
Maximum of log data	5.808142	
Mean of log data	5.032435	
Standard Deviation of log data	0.518834	
Variance of log data	0.269189	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.953768	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	175.393	
MLE Standard Deviation	97.48162	
MLE Coefficient of Variation	0.55579	
MLE Skewness	1.839054	
MLE Median	153.3058	
MLE 80% Quantile	237.662	
MLE 90% Quantile	298.6094	
MLE 95% Quantile	359.9326	
MLE 99% Quantile	512.4703	
MVU Estimate of Median	151.9356	
MVU Estimate of Mean	173.658	
MVU Estimate of Standard Deviation	93.26267	
MVU Estimate of SE of Mean	24.00838	
95% H-UCL	234.2995	
95% Chebyshev (MVUE) UCL	278.3081	
97.5% Chebyshev (MVUE) UCL	323.5903	
99% Chebyshev (MVUE) UCL	412.5383	
Non-parametric Statisitics		
95% CLT UCL	205.8158	
95% Adjusted-CLT UCL	208.239	
95% Modified-t UCL	208.5983	
95% Jackknife UCL	208.2203	
95% Chebyshev (Mean, Sd) UCL	261.8546	
97.5% Chebyshev (Mean, Sd) UCL	300.7982	
99% Chebyshev (Mean, Sd) UCL	377.2954	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	204.7715	
95% Bootstrap-t UCL	209.9911	
95% Hall's Bootstrap UCL	210.46	
95% Percentile Bootstrap UCL	205.72	
95% BCA Bootstrap UCL	217.4333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	208.2203	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	14	
Minimum	0.045	
Maximum	1.4	
Mean	0.461333	
Standard Deviation	0.403743	
Variance	0.163009	
Coefficient of Variation	0.875167	
Skewness	1.074998	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.864318	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.644943	
Gamma Statistics		
k hat	1.331542	
k star (bias corrected)	1.109678	
Theta hat	0.346466	
Theta star	0.415736	
nu hat	39.94625	
nu star	33.29034	
5% Approximate Chi Square Value	21.0958	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	19.90587	
Anderson-Darling Test Statistic	0.379703	
Anderson-Darling 5% Critical Value	0.756903	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.1943	
Kolmogrov-Smirnov 5% Critical Value	0.226322	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.728009	
95% Adjusted Gamma UCL	0.771528	
Lognormal Statistics		
Minimum of log data	-3.101093	
Maximum of log data	0.336472	
Mean of log data	-1.19397	
Standard Deviation of log data	1.030057	
Variance of log data	1.061018	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.938894	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.515065	
MLE Standard Deviation	0.707969	
MLE Coefficient of Variation	1.374522	
MLE Skewness	6.720467	
MLE Median	0.303016	
MLE 80% Quantile	0.72356	
MLE 90% Quantile	1.138434	
MLE 95% Quantile	1.649503	
MLE 99% Quantile	3.326575	
MVU Estimate of Median	0.292463	
MVU Estimate of Mean	0.490111	
MVU Estimate of Standard Deviation	0.573658	
MVU Estimate of SE of Mean	0.142909	
95% H-UCL	1.110888	
95% Chebyshev (MVUE) UCL	1.113037	
97.5% Chebyshev (MVUE) UCL	1.382578	
99% Chebyshev (MVUE) UCL	1.912039	
Non-parametric Statisitics		
95% CLT UCL	0.632803	
95% Adjusted-CLT UCL	0.66372	
95% Modified-t UCL	0.649766	
95% Jackknife UCL	0.644943	
95% Chebyshev (Mean, Sd) UCL	0.915732	
97.5% Chebyshev (Mean, Sd) UCL	1.11235	
99% Chebyshev (Mean, Sd) UCL	1.498569	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.627352	
95% Bootstrap-t UCL	0.706194	
95% Hall's Bootstrap UCL	0.671766	
95% Percentile Bootstrap UCL	0.629667	
95% BCA Bootstrap UCL	0.718	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.728009	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	15	
Minimum	0.59	
Maximum	30.6	
Mean	9.709333	
Standard Deviation	7.143195	
Variance	51.02524	
Coefficient of Variation	0.735704	
Skewness	1.868158	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.835183	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	12.95783	
Gamma Statistics		
k hat	1.935093	
k star (bias corrected)	1.592519	
Theta hat	5.017503	
Theta star	6.096841	
nu hat	58.05278	
nu star	47.77556	
5% Approximate Chi Square Value	32.90886	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	31.39373	
Anderson-Darling Test Statistic	0.42493	
Anderson-Darling 5% Critical Value	0.747742	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.153349	
Kolmogrov-Smirnov 5% Critical Value	0.224509	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	14.09556	
95% Adjusted Gamma UCL	14.77584	
Lognormal Statistics		
Minimum of log data	-0.527633	
Maximum of log data	3.421	
Mean of log data	1.992981	
Standard Deviation of log data	0.895621	
Variance of log data	0.802137	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.874107	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	10.95778	
MLE Standard Deviation	12.15427	
MLE Coefficient of Variation	1.10919	
MLE Skewness	4.692211	
MLE Median	7.337376	
MLE 80% Quantile	15.63921	
MLE 90% Quantile	23.1931	
MLE 95% Quantile	32.01736	
MLE 99% Quantile	58.92093	
MVU Estimate of Median	7.143469	
MVU Estimate of Mean	10.58045	
MVU Estimate of Standard Deviation	10.45687	
MVU Estimate of SE of Mean	2.640835	
95% H-UCL	20.33188	
95% Chebyshev (MVUE) UCL	22.09158	
97.5% Chebyshev (MVUE) UCL	27.07246	
99% Chebyshev (MVUE) UCL	36.85642	
Non-parametric Statisitics		
95% CLT UCL	12.74304	
95% Adjusted-CLT UCL	13.69364	
95% Modified-t UCL	13.10611	
95% Jackknife UCL	12.95783	
95% Chebyshev (Mean, Sd) UCL	17.74873	
97.5% Chebyshev (Mean, Sd) UCL	21.22739	
99% Chebyshev (Mean, Sd) UCL	28.06053	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	12.75176	
95% Bootstrap-t UCL	14.47484	
95% Hall's Bootstrap UCL	28.65875	
95% Percentile Bootstrap UCL	12.77	
95% BCA Bootstrap UCL	14.68333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	14.09556	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	12	
Minimum	0.85	
Maximum	2.9	
Mean	1.585	
Standard Deviation	0.662234	
Variance	0.438554	
Coefficient of Variation	0.417813	
Skewness	0.561653	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909513	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.886163	
Gamma Statistics		
k hat	6.255767	
k star (bias corrected)	5.049058	
Theta hat	0.253366	
Theta star	0.31392	
nu hat	187.673	
nu star	151.4717	
5% Approximate Chi Square Value	124.0184	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	120.9616	
Anderson-Darling Test Statistic	0.491961	
Anderson-Darling 5% Critical Value	0.738259	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.165399	
Kolmogrov-Smirnov 5% Critical Value	0.221937	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.935863	
95% Adjusted Gamma UCL	1.984785	
Lognormal Statistics		
Minimum of log data	-0.162519	
Maximum of log data	1.064711	
Mean of log data	0.378534	
Standard Deviation of log data	0.421137	
Variance of log data	0.177357	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.917475	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.59554	
MLE Standard Deviation	0.702865	
MLE Coefficient of Variation	0.440519	
MLE Skewness	1.407042	
MLE Median	1.460143	
MLE 80% Quantile	2.084221	
MLE 90% Quantile	2.508526	
MLE 95% Quantile	2.919186	
MLE 99% Quantile	3.888795	
MVU Estimate of Median	1.451533	
MVU Estimate of Mean	1.585465	
MVU Estimate of Standard Deviation	0.683174	
MVU Estimate of SE of Mean	0.176158	
95% H-UCL	1.995642	
95% Chebyshev (MVUE) UCL	2.353318	
97.5% Chebyshev (MVUE) UCL	2.685569	
99% Chebyshev (MVUE) UCL	3.338212	
Non-parametric Statisitics		
95% CLT UCL	1.86625	
95% Adjusted-CLT UCL	1.892746	
95% Modified-t UCL	1.890296	
95% Jackknife UCL	1.886163	
95% Chebyshev (Mean, Sd) UCL	2.33032	
97.5% Chebyshev (Mean, Sd) UCL	2.65282	
99% Chebyshev (Mean, Sd) UCL	3.286309	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.861935	
95% Bootstrap-t UCL	1.933019	
95% Hall's Bootstrap UCL	1.88625	
95% Percentile Bootstrap UCL	1.85	
95% BCA Bootstrap UCL	2.001667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.886163	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	14	
Minimum	6.5	
Maximum	39.8	
Mean	16.44667	
Standard Deviation	9.250376	
Variance	85.56945	
Coefficient of Variation	0.562447	
Skewness	1.62213	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.820448	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	20.65344	
Gamma Statistics		
k hat	4.256646	
k star (bias corrected)	3.449761	
Theta hat	3.863762	
Theta star	4.76748	
nu hat	127.6994	
nu star	103.4928	
5% Approximate Chi Square Value	81.01428	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	78.56784	
Anderson-Darling Test Statistic	0.510475	
Anderson-Darling 5% Critical Value	0.73965	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.197375	
Kolmogrov-Smirnov 5% Critical Value	0.222429	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	21.01003	
95% Adjusted Gamma UCL	21.66424	
Lognormal Statistics		
Minimum of log data	1.871802	
Maximum of log data	3.683867	
Mean of log data	2.678085	
Standard Deviation of log data	0.496045	
Variance of log data	0.246061	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.9549	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	16.463	
MLE Standard Deviation	8.695476	
MLE Coefficient of Variation	0.528183	
MLE Skewness	1.7319	
MLE Median	14.55719	
MLE 80% Quantile	22.13684	
MLE 90% Quantile	27.53624	
MLE 95% Quantile	32.91996	
MLE 99% Quantile	46.14949	
MVU Estimate of Median	14.43822	
MVU Estimate of Mean	16.31529	
MVU Estimate of Standard Deviation	8.352959	
MVU Estimate of SE of Mean	2.151293	
95% H-UCL	21.64378	
95% Chebyshev (MVUE) UCL	25.69256	
97.5% Chebyshev (MVUE) UCL	29.75012	
99% Chebyshev (MVUE) UCL	37.72039	
Non-parametric Statisitics		
95% CLT UCL	20.3753	
95% Adjusted-CLT UCL	21.44419	
95% Modified-t UCL	20.82017	
95% Jackknife UCL	20.65344	
95% Chebyshev (Mean, Sd) UCL	26.85762	
97.5% Chebyshev (Mean, Sd) UCL	31.36245	
99% Chebyshev (Mean, Sd) UCL	40.21131	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	20.31496	
95% Bootstrap-t UCL	23.66806	
95% Hall's Bootstrap UCL	44.0194	
95% Percentile Bootstrap UCL	20.61667	
95% BCA Bootstrap UCL	22.23667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	21.01003	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Sed stat - lp-f.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	15	
Number of Missing Data	0	
Number of Valid Observations	15	
Number of Distinct Observations	15	
Minimum	15.2	
Maximum	2800	
Mean	699.46	
Standard Deviation	844.784	
Variance	713660.1	
Coefficient of Variation	1.207766	
Skewness	1.789659	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.749208	
Shapiro-Wilk 5% Critical Value	0.881	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1083.641	
Gamma Statistics		
k hat	0.761596	
k star (bias corrected)	0.653721	
Theta hat	918.4139	
Theta star	1069.967	
nu hat	22.84787	
nu star	19.61163	
5% Approximate Chi Square Value	10.56387	
Adjusted Level of Significance	0.03235	
Adjusted Chi Square Value	9.754015	
Anderson-Darling Test Statistic	0.244474	
Anderson-Darling 5% Critical Value	0.77455	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.117133	
Kolmogrov-Smirnov 5% Critical Value	0.230113	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1298.534	
95% Adjusted Gamma UCL	1406.349	
Lognormal Statistics		
Minimum of log data	2.721295	
Maximum of log data	7.937375	
Mean of log data	5.76591	
Standard Deviation of log data	1.506537	
Variance of log data	2.269653	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.943937	
Shapiro-Wilk 5% Critical Value	0.881	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	993.0064	
MLE Standard Deviation	2924.913	
MLE Coefficient of Variation	2.945513	
MLE Skewness	34.39194	
MLE Median	319.2296	
MLE 80% Quantile	1140.172	
MLE 90% Quantile	2212.349	
MLE 95% Quantile	3805.351	
MLE 99% Quantile	10615.97	
MVU Estimate of Median	295.8621	
MVU Estimate of Mean	866.223	
MVU Estimate of Standard Deviation	1679.713	
MVU Estimate of SE of Mean	384.6223	
95% H-UCL	4272.284	
95% Chebyshev (MVUE) UCL	2542.753	
97.5% Chebyshev (MVUE) UCL	3268.189	
99% Chebyshev (MVUE) UCL	4693.167	
Non-parametric Statisitics		
95% CLT UCL	1058.239	
95% Adjusted-CLT UCL	1165.937	
95% Modified-t UCL	1100.44	
95% Jackknife UCL	1083.641	
95% Chebyshev (Mean, Sd) UCL	1650.233	
97.5% Chebyshev (Mean, Sd) UCL	2061.633	
99% Chebyshev (Mean, Sd) UCL	2869.749	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1049.353	
95% Bootstrap-t UCL	1524.361	
95% Hall's Bootstrap UCL	2873.242	
95% Percentile Bootstrap UCL	1051.273	
95% BCA Bootstrap UCL	1296.147	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1298.534	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Benzo(a)anthracene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.12	
Maximum	0.25	
Mean	0.19125	
Standard Deviation	0.0536	
Variance	0.002873	
Coefficient of Variation	0.280259	
Skewness	-0.684919	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.943459	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.25432	
Gamma Statistics		
k hat	15.08388	
k star (bias corrected)	3.937636	
Theta hat	0.012679	
Theta star	0.04857	
nu hat	120.671	
nu star	31.50109	
5% Approximate Chi Square Value	19.67474	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.368246	
Anderson-Darling 5% Critical Value	0.657095	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.314143	
Kolmogrov-Smirnov 5% Critical Value	0.394579	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.306209	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.120264	
Maximum of log data	-1.386294	
Mean of log data	-1.687688	
Standard Deviation of log data	0.309238	
Variance of log data	0.095628	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.90177	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.194005	
MLE Standard Deviation	0.061457	
MLE Coefficient of Variation	0.316781	
MLE Skewness	0.98213	
MLE Median	0.184947	
MLE 80% Quantile	0.240176	
MLE 90% Quantile	0.275184	
MLE 95% Quantile	0.307589	
MLE 99% Quantile	0.37969	
MVU Estimate of Median	0.182744	
MVU Estimate of Mean	0.191651	
MVU Estimate of Standard Deviation	0.058846	
MVU Estimate of SE of Mean	0.029421	
95% H-UCL	0.350391	
95% Chebyshev (MVUE) UCL	0.319894	
97.5% Chebyshev (MVUE) UCL	0.375385	
99% Chebyshev (MVUE) UCL	0.484386	
Non-parametric Statisitics		
95% CLT UCL	0.235332	
95% Adjusted-CLT UCL	0.225525	
95% Modified-t UCL	0.25279	
95% Jackknife UCL	0.25432	
95% Chebyshev (Mean, Sd) UCL	0.308068	
97.5% Chebyshev (Mean, Sd) UCL	0.358615	
99% Chebyshev (Mean, Sd) UCL	0.457905	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.25432	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Benzo(a)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.093	
Maximum	0.21	
Mean	0.1745	
Standard Deviation	0.05469	
Variance	0.002991	
Coefficient of Variation	0.31341	
Skewness	-1.921238	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.735549	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.238853	
Gamma Statistics		
k hat	10.33293	
k star (bias corrected)	2.749899	
Theta hat	0.016888	
Theta star	0.063457	
nu hat	82.66344	
nu star	21.99919	
5% Approximate Chi Square Value	12.33608	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.767279	
Anderson-Darling 5% Critical Value	0.6571	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.429657	
Kolmogrov-Smirnov 5% Critical Value	0.394907	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.31119	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.375156	
Maximum of log data	-1.560648	
Mean of log data	-1.794999	
Standard Deviation of log data	0.387992	
Variance of log data	0.150538	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.704294	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.179114	
MLE Standard Deviation	0.072194	
MLE Coefficient of Variation	0.403062	
MLE Skewness	1.274668	
MLE Median	0.166128	
MLE 80% Quantile	0.230583	
MLE 90% Quantile	0.273507	
MLE 95% Quantile	0.314506	
MLE 99% Quantile	0.409618	
MVU Estimate of Median	0.163019	
MVU Estimate of Mean	0.175666	
MVU Estimate of Standard Deviation	0.067403	
MVU Estimate of SE of Mean	0.033696	
95% H-UCL	0.423812	
95% Chebyshev (MVUE) UCL	0.322543	
97.5% Chebyshev (MVUE) UCL	0.386096	
99% Chebyshev (MVUE) UCL	0.510935	
Non-parametric Statisitics		
95% CLT UCL	0.219479	
95% Adjusted-CLT UCL	0.191411	
95% Modified-t UCL	0.234475	
95% Jackknife UCL	0.238853	
95% Chebyshev (Mean, Sd) UCL	0.293694	
97.5% Chebyshev (Mean, Sd) UCL	0.34527	
99% Chebyshev (Mean, Sd) UCL	0.446579	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.238853	95% Student's-t UCL
2nd Recommended UCL	0.234475	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Benzo(b)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.098	
Maximum	0.2	
Mean	0.16575	
Standard Deviation	0.047035	
Variance	0.002212	
Coefficient of Variation	0.283768	
Skewness	-1.574193	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.831513	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.221095	
Gamma Statistics		
k hat	13.51215	
k star (bias corrected)	3.544703	
Theta hat	0.012267	
Theta star	0.04676	
nu hat	108.0972	
nu star	28.35763	
5% Approximate Chi Square Value	17.20479	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.548685	
Anderson-Darling 5% Critical Value	0.657096	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.323035	
Kolmogrov-Smirnov 5% Critical Value	0.394688	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.273196	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.322788	
Maximum of log data	-1.609438	
Mean of log data	-1.834735	
Standard Deviation of log data	0.33311	
Variance of log data	0.110962	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.791252	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.168764	
MLE Standard Deviation	0.057813	
MLE Coefficient of Variation	0.342568	
MLE Skewness	1.067905	
MLE Median	0.159656	
MLE 80% Quantile	0.211558	
MLE 90% Quantile	0.244953	
MLE 95% Quantile	0.276162	
MLE 99% Quantile	0.346483	
MVU Estimate of Median	0.157451	
MVU Estimate of Mean	0.166383	
MVU Estimate of Standard Deviation	0.05497	
MVU Estimate of SE of Mean	0.027482	
95% H-UCL	0.32841	
95% Chebyshev (MVUE) UCL	0.286175	
97.5% Chebyshev (MVUE) UCL	0.338009	
99% Chebyshev (MVUE) UCL	0.439827	
Non-parametric Statisitics		
95% CLT UCL	0.204432	
95% Adjusted-CLT UCL	0.184654	
95% Modified-t UCL	0.21801	
95% Jackknife UCL	0.221095	
95% Chebyshev (Mean, Sd) UCL	0.268259	
97.5% Chebyshev (Mean, Sd) UCL	0.312615	
99% Chebyshev (Mean, Sd) UCL	0.399744	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.221095	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Benzo(k)fluoranthene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.1	
Maximum	0.21	
Mean	0.17625	
Standard Deviation	0.051214	
Variance	0.002623	
Coefficient of Variation	0.290578	
Skewness	-1.910158	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.742382	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.236513	
Gamma Statistics		
k hat	12.35804	
k star (bias corrected)	3.256177	
Theta hat	0.014262	
Theta star	0.054128	
nu hat	98.86434	
nu star	26.04942	
5% Approximate Chi Square Value	15.41559	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.750646	
Anderson-Darling 5% Critical Value	0.657098	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.425688	
Kolmogrov-Smirnov 5% Critical Value	0.394767	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.297829	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.302585	
Maximum of log data	-1.560648	
Mean of log data	-1.776857	
Standard Deviation of log data	0.351833	
Variance of log data	0.123786	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.711722	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.17997	
MLE Standard Deviation	0.06533	
MLE Coefficient of Variation	0.363007	
MLE Skewness	1.136855	
MLE Median	0.169169	
MLE 80% Quantile	0.227738	
MLE 90% Quantile	0.265869	
MLE 95% Quantile	0.301769	
MLE 99% Quantile	0.38347	
MVU Estimate of Median	0.166564	
MVU Estimate of Mean	0.177132	
MVU Estimate of Standard Deviation	0.061752	
MVU Estimate of SE of Mean	0.030872	
95% H-UCL	0.372912	
95% Chebyshev (MVUE) UCL	0.311702	
97.5% Chebyshev (MVUE) UCL	0.36993	
99% Chebyshev (MVUE) UCL	0.484309	
Non-parametric Statisitics		
95% CLT UCL	0.21837	
95% Adjusted-CLT UCL	0.192238	
95% Modified-t UCL	0.232437	
95% Jackknife UCL	0.236513	
95% Chebyshev (Mean, Sd) UCL	0.287869	
97.5% Chebyshev (Mean, Sd) UCL	0.336167	
99% Chebyshev (Mean, Sd) UCL	0.431039	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.236513	95% Student's-t UCL
2nd Recommended UCL	0.232437	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Indeno(1,2,3-cd)pyrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.12	
Maximum	0.2	
Mean	0.175	
Standard Deviation	0.037193	
Variance	0.001383	
Coefficient of Variation	0.212533	
Skewness	-1.836714	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.773389	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.218765	
Gamma Statistics		
k hat	25.17198	
k star (bias corrected)	6.459662	
Theta hat	0.006952	
Theta star	0.027091	
nu hat	201.3759	
nu star	51.6773	
5% Approximate Chi Square Value	36.16393	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.662551	
Anderson-Darling 5% Critical Value	0.656892	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.38593	
Kolmogrov-Smirnov 5% Critical Value	0.394168	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.25007	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-2.120264	
Maximum of log data	-1.609438	
Mean of log data	-1.762964	
Standard Deviation of log data	0.240403	
Variance of log data	0.057794	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.746939	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.176565	
MLE Standard Deviation	0.043067	
MLE Coefficient of Variation	0.243918	
MLE Skewness	0.746268	
MLE Median	0.171536	
MLE 80% Quantile	0.210173	
MLE 90% Quantile	0.233623	
MLE 95% Quantile	0.254743	
MLE 99% Quantile	0.300056	
MVU Estimate of Median	0.170299	
MVU Estimate of Mean	0.175278	
MVU Estimate of Standard Deviation	0.041956	
MVU Estimate of SE of Mean	0.020977	
95% H-UCL	0.265296	
95% Chebyshev (MVUE) UCL	0.266716	
97.5% Chebyshev (MVUE) UCL	0.306282	
99% Chebyshev (MVUE) UCL	0.384001	
Non-parametric Statisitics		
95% CLT UCL	0.205589	
95% Adjusted-CLT UCL	0.18734	
95% Modified-t UCL	0.215918	
95% Jackknife UCL	0.218765	
95% Chebyshev (Mean, Sd) UCL	0.256061	
97.5% Chebyshev (Mean, Sd) UCL	0.291136	
99% Chebyshev (Mean, Sd) UCL	0.360034	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.218765	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Phenanthrene	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.195	
Maximum	0.5	
Mean	0.29625	
Standard Deviation	0.142675	
Variance	0.020356	
Coefficient of Variation	0.481604	
Skewness	1.49859	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.826694	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.464133	
Gamma Statistics		
k hat	6.634533	
k star (bias corrected)	1.8253	
Theta hat	0.044653	
Theta star	0.162302	
nu hat	53.07626	
nu star	14.6024	
5% Approximate Chi Square Value	6.984647	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.440456	
Anderson-Darling 5% Critical Value	0.658399	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.292793	
Kolmogrov-Smirnov 5% Critical Value	0.395576	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.619353	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.634756	
Maximum of log data	-0.693147	
Mean of log data	-1.293804	
Standard Deviation of log data	0.439617	
Variance of log data	0.193263	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.867947	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.302047	
MLE Standard Deviation	0.139467	
MLE Coefficient of Variation	0.461738	
MLE Skewness	1.483658	
MLE Median	0.274226	
MLE 80% Quantile	0.397593	
MLE 90% Quantile	0.482441	
MLE 95% Quantile	0.565167	
MLE 99% Quantile	0.762422	
MVU Estimate of Median	0.267649	
MVU Estimate of Mean	0.294536	
MVU Estimate of Standard Deviation	0.127656	
MVU Estimate of SE of Mean	0.06381	
95% H-UCL	0.884698	
95% Chebyshev (MVUE) UCL	0.572678	
97.5% Chebyshev (MVUE) UCL	0.693031	
99% Chebyshev (MVUE) UCL	0.929439	
Non-parametric Statisitics		
95% CLT UCL	0.41359	
95% Adjusted-CLT UCL	0.470705	
95% Modified-t UCL	0.473042	
95% Jackknife UCL	0.464133	
95% Chebyshev (Mean, Sd) UCL	0.607204	
97.5% Chebyshev (Mean, Sd) UCL	0.741754	
99% Chebyshev (Mean, Sd) UCL	1.006051	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.464133	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.22	
Maximum	0.93999	
Mean	0.488748	
Standard Deviation	0.33616	
Variance	0.113003	
Coefficient of Variation	0.687798	
Skewness	1.021743	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.879133	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.8843	
Gamma Statistics		
k hat	2.946635	
k star (bias corrected)	0.903325	
Theta hat	0.165866	
Theta star	0.541054	
nu hat	23.57308	
nu star	7.226603	
5% Approximate Chi Square Value	2.295143	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.370777	
Anderson-Darling 5% Critical Value	0.659471	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.304745	
Kolmogrov-Smirnov 5% Critical Value	0.396632	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.538895	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.514128	
Maximum of log data	-0.061886	
Mean of log data	-0.895087	
Standard Deviation of log data	0.689766	
Variance of log data	0.475778	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.900303	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.518302	
MLE Standard Deviation	0.404563	
MLE Coefficient of Variation	0.780554	
MLE Skewness	2.817228	
MLE Median	0.408572	
MLE 80% Quantile	0.73181	
MLE 90% Quantile	0.991301	
MLE 95% Quantile	1.270714	
MLE 99% Quantile	2.032588	
MVU Estimate of Median	0.384703	
MVU Estimate of Mean	0.485471	
MVU Estimate of Standard Deviation	0.323663	
MVU Estimate of SE of Mean	0.161578	
95% H-UCL	6.380254	
95% Chebyshev (MVUE) UCL	1.189773	
97.5% Chebyshev (MVUE) UCL	1.494525	
99% Chebyshev (MVUE) UCL	2.093151	
Non-parametric Statisitics		
95% CLT UCL	0.765214	
95% Adjusted-CLT UCL	0.856964	
95% Modified-t UCL	0.898611	
95% Jackknife UCL	0.8843	
95% Chebyshev (Mean, Sd) UCL	1.22139	
97.5% Chebyshev (Mean, Sd) UCL	1.538405	
99% Chebyshev (Mean, Sd) UCL	2.16112	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.8843	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	3.1	
Maximum	6.2	
Mean	4.625	
Standard Deviation	1.307351	
Variance	1.709167	
Coefficient of Variation	0.28267	
Skewness	0.100359	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	1.000072	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	6.163336	
Gamma Statistics		
k hat	16.10984	
k star (bias corrected)	4.194126	
Theta hat	0.287092	
Theta star	1.102733	
nu hat	128.8787	
nu star	33.55301	
5% Approximate Chi Square Value	21.30527	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.194662	
Anderson-Darling 5% Critical Value	0.657094	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.172164	
Kolmogrov-Smirnov 5% Critical Value	0.394508	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	7.283769	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.131402	
Maximum of log data	1.824549	
Mean of log data	1.500118	
Standard Deviation of log data	0.292909	
Variance of log data	0.085796	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.993059	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	4.678681	
MLE Standard Deviation	1.400355	
MLE Coefficient of Variation	0.299305	
MLE Skewness	0.924729	
MLE Median	4.48222	
MLE 80% Quantile	5.740961	
MLE 90% Quantile	6.530651	
MLE 95% Quantile	7.256909	
MLE 99% Quantile	8.858922	
MVU Estimate of Median	4.434305	
MVU Estimate of Mean	4.627827	
MVU Estimate of Standard Deviation	1.346914	
MVU Estimate of SE of Mean	0.673419	
95% H-UCL	8.057398	
95% Chebyshev (MVUE) UCL	7.56319	
97.5% Chebyshev (MVUE) UCL	8.833324	
99% Chebyshev (MVUE) UCL	11.32826	
Non-parametric Statisitics		
95% CLT UCL	5.700201	
95% Adjusted-CLT UCL	5.735249	
95% Modified-t UCL	6.168803	
95% Jackknife UCL	6.163336	
95% Chebyshev (Mean, Sd) UCL	7.474305	
97.5% Chebyshev (Mean, Sd) UCL	8.707202	
99% Chebyshev (Mean, Sd) UCL	11.12899	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	6.163336	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Barium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	9.5	
Maximum	12.6	
Mean	10.625	
Standard Deviation	1.443087	
Variance	2.0825	
Coefficient of Variation	0.13582	
Skewness	1.155403	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.870136	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	12.32305	
Gamma Statistics		
k hat	75.52137	
k star (bias corrected)	19.04701	
Theta hat	0.140689	
Theta star	0.55783	
nu hat	604.1709	
nu star	152.3761	
5% Approximate Chi Square Value	124.8373	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.402487	
Anderson-Darling 5% Critical Value	0.656236	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.296238	
Kolmogrov-Smirnov 5% Critical Value	0.393907	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	12.96885	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.251292	
Maximum of log data	2.533697	
Mean of log data	2.356574	
Standard Deviation of log data	0.131623	
Variance of log data	0.017325	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.879665	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	10.64656	
MLE Standard Deviation	1.407421	
MLE Coefficient of Variation	0.132195	
MLE Skewness	0.398895	
MLE Median	10.55473	
MLE 80% Quantile	11.79642	
MLE 90% Quantile	12.49976	
MLE 95% Quantile	13.10631	
MLE 99% Quantile	14.33536	
MVU Estimate of Median	10.53189	
MVU Estimate of Mean	10.62344	
MVU Estimate of Standard Deviation	1.396474	
MVU Estimate of SE of Mean	0.698235	
95% H-UCL	12.86206	
95% Chebyshev (MVUE) UCL	13.66698	
97.5% Chebyshev (MVUE) UCL	14.98392	
99% Chebyshev (MVUE) UCL	17.57079	
Non-parametric Statisitics		
95% CLT UCL	11.81183	
95% Adjusted-CLT UCL	12.25723	
95% Modified-t UCL	12.39253	
95% Jackknife UCL	12.32305	
95% Chebyshev (Mean, Sd) UCL	13.77014	
97.5% Chebyshev (Mean, Sd) UCL	15.13104	
99% Chebyshev (Mean, Sd) UCL	17.80427	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	12.32305	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.0205	
Maximum	0.18	
Mean	0.078125	
Standard Deviation	0.074958	
Variance	0.005619	
Coefficient of Variation	0.959465	
Skewness	1.107603	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.863946	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.166327	
Gamma Statistics		
k hat	1.396553	
k star (bias corrected)	0.515805	
Theta hat	0.055941	
Theta star	0.151462	
nu hat	11.17242	
nu star	4.126438	
5% Approximate Chi Square Value	0.771973	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.396222	
Anderson-Darling 5% Critical Value	0.663247	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.315363	
Kolmogrov-Smirnov 5% Critical Value	0.400102	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.417602	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-3.88733	
Maximum of log data	-1.714798	
Mean of log data	-2.948377	
Standard Deviation of log data	1.058655	
Variance of log data	1.12075	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.879771	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.091813	
MLE Standard Deviation	0.132005	
MLE Coefficient of Variation	1.437759	
MLE Skewness	7.285346	
MLE Median	0.052425	
MLE 80% Quantile	0.128245	
MLE 90% Quantile	0.204333	
MLE 95% Quantile	0.299126	
MLE 99% Quantile	0.615115	
MVU Estimate of Median	0.045383	
MVU Estimate of Mean	0.077409	
MVU Estimate of Standard Deviation	0.075997	
MVU Estimate of SE of Mean	0.037723	
95% H-UCL	30.31451	
95% Chebyshev (MVUE) UCL	0.241838	
97.5% Chebyshev (MVUE) UCL	0.312987	
99% Chebyshev (MVUE) UCL	0.452745	
Non-parametric Statisitics		
95% CLT UCL	0.139773	
95% Adjusted-CLT UCL	0.161951	
95% Modified-t UCL	0.169786	
95% Jackknife UCL	0.166327	
95% Chebyshev (Mean, Sd) UCL	0.241493	
97.5% Chebyshev (Mean, Sd) UCL	0.312182	
99% Chebyshev (Mean, Sd) UCL	0.451037	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.166327	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	7	
Maximum	9.8	
Mean	8.325	
Standard Deviation	1.431491	
Variance	2.049167	
Coefficient of Variation	0.171951	
Skewness	0.087698	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.842892	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	10.00941	
Gamma Statistics		
k hat	44.94465	
k star (bias corrected)	11.40283	
Theta hat	0.185228	
Theta star	0.730082	
nu hat	359.5572	
nu star	91.22264	
5% Approximate Chi Square Value	70.19487	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.497649	
Anderson-Darling 5% Critical Value	0.656134	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.315937	
Kolmogrov-Smirnov 5% Critical Value	0.393891	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	10.81886	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.94591	
Maximum of log data	2.282382	
Mean of log data	2.108097	
Standard Deviation of log data	0.172727	
Variance of log data	0.029835	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.83968	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	8.356288	
MLE Standard Deviation	1.454191	
MLE Coefficient of Variation	0.174024	
MLE Skewness	0.527341	
MLE Median	8.23256	
MLE 80% Quantile	9.526253	
MLE 90% Quantile	10.27847	
MLE 95% Quantile	10.93789	
MLE 99% Quantile	12.30321	
MVU Estimate of Median	8.201892	
MVU Estimate of Mean	8.324975	
MVU Estimate of Standard Deviation	1.434746	
MVU Estimate of SE of Mean	0.717368	
95% H-UCL	10.86716	
95% Chebyshev (MVUE) UCL	11.45191	
97.5% Chebyshev (MVUE) UCL	12.80494	
99% Chebyshev (MVUE) UCL	15.4627	
Non-parametric Statisitics		
95% CLT UCL	9.502297	
95% Adjusted-CLT UCL	9.535832	
95% Modified-t UCL	10.01464	
95% Jackknife UCL	10.00941	
95% Chebyshev (Mean, Sd) UCL	11.44486	
97.5% Chebyshev (Mean, Sd) UCL	12.79483	
99% Chebyshev (Mean, Sd) UCL	15.44658	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	10.00941	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	6.7	
Maximum	16.6	
Mean	11.725	
Standard Deviation	4.813436	
Variance	23.16917	
Coefficient of Variation	0.410528	
Skewness	-0.038366	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892568	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	17.38888	
Gamma Statistics		
k hat	7.420386	
k star (bias corrected)	2.021763	
Theta hat	1.580107	
Theta star	5.799394	
nu hat	59.36309	
nu star	16.17411	
5% Approximate Chi Square Value	8.083878	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.38591	
Anderson-Darling 5% Critical Value	0.658096	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.293854	
Kolmogrov-Smirnov 5% Critical Value	0.395425	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	23.45921	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.902108	
Maximum of log data	2.809403	
Mean of log data	2.392831	
Standard Deviation of log data	0.436585	
Variance of log data	0.190606	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898497	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	12.03879	
MLE Standard Deviation	5.516642	
MLE Coefficient of Variation	0.458239	
MLE Skewness	1.470939	
MLE Median	10.94443	
MLE 80% Quantile	15.82743	
MLE 90% Quantile	19.1795	
MLE 95% Quantile	22.44376	
MLE 99% Quantile	30.21465	
MVU Estimate of Median	10.68553	
MVU Estimate of Mean	11.74366	
MVU Estimate of Standard Deviation	5.055725	
MVU Estimate of SE of Mean	2.527169	
95% H-UCL	34.79509	
95% Chebyshev (MVUE) UCL	22.75933	
97.5% Chebyshev (MVUE) UCL	27.52582	
99% Chebyshev (MVUE) UCL	36.88867	
Non-parametric Statisitics		
95% CLT UCL	15.6837	
95% Adjusted-CLT UCL	15.63437	
95% Modified-t UCL	17.38119	
95% Jackknife UCL	17.38888	
95% Chebyshev (Mean, Sd) UCL	22.21564	
97.5% Chebyshev (Mean, Sd) UCL	26.75495	
99% Chebyshev (Mean, Sd) UCL	35.67154	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	17.38888	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	9	
Maximum	39.9	
Mean	18.925	
Standard Deviation	14.17024	
Variance	200.7958	
Coefficient of Variation	0.748758	
Skewness	1.842847	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.777171	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	35.59887	
Gamma Statistics		
k hat	3.030495	
k star (bias corrected)	0.924291	
Theta hat	6.244854	
Theta star	20.47516	
nu hat	24.24396	
nu star	7.394324	
5% Approximate Chi Square Value	2.388867	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.476731	
Anderson-Darling 5% Critical Value	0.659394	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.343462	
Kolmogrov-Smirnov 5% Critical Value	0.396548	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	58.57907	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.197225	
Maximum of log data	3.686376	
Mean of log data	2.766515	
Standard Deviation of log data	0.644932	
Variance of log data	0.415937	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.889381	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	19.5795	
MLE Standard Deviation	14.06173	
MLE Coefficient of Variation	0.718186	
MLE Skewness	2.524992	
MLE Median	15.90311	
MLE 80% Quantile	27.42575	
MLE 90% Quantile	36.42489	
MLE 95% Quantile	45.94422	
MLE 99% Quantile	71.28079	
MVU Estimate of Median	15.08907	
MVU Estimate of Mean	18.50231	
MVU Estimate of Standard Deviation	11.58109	
MVU Estimate of SE of Mean	5.78349	
95% H-UCL	177.7353	
95% Chebyshev (MVUE) UCL	43.71196	
97.5% Chebyshev (MVUE) UCL	54.6202	
99% Chebyshev (MVUE) UCL	76.04731	
Non-parametric Statisitics		
95% CLT UCL	30.57899	
95% Adjusted-CLT UCL	37.55468	
95% Modified-t UCL	36.68693	
95% Jackknife UCL	35.59887	
95% Chebyshev (Mean, Sd) UCL	49.80833	
97.5% Chebyshev (Mean, Sd) UCL	63.17157	
99% Chebyshev (Mean, Sd) UCL	89.42108	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	35.59887	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	60.4	
Maximum	103	
Mean	81.65	
Standard Deviation	18.97692	
Variance	360.1233	
Coefficient of Variation	0.232418	
Skewness	0.010746	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.971304	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	103.9798	
Gamma Statistics		
k hat	24.12762	
k star (bias corrected)	6.198572	
Theta hat	3.384089	
Theta star	13.17239	
nu hat	193.021	
nu star	49.58857	
5% Approximate Chi Square Value	34.4182	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.243902	
Anderson-Darling 5% Critical Value	0.656932	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.227097	
Kolmogrov-Smirnov 5% Critical Value	0.394182	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	117.6385	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.100989	
Maximum of log data	4.634729	
Mean of log data	4.381576	
Standard Deviation of log data	0.237625	
Variance of log data	0.056466	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.969139	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	82.25371	
MLE Standard Deviation	19.82476	
MLE Coefficient of Variation	0.24102	
MLE Skewness	0.73706	
MLE Median	79.96392	
MLE 80% Quantile	97.74568	
MLE 90% Quantile	108.5189	
MLE 95% Quantile	118.2108	
MLE 99% Quantile	138.9748	
MVU Estimate of Median	79.40071	
MVU Estimate of Mean	81.66792	
MVU Estimate of Standard Deviation	19.32484	
MVU Estimate of SE of Mean	9.662176	
95% H-UCL	122.7793	
95% Chebyshev (MVUE) UCL	123.7844	
97.5% Chebyshev (MVUE) UCL	142.0082	
99% Chebyshev (MVUE) UCL	177.8054	
Non-parametric Statisitics		
95% CLT UCL	97.25712	
95% Adjusted-CLT UCL	97.3116	
95% Modified-t UCL	103.9883	
95% Jackknife UCL	103.9798	
95% Chebyshev (Mean, Sd) UCL	123.0092	
97.5% Chebyshev (Mean, Sd) UCL	140.9054	
99% Chebyshev (Mean, Sd) UCL	176.059	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	103.9798	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Nickel	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	4.9	
Maximum	7.2	
Mean	6.375	
Standard Deviation	1.040433	
Variance	1.0825	
Coefficient of Variation	0.163205	
Skewness	-1.422618	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.870321	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	7.599258	
Gamma Statistics		
k hat	45.60821	
k star (bias corrected)	11.56872	
Theta hat	0.139777	
Theta star	0.551055	
nu hat	364.8657	
nu star	92.54975	
5% Approximate Chi Square Value	71.36052	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.44931	
Anderson-Darling 5% Critical Value	0.656108	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.280218	
Kolmogrov-Smirnov 5% Critical Value	0.393881	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	8.267942	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.589235	
Maximum of log data	1.974081	
Mean of log data	1.841381	
Standard Deviation of log data	0.175438	
Variance of log data	0.030779	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.84601	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	6.403024	
MLE Standard Deviation	1.132034	
MLE Coefficient of Variation	0.176797	
MLE Skewness	0.535917	
MLE Median	6.30524	
MLE 80% Quantile	7.312801	
MLE 90% Quantile	7.899655	
MLE 95% Quantile	8.414672	
MLE 99% Quantile	9.482522	
MVU Estimate of Median	6.28101	
MVU Estimate of Mean	6.378268	
MVU Estimate of Standard Deviation	1.11642	
MVU Estimate of SE of Mean	0.558206	
95% H-UCL	8.370385	
95% Chebyshev (MVUE) UCL	8.81143	
97.5% Chebyshev (MVUE) UCL	9.864261	
99% Chebyshev (MVUE) UCL	11.93234	
Non-parametric Statisitics		
95% CLT UCL	7.23068	
95% Adjusted-CLT UCL	6.835292	
95% Modified-t UCL	7.537585	
95% Jackknife UCL	7.599258	
95% Chebyshev (Mean, Sd) UCL	8.64257	
97.5% Chebyshev (Mean, Sd) UCL	9.62375	
99% Chebyshev (Mean, Sd) UCL	11.55109	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	7.599258	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.32	
Maximum	0.54	
Mean	0.40375	
Standard Deviation	0.096555	
Variance	0.009323	
Coefficient of Variation	0.239146	
Skewness	1.352339	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.90084	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.517365	
Gamma Statistics		
k hat	25.25618	
k star (bias corrected)	6.480712	
Theta hat	0.015986	
Theta star	0.0623	
nu hat	202.0494	
nu star	51.84569	
5% Approximate Chi Square Value	36.30498	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.320631	
Anderson-Darling 5% Critical Value	0.656889	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.242174	
Kolmogrov-Smirnov 5% Critical Value	0.394166	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.576579	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.139434	
Maximum of log data	-0.616186	
Mean of log data	-0.926887	
Standard Deviation of log data	0.226311	
Variance of log data	0.051217	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.937772	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.40605	
MLE Standard Deviation	0.093083	
MLE Coefficient of Variation	0.22924	
MLE Skewness	0.699767	
MLE Median	0.395784	
MLE 80% Quantile	0.479192	
MLE 90% Quantile	0.529365	
MLE 95% Quantile	0.574299	
MLE 99% Quantile	0.669994	
MVU Estimate of Median	0.393255	
MVU Estimate of Mean	0.403429	
MVU Estimate of Standard Deviation	0.090952	
MVU Estimate of SE of Mean	0.045475	
95% H-UCL	0.590442	
95% Chebyshev (MVUE) UCL	0.601651	
97.5% Chebyshev (MVUE) UCL	0.687422	
99% Chebyshev (MVUE) UCL	0.855902	
Non-parametric Statisitics		
95% CLT UCL	0.48316	
95% Adjusted-CLT UCL	0.51804	
95% Modified-t UCL	0.522805	
95% Jackknife UCL	0.517365	
95% Chebyshev (Mean, Sd) UCL	0.614187	
97.5% Chebyshev (Mean, Sd) UCL	0.705244	
99% Chebyshev (Mean, Sd) UCL	0.884106	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.517365	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	7.3	
Maximum	11.6	
Mean	9.6	
Standard Deviation	1.78699	
Variance	3.193333	
Coefficient of Variation	0.186145	
Skewness	-0.473148	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.985317	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	11.70272	
Gamma Statistics		
k hat	36.57731	
k star (bias corrected)	9.310994	
Theta hat	0.262458	
Theta star	1.031039	
nu hat	292.6185	
nu star	74.48795	
5% Approximate Chi Square Value	55.60755	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.246181	
Anderson-Darling 5% Critical Value	0.656455	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.221445	
Kolmogrov-Smirnov 5% Critical Value	0.394008	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	12.85948	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.987874	
Maximum of log data	2.451005	
Mean of log data	2.248031	
Standard Deviation of log data	0.19416	
Variance of log data	0.037698	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.964714	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	9.64925	
MLE Standard Deviation	1.891295	
MLE Coefficient of Variation	0.196004	
MLE Skewness	0.595543	
MLE Median	9.469074	
MLE 80% Quantile	11.15733	
MLE 90% Quantile	12.1524	
MLE 95% Quantile	13.03222	
MLE 99% Quantile	14.87449	
MVU Estimate of Median	9.424516	
MVU Estimate of Mean	9.603505	
MVU Estimate of Standard Deviation	1.859373	
MVU Estimate of SE of Mean	0.929676	
95% H-UCL	13.0915	
95% Chebyshev (MVUE) UCL	13.65587	
97.5% Chebyshev (MVUE) UCL	15.40933	
99% Chebyshev (MVUE) UCL	18.85367	
Non-parametric Statisitics		
95% CLT UCL	11.06967	
95% Adjusted-CLT UCL	10.84381	
95% Modified-t UCL	11.66749	
95% Jackknife UCL	11.70272	
95% Chebyshev (Mean, Sd) UCL	13.49465	
97.5% Chebyshev (Mean, Sd) UCL	15.17987	
99% Chebyshev (Mean, Sd) UCL	18.49016	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	11.70272	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Sed stat - 01.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	46.1	
Maximum	153	
Mean	102.25	
Standard Deviation	47.31233	
Variance	2238.457	
Coefficient of Variation	0.462712	
Skewness	-0.241756	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973572	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	157.9216	
Gamma Statistics		
k hat	5.334245	
k star (bias corrected)	1.500228	
Theta hat	19.1686	
Theta star	68.15631	
nu hat	42.67396	
nu star	12.00182	
5% Approximate Chi Square Value	5.227223	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.261681	
Anderson-Darling 5% Critical Value	0.658901	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.245906	
Kolmogrov-Smirnov 5% Critical Value	0.395826	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	234.7683	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.830813	
Maximum of log data	5.030438	
Mean of log data	4.530768	
Standard Deviation of log data	0.53249	
Variance of log data	0.283546	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.943602	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	106.9692	
MLE Standard Deviation	61.24676	
MLE Coefficient of Variation	0.572564	
MLE Skewness	1.905396	
MLE Median	92.82985	
MLE 80% Quantile	145.5795	
MLE 90% Quantile	184.0152	
MLE 95% Quantile	222.8981	
MLE 99% Quantile	320.3265	
MVU Estimate of Median	89.57447	
MVU Estimate of Mean	103.0201	
MVU Estimate of Standard Deviation	53.73544	
MVU Estimate of SE of Mean	26.85188	
95% H-UCL	495.2559	
95% Chebyshev (MVUE) UCL	220.0647	
97.5% Chebyshev (MVUE) UCL	270.71	
99% Chebyshev (MVUE) UCL	370.1929	
Non-parametric Statisitics		
95% CLT UCL	141.1609	
95% Adjusted-CLT UCL	138.1055	
95% Modified-t UCL	157.445	
95% Jackknife UCL	157.9216	
95% Chebyshev (Mean, Sd) UCL	205.3648	
97.5% Chebyshev (Mean, Sd) UCL	249.9827	
99% Chebyshev (Mean, Sd) UCL	337.6259	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	157.9216	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - nr-so.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	39.6	
Maximum	266	
Mean	111.78	
Standard Deviation	93.17136	
Variance	8680.902	
Coefficient of Variation	0.833524	
Skewness	1.515906	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.83831	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	200.6087	
Gamma Statistics		
k hat	2.082929	
k star (bias corrected)	0.966505	
Theta hat	53.6648	
Theta star	115.6538	
nu hat	20.82929	
nu star	9.665051	
5% Approximate Chi Square Value	3.7327	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	2.310219	
Anderson-Darling Test Statistic	0.325525	
Anderson-Darling 5% Critical Value	0.684299	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.230435	
Kolmogrov-Smirnov 5% Critical Value	0.360383	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	289.4311	
95% Adjusted Gamma UCL	467.6438	
Lognormal Statistics		
Minimum of log data	3.678829	
Maximum of log data	5.583496	
Mean of log data	4.457681	
Standard Deviation of log data	0.793603	
Variance of log data	0.629806	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.926885	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	118.2244	
MLE Standard Deviation	110.7307	
MLE Coefficient of Variation	0.936615	
MLE Skewness	3.631487	
MLE Median	86.28721	
MLE 80% Quantile	168.726	
MLE 90% Quantile	239.2387	
MLE 95% Quantile	318.3524	
MLE 99% Quantile	546.5376	
MVU Estimate of Median	80.96568	
MVU Estimate of Mean	109.9289	
MVU Estimate of Standard Deviation	85.44409	
MVU Estimate of SE of Mean	38.04965	
95% H-UCL	586.3657	
95% Chebyshev (MVUE) UCL	275.7835	
97.5% Chebyshev (MVUE) UCL	347.5489	
99% Chebyshev (MVUE) UCL	488.5182	
Non-parametric Statisitics		
95% CLT UCL	180.3169	
95% Adjusted-CLT UCL	210.5001	
95% Modified-t UCL	205.3167	
95% Jackknife UCL	200.6087	
95% Chebyshev (Mean, Sd) UCL	293.4044	
97.5% Chebyshev (Mean, Sd) UCL	371.9934	
99% Chebyshev (Mean, Sd) UCL	526.3664	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	175.2147	
95% Bootstrap-t UCL	319.6592	
95% Hall's Bootstrap UCL	489.2972	
95% Percentile Bootstrap UCL	176.6	
95% BCA Bootstrap UCL	165.52	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	200.6087	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - nr-so.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.15	
Maximum	3	
Mean	0.981	
Standard Deviation	1.205593	
Variance	1.453455	
Coefficient of Variation	1.228943	
Skewness	1.652909	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.782562	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.130401	
Gamma Statistics		
k hat	0.926116	
k star (bias corrected)	0.50378	
Theta hat	1.059263	
Theta star	1.94728	
nu hat	9.261157	
nu star	5.037796	
5% Approximate Chi Square Value	1.169284	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	0.544792	
Anderson-Darling Test Statistic	0.393538	
Anderson-Darling 5% Critical Value	0.693382	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.286997	
Kolmogrov-Smirnov 5% Critical Value	0.365078	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4.226585	
95% Adjusted Gamma UCL	9.071495	
Lognormal Statistics		
Minimum of log data	-1.89712	
Maximum of log data	1.098612	
Mean of log data	-0.648209	
Standard Deviation of log data	1.255642	
Variance of log data	1.576637	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922143	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.1504	
MLE Standard Deviation	2.253918	
MLE Coefficient of Variation	1.959248	
MLE Skewness	13.39862	
MLE Median	0.522982	
MLE 80% Quantile	1.511056	
MLE 90% Quantile	2.625551	
MLE 95% Quantile	4.126056	
MLE 99% Quantile	9.702796	
MVU Estimate of Median	0.444748	
MVU Estimate of Mean	0.929904	
MVU Estimate of Standard Deviation	1.110323	
MVU Estimate of SE of Mean	0.486549	
95% H-UCL	50.56998	
95% Chebyshev (MVUE) UCL	3.05072	
97.5% Chebyshev (MVUE) UCL	3.968399	
99% Chebyshev (MVUE) UCL	5.771002	
Non-parametric Statisitics		
95% CLT UCL	1.867835	
95% Adjusted-CLT UCL	2.293689	
95% Modified-t UCL	2.196826	
95% Jackknife UCL	2.130401	
95% Chebyshev (Mean, Sd) UCL	3.331134	
97.5% Chebyshev (Mean, Sd) UCL	4.348039	
99% Chebyshev (Mean, Sd) UCL	6.345551	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.778535	
95% Bootstrap-t UCL	10.92755	
95% Hall's Bootstrap UCL	7.070815	
95% Percentile Bootstrap UCL	1.884	
95% BCA Bootstrap UCL	1.749	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.130401	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - nr-so.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	40	
Maximum	228	
Mean	97.72	
Standard Deviation	77.82642	
Variance	6056.952	
Coefficient of Variation	0.796423	
Skewness	1.617443	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.817959	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	171.919	
Gamma Statistics		
k hat	2.402357	
k star (bias corrected)	1.094276	
Theta hat	40.67671	
Theta star	89.30103	
nu hat	24.02357	
nu star	10.94276	
5% Approximate Chi Square Value	4.53831	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	2.921898	
Anderson-Darling Test Statistic	0.364967	
Anderson-Darling 5% Critical Value	0.683718	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.218091	
Kolmogrov-Smirnov 5% Critical Value	0.360048	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	235.6222	
95% Adjusted Gamma UCL	365.9699	
Lognormal Statistics		
Minimum of log data	3.688879	
Maximum of log data	5.429346	
Mean of log data	4.359771	
Standard Deviation of log data	0.721987	
Variance of log data	0.521266	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.916434	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	101.535	
MLE Standard Deviation	83.98351	
MLE Coefficient of Variation	0.827139	
MLE Skewness	3.047309	
MLE Median	78.23918	
MLE 80% Quantile	144.0053	
MLE 90% Quantile	197.853	
MLE 95% Quantile	256.5799	
MLE 99% Quantile	419.5209	
MVU Estimate of Median	74.23109	
MVU Estimate of Mean	95.7266	
MVU Estimate of Standard Deviation	67.93062	
MVU Estimate of SE of Mean	30.28802	
95% H-UCL	392.8146	
95% Chebyshev (MVUE) UCL	227.749	
97.5% Chebyshev (MVUE) UCL	284.8752	
99% Chebyshev (MVUE) UCL	397.0886	
Non-parametric Statisitics		
95% CLT UCL	154.9692	
95% Adjusted-CLT UCL	181.8701	
95% Modified-t UCL	176.115	
95% Jackknife UCL	171.919	
95% Chebyshev (Mean, Sd) UCL	249.4316	
97.5% Chebyshev (Mean, Sd) UCL	315.0774	
99% Chebyshev (Mean, Sd) UCL	444.0257	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	148.4181	
95% Bootstrap-t UCL	319.2669	
95% Hall's Bootstrap UCL	475.1969	
95% Percentile Bootstrap UCL	156	
95% BCA Bootstrap UCL	140.88	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	171.919	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - nr-so.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	38.6	
Maximum	228	
Mean	96.72	
Standard Deviation	78.36078	
Variance	6140.412	
Coefficient of Variation	0.810182	
Skewness	1.613078	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.818099	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	171.4284	
Gamma Statistics		
k hat	2.296657	
k star (bias corrected)	1.051996	
Theta hat	42.11338	
Theta star	91.9395	
nu hat	22.96657	
nu star	10.51996	
5% Approximate Chi Square Value	4.268418	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	2.715111	
Anderson-Darling Test Statistic	0.36723	
Anderson-Darling 5% Critical Value	0.68391	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.230432	
Kolmogrov-Smirnov 5% Critical Value	0.360159	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	238.3765	
95% Adjusted Gamma UCL	374.751	
Lognormal Statistics		
Minimum of log data	3.653252	
Maximum of log data	5.429346	
Mean of log data	4.33859	
Standard Deviation of log data	0.743348	
Variance of log data	0.552567	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909901	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	100.975	
MLE Standard Deviation	86.72735	
MLE Coefficient of Variation	0.858899	
MLE Skewness	3.210312	
MLE Median	76.59947	
MLE 80% Quantile	143.5552	
MLE 90% Quantile	199.0971	
MLE 95% Quantile	260.1863	
MLE 99% Quantile	431.6513	
MVU Estimate of Median	72.44409	
MVU Estimate of Mean	94.82434	
MVU Estimate of Standard Deviation	69.21036	
MVU Estimate of SE of Mean	30.84816	
95% H-UCL	419.5776	
95% Chebyshev (MVUE) UCL	229.2884	
97.5% Chebyshev (MVUE) UCL	287.471	
99% Chebyshev (MVUE) UCL	401.7597	
Non-parametric Statisitics		
95% CLT UCL	154.3623	
95% Adjusted-CLT UCL	181.3747	
95% Modified-t UCL	175.6418	
95% Jackknife UCL	171.4284	
95% Chebyshev (Mean, Sd) UCL	249.4733	
97.5% Chebyshev (Mean, Sd) UCL	315.5698	
99% Chebyshev (Mean, Sd) UCL	445.4035	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	150.552	
95% Bootstrap-t UCL	283.1953	
95% Hall's Bootstrap UCL	430.1015	
95% Percentile Bootstrap UCL	154.2	
95% BCA Bootstrap UCL	134.88	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	171.4284	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - nr-so.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	111	
Maximum	830	
Mean	308	
Standard Deviation	302.5525	
Variance	91538	
Coefficient of Variation	0.982313	
Skewness	1.884345	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.749022	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	596.4507	
Gamma Statistics		
k hat	1.744569	
k star (bias corrected)	0.831161	
Theta hat	176.5479	
Theta star	370.566	
nu hat	17.44569	
nu star	8.311611	
5% Approximate Chi Square Value	2.916063	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	1.710333	
Anderson-Darling Test Statistic	0.490804	
Anderson-Darling 5% Critical Value	0.685441	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.280335	
Kolmogrov-Smirnov 5% Critical Value	0.361083	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	*GAMMA*	*Data follow gamma distribution at 5% signifcance level*
95% Approximate Gamma UCL	877.8877	
95% Adjusted Gamma UCL	1496.771	
Lognormal Statistics		
Minimum of log data	4.70953	
Maximum of log data	6.721426	
Mean of log data	5.416907	
Standard Deviation of log data	0.833898	
Variance of log data	0.695385	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.880408	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	318.8113	
MLE Standard Deviation	319.5248	
MLE Coefficient of Variation	1.002238	
MLE Skewness	4.013444	
MLE Median	225.1815	
MLE 80% Quantile	455.5703	
MLE 90% Quantile	657.5134	
MLE 95% Quantile	887.7305	
MLE 99% Quantile	1566.427	
MVU Estimate of Median	209.8815	
MVU Estimate of Mean	293.9009	
MVU Estimate of Standard Deviation	239.5285	
MVU Estimate of SE of Mean	106.578	
95% H-UCL	1837.743	
95% Chebyshev (MVUE) UCL	758.4635	
97.5% Chebyshev (MVUE) UCL	959.4801	
99% Chebyshev (MVUE) UCL	1354.338	
Non-parametric Statisitics		
95% CLT UCL	530.5579	
95% Adjusted-CLT UCL	652.3927	
95% Modified-t UCL	615.4544	
95% Jackknife UCL	596.4507	
95% Chebyshev (Mean, Sd) UCL	897.7834	
97.5% Chebyshev (Mean, Sd) UCL	1152.983	
99% Chebyshev (Mean, Sd) UCL	1654.274	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	508.0407	
95% Bootstrap-t UCL	2100.416	
95% Hall's Bootstrap UCL	2178.156	
95% Percentile Bootstrap UCL	553.6	
95% BCA Bootstrap UCL	489.8	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	877.8877	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - nr-so.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.36	
Maximum	2	
Mean	0.804	
Standard Deviation	0.695219	
Variance	0.48333	
Coefficient of Variation	0.864701	
Skewness	1.863329	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.743008	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.466816	
Gamma Statistics		
k hat	2.253147	
k star (bias corrected)	1.034592	
Theta hat	0.356834	
Theta star	0.777118	
nu hat	22.53147	
nu star	10.34592	
5% Approximate Chi Square Value	4.158239	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	2.631209	
Anderson-Darling Test Statistic	0.56415	
Anderson-Darling 5% Critical Value	0.683989	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.312823	
Kolmogrov-Smirnov 5% Critical Value	0.360204	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.000395	
95% Adjusted Gamma UCL	3.16133	
Lognormal Statistics		
Minimum of log data	-1.021651	
Maximum of log data	0.693147	
Mean of log data	-0.456185	
Standard Deviation of log data	0.723231	
Variance of log data	0.523063	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.84313	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.82312	
MLE Standard Deviation	0.68234	
MLE Coefficient of Variation	0.828968	
MLE Skewness	3.05656	
MLE Median	0.633697	
MLE 80% Quantile	1.167594	
MLE 90% Quantile	1.605069	
MLE 95% Quantile	2.082418	
MLE 99% Quantile	3.407743	
MVU Estimate of Median	0.601123	
MVU Estimate of Mean	0.775858	
MVU Estimate of Standard Deviation	0.551489	
MVU Estimate of SE of Mean	0.245886	
95% H-UCL	3.197531	
95% Chebyshev (MVUE) UCL	1.847651	
97.5% Chebyshev (MVUE) UCL	2.311416	
99% Chebyshev (MVUE) UCL	3.222394	
Non-parametric Statisitics		
95% CLT UCL	1.315404	
95% Adjusted-CLT UCL	1.59224	
95% Modified-t UCL	1.509996	
95% Jackknife UCL	1.466816	
95% Chebyshev (Mean, Sd) UCL	2.159232	
97.5% Chebyshev (Mean, Sd) UCL	2.745642	
99% Chebyshev (Mean, Sd) UCL	3.897531	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.272618	
95% Bootstrap-t UCL	7.304643	
95% Hall's Bootstrap UCL	3.97542	
95% Percentile Bootstrap UCL	1.344	
95% BCA Bootstrap UCL	1.208	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2.000395	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - nr-so.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	8.7	
Maximum	31.8	
Mean	16.18	
Standard Deviation	9.418439	
Variance	88.707	
Coefficient of Variation	0.582104	
Skewness	1.511428	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.841789	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	25.15945	
Gamma Statistics		
k hat	4.357918	
k star (bias corrected)	1.8765	
Theta hat	3.712782	
Theta star	8.622433	
nu hat	43.57918	
nu star	18.765	
5% Approximate Chi Square Value	9.944556	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	7.305785	
Anderson-Darling Test Statistic	0.355988	
Anderson-Darling 5% Critical Value	0.68105	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.223653	
Kolmogrov-Smirnov 5% Critical Value	0.3584	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	30.53105	
95% Adjusted Gamma UCL	41.55854	
Lognormal Statistics		
Minimum of log data	2.163323	
Maximum of log data	3.459466	
Mean of log data	2.664677	
Standard Deviation of log data	0.529598	
Variance of log data	0.280474	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915812	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	16.52565	
MLE Standard Deviation	9.403038	
MLE Coefficient of Variation	0.568997	
MLE Skewness	1.891206	
MLE Median	14.36331	
MLE 80% Quantile	22.47013	
MLE 90% Quantile	28.36654	
MLE 95% Quantile	34.32471	
MLE 99% Quantile	49.2309	
MVU Estimate of Median	13.9642	
MVU Estimate of Mean	16.03612	
MVU Estimate of Standard Deviation	8.41383	
MVU Estimate of SE of Mean	3.759217	
95% H-UCL	36.9923	
95% Chebyshev (MVUE) UCL	32.42217	
97.5% Chebyshev (MVUE) UCL	39.51243	
99% Chebyshev (MVUE) UCL	53.43986	
Non-parametric Statisitics		
95% CLT UCL	23.10821	
95% Adjusted-CLT UCL	26.15034	
95% Modified-t UCL	25.63396	
95% Jackknife UCL	25.15945	
95% Chebyshev (Mean, Sd) UCL	34.53992	
97.5% Chebyshev (Mean, Sd) UCL	42.48427	
99% Chebyshev (Mean, Sd) UCL	58.08941	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	22.52119	
95% Bootstrap-t UCL	32.97602	
95% Hall's Bootstrap UCL	52.85714	
95% Percentile Bootstrap UCL	22.56	
95% BCA Bootstrap UCL	21.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	25.15945	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - nr-so.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	110	
Maximum	708	
Mean	291	
Standard Deviation	245.876	
Variance	60455	
Coefficient of Variation	0.844935	
Skewness	1.719294	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.805506	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	525.4158	
Gamma Statistics		
k hat	2.189433	
k star (bias corrected)	1.009107	
Theta hat	132.9111	
Theta star	288.3739	
nu hat	21.89433	
nu star	10.09107	
5% Approximate Chi Square Value	3.997911	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	2.509682	
Anderson-Darling Test Statistic	0.359047	
Anderson-Darling 5% Critical Value	0.684105	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.206784	
Kolmogrov-Smirnov 5% Critical Value	0.360271	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	734.5087	
95% Adjusted Gamma UCL	1170.069	
Lognormal Statistics		
Minimum of log data	4.70048	
Maximum of log data	6.562444	
Mean of log data	5.427902	
Standard Deviation of log data	0.755318	
Variance of log data	0.570505	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.928244	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	302.8248	
MLE Standard Deviation	265.5826	
MLE Coefficient of Variation	0.877018	
MLE Skewness	3.305619	
MLE Median	227.6711	
MLE 80% Quantile	431.0161	
MLE 90% Quantile	600.934	
MLE 95% Quantile	788.7106	
MLE 99% Quantile	1319.187	
MVU Estimate of Median	214.927	
MVU Estimate of Mean	283.7319	
MVU Estimate of Standard Deviation	210.3016	
MVU Estimate of SE of Mean	93.71597	
95% H-UCL	1310.991	
95% Chebyshev (MVUE) UCL	692.2304	
97.5% Chebyshev (MVUE) UCL	868.988	
99% Chebyshev (MVUE) UCL	1216.194	
Non-parametric Statisitics		
95% CLT UCL	471.8666	
95% Adjusted-CLT UCL	562.2059	
95% Modified-t UCL	539.5069	
95% Jackknife UCL	525.4158	
95% Chebyshev (Mean, Sd) UCL	770.3005	
97.5% Chebyshev (Mean, Sd) UCL	977.6943	
99% Chebyshev (Mean, Sd) UCL	1385.079	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	454.0581	
95% Bootstrap-t UCL	985.5711	
95% Hall's Bootstrap UCL	1248.055	
95% Percentile Bootstrap UCL	471.6	
95% BCA Bootstrap UCL	427.6	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	525.4158	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	8.1	
Maximum	10.9	
Mean	8.93	
Standard Deviation	1.128938	
Variance	1.2745	
Coefficient of Variation	0.126421	
Skewness	1.966127	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.751553	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	10.00632	
Gamma Statistics		
k hat	85.44033	
k star (bias corrected)	34.30947	
Theta hat	0.104517	
Theta star	0.260278	
nu hat	854.4033	
nu star	343.0947	
5% Approximate Chi Square Value	301.1654	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	283.8059	
Anderson-Darling Test Statistic	0.696826	
Anderson-Darling 5% Critical Value	0.678132	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.380822	
Kolmogrov-Smirnov 5% Critical Value	0.356832	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	10.17326	
95% Adjusted Gamma UCL	10.79553	
Lognormal Statistics		
Minimum of log data	2.091864	
Maximum of log data	2.388763	
Mean of log data	2.183553	
Standard Deviation of log data	0.118461	
Variance of log data	0.014033	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.775778	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	8.940302	
MLE Standard Deviation	1.062801	
MLE Coefficient of Variation	0.118878	
MLE Skewness	0.358313	
MLE Median	8.877793	
MLE 80% Quantile	9.812453	
MLE 90% Quantile	10.33747	
MLE 95% Quantile	10.78785	
MLE 99% Quantile	11.6942	
MVU Estimate of Median	8.86534	
MVU Estimate of Mean	8.927719	
MVU Estimate of Standard Deviation	1.05709	
MVU Estimate of SE of Mean	0.472744	
95% H-UCL	10.10169	
95% Chebyshev (MVUE) UCL	10.98836	
97.5% Chebyshev (MVUE) UCL	11.88	
99% Chebyshev (MVUE) UCL	13.63146	
Non-parametric Statisitics		
95% CLT UCL	9.760447	
95% Adjusted-CLT UCL	10.23479	
95% Modified-t UCL	10.08031	
95% Jackknife UCL	10.00632	
95% Chebyshev (Mean, Sd) UCL	11.1307	
97.5% Chebyshev (Mean, Sd) UCL	12.08295	
99% Chebyshev (Mean, Sd) UCL	13.95345	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	9.664137	
95% Bootstrap-t UCL	12.14517	
95% Hall's Bootstrap UCL	13.89729	
95% Percentile Bootstrap UCL	9.82	
95% BCA Bootstrap UCL	10.02	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	10.00632	95% Student's-t UCL
2nd Recommended UCL	10.08031	95% Modified-t UCL
3rd Recommended UCL	10.10169	95% H-UCL
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	4	
Minimum	0.095	
Maximum	0.37	
Mean	0.195	
Standard Deviation	0.134071	
Variance	0.017975	
Coefficient of Variation	0.687543	
Skewness	0.720199	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.757904	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.322822	
Gamma Statistics		
k hat	2.785073	
k star (bias corrected)	1.247363	
Theta hat	0.070016	
Theta star	0.15633	
nu hat	27.85073	
nu star	12.47363	
5% Approximate Chi Square Value	5.539556	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	3.702701	
Anderson-Darling Test Statistic	0.77879	
Anderson-Darling 5% Critical Value	0.683021	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.386062	
Kolmogrov-Smirnov 5% Critical Value	0.359646	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.439089	
95% Adjusted Gamma UCL	0.656914	
Lognormal Statistics		
Minimum of log data	-2.353878	
Maximum of log data	-0.994252	
Mean of log data	-1.824897	
Standard Deviation of log data	0.680718	
Variance of log data	0.463376	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.746921	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.203272	
MLE Standard Deviation	0.156061	
MLE Coefficient of Variation	0.767744	
MLE Skewness	2.755766	
MLE Median	0.161234	
MLE 80% Quantile	0.286594	
MLE 90% Quantile	0.386673	
MLE 95% Quantile	0.494051	
MLE 99% Quantile	0.785411	
MVU Estimate of Median	0.153878	
MVU Estimate of Mean	0.193024	
MVU Estimate of Standard Deviation	0.129391	
MVU Estimate of SE of Mean	0.057725	
95% H-UCL	0.689111	
95% Chebyshev (MVUE) UCL	0.444642	
97.5% Chebyshev (MVUE) UCL	0.553517	
99% Chebyshev (MVUE) UCL	0.767382	
Non-parametric Statisitics		
95% CLT UCL	0.293623	
95% Adjusted-CLT UCL	0.314257	
95% Modified-t UCL	0.32604	
95% Jackknife UCL	0.322822	
95% Chebyshev (Mean, Sd) UCL	0.456352	
97.5% Chebyshev (Mean, Sd) UCL	0.56944	
99% Chebyshev (Mean, Sd) UCL	0.791578	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.456352	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	9.3	
Maximum	19.7	
Mean	13.48	
Standard Deviation	5.16062	
Variance	26.632	
Coefficient of Variation	0.382835	
Skewness	0.617082	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.770435	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	18.40009	
Gamma Statistics		
k hat	8.974786	
k star (bias corrected)	3.723248	
Theta hat	1.501986	
Theta star	3.620495	
nu hat	89.74786	
nu star	37.23248	
5% Approximate Chi Square Value	24.26055	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	19.81144	
Anderson-Darling Test Statistic	0.694837	
Anderson-Darling 5% Critical Value	0.679255	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.3446	
Kolmogrov-Smirnov 5% Critical Value	0.357738	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	20.68765	
95% Adjusted Gamma UCL	25.33354	
Lognormal Statistics		
Minimum of log data	2.230014	
Maximum of log data	2.980619	
Mean of log data	2.544462	
Standard Deviation of log data	0.371977	
Variance of log data	0.138367	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.780247	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	13.64872	
MLE Standard Deviation	5.257798	
MLE Coefficient of Variation	0.385223	
MLE Skewness	1.212834	
MLE Median	12.73638	
MLE 80% Quantile	17.44028	
MLE 90% Quantile	20.5416	
MLE 95% Quantile	23.48505	
MLE 99% Quantile	30.25557	
MVU Estimate of Median	12.56096	
MVU Estimate of Mean	13.45442	
MVU Estimate of Standard Deviation	4.981714	
MVU Estimate of SE of Mean	2.22735	
95% H-UCL	22.04044	
95% Chebyshev (MVUE) UCL	23.16321	
97.5% Chebyshev (MVUE) UCL	27.36421	
99% Chebyshev (MVUE) UCL	35.61627	
Non-parametric Statisitics		
95% CLT UCL	17.27616	
95% Adjusted-CLT UCL	17.9567	
95% Modified-t UCL	18.50624	
95% Jackknife UCL	18.40009	
95% Chebyshev (Mean, Sd) UCL	23.5399	
97.5% Chebyshev (Mean, Sd) UCL	27.89283	
99% Chebyshev (Mean, Sd) UCL	36.44331	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	16.88594	
95% Bootstrap-t UCL	52.4835	
95% Hall's Bootstrap UCL	105.6343	
95% Percentile Bootstrap UCL	17.2	
95% BCA Bootstrap UCL	16.9	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	18.40009	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	18.3	
Maximum	33.8	
Mean	26.74	
Standard Deviation	7.678737	
Variance	58.963	
Coefficient of Variation	0.287163	
Skewness	-0.531454	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.782259	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	34.06083	
Gamma Statistics		
k hat	13.83873	
k star (bias corrected)	5.668824	
Theta hat	1.932259	
Theta star	4.717028	
nu hat	138.3873	
nu star	56.68824	
5% Approximate Chi Square Value	40.37946	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	34.45609	
Anderson-Darling Test Statistic	0.715683	
Anderson-Darling 5% Critical Value	0.678807	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.342941	
Kolmogrov-Smirnov 5% Critical Value	0.357425	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	37.53997	
95% Adjusted Gamma UCL	43.99348	
Lognormal Statistics		
Minimum of log data	2.906901	
Maximum of log data	3.520461	
Mean of log data	3.249595	
Standard Deviation of log data	0.309431	
Variance of log data	0.095748	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.763489	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	27.0441	
MLE Standard Deviation	8.572654	
MLE Coefficient of Variation	0.316988	
MLE Skewness	0.982815	
MLE Median	25.7799	
MLE 80% Quantile	33.48389	
MLE 90% Quantile	38.36763	
MLE 95% Quantile	42.88875	
MLE 99% Quantile	52.94916	
MVU Estimate of Median	25.53385	
MVU Estimate of Mean	26.77993	
MVU Estimate of Standard Deviation	8.260148	
MVU Estimate of SE of Mean	3.693615	
95% H-UCL	39.34747	
95% Chebyshev (MVUE) UCL	42.88003	
97.5% Chebyshev (MVUE) UCL	49.84655	
99% Chebyshev (MVUE) UCL	63.53094	
Non-parametric Statisitics		
95% CLT UCL	32.38849	
95% Adjusted-CLT UCL	31.51639	
95% Modified-t UCL	33.9248	
95% Jackknife UCL	34.06083	
95% Chebyshev (Mean, Sd) UCL	41.70861	
97.5% Chebyshev (Mean, Sd) UCL	48.18554	
99% Chebyshev (Mean, Sd) UCL	60.90822	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	31.78246	
95% Bootstrap-t UCL	33.75753	
95% Hall's Bootstrap UCL	29.29902	
95% Percentile Bootstrap UCL	32.22	
95% BCA Bootstrap UCL	32.9	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	34.06083	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	90.6	
Maximum	204	
Mean	147.52	
Standard Deviation	43.81954	
Variance	1920.152	
Coefficient of Variation	0.297041	
Skewness	-0.012101	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.995249	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	189.2971	
Gamma Statistics		
k hat	13.36856	
k star (bias corrected)	5.480757	
Theta hat	11.03485	
Theta star	26.91599	
nu hat	133.6856	
nu star	54.80757	
5% Approximate Chi Square Value	38.793	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	32.99999	
Anderson-Darling Test Statistic	0.174728	
Anderson-Darling 5% Critical Value	0.678816	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.15444	
Kolmogrov-Smirnov 5% Critical Value	0.357445	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	208.4194	
95% Adjusted Gamma UCL	245.0065	
Lognormal Statistics		
Minimum of log data	4.506454	
Maximum of log data	5.31812	
Mean of log data	4.956097	
Standard Deviation of log data	0.313853	
Variance of log data	0.098504	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.981089	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	149.2091	
MLE Standard Deviation	48.00695	
MLE Coefficient of Variation	0.321743	
MLE Skewness	0.998535	
MLE Median	142.0383	
MLE 80% Quantile	185.1752	
MLE 90% Quantile	212.5968	
MLE 95% Quantile	238.0271	
MLE 99% Quantile	294.7474	
MVU Estimate of Median	140.6437	
MVU Estimate of Mean	147.7088	
MVU Estimate of Standard Deviation	46.20691	
MVU Estimate of SE of Mean	20.66178	
95% H-UCL	218.6074	
95% Chebyshev (MVUE) UCL	237.7714	
97.5% Chebyshev (MVUE) UCL	276.7416	
99% Chebyshev (MVUE) UCL	353.2909	
Non-parametric Statisitics		
95% CLT UCL	179.7537	
95% Adjusted-CLT UCL	179.6404	
95% Modified-t UCL	189.2795	
95% Jackknife UCL	189.2971	
95% Chebyshev (Mean, Sd) UCL	232.94	
97.5% Chebyshev (Mean, Sd) UCL	269.9013	
99% Chebyshev (Mean, Sd) UCL	342.5046	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	175.8136	
95% Bootstrap-t UCL	190.7465	
95% Hall's Bootstrap UCL	189.3539	
95% Percentile Bootstrap UCL	175.12	
95% BCA Bootstrap UCL	169.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	189.2971	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	3	
Minimum	0.09	
Maximum	0.13	
Mean	0.102	
Standard Deviation	0.016432	
Variance	0.00027	
Coefficient of Variation	0.161095	
Skewness	1.735582	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.778543	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.117666	
Gamma Statistics		
k hat	52.94226	
k star (bias corrected)	21.31024	
Theta hat	0.001927	
Theta star	0.004786	
nu hat	529.4226	
nu star	213.1024	
5% Approximate Chi Square Value	180.3127	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	167.042	
Anderson-Darling Test Statistic	0.605988	
Anderson-Darling 5% Critical Value	0.678249	
Anderson-Darling 5% Gamma Test Result	*AD GAMMA*	*Data follow gamma distribution at 5% significance level*
Kolmogrov-Smirnov Test Statistic	0.338917	
Kolmogrov-Smirnov 5% Critical Value	0.356858	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.120549	
95% Adjusted Gamma UCL	0.130126	
Lognormal Statistics		
Minimum of log data	-2.407946	
Maximum of log data	-2.040221	
Mean of log data	-2.292256	
Standard Deviation of log data	0.150419	
Variance of log data	0.022626	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.804383	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.102188	
MLE Standard Deviation	0.015458	
MLE Coefficient of Variation	0.151274	
MLE Skewness	0.457283	
MLE Median	0.101038	
MLE 80% Quantile	0.114732	
MLE 90% Quantile	0.122583	
MLE 95% Quantile	0.129404	
MLE 99% Quantile	0.143362	
MVU Estimate of Median	0.10081	
MVU Estimate of Mean	0.101955	
MVU Estimate of Standard Deviation	0.015324	
MVU Estimate of SE of Mean	0.006853	
95% H-UCL	0.11978	
95% Chebyshev (MVUE) UCL	0.131828	
97.5% Chebyshev (MVUE) UCL	0.144754	
99% Chebyshev (MVUE) UCL	0.170144	
Non-parametric Statisitics		
95% CLT UCL	0.114087	
95% Adjusted-CLT UCL	0.120182	
95% Modified-t UCL	0.118616	
95% Jackknife UCL	0.117666	
95% Chebyshev (Mean, Sd) UCL	0.134031	
97.5% Chebyshev (Mean, Sd) UCL	0.147891	
99% Chebyshev (Mean, Sd) UCL	0.175116	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.117666	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	4	
Minimum	0.3	
Maximum	1.5	
Mean	0.77	
Standard Deviation	0.441022	
Variance	0.1945	
Coefficient of Variation	0.572755	
Skewness	1.373593	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.842452	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.190466	
Gamma Statistics		
k hat	4.091199	
k star (bias corrected)	1.769813	
Theta hat	0.188209	
Theta star	0.435074	
nu hat	40.91199	
nu star	17.69813	
5% Approximate Chi Square Value	9.171709	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	6.659226	
Anderson-Darling Test Statistic	0.445634	
Anderson-Darling 5% Critical Value	0.681192	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.309123	
Kolmogrov-Smirnov 5% Critical Value	0.358437	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.485826	
95% Adjusted Gamma UCL	2.046418	
Lognormal Statistics		
Minimum of log data	-1.203973	
Maximum of log data	0.405465	
Mean of log data	-0.388528	
Standard Deviation of log data	0.56991	
Variance of log data	0.324797	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.910327	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.797615	
MLE Standard Deviation	0.494103	
MLE Coefficient of Variation	0.619476	
MLE Skewness	2.096152	
MLE Median	0.678054	
MLE 80% Quantile	1.097512	
MLE 90% Quantile	1.410306	
MLE 95% Quantile	1.731476	
MLE 99% Quantile	2.552524	
MVU Estimate of Median	0.656268	
MVU Estimate of Mean	0.770045	
MVU Estimate of Standard Deviation	0.434144	
MVU Estimate of SE of Mean	0.193912	
95% H-UCL	1.97397	
95% Chebyshev (MVUE) UCL	1.615289	
97.5% Chebyshev (MVUE) UCL	1.981026	
99% Chebyshev (MVUE) UCL	2.699447	
Non-parametric Statisitics		
95% CLT UCL	1.094416	
95% Adjusted-CLT UCL	1.223874	
95% Modified-t UCL	1.210659	
95% Jackknife UCL	1.190466	
95% Chebyshev (Mean, Sd) UCL	1.629709	
97.5% Chebyshev (Mean, Sd) UCL	2.001706	
99% Chebyshev (Mean, Sd) UCL	2.732422	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.190466	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	13.1	
Maximum	24.3	
Mean	18.72	
Standard Deviation	5.252809	
Variance	27.592	
Coefficient of Variation	0.280599	
Skewness	0.122597	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.867364	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	23.72798	
Gamma Statistics		
k hat	15.61206	
k star (bias corrected)	6.378157	
Theta hat	1.199073	
Theta star	2.935017	
nu hat	156.1206	
nu star	63.78157	
5% Approximate Chi Square Value	46.40514	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	40.00827	
Anderson-Darling Test Statistic	0.415267	
Anderson-Darling 5% Critical Value	0.678773	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.261897	
Kolmogrov-Smirnov 5% Critical Value	0.357349	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	25.72972	
95% Adjusted Gamma UCL	29.8436	
Lognormal Statistics		
Minimum of log data	2.572612	
Maximum of log data	3.190476	
Mean of log data	2.897224	
Standard Deviation of log data	0.28611	
Variance of log data	0.081859	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.878268	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	18.88095	
MLE Standard Deviation	5.514496	
MLE Coefficient of Variation	0.292067	
MLE Skewness	0.901114	
MLE Median	18.12377	
MLE 80% Quantile	23.08048	
MLE 90% Quantile	26.17686	
MLE 95% Quantile	29.01682	
MLE 99% Quantile	35.25886	
MVU Estimate of Median	17.97581	
MVU Estimate of Mean	18.72372	
MVU Estimate of Standard Deviation	5.342454	
MVU Estimate of SE of Mean	2.389011	
95% H-UCL	26.50592	
95% Chebyshev (MVUE) UCL	29.13717	
97.5% Chebyshev (MVUE) UCL	33.64309	
99% Chebyshev (MVUE) UCL	42.49408	
Non-parametric Statisitics		
95% CLT UCL	22.58397	
95% Adjusted-CLT UCL	22.72159	
95% Modified-t UCL	23.74944	
95% Jackknife UCL	23.72798	
95% Chebyshev (Mean, Sd) UCL	28.95961	
97.5% Chebyshev (Mean, Sd) UCL	33.3903	
99% Chebyshev (Mean, Sd) UCL	42.09352	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	22.20041	
95% Bootstrap-t UCL	25.73933	
95% Hall's Bootstrap UCL	24.10531	
95% Percentile Bootstrap UCL	22.12	
95% BCA Bootstrap UCL	21.66	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	23.72798	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - wss.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	33.5	
Maximum	81.5	
Mean	54.04	
Standard Deviation	18.66837	
Variance	348.508	
Coefficient of Variation	0.345455	
Skewness	0.7519	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.944844	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	71.83825	
Gamma Statistics		
k hat	10.85584	
k star (bias corrected)	4.475671	
Theta hat	4.977964	
Theta star	12.07417	
nu hat	108.5584	
nu star	44.75671	
5% Approximate Chi Square Value	30.40886	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	25.35312	
Anderson-Darling Test Statistic	0.245964	
Anderson-Darling 5% Critical Value	0.678864	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.240684	
Kolmogrov-Smirnov 5% Critical Value	0.357553	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	79.53774	
95% Adjusted Gamma UCL	95.39862	
Lognormal Statistics		
Minimum of log data	3.511545	
Maximum of log data	4.400603	
Mean of log data	3.94296	
Standard Deviation of log data	0.340937	
Variance of log data	0.116238	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973186	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	54.65708	
MLE Standard Deviation	19.18945	
MLE Coefficient of Variation	0.351088	
MLE Skewness	1.09654	
MLE Median	51.57102	
MLE 80% Quantile	68.78951	
MLE 90% Quantile	79.92297	
MLE 95% Quantile	90.35988	
MLE 99% Quantile	113.9749	
MVU Estimate of Median	50.97389	
MVU Estimate of Mean	54.00627	
MVU Estimate of Standard Deviation	18.34153	
MVU Estimate of SE of Mean	8.201167	
95% H-UCL	83.67935	
95% Chebyshev (MVUE) UCL	89.75433	
97.5% Chebyshev (MVUE) UCL	105.2225	
99% Chebyshev (MVUE) UCL	135.6069	
Non-parametric Statisitics		
95% CLT UCL	67.77247	
95% Adjusted-CLT UCL	70.77216	
95% Modified-t UCL	72.30614	
95% Jackknife UCL	71.83825	
95% Chebyshev (Mean, Sd) UCL	90.43135	
97.5% Chebyshev (Mean, Sd) UCL	106.1779	
99% Chebyshev (Mean, Sd) UCL	137.109	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	66.05599	
95% Bootstrap-t UCL	89.10751	
95% Hall's Bootstrap UCL	206.1554	
95% Percentile Bootstrap UCL	67.28	
95% BCA Bootstrap UCL	63.98	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	71.83825	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	16.8	
Maximum	86.3	
Mean	30.025	
Standard Deviation	21.61087	
Variance	467.0296	
Coefficient of Variation	0.719762	
Skewness	2.420942	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.616395	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	42.55241	
Gamma Statistics		
k hat	3.537386	
k star (bias corrected)	2.542837	
Theta hat	8.487906	
Theta star	11.80768	
nu hat	70.74772	
nu star	50.85674	
5% Approximate Chi Square Value	35.47727	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	33.25692	
Anderson-Darling Test Statistic	1.429585	
Anderson-Darling 5% Critical Value	0.730681	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.405856	
Kolmogrov-Smirnov 5% Critical Value	0.268111	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	43.0409	
95% Adjusted Gamma UCL	45.91446	
Lognormal Statistics		
Minimum of log data	2.821379	
Maximum of log data	4.45783	
Mean of log data	3.254075	
Standard Deviation of log data	0.510774	
Variance of log data	0.26089	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.741595	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	29.50382	
MLE Standard Deviation	16.10825	
MLE Coefficient of Variation	0.545972	
MLE Skewness	1.800661	
MLE Median	25.89564	
MLE 80% Quantile	39.87218	
MLE 90% Quantile	49.91989	
MLE 95% Quantile	59.99722	
MLE 99% Quantile	84.95616	
MVU Estimate of Median	25.55964	
MVU Estimate of Mean	29.08584	
MVU Estimate of Standard Deviation	15.16389	
MVU Estimate of SE of Mean	4.785282	
95% H-UCL	43.16666	
95% Chebyshev (MVUE) UCL	49.9444	
97.5% Chebyshev (MVUE) UCL	58.96992	
99% Chebyshev (MVUE) UCL	76.69879	
Non-parametric Statisitics		
95% CLT UCL	41.26586	
95% Adjusted-CLT UCL	46.85618	
95% Modified-t UCL	43.42439	
95% Jackknife UCL	42.55241	
95% Chebyshev (Mean, Sd) UCL	59.81352	
97.5% Chebyshev (Mean, Sd) UCL	72.70304	
99% Chebyshev (Mean, Sd) UCL	98.02201	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	40.64113	
95% Bootstrap-t UCL	111.0472	
95% Hall's Bootstrap UCL	121.9126	
95% Percentile Bootstrap UCL	41.15	
95% BCA Bootstrap UCL	40.42	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	59.81352	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.11	
Maximum	1.1	
Mean	0.494	
Standard Deviation	0.324695	
Variance	0.105427	
Coefficient of Variation	0.657277	
Skewness	0.933641	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.884484	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.682219	
Gamma Statistics		
k hat	2.615978	
k star (bias corrected)	1.897851	
Theta hat	0.18884	
Theta star	0.260294	
nu hat	52.31956	
nu star	37.95702	
5% Approximate Chi Square Value	24.84683	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	23.01786	
Anderson-Darling Test Statistic	0.318028	
Anderson-Darling 5% Critical Value	0.733486	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.218095	
Kolmogrov-Smirnov 5% Critical Value	0.268972	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.754654	
95% Adjusted Gamma UCL	0.814618	
Lognormal Statistics		
Minimum of log data	-2.207275	
Maximum of log data	0.09531	
Mean of log data	-0.908363	
Standard Deviation of log data	0.695056	
Variance of log data	0.483102	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.958841	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.513343	
MLE Standard Deviation	0.404563	
MLE Coefficient of Variation	0.788096	
MLE Skewness	2.853773	
MLE Median	0.403184	
MLE 80% Quantile	0.725393	
MLE 90% Quantile	0.984899	
MLE 95% Quantile	1.264913	
MLE 99% Quantile	2.03061	
MVU Estimate of Median	0.39354	
MVU Estimate of Mean	0.499034	
MVU Estimate of Standard Deviation	0.359837	
MVU Estimate of SE of Mean	0.113046	
95% H-UCL	0.921133	
95% Chebyshev (MVUE) UCL	0.991791	
97.5% Chebyshev (MVUE) UCL	1.205008	
99% Chebyshev (MVUE) UCL	1.623831	
Non-parametric Statisitics		
95% CLT UCL	0.662889	
95% Adjusted-CLT UCL	0.695281	
95% Modified-t UCL	0.687272	
95% Jackknife UCL	0.682219	
95% Chebyshev (Mean, Sd) UCL	0.941561	
97.5% Chebyshev (Mean, Sd) UCL	1.135221	
99% Chebyshev (Mean, Sd) UCL	1.515628	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.652949	
95% Bootstrap-t UCL	0.750463	
95% Hall's Bootstrap UCL	0.715138	
95% Percentile Bootstrap UCL	0.65	
95% BCA Bootstrap UCL	0.745	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.682219	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	13.4	
Maximum	211	
Mean	56.29	
Standard Deviation	67.97231	
Variance	4620.234	
Coefficient of Variation	1.207538	
Skewness	1.88989	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.652519	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	95.69227	
Gamma Statistics		
k hat	1.190116	
k star (bias corrected)	0.899748	
Theta hat	47.2979	
Theta star	62.56195	
nu hat	23.80233	
nu star	17.99496	
5% Approximate Chi Square Value	9.385848	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	8.326263	
Anderson-Darling Test Statistic	1.066463	
Anderson-Darling 5% Critical Value	0.744833	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.351936	
Kolmogrov-Smirnov 5% Critical Value	0.27275	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	107.9217	
95% Adjusted Gamma UCL	121.6556	
Lognormal Statistics		
Minimum of log data	2.595255	
Maximum of log data	5.351858	
Mean of log data	3.554827	
Standard Deviation of log data	0.93839	
Variance of log data	0.880576	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.846555	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	54.33207	
MLE Standard Deviation	64.56807	
MLE Coefficient of Variation	1.188397	
MLE Skewness	5.24355	
MLE Median	34.98176	
MLE 80% Quantile	77.30559	
MLE 90% Quantile	116.8228	
MLE 95% Quantile	163.7725	
MLE 99% Quantile	310.2945	
MVU Estimate of Median	33.46902	
MVU Estimate of Mean	51.30891	
MVU Estimate of Standard Deviation	51.30478	
MVU Estimate of SE of Mean	15.91812	
95% H-UCL	137.9173	
95% Chebyshev (MVUE) UCL	120.6944	
97.5% Chebyshev (MVUE) UCL	150.7175	
99% Chebyshev (MVUE) UCL	209.6922	
Non-parametric Statisitics		
95% CLT UCL	91.64569	
95% Adjusted-CLT UCL	105.3718	
95% Modified-t UCL	97.83327	
95% Jackknife UCL	95.69227	
95% Chebyshev (Mean, Sd) UCL	149.9834	
97.5% Chebyshev (Mean, Sd) UCL	190.5245	
99% Chebyshev (Mean, Sd) UCL	270.1599	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	89.85995	
95% Bootstrap-t UCL	294.8188	
95% Hall's Bootstrap UCL	357.3429	
95% Percentile Bootstrap UCL	93.9	
95% BCA Bootstrap UCL	117.49	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	137.9173	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	26.5	
Maximum	82.9	
Mean	40.16	
Standard Deviation	17.64314	
Variance	311.2804	
Coefficient of Variation	0.439321	
Skewness	1.949457	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.748936	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	50.3874	
Gamma Statistics		
k hat	7.669301	
k star (bias corrected)	5.435177	
Theta hat	5.236461	
Theta star	7.388903	
nu hat	153.386	
nu star	108.7035	
5% Approximate Chi Square Value	85.63519	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	82.08232	
Anderson-Darling Test Statistic	0.79953	
Anderson-Darling 5% Critical Value	0.727106	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.267299	
Kolmogrov-Smirnov 5% Critical Value	0.267003	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	50.97828	
95% Adjusted Gamma UCL	53.18484	
Lognormal Statistics		
Minimum of log data	3.277145	
Maximum of log data	4.417635	
Mean of log data	3.626262	
Standard Deviation of log data	0.360875	
Variance of log data	0.130231	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.848695	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	40.10005	
MLE Standard Deviation	14.95529	
MLE Coefficient of Variation	0.37295	
MLE Skewness	1.170723	
MLE Median	37.57211	
MLE 80% Quantile	50.96818	
MLE 90% Quantile	59.7391	
MLE 95% Quantile	68.0268	
MLE 99% Quantile	86.97822	
MVU Estimate of Median	37.32811	
MVU Estimate of Mean	39.82749	
MVU Estimate of Standard Deviation	14.52354	
MVU Estimate of SE of Mean	4.59024	
95% H-UCL	51.27312	
95% Chebyshev (MVUE) UCL	59.83589	
97.5% Chebyshev (MVUE) UCL	68.49353	
99% Chebyshev (MVUE) UCL	85.4998	
Non-parametric Statisitics		
95% CLT UCL	49.33705	
95% Adjusted-CLT UCL	53.01216	
95% Modified-t UCL	50.96064	
95% Jackknife UCL	50.3874	
95% Chebyshev (Mean, Sd) UCL	64.47939	
97.5% Chebyshev (Mean, Sd) UCL	75.00241	
99% Chebyshev (Mean, Sd) UCL	95.67285	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	48.82113	
95% Bootstrap-t UCL	70.96007	
95% Hall's Bootstrap UCL	100.1974	
95% Percentile Bootstrap UCL	49.35	
95% BCA Bootstrap UCL	47.89	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	50.3874	95% Student's-t UCL
2nd Recommended UCL	50.96064	95% Modified-t UCL
3rd Recommended UCL	51.27312	95% H-UCL
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	128	
Maximum	309	
Mean	193.85	
Standard Deviation	55.34139	
Variance	3062.669	
Coefficient of Variation	0.285486	
Skewness	0.700626	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.908659	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	225.9304	
Gamma Statistics		
k hat	14.02319	
k star (bias corrected)	9.882897	
Theta hat	13.82353	
Theta star	19.61469	
nu hat	280.4637	
nu star	197.6579	
5% Approximate Chi Square Value	166.1236	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	161.0988	
Anderson-Darling Test Statistic	0.428157	
Anderson-Darling 5% Critical Value	0.724855	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.19795	
Kolmogrov-Smirnov 5% Critical Value	0.266445	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	230.6475	
95% Adjusted Gamma UCL	237.8416	
Lognormal Statistics		
Minimum of log data	4.85203	
Maximum of log data	5.733341	
Mean of log data	5.231006	
Standard Deviation of log data	0.283441	
Variance of log data	0.080339	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.917273	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	194.6446	
MLE Standard Deviation	56.29722	
MLE Coefficient of Variation	0.289231	
MLE Skewness	0.891888	
MLE Median	186.9808	
MLE 80% Quantile	237.5823	
MLE 90% Quantile	269.1391	
MLE 95% Quantile	298.0518	
MLE 99% Quantile	361.5104	
MVU Estimate of Median	186.2309	
MVU Estimate of Mean	193.8414	
MVU Estimate of Standard Deviation	55.30039	
MVU Estimate of SE of Mean	17.48381	
95% H-UCL	234.241	
95% Chebyshev (MVUE) UCL	270.0516	
97.5% Chebyshev (MVUE) UCL	303.0278	
99% Chebyshev (MVUE) UCL	367.8032	
Non-parametric Statisitics		
95% CLT UCL	222.6357	
95% Adjusted-CLT UCL	226.7788	
95% Modified-t UCL	226.5766	
95% Jackknife UCL	225.9304	
95% Chebyshev (Mean, Sd) UCL	270.1328	
97.5% Chebyshev (Mean, Sd) UCL	303.1405	
99% Chebyshev (Mean, Sd) UCL	367.9776	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	221.5738	
95% Bootstrap-t UCL	230.7243	
95% Hall's Bootstrap UCL	238.4249	
95% Percentile Bootstrap UCL	220.85	
95% BCA Bootstrap UCL	232.5	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	225.9304	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05 xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	8	
Minimum	0.07	
Maximum	0.6	
Mean	0.174	
Standard Deviation	0.160083	
Variance	0.025627	
Coefficient of Variation	0.920019	
Skewness	2.517282	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.654362	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.266797	
Gamma Statistics		
k hat	2.253629	
k star (bias corrected)	1.644207	
Theta hat	0.077209	
Theta star	0.105826	
nu hat	45.07257	
nu star	32.88414	
5% Approximate Chi Square Value	20.77229	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	19.11499	
Anderson-Darling Test Statistic	0.827778	
Anderson-Darling 5% Critical Value	0.734718	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.27484	
Kolmogrov-Smirnov 5% Critical Value	0.269465	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.275455	
95% Adjusted Gamma UCL	0.299338	
Lognormal Statistics		
Minimum of log data	-2.65926	
Maximum of log data	-0.510826	
Mean of log data	-1.986675	
Standard Deviation of log data	0.652604	
Variance of log data	0.425892	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.870468	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.169699	
MLE Standard Deviation	0.123654	
MLE Coefficient of Variation	0.728666	
MLE Skewness	2.572888	
MLE Median	0.137151	
MLE 80% Quantile	0.238062	
MLE 90% Quantile	0.317246	
MLE 95% Quantile	0.401262	
MLE 99% Quantile	0.625804	
MVU Estimate of Median	0.134255	
MVU Estimate of Mean	0.16559	
MVU Estimate of Standard Deviation	0.111652	
MVU Estimate of SE of Mean	0.035124	
95% H-UCL	0.289305	
95% Chebyshev (MVUE) UCL	0.318693	
97.5% Chebyshev (MVUE) UCL	0.384941	
99% Chebyshev (MVUE) UCL	0.515071	
Non-parametric Statisitics		
95% CLT UCL	0.257267	
95% Adjusted-CLT UCL	0.300326	
95% Modified-t UCL	0.273514	
95% Jackknife UCL	0.266797	
95% Chebyshev (Mean, Sd) UCL	0.39466	
97.5% Chebyshev (Mean, Sd) UCL	0.490139	
99% Chebyshev (Mean, Sd) UCL	0.67769	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.253063	
95% Bootstrap-t UCL	0.484581	
95% Hall's Bootstrap UCL	0.59487	
95% Percentile Bootstrap UCL	0.268	
95% BCA Bootstrap UCL	0.249	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	0.289305	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.325	
Maximum	1.85	
Mean	0.781	
Standard Deviation	0.627016	
Variance	0.393149	
Coefficient of Variation	0.802837	
Skewness	1.102082	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.729448	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.144469	
Gamma Statistics		
k hat	2.080467	
k star (bias corrected)	1.522993	
Theta hat	0.375397	
Theta star	0.512806	
nu hat	41.60934	
nu star	30.45987	
5% Approximate Chi Square Value	18.85267	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	17.28198	
Anderson-Darling Test Statistic	1.162012	
Anderson-Darling 5% Critical Value	0.735306	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.334021	
Kolmogrov-Smirnov 5% Critical Value	0.269701	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1.261845	
95% Adjusted Gamma UCL	1.37653	
Lognormal Statistics		
Minimum of log data	-1.12393	
Maximum of log data	0.615186	
Mean of log data	-0.506359	
Standard Deviation of log data	0.728278	
Variance of log data	0.530388	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.774063	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.785712	
MLE Standard Deviation	0.657182	
MLE Coefficient of Variation	0.836416	
MLE Skewness	3.094399	
MLE Median	0.602686	
MLE 80% Quantile	1.115202	
MLE 90% Quantile	1.536455	
MLE 95% Quantile	1.997023	
MLE 99% Quantile	3.279249	
MVU Estimate of Median	0.586875	
MVU Estimate of Mean	0.761379	
MVU Estimate of Standard Deviation	0.577166	
MVU Estimate of SE of Mean	0.181102	
95% H-UCL	1.470166	
95% Chebyshev (MVUE) UCL	1.550786	
97.5% Chebyshev (MVUE) UCL	1.892363	
99% Chebyshev (MVUE) UCL	2.563325	
Non-parametric Statisitics		
95% CLT UCL	1.107141	
95% Adjusted-CLT UCL	1.180978	
95% Modified-t UCL	1.155986	
95% Jackknife UCL	1.144469	
95% Chebyshev (Mean, Sd) UCL	1.645282	
97.5% Chebyshev (Mean, Sd) UCL	2.019257	
99% Chebyshev (Mean, Sd) UCL	2.753859	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.096828	
95% Bootstrap-t UCL	1.300768	
95% Hall's Bootstrap UCL	1.065692	
95% Percentile Bootstrap UCL	1.102	
95% BCA Bootstrap UCL	1.031	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1.645282	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	17.2	
Maximum	34.9	
Mean	22.72	
Standard Deviation	5.467439	
Variance	29.89289	
Coefficient of Variation	0.240644	
Skewness	1.366908	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.857495	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	25.88937	
Gamma Statistics		
k hat	21.73961	
k star (bias corrected)	15.28439	
Theta hat	1.045097	
Theta star	1.486484	
nu hat	434.7921	
nu star	305.6878	
5% Approximate Chi Square Value	266.1774	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	259.7642	
Anderson-Darling Test Statistic	0.528555	
Anderson-Darling 5% Critical Value	0.724541	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.238854	
Kolmogrov-Smirnov 5% Critical Value	0.266152	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	26.09247	
95% Adjusted Gamma UCL	26.73666	
Lognormal Statistics		
Minimum of log data	2.844909	
Maximum of log data	3.552487	
Mean of log data	3.10007	
Standard Deviation of log data	0.220713	
Variance of log data	0.048714	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904085	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	22.74685	
MLE Standard Deviation	5.082291	
MLE Coefficient of Variation	0.223428	
MLE Skewness	0.681438	
MLE Median	22.1995	
MLE 80% Quantile	26.75101	
MLE 90% Quantile	29.47923	
MLE 95% Quantile	31.91712	
MLE 99% Quantile	37.09373	
MVU Estimate of Median	22.14548	
MVU Estimate of Mean	22.69053	
MVU Estimate of Standard Deviation	5.027936	
MVU Estimate of SE of Mean	1.589847	
95% H-UCL	26.1585	
95% Chebyshev (MVUE) UCL	29.62051	
97.5% Chebyshev (MVUE) UCL	32.61912	
99% Chebyshev (MVUE) UCL	38.50931	
Non-parametric Statisitics		
95% CLT UCL	25.56388	
95% Adjusted-CLT UCL	26.36243	
95% Modified-t UCL	26.01393	
95% Jackknife UCL	25.88937	
95% Chebyshev (Mean, Sd) UCL	30.25634	
97.5% Chebyshev (Mean, Sd) UCL	33.51733	
99% Chebyshev (Mean, Sd) UCL	39.9229	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	25.35637	
95% Bootstrap-t UCL	27.61621	
95% Hall's Bootstrap UCL	26.83498	
95% Percentile Bootstrap UCL	25.58	
95% BCA Bootstrap UCL	25.18	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	25.88937	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - cb05.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	60.7	
Maximum	259	
Mean	129.67	
Standard Deviation	62.62208	
Variance	3921.525	
Coefficient of Variation	0.482934	
Skewness	1.171879	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.853121	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	165.9708	
Gamma Statistics		
k hat	5.50119	
k star (bias corrected)	3.9175	
Theta hat	23.57126	
Theta star	33.10019	
nu hat	110.0238	
nu star	78.35	
5% Approximate Chi Square Value	58.95409	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	56.0385	
Anderson-Darling Test Statistic	0.55421	
Anderson-Darling 5% Critical Value	0.72901	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.237145	
Kolmogrov-Smirnov 5% Critical Value	0.26735	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	172.3315	
95% Adjusted Gamma UCL	181.2976	
Lognormal Statistics		
Minimum of log data	4.105944	
Maximum of log data	5.556828	
Mean of log data	4.771359	
Standard Deviation of log data	0.445451	
Variance of log data	0.198426	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.930409	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	130.3955	
MLE Standard Deviation	61.08887	
MLE Coefficient of Variation	0.468489	
MLE Skewness	1.508293	
MLE Median	118.0796	
MLE 80% Quantile	172.0465	
MLE 90% Quantile	209.2988	
MLE 95% Quantile	245.7034	
MLE 99% Quantile	332.7785	
MVU Estimate of Median	116.9128	
MVU Estimate of Mean	129.0163	
MVU Estimate of Standard Deviation	58.38183	
MVU Estimate of SE of Mean	18.43921	
95% H-UCL	179.3331	
95% Chebyshev (MVUE) UCL	209.3909	
97.5% Chebyshev (MVUE) UCL	244.1691	
99% Chebyshev (MVUE) UCL	312.4841	
Non-parametric Statisitics		
95% CLT UCL	162.2428	
95% Adjusted-CLT UCL	170.0841	
95% Modified-t UCL	167.1939	
95% Jackknife UCL	165.9708	
95% Chebyshev (Mean, Sd) UCL	215.9886	
97.5% Chebyshev (Mean, Sd) UCL	253.3387	
99% Chebyshev (Mean, Sd) UCL	326.7058	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	161.06	
95% Bootstrap-t UCL	180.4067	
95% Hall's Bootstrap UCL	165.9977	
95% Percentile Bootstrap UCL	162.36	
95% BCA Bootstrap UCL	180.94	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	165.9708	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	21.8	
Maximum	272	
Mean	98.63	
Standard Deviation	101.2825	
Variance	10258.14	
Coefficient of Variation	1.026893	
Skewness	1.803742	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.794713	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	195.1918	
Gamma Statistics		
k hat	1.467996	
k star (bias corrected)	0.720532	
Theta hat	67.18682	
Theta star	136.885	
nu hat	14.67996	
nu star	7.205318	
5% Approximate Chi Square Value	2.283313	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	1.264511	
Anderson-Darling Test Statistic	0.308196	
Anderson-Darling 5% Critical Value	0.686707	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.241904	
Kolmogrov-Smirnov 5% Critical Value	0.361845	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	311.241	
95% Adjusted Gamma UCL	562.0043	
Lognormal Statistics		
Minimum of log data	3.08191	
Maximum of log data	5.605802	
Mean of log data	4.213618	
Standard Deviation of log data	0.954432	
Variance of log data	0.910941	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.977445	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	106.6005	
MLE Standard Deviation	129.9765	
MLE Coefficient of Variation	1.219287	
MLE Skewness	5.470526	
MLE Median	67.60065	
MLE 80% Quantile	151.4284	
MLE 90% Quantile	230.4567	
MLE 95% Quantile	324.9458	
MLE 99% Quantile	622.4272	
MVU Estimate of Median	61.6268	
MVU Estimate of Mean	95.41297	
MVU Estimate of Standard Deviation	88.3885	
MVU Estimate of SE of Mean	39.20733	
95% H-UCL	1008.609	
95% Chebyshev (MVUE) UCL	266.3137	
97.5% Chebyshev (MVUE) UCL	340.2626	
99% Chebyshev (MVUE) UCL	485.5209	
Non-parametric Statisitics		
95% CLT UCL	173.1335	
95% Adjusted-CLT UCL	212.1743	
95% Modified-t UCL	201.2814	
95% Jackknife UCL	195.1918	
95% Chebyshev (Mean, Sd) UCL	296.0659	
97.5% Chebyshev (Mean, Sd) UCL	381.4966	
99% Chebyshev (Mean, Sd) UCL	549.3087	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	163.4165	
95% Bootstrap-t UCL	516.8375	
95% Hall's Bootstrap UCL	602.9453	
95% Percentile Bootstrap UCL	171.92	
95% BCA Bootstrap UCL	204	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	195.1918	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.115	
Maximum	4.6	
Mean	1.352	
Standard Deviation	1.884325	
Variance	3.550683	
Coefficient of Variation	1.393732	
Skewness	1.879907	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.741939	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	*NOT NORMAL*	*Data not normal at 5% significance level*
95% Student's-t UCL	3.148498	
Gamma Statistics		
k hat	0.736135	
k star (bias corrected)	0.427787	
Theta hat	1.836619	
Theta star	3.160448	
nu hat	7.361352	
nu star	4.277874	
5% Approximate Chi Square Value	0.834132	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	0.355888	
Anderson-Darling Test Statistic	0.385166	
Anderson-Darling 5% Critical Value	0.698955	
Anderson-Darling 5% Gamma Test Result	*AD GAMMA*	*Data follow gamma distribution at 5% signifcance level*
Kolmogrov-Smirnov Test Statistic	0.305136	
Kolmogrov-Smirnov 5% Critical Value	0.366945	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	6.933781	
95% Adjusted Gamma UCL	16.25141	
Lognormal Statistics		
Minimum of log data	-2.162823	
Maximum of log data	1.526056	
Mean of log data	-0.513696	
Standard Deviation of log data	1.447631	
Variance of log data	2.095636	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.950933	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.70595	
MLE Standard Deviation	4.555434	
MLE Coefficient of Variation	2.67032	
MLE Skewness	27.05198	
MLE Median	0.59828	
MLE 80% Quantile	2.033082	
MLE 90% Quantile	3.843988	
MLE 95% Quantile	6.473117	
MLE 99% Quantile	17.3483	
MVU Estimate of Median	0.481361	
MVU Estimate of Mean	1.261237	
MVU Estimate of Standard Deviation	1.710337	
MVU Estimate of SE of Mean	0.741036	
95% H-UCL	248.7994	
95% Chebyshev (MVUE) UCL	4.491337	
97.5% Chebyshev (MVUE) UCL	5.889003	
99% Chebyshev (MVUE) UCL	8.634449	
Non-parametric Statisitics		
95% CLT UCL	2.738112	
95% Adjusted-CLT UCL	3.495123	
95% Modified-t UCL	3.266577	
95% Jackknife UCL	3.148498	
95% Chebyshev (Mean, Sd) UCL	5.025227	
97.5% Chebyshev (Mean, Sd) UCL	6.614635	
99% Chebyshev (Mean, Sd) UCL	9.736719	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.580562	
95% Bootstrap-t UCL	20.3014	
95% Hall's Bootstrap UCL	16.42901	
95% Percentile Bootstrap UCL	2.843	
95% BCA Bootstrap UCL	3.109	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	6.933781	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	32.6	
Maximum	550	
Mean	193.25	
Standard Deviation	207.5264	
Variance	43067.21	
Coefficient of Variation	1.073875	
Skewness	1.834401	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.792603	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	391.1037	
Gamma Statistics		
k hat	1.301865	
k star (bias corrected)	0.654079	
Theta hat	148.4409	
Theta star	295.4535	
nu hat	13.01865	
nu star	6.540793	
5% Approximate Chi Square Value	1.921635	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	1.01971	
Anderson-Darling Test Statistic	0.283685	
Anderson-Darling 5% Critical Value	0.688352	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.224252	
Kolmogrov-Smirnov 5% Critical Value	0.362756	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	657.7774	
95% Adjusted Gamma UCL	1239.576	
Lognormal Statistics		
Minimum of log data	3.484312	
Maximum of log data	6.309918	
Mean of log data	4.833109	
Standard Deviation of log data	1.043479	
Variance of log data	1.088847	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.986232	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	216.4875	
MLE Standard Deviation	303.9201	
MLE Coefficient of Variation	1.403869	
MLE Skewness	6.97842	
MLE Median	125.6009	
MLE 80% Quantile	303.3383	
MLE 90% Quantile	480.0927	
MLE 95% Quantile	698.9865	
MLE 99% Quantile	1422.598	
MVU Estimate of Median	112.4123	
MVU Estimate of Mean	188.8492	
MVU Estimate of Standard Deviation	190.1986	
MVU Estimate of SE of Mean	84.12292	
95% H-UCL	3085.864	
95% Chebyshev (MVUE) UCL	555.5325	
97.5% Chebyshev (MVUE) UCL	714.1967	
99% Chebyshev (MVUE) UCL	1025.862	
Non-parametric Statisitics		
95% CLT UCL	345.9066	
95% Adjusted-CLT UCL	427.2605	
95% Modified-t UCL	403.7933	
95% Jackknife UCL	391.1037	
95% Chebyshev (Mean, Sd) UCL	597.7934	
97.5% Chebyshev (Mean, Sd) UCL	772.8397	
99% Chebyshev (Mean, Sd) UCL	1116.684	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	331.5488	
95% Bootstrap-t UCL	953.8216	
95% Hall's Bootstrap UCL	1237.224	
95% Percentile Bootstrap UCL	353.66	
95% BCA Bootstrap UCL	406.8	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	391.1037	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	41.4	
Maximum	320	
Mean	145.18	
Standard Deviation	108.4424	
Variance	11759.76	
Coefficient of Variation	0.746952	
Skewness	1.290213	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906639	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	248.568	
Gamma Statistics		
k hat	2.356883	
k star (bias corrected)	1.076086	
Theta hat	61.59832	
Theta star	134.9148	
nu hat	23.56883	
nu star	10.76086	
5% Approximate Chi Square Value	4.421816	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	2.832428	
Anderson-Darling Test Statistic	0.181749	
Anderson-Darling 5% Critical Value	0.6838	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.15818	
Kolmogrov-Smirnov 5% Critical Value	0.360095	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	353.3078	
95% Adjusted Gamma UCL	551.5628	
Lognormal Statistics		
Minimum of log data	3.723281	
Maximum of log data	5.768321	
Mean of log data	4.751078	
Standard Deviation of log data	0.76853	
Variance of log data	0.590638	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.999318	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	155.4614	
MLE Standard Deviation	139.4949	
MLE Coefficient of Variation	0.897296	
MLE Skewness	3.414339	
MLE Median	115.709	
MLE 80% Quantile	221.5141	
MLE 90% Quantile	310.6415	
MLE 95% Quantile	409.6529	
MLE 99% Quantile	691.3728	
MVU Estimate of Median	109.008	
MVU Estimate of Mean	145.2855	
MVU Estimate of Standard Deviation	109.4972	
MVU Estimate of SE of Mean	48.78358	
95% H-UCL	704.7725	
95% Chebyshev (MVUE) UCL	357.9282	
97.5% Chebyshev (MVUE) UCL	449.9388	
99% Chebyshev (MVUE) UCL	630.676	
Non-parametric Statisitics		
95% CLT UCL	224.9504	
95% Adjusted-CLT UCL	254.8503	
95% Modified-t UCL	253.2318	
95% Jackknife UCL	248.568	
95% Chebyshev (Mean, Sd) UCL	356.5732	
97.5% Chebyshev (Mean, Sd) UCL	448.0432	
99% Chebyshev (Mean, Sd) UCL	627.7184	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	217.5459	
95% Bootstrap-t UCL	362.2259	
95% Hall's Bootstrap UCL	692.3064	
95% Percentile Bootstrap UCL	218.6	
95% BCA Bootstrap UCL	260	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	248.568	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	58.1	
Maximum	2850	
Mean	791.28	
Standard Deviation	1193.962	
Variance	1425544	
Coefficient of Variation	1.508899	
Skewness	1.884817	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.727166	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1929.592	
Gamma Statistics		
k hat	0.583668	
k star (bias corrected)	0.366801	
Theta hat	1355.702	
Theta star	2157.249	
nu hat	5.83668	
nu star	3.668005	
5% Approximate Chi Square Value	0.594851	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	0.235055	
Anderson-Darling Test Statistic	0.448464	
Anderson-Darling 5% Critical Value	0.706706	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.302524	
Kolmogrov-Smirnov 5% Critical Value	0.369963	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4879.24	
95% Adjusted Gamma UCL	12347.81	
Lognormal Statistics		
Minimum of log data	4.062166	
Maximum of log data	7.955074	
Mean of log data	5.610705	
Standard Deviation of log data	1.669963	
Variance of log data	2.788776	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898671	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1102.232	
MLE Standard Deviation	4305.921	
MLE Coefficient of Variation	3.906546	
MLE Skewness	71.33782	
MLE Median	273.3369	
MLE 80% Quantile	1120.829	
MLE 90% Quantile	2336.962	
MLE 95% Quantile	4263.278	
MLE 99% Quantile	13293.61	
MVU Estimate of Median	203.875	
MVU Estimate of Mean	715.2384	
MVU Estimate of Standard Deviation	1098.128	
MVU Estimate of SE of Mean	467.9933	
95% H-UCL	798603.7	
95% Chebyshev (MVUE) UCL	2755.174	
97.5% Chebyshev (MVUE) UCL	3637.856	
99% Chebyshev (MVUE) UCL	5371.713	
Non-parametric Statisitics		
95% CLT UCL	1669.559	
95% Adjusted-CLT UCL	2150.476	
95% Modified-t UCL	2004.605	
95% Jackknife UCL	1929.592	
95% Chebyshev (Mean, Sd) UCL	3118.74	
97.5% Chebyshev (Mean, Sd) UCL	4125.833	
99% Chebyshev (Mean, Sd) UCL	6104.073	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1552.63	
95% Bootstrap-t UCL	19307.21	
95% Hall's Bootstrap UCL	7929.334	
95% Percentile Bootstrap UCL	1736.58	
95% BCA Bootstrap UCL	2291.62	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	4879.24	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	0.31	
Maximum	3.4	
Mean	1.189	
Standard Deviation	1.27247	
Variance	1.61918	
Coefficient of Variation	1.070202	
Skewness	1.937987	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.756887	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.402161	
Gamma Statistics		
k hat	1.455329	
k star (bias corrected)	0.715465	
Theta hat	0.816997	
Theta star	1.661856	
nu hat	14.55329	
nu star	7.154651	
5% Approximate Chi Square Value	2.25521	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	1.245195	
Anderson-Darling Test Statistic	0.381117	
Anderson-Darling 5% Critical Value	0.686832	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.225337	
Kolmogrov-Smirnov 5% Critical Value	0.361915	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	3.772101	
95% Adjusted Gamma UCL	6.831767	
Lognormal Statistics		
Minimum of log data	-1.171183	
Maximum of log data	1.223775	
Mean of log data	-0.208236	
Standard Deviation of log data	0.932964	
Variance of log data	0.870423	
Lilliefors Test Statisitic	*N/R*	*Shapiro Wilk method yields a more accurate result*
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.946728	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.254798	
MLE Standard Deviation	1.478278	
MLE Coefficient of Variation	1.1781	
MLE Skewness	5.169408	
MLE Median	0.812015	
MLE 80% Quantile	1.78625	
MLE 90% Quantile	2.692911	
MLE 95% Quantile	3.767796	
MLE 99% Quantile	7.112394	
MVU Estimate of Median	0.743357	
MVU Estimate of Mean	1.129517	
MVU Estimate of Standard Deviation	1.024144	
MVU Estimate of SE of Mean	0.454571	
95% H-UCL	10.81546	
95% Chebyshev (MVUE) UCL	3.110944	
97.5% Chebyshev (MVUE) UCL	3.968309	
99% Chebyshev (MVUE) UCL	5.652437	
Non-parametric Statisitics		
95% CLT UCL	2.12503	
95% Adjusted-CLT UCL	2.652028	
95% Modified-t UCL	2.484362	
95% Jackknife UCL	2.402161	
95% Chebyshev (Mean, Sd) UCL	3.669501	
97.5% Chebyshev (Mean, Sd) UCL	4.742815	
99% Chebyshev (Mean, Sd) UCL	6.851134	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.021773	
95% Bootstrap-t UCL	6.067249	
95% Hall's Bootstrap UCL	6.208976	
95% Percentile Bootstrap UCL	2.242	
95% BCA Bootstrap UCL	2.86	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	3.772101	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	4	
Minimum	0.75	
Maximum	3.4	
Mean	1.47	
Standard Deviation	1.136112	
Variance	1.29075	
Coefficient of Variation	0.772865	
Skewness	1.763467	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.748851	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.553158	
Gamma Statistics		
k hat	2.731423	
k star (bias corrected)	1.225902	
Theta hat	0.538181	
Theta star	1.199117	
nu hat	27.31423	
nu star	12.25902	
5% Approximate Chi Square Value	5.397099	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	3.590428	
Anderson-Darling Test Statistic	0.604203	
Anderson-Darling 5% Critical Value	0.683119	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.331968	
Kolmogrov-Smirnov 5% Critical Value	0.359702	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	3.338973	
95% Adjusted Gamma UCL	5.019114	
Lognormal Statistics		
Minimum of log data	-0.287682	
Maximum of log data	1.223775	
Mean of log data	0.191179	
Standard Deviation of log data	0.657213	
Variance of log data	0.431929	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.815982	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.50252	
MLE Standard Deviation	1.104353	
MLE Coefficient of Variation	0.735001	
MLE Skewness	2.602069	
MLE Median	1.210676	
MLE 80% Quantile	2.109655	
MLE 90% Quantile	2.817072	
MLE 95% Quantile	3.569034	
MLE 99% Quantile	5.58373	
MVU Estimate of Median	1.159131	
MVU Estimate of Mean	1.432246	
MVU Estimate of Standard Deviation	0.927898	
MVU Estimate of SE of Mean	0.414084	
95% H-UCL	4.74157	
95% Chebyshev (MVUE) UCL	3.237198	
97.5% Chebyshev (MVUE) UCL	4.018203	
99% Chebyshev (MVUE) UCL	5.552334	
Non-parametric Statisitics		
95% CLT UCL	2.305725	
95% Adjusted-CLT UCL	2.733878	
95% Modified-t UCL	2.619941	
95% Jackknife UCL	2.553158	
95% Chebyshev (Mean, Sd) UCL	3.68469	
97.5% Chebyshev (Mean, Sd) UCL	4.642988	
99% Chebyshev (Mean, Sd) UCL	6.525378	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	3.338973	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	14.1	
Maximum	41.9	
Mean	26.66	
Standard Deviation	11.80733	
Variance	139.413	
Coefficient of Variation	0.442886	
Skewness	0.155307	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.929826	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	37.91699	
Gamma Statistics		
k hat	5.959491	
k star (bias corrected)	2.51713	
Theta hat	4.473536	
Theta star	10.59143	
nu hat	59.59491	
nu star	25.1713	
5% Approximate Chi Square Value	14.74103	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	11.40518	
Anderson-Darling Test Statistic	0.334089	
Anderson-Darling 5% Critical Value	0.680359	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.249095	
Kolmogrov-Smirnov 5% Critical Value	0.358172	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	45.52375	
95% Adjusted Gamma UCL	58.83877	
Lognormal Statistics		
Minimum of log data	2.646175	
Maximum of log data	3.735286	
Mean of log data	3.196925	
Standard Deviation of log data	0.474939	
Variance of log data	0.225567	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909522	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	27.37714	
MLE Standard Deviation	13.77136	
MLE Coefficient of Variation	0.503024	
MLE Skewness	1.636354	
MLE Median	24.4572	
MLE 80% Quantile	36.53418	
MLE 90% Quantile	45.02516	
MLE 95% Quantile	53.42077	
MLE 99% Quantile	73.82025	
MVU Estimate of Median	23.90966	
MVU Estimate of Mean	26.73127	
MVU Estimate of Standard Deviation	12.60076	
MVU Estimate of SE of Mean	5.631712	
95% H-UCL	54.1018	
95% Chebyshev (MVUE) UCL	51.27933	
97.5% Chebyshev (MVUE) UCL	61.9013	
99% Chebyshev (MVUE) UCL	82.76609	
Non-parametric Statisitics		
95% CLT UCL	35.34548	
95% Adjusted-CLT UCL	35.73736	
95% Modified-t UCL	37.97812	
95% Jackknife UCL	37.91699	
95% Chebyshev (Mean, Sd) UCL	49.67672	
97.5% Chebyshev (Mean, Sd) UCL	59.63607	
99% Chebyshev (Mean, Sd) UCL	79.19929	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	34.45849	
95% Bootstrap-t UCL	37.89872	
95% Hall's Bootstrap UCL	32.81605	
95% Percentile Bootstrap UCL	34.64	
95% BCA Bootstrap UCL	37.44	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	37.91699	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - da.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	5	
Number of Missing Data	0	
Number of Valid Observations	5	
Number of Distinct Observations	5	
Minimum	53.1	
Maximum	843	
Mean	274.54	
Standard Deviation	333.8751	
Variance	111472.6	
Coefficient of Variation	1.216126	
Skewness	1.775018	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.766314	
Shapiro-Wilk 5% Critical Value	0.762	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	592.8534	
Gamma Statistics		
k hat	1.010672	
k star (bias corrected)	0.537602	
Theta hat	271.6411	
Theta star	510.6751	
nu hat	10.10672	
nu star	5.37602	
5% Approximate Chi Square Value	1.329326	
Adjusted Level of Significance	0.0086	
Adjusted Chi Square Value	0.640876	
Anderson-Darling Test Statistic	0.413335	
Anderson-Darling 5% Critical Value	0.691234	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.263556	
Kolmogrov-Smirnov 5% Critical Value	0.364352	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1110.286	
95% Adjusted Gamma UCL	2302.993	
Lognormal Statistics		
Minimum of log data	3.972177	
Maximum of log data	6.736967	
Mean of log data	5.044685	
Standard Deviation of log data	1.176202	
Variance of log data	1.383451	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904768	
Shapiro-Wilk 5% Critical Value	0.762	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	309.9497	
MLE Standard Deviation	535.8315	
MLE Coefficient of Variation	1.728769	
MLE Skewness	10.35298	
MLE Median	155.1954	
MLE 80% Quantile	419.2953	
MLE 90% Quantile	703.5255	
MLE 95% Quantile	1074.421	
MLE 99% Quantile	2393.544	
MVU Estimate of Median	134.6925	
MVU Estimate of Mean	258.4643	
MVU Estimate of Standard Deviation	290.7697	
MVU Estimate of SE of Mean	127.9107	
95% H-UCL	8715.374	
95% Chebyshev (MVUE) UCL	816.014	
97.5% Chebyshev (MVUE) UCL	1057.266	
99% Chebyshev (MVUE) UCL	1531.16	
Non-parametric Statisitics		
95% CLT UCL	520.1388	
95% Adjusted-CLT UCL	646.7866	
95% Modified-t UCL	612.6079	
95% Jackknife UCL	592.8534	
95% Chebyshev (Mean, Sd) UCL	925.3824	
97.5% Chebyshev (Mean, Sd) UCL	1207.002	
99% Chebyshev (Mean, Sd) UCL	1760.191	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	496.2363	
95% Bootstrap-t UCL	2307.563	
95% Hall's Bootstrap UCL	2527.484	
95% Percentile Bootstrap UCL	528.04	
95% BCA Bootstrap UCL	685.02	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	592.8534	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - kf-so.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	19.9	
Maximum	53.3	
Mean	39.57	
Standard Deviation	10.7859	
Variance	116.3357	
Coefficient of Variation	0.272578	
Skewness	-0.487068	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.954791	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	45.82238	
Gamma Statistics		
k hat	12.87706	
k star (bias corrected)	9.080605	
Theta hat	3.072907	
Theta star	4.357639	
nu hat	257.5411	
nu star	181.6121	
5% Approximate Chi Square Value	151.4352	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	146.6466	
Anderson-Darling Test Statistic	0.319461	
Anderson-Darling 5% Critical Value	0.724913	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.151354	
Kolmogrov-Smirnov 5% Critical Value	0.266498	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	47.45521	
95% Adjusted Gamma UCL	49.00482	
Lognormal Statistics		
Minimum of log data	2.99072	
Maximum of log data	3.975936	
Mean of log data	3.63874	
Standard Deviation of log data	0.309434	
Variance of log data	0.09575	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.909542	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	39.90953	
MLE Standard Deviation	12.65098	
MLE Coefficient of Variation	0.316991	
MLE Skewness	0.982827	
MLE Median	38.04388	
MLE 80% Quantile	49.41294	
MLE 90% Quantile	56.62007	
MLE 95% Quantile	63.29206	
MLE 99% Quantile	78.13865	
MVU Estimate of Median	37.8621	
MVU Estimate of Mean	39.71227	
MVU Estimate of Standard Deviation	12.38352	
MVU Estimate of SE of Mean	3.914839	
95% H-UCL	48.98684	
95% Chebyshev (MVUE) UCL	56.77666	
97.5% Chebyshev (MVUE) UCL	64.16044	
99% Chebyshev (MVUE) UCL	78.66443	
Non-parametric Statisitics		
95% CLT UCL	45.18027	
95% Adjusted-CLT UCL	44.61893	
95% Modified-t UCL	45.73483	
95% Jackknife UCL	45.82238	
95% Chebyshev (Mean, Sd) UCL	54.43734	
97.5% Chebyshev (Mean, Sd) UCL	60.87045	
99% Chebyshev (Mean, Sd) UCL	73.50705	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	44.80592	
95% Bootstrap-t UCL	45.25351	
95% Hall's Bootstrap UCL	44.70306	
95% Percentile Bootstrap UCL	44.66	
95% BCA Bootstrap UCL	46.41	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	45.82238	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - kf-so.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.22	
Maximum	2.1	
Mean	1.0485	
Standard Deviation	0.622674	
Variance	0.387723	
Coefficient of Variation	0.593871	
Skewness	-0.020694	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.932302	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.409452	
Gamma Statistics		
k hat	2.216401	
k star (bias corrected)	1.618147	
Theta hat	0.473064	
Theta star	0.647963	
nu hat	44.32802	
nu star	32.36295	
5% Approximate Chi Square Value	20.35796	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	18.71901	
Anderson-Darling Test Statistic	0.628804	
Anderson-Darling 5% Critical Value	0.734844	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.266	
Kolmogrov-Smirnov 5% Critical Value	0.269516	
Kolmogrov-Smirnov 5% Gamma Test Result	*KS GAMMA*	*Data follow gamma distribution at 5% signifcance level*
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.666795	
95% Adjusted Gamma UCL	1.812732	
Lognormal Statistics		
Minimum of log data	-1.514128	
Maximum of log data	0.741937	
Mean of log data	-0.194877	
Standard Deviation of log data	0.8244	
Variance of log data	0.679635	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.842511	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.155971	
MLE Standard Deviation	1.140351	
MLE Coefficient of Variation	0.986488	
MLE Skewness	3.919472	
MLE Median	0.822936	
MLE 80% Quantile	1.651594	
MLE 90% Quantile	2.373765	
MLE 95% Quantile	3.193959	
MLE 99% Quantile	5.599502	
MVU Estimate of Median	0.795357	
MVU Estimate of Mean	*1.108436*	
MVU Estimate of Standard Deviation	0.960948	
MVU Estimate of SE of Mean	0.300218	
95% H-UCL	2.464941	
95% Chebyshev (MVUE) UCL	2.417058	
97.5% Chebyshev (MVUE) UCL	2.983299	
99% Chebyshev (MVUE) UCL	4.095571	
Non-parametric Statisitics		
95% CLT UCL	1.372383	
95% Adjusted-CLT UCL	1.371006	
95% Modified-t UCL	1.409237	
95% Jackknife UCL	1.409452	
95% Chebyshev (Mean, Sd) UCL	1.906796	
97.5% Chebyshev (Mean, Sd) UCL	2.278182	
99% Chebyshev (Mean, Sd) UCL	3.007697	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.354756	
95% Bootstrap-t UCL	1.390774	
95% Hall's Bootstrap UCL	1.361371	
95% Percentile Bootstrap UCL	1.36	
95% BCA Bootstrap UCL	1.44	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.409452	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - kf-so.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	48.4	
Maximum	141	
Mean	101.14	
Standard Deviation	31.40429	
Variance	986.2293	
Coefficient of Variation	0.310503	
Skewness	-0.763038	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.90325	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	119.3445	
Gamma Statistics		
k hat	9.152	
k star (bias corrected)	6.473067	
Theta hat	11.05114	
Theta star	15.62474	
nu hat	183.04	
nu star	129.4613	
5% Approximate Chi Square Value	104.1737	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	100.2353	
Anderson-Darling Test Statistic	0.699191	
Anderson-Darling 5% Critical Value	0.725805	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.238439	
Kolmogrov-Smirnov 5% Critical Value	0.266766	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	125.6912	
95% Adjusted Gamma UCL	130.6299	
Lognormal Statistics		
Minimum of log data	3.8795	
Maximum of log data	4.94876	
Mean of log data	4.560879	
Standard Deviation of log data	0.37537	
Variance of log data	0.140903	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.821436	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	102.6505	
MLE Standard Deviation	39.92994	
MLE Coefficient of Variation	0.388989	
MLE Skewness	1.225826	
MLE Median	95.66754	
MLE 80% Quantile	131.3764	
MLE 90% Quantile	154.9697	
MLE 95% Quantile	177.3921	
MLE 99% Quantile	229.0613	
MVU Estimate of Median	94.99549	
MVU Estimate of Mean	101.8931	
MVU Estimate of Standard Deviation	38.68122	
MVU Estimate of SE of Mean	12.2243	
95% H-UCL	132.8307	
95% Chebyshev (MVUE) UCL	155.1776	
97.5% Chebyshev (MVUE) UCL	178.2338	
99% Chebyshev (MVUE) UCL	223.5233	
Non-parametric Statisitics		
95% CLT UCL	117.4749	
95% Adjusted-CLT UCL	114.9144	
95% Modified-t UCL	118.9451	
95% Jackknife UCL	119.3445	
95% Chebyshev (Mean, Sd) UCL	144.4278	
97.5% Chebyshev (Mean, Sd) UCL	163.1585	
99% Chebyshev (Mean, Sd) UCL	199.9513	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	116.5497	
95% Bootstrap-t UCL	117.0514	
95% Hall's Bootstrap UCL	114.1219	
95% Percentile Bootstrap UCL	115.95	
95% BCA Bootstrap UCL	112.65	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	119.3445	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - kf-so.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	50.6	
Maximum	146	
Mean	91.14	
Standard Deviation	29.56154	
Variance	873.8849	
Coefficient of Variation	0.324353	
Skewness	0.397471	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.941133	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	108.2763	
Gamma Statistics		
k hat	10.21763	
k star (bias corrected)	7.219008	
Theta hat	8.919876	
Theta star	12.625	
nu hat	204.3526	
nu star	144.3802	
5% Approximate Chi Square Value	117.6063	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	113.4095	
Anderson-Darling Test Statistic	0.343388	
Anderson-Darling 5% Critical Value	0.725049	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.158021	
Kolmogrov-Smirnov 5% Critical Value	0.26662	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	111.8887	
95% Adjusted Gamma UCL	116.0292	
Lognormal Statistics		
Minimum of log data	3.923952	
Maximum of log data	4.983607	
Mean of log data	4.462664	
Standard Deviation of log data	0.339109	
Variance of log data	0.114995	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.928299	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	91.85047	
MLE Standard Deviation	32.06463	
MLE Coefficient of Variation	0.349096	
MLE Skewness	1.089831	
MLE Median	86.71825	
MLE 80% Quantile	115.4932	
MLE 90% Quantile	134.0777	
MLE 95% Quantile	151.4869	
MLE 99% Quantile	190.8395	
MVU Estimate of Median	86.22081	
MVU Estimate of Mean	91.30187	
MVU Estimate of Standard Deviation	31.24864	
MVU Estimate of SE of Mean	9.877458	
95% H-UCL	115.3961	
95% Chebyshev (MVUE) UCL	134.3567	
97.5% Chebyshev (MVUE) UCL	152.9866	
99% Chebyshev (MVUE) UCL	189.5813	
Non-parametric Statisitics		
95% CLT UCL	106.5164	
95% Adjusted-CLT UCL	107.7719	
95% Modified-t UCL	108.4721	
95% Jackknife UCL	108.2763	
95% Chebyshev (Mean, Sd) UCL	131.8878	
97.5% Chebyshev (Mean, Sd) UCL	149.5194	
99% Chebyshev (Mean, Sd) UCL	184.1532	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	106.119	
95% Bootstrap-t UCL	110.223	
95% Hall's Bootstrap UCL	117.3779	
95% Percentile Bootstrap UCL	105.85	
95% BCA Bootstrap UCL	111.46	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	108.2763	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - kf-so.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	245	
Maximum	1380	
Mean	642.3	
Standard Deviation	316.0949	
Variance	99916.01	
Coefficient of Variation	0.49213	
Skewness	1.370641	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.891781	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	825.5343	
Gamma Statistics		
k hat	5.060958	
k star (bias corrected)	3.609337	
Theta hat	126.9127	
Theta star	177.9551	
nu hat	101.2192	
nu star	72.18674	
5% Approximate Chi Square Value	53.61992	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	50.84803	
Anderson-Darling Test Statistic	0.235006	
Anderson-Darling 5% Critical Value	0.729396	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.138801	
Kolmogrov-Smirnov 5% Critical Value	0.26742	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	864.7075	
95% Adjusted Gamma UCL	911.8455	
Lognormal Statistics		
Minimum of log data	5.501258	
Maximum of log data	7.229839	
Mean of log data	6.363019	
Standard Deviation of log data	0.478489	
Variance of log data	0.228952	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.978201	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	650.3397	
MLE Standard Deviation	329.8714	
MLE Coefficient of Variation	0.507229	
MLE Skewness	1.652189	
MLE Median	579.9947	
MLE 80% Quantile	868.9993	
MLE 90% Quantile	1072.639	
MLE 95% Quantile	1274.276	
MLE 99% Quantile	1765.139	
MVU Estimate of Median	573.3861	
MVU Estimate of Mean	642.33	
MVU Estimate of Standard Deviation	312.9526	
MVU Estimate of SE of Mean	98.80393	
95% H-UCL	922.2594	
95% Chebyshev (MVUE) UCL	1073.006	
97.5% Chebyshev (MVUE) UCL	1259.36	
99% Chebyshev (MVUE) UCL	1625.417	
Non-parametric Statisitics		
95% CLT UCL	806.7163	
95% Adjusted-CLT UCL	853.01	
95% Modified-t UCL	832.7552	
95% Jackknife UCL	825.5343	
95% Chebyshev (Mean, Sd) UCL	1078.007	
97.5% Chebyshev (Mean, Sd) UCL	1266.537	
99% Chebyshev (Mean, Sd) UCL	1636.87	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	800.2721	
95% Bootstrap-t UCL	904.0353	
95% Hall's Bootstrap UCL	1520.223	
95% Percentile Bootstrap UCL	810.6	
95% BCA Bootstrap UCL	898.7	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	825.5343	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - kf-so.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.27	
Maximum	0.84	
Mean	0.586	
Standard Deviation	0.178276	
Variance	0.031782	
Coefficient of Variation	0.304225	
Skewness	-0.687505	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.935506	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.689343	
Gamma Statistics		
k hat	9.671392	
k star (bias corrected)	6.836641	
Theta hat	0.060591	
Theta star	0.085715	
nu hat	193.4278	
nu star	136.7328	
5% Approximate Chi Square Value	110.7106	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	106.6445	
Anderson-Darling Test Statistic	0.574553	
Anderson-Darling 5% Critical Value	0.725349	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.221165	
Kolmogrov-Smirnov 5% Critical Value	0.266683	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.723738	
95% Adjusted Gamma UCL	0.751332	
Lognormal Statistics		
Minimum of log data	-1.309333	
Maximum of log data	-0.174353	
Mean of log data	-0.587024	
Standard Deviation of log data	0.364029	
Variance of log data	0.132517	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858255	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.594065	
MLE Standard Deviation	0.223623	
MLE Coefficient of Variation	0.376428	
MLE Skewness	1.182625	
MLE Median	0.555979	
MLE 80% Quantile	0.756222	
MLE 90% Quantile	0.887588	
MLE 95% Quantile	1.011873	
MLE 99% Quantile	1.29655	
MVU Estimate of Median	0.552305	
MVU Estimate of Mean	0.589954	
MVU Estimate of Standard Deviation	0.217052	
MVU Estimate of SE of Mean	0.068599	
95% H-UCL	0.761555	
95% Chebyshev (MVUE) UCL	0.888971	
97.5% Chebyshev (MVUE) UCL	1.018355	
99% Chebyshev (MVUE) UCL	1.272507	
Non-parametric Statisitics		
95% CLT UCL	0.67873	
95% Adjusted-CLT UCL	0.665634	
95% Modified-t UCL	0.6873	
95% Jackknife UCL	0.689343	
95% Chebyshev (Mean, Sd) UCL	0.831736	
97.5% Chebyshev (Mean, Sd) UCL	0.938066	
99% Chebyshev (Mean, Sd) UCL	1.146931	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.672901	
95% Bootstrap-t UCL	0.670938	
95% Hall's Bootstrap UCL	0.669281	
95% Percentile Bootstrap UCL	0.669	
95% BCA Bootstrap UCL	0.695	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.689343	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - kf-so.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	15.5	
Maximum	38.6	
Mean	25.3	
Standard Deviation	6.521418	
Variance	42.52889	
Coefficient of Variation	0.257764	
Skewness	0.629256	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	*N/R*	*Shapiro Wilk method yields a more accurate result*
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.949053	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	29.08034	
Gamma Statistics		
k hat	16.9367	
k star (bias corrected)	11.92236	
Theta hat	1.493797	
Theta star	2.122063	
nu hat	338.7341	
nu star	238.4472	
5% Approximate Chi Square Value	203.6924	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	198.1072	
Anderson-Darling Test Statistic	0.283795	
Anderson-Darling 5% Critical Value	0.724706	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.187022	
Kolmogrov-Smirnov 5% Critical Value	0.266311	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	29.61678	
95% Adjusted Gamma UCL	30.45177	
Lognormal Statistics		
Minimum of log data	2.74084	
Maximum of log data	3.653252	
Mean of log data	3.200992	
Standard Deviation of log data	0.258868	
Variance of log data	0.067012	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963218	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	25.39363	
MLE Standard Deviation	6.685271	
MLE Coefficient of Variation	0.263266	
MLE Skewness	0.808043	
MLE Median	24.55689	
MLE 80% Quantile	30.56133	
MLE 90% Quantile	34.24831	
MLE 95% Quantile	37.59344	
MLE 99% Quantile	44.8408	
MVU Estimate of Median	24.47472	
MVU Estimate of Mean	25.30661	
MVU Estimate of Standard Deviation	6.586692	
MVU Estimate of SE of Mean	2.082586	
95% H-UCL	30.0093	
95% Chebyshev (MVUE) UCL	34.38439	
97.5% Chebyshev (MVUE) UCL	38.31236	
99% Chebyshev (MVUE) UCL	46.02808	
Non-parametric Statisitics		
95% CLT UCL	28.6921	
95% Adjusted-CLT UCL	29.13058	
95% Modified-t UCL	29.14874	
95% Jackknife UCL	29.08034	
95% Chebyshev (Mean, Sd) UCL	34.28915	
97.5% Chebyshev (Mean, Sd) UCL	38.17877	
99% Chebyshev (Mean, Sd) UCL	45.81916	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	28.47789	
95% Bootstrap-t UCL	29.79367	
95% Hall's Bootstrap UCL	31.94824	
95% Percentile Bootstrap UCL	28.64	
95% BCA Bootstrap UCL	30.09	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	29.08034	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - kf-so.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	181	
Maximum	478	
Mean	332.9	
Standard Deviation	99.32377	
Variance	9865.211	
Coefficient of Variation	0.298359	
Skewness	0.00977	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.958191	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	390.4761	
Gamma Statistics		
k hat	11.71166	
k star (bias corrected)	8.264828	
Theta hat	28.42466	
Theta star	40.27912	
nu hat	234.2332	
nu star	165.2966	
5% Approximate Chi Square Value	136.5632	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	132.0257	
Anderson-Darling Test Statistic	0.254677	
Anderson-Darling 5% Critical Value	0.724973	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.175379	
Kolmogrov-Smirnov 5% Critical Value	0.266551	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	402.9434	
95% Adjusted Gamma UCL	416.7919	
Lognormal Statistics		
Minimum of log data	5.198497	
Maximum of log data	6.169611	
Mean of log data	5.764543	
Standard Deviation of log data	0.31723	
Variance of log data	0.100635	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.950602	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	335.2445	
MLE Standard Deviation	109.0822	
MLE Coefficient of Variation	0.325381	
MLE Skewness	1.010592	
MLE Median	318.7932	
MLE 80% Quantile	416.7981	
MLE 90% Quantile	479.2312	
MLE 95% Quantile	537.2084	
MLE 99% Quantile	666.753	
MVU Estimate of Median	317.1924	
MVU Estimate of Mean	333.5002	
MVU Estimate of Standard Deviation	106.657	
MVU Estimate of SE of Mean	33.71677	
95% H-UCL	413.987	
95% Chebyshev (MVUE) UCL	480.4682	
97.5% Chebyshev (MVUE) UCL	544.0614	
99% Chebyshev (MVUE) UCL	668.9778	
Non-parametric Statisitics		
95% CLT UCL	384.5631	
95% Adjusted-CLT UCL	384.6668	
95% Modified-t UCL	390.4923	
95% Jackknife UCL	390.4761	
95% Chebyshev (Mean, Sd) UCL	469.8084	
97.5% Chebyshev (Mean, Sd) UCL	529.0487	
99% Chebyshev (Mean, Sd) UCL	645.4149	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	381.6694	
95% Bootstrap-t UCL	393.1891	
95% Hall's Bootstrap UCL	383.6178	
95% Percentile Bootstrap UCL	380.9	
95% BCA Bootstrap UCL	400.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	390.4761	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - dp.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	26	
Minimum	6.05	
Maximum	219	
Mean	33.20385	
Standard Deviation	42.0077	
Variance	1764.647	
Coefficient of Variation	1.265146	
Skewness	3.767259	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.552376	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	47.27617	
Gamma Statistics		
k hat	1.480106	
k star (bias corrected)	1.334965	
Theta hat	22.43343	
Theta star	24.87244	
nu hat	76.9655	
nu star	69.4182	
5% Approximate Chi Square Value	51.23537	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	50.2033	
Anderson-Darling Test Statistic	1.115165	
Anderson-Darling 5% Critical Value	0.762071	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.185033	
Kolmogrov-Smirnov 5% Critical Value	0.174334	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	44.9875	
95% Adjusted Gamma UCL	45.91234	
Lognormal Statistics		
Minimum of log data	1.800058	
Maximum of log data	5.389072	
Mean of log data	3.128279	
Standard Deviation of log data	0.790582	
Variance of log data	0.62502	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955892	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	31.21157	
MLE Standard Deviation	29.08347	
MLE Coefficient of Variation	0.931817	
MLE Skewness	3.604531	
MLE Median	22.83465	
MLE 80% Quantile	44.53702	
MLE 90% Quantile	63.06568	
MLE 95% Quantile	83.8296	
MLE 99% Quantile	143.6202	
MVU Estimate of Median	22.56171	
MVU Estimate of Mean	30.73845	
MVU Estimate of Standard Deviation	27.11274	
MVU Estimate of SE of Mean	5.218525	
95% H-UCL	44.50463	
95% Chebyshev (MVUE) UCL	53.48547	
97.5% Chebyshev (MVUE) UCL	63.32812	
99% Chebyshev (MVUE) UCL	82.66211	
Non-parametric Statisitics		
95% CLT UCL	46.75479	
95% Adjusted-CLT UCL	53.2585	
95% Modified-t UCL	48.29062	
95% Jackknife UCL	47.27617	
95% Chebyshev (Mean, Sd) UCL	69.11415	
97.5% Chebyshev (Mean, Sd) UCL	84.65256	
99% Chebyshev (Mean, Sd) UCL	115.1748	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	46.37146	
95% Bootstrap-t UCL	67.28979	
95% Hall's Bootstrap UCL	98.16052	
95% Percentile Bootstrap UCL	48.06346	
95% BCA Bootstrap UCL	45.44808	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	44.50463	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - dp.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	9	
Minimum	0.05	
Maximum	0.6475	
Mean	0.090481	
Standard Deviation	0.115287	
Variance	0.013291	
Coefficient of Variation	1.274156	
Skewness	4.875533	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.306716	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.129101	
Gamma Statistics		
k hat	2.379905	
k star (bias corrected)	2.130941	
Theta hat	0.038019	
Theta star	0.04246	
nu hat	123.755	
nu star	110.8089	
5% Approximate Chi Square Value	87.50631	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	86.13904	
Anderson-Darling Test Statistic	5.553672	
Anderson-Darling 5% Critical Value	0.754732	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.408474	
Kolmogrov-Smirnov 5% Critical Value	0.17301	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.114575	
95% Adjusted Gamma UCL	0.116394	
Lognormal Statistics		
Minimum of log data	-2.995732	
Maximum of log data	-0.434636	
Mean of log data	-2.627182	
Standard Deviation of log data	0.50048	
Variance of log data	0.250481	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.52775	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.081926	
MLE Standard Deviation	0.043709	
MLE Coefficient of Variation	0.533519	
MLE Skewness	1.75242	
MLE Median	0.072282	
MLE 80% Quantile	0.11033	
MLE 90% Quantile	0.137509	
MLE 95% Quantile	0.164657	
MLE 99% Quantile	0.231526	
MVU Estimate of Median	0.071934	
MVU Estimate of Mean	0.081489	
MVU Estimate of Standard Deviation	0.042631	
MVU Estimate of SE of Mean	0.008332	
95% H-UCL	0.099673	
95% Chebyshev (MVUE) UCL	0.117809	
97.5% Chebyshev (MVUE) UCL	0.133524	
99% Chebyshev (MVUE) UCL	0.164395	
Non-parametric Statisitics		
95% CLT UCL	0.12767	
95% Adjusted-CLT UCL	0.15077	
95% Modified-t UCL	0.132704	
95% Jackknife UCL	0.129101	
95% Chebyshev (Mean, Sd) UCL	0.189034	
97.5% Chebyshev (Mean, Sd) UCL	0.231677	
99% Chebyshev (Mean, Sd) UCL	0.315443	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.125807	
95% Bootstrap-t UCL	0.320925	
95% Hall's Bootstrap UCL	0.270605	
95% Percentile Bootstrap UCL	0.134519	
95% BCA Bootstrap UCL	0.132212	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.189034	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - dp.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	26	
Minimum	24.4	
Maximum	316	
Mean	109.7038	
Standard Deviation	76.26076	
Variance	5815.703	
Coefficient of Variation	0.695151	
Skewness	1.042874	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.899627	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	135.2507	
Gamma Statistics		
k hat	2.187336	
k star (bias corrected)	1.960592	
Theta hat	50.15408	
Theta star	55.95444	
nu hat	113.7415	
nu star	101.9508	
5% Approximate Chi Square Value	79.64964	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	78.348	
Anderson-Darling Test Statistic	0.349187	
Anderson-Darling 5% Critical Value	0.756034	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.134121	
Kolmogrov-Smirnov 5% Critical Value	0.173203	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	140.4199	
95% Adjusted Gamma UCL	142.7528	
Lognormal Statistics		
Minimum of log data	3.194583	
Maximum of log data	5.755742	
Mean of log data	4.452112	
Standard Deviation of log data	0.741496	
Variance of log data	0.549817	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956716	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	112.9585	
MLE Standard Deviation	96.70566	
MLE Coefficient of Variation	0.856117	
MLE Skewness	3.195829	
MLE Median	85.80799	
MLE 80% Quantile	160.5614	
MLE 90% Quantile	222.5018	
MLE 95% Quantile	290.5785	
MLE 99% Quantile	481.4646	
MVU Estimate of Median	84.90513	
MVU Estimate of Mean	111.4884	
MVU Estimate of Standard Deviation	91.04267	
MVU Estimate of SE of Mean	17.59199	
95% H-UCL	156.3081	
95% Chebyshev (MVUE) UCL	188.1701	
97.5% Chebyshev (MVUE) UCL	221.3503	
99% Chebyshev (MVUE) UCL	286.5264	
Non-parametric Statisitics		
95% CLT UCL	134.3042	
95% Adjusted-CLT UCL	137.5727	
95% Modified-t UCL	135.7605	
95% Jackknife UCL	135.2507	
95% Chebyshev (Mean, Sd) UCL	174.8954	
97.5% Chebyshev (Mean, Sd) UCL	203.1038	
99% Chebyshev (Mean, Sd) UCL	258.5138	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	133.7529	
95% Bootstrap-t UCL	138.9436	
95% Hall's Bootstrap UCL	141.5008	
95% Percentile Bootstrap UCL	134.9346	
95% BCA Bootstrap UCL	130.4808	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	140.4199	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - dp.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	26	
Minimum	20.8	
Maximum	298.5	
Mean	80.37692	
Standard Deviation	58.21595	
Variance	3389.097	
Coefficient of Variation	0.724287	
Skewness	2.16901	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.803486	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	99.87891	
Gamma Statistics		
k hat	2.512006	
k star (bias corrected)	2.2478	
Theta hat	31.99711	
Theta star	35.75804	
nu hat	130.6243	
nu star	116.8856	
5% Approximate Chi Square Value	92.91903	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	91.50825	
Anderson-Darling Test Statistic	0.339908	
Anderson-Darling 5% Critical Value	0.753839	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.093306	
Kolmogrov-Smirnov 5% Critical Value	0.172878	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	101.1085	
95% Adjusted Gamma UCL	102.6673	
Lognormal Statistics		
Minimum of log data	3.034953	
Maximum of log data	5.69877	
Mean of log data	4.174672	
Standard Deviation of log data	0.663977	
Variance of log data	0.440865	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.965842	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	81.05314	
MLE Standard Deviation	60.33161	
MLE Coefficient of Variation	0.744346	
MLE Skewness	2.645445	
MLE Median	65.01853	
MLE 80% Quantile	113.9469	
MLE 90% Quantile	152.6096	
MLE 95% Quantile	193.817	
MLE 99% Quantile	304.6254	
MVU Estimate of Median	64.46945	
MVU Estimate of Mean	80.23779	
MVU Estimate of Standard Deviation	57.57451	
MVU Estimate of SE of Mean	11.18041	
95% H-UCL	107.2606	
95% Chebyshev (MVUE) UCL	128.9721	
97.5% Chebyshev (MVUE) UCL	150.0594	
99% Chebyshev (MVUE) UCL	191.4815	
Non-parametric Statisitics		
95% CLT UCL	99.15636	
95% Adjusted-CLT UCL	104.3457	
95% Modified-t UCL	100.6883	
95% Jackknife UCL	99.87891	
95% Chebyshev (Mean, Sd) UCL	130.1429	
97.5% Chebyshev (Mean, Sd) UCL	151.6766	
99% Chebyshev (Mean, Sd) UCL	193.9755	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	99.28679	
95% Bootstrap-t UCL	108.2643	
95% Hall's Bootstrap UCL	125.6853	
95% Percentile Bootstrap UCL	100.9558	
95% BCA Bootstrap UCL	96.29231	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	101.1085	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - dp.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	24	
Minimum	84.8	
Maximum	818	
Mean	264.1769	
Standard Deviation	178.553	
Variance	31881.16	
Coefficient of Variation	0.675884	
Skewness	1.411437	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.84967	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	323.9911	
Gamma Statistics		
k hat	2.707181	
k star (bias corrected)	2.420455	
Theta hat	97.58378	
Theta star	109.1435	
nu hat	140.7734	
nu star	125.8636	
5% Approximate Chi Square Value	100.9471	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	99.47404	
Anderson-Darling Test Statistic	0.640066	
Anderson-Darling 5% Critical Value	0.752519	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.149592	
Kolmogrov-Smirnov 5% Critical Value	0.172683	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	329.3831	
95% Adjusted Gamma UCL	334.2608	
Lognormal Statistics		
Minimum of log data	4.440296	
Maximum of log data	6.706862	
Mean of log data	5.380701	
Standard Deviation of log data	0.629995	
Variance of log data	0.396894	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.952326	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	264.8457	
MLE Standard Deviation	184.8612	
MLE Coefficient of Variation	0.697996	
MLE Skewness	2.434049	
MLE Median	217.1744	
MLE 80% Quantile	369.8311	
MLE 90% Quantile	487.9653	
MLE 95% Quantile	612.1899	
MLE 99% Quantile	940.1779	
MVU Estimate of Median	215.5226	
MVU Estimate of Mean	262.4839	
MVU Estimate of Standard Deviation	177.3421	
MVU Estimate of SE of Mean	34.49869	
95% H-UCL	344.0337	
95% Chebyshev (MVUE) UCL	412.8602	
97.5% Chebyshev (MVUE) UCL	477.9281	
99% Chebyshev (MVUE) UCL	605.7415	
Non-parametric Statisitics		
95% CLT UCL	321.775	
95% Adjusted-CLT UCL	332.132	
95% Modified-t UCL	325.6066	
95% Jackknife UCL	323.9911	
95% Chebyshev (Mean, Sd) UCL	416.813	
97.5% Chebyshev (Mean, Sd) UCL	482.8587	
99% Chebyshev (Mean, Sd) UCL	612.5928	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	321.5847	
95% Bootstrap-t UCL	340.7962	
95% Hall's Bootstrap UCL	336.6652	
95% Percentile Bootstrap UCL	325.4	
95% BCA Bootstrap UCL	309.3385	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	329.3831	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - dp xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	20	
Minimum	0.065	
Maximum	2.35	
Mean	0.765577	
Standard Deviation	0.567576	
Variance	0.322143	
Coefficient of Variation	0.74137	
Skewness	0.84924	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924958	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.955711	
Gamma Statistics		
k hat	1.475717	
k star (bias corrected)	1.331083	
Theta hat	0.518783	
Theta star	0.575153	
nu hat	76.73727	
nu star	69.21631	
5% Approximate Chi Square Value	51.06178	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	50.03156	
Anderson-Darling Test Statistic	0.462214	
Anderson-Darling 5% Critical Value	0.762175	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.112031	
Kolmogrov-Smirnov 5% Critical Value	0.174352	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.03777	
95% Adjusted Gamma UCL	1.05914	
Lognormal Statistics		
Minimum of log data	-2.733368	
Maximum of log data	0.854415	
Mean of log data	-0.642727	
Standard Deviation of log data	1.016904	
Variance of log data	1.034093	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.905364	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.881896	
MLE Standard Deviation	1.187307	
MLE Coefficient of Variation	1.346311	
MLE Skewness	6.479196	
MLE Median	0.525856	
MLE 80% Quantile	1.241793	
MLE 90% Quantile	1.942535	
MLE 95% Quantile	2.801288	
MLE 99% Quantile	5.599015	
MVU Estimate of Median	0.515495	
MVU Estimate of Mean	0.856992	
MVU Estimate of Standard Deviation	1.04252	
MVU Estimate of SE of Mean	0.195323	
95% H-UCL	1.47079	
95% Chebyshev (MVUE) UCL	1.708387	
97.5% Chebyshev (MVUE) UCL	2.076786	
99% Chebyshev (MVUE) UCL	2.800435	
Non-parametric Statisitics		
95% CLT UCL	0.948667	
95% Adjusted-CLT UCL	0.968476	
95% Modified-t UCL	0.958801	
95% Jackknife UCL	0.955711	
95% Chebyshev (Mean, Sd) UCL	1.25077	
97.5% Chebyshev (Mean, Sd) UCL	1.460713	
99% Chebyshev (Mean, Sd) UCL	1.873106	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.944527	
95% Bootstrap-t UCL	0.981342	
95% Hall's Bootstrap UCL	0.978564	
95% Percentile Bootstrap UCL	0.944615	
95% BCA Bootstrap UCL	0.915577	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.955711	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - dp.xls	
Variable	Thallium	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	17	
Minimum	0.8	
Maximum	3.6	
Mean	1.568269	
Standard Deviation	0.772385	
Variance	0.596578	
Coefficient of Variation	0.492508	
Skewness	1.086953	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.829642	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.827013	
Gamma Statistics		
k hat	5.032734	
k star (bias corrected)	4.477675	
Theta hat	0.311614	
Theta star	0.350242	
nu hat	261.7022	
nu star	232.8391	
5% Approximate Chi Square Value	198.5098	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	196.4191	
Anderson-Darling Test Statistic	1.587983	
Anderson-Darling 5% Critical Value	0.746316	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.27154	
Kolmogrov-Smirnov 5% Critical Value	0.171558	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	1.839478	
95% Adjusted Gamma UCL	1.859058	
Lognormal Statistics		
Minimum of log data	-0.223144	
Maximum of log data	1.280934	
Mean of log data	0.347346	
Standard Deviation of log data	0.447936	
Variance of log data	0.200647	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.875016	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.564661	
MLE Standard Deviation	0.73754	
MLE Coefficient of Variation	0.471374	
MLE Skewness	1.518858	
MLE Median	1.415306	
MLE 80% Quantile	2.066491	
MLE 90% Quantile	2.516689	
MLE 95% Quantile	2.957077	
MLE 99% Quantile	4.011823	
MVU Estimate of Median	1.409855	
MVU Estimate of Mean	1.558103	
MVU Estimate of Standard Deviation	0.72318	
MVU Estimate of SE of Mean	0.141514	
95% H-UCL	1.857758	
95% Chebyshev (MVUE) UCL	2.174947	
97.5% Chebyshev (MVUE) UCL	2.441857	
99% Chebyshev (MVUE) UCL	2.966148	
Non-parametric Statisitics		
95% CLT UCL	1.817427	
95% Adjusted-CLT UCL	1.851929	
95% Modified-t UCL	1.832395	
95% Jackknife UCL	1.827013	
95% Chebyshev (Mean, Sd) UCL	2.228542	
97.5% Chebyshev (Mean, Sd) UCL	2.514243	
99% Chebyshev (Mean, Sd) UCL	3.075447	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.819861	
95% Bootstrap-t UCL	1.869301	
95% Hall's Bootstrap UCL	1.847246	
95% Percentile Bootstrap UCL	1.827885	
95% BCA Bootstrap UCL	1.948077	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	1.827013	95% Student's-t UCL
2nd Recommended UCL	1.832395	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\HH - June 2004\Soil stat - dp.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	26	
Minimum	15.6	
Maximum	58.1	
Mean	27.80769	
Standard Deviation	10.22584	
Variance	104.5677	
Coefficient of Variation	0.367734	
Skewness	1.102656	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.9102	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	31.23329	
Gamma Statistics		
k hat	8.536472	
k star (bias corrected)	7.577136	
Theta hat	3.257516	
Theta star	3.669948	
nu hat	443.8966	
nu star	394.0111	
5% Approximate Chi Square Value	348.9926	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	346.1998	
Anderson-Darling Test Statistic	0.350561	
Anderson-Darling 5% Critical Value	0.744774	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.108629	
Kolmogrov-Smirnov 5% Critical Value	0.171312	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	31.39476	
95% Adjusted Gamma UCL	31.64802	
Lognormal Statistics		
Minimum of log data	2.747271	
Maximum of log data	4.062166	
Mean of log data	3.265598	
Standard Deviation of log data	0.347851	
Variance of log data	0.121	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.961704	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	27.82955	
MLE Standard Deviation	9.980877	
MLE Coefficient of Variation	0.358643	
MLE Skewness	1.12206	
MLE Median	26.19578	
MLE 80% Quantile	35.14675	
MLE 90% Quantile	40.95961	
MLE 95% Quantile	46.42381	
MLE 99% Quantile	58.83276	
MVU Estimate of Median	26.13489	
MVU Estimate of Mean	27.76141	
MVU Estimate of Standard Deviation	9.866457	
MVU Estimate of SE of Mean	1.933371	
95% H-UCL	31.63869	
95% Chebyshev (MVUE) UCL	36.18878	
97.5% Chebyshev (MVUE) UCL	39.83531	
99% Chebyshev (MVUE) UCL	46.99821	
Non-parametric Statisitics		
95% CLT UCL	31.10637	
95% Adjusted-CLT UCL	31.56976	
95% Modified-t UCL	31.30556	
95% Jackknife UCL	31.23329	
95% Chebyshev (Mean, Sd) UCL	36.54925	
97.5% Chebyshev (Mean, Sd) UCL	40.33173	
99% Chebyshev (Mean, Sd) UCL	47.76168	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	31.02086	
95% Bootstrap-t UCL	31.8041	
95% Hall's Bootstrap UCL	31.92085	
95% Percentile Bootstrap UCL	31.06154	
95% BCA Bootstrap UCL	30.46154	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	31.39476	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Soil stat - dp.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	26	
Number of Missing Data	0	
Number of Valid Observations	26	
Number of Distinct Observations	26	
Minimum	55.8	
Maximum	44800	
Mean	1923.894	
Standard Deviation	8745.708	
Variance	76487402	
Coefficient of Variation	4.545836	
Skewness	5.097764	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.211325	
Shapiro-Wilk 5% Critical Value	0.92	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	4853.653	
Gamma Statistics		
k hat	0.318394	
k star (bias corrected)	0.307297	
Theta hat	6042.498	
Theta star	6260.697	
nu hat	16.55648	
nu star	15.97945	
5% Approximate Chi Square Value	7.946424	
Adjusted Level of Significance	0.0398	
Adjusted Chi Square Value	7.573087	
Anderson-Darling Test Statistic	7.204746	
Anderson-Darling 5% Critical Value	0.847639	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.473829	
Kolmogrov-Smirnov 5% Critical Value	0.185345	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	3868.756	
95% Adjusted Gamma UCL	4059.477	
Lognormal Statistics		
Minimum of log data	4.021774	
Maximum of log data	10.70996	
Mean of log data	5.417281	
Standard Deviation of log data	1.205385	
Variance of log data	1.452954	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.633202	
Shapiro-Wilk 5% Critical Value	0.92	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	465.8005	
MLE Standard Deviation	843.0507	
MLE Coefficient of Variation	1.809896	
MLE Skewness	11.35841	
MLE Median	225.2657	
MLE 80% Quantile	623.8009	
MLE 90% Quantile	1060.187	
MLE 95% Quantile	1636.213	
MLE 99% Quantile	3718.244	
MVU Estimate of Median	219.0523	
MVU Estimate of Mean	445.3293	
MVU Estimate of Standard Deviation	688.6087	
MVU Estimate of SE of Mean	124.531	
95% H-UCL	907.5647	
95% Chebyshev (MVUE) UCL	988.1472	
97.5% Chebyshev (MVUE) UCL	1223.025	
99% Chebyshev (MVUE) UCL	1684.397	
Non-parametric Statisitics		
95% CLT UCL	4745.105	
95% Adjusted-CLT UCL	6577.342	
95% Modified-t UCL	5139.445	
95% Jackknife UCL	4853.653	
95% Chebyshev (Mean, Sd) UCL	9400.166	
97.5% Chebyshev (Mean, Sd) UCL	12635.15	
99% Chebyshev (Mean, Sd) UCL	18989.66	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4702.783	
95% Bootstrap-t UCL	173546.3	
95% Hall's Bootstrap UCL	58034.18	
95% Percentile Bootstrap UCL	5358.658	
95% BCA Bootstrap UCL	7073.762	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	18989.66	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	4,4'-DDD	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	8	
Minimum	0.0013	
Maximum	0.0098	
Mean	0.004756	
Standard Deviation	0.003108	
Variance	9.66E-06	
Coefficient of Variation	0.653488	
Skewness	0.589538	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898842	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.006682	
Gamma Statistics		
k hat	2.501019	
k star (bias corrected)	1.74142	
Theta hat	0.001901	
Theta star	0.002731	
nu hat	45.01835	
nu star	31.34557	
5% Approximate Chi Square Value	19.55172	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	17.61369	
Anderson-Darling Test Statistic	0.359556	
Anderson-Darling 5% Critical Value	0.728282	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.21749	
Kolmogrov-Smirnov 5% Critical Value	0.281909	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.007624	
95% Adjusted Gamma UCL	0.008463	
Lognormal Statistics		
Minimum of log data	-6.645391	
Maximum of log data	-4.625373	
Mean of log data	-5.561484	
Standard Deviation of log data	0.715906	
Variance of log data	0.512521	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.930208	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.004966	
MLE Standard Deviation	0.004063	
MLE Coefficient of Variation	0.818226	
MLE Skewness	3.002476	
MLE Median	0.003843	
MLE 80% Quantile	0.007037	
MLE 90% Quantile	0.009643	
MLE 95% Quantile	0.012478	
MLE 99% Quantile	0.020317	
MVU Estimate of Median	0.003735	
MVU Estimate of Mean	0.004802	
MVU Estimate of Standard Deviation	0.003547	
MVU Estimate of SE of Mean	0.001175	
95% H-UCL	0.009803	
95% Chebyshev (MVUE) UCL	0.009922	
97.5% Chebyshev (MVUE) UCL	0.012138	
99% Chebyshev (MVUE) UCL	0.016489	
Non-parametric Statisitics		
95% CLT UCL	0.006459	
95% Adjusted-CLT UCL	0.006677	
95% Modified-t UCL	0.006716	
95% Jackknife UCL	0.006682	
95% Chebyshev (Mean, Sd) UCL	0.009271	
97.5% Chebyshev (Mean, Sd) UCL	0.011225	
99% Chebyshev (Mean, Sd) UCL	0.015063	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.006348	
95% Bootstrap-t UCL	0.007132	
95% Hall's Bootstrap UCL	0.00677	
95% Percentile Bootstrap UCL	0.006389	
95% BCA Bootstrap UCL	0.006122	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.006682	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	4,4'-DDE	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	8	
Minimum	0.0038	
Maximum	0.026	
Mean	0.010178	
Standard Deviation	0.007215	
Variance	5.21E-05	
Coefficient of Variation	0.708902	
Skewness	1.530278	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.808594	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.01465	
Gamma Statistics		
k hat	2.800295	
k star (bias corrected)	1.940938	
Theta hat	0.003635	
Theta star	0.005244	
nu hat	50.40531	
nu star	34.93688	
5% Approximate Chi Square Value	22.41227	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	20.32161	
Anderson-Darling Test Statistic	0.515587	
Anderson-Darling 5% Critical Value	0.727393	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.277327	
Kolmogrov-Smirnov 5% Critical Value	0.281568	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.015865	
95% Adjusted Gamma UCL	0.017498	
Lognormal Statistics		
Minimum of log data	-5.572754	
Maximum of log data	-3.649659	
Mean of log data	-4.7766	
Standard Deviation of log data	0.6297	
Variance of log data	0.396522	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.925979	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.010272	
MLE Standard Deviation	0.007166	
MLE Coefficient of Variation	0.6976	
MLE Skewness	2.432284	
MLE Median	0.008425	
MLE 80% Quantile	0.014343	
MLE 90% Quantile	0.018922	
MLE 95% Quantile	0.023736	
MLE 99% Quantile	0.036446	
MVU Estimate of Median	0.008241	
MVU Estimate of Mean	0.010018	
MVU Estimate of Standard Deviation	0.006466	
MVU Estimate of SE of Mean	0.002146	
95% H-UCL	0.018014	
95% Chebyshev (MVUE) UCL	0.019374	
97.5% Chebyshev (MVUE) UCL	0.023422	
99% Chebyshev (MVUE) UCL	0.031374	
Non-parametric Statisitics		
95% CLT UCL	0.014134	
95% Adjusted-CLT UCL	0.015445	
95% Modified-t UCL	0.014854	
95% Jackknife UCL	0.01465	
95% Chebyshev (Mean, Sd) UCL	0.020661	
97.5% Chebyshev (Mean, Sd) UCL	0.025197	
99% Chebyshev (Mean, Sd) UCL	0.034107	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.013836	
95% Bootstrap-t UCL	0.017422	
95% Hall's Bootstrap UCL	0.015181	
95% Percentile Bootstrap UCL	0.014244	
95% BCA Bootstrap UCL	0.013533	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.015865	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	4,4'-DDT	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	7	
Minimum	0.00049	
Maximum	0.0046	
Mean	0.001791	
Standard Deviation	0.001527	
Variance	2.33E-06	
Coefficient of Variation	0.852346	
Skewness	0.960139	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.856548	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.002814	
Gamma Statistics		
k hat	1.57394	
k star (bias corrected)	1.067046	
Theta hat	0.001138	
Theta star	0.001679	
nu hat	25.18303	
nu star	17.07273	
5% Approximate Chi Square Value	8.722888	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	7.264836	
Anderson-Darling Test Statistic	0.48427	
Anderson-Darling 5% Critical Value	0.727762	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.224634	
Kolmogrov-Smirnov 5% Critical Value	0.298687	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.003506	
95% Adjusted Gamma UCL	0.00421	
Lognormal Statistics		
Minimum of log data	-7.621105	
Maximum of log data	-5.381699	
Mean of log data	-6.674989	
Standard Deviation of log data	0.915709	
Variance of log data	0.838522	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.872247	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.001919	
MLE Standard Deviation	0.002199	
MLE Coefficient of Variation	1.145839	
MLE Skewness	4.941941	
MLE Median	0.001262	
MLE 80% Quantile	0.002736	
MLE 90% Quantile	0.004094	
MLE 95% Quantile	0.005692	
MLE 99% Quantile	0.01062	
MVU Estimate of Median	0.001197	
MVU Estimate of Mean	0.001797	
MVU Estimate of Standard Deviation	0.001703	
MVU Estimate of SE of Mean	0.000594	
95% H-UCL	0.005986	
95% Chebyshev (MVUE) UCL	0.004384	
97.5% Chebyshev (MVUE) UCL	0.005504	
99% Chebyshev (MVUE) UCL	0.007703	
Non-parametric Statisitics		
95% CLT UCL	0.002679	
95% Adjusted-CLT UCL	0.002875	
95% Modified-t UCL	0.002844	
95% Jackknife UCL	0.002814	
95% Chebyshev (Mean, Sd) UCL	0.004144	
97.5% Chebyshev (Mean, Sd) UCL	0.005162	
99% Chebyshev (Mean, Sd) UCL	0.007162	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.002608	
95% Bootstrap-t UCL	0.003436	
95% Hall's Bootstrap UCL	0.002852	
95% Percentile Bootstrap UCL	0.002666	
95% BCA Bootstrap UCL	0.0025	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.002814	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	Aldrin	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	5	
Minimum	0.00026	
Maximum	0.0013	
Mean	0.000464	
Standard Deviation	0.000353	
Variance	1.24E-07	
Coefficient of Variation	0.760542	
Skewness	2.400373	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.642075	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.0007	
Gamma Statistics		
k hat	3.167836	
k star (bias corrected)	2.063231	
Theta hat	0.000146	
Theta star	0.000225	
nu hat	50.68538	
nu star	33.0117	
5% Approximate Chi Square Value	20.87383	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	18.47187	
Anderson-Darling Test Statistic	0.947291	
Anderson-Darling 5% Critical Value	0.720983	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.29079	
Kolmogrov-Smirnov 5% Critical Value	0.296137	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.000733	
95% Adjusted Gamma UCL	0.000829	
Lognormal Statistics		
Minimum of log data	-8.254829	
Maximum of log data	-6.645391	
Mean of log data	-7.842226	
Standard Deviation of log data	0.55519	
Variance of log data	0.308236	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.77928	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.000458	
MLE Standard Deviation	0.000275	
MLE Coefficient of Variation	0.600852	
MLE Skewness	2.019476	
MLE Median	0.000393	
MLE 80% Quantile	0.000628	
MLE 90% Quantile	0.000802	
MLE 95% Quantile	0.000979	
MLE 99% Quantile	0.001429	
MVU Estimate of Median	0.000385	
MVU Estimate of Mean	0.000449	
MVU Estimate of Standard Deviation	0.000253	
MVU Estimate of SE of Mean	8.91E-05	
95% H-UCL	0.000772	
95% Chebyshev (MVUE) UCL	0.000837	
97.5% Chebyshev (MVUE) UCL	0.001005	
99% Chebyshev (MVUE) UCL	0.001335	
Non-parametric Statisitics		
95% CLT UCL	0.000669	
95% Adjusted-CLT UCL	0.000782	
95% Modified-t UCL	0.000718	
95% Jackknife UCL	0.0007	
95% Chebyshev (Mean, Sd) UCL	0.001007	
97.5% Chebyshev (Mean, Sd) UCL	0.001242	
99% Chebyshev (Mean, Sd) UCL	0.001704	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.000653	
95% Bootstrap-t UCL	0.001136	
95% Hall's Bootstrap UCL	0.001329	
95% Percentile Bootstrap UCL	0.00068	
95% BCA Bootstrap UCL	0.00065	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.000733	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	alpha-Chlordane	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	0.0013	
Maximum	0.0089	
Mean	0.004156	
Standard Deviation	0.002598	
Variance	6.75E-06	
Coefficient of Variation	0.625218	
Skewness	0.840928	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.897607	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.005766	
Gamma Statistics		
k hat	2.916594	
k star (bias corrected)	2.01847	
Theta hat	0.001425	
Theta star	0.002059	
nu hat	52.49868	
nu star	36.33246	
5% Approximate Chi Square Value	23.5342	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	21.38631	
Anderson-Darling Test Statistic	0.315296	
Anderson-Darling 5% Critical Value	0.727048	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.169046	
Kolmogrov-Smirnov 5% Critical Value	0.281435	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.006415	
95% Adjusted Gamma UCL	0.00706	
Lognormal Statistics		
Minimum of log data	-6.645391	
Maximum of log data	-4.721704	
Mean of log data	-5.664429	
Standard Deviation of log data	0.651106	
Variance of log data	0.423939	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.948943	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.004286	
MLE Standard Deviation	0.003114	
MLE Coefficient of Variation	0.726614	
MLE Skewness	2.563471	
MLE Median	0.003467	
MLE 80% Quantile	0.006011	
MLE 90% Quantile	0.008004	
MLE 95% Quantile	0.010119	
MLE 99% Quantile	0.015765	
MVU Estimate of Median	0.003386	
MVU Estimate of Mean	0.004172	
MVU Estimate of Standard Deviation	0.002788	
MVU Estimate of SE of Mean	0.000925	
95% H-UCL	0.007731	
95% Chebyshev (MVUE) UCL	0.008204	
97.5% Chebyshev (MVUE) UCL	0.009949	
99% Chebyshev (MVUE) UCL	0.013377	
Non-parametric Statisitics		
95% CLT UCL	0.00558	
95% Adjusted-CLT UCL	0.005839	
95% Modified-t UCL	0.005806	
95% Jackknife UCL	0.005766	
95% Chebyshev (Mean, Sd) UCL	0.007931	
97.5% Chebyshev (Mean, Sd) UCL	0.009564	
99% Chebyshev (Mean, Sd) UCL	0.012773	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.005525	
95% Bootstrap-t UCL	0.006388	
95% Hall's Bootstrap UCL	0.006819	
95% Percentile Bootstrap UCL	0.005567	
95% BCA Bootstrap UCL	0.006211	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.005766	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	Aroclor-1254	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	8	
Minimum	0.00495	
Maximum	0.036	
Mean	0.015839	
Standard Deviation	0.009765	
Variance	9.54E-05	
Coefficient of Variation	0.616515	
Skewness	0.980276	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.915056	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.021892	
Gamma Statistics		
k hat	2.888128	
k star (bias corrected)	1.999493	
Theta hat	0.005484	
Theta star	0.007921	
nu hat	51.9863	
nu star	35.99087	
5% Approximate Chi Square Value	23.25909	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	21.12511	
Anderson-Darling Test Statistic	0.262272	
Anderson-Darling 5% Critical Value	0.727132	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.146458	
Kolmogrov-Smirnov 5% Critical Value	0.281468	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.024509	
95% Adjusted Gamma UCL	0.026985	
Lognormal Statistics		
Minimum of log data	-5.308368	
Maximum of log data	-3.324236	
Mean of log data	-4.328286	
Standard Deviation of log data	0.668878	
Variance of log data	0.447398	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.935517	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.016497	
MLE Standard Deviation	0.012392	
MLE Coefficient of Variation	0.751156	
MLE Skewness	2.677299	
MLE Median	0.01319	
MLE 80% Quantile	0.023212	
MLE 90% Quantile	0.031155	
MLE 95% Quantile	0.039637	
MLE 99% Quantile	0.062507	
MVU Estimate of Median	0.012866	
MVU Estimate of Mean	0.016031	
MVU Estimate of Standard Deviation	0.011022	
MVU Estimate of SE of Mean	0.003655	
95% H-UCL	0.030481	
95% Chebyshev (MVUE) UCL	0.031964	
97.5% Chebyshev (MVUE) UCL	0.038858	
99% Chebyshev (MVUE) UCL	0.0524	
Non-parametric Statisitics		
95% CLT UCL	0.021193	
95% Adjusted-CLT UCL	0.022329	
95% Modified-t UCL	0.022069	
95% Jackknife UCL	0.021892	
95% Chebyshev (Mean, Sd) UCL	0.030027	
97.5% Chebyshev (Mean, Sd) UCL	0.036166	
99% Chebyshev (Mean, Sd) UCL	0.048225	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.021015	
95% Bootstrap-t UCL	0.0234	
95% Hall's Bootstrap UCL	0.025216	
95% Percentile Bootstrap UCL	0.021067	
95% BCA Bootstrap UCL	0.020111	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.021892	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	Aroclor-1260	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	8	
Minimum	0.014	
Maximum	0.11	
Mean	0.039778	
Standard Deviation	0.030091	
Variance	0.000905	
Coefficient of Variation	0.756468	
Skewness	1.876324	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.793352	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.058429	
Gamma Statistics		
k hat	2.654098	
k star (bias corrected)	1.843473	
Theta hat	0.014987	
Theta star	0.021578	
nu hat	47.77377	
nu star	33.18251	
5% Approximate Chi Square Value	21.00988	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	18.99277	
Anderson-Darling Test Statistic	0.381784	
Anderson-Darling 5% Critical Value	0.727827	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.165119	
Kolmogrov-Smirnov 5% Critical Value	0.281734	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.062824	
95% Adjusted Gamma UCL	0.069496	
Lognormal Statistics		
Minimum of log data	-4.268698	
Maximum of log data	-2.207275	
Mean of log data	-3.424507	
Standard Deviation of log data	0.640308	
Variance of log data	0.409994	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956772	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.039975	
MLE Standard Deviation	0.028458	
MLE Coefficient of Variation	0.711905	
MLE Skewness	2.496516	
MLE Median	0.032565	
MLE 80% Quantile	0.055942	
MLE 90% Quantile	0.074147	
MLE 95% Quantile	0.093369	
MLE 99% Quantile	0.144403	
MVU Estimate of Median	0.03183	
MVU Estimate of Mean	0.03895	
MVU Estimate of Standard Deviation	0.025582	
MVU Estimate of SE of Mean	0.00849	
95% H-UCL	0.071082	
95% Chebyshev (MVUE) UCL	0.075956	
97.5% Chebyshev (MVUE) UCL	0.091969	
99% Chebyshev (MVUE) UCL	0.123423	
Non-parametric Statisitics		
95% CLT UCL	0.056276	
95% Adjusted-CLT UCL	0.062979	
95% Modified-t UCL	0.059475	
95% Jackknife UCL	0.058429	
95% Chebyshev (Mean, Sd) UCL	0.083498	
97.5% Chebyshev (Mean, Sd) UCL	0.102416	
99% Chebyshev (Mean, Sd) UCL	0.139577	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.055462	
95% Bootstrap-t UCL	0.079074	
95% Hall's Bootstrap UCL	0.129808	
95% Percentile Bootstrap UCL	0.057	
95% BCA Bootstrap UCL	0.054222	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.062824	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	delta-BHC	
Raw Statistics		
Number of Observations	8	
Number of Missing Data	0	
Number of Valid Observations	8	
Number of Distinct Observations	6	
Minimum	0.00026	
Maximum	0.0013	
Mean	0.00054	
Standard Deviation	0.000332	
Variance	1.1E-07	
Coefficient of Variation	0.614987	
Skewness	2.024029	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.759086	
Shapiro-Wilk 5% Critical Value	0.818	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.000762	
Gamma Statistics		
k hat	4.024653	
k star (bias corrected)	2.598742	
Theta hat	0.000134	
Theta star	0.000208	
nu hat	64.39445	
nu star	41.57986	
5% Approximate Chi Square Value	27.79748	
Adjusted Level of Significance	0.01946	
Adjusted Chi Square Value	24.98162	
Anderson-Darling Test Statistic	0.508309	
Anderson-Darling 5% Critical Value	0.718582	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.252847	
Kolmogrov-Smirnov 5% Critical Value	0.295328	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.000808	
95% Adjusted Gamma UCL	0.000899	
Lognormal Statistics		
Minimum of log data	-8.254829	
Maximum of log data	-6.645391	
Mean of log data	-7.65329	
Standard Deviation of log data	0.519488	
Variance of log data	0.269868	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.901383	
Shapiro-Wilk 5% Critical Value	0.818	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.000543	
MLE Standard Deviation	0.000302	
MLE Coefficient of Variation	0.556589	
MLE Skewness	1.842192	
MLE Median	0.000474	
MLE 80% Quantile	0.000736	
MLE 90% Quantile	0.000925	
MLE 95% Quantile	0.001115	
MLE 99% Quantile	0.001589	
MVU Estimate of Median	0.000467	
MVU Estimate of Mean	0.000533	
MVU Estimate of Standard Deviation	0.00028	
MVU Estimate of SE of Mean	9.9E-05	
95% H-UCL	0.000873	
95% Chebyshev (MVUE) UCL	0.000965	
97.5% Chebyshev (MVUE) UCL	0.001151	
99% Chebyshev (MVUE) UCL	0.001518	
Non-parametric Statisitics		
95% CLT UCL	0.000733	
95% Adjusted-CLT UCL	0.000823	
95% Modified-t UCL	0.000776	
95% Jackknife UCL	0.000762	
95% Chebyshev (Mean, Sd) UCL	0.001052	
97.5% Chebyshev (Mean, Sd) UCL	0.001273	
99% Chebyshev (Mean, Sd) UCL	0.001708	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.000716	
95% Bootstrap-t UCL	0.000954	
95% Hall's Bootstrap UCL	0.001562	
95% Percentile Bootstrap UCL	0.000745	
95% BCA Bootstrap UCL	0.000693	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.000808	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable	Dieldrin	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	8	
Minimum	0.00077	
Maximum	0.0029	
Mean	0.001763	
Standard Deviation	0.000736	
Variance	5.42E-07	
Coefficient of Variation	0.417643	
Skewness	0.288902	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.949773	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.00222	
Gamma Statistics		
k hat	6.077741	
k star (bias corrected)	4.125902	
Theta hat	0.00029	
Theta star	0.000427	
nu hat	109.3993	
nu star	74.26623	
5% Approximate Chi Square Value	55.41583	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	51.99583	
Anderson-Darling Test Statistic	0.229884	
Anderson-Darling 5% Critical Value	0.722542	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.162253	
Kolmogrov-Smirnov 5% Critical Value	0.279728	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.002363	
95% Adjusted Gamma UCL	0.002519	
Lognormal Statistics		
Minimum of log data	-7.16912	
Maximum of log data	-5.843045	
Mean of log data	-6.425067	
Standard Deviation of log data	0.448004	
Variance of log data	0.200708	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955393	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.001791	
MLE Standard Deviation	0.000845	
MLE Coefficient of Variation	0.471453	
MLE Skewness	1.519146	
MLE Median	0.00162	
MLE 80% Quantile	0.002366	
MLE 90% Quantile	0.002882	
MLE 95% Quantile	0.003386	
MLE 99% Quantile	0.004594	
MVU Estimate of Median	0.001602	
MVU Estimate of Mean	0.00177	
MVU Estimate of Standard Deviation	0.000803	
MVU Estimate of SE of Mean	0.000267	
95% H-UCL	0.002547	
95% Chebyshev (MVUE) UCL	0.002936	
97.5% Chebyshev (MVUE) UCL	0.003441	
99% Chebyshev (MVUE) UCL	0.004432	
Non-parametric Statisitics		
95% CLT UCL	0.002167	
95% Adjusted-CLT UCL	0.002192	
95% Modified-t UCL	0.002224	
95% Jackknife UCL	0.00222	
95% Chebyshev (Mean, Sd) UCL	0.002833	
97.5% Chebyshev (Mean, Sd) UCL	0.003296	
99% Chebyshev (Mean, Sd) UCL	0.004206	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.002136	
95% Bootstrap-t UCL	0.0023	
95% Hall's Bootstrap UCL	0.002223	
95% Percentile Bootstrap UCL	0.002163	
95% BCA Bootstrap UCL	0.002063	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.00222	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	Heptachlor epoxide	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	7	
Minimum	0.00026	
Maximum	0.0017	
Mean	0.000542	
Standard Deviation	0.00045	
Variance	2.03E-07	
Coefficient of Variation	0.830572	
Skewness	2.603672	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.627695	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.000821	
Gamma Statistics		
k hat	2.777785	
k star (bias corrected)	1.925931	
Theta hat	0.000195	
Theta star	0.000282	
nu hat	50.00013	
nu star	34.66675	
5% Approximate Chi Square Value	22.19575	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	20.11629	
Anderson-Darling Test Statistic	0.878155	
Anderson-Darling 5% Critical Value	0.72746	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.265701	
Kolmogrov-Smirnov 5% Critical Value	0.281593	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.000847	
95% Adjusted Gamma UCL	0.000934	
Lognormal Statistics		
Minimum of log data	-8.254829	
Maximum of log data	-6.377127	
Mean of log data	-7.710502	
Standard Deviation of log data	0.587375	
Variance of log data	0.345009	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.828379	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.000532	
MLE Standard Deviation	0.000342	
MLE Coefficient of Variation	0.641875	
MLE Skewness	2.190079	
MLE Median	0.000448	
MLE 80% Quantile	0.000736	
MLE 90% Quantile	0.000953	
MLE 95% Quantile	0.001178	
MLE 99% Quantile	0.001757	
MVU Estimate of Median	0.00044	
MVU Estimate of Mean	0.000521	
MVU Estimate of Standard Deviation	0.000313	
MVU Estimate of SE of Mean	0.000104	
95% H-UCL	0.000885	
95% Chebyshev (MVUE) UCL	0.000974	
97.5% Chebyshev (MVUE) UCL	0.00117	
99% Chebyshev (MVUE) UCL	0.001555	
Non-parametric Statisitics		
95% CLT UCL	0.000789	
95% Adjusted-CLT UCL	0.000928	
95% Modified-t UCL	0.000843	
95% Jackknife UCL	0.000821	
95% Chebyshev (Mean, Sd) UCL	0.001197	
97.5% Chebyshev (Mean, Sd) UCL	0.00148	
99% Chebyshev (Mean, Sd) UCL	0.002036	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.000771	
95% Bootstrap-t UCL	0.001252	
95% Hall's Bootstrap UCL	0.001775	
95% Percentile Bootstrap UCL	0.000822	
95% BCA Bootstrap UCL	0.00076	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.000847	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	7	
Minimum	0.041	
Maximum	0.16	
Mean	0.070056	
Standard Deviation	0.040137	
Variance	0.001611	
Coefficient of Variation	0.572929	
Skewness	1.692695	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.739126	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.094934	
Gamma Statistics		
k hat	4.523409	
k star (bias corrected)	3.08968	
Theta hat	0.015487	
Theta star	0.022674	
nu hat	81.42137	
nu star	55.61424	
5% Approximate Chi Square Value	39.47286	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	36.62344	
Anderson-Darling Test Statistic	0.98371	
Anderson-Darling 5% Critical Value	0.723808	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.364329	
Kolmogrov-Smirnov 5% Critical Value	0.280121	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.098703	
95% Adjusted Gamma UCL	0.106382	
Lognormal Statistics		
Minimum of log data	-3.194183	
Maximum of log data	-1.832581	
Mean of log data	-2.773056	
Standard Deviation of log data	0.477807	
Variance of log data	0.228299	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.802658	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.070025	
MLE Standard Deviation	0.035462	
MLE Coefficient of Variation	0.50642	
MLE Skewness	1.649138	
MLE Median	0.062471	
MLE 80% Quantile	0.093545	
MLE 90% Quantile	0.115432	
MLE 95% Quantile	0.137097	
MLE 99% Quantile	0.18982	
MVU Estimate of Median	0.061682	
MVU Estimate of Mean	0.069073	
MVU Estimate of Standard Deviation	0.033489	
MVU Estimate of SE of Mean	0.011147	
95% H-UCL	0.102699	
95% Chebyshev (MVUE) UCL	0.11766	
97.5% Chebyshev (MVUE) UCL	0.138683	
99% Chebyshev (MVUE) UCL	0.17998	
Non-parametric Statisitics		
95% CLT UCL	0.092062	
95% Adjusted-CLT UCL	0.100128	
95% Modified-t UCL	0.096192	
95% Jackknife UCL	0.094934	
95% Chebyshev (Mean, Sd) UCL	0.128373	
97.5% Chebyshev (Mean, Sd) UCL	0.153607	
99% Chebyshev (Mean, Sd) UCL	0.203174	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.091365	
95% Bootstrap-t UCL	0.117785	
95% Hall's Bootstrap UCL	0.09627	
95% Percentile Bootstrap UCL	0.093389	
95% BCA Bootstrap UCL	0.108056	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.094934	95% Student's-t UCL
2nd Recommended UCL	0.096192	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	0.16	
Maximum	0.62	
Mean	0.375556	
Standard Deviation	0.16318	
Variance	0.026628	
Coefficient of Variation	0.434503	
Skewness	0.085407	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955906	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.476703	
Gamma Statistics		
k hat	5.290965	
k star (bias corrected)	3.601384	
Theta hat	0.070981	
Theta star	0.104281	
nu hat	95.23736	
nu star	64.82491	
5% Approximate Chi Square Value	47.29659	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	44.15522	
Anderson-Darling Test Statistic	0.252226	
Anderson-Darling 5% Critical Value	0.722701	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.149753	
Kolmogrov-Smirnov 5% Critical Value	0.27981	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.514738	
95% Adjusted Gamma UCL	0.551359	
Lognormal Statistics		
Minimum of log data	-1.832581	
Maximum of log data	-0.478036	
Mean of log data	-1.076816	
Standard Deviation of log data	0.488719	
Variance of log data	0.238846	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.926883	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.383892	
MLE Standard Deviation	0.199396	
MLE Coefficient of Variation	0.519406	
MLE Skewness	1.698346	
MLE Median	0.340679	
MLE 80% Quantile	0.514866	
MLE 90% Quantile	0.638386	
MLE 95% Quantile	0.761189	
MLE 99% Quantile	1.061777	
MVU Estimate of Median	0.336182	
MVU Estimate of Mean	0.378415	
MVU Estimate of Standard Deviation	0.187779	
MVU Estimate of SE of Mean	0.062494	
95% H-UCL	0.56963	
95% Chebyshev (MVUE) UCL	0.650819	
97.5% Chebyshev (MVUE) UCL	0.768688	
99% Chebyshev (MVUE) UCL	1.000219	
Non-parametric Statisitics		
95% CLT UCL	0.465025	
95% Adjusted-CLT UCL	0.466679	
95% Modified-t UCL	0.476961	
95% Jackknife UCL	0.476703	
95% Chebyshev (Mean, Sd) UCL	0.612651	
97.5% Chebyshev (Mean, Sd) UCL	0.715242	
99% Chebyshev (Mean, Sd) UCL	0.916763	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.459662	
95% Bootstrap-t UCL	0.483202	
95% Hall's Bootstrap UCL	0.469602	
95% Percentile Bootstrap UCL	0.46	
95% BCA Bootstrap UCL	0.492222	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.476703	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	0.0255	
Maximum	0.065	
Mean	0.039222	
Standard Deviation	0.014342	
Variance	0.000206	
Coefficient of Variation	0.365661	
Skewness	1.302356	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.794245	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.048112	
Gamma Statistics		
k hat	9.916337	
k star (bias corrected)	6.684966	
Theta hat	0.003955	
Theta star	0.005867	
nu hat	178.4941	
nu star	120.3294	
5% Approximate Chi Square Value	95.99424	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	91.41605	
Anderson-Darling Test Statistic	0.705036	
Anderson-Darling 5% Critical Value	0.721767	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.25867	
Kolmogrov-Smirnov 5% Critical Value	0.279329	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.049165	
95% Adjusted Gamma UCL	0.051628	
Lognormal Statistics		
Minimum of log data	-3.669077	
Maximum of log data	-2.733368	
Mean of log data	-3.28978	
Standard Deviation of log data	0.327378	
Variance of log data	0.107176	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.868804	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.039313	
MLE Standard Deviation	0.013223	
MLE Coefficient of Variation	0.336348	
MLE Skewness	1.047097	
MLE Median	0.037262	
MLE 80% Quantile	0.049137	
MLE 90% Quantile	0.05675	
MLE 95% Quantile	0.063848	
MLE 99% Quantile	0.079795	
MVU Estimate of Median	0.037041	
MVU Estimate of Mean	0.039071	
MVU Estimate of Standard Deviation	0.012881	
MVU Estimate of SE of Mean	0.004292	
95% H-UCL	0.049895	
95% Chebyshev (MVUE) UCL	0.05778	
97.5% Chebyshev (MVUE) UCL	0.065876	
99% Chebyshev (MVUE) UCL	0.081778	
Non-parametric Statisitics		
95% CLT UCL	0.047086	
95% Adjusted-CLT UCL	0.049303	
95% Modified-t UCL	0.048458	
95% Jackknife UCL	0.048112	
95% Chebyshev (Mean, Sd) UCL	0.060061	
97.5% Chebyshev (Mean, Sd) UCL	0.069078	
99% Chebyshev (Mean, Sd) UCL	0.086789	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.04666	
95% Bootstrap-t UCL	0.062619	
95% Hall's Bootstrap UCL	0.108255	
95% Percentile Bootstrap UCL	0.047278	
95% BCA Bootstrap UCL	0.046	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.049165	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	0.023	
Maximum	0.58	
Mean	0.100056	
Standard Deviation	0.18024	
Variance	0.032487	
Coefficient of Variation	1.801401	
Skewness	2.983223	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.441991	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.211777	
Gamma Statistics		
k hat	0.902533	
k star (bias corrected)	0.675763	
Theta hat	0.110861	
Theta star	0.148063	
nu hat	16.24559	
nu star	12.16373	
5% Approximate Chi Square Value	5.334047	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	4.41869	
Anderson-Darling Test Statistic	1.954365	
Anderson-Darling 5% Critical Value	0.746585	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.442705	
Kolmogrov-Smirnov 5% Critical Value	0.287828	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.228166	
95% Adjusted Gamma UCL	0.275432	
Lognormal Statistics		
Minimum of log data	-3.772261	
Maximum of log data	-0.544727	
Mean of log data	-2.949547	
Standard Deviation of log data	0.939877	
Variance of log data	0.883369	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.663242	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.081442	
MLE Standard Deviation	0.097017	
MLE Coefficient of Variation	1.191233	
MLE Skewness	5.2641	
MLE Median	0.052363	
MLE 80% Quantile	0.115863	
MLE 90% Quantile	0.175204	
MLE 95% Quantile	0.245748	
MLE 99% Quantile	0.466082	
MVU Estimate of Median	0.049844	
MVU Estimate of Mean	0.076448	
MVU Estimate of Standard Deviation	0.075599	
MVU Estimate of SE of Mean	0.024768	
95% H-UCL	0.233042	
95% Chebyshev (MVUE) UCL	0.184408	
97.5% Chebyshev (MVUE) UCL	0.231123	
99% Chebyshev (MVUE) UCL	0.322884	
Non-parametric Statisitics		
95% CLT UCL	0.198878	
95% Adjusted-CLT UCL	0.262716	
95% Modified-t UCL	0.221735	
95% Jackknife UCL	0.211777	
95% Chebyshev (Mean, Sd) UCL	0.361938	
97.5% Chebyshev (Mean, Sd) UCL	0.475255	
99% Chebyshev (Mean, Sd) UCL	0.697845	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.191989	
95% Bootstrap-t UCL	1.58059	
95% Hall's Bootstrap UCL	1.171515	
95% Percentile Bootstrap UCL	0.216111	
95% BCA Bootstrap UCL	0.2805	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.361938	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach3.xls	
Variable:	Selenium	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	8	
Minimum	0.27	
Maximum	0.78	
Mean	0.468889	
Standard Deviation	0.168259	
Variance	0.028311	
Coefficient of Variation	0.358846	
Skewness	0.828469	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.913681	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.573184	
Gamma Statistics		
k hat	9.376162	
k star (bias corrected)	6.324848	
Theta hat	0.050009	
Theta star	0.074134	
nu hat	168.7709	
nu star	113.8473	
5% Approximate Chi Square Value	90.21045	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	85.77987	
Anderson-Darling Test Statistic	0.333103	
Anderson-Darling 5% Critical Value	0.721876	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.224345	
Kolmogrov-Smirnov 5% Critical Value	0.279385	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.591747	
95% Adjusted Gamma UCL	0.622311	
Lognormal Statistics		
Minimum of log data	-1.309333	
Maximum of log data	-0.248461	
Mean of log data	-0.811663	
Standard Deviation of log data	0.345721	
Variance of log data	0.119523	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.955992	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.471469	
MLE Standard Deviation	0.167991	
MLE Coefficient of Variation	0.356313	
MLE Skewness	1.114177	
MLE Median	0.444119	
MLE 80% Quantile	0.594801	
MLE 90% Quantile	0.692525	
MLE 95% Quantile	0.784309	
MLE 99% Quantile	0.992512	
MVU Estimate of Median	0.441178	
MVU Estimate of Mean	0.468218	
MVU Estimate of Standard Deviation	0.163139	
MVU Estimate of SE of Mean	0.054357	
95% H-UCL	0.608106	
95% Chebyshev (MVUE) UCL	0.705155	
97.5% Chebyshev (MVUE) UCL	0.807678	
99% Chebyshev (MVUE) UCL	1.009064	
Non-parametric Statisitics		
95% CLT UCL	0.561143	
95% Adjusted-CLT UCL	0.577693	
95% Modified-t UCL	0.575766	
95% Jackknife UCL	0.573184	
95% Chebyshev (Mean, Sd) UCL	0.713364	
97.5% Chebyshev (Mean, Sd) UCL	0.819148	
99% Chebyshev (Mean, Sd) UCL	1.026941	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.556518	
95% Bootstrap-t UCL	0.605304	
95% Hall's Bootstrap UCL	0.578706	
95% Percentile Bootstrap UCL	0.556667	
95% BCA Bootstrap UCL	0.55	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.573184	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable	4,4'-DDD	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	8	
Minimum	0.0021	
Maximum	0.0205	
Mean	0.00623	
Standard Deviation	0.006923	
Variance	4.79E-05	
Coefficient of Variation	1.111306	
Skewness	1.766551	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.60799	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.010243	
Gamma Statistics		
k hat	1.432076	
k star (bias corrected)	1.06912	
Theta hat	0.00435	
Theta star	0.005827	
nu hat	28.64151	
nu star	21.38239	
5% Approximate Chi Square Value	11.87485	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	10.66289	
Anderson-Darling Test Statistic	1.626042	
Anderson-Darling 5% Critical Value	0.740458	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.342751	
Kolmogrov-Smirnov 5% Critical Value	0.271477	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.011218	
95% Adjusted Gamma UCL	0.012493	
Lognormal Statistics		
Minimum of log data	-6.165818	
Maximum of log data	-3.88733	
Mean of log data	-5.466498	
Standard Deviation of log data	0.826865	
Variance of log data	0.683706	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.724125	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.005948	
MLE Standard Deviation	0.005892	
MLE Coefficient of Variation	0.990559	
MLE Skewness	3.943619	
MLE Median	0.004226	
MLE 80% Quantile	0.008499	
MLE 90% Quantile	0.012229	
MLE 95% Quantile	0.016469	
MLE 99% Quantile	0.02892	
MVU Estimate of Median	0.004084	
MVU Estimate of Mean	0.005702	
MVU Estimate of Standard Deviation	0.004959	
MVU Estimate of SE of Mean	0.001549	
95% H-UCL	0.012729	
95% Chebyshev (MVUE) UCL	0.012455	
97.5% Chebyshev (MVUE) UCL	0.015377	
99% Chebyshev (MVUE) UCL	0.021117	
Non-parametric Statisitics		
95% CLT UCL	0.009831	
95% Adjusted-CLT UCL	0.011138	
95% Modified-t UCL	0.010447	
95% Jackknife UCL	0.010243	
95% Chebyshev (Mean, Sd) UCL	0.015773	
97.5% Chebyshev (Mean, Sd) UCL	0.019903	
99% Chebyshev (Mean, Sd) UCL	0.028014	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.009678	
95% Bootstrap-t UCL	0.037596	
95% Hall's Bootstrap UCL	0.035971	
95% Percentile Bootstrap UCL	0.009825	
95% BCA Bootstrap UCL	0.009495	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.015773	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable	4,4'-DDE	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.0057	
Maximum	0.12	
Mean	0.03038	
Standard Deviation	0.040297	
Variance	0.001624	
Coefficient of Variation	1.326424	
Skewness	1.877797	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.611473	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.053739	
Gamma Statistics		
k hat	1.027994	
k star (bias corrected)	0.786262	
Theta hat	0.029553	
Theta star	0.038639	
nu hat	20.55987	
nu star	15.72525	
5% Approximate Chi Square Value	7.767458	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.817725	
Anderson-Darling Test Statistic	1.453358	
Anderson-Darling 5% Critical Value	0.747764	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.376195	
Kolmogrov-Smirnov 5% Critical Value	0.273603	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.061504	
95% Adjusted Gamma UCL	0.070072	
Lognormal Statistics		
Minimum of log data	-5.167289	
Maximum of log data	-2.120264	
Mean of log data	-4.053667	
Standard Deviation of log data	0.993707	
Variance of log data	0.987453	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.793664	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.028441	
MLE Standard Deviation	0.036911	
MLE Coefficient of Variation	1.29784	
MLE Skewness	6.079588	
MLE Median	0.017359	
MLE 80% Quantile	0.040196	
MLE 90% Quantile	0.06224	
MLE 95% Quantile	0.089009	
MLE 99% Quantile	0.175116	
MVU Estimate of Median	0.016519	
MVU Estimate of Mean	0.026628	
MVU Estimate of Standard Deviation	0.028387	
MVU Estimate of SE of Mean	0.008771	
95% H-UCL	0.079151	
95% Chebyshev (MVUE) UCL	0.064861	
97.5% Chebyshev (MVUE) UCL	0.081405	
99% Chebyshev (MVUE) UCL	0.113902	
Non-parametric Statisitics		
95% CLT UCL	0.05134	
95% Adjusted-CLT UCL	0.059426	
95% Modified-t UCL	0.055	
95% Jackknife UCL	0.053739	
95% Chebyshev (Mean, Sd) UCL	0.085925	
97.5% Chebyshev (Mean, Sd) UCL	0.10996	
99% Chebyshev (Mean, Sd) UCL	0.157171	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.049843	
95% Bootstrap-t UCL	0.265342	
95% Hall's Bootstrap UCL	0.235422	
95% Percentile Bootstrap UCL	0.05174	
95% BCA Bootstrap UCL	0.04886	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.085925	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\NHHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	4,4'-DDT	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.00064	
Maximum	0.0185	
Mean	0.003898	
Standard Deviation	0.005491	
Variance	3.01E-05	
Coefficient of Variation	1.408644	
Skewness	2.525668	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.631816	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.007081	
Gamma Statistics		
k hat	0.972947	
k star (bias corrected)	0.74773	
Theta hat	0.004006	
Theta star	0.005213	
nu hat	19.45895	
nu star	14.9546	
5% Approximate Chi Square Value	7.22879	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	6.318029	
Anderson-Darling Test Statistic	0.760662	
Anderson-Darling 5% Critical Value	0.749211	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.24105	
Kolmogrov-Smirnov 5% Critical Value	0.273991	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.008064	
95% Adjusted Gamma UCL	0.009226	
Lognormal Statistics		
Minimum of log data	-7.354042	
Maximum of log data	-3.989985	
Mean of log data	-6.142484	
Standard Deviation of log data	1.055097	
Variance of log data	1.113229	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906929	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.00375	
MLE Standard Deviation	0.005362	
MLE Coefficient of Variation	1.429746	
MLE Skewness	7.211887	
MLE Median	0.00215	
MLE 80% Quantile	0.005243	
MLE 90% Quantile	0.00834	
MLE 95% Quantile	0.012194	
MLE 99% Quantile	0.025014	
MVU Estimate of Median	0.002033	
MVU Estimate of Mean	0.003475	
MVU Estimate of Standard Deviation	0.003964	
MVU Estimate of SE of Mean	0.001218	
95% H-UCL	0.011627	
95% Chebyshev (MVUE) UCL	0.008786	
97.5% Chebyshev (MVUE) UCL	0.011084	
99% Chebyshev (MVUE) UCL	0.015598	
Non-parametric Statisitics		
95% CLT UCL	0.006754	
95% Adjusted-CLT UCL	0.008236	
95% Modified-t UCL	0.007312	
95% Jackknife UCL	0.007081	
95% Chebyshev (Mean, Sd) UCL	0.011467	
97.5% Chebyshev (Mean, Sd) UCL	0.014742	
99% Chebyshev (Mean, Sd) UCL	0.021175	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.006648	
95% Bootstrap-t UCL	0.01585	
95% Hall's Bootstrap UCL	0.018609	
95% Percentile Bootstrap UCL	0.00691	
95% BCA Bootstrap UCL	0.006492	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.008064	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	Aldrin	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	7	
Minimum	0.00026	
Maximum	0.00255	
Mean	0.000646	
Standard Deviation	0.000687	
Variance	4.71E-07	
Coefficient of Variation	1.062856	
Skewness	2.873866	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.566253	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.001044	
Gamma Statistics		
k hat	1.953556	
k star (bias corrected)	1.434156	
Theta hat	0.000331	
Theta star	0.00045	
nu hat	39.07111	
nu star	28.68311	
5% Approximate Chi Square Value	17.45883	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	15.95377	
Anderson-Darling Test Statistic	1.086262	
Anderson-Darling 5% Critical Value	0.735919	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.309422	
Kolmogrov-Smirnov 5% Critical Value	0.269932	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.001061	
95% Adjusted Gamma UCL	0.001161	
Lognormal Statistics		
Minimum of log data	-8.254829	
Maximum of log data	-5.971662	
Mean of log data	-7.621976	
Standard Deviation of log data	0.682558	
Variance of log data	0.465886	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.816177	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.000618	
MLE Standard Deviation	0.000476	
MLE Coefficient of Variation	0.770341	
MLE Skewness	2.768162	
MLE Median	0.00049	
MLE 80% Quantile	0.000872	
MLE 90% Quantile	0.001177	
MLE 95% Quantile	0.001505	
MLE 99% Quantile	0.002395	
MVU Estimate of Median	0.000478	
MVU Estimate of Mean	0.000601	
MVU Estimate of Standard Deviation	0.000425	
MVU Estimate of SE of Mean	0.000134	
95% H-UCL	0.001092	
95% Chebyshev (MVUE) UCL	0.001184	
97.5% Chebyshev (MVUE) UCL	0.001436	
99% Chebyshev (MVUE) UCL	0.001932	
Non-parametric Statisitics		
95% CLT UCL	0.001003	
95% Adjusted-CLT UCL	0.001214	
95% Modified-t UCL	0.001077	
95% Jackknife UCL	0.001044	
95% Chebyshev (Mean, Sd) UCL	0.001592	
97.5% Chebyshev (Mean, Sd) UCL	0.002002	
99% Chebyshev (Mean, Sd) UCL	0.002806	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.000997	
95% Bootstrap-t UCL	0.002156	
95% Hall's Bootstrap UCL	0.002742	
95% Percentile Bootstrap UCL	0.001053	
95% BCA Bootstrap UCL	0.000967	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.001592	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	alpha-Chlordane	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	8	
Minimum	0.00145	
Maximum	0.0042	
Mean	0.00202	
Standard Deviation	0.00089	
Variance	7.91E-07	
Coefficient of Variation	0.44035	
Skewness	2.09916	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.662056	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.002536	
Gamma Statistics		
k hat	7.946992	
k star (bias corrected)	5.629561	
Theta hat	0.000254	
Theta star	0.000359	
nu hat	158.9398	
nu star	112.5912	
5% Approximate Chi Square Value	89.092	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	85.4643	
Anderson-Darling Test Statistic	1.391269	
Anderson-Darling 5% Critical Value	0.726863	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.320631	
Kolmogrov-Smirnov 5% Critical Value	0.266958	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.002553	
95% Adjusted Gamma UCL	0.002661	
Lognormal Statistics		
Minimum of log data	-6.536192	
Maximum of log data	-5.472671	
Mean of log data	-6.268892	
Standard Deviation of log data	0.349549	
Variance of log data	0.122185	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.730833	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.002014	
MLE Standard Deviation	0.000726	
MLE Coefficient of Variation	0.360504	
MLE Skewness	1.128363	
MLE Median	0.001894	
MLE 80% Quantile	0.002545	
MLE 90% Quantile	0.002968	
MLE 95% Quantile	0.003366	
MLE 99% Quantile	0.004271	
MVU Estimate of Median	0.001883	
MVU Estimate of Mean	0.002001	
MVU Estimate of Standard Deviation	0.000706	
MVU Estimate of SE of Mean	0.000223	
95% H-UCL	0.002551	
95% Chebyshev (MVUE) UCL	0.002974	
97.5% Chebyshev (MVUE) UCL	0.003395	
99% Chebyshev (MVUE) UCL	0.004222	
Non-parametric Statisitics		
95% CLT UCL	0.002483	
95% Adjusted-CLT UCL	0.002682	
95% Modified-t UCL	0.002567	
95% Jackknife UCL	0.002536	
95% Chebyshev (Mean, Sd) UCL	0.003246	
97.5% Chebyshev (Mean, Sd) UCL	0.003777	
99% Chebyshev (Mean, Sd) UCL	0.004819	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.002463	
95% Bootstrap-t UCL	0.004579	
95% Hall's Bootstrap UCL	0.004892	
95% Percentile Bootstrap UCL	0.002475	
95% BCA Bootstrap UCL	0.00242	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.002536	95% Student's-t UCL
2nd Recommended UCL	0.002567	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable	Aroclor-1254	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.017	
Maximum	0.14	
Mean	0.0504	
Standard Deviation	0.040454	
Variance	0.001636	
Coefficient of Variation	0.80265	
Skewness	1.709847	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.728657	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.07385	
Gamma Statistics		
k hat	2.421175	
k star (bias corrected)	1.761489	
Theta hat	0.020816	
Theta star	0.028612	
nu hat	48.42349	
nu star	35.22978	
5% Approximate Chi Square Value	22.64729	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	20.90911	
Anderson-Darling Test Statistic	0.921358	
Anderson-Darling 5% Critical Value	0.734148	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.293508	
Kolmogrov-Smirnov 5% Critical Value	0.269237	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.078401	
95% Adjusted Gamma UCL	0.084919	
Lognormal Statistics		
Minimum of log data	-4.074542	
Maximum of log data	-1.966113	
Mean of log data	-3.208266	
Standard Deviation of log data	0.654499	
Variance of log data	0.428369	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.873089	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.050083	
MLE Standard Deviation	0.036624	
MLE Coefficient of Variation	0.731268	
MLE Skewness	2.584852	
MLE Median	0.040427	
MLE 80% Quantile	0.070284	
MLE 90% Quantile	0.09374	
MLE 95% Quantile	0.118646	
MLE 99% Quantile	0.185278	
MVU Estimate of Median	0.039568	
MVU Estimate of Mean	0.048862	
MVU Estimate of Standard Deviation	0.033048	
MVU Estimate of SE of Mean	0.010396	
95% H-UCL	0.085572	
95% Chebyshev (MVUE) UCL	0.094176	
97.5% Chebyshev (MVUE) UCL	0.113784	
99% Chebyshev (MVUE) UCL	0.152299	
Non-parametric Statisitics		
95% CLT UCL	0.071442	
95% Adjusted-CLT UCL	0.078833	
95% Modified-t UCL	0.075003	
95% Jackknife UCL	0.07385	
95% Chebyshev (Mean, Sd) UCL	0.106161	
97.5% Chebyshev (Mean, Sd) UCL	0.130289	
99% Chebyshev (Mean, Sd) UCL	0.177684	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.070425	
95% Bootstrap-t UCL	0.125868	
95% Hall's Bootstrap UCL	0.17845	
95% Percentile Bootstrap UCL	0.0712	
95% BCA Bootstrap UCL	0.0682	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	0.085572	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	Aroclor-1260	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.015	
Maximum	0.315	
Mean	0.0641	
Standard Deviation	0.090103	
Variance	0.008119	
Coefficient of Variation	1.405662	
Skewness	2.932042	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.523789	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.116331	
Gamma Statistics		
k hat	1.260446	
k star (bias corrected)	0.948979	
Theta hat	0.050855	
Theta star	0.067546	
nu hat	25.20891	
nu star	18.97957	
5% Approximate Chi Square Value	10.10103	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	8.995842	
Anderson-Darling Test Statistic	1.395902	
Anderson-Darling 5% Critical Value	0.743561	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.362689	
Kolmogrov-Smirnov 5% Critical Value	0.27238	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.120442	
95% Adjusted Gamma UCL	0.135239	
Lognormal Statistics		
Minimum of log data	-4.199705	
Maximum of log data	-1.155183	
Mean of log data	-3.193795	
Standard Deviation of log data	0.837472	
Variance of log data	0.701359	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.80751	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.058244	
MLE Standard Deviation	0.058722	
MLE Coefficient of Variation	1.008212	
MLE Skewness	4.049476	
MLE Median	0.041016	
MLE 80% Quantile	0.083231	
MLE 90% Quantile	0.120315	
MLE 95% Quantile	0.16265	
MLE 99% Quantile	0.287701	
MVU Estimate of Median	0.039598	
MVU Estimate of Mean	0.05576	
MVU Estimate of Standard Deviation	0.049179	
MVU Estimate of SE of Mean	0.015354	
95% H-UCL	0.126568	
95% Chebyshev (MVUE) UCL	0.122686	
97.5% Chebyshev (MVUE) UCL	0.151644	
99% Chebyshev (MVUE) UCL	0.208528	
Non-parametric Statisitics		
95% CLT UCL	0.110967	
95% Adjusted-CLT UCL	0.139196	
95% Modified-t UCL	0.120734	
95% Jackknife UCL	0.116331	
95% Chebyshev (Mean, Sd) UCL	0.188298	
97.5% Chebyshev (Mean, Sd) UCL	0.242039	
99% Chebyshev (Mean, Sd) UCL	0.347602	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.10897	
95% Bootstrap-t UCL	0.504531	
95% Hall's Bootstrap UCL	0.416574	
95% Percentile Bootstrap UCL	0.1155	
95% BCA Bootstrap UCL	0.1153	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.188298	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	Dieldrin	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.0007	
Maximum	0.0049	
Mean	0.001475	
Standard Deviation	0.001234	
Variance	1.52E-06	
Coefficient of Variation	0.836618	
Skewness	2.878304	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.575746	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.00219	
Gamma Statistics		
k hat	2.977284	
k star (bias corrected)	2.150766	
Theta hat	0.000495	
Theta star	0.000686	
nu hat	59.54569	
nu star	43.01531	
5% Approximate Chi Square Value	28.97482	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	26.98558	
Anderson-Darling Test Statistic	1.125829	
Anderson-Darling 5% Critical Value	0.732257	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.311649	
Kolmogrov-Smirnov 5% Critical Value	0.268481	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.00219	
95% Adjusted Gamma UCL	0.002351	
Lognormal Statistics		
Minimum of log data	-7.26443	
Maximum of log data	-5.31852	
Mean of log data	-6.696336	
Standard Deviation of log data	0.546909	
Variance of log data	0.29911	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.803661	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.001435	
MLE Standard Deviation	0.000847	
MLE Coefficient of Variation	0.590472	
MLE Skewness	1.977289	
MLE Median	0.001235	
MLE 80% Quantile	0.001961	
MLE 90% Quantile	0.002495	
MLE 95% Quantile	0.003038	
MLE 99% Quantile	0.004408	
MVU Estimate of Median	0.001217	
MVU Estimate of Mean	0.001411	
MVU Estimate of Standard Deviation	0.00079	
MVU Estimate of SE of Mean	0.000249	
95% H-UCL	0.002177	
95% Chebyshev (MVUE) UCL	0.002497	
97.5% Chebyshev (MVUE) UCL	0.002967	
99% Chebyshev (MVUE) UCL	0.00389	
Non-parametric Statisitics		
95% CLT UCL	0.002117	
95% Adjusted-CLT UCL	0.002496	
95% Modified-t UCL	0.00225	
95% Jackknife UCL	0.00219	
95% Chebyshev (Mean, Sd) UCL	0.003176	
97.5% Chebyshev (Mean, Sd) UCL	0.003912	
99% Chebyshev (Mean, Sd) UCL	0.005358	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.002085	
95% Bootstrap-t UCL	0.003758	
95% Hall's Bootstrap UCL	0.004622	
95% Percentile Bootstrap UCL	0.002185	
95% BCA Bootstrap UCL	0.002129	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.003176	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	5	
Minimum	0.0445	
Maximum	0.14	
Mean	0.0603	
Standard Deviation	0.028228	
Variance	0.000797	
Coefficient of Variation	0.468133	
Skewness	3.067533	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.482571	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.076663	
Gamma Statistics		
k hat	8.370349	
k star (bias corrected)	5.925911	
Theta hat	0.007204	
Theta star	0.010176	
nu hat	167.407	
nu star	118.5182	
5% Approximate Chi Square Value	94.37626	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	90.6369	
Anderson-Darling Test Statistic	2.142898	
Anderson-Darling 5% Critical Value	0.726491	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.457947	
Kolmogrov-Smirnov 5% Critical Value	0.266891	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.075725	
95% Adjusted Gamma UCL	0.078849	
Lognormal Statistics		
Minimum of log data	-3.112266	
Maximum of log data	-1.966113	
Mean of log data	-2.869346	
Standard Deviation of log data	0.325102	
Variance of log data	0.105692	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.567992	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.059815	
MLE Standard Deviation	0.019971	
MLE Coefficient of Variation	0.333885	
MLE Skewness	1.038875	
MLE Median	0.056736	
MLE 80% Quantile	0.074673	
MLE 90% Quantile	0.086157	
MLE 95% Quantile	0.096854	
MLE 99% Quantile	0.120856	
MVU Estimate of Median	0.056437	
MVU Estimate of Mean	0.059488	
MVU Estimate of Standard Deviation	0.019505	
MVU Estimate of SE of Mean	0.006166	
95% H-UCL	0.07432	
95% Chebyshev (MVUE) UCL	0.086363	
97.5% Chebyshev (MVUE) UCL	0.097992	
99% Chebyshev (MVUE) UCL	0.120835	
Non-parametric Statisitics		
95% CLT UCL	0.074983	
95% Adjusted-CLT UCL	0.084235	
95% Modified-t UCL	0.078107	
95% Jackknife UCL	0.076663	
95% Chebyshev (Mean, Sd) UCL	0.09921	
97.5% Chebyshev (Mean, Sd) UCL	0.116047	
99% Chebyshev (Mean, Sd) UCL	0.149119	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.073919	
95% Bootstrap-t UCL	0.147062	
95% Hall's Bootstrap UCL	0.151828	
95% Percentile Bootstrap UCL	0.0778	
95% BCA Bootstrap UCL	0.0868	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.076663	95% Student's-t UCL
2nd Recommended UCL	0.078107	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	7	
Minimum	0.1175	
Maximum	0.24	
Mean	0.16375	
Standard Deviation	0.035064	
Variance	0.00123	
Coefficient of Variation	0.214134	
Skewness	0.825426	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.907965	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.184076	
Gamma Statistics		
k hat	25.24843	
k star (bias corrected)	17.74057	
Theta hat	0.006486	
Theta star	0.00923	
nu hat	504.9686	
nu star	354.8114	
5% Approximate Chi Square Value	312.1519	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	305.1903	
Anderson-Darling Test Statistic	0.393546	
Anderson-Darling 5% Critical Value	0.724522	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.191533	
Kolmogrov-Smirnov 5% Critical Value	0.266116	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.186128	
95% Adjusted Gamma UCL	0.190374	
Lognormal Statistics		
Minimum of log data	-2.141317	
Maximum of log data	-1.427116	
Mean of log data	-1.829348	
Standard Deviation of log data	0.209577	
Variance of log data	0.043923	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.931957	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.164082	
MLE Standard Deviation	0.034769	
MLE Coefficient of Variation	0.2119	
MLE Skewness	0.645213	
MLE Median	0.160518	
MLE 80% Quantile	0.191617	
MLE 90% Quantile	0.210127	
MLE 95% Quantile	0.226594	
MLE 99% Quantile	0.261356	
MVU Estimate of Median	0.160166	
MVU Estimate of Mean	0.163717	
MVU Estimate of Standard Deviation	0.034434	
MVU Estimate of SE of Mean	0.010888	
95% H-UCL	0.187235	
95% Chebyshev (MVUE) UCL	0.211177	
97.5% Chebyshev (MVUE) UCL	0.231714	
99% Chebyshev (MVUE) UCL	0.272053	
Non-parametric Statisitics		
95% CLT UCL	0.181989	
95% Adjusted-CLT UCL	0.185081	
95% Modified-t UCL	0.184559	
95% Jackknife UCL	0.184076	
95% Chebyshev (Mean, Sd) UCL	0.212083	
97.5% Chebyshev (Mean, Sd) UCL	0.232997	
99% Chebyshev (Mean, Sd) UCL	0.274078	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.181046	
95% Bootstrap-t UCL	0.187627	
95% Hall's Bootstrap UCL	0.196098	
95% Percentile Bootstrap UCL	0.182	
95% BCA Bootstrap UCL	0.18975	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.184076	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.0305	
Maximum	0.072	
Mean	0.04005	
Standard Deviation	0.012176	
Variance	0.000148	
Coefficient of Variation	0.304012	
Skewness	2.426943	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.6667	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.047108	
Gamma Statistics		
k hat	15.96641	
k star (bias corrected)	11.24315	
Theta hat	0.002508	
Theta star	0.003562	
nu hat	319.3281	
nu star	224.863	
5% Approximate Chi Square Value	191.1477	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	185.7434	
Anderson-Darling Test Statistic	1.262137	
Anderson-Darling 5% Critical Value	0.724756	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.369866	
Kolmogrov-Smirnov 5% Critical Value	0.266356	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.047114	
95% Adjusted Gamma UCL	0.048485	
Lognormal Statistics		
Minimum of log data	-3.490029	
Maximum of log data	-2.631089	
Mean of log data	-3.249269	
Standard Deviation of log data	0.247959	
Variance of log data	0.061484	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.751526	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.040014	
MLE Standard Deviation	0.010076	
MLE Coefficient of Variation	0.25182	
MLE Skewness	0.771428	
MLE Median	0.038803	
MLE 80% Quantile	0.047847	
MLE 90% Quantile	0.053363	
MLE 95% Quantile	0.058345	
MLE 99% Quantile	0.069078	
MVU Estimate of Median	0.038683	
MVU Estimate of Mean	0.039888	
MVU Estimate of Standard Deviation	0.00994	
MVU Estimate of SE of Mean	0.003143	
95% H-UCL	0.046915	
95% Chebyshev (MVUE) UCL	0.053588	
97.5% Chebyshev (MVUE) UCL	0.059516	
99% Chebyshev (MVUE) UCL	0.07116	
Non-parametric Statisitics		
95% CLT UCL	0.046383	
95% Adjusted-CLT UCL	0.049541	
95% Modified-t UCL	0.047601	
95% Jackknife UCL	0.047108	
95% Chebyshev (Mean, Sd) UCL	0.056833	
97.5% Chebyshev (Mean, Sd) UCL	0.064095	
99% Chebyshev (Mean, Sd) UCL	0.07836	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.046013	
95% Bootstrap-t UCL	0.068174	
95% Hall's Bootstrap UCL	0.087078	
95% Percentile Bootstrap UCL	0.04695	
95% BCA Bootstrap UCL	0.051	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.047108	95% Student's-t UCL
2nd Recommended UCL	0.047601	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	0.1	
Maximum	0.57	
Mean	0.206	
Standard Deviation	0.142922	
Variance	0.020427	
Coefficient of Variation	0.693796	
Skewness	2.245916	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.691653	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.288849	
Gamma Statistics		
k hat	3.557228	
k star (bias corrected)	2.556727	
Theta hat	0.05791	
Theta star	0.080572	
nu hat	71.14457	
nu star	51.13453	
5% Approximate Chi Square Value	35.70961	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	33.48141	
Anderson-Darling Test Statistic	0.922624	
Anderson-Darling 5% Critical Value	0.730625	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.288659	
Kolmogrov-Smirnov 5% Critical Value	0.268099	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.294983	
95% Adjusted Gamma UCL	0.314614	
Lognormal Statistics		
Minimum of log data	-2.302585	
Maximum of log data	-0.562119	
Mean of log data	-1.726973	
Standard Deviation of log data	0.520998	
Variance of log data	0.271439	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.853274	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.20367	
MLE Standard Deviation	0.113737	
MLE Coefficient of Variation	0.558436	
MLE Skewness	1.849455	
MLE Median	0.177822	
MLE 80% Quantile	0.276172	
MLE 90% Quantile	0.347326	
MLE 95% Quantile	0.41898	
MLE 99% Quantile	0.597421	
MVU Estimate of Median	0.175422	
MVU Estimate of Mean	0.200659	
MVU Estimate of Standard Deviation	0.106792	
MVU Estimate of SE of Mean	0.033695	
95% H-UCL	0.301024	
95% Chebyshev (MVUE) UCL	0.347532	
97.5% Chebyshev (MVUE) UCL	0.411084	
99% Chebyshev (MVUE) UCL	0.53592	
Non-parametric Statisitics		
95% CLT UCL	0.280341	
95% Adjusted-CLT UCL	0.314639	
95% Modified-t UCL	0.294199	
95% Jackknife UCL	0.288849	
95% Chebyshev (Mean, Sd) UCL	0.403004	
97.5% Chebyshev (Mean, Sd) UCL	0.488248	
99% Chebyshev (Mean, Sd) UCL	0.655693	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.275912	
95% Bootstrap-t UCL	0.510938	
95% Hall's Bootstrap UCL	0.679952	
95% Percentile Bootstrap UCL	0.28	
95% BCA Bootstrap UCL	0.325	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	0.301024	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach45.xls	
Variable	Selenium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	0.39	
Maximum	0.84	
Mean	0.596	
Standard Deviation	0.139539	
Variance	0.019471	
Coefficient of Variation	0.234126	
Skewness	0.026046	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963205	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.676888	
Gamma Statistics		
k hat	19.34721	
k star (bias corrected)	13.60971	
Theta hat	0.030805	
Theta star	0.043792	
nu hat	386.9442	
nu star	272.1943	
5% Approximate Chi Square Value	234.979	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	228.9654	
Anderson-Darling Test Statistic	0.276919	
Anderson-Darling 5% Critical Value	0.724583	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.141399	
Kolmogrov-Smirnov 5% Critical Value	0.2662	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.690393	
95% Adjusted Gamma UCL	0.708525	
Lognormal Statistics		
Minimum of log data	-0.941609	
Maximum of log data	-0.174353	
Mean of log data	-0.543581	
Standard Deviation of log data	0.244786	
Variance of log data	0.05992	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.941945	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.598325	
MLE Standard Deviation	0.148683	
MLE Coefficient of Variation	0.248499	
MLE Skewness	0.760841	
MLE Median	0.580665	
MLE 80% Quantile	0.714097	
MLE 90% Quantile	0.795304	
MLE 95% Quantile	0.868569	
MLE 99% Quantile	1.026126	
MVU Estimate of Median	0.578928	
MVU Estimate of Mean	0.596496	
MVU Estimate of Standard Deviation	0.146724	
MVU Estimate of SE of Mean	0.046393	
95% H-UCL	0.69991	
95% Chebyshev (MVUE) UCL	0.798718	
97.5% Chebyshev (MVUE) UCL	0.886219	
99% Chebyshev (MVUE) UCL	1.058099	
Non-parametric Statisitics		
95% CLT UCL	0.668581	
95% Adjusted-CLT UCL	0.668969	
95% Modified-t UCL	0.676949	
95% Jackknife UCL	0.676888	
95% Chebyshev (Mean, Sd) UCL	0.788341	
97.5% Chebyshev (Mean, Sd) UCL	0.871567	
99% Chebyshev (Mean, Sd) UCL	1.035049	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.665591	
95% Bootstrap-t UCL	0.680262	
95% Hall's Bootstrap UCL	0.675355	
95% Percentile Bootstrap UCL	0.667	
95% BCA Bootstrap UCL	0.689	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.676888	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	4,4'-DDD	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.004	
Maximum	0.027	
Mean	0.012683	
Standard Deviation	0.008916	
Variance	7.95E-05	
Coefficient of Variation	0.702946	
Skewness	0.984363	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.885477	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.020018	
Gamma Statistics		
k hat	2.55303	
k star (bias corrected)	1.387626	
Theta hat	0.004968	
Theta star	0.00914	
nu hat	30.63636	
nu star	16.65151	
5% Approximate Chi Square Value	8.422468	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	6.423729	
Anderson-Darling Test Statistic	0.275733	
Anderson-Darling 5% Critical Value	0.702617	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.22684	
Kolmogrov-Smirnov 5% Critical Value	0.335122	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.025075	
95% Adjusted Gamma UCL	0.032878	
Lognormal Statistics		
Minimum of log data	-5.521461	
Maximum of log data	-3.611918	
Mean of log data	-4.575914	
Standard Deviation of log data	0.71324	
Variance of log data	0.508711	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.965202	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.013279	
MLE Standard Deviation	0.010814	
MLE Coefficient of Variation	0.814337	
MLE Skewness	2.983037	
MLE Median	0.010297	
MLE 80% Quantile	0.018813	
MLE 90% Quantile	0.025748	
MLE 95% Quantile	0.033285	
MLE 99% Quantile	0.0541	
MVU Estimate of Median	0.009867	
MVU Estimate of Mean	0.012651	
MVU Estimate of Standard Deviation	0.009013	
MVU Estimate of SE of Mean	0.003665	
95% H-UCL	0.038348	
95% Chebyshev (MVUE) UCL	0.028627	
97.5% Chebyshev (MVUE) UCL	0.035539	
99% Chebyshev (MVUE) UCL	0.049118	
Non-parametric Statisitics		
95% CLT UCL	0.01867	
95% Adjusted-CLT UCL	0.020233	
95% Modified-t UCL	0.020262	
95% Jackknife UCL	0.020018	
95% Chebyshev (Mean, Sd) UCL	0.028549	
97.5% Chebyshev (Mean, Sd) UCL	0.035414	
99% Chebyshev (Mean, Sd) UCL	0.048899	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.01804	
95% Bootstrap-t UCL	0.033128	
95% Hall's Bootstrap UCL	0.070478	
95% Percentile Bootstrap UCL	0.018533	
95% BCA Bootstrap UCL	0.0212	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.020018	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	4,4'-DDE	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.0061	
Maximum	0.083	
Mean	0.035517	
Standard Deviation	0.027487	
Variance	0.000756	
Coefficient of Variation	0.773911	
Skewness	1.149539	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.903875	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.058128	
Gamma Statistics		
k hat	1.888806	
k star (bias corrected)	1.055514	
Theta hat	0.018804	
Theta star	0.033649	
nu hat	22.66567	
nu star	12.66617	
5% Approximate Chi Square Value	5.66791	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	4.099376	
Anderson-Darling Test Statistic	0.228748	
Anderson-Darling 5% Critical Value	0.705006	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.210731	
Kolmogrov-Smirnov 5% Critical Value	0.33619	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.07937	
95% Adjusted Gamma UCL	0.109739	
Lognormal Statistics		
Minimum of log data	-5.099467	
Maximum of log data	-2.488915	
Mean of log data	-3.625244	
Standard Deviation of log data	0.89452	
Variance of log data	0.800167	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956193	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.039749	
MLE Standard Deviation	0.044011	
MLE Coefficient of Variation	1.107209	
MLE Skewness	4.678968	
MLE Median	0.026643	
MLE 80% Quantile	0.056734	
MLE 90% Quantile	0.084097	
MLE 95% Quantile	0.116047	
MLE 99% Quantile	0.213399	
MVU Estimate of Median	0.024908	
MVU Estimate of Mean	0.036651	
MVU Estimate of Standard Deviation	0.032699	
MVU Estimate of SE of Mean	0.013232	
95% H-UCL	0.191472	
95% Chebyshev (MVUE) UCL	0.094328	
97.5% Chebyshev (MVUE) UCL	0.119285	
99% Chebyshev (MVUE) UCL	0.168308	
Non-parametric Statisitics		
95% CLT UCL	0.053974	
95% Adjusted-CLT UCL	0.059601	
95% Modified-t UCL	0.059006	
95% Jackknife UCL	0.058128	
95% Chebyshev (Mean, Sd) UCL	0.08443	
97.5% Chebyshev (Mean, Sd) UCL	0.105594	
99% Chebyshev (Mean, Sd) UCL	0.147168	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.052739	
95% Bootstrap-t UCL	0.088409	
95% Hall's Bootstrap UCL	0.203561	
95% Percentile Bootstrap UCL	0.052333	
95% BCA Bootstrap UCL	0.057667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.058128	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	4,4'-DDT	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.00055	
Maximum	0.0067	
Mean	0.002767	
Standard Deviation	0.002333	
Variance	5.44E-06	
Coefficient of Variation	0.843313	
Skewness	1.10714	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.895175	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.004686	
Gamma Statistics		
k hat	1.688997	
k star (bias corrected)	0.955609	
Theta hat	0.001638	
Theta star	0.002895	
nu hat	20.26796	
nu star	11.46731	
5% Approximate Chi Square Value	4.877328	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	3.449609	
Anderson-Darling Test Statistic	0.192806	
Anderson-Darling 5% Critical Value	0.706437	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.174579	
Kolmogrov-Smirnov 5% Critical Value	0.336838	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.006505	
95% Adjusted Gamma UCL	0.009197	
Lognormal Statistics		
Minimum of log data	-7.505592	
Maximum of log data	-5.005648	
Mean of log data	-6.214464	
Standard Deviation of log data	0.916026	
Variance of log data	0.839104	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.985301	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.003043	
MLE Standard Deviation	0.003489	
MLE Coefficient of Variation	1.146426	
MLE Skewness	4.946018	
MLE Median	0.002	
MLE 80% Quantile	0.004338	
MLE 90% Quantile	0.006491	
MLE 95% Quantile	0.009026	
MLE 99% Quantile	0.016844	
MVU Estimate of Median	0.001864	
MVU Estimate of Mean	0.002793	
MVU Estimate of Standard Deviation	0.002551	
MVU Estimate of SE of Mean	0.001032	
95% H-UCL	0.015696	
95% Chebyshev (MVUE) UCL	0.007289	
97.5% Chebyshev (MVUE) UCL	0.009235	
99% Chebyshev (MVUE) UCL	0.013056	
Non-parametric Statisitics		
95% CLT UCL	0.004333	
95% Adjusted-CLT UCL	0.004793	
95% Modified-t UCL	0.004758	
95% Jackknife UCL	0.004686	
95% Chebyshev (Mean, Sd) UCL	0.006919	
97.5% Chebyshev (Mean, Sd) UCL	0.008715	
99% Chebyshev (Mean, Sd) UCL	0.012244	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.004153	
95% Bootstrap-t UCL	0.006596	
95% Hall's Bootstrap UCL	0.013484	
95% Percentile Bootstrap UCL	0.004325	
95% BCA Bootstrap UCL	0.005192	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.004686	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	Aldrin	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.00028	
Maximum	0.00255	
Mean	0.00106	
Standard Deviation	0.000836	
Variance	6.99E-07	
Coefficient of Variation	0.78876	
Skewness	1.294853	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.859546	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.001748	
Gamma Statistics		
k hat	2.06416	
k star (bias corrected)	1.143191	
Theta hat	0.000514	
Theta star	0.000927	
nu hat	24.76992	
nu star	13.71829	
5% Approximate Chi Square Value	6.377822	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	4.690443	
Anderson-Darling Test Statistic	0.325939	
Anderson-Darling 5% Critical Value	0.704025	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.241578	
Kolmogrov-Smirnov 5% Critical Value	0.335748	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.00228	
95% Adjusted Gamma UCL	0.0031	
Lognormal Statistics		
Minimum of log data	-8.180721	
Maximum of log data	-5.971662	
Mean of log data	-7.110857	
Standard Deviation of log data	0.80403	
Variance of log data	0.646464	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.950533	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.001128	
MLE Standard Deviation	0.001075	
MLE Coefficient of Variation	0.953299	
MLE Skewness	3.726236	
MLE Median	0.000816	
MLE 80% Quantile	0.00161	
MLE 90% Quantile	0.002293	
MLE 95% Quantile	0.003063	
MLE 99% Quantile	0.005297	
MVU Estimate of Median	0.000773	
MVU Estimate of Mean	0.001058	
MVU Estimate of Standard Deviation	0.000849	
MVU Estimate of SE of Mean	0.000345	
95% H-UCL	0.004147	
95% Chebyshev (MVUE) UCL	0.002561	
97.5% Chebyshev (MVUE) UCL	0.003211	
99% Chebyshev (MVUE) UCL	0.004488	
Non-parametric Statisitics		
95% CLT UCL	0.001621	
95% Adjusted-CLT UCL	0.001814	
95% Modified-t UCL	0.001778	
95% Jackknife UCL	0.001748	
95% Chebyshev (Mean, Sd) UCL	0.002548	
97.5% Chebyshev (Mean, Sd) UCL	0.003192	
99% Chebyshev (Mean, Sd) UCL	0.004456	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.00157	
95% Bootstrap-t UCL	0.00223	
95% Hall's Bootstrap UCL	0.002078	
95% Percentile Bootstrap UCL	0.001655	
95% BCA Bootstrap UCL	0.00183	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.001748	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	alpha-Chlordane	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.0035	
Maximum	0.011	
Mean	0.005442	
Standard Deviation	0.002827	
Variance	7.99E-06	
Coefficient of Variation	0.519461	
Skewness	2.072503	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.733465	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.007767	
Gamma Statistics		
k hat	5.997066	
k star (bias corrected)	3.109644	
Theta hat	0.000907	
Theta star	0.00175	
nu hat	71.9648	
nu star	37.31573	
5% Approximate Chi Square Value	24.32785	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	20.62482	
Anderson-Darling Test Statistic	0.607261	
Anderson-Darling 5% Critical Value	0.698106	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.268727	
Kolmogrov-Smirnov 5% Critical Value	0.332728	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.008347	
95% Adjusted Gamma UCL	0.009845	
Lognormal Statistics		
Minimum of log data	-5.654992	
Maximum of log data	-4.50986	
Mean of log data	-5.299355	
Standard Deviation of log data	0.423604	
Variance of log data	0.17944	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.839648	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.005464	
MLE Standard Deviation	0.002422	
MLE Coefficient of Variation	0.443337	
MLE Skewness	1.417147	
MLE Median	0.004995	
MLE 80% Quantile	0.007145	
MLE 90% Quantile	0.008608	
MLE 95% Quantile	0.010026	
MLE 99% Quantile	0.013379	
MVU Estimate of Median	0.004921	
MVU Estimate of Mean	0.005378	
MVU Estimate of Standard Deviation	0.002278	
MVU Estimate of SE of Mean	0.000929	
95% H-UCL	0.008806	
95% Chebyshev (MVUE) UCL	0.00943	
97.5% Chebyshev (MVUE) UCL	0.011183	
99% Chebyshev (MVUE) UCL	0.014626	
Non-parametric Statisitics		
95% CLT UCL	0.00734	
95% Adjusted-CLT UCL	0.008383	
95% Modified-t UCL	0.00793	
95% Jackknife UCL	0.007767	
95% Chebyshev (Mean, Sd) UCL	0.010472	
97.5% Chebyshev (Mean, Sd) UCL	0.012648	
99% Chebyshev (Mean, Sd) UCL	0.016924	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.007189	
95% Bootstrap-t UCL	0.012993	
95% Hall's Bootstrap UCL	0.014969	
95% Percentile Bootstrap UCL	0.007483	
95% BCA Bootstrap UCL	0.008833	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.008347	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable	Aroclor-1248	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.0025	
Maximum	0.025	
Mean	0.010892	
Standard Deviation	0.007986	
Variance	6.38E-05	
Coefficient of Variation	0.733234	
Skewness	1.17153	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.90528	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.017461	
Gamma Statistics		
k hat	2.185836	
k star (bias corrected)	1.204029	
Theta hat	0.004983	
Theta star	0.009046	
nu hat	26.23003	
nu star	14.44835	
5% Approximate Chi Square Value	6.87828	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	5.110803	
Anderson-Darling Test Statistic	0.206552	
Anderson-Darling 5% Critical Value	0.703675	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.167596	
Kolmogrov-Smirnov 5% Critical Value	0.335592	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.022879	
95% Adjusted Gamma UCL	0.030791	
Lognormal Statistics		
Minimum of log data	-5.991465	
Maximum of log data	-3.688879	
Mean of log data	-4.76561	
Standard Deviation of log data	0.807043	
Variance of log data	0.651319	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973875	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.011797	
MLE Standard Deviation	0.011303	
MLE Coefficient of Variation	0.958159	
MLE Skewness	3.754133	
MLE Median	0.008518	
MLE 80% Quantile	0.016846	
MLE 90% Quantile	0.024027	
MLE 95% Quantile	0.032128	
MLE 99% Quantile	0.055664	
MVU Estimate of Median	0.008064	
MVU Estimate of Mean	0.011065	
MVU Estimate of Standard Deviation	0.008914	
MVU Estimate of SE of Mean	0.003617	
95% H-UCL	0.043758	
95% Chebyshev (MVUE) UCL	0.02683	
97.5% Chebyshev (MVUE) UCL	0.033651	
99% Chebyshev (MVUE) UCL	0.04705	
Non-parametric Statisitics		
95% CLT UCL	0.016254	
95% Adjusted-CLT UCL	0.017921	
95% Modified-t UCL	0.017721	
95% Jackknife UCL	0.017461	
95% Chebyshev (Mean, Sd) UCL	0.025103	
97.5% Chebyshev (Mean, Sd) UCL	0.031252	
99% Chebyshev (Mean, Sd) UCL	0.043332	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.015619	
95% Bootstrap-t UCL	0.020344	
95% Hall's Bootstrap UCL	0.022644	
95% Percentile Bootstrap UCL	0.016233	
95% BCA Bootstrap UCL	0.018808	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.017461	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	Aroclor-1254	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.015	
Maximum	0.18	
Mean	0.076667	
Standard Deviation	0.062154	
Variance	0.003863	
Coefficient of Variation	0.810699	
Skewness	1.042058	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906322	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.127797	
Gamma Statistics		
k hat	1.775878	
k star (bias corrected)	0.99905	
Theta hat	0.043171	
Theta star	0.07674	
nu hat	21.31053	
nu star	11.9886	
5% Approximate Chi Square Value	5.218515	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	3.72882	
Anderson-Darling Test Statistic	0.17833	
Anderson-Darling 5% Critical Value	0.705815	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.157773	
Kolmogrov-Smirnov 5% Critical Value	0.336556	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.176128	
95% Adjusted Gamma UCL	0.246492	
Lognormal Statistics		
Minimum of log data	-4.199705	
Maximum of log data	-1.714798	
Mean of log data	-2.875523	
Standard Deviation of log data	0.90106	
Variance of log data	0.811909	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.984778	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.084621	
MLE Standard Deviation	0.094693	
MLE Coefficient of Variation	1.119019	
MLE Skewness	4.758295	
MLE Median	0.056387	
MLE 80% Quantile	0.120739	
MLE 90% Quantile	0.179485	
MLE 95% Quantile	0.24826	
MLE 99% Quantile	0.458563	
MVU Estimate of Median	0.052663	
MVU Estimate of Mean	0.077917	
MVU Estimate of Standard Deviation	0.070019	
MVU Estimate of SE of Mean	0.028328	
95% H-UCL	0.416123	
95% Chebyshev (MVUE) UCL	0.201393	
97.5% Chebyshev (MVUE) UCL	0.254822	
99% Chebyshev (MVUE) UCL	0.359772	
Non-parametric Statisitics		
95% CLT UCL	0.118403	
95% Adjusted-CLT UCL	0.129938	
95% Modified-t UCL	0.129596	
95% Jackknife UCL	0.127797	
95% Chebyshev (Mean, Sd) UCL	0.18727	
97.5% Chebyshev (Mean, Sd) UCL	0.235128	
99% Chebyshev (Mean, Sd) UCL	0.329136	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.115169	
95% Bootstrap-t UCL	0.196323	
95% Hall's Bootstrap UCL	0.420036	
95% Percentile Bootstrap UCL	0.118333	
95% BCA Bootstrap UCL	0.1335	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.127797	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable	Aroclor-1260	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.025	
Maximum	0.11	
Mean	0.05175	
Standard Deviation	0.032202	
Variance	0.001037	
Coefficient of Variation	0.622263	
Skewness	1.45559	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.847311	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.078241	
Gamma Statistics		
k hat	3.683841	
k star (bias corrected)	1.953032	
Theta hat	0.014048	
Theta star	0.026497	
nu hat	44.2061	
nu star	23.43638	
5% Approximate Chi Square Value	13.41916	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	10.78534	
Anderson-Darling Test Statistic	0.334237	
Anderson-Darling 5% Critical Value	0.700407	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.216934	
Kolmogrov-Smirnov 5% Critical Value	0.333859	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.090381	
95% Adjusted Gamma UCL	0.112452	
Lognormal Statistics		
Minimum of log data	-3.688879	
Maximum of log data	-2.207275	
Mean of log data	-3.103156	
Standard Deviation of log data	0.56736	
Variance of log data	0.321897	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.930318	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.052749	
MLE Standard Deviation	0.032506	
MLE Coefficient of Variation	0.616233	
MLE Skewness	2.082708	
MLE Median	0.044907	
MLE 80% Quantile	0.072531	
MLE 90% Quantile	0.093098	
MLE 95% Quantile	0.114195	
MLE 99% Quantile	0.168053	
MVU Estimate of Median	0.043714	
MVU Estimate of Mean	0.051226	
MVU Estimate of Standard Deviation	0.029049	
MVU Estimate of SE of Mean	0.011839	
95% H-UCL	0.109729	
95% Chebyshev (MVUE) UCL	0.102832	
97.5% Chebyshev (MVUE) UCL	0.125163	
99% Chebyshev (MVUE) UCL	0.169026	
Non-parametric Statisitics		
95% CLT UCL	0.073374	
95% Adjusted-CLT UCL	0.081721	
95% Modified-t UCL	0.079543	
95% Jackknife UCL	0.078241	
95% Chebyshev (Mean, Sd) UCL	0.109054	
97.5% Chebyshev (Mean, Sd) UCL	0.13385	
99% Chebyshev (Mean, Sd) UCL	0.182556	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.071691	
95% Bootstrap-t UCL	0.119044	
95% Hall's Bootstrap UCL	0.199032	
95% Percentile Bootstrap UCL	0.073333	
95% BCA Bootstrap UCL	0.08425	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.078241	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	Dieldrin	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.00055	
Maximum	0.0049	
Mean	0.002137	
Standard Deviation	0.001539	
Variance	2.37E-06	
Coefficient of Variation	0.72012	
Skewness	1.279402	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.899928	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.003402	
Gamma Statistics		
k hat	2.37117	
k star (bias corrected)	1.296696	
Theta hat	0.000901	
Theta star	0.001648	
nu hat	28.45404	
nu star	15.56035	
5% Approximate Chi Square Value	7.651703	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	5.76564	
Anderson-Darling Test Statistic	0.193369	
Anderson-Darling 5% Critical Value	0.703141	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.166409	
Kolmogrov-Smirnov 5% Critical Value	0.335355	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.004345	
95% Adjusted Gamma UCL	0.005766	
Lognormal Statistics		
Minimum of log data	-7.505592	
Maximum of log data	-5.31852	
Mean of log data	-6.373952	
Standard Deviation of log data	0.761951	
Variance of log data	0.580569	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.982285	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.00228	
MLE Standard Deviation	0.002023	
MLE Coefficient of Variation	0.887161	
MLE Skewness	3.35973	
MLE Median	0.001705	
MLE 80% Quantile	0.003247	
MLE 90% Quantile	0.00454	
MLE 95% Quantile	0.005973	
MLE 99% Quantile	0.010035	
MVU Estimate of Median	0.001624	
MVU Estimate of Mean	0.002155	
MVU Estimate of Standard Deviation	0.00164	
MVU Estimate of SE of Mean	0.000666	
95% H-UCL	0.007468	
95% Chebyshev (MVUE) UCL	0.005059	
97.5% Chebyshev (MVUE) UCL	0.006315	
99% Chebyshev (MVUE) UCL	0.008783	
Non-parametric Statisitics		
95% CLT UCL	0.00317	
95% Adjusted-CLT UCL	0.00352	
95% Modified-t UCL	0.003457	
95% Jackknife UCL	0.003402	
95% Chebyshev (Mean, Sd) UCL	0.004875	
97.5% Chebyshev (Mean, Sd) UCL	0.006059	
99% Chebyshev (Mean, Sd) UCL	0.008387	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.003063	
95% Bootstrap-t UCL	0.004087	
95% Hall's Bootstrap UCL	0.007714	
95% Percentile Bootstrap UCL	0.003195	
95% BCA Bootstrap UCL	0.00365	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.003402	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	Heptachlor epoxide	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.00026	
Maximum	0.00255	
Mean	0.001057	
Standard Deviation	0.00084	
Variance	7.05E-07	
Coefficient of Variation	0.79481	
Skewness	1.276421	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.86455	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.001748	
Gamma Statistics		
k hat	1.998555	
k star (bias corrected)	1.110389	
Theta hat	0.000529	
Theta star	0.000952	
nu hat	23.98266	
nu star	13.32466	
5% Approximate Chi Square Value	6.110592	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	4.467188	
Anderson-Darling Test Statistic	0.310934	
Anderson-Darling 5% Critical Value	0.70422	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.234465	
Kolmogrov-Smirnov 5% Critical Value	0.335835	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.002304	
95% Adjusted Gamma UCL	0.003152	
Lognormal Statistics		
Minimum of log data	-8.254829	
Maximum of log data	-5.971662	
Mean of log data	-7.123208	
Standard Deviation of log data	0.824071	
Variance of log data	0.679093	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.954736	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.001132	
MLE Standard Deviation	0.001116	
MLE Coefficient of Variation	0.985946	
MLE Skewness	3.916265	
MLE Median	0.000806	
MLE 80% Quantile	0.001618	
MLE 90% Quantile	0.002324	
MLE 95% Quantile	0.003127	
MLE 99% Quantile	0.005481	
MVU Estimate of Median	0.000761	
MVU Estimate of Mean	0.001059	
MVU Estimate of Standard Deviation	0.000871	
MVU Estimate of SE of Mean	0.000353	
95% H-UCL	0.004409	
95% Chebyshev (MVUE) UCL	0.002598	
97.5% Chebyshev (MVUE) UCL	0.003264	
99% Chebyshev (MVUE) UCL	0.004572	
Non-parametric Statisitics		
95% CLT UCL	0.001621	
95% Adjusted-CLT UCL	0.001812	
95% Modified-t UCL	0.001777	
95% Jackknife UCL	0.001748	
95% Chebyshev (Mean, Sd) UCL	0.002551	
97.5% Chebyshev (Mean, Sd) UCL	0.003198	
99% Chebyshev (Mean, Sd) UCL	0.004468	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.001593	
95% Bootstrap-t UCL	0.002215	
95% *Hall's Bootstrap UCL*	0.002064	
95% Percentile Bootstrap UCL	0.00161	
95% BCA Bootstrap UCL	0.001872	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.001748	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	4	
Minimum	0.0385	
Maximum	0.05	
Mean	0.046917	
Standard Deviation	0.004641	
Variance	2.15E-05	
Coefficient of Variation	0.098926	
Skewness	-1.555624	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.763808	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.050735	
Gamma Statistics		
k hat	113.5553	
k star (bias corrected)	56.88875	
Theta hat	0.000413	
Theta star	0.000825	
nu hat	1362.663	
nu star	682.665	
5% Approximate Chi Square Value	623.0327	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	602.2276	
Anderson-Darling Test Statistic	0.773419	
Anderson-Darling 5% Critical Value	0.69621	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.317236	
Kolmogrov-Smirnov 5% Critical Value	0.33154	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.051407	
95% Adjusted Gamma UCL	0.053183	
Lognormal Statistics		
Minimum of log data	-3.257097	
Maximum of log data	-2.995732	
Mean of log data	-3.063792	
Standard Deviation of log data	0.104906	
Variance of log data	0.011005	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.752201	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.046968	
MLE Standard Deviation	0.004941	
MLE Coefficient of Variation	0.105196	
MLE Skewness	0.316751	
MLE Median	0.04671	
MLE 80% Quantile	0.05104	
MLE 90% Quantile	0.053451	
MLE 95% Quantile	0.055508	
MLE 99% Quantile	0.059619	
MVU Estimate of Median	0.046667	
MVU Estimate of Mean	0.046925	
MVU Estimate of Standard Deviation	0.004923	
MVU Estimate of SE of Mean	0.00201	
95% H-UCL	0.051507	
95% Chebyshev (MVUE) UCL	0.055685	
97.5% Chebyshev (MVUE) UCL	0.059475	
99% Chebyshev (MVUE) UCL	0.066921	
Non-parametric Statisitics		
95% CLT UCL	0.050033	
95% Adjusted-CLT UCL	0.048748	
95% Modified-t UCL	0.050534	
95% Jackknife UCL	0.050735	
95% Chebyshev (Mean, Sd) UCL	0.055176	
97.5% Chebyshev (Mean, Sd) UCL	0.05875	
99% Chebyshev (Mean, Sd) UCL	0.06577	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.051407	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.037	
Maximum	0.17	
Mean	0.065417	
Standard Deviation	0.051415	
Variance	0.002644	
Coefficient of Variation	0.785968	
Skewness	2.410315	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.57722	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.107713	
Gamma Statistics		
k hat	3.168271	
k star (bias corrected)	1.695247	
Theta hat	0.020647	
Theta star	0.038588	
nu hat	38.01925	
nu star	20.34296	
5% Approximate Chi Square Value	11.10285	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	8.746126	
Anderson-Darling Test Statistic	1.223402	
Anderson-Darling 5% Critical Value	0.701103	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.45681	
Kolmogrov-Smirnov 5% Critical Value	0.33438	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.119858	
95% Adjusted Gamma UCL	0.152155	
Lognormal Statistics		
Minimum of log data	-3.296837	
Maximum of log data	-1.771957	
Mean of log data	-2.893016	
Standard Deviation of log data	0.558437	
Variance of log data	0.311852	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.667874	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.064759	
MLE Standard Deviation	0.039175	
MLE Coefficient of Variation	0.60494	
MLE Skewness	2.036199	
MLE Median	0.055409	
MLE 80% Quantile	0.088821	
MLE 90% Quantile	0.11356	
MLE 95% Quantile	0.138846	
MLE 99% Quantile	0.203093	
MVU Estimate of Median	0.053982	
MVU Estimate of Mean	0.062951	
MVU Estimate of Standard Deviation	0.035137	
MVU Estimate of SE of Mean	0.014322	
95% H-UCL	0.132344	
95% Chebyshev (MVUE) UCL	0.125379	
97.5% Chebyshev (MVUE) UCL	0.152392	
99% Chebyshev (MVUE) UCL	0.205454	
Non-parametric Statisitics		
95% CLT UCL	0.099943	
95% Adjusted-CLT UCL	0.122012	
95% Modified-t UCL	0.111155	
95% Jackknife UCL	0.107713	
95% Chebyshev (Mean, Sd) UCL	0.156911	
97.5% Chebyshev (Mean, Sd) UCL	0.196501	
99% Chebyshev (Mean, Sd) UCL	0.274267	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.096145	
95% Bootstrap-t UCL	0.472898	
95% Hall's Bootstrap UCL	0.420916	
95% Percentile Bootstrap UCL	0.105417	
95% BCA Bootstrap UCL	0.0885	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.156911	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.12	
Maximum	0.8	
Mean	0.248333	
Standard Deviation	0.270807	
Variance	0.073337	
Coefficient of Variation	1.0905	
Skewness	2.427666	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.550793	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.47111	
Gamma Statistics		
k hat	1.811798	
k star (bias corrected)	1.01701	
Theta hat	0.137065	
Theta star	0.24418	
nu hat	21.74158	
nu star	12.20412	
5% Approximate Chi Square Value	5.360757	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	3.845779	
Anderson-Darling Test Statistic	1.309351	
Anderson-Darling 5% Critical Value	0.705558	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.421628	
Kolmogrov-Smirnov 5% Critical Value	0.33644	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.565347	
95% Adjusted Gamma UCL	0.788056	
Lognormal Statistics		
Minimum of log data	-2.120264	
Maximum of log data	-0.223144	
Mean of log data	-1.693653	
Standard Deviation of log data	0.730066	
Variance of log data	0.532996	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.635906	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.239991	
MLE Standard Deviation	0.201368	
MLE Coefficient of Variation	0.839065	
MLE Skewness	3.107921	
MLE Median	0.183847	
MLE 80% Quantile	0.340702	
MLE 90% Quantile	0.469767	
MLE 95% Quantile	0.610977	
MLE 99% Quantile	1.00449	
MVU Estimate of Median	0.175809	
MVU Estimate of Mean	0.228051	
MVU Estimate of Standard Deviation	0.166279	
MVU Estimate of SE of Mean	0.067593	
95% H-UCL	0.723184	
95% Chebyshev (MVUE) UCL	0.522683	
97.5% Chebyshev (MVUE) UCL	0.650171	
99% Chebyshev (MVUE) UCL	0.900596	
Non-parametric Statisitics		
95% CLT UCL	0.430183	
95% Adjusted-CLT UCL	0.547262	
95% Modified-t UCL	0.489372	
95% Jackknife UCL	0.47111	
95% Chebyshev (Mean, Sd) UCL	0.730239	
97.5% Chebyshev (Mean, Sd) UCL	0.93876	
99% Chebyshev (Mean, Sd) UCL	1.348358	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.412559	
95% Bootstrap-t UCL	4.445378	
95% Hall's Bootstrap UCL	2.13575	
95% Percentile Bootstrap UCL	0.465	
95% BCA Bootstrap UCL	0.368333	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.730239	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\June 2004-revised\Fish stat - reach6.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.0265	
Maximum	2.3	
Mean	0.416667	
Standard Deviation	0.92282	
Variance	0.851597	
Coefficient of Variation	2.214769	
Skewness	2.447366	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.510912	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.175816	
Gamma Statistics		
k hat	0.38226	
k star (bias corrected)	0.302241	
Theta hat	1.090008	
Theta star	1.37859	
nu hat	4.587122	
nu star	3.626894	
5% Approximate Chi Square Value	0.57985	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	0.271986	
Anderson-Darling Test Statistic	1.350007	
Anderson-Darling 5% Critical Value	0.754	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.434318	
Kolmogrov-Smirnov 5% Critical Value	0.35342	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	2.606203	
95% Adjusted Gamma UCL	5.556189	
Lognormal Statistics		
Minimum of log data	-3.630611	
Maximum of log data	0.832909	
Mean of log data	-2.609566	
Standard Deviation of log data	1.726723	
Variance of log data	2.981571	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.656866	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.326678	
MLE Standard Deviation	1.413378	
MLE Coefficient of Variation	4.326519	
MLE Skewness	93.96665	
MLE Median	0.073566	
MLE 80% Quantile	0.316483	
MLE 90% Quantile	0.676565	
MLE 95% Quantile	1.259724	
MLE 99% Quantile	4.082832	
MVU Estimate of Median	0.056837	
MVU Estimate of Mean	0.21629	
MVU Estimate of Standard Deviation	0.366262	
MVU Estimate of SE of Mean	0.139357	
95% H-UCL	73.61174	
95% Chebyshev (MVUE) UCL	0.823734	
97.5% Chebyshev (MVUE) UCL	1.086576	
99% Chebyshev (MVUE) UCL	1.602877	
Non-parametric Statisitics		
95% CLT UCL	1.036349	
95% Adjusted-CLT UCL	1.438551	
95% Modified-t UCL	1.238551	
95% Jackknife UCL	1.175816	
95% Chebyshev (Mean, Sd) UCL	2.058837	
97.5% Chebyshev (Mean, Sd) UCL	2.769406	
99% Chebyshev (Mean, Sd) UCL	4.165181	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.975245	
95% Bootstrap-t UCL	117.9495	
95% Hall's Bootstrap UCL	48.61392	
95% Percentile Bootstrap UCL	1.165167	
95% BCA Bootstrap UCL	0.803333	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	4.165181	99% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	YES	Cosider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	J:\NE\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.018	
Maximum	0.2	
Mean	0.146333	
Standard Deviation	0.068474	
Variance	0.004689	
Coefficient of Variation	0.467931	
Skewness	-1.678981	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.805061	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.202663	
Gamma Statistics		
k hat	2.368278	
k star (bias corrected)	1.29525	
Theta hat	0.061789	
Theta star	0.112977	
nu hat	28.41934	
nu star	15.543	
5% Approximate Chi Square Value	7.639537	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	5.755295	
Anderson-Darling Test Statistic	0.970533	
Anderson-Darling 5% Critical Value	0.703149	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.349963	
Kolmogrov-Smirnov 5% Critical Value	0.335359	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.297722	
95% Adjusted Gamma UCL	0.395194	
Lognormal Statistics		
Minimum of log data	-4.017384	
Maximum of log data	-1.609438	
Mean of log data	-2.147604	
Standard Deviation of log data	0.931028	
Variance of log data	0.866812	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.647899	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.180108	
MLE Standard Deviation	0.211527	
MLE Coefficient of Variation	1.174442	
MLE Skewness	5.143251	
MLE Median	0.116764	
MLE 80% Quantile	0.256434	
MLE 90% Quantile	0.386264	
MLE 95% Quantile	0.540066	
MLE 99% Quantile	1.018128	
MVU Estimate of Median	0.108544	
MVU Estimate of Mean	0.164754	
MVU Estimate of Standard Deviation	0.15293	
MVU Estimate of SE of Mean	0.061803	
95% H-UCL	0.975353	
95% Chebyshev (MVUE) UCL	0.434149	
97.5% Chebyshev (MVUE) UCL	0.550716	
99% Chebyshev (MVUE) UCL	0.779689	
Non-parametric Statisitics		
95% CLT UCL	0.192314	
95% Adjusted-CLT UCL	0.17184	
95% Modified-t UCL	0.199469	
95% Jackknife UCL	0.202663	
95% Chebyshev (Mean, Sd) UCL	0.268183	
97.5% Chebyshev (Mean, Sd) UCL	0.320908	
99% Chebyshev (Mean, Sd) UCL	0.424475	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.188088	
95% Bootstrap-t UCL	0.185586	
95% Hall's Bootstrap UCL	0.176863	
95% Percentile Bootstrap UCL	0.183333	
95% BCA Bootstrap UCL	0.185	
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.202663	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NB\WELLSG&H\OU3-supplemental\HHRA\Statistics\HH - June 2004\Fish stat - reach6.xls	
Variable:	Selenium	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.45	
Maximum	0.65	
Mean	0.565833	
Standard Deviation	0.071443	
Variance	0.005104	
Coefficient of Variation	0.126262	
Skewness	-0.653361	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.966171	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.624606	
Gamma Statistics		
k hat	71.62218	
k star (bias corrected)	35.9222	
Theta hat	0.0079	
Theta star	0.015752	
nu hat	859.4661	
nu star	431.0664	
5% Approximate Chi Square Value	383.9238	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	367.71	
Anderson-Darling Test Statistic	0.23199	
Anderson-Darling 5% Critical Value	0.69659	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.147917	
Kolmogrov-Smirnov 5% Critical Value	0.331693	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	0.635313	
95% Adjusted Gamma UCL	0.663326	
Lognormal Statistics		
Minimum of log data	-0.798508	
Maximum of log data	-0.430783	
Mean of log data	-0.576453	
Standard Deviation of log data	0.13137	
Variance of log data	0.017258	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.946705	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.566757	
MLE Standard Deviation	0.074778	
MLE Coefficient of Variation	0.131939	
MLE Skewness	0.398115	
MLE Median	0.561888	
MLE 80% Quantile	0.627856	
MLE 90% Quantile	0.665217	
MLE 95% Quantile	0.697433	
MLE 99% Quantile	0.762704	
MVU Estimate of Median	0.56108	
MVU Estimate of Mean	0.565939	
MVU Estimate of Standard Deviation	0.074347	
MVU Estimate of SE of Mean	0.030352	
95% H-UCL	0.637386	
95% Chebyshev (MVUE) UCL	0.69824	
97.5% Chebyshev (MVUE) UCL	0.755487	
99% Chebyshev (MVUE) UCL	0.867938	
Non-parametric Statisitics		
95% CLT UCL	0.613808	
95% Adjusted-CLT UCL	0.605495	
95% Modified-t UCL	0.623309	
95% Jackknife UCL	0.624606	
95% Chebyshev (Mean, Sd) UCL	0.692968	
97.5% Chebyshev (Mean, Sd) UCL	0.747979	
99% Chebyshev (Mean, Sd) UCL	0.856038	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.609462	
95% Bootstrap-t UCL	0.613728	
95% Hall's Bootstrap UCL	0.61216	
95% Percentile Bootstrap UCL	0.6075	
95% BCA Bootstrap UCL	0.618333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.624606	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	NO	
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SD.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	5	
Minimum	9.5	
Maximum	29	
Mean	14.5	
Standard Deviation	7.27152	
Variance	52.875	
Coefficient of Variation	0.501484	
Skewness	1.27752	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.71167	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	19.00725	
Gamma Statistics		
k hat	5.461254	
k star (bias corrected)	3.71491	
Theta hat	2.655068	
Theta star	3.90319	
nu hat	98.30257	
nu star	66.86838	
5% Approximate Chi Square Value	49.04609	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	45.8428	
Anderson-Darling Test Statistic	1.401289	
Anderson-Darling 5% Critical Value	0.722667	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.4154	
Kolmogrov-Smirnov 5% Critical Value	0.279792	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	19.76899	
95% Adjusted Gamma UCL	21.15036	
Lognormal Statistics		
Minimum of log data	2.251292	
Maximum of log data	3.367296	
Mean of log data	2.57981	
Standard Deviation of log data	0.439698	
Variance of log data	0.193335	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.712608	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	14.5338	
MLE Standard Deviation	6.712172	
MLE Coefficient of Variation	0.461832	
MLE Skewness	1.483999	
MLE Median	13.19463	
MLE 80% Quantile	19.13186	
MLE 90% Quantile	23.21554	
MLE 95% Quantile	27.19718	
MLE 99% Quantile	36.6916	
MVU Estimate of Median	13.05351	
MVU Estimate of Mean	14.36812	
MVU Estimate of Standard Deviation	6.396704	
MVU Estimate of SE of Mean	2.129975	
95% H-UCL	20.49098	
95% Chebyshev (MVUE) UCL	23.65246	
97.5% Chebyshev (MVUE) UCL	27.66981	
99% Chebyshev (MVUE) UCL	35.5611	
Non-parametric Statisitics		
95% CLT UCL	18.48686	
95% Adjusted-CLT UCL	19.58975	
95% Modified-t UCL	19.17927	
95% Jackknife UCL	19.00725	
95% Chebyshev (Mean, Sd) UCL	25.06527	
97.5% Chebyshev (Mean, Sd) UCL	29.63688	
99% Chebyshev (Mean, Sd) UCL	38.6169	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	18.21642	
95% Bootstrap-t UCL	21.95818	
95% Hall's Bootstrap UCL	17.43986	
95% Percentile Bootstrap UCL	18.5	
95% BCA Bootstrap UCL	17.72222	
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	19.00725	95% Student's-t UCL
2nd Recommended UCL	19.17927	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SD.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	7	
Minimum	78	
Maximum	470	
Mean	185.3333	
Standard Deviation	113.8244	
Variance	12956	
Coefficient of Variation	0.614161	
Skewness	2.320633	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.720917	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	255.8873	
Gamma Statistics		
k hat	4.289436	
k star (bias corrected)	2.933698	
Theta hat	43.20693	
Theta star	63.17397	
nu hat	77.20984	
nu star	52.80656	
5% Approximate Chi Square Value	37.11066	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	34.35492	
Anderson-Darling Test Statistic	0.641668	
Anderson-Darling 5% Critical Value	0.724323	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.224538	
Kolmogrov-Smirnov 5% Critical Value	0.280259	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	263.7198	
95% Adjusted Gamma UCL	284.8738	
Lognormal Statistics		
Minimum of log data	4.356709	
Maximum of log data	6.152733	
Mean of log data	5.101085	
Standard Deviation of log data	0.490171	
Variance of log data	0.240268	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904946	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	185.1598	
MLE Standard Deviation	96.4947	
MLE Coefficient of Variation	0.521143	
MLE Skewness	1.704965	
MLE Median	164.2	
MLE 80% Quantile	248.4596	
MLE 90% Quantile	308.2637	
MLE 95% Quantile	367.7551	
MLE 99% Quantile	513.4866	
MVU Estimate of Median	162.0199	
MVU Estimate of Mean	182.5013	
MVU Estimate of Standard Deviation	90.83873	
MVU Estimate of SE of Mean	30.23094	
95% H-UCL	275.1762	
95% Chebyshev (MVUE) UCL	314.2749	
97.5% Chebyshev (MVUE) UCL	371.2934	
99% Chebyshev (MVUE) UCL	483.2954	
Non-parametric Statisitics		
95% CLT UCL	247.7415	
95% Adjusted-CLT UCL	279.1018	
95% Modified-t UCL	260.7789	
95% Jackknife UCL	255.8873	
95% Chebyshev (Mean, Sd) UCL	350.7164	
97.5% Chebyshev (Mean, Sd) UCL	422.2778	
99% Chebyshev (Mean, Sd) UCL	562.8462	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	243.7468	
95% Bootstrap-t UCL	340.5486	
95% Hall's Bootstrap UCL	511.7186	
95% Percentile Bootstrap UCL	248.8889	
95% BCA Bootstrap UCL	288.6667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	263.7198	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SD.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	91	
Maximum	330	
Mean	188.4444	
Standard Deviation	69.73541	
Variance	4863.028	
Coefficient of Variation	0.370058	
Skewness	0.831786	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.957843	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	231.6699	
Gamma Statistics		
k hat	8.393692	
k star (bias corrected)	5.669869	
Theta hat	22.45072	
Theta star	33.23612	
nu hat	151.0865	
nu star	102.0576	
5% Approximate Chi Square Value	79.74415	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	75.5932	
Anderson-Darling Test Statistic	0.148073	
Anderson-Darling 5% Critical Value	0.722074	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.110885	
Kolmogrov-Smirnov 5% Critical Value	0.279487	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	241.1738	
95% Adjusted Gamma UCL	254.417	
Lognormal Statistics		
Minimum of log data	4.51086	
Maximum of log data	5.799093	
Mean of log data	5.178054	
Standard Deviation of log data	0.373787	
Variance of log data	0.139716	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.989608	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	190.1687	
MLE Standard Deviation	73.63917	
MLE Coefficient of Variation	0.387231	
MLE Skewness	1.219756	
MLE Median	177.3373	
MLE 80% Quantile	243.2046	
MLE 90% Quantile	286.6808	
MLE 95% Quantile	327.9734	
MLE 99% Quantile	423.046	
MVU Estimate of Median	175.9651	
MVU Estimate of Mean	188.6266	
MVU Estimate of Standard Deviation	71.14888	
MVU Estimate of SE of Mean	23.70288	
95% H-UCL	251.6009	
95% Chebyshev (MVUE) UCL	291.945	
97.5% Chebyshev (MVUE) UCL	336.651	
99% Chebyshev (MVUE) UCL	424.4672	
Non-parametric Statisitics		
95% CLT UCL	226.6793	
95% Adjusted-CLT UCL	233.5659	
95% Modified-t UCL	232.7441	
95% Jackknife UCL	231.6699	
95% Chebyshev (Mean, Sd) UCL	289.7676	
97.5% Chebyshev (Mean, Sd) UCL	333.6103	
99% Chebyshev (Mean, Sd) UCL	419.7306	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	225.0242	
95% Bootstrap-t UCL	239.5937	
95% Hall's Bootstrap UCL	252.7015	
95% Percentile Bootstrap UCL	226.6667	
95% BCA Bootstrap UCL	217.7778	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	231.6699	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SD.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	8	
Minimum	0.15	
Maximum	1.045	
Mean	0.526111	
Standard Deviation	0.279372	
Variance	0.078049	
Coefficient of Variation	0.531013	
Skewness	0.609369	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.962579	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	0.69928	
Gamma Statistics		
k hat	3.645888	
k star (bias corrected)	2.504666	
Theta hat	0.144303	
Theta star	0.210052	
nu hat	65.62599	
nu star	45.08399	
5% Approximate Chi Square Value	30.67906	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	28.19449	
Anderson-Darling Test Statistic	0.172583	
Anderson-Darling 5% Critical Value	0.725612	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.134826	
Kolmogrov-Smirnov 5% Critical Value	0.280752	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.773139	
95% Adjusted Gamma UCL	0.84127	
Lognormal Statistics		
Minimum of log data	-1.89712	
Maximum of log data	0.044017	
Mean of log data	-0.785607	
Standard Deviation of log data	0.599505	
Variance of log data	0.359406	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.963507	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.545581	
MLE Standard Deviation	0.358791	
MLE Coefficient of Variation	0.657631	
MLE Skewness	2.257303	
MLE Median	0.455843	
MLE 80% Quantile	0.75652	
MLE 90% Quantile	0.984872	
MLE 95% Quantile	1.222109	
MLE 99% Quantile	1.838299	
MVU Estimate of Median	0.446813	
MVU Estimate of Mean	0.533479	
MVU Estimate of Standard Deviation	0.327088	
MVU Estimate of SE of Mean	0.108655	
95% H-UCL	0.920693	
95% Chebyshev (MVUE) UCL	1.007097	
97.5% Chebyshev (MVUE) UCL	1.212032	
99% Chebyshev (MVUE) UCL	1.614587	
Non-parametric Statisitics		
95% CLT UCL	0.679286	
95% Adjusted-CLT UCL	0.699498	
95% Modified-t UCL	0.702432	
95% Jackknife UCL	0.69928	
95% Chebyshev (Mean, Sd) UCL	0.932029	
97.5% Chebyshev (Mean, Sd) UCL	1.10767	
99% Chebyshev (Mean, Sd) UCL	1.452683	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.673352	
95% Bootstrap-t UCL	0.723118	
95% Hall's Bootstrap UCL	0.732811	
95% Percentile Bootstrap UCL	0.671667	
95% BCA Bootstrap UCL	0.764444	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	0.69928	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SO.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	9.5	
Maximum	98	
Mean	46.38889	
Standard Deviation	33.55758	
Variance	1126.111	
Coefficient of Variation	0.723397	
Skewness	0.449852	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.889931	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	67.18953	
Gamma Statistics		
k hat	1.830882	
k star (bias corrected)	1.294662	
Theta hat	25.33691	
Theta star	35.83089	
nu hat	32.95587	
nu star	23.30391	
5% Approximate Chi Square Value	13.31886	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	11.75707	
Anderson-Darling Test Statistic	0.374433	
Anderson-Darling 5% Critical Value	0.731323	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.181306	
Kolmogrov-Smirnov 5% Critical Value	0.282987	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	81.16628	
95% Adjusted Gamma UCL	91.94831	
Lognormal Statistics		
Minimum of log data	2.251292	
Maximum of log data	4.584967	
Mean of log data	3.539766	
Standard Deviation of log data	0.878728	
Variance of log data	0.772164	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904544	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	50.69607	
MLE Standard Deviation	54.70583	
MLE Coefficient of Variation	1.079094	
MLE Skewness	4.493828	
MLE Median	34.45887	
MLE 80% Quantile	72.4062	
MLE 90% Quantile	106.5839	
MLE 95% Quantile	146.2438	
MLE 99% Quantile	266.0512	
MVU Estimate of Median	33.00578	
MVU Estimate of Mean	48.03804	
MVU Estimate of Standard Deviation	44.16304	
MVU Estimate of SE of Mean	14.5207	
95% H-UCL	129.8548	
95% Chebyshev (MVUE) UCL	111.3323	
97.5% Chebyshev (MVUE) UCL	138.7198	
99% Chebyshev (MVUE) UCL	192.5172	
Non-parametric Statisitics		
95% CLT UCL	64.78799	
95% Adjusted-CLT UCL	66.58024	
95% Modified-t UCL	67.46909	
95% Jackknife UCL	67.18953	
95% Chebyshev (Mean, Sd) UCL	95.14692	
97.5% Chebyshev (Mean, Sd) UCL	116.2446	
99% Chebyshev (Mean, Sd) UCL	157.6868	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	63.64378	
95% Bootstrap-t UCL	70.86248	
95% Hall's Bootstrap UCL	62.22648	
95% Percentile Bootstrap UCL	64.44444	
95% BCA Bootstrap UCL	71.16667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	67.18953	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SO.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	19	
Maximum	90	
Mean	39.94444	
Standard Deviation	21.8152	
Variance	475.9028	
Coefficient of Variation	0.546138	
Skewness	1.640527	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.843466	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	53.46658	
Gamma Statistics		
k hat	4.595557	
k star (bias corrected)	3.137779	
Theta hat	8.69197	
Theta star	12.73017	
nu hat	82.72002	
nu star	56.48002	
5% Approximate Chi Square Value	40.20356	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	37.32573	
Anderson-Darling Test Statistic	0.286883	
Anderson-Darling 5% Critical Value	0.72365	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.160813	
Kolmogrov-Smirnov 5% Critical Value	0.280079	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	56.11599	
95% Adjusted Gamma UCL	60.44257	
Lognormal Statistics		
Minimum of log data	2.944439	
Maximum of log data	4.49981	
Mean of log data	3.574761	
Standard Deviation of log data	0.489995	
Variance of log data	0.240095	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956479	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	40.23788	
MLE Standard Deviation	20.96119	
MLE Coefficient of Variation	0.520932	
MLE Skewness	1.70416	
MLE Median	35.6861	
MLE 80% Quantile	53.99044	
MLE 90% Quantile	66.98071	
MLE 95% Quantile	79.90215	
MLE 99% Quantile	111.5518	
MVU Estimate of Median	35.21263	
MVU Estimate of Mean	39.66058	
MVU Estimate of Standard Deviation	19.73346	
MVU Estimate of SE of Mean	6.56727	
95% H-UCL	59.78833	
95% Chebyshev (MVUE) UCL	68.28664	
97.5% Chebyshev (MVUE) UCL	80.67316	
99% Chebyshev (MVUE) UCL	105.0041	
Non-parametric Statisitics		
95% CLT UCL	51.90538	
95% Adjusted-CLT UCL	56.15432	
95% Modified-t UCL	54.12933	
95% Jackknife UCL	53.46658	
95% Chebyshev (Mean, Sd) UCL	71.64119	
97.5% Chebyshev (Mean, Sd) UCL	85.3564	
99% Chebyshev (Mean, Sd) UCL	112.2973	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	51.42471	
95% Bootstrap-t UCL	62.21089	
95% Hall's Bootstrap UCL	104.6447	
95% Percentile Bootstrap UCL	52.27778	
95% BCA Bootstrap UCL	60.66667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	53.46658	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SO.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	88	
Maximum	930	
Mean	298.1111	
Standard Deviation	261.3754	
Variance	68317.11	
Coefficient of Variation	0.876772	
Skewness	2.068648	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.764107	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	460.1245	
Gamma Statistics		
k hat	2.015486	
k star (bias corrected)	1.417731	
Theta hat	147.9103	
Theta star	210.2733	
nu hat	36.27875	
nu star	25.51917	
5% Approximate Chi Square Value	15.00783	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	13.33685	
Anderson-Darling Test Statistic	0.367642	
Anderson-Darling 5% Critical Value	0.729724	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.154599	
Kolmogrov-Smirnov 5% Critical Value	0.282462	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	506.9051	
95% Adjusted Gamma UCL	570.4157	
Lognormal Statistics		
Minimum of log data	4.477337	
Maximum of log data	6.835185	
Mean of log data	5.42933	
Standard Deviation of log data	0.749041	
Variance of log data	0.561063	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.951523	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	301.8291	
MLE Standard Deviation	261.833	
MLE Coefficient of Variation	0.867488	
MLE Skewness	3.255277	
MLE Median	227.9963	
MLE 80% Quantile	429.3488	
MLE 90% Quantile	596.9586	
MLE 95% Quantile	781.7248	
MLE 99% Quantile	1301.926	
MVU Estimate of Median	220.9776	
MVU Estimate of Mean	290.8464	
MVU Estimate of Standard Deviation	225.3721	
MVU Estimate of SE of Mean	74.54206	
95% H-UCL	625.7731	
95% Chebyshev (MVUE) UCL	615.7677	
97.5% Chebyshev (MVUE) UCL	756.3614	
99% Chebyshev (MVUE) UCL	1032.53	
Non-parametric Statisitics		
95% CLT UCL	441.4192	
95% Adjusted-CLT UCL	505.6124	
95% Modified-t UCL	470.1373	
95% Jackknife UCL	460.1245	
95% Chebyshev (Mean, Sd) UCL	677.8808	
97.5% Chebyshev (Mean, Sd) UCL	842.2074	
99% Chebyshev (Mean, Sd) UCL	1164.995	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	433.6723	
95% Bootstrap-t UCL	622.3925	
95% Hall's Bootstrap UCL	1070.706	
95% Percentile Bootstrap UCL	444.7778	
95% BCA Bootstrap UCL	525.6667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	506.9051	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SO.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	63	
Maximum	600	
Mean	228.6667	
Standard Deviation	158.3501	
Variance	25074.75	
Coefficient of Variation	0.692493	
Skewness	1.851121	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.815657	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	326.8199	
Gamma Statistics		
k hat	2.927242	
k star (bias corrected)	2.025569	
Theta hat	78.11675	
Theta star	112.8901	
nu hat	52.69036	
nu star	36.46024	
5% Approximate Chi Square Value	23.6372	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	21.48412	
Anderson-Darling Test Statistic	0.32958	
Anderson-Darling 5% Critical Value	0.727016	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.225638	
Kolmogrov-Smirnov 5% Critical Value	0.281423	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	352.717	
95% Adjusted Gamma UCL	388.0654	
Lognormal Statistics		
Minimum of log data	4.143135	
Maximum of log data	6.39693	
Mean of log data	5.251839	
Standard Deviation of log data	0.631761	
Variance of log data	0.399122	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.971791	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	233.0842	
MLE Standard Deviation	163.2448	
MLE Coefficient of Variation	0.700368	
MLE Skewness	2.444647	
MLE Median	190.917	
MLE 80% Quantile	325.6024	
MLE 90% Quantile	429.9427	
MLE 95% Quantile	539.7391	
MLE 99% Quantile	829.9084	
MVU Estimate of Median	186.7211	
MVU Estimate of Mean	227.2835	
MVU Estimate of Standard Deviation	147.1911	
MVU Estimate of SE of Mean	48.85935	
95% H-UCL	409.8548	
95% Chebyshev (MVUE) UCL	440.2564	
97.5% Chebyshev (MVUE) UCL	532.41	
99% Chebyshev (MVUE) UCL	713.4278	
Non-parametric Statisitics		
95% CLT UCL	315.4876	
95% Adjusted-CLT UCL	350.2885	
95% Modified-t UCL	332.2481	
95% Jackknife UCL	326.8199	
95% Chebyshev (Mean, Sd) UCL	458.744	
97.5% Chebyshev (Mean, Sd) UCL	558.2987	
99% Chebyshev (Mean, Sd) UCL	753.8545	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	310.3858	
95% Bootstrap-t UCL	444.5326	
95% Hall's Bootstrap UCL	804.0799	
95% Percentile Bootstrap UCL	315.5556	
95% BCA Bootstrap UCL	367.7778	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	352.717	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SO.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	8	
Minimum	0.22	
Maximum	1.2	
Mean	0.432222	
Standard Deviation	0.316969	
Variance	0.100469	
Coefficient of Variation	0.733348	
Skewness	2.126718	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.71061	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.628695	
Gamma Statistics		
k hat	3.082819	
k star (bias corrected)	2.129287	
Theta hat	0.140204	
Theta star	0.202989	
nu hat	55.49074	
nu star	38.32716	
5% Approximate Chi Square Value	25.14684	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	22.91899	
Anderson-Darling Test Statistic	0.77339	
Anderson-Darling 5% Critical Value	0.726648	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.231702	
Kolmogrov-Smirnov 5% Critical Value	0.281265	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.658765	
95% Adjusted Gamma UCL	0.7228	
Lognormal Statistics		
Minimum of log data	-1.514128	
Maximum of log data	0.182322	
Mean of log data	-1.009685	
Standard Deviation of log data	0.573279	
Variance of log data	0.328649	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.841158	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.429403	
MLE Standard Deviation	0.267849	
MLE Coefficient of Variation	0.623771	
MLE Skewness	2.114017	
MLE Median	0.364334	
MLE 80% Quantile	0.591399	
MLE 90% Quantile	0.761077	
MLE 95% Quantile	0.935532	
MLE 99% Quantile	1.38232	
MVU Estimate of Median	0.35773	
MVU Estimate of Mean	0.420763	
MVU Estimate of Standard Deviation	0.246247	
MVU Estimate of SE of Mean	0.081844	
95% H-UCL	0.701675	
95% Chebyshev (MVUE) UCL	0.777513	
97.5% Chebyshev (MVUE) UCL	0.93188	
99% Chebyshev (MVUE) UCL	1.235102	
Non-parametric Statisitics		
95% CLT UCL	0.606012	
95% Adjusted-CLT UCL	0.686044	
95% Modified-t UCL	0.641179	
95% Jackknife UCL	0.628695	
95% Chebyshev (Mean, Sd) UCL	0.892768	
97.5% Chebyshev (Mean, Sd) UCL	1.092046	
99% Chebyshev (Mean, Sd) UCL	1.48349	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.601753	
95% Bootstrap-t UCL	0.858189	
95% Hall's Bootstrap UCL	1.148958	
95% Percentile Bootstrap UCL	0.618889	
95% BCA Bootstrap UCL	0.735556	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.658765	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\AJRW-SO.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	9	
Number of Missing Data	0	
Number of Valid Observations	9	
Number of Distinct Observations	9	
Minimum	29	
Maximum	70	
Mean	44.11111	
Standard Deviation	13.10004	
Variance	171.6111	
Coefficient of Variation	0.296978	
Skewness	0.803771	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.934239	
Shapiro-Wilk 5% Critical Value	0.829	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	52.23116	
Gamma Statistics		
k hat	13.45	
k star (bias corrected)	9.040738	
Theta hat	3.279638	
Theta star	4.879149	
nu hat	242.0999	
nu star	162.7333	
5% Approximate Chi Square Value	134.2331	
Adjusted Level of Significance	0.02308	
Adjusted Chi Square Value	128.7738	
Anderson-Darling Test Statistic	0.233848	
Anderson-Darling 5% Critical Value	0.721481	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.155099	
Kolmogrov-Smirnov 5% Critical Value	0.279158	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	53.47674	
95% Adjusted Gamma UCL	55.74383	
Lognormal Statistics		
Minimum of log data	3.367296	
Maximum of log data	4.248495	
Mean of log data	3.749077	
Standard Deviation of log data	0.289032	
Variance of log data	0.08354	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.960329	
Shapiro-Wilk 5% Critical Value	0.829	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	44.29387	
MLE Standard Deviation	13.07444	
MLE Coefficient of Variation	0.295175	
MLE Skewness	0.911243	
MLE Median	42.48183	
MLE 80% Quantile	54.23404	
MLE 90% Quantile	61.58898	
MLE 95% Quantile	68.34268	
MLE 99% Quantile	83.20982	
MVU Estimate of Median	42.28504	
MVU Estimate of Mean	44.08275	
MVU Estimate of Standard Deviation	12.81138	
MVU Estimate of SE of Mean	4.269576	
95% H-UCL	54.41274	
95% Chebyshev (MVUE) UCL	62.6934	
97.5% Chebyshev (MVUE) UCL	70.74625	
99% Chebyshev (MVUE) UCL	86.5645	
Non-parametric Statisitics		
95% CLT UCL	51.29366	
95% Adjusted-CLT UCL	52.54376	
95% Modified-t UCL	52.42615	
95% Jackknife UCL	52.23116	
95% Chebyshev (Mean, Sd) UCL	63.14503	
97.5% Chebyshev (Mean, Sd) UCL	71.38102	
99% Chebyshev (Mean, Sd) UCL	87.55904	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	50.84604	
95% Bootstrap-t UCL	53.79375	
95% Hall's Bootstrap UCL	54.18474	
95% Percentile Bootstrap UCL	51.11111	
95% BCA Bootstrap UCL	54	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	52.23116	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05base.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	11	
Number of Missing Data	0	
Number of Valid Observations	11	
Number of Distinct Observations	11	
Minimum	13	
Maximum	28	
Mean	21.25455	
Standard Deviation	4.647443	
Variance	21.59873	
Coefficient of Variation	0.218656	
Skewness	-0.530441	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.947759	
Shapiro-Wilk 5% Critical Value	0.85	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	23.79427	
Gamma Statistics		
k hat	20.59584	
k star (bias corrected)	15.0394	
Theta hat	1.031983	
Theta star	1.413258	
nu hat	453.1084	
nu star	330.8667	
5% Approximate Chi Square Value	289.713	
Adjusted Level of Significance	0.02783	
Adjusted Chi Square Value	283.4304	
Anderson-Darling Test Statistic	0.419934	
Anderson-Darling 5% Critical Value	0.728694	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.17897	
Kolmogrov-Smirnov 5% Critical Value	0.255022	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	24.27376	
95% Adjusted Gamma UCL	24.81181	
Lognormal Statistics		
Minimum of log data	2.564949	
Maximum of log data	3.332205	
Mean of log data	3.032098	
Standard Deviation of log data	0.239623	
Variance of log data	0.057419	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.906479	
Shapiro-Wilk 5% Critical Value	0.85	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	21.34478	
MLE Standard Deviation	5.189008	
MLE Coefficient of Variation	0.243104	
MLE Skewness	0.74368	
MLE Median	20.74069	
MLE 80% Quantile	25.39568	
MLE 90% Quantile	28.2195	
MLE 95% Quantile	30.76192	
MLE 99% Quantile	36.21455	
MVU Estimate of Median	20.68662	
MVU Estimate of Mean	21.28794	
MVU Estimate of Standard Deviation	5.128669	
MVU Estimate of SE of Mean	1.546168	
95% H-UCL	24.64204	
95% Chebyshev (MVUE) UCL	28.02753	
97.5% Chebyshev (MVUE) UCL	30.94376	
99% Chebyshev (MVUE) UCL	36.67212	
Non-parametric Statisitics		
95% CLT UCL	23.55941	
95% Adjusted-CLT UCL	23.31994	
95% Modified-t UCL	23.75692	
95% Jackknife UCL	23.79427	
95% Chebyshev (Mean, Sd) UCL	27.36248	
97.5% Chebyshev (Mean, Sd) UCL	30.00539	
99% Chebyshev (Mean, Sd) UCL	35.19687	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	23.46948	
95% Bootstrap-t UCL	23.58608	
95% Hall's Bootstrap UCL	23.28026	
95% Percentile Bootstrap UCL	23.27273	
95% BCA Bootstrap UCL	23.81818	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	23.79427	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05base.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	11	
Number of Missing Data	0	
Number of Valid Observations	11	
Number of Distinct Observations	11	
Minimum	2.85	
Maximum	14.2	
Mean	7.75	
Standard Deviation	3.297196	
Variance	10.8715	
Coefficient of Variation	0.425445	
Skewness	0.568981	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.964564	
Shapiro-Wilk 5% Critical Value	0.85	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	9.551844	
Gamma Statistics		
k hat	5.861886	
k star (bias corrected)	4.323796	
Theta hat	1.3221	
Theta star	1.792407	
nu hat	128.9615	
nu star	95.12351	
5% Approximate Chi Square Value	73.62443	
Adjusted Level of Significance	0.02783	
Adjusted Chi Square Value	70.54669	
Anderson-Darling Test Statistic	0.171409	
Anderson-Darling 5% Critical Value	0.731058	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.126414	
Kolmogrov-Smirnov 5% Critical Value	0.255893	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	10.01308	
95% Adjusted Gamma UCL	10.44992	
Lognormal Statistics		
Minimum of log data	1.047319	
Maximum of log data	2.653242	
Mean of log data	1.959978	
Standard Deviation of log data	0.452774	
Variance of log data	0.205004	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973574	
Shapiro-Wilk 5% Critical Value	0.85	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.86545	
MLE Standard Deviation	3.751826	
MLE Coefficient of Variation	0.477001	
MLE Skewness	1.539534	
MLE Median	7.09917	
MLE 80% Quantile	10.40797	
MLE 90% Quantile	12.70241	
MLE 95% Quantile	14.95118	
MLE 99% Quantile	20.35098	
MVU Estimate of Median	7.033273	
MVU Estimate of Mean	7.786959	
MVU Estimate of Standard Deviation	3.592896	
MVU Estimate of SE of Mean	1.081756	
95% H-UCL	10.65526	
95% Chebyshev (MVUE) UCL	12.50222	
97.5% Chebyshev (MVUE) UCL	14.54252	
99% Chebyshev (MVUE) UCL	18.55029	
Non-parametric Statisitics		
95% CLT UCL	9.385218	
95% Adjusted-CLT UCL	9.567452	
95% Modified-t UCL	9.580268	
95% Jackknife UCL	9.551844	
95% Chebyshev (Mean, Sd) UCL	12.08336	
97.5% Chebyshev (Mean, Sd) UCL	13.95841	
99% Chebyshev (Mean, Sd) UCL	17.64159	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	9.257684	
95% Bootstrap-t UCL	9.757633	
95% Hall's Bootstrap UCL	9.786297	
95% Percentile Bootstrap UCL	9.427273	
95% BCA Bootstrap UCL	9.009091	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	9.551844	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05base.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	11	
Number of Missing Data	0	
Number of Valid Observations	11	
Number of Distinct Observations	10	
Minimum	462	
Maximum	764	
Mean	593.1818	
Standard Deviation	102.7374	
Variance	10554.96	
Coefficient of Variation	0.173197	
Skewness	0.463246	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.934559	
Shapiro-Wilk 5% Critical Value	0.85	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	649.3255	
Gamma Statistics		
k hat	37.48689	
k star (bias corrected)	27.3238	
Theta hat	15.82371	
Theta star	21.70934	
nu hat	824.7116	
nu star	601.1236	
5% Approximate Chi Square Value	545.2387	
Adjusted Level of Significance	0.02783	
Adjusted Chi Square Value	536.5507	
Anderson-Darling Test Statistic	0.26543	
Anderson-Darling 5% Critical Value	0.728525	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.138386	
Kolmogrov-Smirnov 5% Critical Value	0.254808	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	653.9807	
95% Adjusted Gamma UCL	664.5702	
Lognormal Statistics		
Minimum of log data	6.135565	
Maximum of log data	6.638568	
Mean of log data	6.372104	
Standard Deviation of log data	0.171088	
Variance of log data	0.029271	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.946853	
Shapiro-Wilk 5% Critical Value	0.85	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	593.9167	
MLE Standard Deviation	102.3599	
MLE Coefficient of Variation	0.172347	
MLE Skewness	0.522161	
MLE Median	585.2878	
MLE 80% Quantile	676.3243	
MLE 90% Quantile	729.2023	
MLE 95% Quantile	775.5269	
MLE 99% Quantile	871.3584	
MVU Estimate of Median	584.5095	
MVU Estimate of Mean	593.1183	
MVU Estimate of Standard Deviation	101.7557	
MVU Estimate of SE of Mean	30.67953	
95% H-UCL	656.0499	
95% Chebyshev (MVUE) UCL	726.8473	
97.5% Chebyshev (MVUE) UCL	784.7119	
99% Chebyshev (MVUE) UCL	898.3758	
Non-parametric Statisitics		
95% CLT UCL	644.1336	
95% Adjusted-CLT UCL	648.7566	
95% Modified-t UCL	650.0466	
95% Jackknife UCL	649.3255	
95% Chebyshev (Mean, Sd) UCL	728.2052	
97.5% Chebyshev (Mean, Sd) UCL	786.6299	
99% Chebyshev (Mean, Sd) UCL	901.3939	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	641.2237	
95% Bootstrap-t UCL	656.8851	
95% Hall's Bootstrap UCL	649.4282	
95% Percentile Bootstrap UCL	642.5455	
95% BCA Bootstrap UCL	635.1818	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	649.3255	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05base.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	11	
Number of Missing Data	0	
Number of Valid Observations	11	
Number of Distinct Observations	4	
Minimum	0.02	
Maximum	0.1	
Mean	0.054091	
Standard Deviation	0.019598	
Variance	0.000384	
Coefficient of Variation	0.36232	
Skewness	1.067298	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.733975	
Shapiro-Wilk 5% Critical Value	0.85	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.064801	
Gamma Statistics		
k hat	8.218742	
k star (bias corrected)	6.037873	
Theta hat	0.006581	
Theta star	0.008959	
nu hat	180.8123	
nu star	132.8332	
5% Approximate Chi Square Value	107.2024	
Adjusted Level of Significance	0.02783	
Adjusted Chi Square Value	103.452	
Anderson-Darling Test Statistic	1.655183	
Anderson-Darling 5% Critical Value	0.730097	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.367196	
Kolmogrov-Smirnov 5% Critical Value	0.255601	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.067023	
95% Adjusted Gamma UCL	0.069453	
Lognormal Statistics		
Minimum of log data	-3.912023	
Maximum of log data	-2.302585	
Mean of log data	-2.979158	
Standard Deviation of log data	0.384892	
Variance of log data	0.148142	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.724305	
Shapiro-Wilk 5% Critical Value	0.85	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.054744	
MLE Standard Deviation	0.021876	
MLE Coefficient of Variation	0.399597	
MLE Skewness	1.262598	
MLE Median	0.050836	
MLE 80% Quantile	0.070375	
MLE 90% Quantile	0.083361	
MLE 95% Quantile	0.09575	
MLE 99% Quantile	0.124444	
MVU Estimate of Median	0.050494	
MVU Estimate of Mean	0.054356	
MVU Estimate of Standard Deviation	0.021211	
MVU Estimate of SE of Mean	0.00639	
95% H-UCL	0.070178	
95% Chebyshev (MVUE) UCL	0.082212	
97.5% Chebyshev (MVUE) UCL	0.094265	
99% Chebyshev (MVUE) UCL	0.11794	
Non-parametric Statisitics		
95% CLT UCL	0.06381	
95% Adjusted-CLT UCL	0.065842	
95% Modified-t UCL	0.065118	
95% Jackknife UCL	0.064801	
95% Chebyshev (Mean, Sd) UCL	0.079848	
97.5% Chebyshev (Mean, Sd) UCL	0.090993	
99% Chebyshev (Mean, Sd) UCL	0.112886	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.064801	95% Student's-t UCL
2nd Recommended UCL	0.065118	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05storm.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.85	
Maximum	3.9	
Mean	1.758333	
Standard Deviation	1.124907	
Variance	1.265417	
Coefficient of Variation	0.639758	
Skewness	1.793274	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.798774	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.683727	
Gamma Statistics		
k hat	3.779523	
k star (bias corrected)	2.000873	
Theta hat	0.465226	
Theta star	0.878783	
nu hat	45.35428	
nu star	24.01047	
5% Approximate Chi Square Value	13.85491	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	11.1716	
Anderson-Darling Test Statistic	0.421603	
Anderson-Darling 5% Critical Value	0.700278	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.247797	
Kolmogrov-Smirnov 5% Critical Value	0.333763	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	3.047182	
95% Adjusted Gamma UCL	3.779083	
Lognormal Statistics		
Minimum of log data	-0.162519	
Maximum of log data	1.360977	
Mean of log data	0.42628	
Standard Deviation of log data	0.548328	
Variance of log data	0.300664	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.919771	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.779998	
MLE Standard Deviation	1.054197	
MLE Coefficient of Variation	0.592246	
MLE Skewness	1.984471	
MLE Median	1.53155	
MLE 80% Quantile	2.434199	
MLE 90% Quantile	3.098389	
MLE 95% Quantile	3.774547	
MLE 99% Quantile	5.483217	
MVU Estimate of Median	1.493519	
MVU Estimate of Mean	1.732204	
MVU Estimate of Standard Deviation	0.949396	
MVU Estimate of SE of Mean	0.387017	
95% H-UCL	3.566529	
95% Chebyshev (MVUE) UCL	3.41917	
97.5% Chebyshev (MVUE) UCL	4.149122	
99% Chebyshev (MVUE) UCL	5.58297	
Non-parametric Statisitics		
95% CLT UCL	2.513718	
95% Adjusted-CLT UCL	2.872965	
95% Modified-t UCL	2.739762	
95% Jackknife UCL	2.683727	
95% Chebyshev (Mean, Sd) UCL	3.760121	
97.5% Chebyshev (Mean, Sd) UCL	4.626296	
99% Chebyshev (Mean, Sd) UCL	6.327729	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.440128	
95% Bootstrap-t UCL	4.260169	
95% Hall's Bootstrap UCL	5.321136	
95% Percentile Bootstrap UCL	2.558333	
95% BCA Bootstrap UCL	2.925	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.683727	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05storm.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	11.5	
Maximum	23.3	
Mean	15.30833	
Standard Deviation	4.507374	
Variance	20.31642	
Coefficient of Variation	0.294439	
Skewness	1.341784	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858311	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	19.01628	
Gamma Statistics		
k hat	15.62334	
k star (bias corrected)	7.92278	
Theta hat	0.979838	
Theta star	1.932192	
nu hat	187.4801	
nu star	95.07337	
5% Approximate Chi Square Value	73.58029	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	66.77902	
Anderson-Darling Test Statistic	0.39848	
Anderson-Darling 5% Critical Value	0.697633	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.245255	
Kolmogrov-Smirnov 5% Critical Value	0.332058	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	19.77996	
95% Adjusted Gamma UCL	21.79449	
Lognormal Statistics		
Minimum of log data	2.442347	
Maximum of log data	3.148453	
Mean of log data	2.696053	
Standard Deviation of log data	0.271166	
Variance of log data	0.073531	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.89906	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	15.37616	
MLE Standard Deviation	4.247327	
MLE Coefficient of Variation	0.276228	
MLE Skewness	0.849761	
MLE Median	14.82111	
MLE 80% Quantile	18.63773	
MLE 90% Quantile	20.99955	
MLE 95% Quantile	23.15292	
MLE 99% Quantile	27.84866	
MVU Estimate of Median	14.73049	
MVU Estimate of Mean	15.2802	
MVU Estimate of Standard Deviation	4.143351	
MVU Estimate of SE of Mean	1.691353	
95% H-UCL	20.10555	
95% Chebyshev (MVUE) UCL	22.65263	
97.5% Chebyshev (MVUE) UCL	25.84269	
99% Chebyshev (MVUE) UCL	32.10895	
Non-parametric Statisitics		
95% CLT UCL	18.33507	
95% Adjusted-CLT UCL	19.41212	
95% Modified-t UCL	19.18428	
95% Jackknife UCL	19.01628	
95% Chebyshev (Mean, Sd) UCL	23.32926	
97.5% Chebyshev (Mean, Sd) UCL	26.79993	
99% Chebyshev (Mean, Sd) UCL	33.61737	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	18.11123	
95% Bootstrap-t UCL	22.02023	
95% Hall's Bootstrap UCL	32.41326	
95% Percentile Bootstrap UCL	18.34167	
95% BCA Bootstrap UCL	19.975	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	19.01628	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05storm.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	1.3	
Maximum	12.1	
Mean	6.983333	
Standard Deviation	3.962533	
Variance	15.70167	
Coefficient of Variation	0.567427	
Skewness	-0.166984	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.985751	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	10.24307	
Gamma Statistics		
k hat	2.535795	
k star (bias corrected)	1.379009	
Theta hat	2.753903	
Theta star	5.064024	
nu hat	30.42954	
nu star	16.5481	
5% Approximate Chi Square Value	8.348954	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	6.360745	
Anderson-Darling Test Statistic	0.278801	
Anderson-Darling 5% Critical Value	0.702667	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.177463	
Kolmogrov-Smirnov 5% Critical Value	0.335144	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	13.84137	
95% Adjusted Gamma UCL	18.16783	
Lognormal Statistics		
Minimum of log data	0.262364	
Maximum of log data	2.493205	
Mean of log data	1.733579	
Standard Deviation of log data	0.812393	
Variance of log data	0.659982	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.882447	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.874025	
MLE Standard Deviation	7.61283	
MLE Coefficient of Variation	0.966828	
MLE Skewness	3.804234	
MLE Median	5.660875	
MLE 80% Quantile	11.24642	
MLE 90% Quantile	16.07882	
MLE 95% Quantile	21.54113	
MLE 99% Quantile	37.45738	
MVU Estimate of Median	5.355589	
MVU Estimate of Mean	7.378493	
MVU Estimate of Standard Deviation	5.983016	
MVU Estimate of SE of Mean	2.427252	
95% H-UCL	29.65466	
95% Chebyshev (MVUE) UCL	17.95864	
97.5% Chebyshev (MVUE) UCL	22.53668	
99% Chebyshev (MVUE) UCL	31.52935	
Non-parametric Statisitics		
95% CLT UCL	9.644209	
95% Adjusted-CLT UCL	9.526373	
95% Modified-t UCL	10.22469	
95% Jackknife UCL	10.24307	
95% Chebyshev (Mean, Sd) UCL	14.03471	
97.5% Chebyshev (Mean, Sd) UCL	17.08585	
99% Chebyshev (Mean, Sd) UCL	23.07922	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	9.434211	
95% Bootstrap-t UCL	10.11762	
95% Hall's Bootstrap UCL	10.00422	
95% Percentile Bootstrap UCL	9.383333	
95% BCA Bootstrap UCL	9.916667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	10.24307	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05storm.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	124	
Maximum	529	
Mean	237.5833	
Standard Deviation	148.9881	
Variance	22197.44	
Coefficient of Variation	0.627098	
Skewness	2.016761	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.748165	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	360.1469	
Gamma Statistics		
k hat	4.158562	
k star (bias corrected)	2.190392	
Theta hat	57.13112	
Theta star	108.4661	
nu hat	49.90275	
nu star	26.28471	
5% Approximate Chi Square Value	15.59693	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	12.72295	
Anderson-Darling Test Statistic	0.545851	
Anderson-Darling 5% Critical Value	0.699674	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.283614	
Kolmogrov-Smirnov 5% Critical Value	0.333421	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	400.3869	
95% Adjusted Gamma UCL	490.8303	
Lognormal Statistics		
Minimum of log data	4.820282	
Maximum of log data	6.270988	
Mean of log data	5.345493	
Standard Deviation of log data	0.513143	
Variance of log data	0.263316	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.88249	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	239.1643	
MLE Standard Deviation	131.2656	
MLE Coefficient of Variation	0.548851	
MLE Skewness	1.811888	
MLE Median	209.6612	
MLE 80% Quantile	323.4676	
MLE 90% Quantile	405.4031	
MLE 95% Quantile	487.6575	
MLE 99% Quantile	691.6387	
MVU Estimate of Median	205.0965	
MVU Estimate of Mean	233.5841	
MVU Estimate of Standard Deviation	119.8207	
MVU Estimate of SE of Mean	48.86039	
95% H-UCL	448.5178	
95% Chebyshev (MVUE) UCL	446.5616	
97.5% Chebyshev (MVUE) UCL	538.7171	
99% Chebyshev (MVUE) UCL	719.7388	
Non-parametric Statisitics		
95% CLT UCL	337.6301	
95% Adjusted-CLT UCL	391.1401	
95% Modified-t UCL	368.4933	
95% Jackknife UCL	360.1469	
95% Chebyshev (Mean, Sd) UCL	502.7095	
97.5% Chebyshev (Mean, Sd) UCL	617.4298	
99% Chebyshev (Mean, Sd) UCL	842.7757	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	329.239	
95% Bootstrap-t UCL	540.7505	
95% Hall's Bootstrap UCL	715.3657	
95% Percentile Bootstrap UCL	338.1667	
95% BCA Bootstrap UCL	315.5833	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	400.3869	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW05storm.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	2	
Minimum	0.05	
Maximum	0.13	
Mean	0.063333	
Standard Deviation	0.03266	
Variance	0.001067	
Coefficient of Variation	0.515682	
Skewness	2.44949	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.496293	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.090201	
Gamma Statistics		
k hat	6.644217	
k star (bias corrected)	3.43322	
Theta hat	0.009532	
Theta star	0.018447	
nu hat	79.73061	
nu star	41.19864	
5% Approximate Chi Square Value	27.48556	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	23.51991	
Anderson-Darling Test Statistic	1.724108	
Anderson-Darling 5% Critical Value	0.698142	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.508454	
Kolmogrov-Smirnov 5% Critical Value	0.332688	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.094932	
95% Adjusted Gamma UCL	0.110938	
Lognormal Statistics		
Minimum of log data	-2.995732	
Maximum of log data	-2.040221	
Mean of log data	-2.83648	
Standard Deviation of log data	0.390086	
Variance of log data	0.152167	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.496293	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.063267	
MLE Standard Deviation	0.025649	
MLE Coefficient of Variation	0.405407	
MLE Skewness	1.282851	
MLE Median	0.058632	
MLE 80% Quantile	0.081524	
MLE 90% Quantile	0.096789	
MLE 95% Quantile	0.111382	
MLE 99% Quantile	0.145273	
MVU Estimate of Median	0.057892	
MVU Estimate of Mean	0.062434	
MVU Estimate of Standard Deviation	0.024352	
MVU Estimate of SE of Mean	0.009938	
95% H-UCL	0.096918	
95% Chebyshev (MVUE) UCL	0.105751	
97.5% Chebyshev (MVUE) UCL	0.124495	
99% Chebyshev (MVUE) UCL	0.161312	
Non-parametric Statisitics		
95% CLT UCL	0.085265	
95% Adjusted-CLT UCL	0.099512	
95% Modified-t UCL	0.092423	
95% Jackknife UCL	0.090201	
95% Chebyshev (Mean, Sd) UCL	0.121452	
97.5% Chebyshev (Mean, Sd) UCL	0.1466	
99% Chebyshev (Mean, Sd) UCL	0.195998	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/A	Not enough distinct data error
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.090201	95% Student's-t UCL
2nd Recommended UCL	0.092423	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06base.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	6.6	
Maximum	18.9	
Mean	12.06	
Standard Deviation	3.931695	
Variance	15.45822	
Coefficient of Variation	0.326011	
Skewness	0.177382	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.952473	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	14.33913	
Gamma Statistics		
k hat	9.975532	
k star (bias corrected)	7.049539	
Theta hat	1.208958	
Theta star	1.71075	
nu hat	199.5106	
nu star	140.9908	
5% Approximate Chi Square Value	114.5475	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	110.4082	
Anderson-Darling Test Statistic	0.300112	
Anderson-Darling 5% Critical Value	0.725081	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.173534	
Kolmogrov-Smirnov 5% Critical Value	0.266634	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	14.84405	
95% Adjusted Gamma UCL	15.40056	
Lognormal Statistics		
Minimum of log data	1.88707	
Maximum of log data	2.939162	
Mean of log data	2.438935	
Standard Deviation of log data	0.342942	
Variance of log data	0.117609	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.947798	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	12.15499	
MLE Standard Deviation	4.294069	
MLE Coefficient of Variation	0.353276	
MLE Skewness	1.103919	
MLE Median	11.46083	
MLE 80% Quantile	15.31328	
MLE 90% Quantile	17.80741	
MLE 95% Quantile	20.14737	
MLE 99% Quantile	25.44749	
MVU Estimate of Median	11.3936	
MVU Estimate of Mean	12.08068	
MVU Estimate of Standard Deviation	4.182276	
MVU Estimate of SE of Mean	1.32196	
95% H-UCL	15.31774	
95% Chebyshev (MVUE) UCL	17.84297	
97.5% Chebyshev (MVUE) UCL	20.33631	
99% Chebyshev (MVUE) UCL	25.23401	
Non-parametric Statisitics		
95% CLT UCL	14.10506	
95% Adjusted-CLT UCL	14.17958	
95% Modified-t UCL	14.35075	
95% Jackknife UCL	14.33913	
95% Chebyshev (Mean, Sd) UCL	17.47947	
97.5% Chebyshev (Mean, Sd) UCL	19.82447	
99% Chebyshev (Mean, Sd) UCL	24.43079	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	14.00813	
95% Bootstrap-t UCL	14.41693	
95% Hall's Bootstrap UCL	14.21123	
95% Percentile Bootstrap UCL	13.95	
95% BCA Bootstrap UCL	14.78	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	14.33913	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06base.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	1.35	
Maximum	13.4	
Mean	4.13	
Standard Deviation	3.440543	
Variance	11.83733	
Coefficient of Variation	0.833061	
Skewness	2.575032	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.674209	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	6.124418	
Gamma Statistics		
k hat	2.60413	
k star (bias corrected)	1.889558	
Theta hat	1.585942	
Theta star	2.185696	
nu hat	52.08261	
nu star	37.79116	
5% Approximate Chi Square Value	24.7125	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	22.88896	
Anderson-Darling Test Statistic	0.626147	
Anderson-Darling 5% Critical Value	0.733526	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.219623	
Kolmogrov-Smirnov 5% Critical Value	0.268988	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	6.315731	
95% Adjusted Gamma UCL	6.818897	
Lognormal Statistics		
Minimum of log data	0.300105	
Maximum of log data	2.595255	
Mean of log data	1.214156	
Standard Deviation of log data	0.622049	
Variance of log data	0.386945	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.929141	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	4.086255	
MLE Standard Deviation	2.808762	
MLE Coefficient of Variation	0.687368	
MLE Skewness	2.38687	
MLE Median	3.367452	
MLE 80% Quantile	5.696135	
MLE 90% Quantile	7.489405	
MLE 95% Quantile	9.369193	
MLE 99% Quantile	14.3112	
MVU Estimate of Median	3.302815	
MVU Estimate of Mean	3.997302	
MVU Estimate of Standard Deviation	2.561821	
MVU Estimate of SE of Mean	0.806594	
95% H-UCL	6.725092	
95% Chebyshev (MVUE) UCL	7.513165	
97.5% Chebyshev (MVUE) UCL	9.034482	
99% Chebyshev (MVUE) UCL	12.02281	
Non-parametric Statisitics		
95% CLT UCL	5.919593	
95% Adjusted-CLT UCL	6.866244	
95% Modified-t UCL	6.272076	
95% Jackknife UCL	6.124418	
95% Chebyshev (Mean, Sd) UCL	8.872461	
97.5% Chebyshev (Mean, Sd) UCL	10.92453	
99% Chebyshev (Mean, Sd) UCL	14.95541	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	5.814048	
95% Bootstrap-t UCL	9.108491	
95% Hall's Bootstrap UCL	13.15606	
95% Percentile Bootstrap UCL	5.985	
95% BCA Bootstrap UCL	7.32	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	6.315731	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06base.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	367	
Maximum	757	
Mean	506.5	
Standard Deviation	124.6	
Variance	15525.17	
Coefficient of Variation	0.246002	
Skewness	0.706411	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.920648	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	578.7283	
Gamma Statistics		
k hat	19.17443	
k star (bias corrected)	13.48877	
Theta hat	26.41539	
Theta star	37.54976	
nu hat	383.4886	
nu star	269.7753	
5% Approximate Chi Square Value	232.7311	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	226.7473	
Anderson-Darling Test Statistic	0.331068	
Anderson-Darling 5% Critical Value	0.724592	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.151374	
Kolmogrov-Smirnov 5% Critical Value	0.266208	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	587.1205	
95% Adjusted Gamma UCL	602.6145	
Lognormal Statistics		
Minimum of log data	5.905362	
Maximum of log data	6.629363	
Mean of log data	6.201221	
Standard Deviation of log data	0.240241	
Variance of log data	0.057716	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.934744	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	507.7957	
MLE Standard Deviation	123.775	
MLE Coefficient of Variation	0.24375	
MLE Skewness	0.745731	
MLE Median	493.3512	
MLE 80% Quantile	604.3933	
MLE 90% Quantile	671.7802	
MLE 95% Quantile	732.4668	
MLE 99% Quantile	862.6614	
MVU Estimate of Median	491.9292	
MVU Estimate of Mean	506.3016	
MVU Estimate of Standard Deviation	122.2049	
MVU Estimate of SE of Mean	38.64031	
95% H-UCL	592.0792	
95% Chebyshev (MVUE) UCL	674.7307	
97.5% Chebyshev (MVUE) UCL	747.6102	
99% Chebyshev (MVUE) UCL	890.7677	
Non-parametric Statisitics		
95% CLT UCL	571.3105	
95% Adjusted-CLT UCL	580.7154	
95% Modified-t UCL	580.1953	
95% Jackknife UCL	578.7283	
95% Chebyshev (Mean, Sd) UCL	678.2493	
97.5% Chebyshev (Mean, Sd) UCL	752.5653	
99% Chebyshev (Mean, Sd) UCL	898.5448	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	568.8258	
95% Bootstrap-t UCL	591.12	
95% Hall's Bootstrap UCL	595.2144	
95% Percentile Bootstrap UCL	569.3	
95% BCA Bootstrap UCL	598.3	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	578.7283	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06storm.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.75	
Maximum	3.9	
Mean	1.45	
Standard Deviation	1.218195	
Variance	1.484	
Coefficient of Variation	0.840135	
Skewness	2.29443	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.645159	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.452136	
Gamma Statistics		
k hat	2.688635	
k star (bias corrected)	1.455428	
Theta hat	0.539307	
Theta star	0.99627	
nu hat	32.26362	
nu star	17.46514	
5% Approximate Chi Square Value	9.004126	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	6.923556	
Anderson-Darling Test Statistic	0.839391	
Anderson-Darling 5% Critical Value	0.702227	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.321112	
Kolmogrov-Smirnov 5% Critical Value	0.334949	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	2.812539	
95% Adjusted Gamma UCL	3.657724	
Lognormal Statistics		
Minimum of log data	-0.287682	
Maximum of log data	1.360977	
Mean of log data	0.174218	
Standard Deviation of log data	0.617581	
Variance of log data	0.381406	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.77926	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	1.4404	
MLE Standard Deviation	0.981527	
MLE Coefficient of Variation	0.681427	
MLE Skewness	2.360696	
MLE Median	1.190315	
MLE 80% Quantile	2.005862	
MLE 90% Quantile	2.632172	
MLE 95% Quantile	3.287537	
MLE 99% Quantile	5.006371	
MVU Estimate of Median	1.152909	
MVU Estimate of Mean	1.390537	
MVU Estimate of Standard Deviation	0.858175	
MVU Estimate of SE of Mean	0.34954	
95% H-UCL	3.327102	
95% Chebyshev (MVUE) UCL	2.914146	
97.5% Chebyshev (MVUE) UCL	3.573413	
99% Chebyshev (MVUE) UCL	4.868416	
Non-parametric Statisitics		
95% CLT UCL	2.268029	
95% Adjusted-CLT UCL	2.76579	
95% Modified-t UCL	2.529777	
95% Jackknife UCL	2.452136	
95% Chebyshev (Mean, Sd) UCL	3.617795	
97.5% Chebyshev (Mean, Sd) UCL	4.555801	
99% Chebyshev (Mean, Sd) UCL	6.398333	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.188234	
95% Bootstrap-t UCL	6.325319	
95% Hall's Bootstrap UCL	6.180274	
95% Percentile Bootstrap UCL	2.366667	
95% BCA Bootstrap UCL	2.875	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2.812539	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06storm.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	15.2	
Maximum	25.5	
Mean	19.89167	
Standard Deviation	4.85061	
Variance	23.52842	
Coefficient of Variation	0.243851	
Skewness	0.300378	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.830611	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	23.88197	
Gamma Statistics		
k hat	20.37544	
k star (bias corrected)	10.29883	
Theta hat	0.976257	
Theta star	1.931449	
nu hat	244.5052	
nu star	123.5859	
5% Approximate Chi Square Value	98.90711	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	90.9397	
Anderson-Darling Test Statistic	0.535966	
Anderson-Darling 5% Critical Value	0.697087	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.247516	
Kolmogrov-Smirnov 5% Critical Value	0.331731	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	24.85494	
95% Adjusted Gamma UCL	27.03253	
Lognormal Statistics		
Minimum of log data	2.721295	
Maximum of log data	3.238678	
Mean of log data	2.965561	
Standard Deviation of log data	0.243335	
Variance of log data	0.059212	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.836709	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	19.98869	
MLE Standard Deviation	4.936845	
MLE Coefficient of Variation	0.246982	
MLE Skewness	0.756012	
MLE Median	19.40558	
MLE 80% Quantile	23.83557	
MLE 90% Quantile	26.52921	
MLE 95% Quantile	28.95801	
MLE 99% Quantile	34.17717	
MVU Estimate of Median	19.31	
MVU Estimate of Mean	19.88859	
MVU Estimate of Standard Deviation	4.839498	
MVU Estimate of SE of Mean	1.975592	
95% H-UCL	25.2959	
95% Chebyshev (MVUE) UCL	28.5	
97.5% Chebyshev (MVUE) UCL	32.22616	
99% Chebyshev (MVUE) UCL	39.54549	
Non-parametric Statisitics		
95% CLT UCL	23.14889	
95% Adjusted-CLT UCL	23.40837	
95% Modified-t UCL	23.92245	
95% Jackknife UCL	23.88197	
95% Chebyshev (Mean, Sd) UCL	28.52339	
97.5% Chebyshev (Mean, Sd) UCL	32.25834	
99% Chebyshev (Mean, Sd) UCL	39.59494	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	22.86293	
95% Bootstrap-t UCL	23.86895	
95% Hall's Bootstrap UCL	22.5749	
95% Percentile Bootstrap UCL	23.05	
95% BCA Bootstrap UCL	22.325	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	23.88197	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06storm.xls	
Variable	Chromium	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	5.6	
Maximum	24.2	
Mean	14.26667	
Standard Deviation	7.344839	
Variance	53.94667	
Coefficient of Variation	0.514825	
Skewness	0.17544	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.937582	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	20.30883	
Gamma Statistics		
k hat	4.087962	
k star (bias corrected)	2.155092	
Theta hat	3.489922	
Theta star	6.61998	
nu hat	49.05554	
nu star	25.8611	
5% Approximate Chi Square Value	15.27063	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	12.43155	
Anderson-Darling Test Statistic	0.287171	
Anderson-Darling 5% Critical Value	0.69981	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.226656	
Kolmogrov-Smirnov 5% Critical Value	0.333474	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	24.16087	
95% Adjusted Gamma UCL	29.67866	
Lognormal Statistics		
Minimum of log data	1.722767	
Maximum of log data	3.186353	
Mean of log data	2.530658	
Standard Deviation of log data	0.573178	
Variance of log data	0.328533	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.938392	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	14.8044	
MLE Standard Deviation	9.232636	
MLE Coefficient of Variation	0.623641	
MLE Skewness	2.113476	
MLE Median	12.56177	
MLE 80% Quantile	20.38895	
MLE 90% Quantile	26.23754	
MLE 95% Quantile	32.25056	
MLE 99% Quantile	47.64937	
MVU Estimate of Median	12.2212	
MVU Estimate of Mean	14.36756	
MVU Estimate of Standard Deviation	8.230858	
MVU Estimate of SE of Mean	3.354366	
95% H-UCL	31.15858	
95% Chebyshev (MVUE) UCL	28.98891	
97.5% Chebyshev (MVUE) UCL	35.31557	
99% Chebyshev (MVUE) UCL	47.74309	
Non-parametric Statisitics		
95% CLT UCL	19.19879	
95% Adjusted-CLT UCL	19.42827	
95% Modified-t UCL	20.34462	
95% Jackknife UCL	20.30883	
95% Chebyshev (Mean, Sd) UCL	27.3369	
97.5% Chebyshev (Mean, Sd) UCL	32.99241	
99% Chebyshev (Mean, Sd) UCL	44.10155	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	18.74945	
95% Bootstrap-t UCL	21.30921	
95% Hall's Bootstrap UCL	18.30385	
95% Percentile Bootstrap UCL	18.6	
95% BCA Bootstrap UCL	17.86667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	20.30883	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06storm.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	3.55	
Maximum	16.25	
Mean	8.916667	
Standard Deviation	5.897937	
Variance	34.78567	
Coefficient of Variation	0.661451	
Skewness	0.212442	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.811376	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	13.76855	
Gamma Statistics		
k hat	2.470442	
k star (bias corrected)	1.346332	
Theta hat	3.60934	
Theta star	6.622932	
nu hat	29.64531	
nu star	16.15599	
5% Approximate Chi Square Value	8.071068	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	6.123067	
Anderson-Darling Test Statistic	0.71477	
Anderson-Darling 5% Critical Value	0.702855	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.31654	
Kolmogrov-Smirnov 5% Critical Value	0.335228	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	17.84863	
95% Adjusted Gamma UCL	23.52702	
Lognormal Statistics		
Minimum of log data	1.266948	
Maximum of log data	2.788093	
Mean of log data	1.972084	
Standard Deviation of log data	0.741136	
Variance of log data	0.549282	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.782222	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	9.45671	
MLE Standard Deviation	8.090927	
MLE Coefficient of Variation	0.855575	
MLE Skewness	3.193014	
MLE Median	7.185633	
MLE 80% Quantile	13.44145	
MLE 90% Quantile	18.62385	
MLE 95% Quantile	24.31885	
MLE 99% Quantile	40.28443	
MVU Estimate of Median	6.862053	
MVU Estimate of Mean	8.970462	
MVU Estimate of Standard Deviation	6.639364	
MVU Estimate of SE of Mean	2.698288	
95% H-UCL	29.322	
95% Chebyshev (MVUE) UCL	20.73203	
97.5% Chebyshev (MVUE) UCL	25.82127	
99% Chebyshev (MVUE) UCL	35.81809	
Non-parametric Statisitics		
95% CLT UCL	12.87718	
95% Adjusted-CLT UCL	13.10032	
95% Modified-t UCL	13.80335	
95% Jackknife UCL	13.76855	
95% Chebyshev (Mean, Sd) UCL	19.41212	
97.5% Chebyshev (Mean, Sd) UCL	23.95352	
99% Chebyshev (Mean, Sd) UCL	32.8742	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	12.47187	
95% Bootstrap-t UCL	13.66367	
95% Hall's Bootstrap UCL	11.03202	
95% Percentile Bootstrap UCL	12.5	
95% BCA Bootstrap UCL	11.43333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	13.76855	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06storm.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	177	
Maximum	490	
Mean	306.6667	
Standard Deviation	126.421	
Variance	15982.27	
Coefficient of Variation	0.412242	
Skewness	0.544268	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.902915	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	410.6656	
Gamma Statistics		
k hat	7.220773	
k star (bias corrected)	3.721498	
Theta hat	42.47006	
Theta star	82.4041	
nu hat	86.64928	
nu star	44.65797	
5% Approximate Chi Square Value	30.32739	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	26.13778	
Anderson-Darling Test Statistic	0.365025	
Anderson-Darling 5% Critical Value	0.698174	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.270363	
Kolmogrov-Smirnov 5% Critical Value	0.332652	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	451.5756	
95% Adjusted Gamma UCL	523.9585	
Lognormal Statistics		
Minimum of log data	5.17615	
Maximum of log data	6.194405	
Mean of log data	5.654921	
Standard Deviation of log data	0.411904	
Variance of log data	0.169665	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.917539	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	310.9879	
MLE Standard Deviation	133.7277	
MLE Coefficient of Variation	0.430009	
MLE Skewness	1.36954	
MLE Median	285.694	
MLE 80% Quantile	404.6331	
MLE 90% Quantile	485.0338	
MLE 95% Quantile	562.5636	
MLE 99% Quantile	744.722	
MVU Estimate of Median	281.675	
MVU Estimate of Mean	306.4075	
MVU Estimate of Standard Deviation	126.1919	
MVU Estimate of SE of Mean	51.49214	
95% H-UCL	492.2593	
95% Chebyshev (MVUE) UCL	530.8565	
97.5% Chebyshev (MVUE) UCL	627.9758	
99% Chebyshev (MVUE) UCL	818.7478	
Non-parametric Statisitics		
95% CLT UCL	391.5595	
95% Adjusted-CLT UCL	403.813	
95% Modified-t UCL	412.5769	
95% Jackknife UCL	410.6656	
95% Chebyshev (Mean, Sd) UCL	531.6345	
97.5% Chebyshev (Mean, Sd) UCL	628.9782	
99% Chebyshev (Mean, Sd) UCL	820.1912	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	385.03	
95% Bootstrap-t UCL	427.0969	
95% Hall's Bootstrap UCL	402.4533	
95% Percentile Bootstrap UCL	385	
95% BCA Bootstrap UCL	367.5	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	410.6656	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW06storm.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	3	
Minimum	0.05	
Maximum	0.16	
Mean	0.08	
Standard Deviation	0.048166	
Variance	0.00232	
Coefficient of Variation	0.60208	
Skewness	1.256421	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	*Shapiro Wilk method yields a more accurate result*
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.704232	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.119624	
Gamma Statistics		
k hat	3.998315	
k star (bias corrected)	2.110269	
Theta hat	0.020008	
Theta star	0.03791	
nu hat	47.97978	
nu star	25.32322	
5% Approximate Chi Square Value	14.85748	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	12.06311	
Anderson-Darling Test Statistic	1.055871	
Anderson-Darling 5% Critical Value	0.699982	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.424174	
Kolmogrov-Smirnov 5% Critical Value	0.333542	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.136353	
95% Adjusted Gamma UCL	0.167938	
Lognormal Statistics		
Minimum of log data	-2.995732	
Maximum of log data	-1.832581	
Mean of log data	-2.655962	
Standard Deviation of log data	0.534173	
Variance of log data	0.285341	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.692083	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.081001	
MLE Standard Deviation	0.046547	
MLE Coefficient of Variation	0.574644	
MLE Skewness	1.913687	
MLE Median	0.070231	
MLE 80% Quantile	0.110296	
MLE 90% Quantile	0.13952	
MLE 95% Quantile	0.169103	
MLE 99% Quantile	0.243296	
MVU Estimate of Median	0.068575	
MVU Estimate of Mean	0.078944	
MVU Estimate of Standard Deviation	0.042153	
MVU Estimate of SE of Mean	0.017186	
95% H-UCL	0.15796	
95% Chebyshev (MVUE) UCL	0.153854	
97.5% Chebyshev (MVUE) UCL	0.186268	
99% Chebyshev (MVUE) UCL	0.249939	
Non-parametric Statisitics		
95% CLT UCL	0.112344	
95% Adjusted-CLT UCL	0.123121	
95% Modified-t UCL	0.121305	
95% Jackknife UCL	0.119624	
95% Chebyshev (Mean, Sd) UCL	0.165713	
97.5% Chebyshev (Mean, Sd) UCL	0.202801	
99% Chebyshev (Mean, Sd) UCL	0.275653	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.165713	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW07base.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	3.95	
Maximum	8.3	
Mean	5.695	
Standard Deviation	1.204955	
Variance	1.451917	
Coefficient of Variation	0.211581	
Skewness	0.902474	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.948213	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	6.39349	
Gamma Statistics		
k hat	26.14156	
k star (bias corrected)	18.36576	
Theta hat	0.217852	
Theta star	0.310088	
nu hat	522.8312	
nu star	367.3151	
5% Approximate Chi Square Value	323.8897	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	316.7946	
Anderson-Darling Test Statistic	0.191309	
Anderson-Darling 5% Critical Value	0.724517	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.124902	
Kolmogrov-Smirnov 5% Critical Value	0.266107	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	6.458557	
95% Adjusted Gamma UCL	6.603206	
Lognormal Statistics		
Minimum of log data	1.373716	
Maximum of log data	2.116256	
Mean of log data	1.72034	
Standard Deviation of log data	0.20531	
Variance of log data	0.042152	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.982516	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	5.705418	
MLE Standard Deviation	1.183835	
MLE Coefficient of Variation	0.207493	
MLE Skewness	0.631412	
MLE Median	5.586428	
MLE 80% Quantile	6.644751	
MLE 90% Quantile	7.272963	
MLE 95% Quantile	7.830885	
MLE 99% Quantile	9.006008	
MVU Estimate of Median	5.574664	
MVU Estimate of Mean	5.69322	
MVU Estimate of Standard Deviation	1.172888	
MVU Estimate of SE of Mean	0.370878	
95% H-UCL	6.491317	
95% Chebyshev (MVUE) UCL	7.309838	
97.5% Chebyshev (MVUE) UCL	8.00935	
99% Chebyshev (MVUE) UCL	9.383406	
Non-parametric Statisitics		
95% CLT UCL	6.321755	
95% Adjusted-CLT UCL	6.43795	
95% Modified-t UCL	6.411614	
95% Jackknife UCL	6.39349	
95% Chebyshev (Mean, Sd) UCL	7.355916	
97.5% Chebyshev (Mean, Sd) UCL	8.074596	
99% Chebyshev (Mean, Sd) UCL	9.486303	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	6.29956	
95% Bootstrap-t UCL	6.595199	
95% Hall's Bootstrap UCL	6.874562	
95% Percentile Bootstrap UCL	6.33	
95% BCA Bootstrap UCL	6.53	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	6.39349	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW07base.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	234	
Maximum	591	
Mean	374.5	
Standard Deviation	113.9193	
Variance	12977.61	
Coefficient of Variation	0.30419	
Skewness	0.621396	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.925236	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	440.5369	
Gamma Statistics		
k hat	12.44073	
k star (bias corrected)	8.775176	
Theta hat	30.10274	
Theta star	42.67721	
nu hat	248.8145	
nu star	175.5035	
5% Approximate Chi Square Value	145.8591	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	141.1632	
Anderson-Darling Test Statistic	0.340438	
Anderson-Darling 5% Critical Value	0.724936	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.193717	
Kolmogrov-Smirnov 5% Critical Value	0.266518	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	450.6133	
95% Adjusted Gamma UCL	465.6035	
Lognormal Statistics		
Minimum of log data	5.455321	
Maximum of log data	6.381816	
Mean of log data	5.884863	
Standard Deviation of log data	0.299937	
Variance of log data	0.089962	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.95003	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	376.0959	
MLE Standard Deviation	115.3902	
MLE Coefficient of Variation	0.30681	
MLE Skewness	0.949312	
MLE Median	359.5536	
MLE 80% Quantile	463.2698	
MLE 90% Quantile	528.6263	
MLE 95% Quantile	588.9014	
MLE 99% Quantile	722.3542	
MVU Estimate of Median	357.9392	
MVU Estimate of Mean	374.3526	
MVU Estimate of Standard Deviation	113.0996	
MVU Estimate of SE of Mean	35.75578	
95% H-UCL	458.287	
95% Chebyshev (MVUE) UCL	530.2085	
97.5% Chebyshev (MVUE) UCL	597.6474	
99% Chebyshev (MVUE) UCL	730.1181	
Non-parametric Statisitics		
95% CLT UCL	433.7549	
95% Adjusted-CLT UCL	441.3189	
95% Modified-t UCL	441.7167	
95% Jackknife UCL	440.5369	
95% Chebyshev (Mean, Sd) UCL	531.5269	
97.5% Chebyshev (Mean, Sd) UCL	599.4726	
99% Chebyshev (Mean, Sd) UCL	732.9388	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	430.5764	
95% Bootstrap-t UCL	446.4749	
95% Hall's Bootstrap UCL	441.0315	
95% Percentile Bootstrap UCL	433.7	
95% BCA Bootstrap UCL	461	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	440.5369	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW07storm.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	4.8	
Maximum	18.1	
Mean	9.733333	
Standard Deviation	5.014745	
Variance	25.14767	
Coefficient of Variation	0.515214	
Skewness	0.896454	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.907254	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	13.85866	
Gamma Statistics		
k hat	4.73901	
k star (bias corrected)	2.480616	
Theta hat	2.053875	
Theta star	3.923756	
nu hat	56.86812	
nu star	29.76739	
5% Approximate Chi Square Value	18.30806	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	15.15676	
Anderson-Darling Test Statistic	0.289957	
Anderson-Darling 5% Critical Value	0.698554	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.180529	
Kolmogrov-Smirnov 5% Critical Value	0.332986	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	15.8256	
95% Adjusted Gamma UCL	19.11596	
Lognormal Statistics		
Minimum of log data	1.568616	
Maximum of log data	2.895912	
Mean of log data	2.166355	
Standard Deviation of log data	0.51216	
Variance of log data	0.262308	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.941472	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	9.949366	
MLE Standard Deviation	5.44883	
MLE Coefficient of Variation	0.547656	
MLE Skewness	1.807225	
MLE Median	8.726416	
MLE 80% Quantile	13.45203	
MLE 90% Quantile	16.85219	
MLE 95% Quantile	20.26425	
MLE 99% Quantile	28.72132	
MVU Estimate of Median	8.537148	
MVU Estimate of Mean	9.718162	
MVU Estimate of Standard Deviation	4.975554	
MVU Estimate of SE of Mean	2.028944	
95% H-UCL	18.62518	
95% Chebyshev (MVUE) UCL	18.56212	
97.5% Chebyshev (MVUE) UCL	22.38891	
99% Chebyshev (MVUE) UCL	29.9059	
Non-parametric Statisitics		
95% CLT UCL	13.10078	
95% Adjusted-CLT UCL	13.90136	
95% Modified-t UCL	13.98354	
95% Jackknife UCL	13.85866	
95% Chebyshev (Mean, Sd) UCL	18.65714	
97.5% Chebyshev (Mean, Sd) UCL	22.51847	
99% Chebyshev (Mean, Sd) UCL	30.10332	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	12.7934	
95% Bootstrap-t UCL	15.6425	
95% Hall's Bootstrap UCL	13.64199	
95% Percentile Bootstrap UCL	13.00833	
95% BCA Bootstrap UCL	14.15833	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	13.85866	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW07storm.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	1.65	
Maximum	13.2	
Mean	5.8	
Standard Deviation	4.501222	
Variance	20.261	
Coefficient of Variation	0.776073	
Skewness	0.889986	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.8917	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	9.502885	
Gamma Statistics		
k hat	1.946409	
k star (bias corrected)	1.084316	
Theta hat	2.979846	
Theta star	5.348995	
nu hat	23.35691	
nu star	13.01179	
5% Approximate Chi Square Value	5.899558	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	4.291519	
Anderson-Darling Test Statistic	0.325646	
Anderson-Darling 5% Critical Value	0.704594	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.224429	
Kolmogrov-Smirnov 5% Critical Value	0.336004	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	*GAMMA*	*Data follow gamma distribution at 5% signifcance level*
95% Approximate Gamma UCL	12.79221	
95% Adjusted Gamma UCL	17.58547	
Lognormal Statistics		
Minimum of log data	0.500775	
Maximum of log data	2.580217	
Mean of log data	1.4795	
Standard Deviation of log data	0.83994	
Variance of log data	0.7055	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924923	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	6.247929	
MLE Standard Deviation	6.325108	
MLE Coefficient of Variation	1.012353	
MLE Skewness	4.074576	
MLE Median	4.390751	
MLE 80% Quantile	8.928511	
MLE 90% Quantile	12.92061	
MLE 95% Quantile	17.48253	
MLE 99% Quantile	30.97564	
MVU Estimate of Median	4.137973	
MVU Estimate of Mean	5.82458	
MVU Estimate of Standard Deviation	4.882005	
MVU Estimate of SE of Mean	1.979018	
95% H-UCL	25.486	
95% Chebyshev (MVUE) UCL	14.45092	
97.5% Chebyshev (MVUE) UCL	18.18354	
99% Chebyshev (MVUE) UCL	25.51556	
Non-parametric Statisitics		
95% CLT UCL	8.82261	
95% Adjusted-CLT UCL	9.536025	
95% Modified-t UCL	9.614164	
95% Jackknife UCL	9.502885	
95% Chebyshev (Mean, Sd) UCL	13.80998	
97.5% Chebyshev (Mean, Sd) UCL	17.27591	
99% Chebyshev (Mean, Sd) UCL	24.08405	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	8.547232	
95% Bootstrap-t UCL	10.59971	
95% Hall's Bootstrap UCL	9.520321	
95% Percentile Bootstrap UCL	8.566667	
95% BCA Bootstrap UCL	8.308333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	9.502885	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW07storm.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	1.85	
Maximum	17	
Mean	7.033333	
Standard Deviation	5.678175	
Variance	32.24167	
Coefficient of Variation	0.807323	
Skewness	1.217426	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.875731	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	11.70443	
Gamma Statistics		
k hat	1.935405	
k star (bias corrected)	1.078814	
Theta hat	3.634037	
Theta star	6.519508	
nu hat	23.22486	
nu star	12.94576	
5% Approximate Chi Square Value	5.855184	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	4.254656	
Anderson-Darling Test Statistic	0.281757	
Anderson-Darling 5% Critical Value	0.704673	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.231428	
Kolmogrov-Smirnov 5% Critical Value	0.336039	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	15.55064	
95% Adjusted Gamma UCL	21.40052	
Lognormal Statistics		
Minimum of log data	0.615186	
Maximum of log data	2.833213	
Mean of log data	1.670603	
Standard Deviation of log data	0.833637	
Variance of log data	0.694951	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.956853	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.523854	
MLE Standard Deviation	7.537424	
MLE Coefficient of Variation	1.001804	
MLE Skewness	4.010832	
MLE Median	5.315372	
MLE 80% Quantile	10.7513	
MLE 90% Quantile	15.5153	
MLE 95% Quantile	20.94576	
MLE 99% Quantile	36.95286	
MVU Estimate of Median	5.013844	
MVU Estimate of Mean	7.022499	
MVU Estimate of Standard Deviation	5.842218	
MVU Estimate of SE of Mean	2.368701	
95% H-UCL	30.12794	
95% Chebyshev (MVUE) UCL	17.34743	
97.5% Chebyshev (MVUE) UCL	21.81503	
99% Chebyshev (MVUE) UCL	30.59078	
Non-parametric Statisitics		
95% CLT UCL	10.84628	
95% Adjusted-CLT UCL	12.07734	
95% Modified-t UCL	11.89645	
95% Jackknife UCL	11.70443	
95% Chebyshev (Mean, Sd) UCL	17.13772	
97.5% Chebyshev (Mean, Sd) UCL	21.50989	
99% Chebyshev (Mean, Sd) UCL	30.09819	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	10.39643	
95% Bootstrap-t UCL	15.60848	
95% Hall's Bootstrap UCL	12.73486	
95% Percentile Bootstrap UCL	10.76667	
95% BCA Bootstrap UCL	13.125	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	11.70443	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW07storm.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	114.5	
Maximum	308	
Mean	181.25	
Standard Deviation	72.6772	
Variance	5281.975	
Coefficient of Variation	0.400978	
Skewness	1.278275	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.868676	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	241.0372	
Gamma Statistics		
k hat	8.524198	
k star (bias corrected)	4.37321	
Theta hat	21.263	
Theta star	41.44553	
nu hat	102.2904	
nu star	52.47852	
5% Approximate Chi Square Value	36.83544	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	32.16892	
Anderson-Darling Test Statistic	0.370046	
Anderson-Darling 5% Critical Value	0.698247	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.282197	
Kolmogrov-Smirnov 5% Critical Value	0.332571	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	258.2223	
95% Adjusted Gamma UCL	295.6808	
Lognormal Statistics		
Minimum of log data	4.740575	
Maximum of log data	5.7301	
Mean of log data	5.140075	
Standard Deviation of log data	0.368678	
Variance of log data	0.135923	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.927519	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	182.735	
MLE Standard Deviation	69.72584	
MLE Coefficient of Variation	0.381568	
MLE Skewness	1.200258	
MLE Median	170.7287	
MLE 80% Quantile	233.1328	
MLE 90% Quantile	274.1914	
MLE 95% Quantile	313.1088	
MLE 99% Quantile	402.4699	
MVU Estimate of Median	168.8026	
MVU Estimate of Mean	180.5955	
MVU Estimate of Standard Deviation	66.57514	
MVU Estimate of SE of Mean	27.17045	
95% H-UCL	271.4052	
95% Chebyshev (MVUE) UCL	299.0287	
97.5% Chebyshev (MVUE) UCL	350.2749	
99% Chebyshev (MVUE) UCL	450.938	
Non-parametric Statisitics		
95% CLT UCL	230.0534	
95% Adjusted-CLT UCL	246.5978	
95% Modified-t UCL	243.6178	
95% Jackknife UCL	241.0372	
95% Chebyshev (Mean, Sd) UCL	310.58	
97.5% Chebyshev (Mean, Sd) UCL	366.5412	
99% Chebyshev (Mean, Sd) UCL	476.4662	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	225.5596	
95% Bootstrap-t UCL	329.986	
95% Hall's Bootstrap UCL	571.5012	
95% Percentile Bootstrap UCL	229.5	
95% BCA Bootstrap UCL	218.3333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	241.0372	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW07storm.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	2	
Minimum	0.05	
Maximum	0.11	
Mean	0.06	
Standard Deviation	0.024495	
Variance	0.0006	
Coefficient of Variation	0.408248	
Skewness	2.44949	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.496293	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.08015	
Gamma Statistics		
k hat	9.984637	
k star (bias corrected)	5.10343	
Theta hat	0.006009	
Theta star	0.011757	
nu hat	119.8156	
nu star	61.24116	
5% Approximate Chi Square Value	44.23987	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	39.07885	
Anderson-Darling Test Statistic	1.722078	
Anderson-Darling 5% Critical Value	0.698329	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.507649	
Kolmogrov-Smirnov 5% Critical Value	0.332481	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.083058	
95% Adjusted Gamma UCL	0.094027	
Lognormal Statistics		
Minimum of log data	-2.995732	
Maximum of log data	-2.207275	
Mean of log data	-2.864323	
Standard Deviation of log data	0.321886	
Variance of log data	0.103611	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.496293	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.060054	
MLE Standard Deviation	0.019842	
MLE Coefficient of Variation	0.330407	
MLE Skewness	1.027291	
MLE Median	0.057022	
MLE 80% Quantile	0.074846	
MLE 90% Quantile	0.086233	
MLE 95% Quantile	0.096828	
MLE 99% Quantile	0.120559	
MVU Estimate of Median	0.056531	
MVU Estimate of Mean	0.059522	
MVU Estimate of Standard Deviation	0.019158	
MVU Estimate of SE of Mean	0.00782	
95% H-UCL	0.083684	
95% Chebyshev (MVUE) UCL	0.093607	
97.5% Chebyshev (MVUE) UCL	0.108356	
99% Chebyshev (MVUE) UCL	0.137328	
Non-parametric Statisitics		
95% CLT UCL	0.076449	
95% Adjusted-CLT UCL	0.087134	
95% Modified-t UCL	0.081817	
95% Jackknife UCL	0.08015	
95% Chebyshev (Mean, Sd) UCL	0.103589	
97.5% Chebyshev (Mean, Sd) UCL	0.12245	
99% Chebyshev (Mean, Sd) UCL	0.159499	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/A	Not enough distinct data error
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.08015	95% Student's-t UCL
2nd Recommended UCL	0.081817	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08base.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	9	
Minimum	1.5	
Maximum	6.35	
Mean	3.525	
Standard Deviation	1.690044	
Variance	2.85625	
Coefficient of Variation	0.479445	
Skewness	0.490063	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.935072	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	4.504687	
Gamma Statistics		
k hat	4.67057	
k star (bias corrected)	3.336066	
Theta hat	0.754726	
Theta star	1.056634	
nu hat	93.41141	
nu star	66.72132	
5% Approximate Chi Square Value	48.92003	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	46.28076	
Anderson-Darling Test Statistic	0.226864	
Anderson-Darling 5% Critical Value	0.72943	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.126928	
Kolmogrov-Smirnov 5% Critical Value	0.267558	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4.807696	
95% Adjusted Gamma UCL	5.081867	
Lognormal Statistics		
Minimum of log data	0.405465	
Maximum of log data	1.848455	
Mean of log data	1.149024	
Standard Deviation of log data	0.50858	
Variance of log data	0.258653	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.943211	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	3.590713	
MLE Standard Deviation	1.950867	
MLE Coefficient of Variation	0.543309	
MLE Skewness	1.790304	
MLE Median	3.155112	
MLE 80% Quantile	4.849007	
MLE 90% Quantile	6.065088	
MLE 95% Quantile	7.283691	
MLE 99% Quantile	10.29832	
MVU Estimate of Median	3.114524	
MVU Estimate of Mean	3.540313	
MVU Estimate of Standard Deviation	1.8375	
MVU Estimate of SE of Mean	0.579881	
95% H-UCL	5.24219	
95% Chebyshev (MVUE) UCL	6.067955	
97.5% Chebyshev (MVUE) UCL	7.161668	
99% Chebyshev (MVUE) UCL	9.310055	
Non-parametric Statisitics		
95% CLT UCL	4.404074	
95% Adjusted-CLT UCL	4.492571	
95% Modified-t UCL	4.518491	
95% Jackknife UCL	4.504687	
95% Chebyshev (Mean, Sd) UCL	5.854565	
97.5% Chebyshev (Mean, Sd) UCL	6.86257	
99% Chebyshev (Mean, Sd) UCL	8.8426	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	4.346559	
95% Bootstrap-t UCL	4.660451	
95% Hall's Bootstrap UCL	4.62748	
95% Percentile Bootstrap UCL	4.38	
95% BCA Bootstrap UCL	4.785	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	4.504687	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08base.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	147	
Maximum	425	
Mean	250.8	
Standard Deviation	78.97369	
Variance	6236.844	
Coefficient of Variation	0.314887	
Skewness	1.070407	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	*N/R*	*Shapiro Wilk method yields a more accurate result*
Shapiro-Wilk Test Statisitic	0.918897	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	296.5796	
Gamma Statistics		
k hat	12.13838	
k star (bias corrected)	8.563531	
Theta hat	20.66174	
Theta star	29.28698	
nu hat	242.7676	
nu star	171.2706	
5% Approximate Chi Square Value	142.0007	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	137.3699	
Anderson-Darling Test Statistic	0.266873	
Anderson-Darling 5% Critical Value	0.724951	
Anderson-Darling 5% Gamma Test Result	*AD GAMMA*	*Data follow gamma distribution at 5% signifcance level*
Kolmogrov-Smirnov Test Statistic	0.15376	
Kolmogrov-Smirnov 5% Critical Value	0.266532	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	302.4961	
95% Adjusted Gamma UCL	312.6935	
Lognormal Statistics		
Minimum of log data	4.990433	
Maximum of log data	6.052089	
Mean of log data	5.482899	
Standard Deviation of log data	0.301703	
Variance of log data	0.091025	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.971388	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	*LOGNORMAL*	*Data are lognormal at 5% significance level*
MLE Mean	251.7436	
MLE Standard Deviation	77.71335	
MLE Coefficient of Variation	0.3087	
MLE Skewness	0.955519	
MLE Median	240.543	
MLE 80% Quantile	310.3925	
MLE 90% Quantile	354.457	
MLE 95% Quantile	395.1241	
MLE 99% Quantile	485.2478	
MVU Estimate of Median	239.4503	
MVU Estimate of Mean	250.5626	
MVU Estimate of Standard Deviation	76.15231	
MVU Estimate of SE of Mean	24.07495	
95% H-UCL	307.1732	
95% Chebyshev (MVUE) UCL	355.5029	
97.5% Chebyshev (MVUE) UCL	400.9106	
99% Chebyshev (MVUE) UCL	490.1053	
Non-parametric Statisitics		
95% CLT UCL	291.878	
95% Adjusted-CLT UCL	300.9106	
95% Modified-t UCL	297.9885	
95% Jackknife UCL	296.5796	
95% Chebyshev (Mean, Sd) UCL	359.6577	
97.5% Chebyshev (Mean, Sd) UCL	406.7606	
99% Chebyshev (Mean, Sd) UCL	499.2849	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	289.5913	
95% Bootstrap-t UCL	313.0346	
95% Hall's Bootstrap UCL	319.218	
95% Percentile Bootstrap UCL	289.05	
95% BCA Bootstrap UCL	285.45	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	296.5796	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08storm.xls	
Variable	Antimony	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.815973	
Maximum	1.835229	
Mean	1.16691	
Standard Deviation	0.353412	
Variance	0.1249	
Coefficient of Variation	0.302862	
Skewness	1.670852	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.841112	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.457641	
Gamma Statistics		
k hat	15.22054	
k star (bias corrected)	7.721379	
Theta hat	0.076667	
Theta star	0.151127	
nu hat	182.6464	
nu star	92.65655	
5% Approximate Chi Square Value	71.45438	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	64.75951	
Anderson-Darling Test Statistic	0.420259	
Anderson-Darling 5% Critical Value	0.697683	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.251099	
Kolmogrov-Smirnov 5% Critical Value	0.332088	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.51316	
95% Adjusted Gamma UCL	1.669591	
Lognormal Statistics		
Minimum of log data	-0.203374	
Maximum of log data	0.607169	
Mean of log data	0.12115	
Standard Deviation of log data	0.273341	
Variance of log data	0.074716	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.917611	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.17176	
MLE Standard Deviation	0.326367	
MLE Coefficient of Variation	0.278527	
MLE Skewness	0.85719	
MLE Median	1.128794	
MLE 80% Quantile	1.422083	
MLE 90% Quantile	1.603828	
MLE 95% Quantile	1.769675	
MLE 99% Quantile	2.131747	
MVU Estimate of Median	1.121781	
MVU Estimate of Mean	1.164328	
MVU Estimate of Standard Deviation	0.318249	
MVU Estimate of SE of Mean	0.129912	
95% H-UCL	1.536189	
95% Chebyshev (MVUE) UCL	1.7306	
97.5% Chebyshev (MVUE) UCL	1.975627	
99% Chebyshev (MVUE) UCL	2.456934	
Non-parametric Statisitics		
95% CLT UCL	1.40423	
95% Adjusted-CLT UCL	1.509389	
95% Modified-t UCL	1.474044	
95% Jackknife UCL	1.457641	
95% Chebyshev (Mean, Sd) UCL	1.795812	
97.5% Chebyshev (Mean, Sd) UCL	2.067939	
99% Chebyshev (Mean, Sd) UCL	2.602478	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.379542	
95% Bootstrap-t UCL	1.744622	
95% Hall's Bootstrap UCL	2.608309	
95% Percentile Bootstrap UCL	1.397239	
95% BCA Bootstrap UCL	1.499673	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.457641	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08storm.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	4.462236	
Maximum	29.86236	
Mean	10.57917	
Standard Deviation	9.553179	
Variance	91.26324	
Coefficient of Variation	0.903017	
Skewness	2.326688	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.642779	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	18.438	
Gamma Statistics		
k hat	2.372191	
k star (bias corrected)	1.297207	
Theta hat	4.459664	
Theta star	8.155351	
nu hat	28.46629	
nu star	15.56648	
5% Approximate Chi Square Value	7.655998	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	5.769294	
Anderson-Darling Test Statistic	0.820116	
Anderson-Darling 5% Critical Value	0.703138	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.376213	
Kolmogrov-Smirnov 5% Critical Value	0.335354	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	21.51	
95% Adjusted Gamma UCL	28.54431	
Lognormal Statistics		
Minimum of log data	1.49565	
Maximum of log data	3.396599	
Mean of log data	2.133547	
Standard Deviation of log data	0.659073	
Variance of log data	0.434377	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.817444	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	10.49329	
MLE Standard Deviation	7.739469	
MLE Coefficient of Variation	0.737564	
MLE Skewness	2.613927	
MLE Median	8.444768	
MLE 80% Quantile	14.73851	
MLE 90% Quantile	19.69679	
MLE 95% Quantile	24.97116	
MLE 99% Quantile	39.11673	
MVU Estimate of Median	8.14301	
MVU Estimate of Mean	10.07537	
MVU Estimate of Standard Deviation	6.63456	
MVU Estimate of SE of Mean	2.700593	
95% H-UCL	26.59712	
95% Chebyshev (MVUE) UCL	21.84698	
97.5% Chebyshev (MVUE) UCL	26.94056	
99% Chebyshev (MVUE) UCL	36.94593	
Non-parametric Statisitics		
95% CLT UCL	16.99422	
95% Adjusted-CLT UCL	20.95258	
95% Modified-t UCL	19.05543	
95% Jackknife UCL	18.438	
95% Chebyshev (Mean, Sd) UCL	27.57918	
97.5% Chebyshev (Mean, Sd) UCL	34.9351	
99% Chebyshev (Mean, Sd) UCL	49.38437	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	16.26327	
95% Bootstrap-t UCL	45.75756	
95% Hall's Bootstrap UCL	52.50759	
95% Percentile Bootstrap UCL	17.79982	
95% BCA Bootstrap UCL	19.1685	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	LOGNORMAL	
1st Recommended UCL	26.59712	95% H-UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08storm.xls	
Variable:	Chromium	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	3.073702	
Maximum	59.10161	
Mean	15.11686	
Standard Deviation	21.74224	
Variance	472.7252	
Coefficient of Variation	1.438278	
Skewness	2.353336	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.617542	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	33.0029	
Gamma Statistics		
k hat	0.975518	
k star (bias corrected)	0.59887	
Theta hat	15.49623	
Theta star	25.2423	
nu hat	11.70622	
nu star	7.186444	
5% Approximate Chi Square Value	2.272834	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	1.40697	
Anderson-Darling Test Statistic	0.709589	
Anderson-Darling 5% Critical Value	0.715677	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.313636	
Kolmogrov-Smirnov 5% Critical Value	0.341105	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	47.79779	
95% Adjusted Gamma UCL	77.21306	
Lognormal Statistics		
Minimum of log data	1.122883	
Maximum of log data	4.079258	
Mean of log data	2.122374	
Standard Deviation of log data	1.073807	
Variance of log data	1.153062	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.867445	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	14.86345	
MLE Standard Deviation	21.88452	
MLE Coefficient of Variation	1.472372	
MLE Skewness	7.609037	
MLE Median	8.350939	
MLE 80% Quantile	20.69188	
MLE 90% Quantile	33.18893	
MLE 95% Quantile	48.85159	
MLE 99% Quantile	101.4991	
MVU Estimate of Median	7.575563	
MVU Estimate of Mean	13.11624	
MVU Estimate of Standard Deviation	14.01622	
MVU Estimate of SE of Mean	5.628698	
95% H-UCL	133.1772	
95% Chebyshev (MVUE) UCL	37.65116	
97.5% Chebyshev (MVUE) UCL	48.26744	
99% Chebyshev (MVUE) UCL	69.12107	
Non-parametric Statisitics		
95% CLT UCL	29.71697	
95% Adjusted-CLT UCL	38.82904	
95% Modified-t UCL	34.4242	
95% Jackknife UCL	33.0029	
95% Chebyshev (Mean, Sd) UCL	53.80747	
97.5% Chebyshev (Mean, Sd) UCL	70.54893	
99% Chebyshev (Mean, Sd) UCL	103.4343	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	28.51822	
95% Bootstrap-t UCL	121.843	
95% Hall's Bootstrap UCL	112.0693	
95% Percentile Bootstrap UCL	32.32697	
95% BCA Bootstrap UCL	40.48165	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	47.79779	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08storm.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	3.859222	
Maximum	82.96712	
Mean	23.24625	
Standard Deviation	29.92947	
Variance	895.773	
Coefficient of Variation	1.287497	
Skewness	2.206387	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.683482	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	47.86742	
Gamma Statistics		
k hat	1.020425	
k star (bias corrected)	0.621323	
Theta hat	22.78096	
Theta star	37.41409	
nu hat	12.24509	
nu star	7.455881	
5% Approximate Chi Square Value	2.423484	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	1.518997	
Anderson-Darling Test Statistic	0.478456	
Anderson-Darling 5% Critical Value	0.714801	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.289096	
Kolmogrov-Smirnov 5% Critical Value	0.340711	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	71.51739	
95% Adjusted Gamma UCL	114.1024	
Lognormal Statistics		
Minimum of log data	1.350466	
Maximum of log data	4.418444	
Mean of log data	2.581814	
Standard Deviation of log data	1.135777	
Variance of log data	1.28999	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.910577	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	25.19912	
MLE Standard Deviation	40.88748	
MLE Coefficient of Variation	1.622576	
MLE Skewness	9.139565	
MLE Median	13.2211	
MLE 80% Quantile	34.52024	
MLE 90% Quantile	56.89957	
MLE 95% Quantile	85.64131	
MLE 99% Quantile	185.6071	
MVU Estimate of Median	11.85333	
MVU Estimate of Mean	21.83596	
MVU Estimate of Standard Deviation	24.65714	
MVU Estimate of SE of Mean	9.868867	
95% H-UCL	287.2957	
95% Chebyshev (MVUE) UCL	64.85335	
97.5% Chebyshev (MVUE) UCL	83.46701	
99% Chebyshev (MVUE) UCL	120.0299	
Non-parametric Statisitics		
95% CLT UCL	43.34414	
95% Adjusted-CLT UCL	55.10421	
95% Modified-t UCL	49.70176	
95% Jackknife UCL	47.86742	
95% Chebyshev (Mean, Sd) UCL	76.50612	
97.5% Chebyshev (Mean, Sd) UCL	99.55171	
99% Chebyshev (Mean, Sd) UCL	144.8203	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	41.51211	
95% Bootstrap-t UCL	97.71949	
95% Hall's Bootstrap UCL	139.4263	
95% Percentile Bootstrap UCL	45.75237	
95% BCA Bootstrap UCL	50.42883	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	71.51739	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08storm.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	154.5943	
Maximum	807.0306	
Mean	337.7472	
Standard Deviation	241.8932	
Variance	58512.3	
Coefficient of Variation	0.716196	
Skewness	1.93824	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.772499	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	536.7382	
Gamma Statistics		
k hat	3.136794	
k star (bias corrected)	1.679508	
Theta hat	107.6727	
Theta star	201.0989	
nu hat	37.64153	
nu star	20.1541	
5% Approximate Chi Square Value	10.96332	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	8.624137	
Anderson-Darling Test Statistic	0.420965	
Anderson-Darling 5% Critical Value	0.701145	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.23789	
Kolmogrov-Smirnov 5% Critical Value	0.334412	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	620.8877	
95% Adjusted Gamma UCL	789.2952	
Lognormal Statistics		
Minimum of log data	5.040804	
Maximum of log data	6.693362	
Mean of log data	5.654512	
Standard Deviation of log data	0.601061	
Variance of log data	0.361274	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.916577	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	342.1158	
MLE Standard Deviation	225.6814	
MLE Coefficient of Variation	0.659664	
MLE Skewness	2.266049	
MLE Median	285.5771	
MLE 80% Quantile	474.5697	
MLE 90% Quantile	618.239	
MLE 95% Quantile	767.591	
MLE 99% Quantile	1155.836	
MVU Estimate of Median	277.0714	
MVU Estimate of Mean	330.9419	
MVU Estimate of Standard Deviation	198.7918	
MVU Estimate of SE of Mean	80.98712	
95% H-UCL	762.8059	
95% Chebyshev (MVUE) UCL	683.9566	
97.5% Chebyshev (MVUE) UCL	836.7064	
99% Chebyshev (MVUE) UCL	1136.754	
Non-parametric Statisitics		
95% CLT UCL	500.1805	
95% Adjusted-CLT UCL	583.6755	
95% Modified-t UCL	549.7617	
95% Jackknife UCL	536.7382	
95% Chebyshev (Mean, Sd) UCL	768.1992	
97.5% Chebyshev (Mean, Sd) UCL	954.4561	
99% Chebyshev (Mean, Sd) UCL	1320.322	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	481.6879	
95% Bootstrap-t UCL	797.4899	
95% Hall's Bootstrap UCL	1163.99	
95% Percentile Bootstrap UCL	508.0128	
95% BCA Bootstrap UCL	604.5513	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	620.8877	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08storm.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	0.053619	
Maximum	0.241693	
Mean	0.094872	
Standard Deviation	0.072829	
Variance	0.005304	
Coefficient of Variation	0.767655	
Skewness	2.319657	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.634145	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.154784	
Gamma Statistics		
k hat	3.194082	
k star (bias corrected)	1.708152	
Theta hat	0.029702	
Theta star	0.055541	
nu hat	38.32898	
nu star	20.49783	
5% Approximate Chi Square Value	11.21743	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	8.846387	
Anderson-Darling Test Statistic	0.917001	
Anderson-Darling 5% Critical Value	0.701068	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.328263	
Kolmogrov-Smirnov 5% Critical Value	0.334354	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	0.173362	
95% Adjusted Gamma UCL	0.219827	
Lognormal Statistics		
Minimum of log data	-2.92585	
Maximum of log data	-1.420087	
Mean of log data	-2.519856	
Standard Deviation of log data	0.56375	
Variance of log data	0.317814	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.751952	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.094331	
MLE Standard Deviation	0.057698	
MLE Coefficient of Variation	0.611654	
MLE Skewness	2.063793	
MLE Median	0.080471	
MLE 80% Quantile	0.129576	
MLE 90% Quantile	0.166055	
MLE 95% Quantile	0.203419	
MLE 99% Quantile	0.298623	
MVU Estimate of Median	0.07836	
MVU Estimate of Mean	0.091644	
MVU Estimate of Standard Deviation	0.051639	
MVU Estimate of SE of Mean	0.021047	
95% H-UCL	0.194818	
95% Chebyshev (MVUE) UCL	0.183385	
97.5% Chebyshev (MVUE) UCL	0.223082	
99% Chebyshev (MVUE) UCL	0.301058	
Non-parametric Statisitics		
95% CLT UCL	0.143778	
95% Adjusted-CLT UCL	0.173863	
95% Modified-t UCL	0.159477	
95% Jackknife UCL	0.154784	
95% Chebyshev (Mean, Sd) UCL	0.224473	
97.5% Chebyshev (Mean, Sd) UCL	0.280551	
99% Chebyshev (Mean, Sd) UCL	0.390706	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	0.139269	
95% Bootstrap-t UCL	0.516601	
95% Hall's Bootstrap UCL	0.388616	
95% Percentile Bootstrap UCL	0.150243	
95% BCA Bootstrap UCL	0.180412	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	0.173362	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW08storm.xls	
Variable:	Thallium	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	1.158016	
Maximum	2.152675	
Mean	1.516906	
Standard Deviation	0.387341	
Variance	0.150033	
Coefficient of Variation	0.255349	
Skewness	0.965846	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.898537	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.835548	
Gamma Statistics		
k hat	19.79951	
k star (bias corrected)	10.01086	
Theta hat	0.076613	
Theta star	0.151526	
nu hat	237.5941	
nu star	120.1304	
5% Approximate Chi Square Value	95.81639	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	87.98262	
Anderson-Darling Test Statistic	0.327293	
Anderson-Darling 5% Critical Value	0.697115	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.223569	
Kolmogrov-Smirnov 5% Critical Value	0.331745	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.90183	
95% Adjusted Gamma UCL	2.071164	
Lognormal Statistics		
Minimum of log data	0.146708	
Maximum of log data	0.766711	
Mean of log data	0.391207	
Standard Deviation of log data	0.243307	
Variance of log data	0.059198	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.922648	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.523189	
MLE Standard Deviation	0.376156	
MLE Coefficient of Variation	0.246953	
MLE Skewness	0.75592	
MLE Median	1.478765	
MLE 80% Quantile	1.8163	
MLE 90% Quantile	2.021535	
MLE 95% Quantile	2.206588	
MLE 99% Quantile	2.604237	
MVU Estimate of Median	1.471482	
MVU Estimate of Mean	1.515563	
MVU Estimate of Standard Deviation	0.368741	
MVU Estimate of SE of Mean	0.150528	
95% H-UCL	1.92755	
95% Chebyshev (MVUE) UCL	2.1717	
97.5% Chebyshev (MVUE) UCL	2.455611	
99% Chebyshev (MVUE) UCL	3.0133	
Non-parametric Statisitics		
95% CLT UCL	1.777008	
95% Adjusted-CLT UCL	1.843632	
95% Modified-t UCL	1.84594	
95% Jackknife UCL	1.835548	
95% Chebyshev (Mean, Sd) UCL	2.206184	
97.5% Chebyshev (Mean, Sd) UCL	2.504435	
99% Chebyshev (Mean, Sd) UCL	3.090291	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.751692	
95% Bootstrap-t UCL	2.018183	
95% Hall's Bootstrap UCL	2.075123	
95% Percentile Bootstrap UCL	1.772659	
95% BCA Bootstrap UCL	1.86845	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.835548	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW09base.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	7	
Minimum	0.95	
Maximum	3.8	
Mean	1.98	
Standard Deviation	1.010555	
Variance	1.021222	
Coefficient of Variation	0.510382	
Skewness	0.935048	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.815281	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	2.5658	
Gamma Statistics		
k hat	4.771988	
k star (bias corrected)	3.407058	
Theta hat	0.414921	
Theta star	0.581147	
nu hat	95.43976	
nu star	68.14116	
5% Approximate Chi Square Value	50.13806	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	47.46383	
Anderson-Darling Test Statistic	0.787296	
Anderson-Darling 5% Critical Value	0.729436	
Anderson-Darling 5% Gamma Test Result	*NOT AD GAMMA*	*Data not gamma distributed at 5% significance level*
Kolmogrov-Smirnov Test Statistic	0.267377	
Kolmogrov-Smirnov 5% Critical Value	0.267519	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	2.69096	
95% Adjusted Gamma UCL	2.842575	
Lognormal Statistics		
Minimum of log data	-0.051293	
Maximum of log data	1.335001	
Mean of log data	0.574675	
Standard Deviation of log data	0.482006	
Variance of log data	0.23233	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.874908	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.995391	
MLE Standard Deviation	1.020455	
MLE Coefficient of Variation	0.511406	
MLE Skewness	1.66797	
MLE Median	1.776553	
MLE 80% Quantile	2.669712	
MLE 90% Quantile	3.300432	
MLE 95% Quantile	3.925821	
MLE 99% Quantile	5.451125	
MVU Estimate of Median	1.756013	
MVU Estimate of Mean	1.970428	
MVU Estimate of Standard Deviation	0.967327	
MVU Estimate of SE of Mean	0.305386	
95% H-UCL	2.839172	
95% Chebyshev (MVUE) UCL	3.301574	
97.5% Chebyshev (MVUE) UCL	3.877562	
99% Chebyshev (MVUE) UCL	5.008979	
Non-parametric Statisitics		
95% CLT UCL	2.505639	
95% Adjusted-CLT UCL	2.606605	
95% Modified-t UCL	2.581549	
95% Jackknife UCL	2.5658	
95% Chebyshev (Mean, Sd) UCL	3.372954	
97.5% Chebyshev (Mean, Sd) UCL	3.975687	
99% Chebyshev (Mean, Sd) UCL	5.159638	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	2.475156	
95% Bootstrap-t UCL	2.711353	
95% *Hall's Bootstrap* UCL	2.445962	
95% Percentile Bootstrap UCL	2.515	
95% BCA Bootstrap UCL	2.745	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2.69096	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW09base.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	10	
Minimum	15.7	
Maximum	98.4	
Mean	39.83	
Standard Deviation	24.94634	
Variance	622.3201	
Coefficient of Variation	0.62632	
Skewness	1.649675	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.839598	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	54.29093	
Gamma Statistics		
k hat	3.522953	
k star (bias corrected)	2.532734	
Theta hat	11.30586	
Theta star	15.72609	
nu hat	70.45906	
nu star	50.65468	
5% Approximate Chi Square Value	35.30835	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	33.09372	
Anderson-Darling Test Statistic	0.289727	
Anderson-Darling 5% Critical Value	0.730721	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.156725	
Kolmogrov-Smirnov 5% Critical Value	0.268121	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	57.14161	
95% Adjusted Gamma UCL	60.96551	
Lognormal Statistics		
Minimum of log data	2.753661	
Maximum of log data	4.589041	
Mean of log data	3.536032	
Standard Deviation of log data	0.559449	
Variance of log data	0.312983	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.969829	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	40.14602	
MLE Standard Deviation	24.33718	
MLE Coefficient of Variation	0.606217	
MLE Skewness	2.041433	
MLE Median	34.33042	
MLE 80% Quantile	55.07887	
MLE 90% Quantile	70.45145	
MLE 95% Quantile	86.17029	
MLE 99% Quantile	126.1296	
MVU Estimate of Median	33.7966	
MVU Estimate of Mean	39.45344	
MVU Estimate of Standard Deviation	22.61726	
MVU Estimate of SE of Mean	7.131255	
95% H-UCL	61.71587	
95% Chebyshev (MVUE) UCL	70.53786	
97.5% Chebyshev (MVUE) UCL	83.98811	
99% Chebyshev (MVUE) UCL	110.4085	
Non-parametric Statisitics		
95% CLT UCL	52.8058	
95% Adjusted-CLT UCL	57.2031	
95% Modified-t UCL	54.97682	
95% Jackknife UCL	54.29093	
95% Chebyshev (Mean, Sd) UCL	74.21616	
97.5% Chebyshev (Mean, Sd) UCL	89.09508	
99% Chebyshev (Mean, Sd) UCL	118.3218	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	52.14414	
95% Bootstrap-t UCL	67.17668	
95% Hall's Bootstrap UCL	126.8033	
95% Percentile Bootstrap UCL	52.43	
95% BCA Bootstrap UCL	61.2	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	GAMMA	
1st Recommended UCL	57.14161	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW09storm.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.6	
Maximum	2.5	
Mean	1.2	
Standard Deviation	0.695701	
Variance	0.484	
Coefficient of Variation	0.579751	
Skewness	1.657167	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.829121	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.772312	
Gamma Statistics		
k hat	4.427463	
k star (bias corrected)	2.324842	
Theta hat	0.271036	
Theta star	0.516164	
nu hat	53.12955	
nu star	27.89811	
5% Approximate Chi Square Value	16.84683	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	13.84232	
Anderson-Darling Test Statistic	0.370282	
Anderson-Darling 5% Critical Value	0.699155	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.237364	
Kolmogrov-Smirnov 5% Critical Value	0.333219	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.987182	
95% Adjusted Gamma UCL	2.418506	
Lognormal Statistics		
Minimum of log data	-0.510826	
Maximum of log data	0.916291	
Mean of log data	0.06516	
Standard Deviation of log data	0.509302	
Variance of log data	0.259388	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.937502	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.215134	
MLE Standard Deviation	0.661257	
MLE Coefficient of Variation	0.544184	
MLE Skewness	1.793706	
MLE Median	1.06733	
MLE 80% Quantile	1.641351	
MLE 90% Quantile	2.053637	
MLE 95% Quantile	2.466897	
MLE 99% Quantile	3.489629	
MVU Estimate of Median	1.044436	
MVU Estimate of Mean	1.187228	
MVU Estimate of Standard Deviation	0.604455	
MVU Estimate of SE of Mean	0.246492	
95% H-UCL	2.262938	
95% Chebyshev (MVUE) UCL	2.261661	
97.5% Chebyshev (MVUE) UCL	2.726569	
99% Chebyshev (MVUE) UCL	3.639792	
Non-parametric Statisitics		
95% CLT UCL	1.667169	
95% Adjusted-CLT UCL	1.872483	
95% Modified-t UCL	1.804336	
95% Jackknife UCL	1.772312	
95% Chebyshev (Mean, Sd) UCL	2.438009	
97.5% Chebyshev (Mean, Sd) UCL	2.973697	
99% Chebyshev (Mean, Sd) UCL	4.025951	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.630683	
95% Bootstrap-t UCL	2.547219	
95% Hall's Bootstrap UCL	3.69858	
95% Percentile Bootstrap UCL	1.7	
95% BCA Bootstrap UCL	1.983333	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.772312	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW09storm.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	6	
Minimum	1	
Maximum	4.65	
Mean	2.608333	
Standard Deviation	1.484391	
Variance	2.203417	
Coefficient of Variation	0.569096	
Skewness	0.616233	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.8949	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	3.829453	
Gamma Statistics		
k hat	3.676968	
k star (bias corrected)	1.949595	
Theta hat	0.709371	
Theta star	1.337885	
nu hat	44.12361	
nu star	23.39514	
5% Approximate Chi Square Value	13.38793	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	10.75768	
Anderson-Darling Test Statistic	0.286711	
Anderson-Darling 5% Critical Value	0.700416	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.210235	
Kolmogrov-Smirnov 5% Critical Value	0.333866	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4.558011	
95% Adjusted Gamma UCL	5.672443	
Lognormal Statistics		
Minimum of log data	0	
Maximum of log data	1.536867	
Mean of log data	0.81661	
Standard Deviation of log data	0.59342	
Variance of log data	0.352148	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.950393	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.698468	
MLE Standard Deviation	1.753212	
MLE Coefficient of Variation	0.649706	
MLE Skewness	2.223372	
MLE Median	2.262816	
MLE 80% Quantile	3.73613	
MLE 90% Quantile	4.850857	
MLE 95% Quantile	6.006166	
MLE 99% Quantile	8.997132	
MVU Estimate of Median	2.197105	
MVU Estimate of Mean	2.612715	
MVU Estimate of Standard Deviation	1.549514	
MVU Estimate of SE of Mean	0.631328	
95% H-UCL	5.920775	
95% Chebyshev (MVUE) UCL	5.364612	
97.5% Chebyshev (MVUE) UCL	6.55536	
99% Chebyshev (MVUE) UCL	8.894353	
Non-parametric Statisitics		
95% CLT UCL	3.605115	
95% Adjusted-CLT UCL	3.768015	
95% Modified-t UCL	3.854862	
95% Jackknife UCL	3.829453	
95% Chebyshev (Mean, Sd) UCL	5.249826	
97.5% Chebyshev (Mean, Sd) UCL	6.392803	
99% Chebyshev (Mean, Sd) UCL	8.637958	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	3.513964	
95% Bootstrap-t UCL	5.19941	
95% Hall's Bootstrap UCL	13.08493	
95% Percentile Bootstrap UCL	3.583333	
95% BCA Bootstrap UCL	3.975	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	3.829453	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW10base.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	7	
Minimum	0.6	
Maximum	2.9	
Mean	1.34	
Standard Deviation	0.77165	
Variance	0.595444	
Coefficient of Variation	0.575859	
Skewness	1.164381	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.86021	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.787311	
Gamma Statistics		
k hat	3.819925	
k star (bias corrected)	2.740614	
Theta hat	0.350792	
Theta star	0.488941	
nu hat	76.3985	
nu star	54.81228	
5% Approximate Chi Square Value	38.79697	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	36.46673	
Anderson-Darling Test Statistic	0.383449	
Anderson-Darling 5% Critical Value	0.729892	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.160421	
Kolmogrov-Smirnov 5% Critical Value	0.267933	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1.89315	
95% Adjusted Gamma UCL	2.014123	
Lognormal Statistics		
Minimum of log data	-0.510826	
Maximum of log data	1.064711	
Mean of log data	0.156104	
Standard Deviation of log data	0.542679	
Variance of log data	0.294501	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.930011	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.354394	
MLE Standard Deviation	0.792588	
MLE Coefficient of Variation	0.585197	
MLE Skewness	1.955996	
MLE Median	1.168948	
MLE 80% Quantile	1.849042	
MLE 90% Quantile	2.347725	
MLE 95% Quantile	2.854256	
MLE 99% Quantile	4.130406	
MVU Estimate of Median	1.151838	
MVU Estimate of Mean	1.332524	
MVU Estimate of Standard Deviation	0.73997	
MVU Estimate of SE of Mean	0.233388	
95% H-UCL	2.046205	
95% Chebyshev (MVUE) UCL	2.349838	
97.5% Chebyshev (MVUE) UCL	2.790031	
99% Chebyshev (MVUE) UCL	3.654704	
Non-parametric Statisitics		
95% CLT UCL	1.741373	
95% Adjusted-CLT UCL	1.837378	
95% Modified-t UCL	1.802286	
95% Jackknife UCL	1.787311	
95% Chebyshev (Mean, Sd) UCL	2.403647	
97.5% Chebyshev (Mean, Sd) UCL	2.863888	
99% Chebyshev (Mean, Sd) UCL	3.767942	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.73008	
95% Bootstrap-t UCL	2.066405	
95% Hall's Bootstrap UCL	2.477916	
95% Percentile Bootstrap UCL	1.745	
95% BCA Bootstrap UCL	1.65	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.787311	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW10base xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	10	
Number of Missing Data	0	
Number of Valid Observations	10	
Number of Distinct Observations	3	
Minimum	0.05	
Maximum	0.36	
Mean	0.0835	
Standard Deviation	0.097469	
Variance	0.0095	
Coefficient of Variation	1.167298	
Skewness	3.125447	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.405214	
Shapiro-Wilk 5% Critical Value	0.842	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.140001	
Gamma Statistics		
k hat	1.969414	
k star (bias corrected)	1.445257	
Theta hat	0.042398	
Theta star	0.057775	
nu hat	39.38829	
nu star	28.90513	
5% Approximate Chi Square Value	17.63236	
Adjusted Level of Significance	0.0267	
Adjusted Chi Square Value	16.11899	
Anderson-Darling Test Statistic	2.817747	
Anderson-Darling 5% Critical Value	0.735803	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.460919	
Kolmogrov-Smirnov 5% Critical Value	0.26989	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.136883	
95% Adjusted Gamma UCL	0.149735	
Lognormal Statistics		
Minimum of log data	-2.995732	
Maximum of log data	-1.021651	
Mean of log data	-2.757778	
Standard Deviation of log data	0.623179	
Variance of log data	0.388353	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.458826	
Shapiro-Wilk 5% Critical Value	0.842	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.077027	
MLE Standard Deviation	0.053062	
MLE Coefficient of Variation	0.688876	
MLE Skewness	2.393533	
MLE Median	0.063433	
MLE 80% Quantile	0.1074	
MLE 90% Quantile	0.141283	
MLE 95% Quantile	0.176816	
MLE 99% Quantile	0.270289	
MVU Estimate of Median	0.062211	
MVU Estimate of Mean	0.075343	
MVU Estimate of Standard Deviation	0.048379	
MVU Estimate of SE of Mean	0.015232	
95% H-UCL	0.126932	
95% Chebyshev (MVUE) UCL	0.141737	
97.5% Chebyshev (MVUE) UCL	0.170466	
99% Chebyshev (MVUE) UCL	0.226899	
Non-parametric Statisitics		
95% CLT UCL	0.134199	
95% Adjusted-CLT UCL	0.166749	
95% Modified-t UCL	0.145078	
95% Jackknife UCL	0.140001	
95% Chebyshev (Mean, Sd) UCL	0.217852	
97.5% Chebyshev (Mean, Sd) UCL	0.275987	
99% Chebyshev (Mean, Sd) UCL	0.39018	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.217852	95% Chebyshev (Mean, Sd) UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW10storm.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	5	
Minimum	0.65	
Maximum	2.775	
Mean	1.3625	
Standard Deviation	0.747956	
Variance	0.559438	
Coefficient of Variation	0.548958	
Skewness	1.693713	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.835523	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1.977798	
Gamma Statistics		
k hat	4.866747	
k star (bias corrected)	2.544485	
Theta hat	0.279961	
Theta star	0.535472	
nu hat	58.40096	
nu star	30.53381	
5% Approximate Chi Square Value	18.91093	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	15.70074	
Anderson-Darling Test Statistic	0.351427	
Anderson-Darling 5% Critical Value	0.698307	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.190471	
Kolmogrov-Smirnov 5% Critical Value	0.33289	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.199909	
95% Adjusted Gamma UCL	2.649705	
Lognormal Statistics		
Minimum of log data	-0.430783	
Maximum of log data	1.020651	
Mean of log data	0.203079	
Standard Deviation of log data	0.488682	
Variance of log data	0.23881	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.952961	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.380553	
MLE Standard Deviation	0.717007	
MLE Coefficient of Variation	0.519362	
MLE Skewness	1.698178	
MLE Median	1.22517	
MLE 80% Quantile	1.851536	
MLE 90% Quantile	2.295695	
MLE 95% Quantile	2.73727	
MLE 99% Quantile	3.818101	
MVU Estimate of Median	1.200961	
MVU Estimate of Mean	1.351492	
MVU Estimate of Standard Deviation	0.660261	
MVU Estimate of SE of Mean	0.269293	
95% H-UCL	2.478226	
95% Chebyshev (MVUE) UCL	2.525314	
97.5% Chebyshev (MVUE) UCL	3.033227	
99% Chebyshev (MVUE) UCL	4.030925	
Non-parametric Statisitics		
95% CLT UCL	1.864759	
95% Adjusted-CLT UCL	2.090362	
95% Modified-t UCL	2.012988	
95% Jackknife UCL	1.977798	
95% Chebyshev (Mean, Sd) UCL	2.693497	
97.5% Chebyshev (Mean, Sd) UCL	3.26942	
99% Chebyshev (Mean, Sd) UCL	4.40071	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	1.823583	
95% Bootstrap-t UCL	2.760998	
95% Hall's Bootstrap UCL	4.494575	
95% Percentile Bootstrap UCL	1.870833	
95% BCA Bootstrap UCL	2.066667	
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1.977798	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\SW10storm.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	6	
Number of Missing Data	0	
Number of Valid Observations	6	
Number of Distinct Observations	2	
Minimum	0.05	
Maximum	0.1	
Mean	0.058333	
Standard Deviation	0.020412	
Variance	0.000417	
Coefficient of Variation	0.349927	
Skewness	2.44949	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.496293	
Shapiro-Wilk 5% Critical Value	0.788	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	0.075125	
Gamma Statistics		
k hat	13.10908	
k star (bias corrected)	6.66565	
Theta hat	0.00445	
Theta star	0.008751	
nu hat	157.3089	
nu star	79.9878	
5% Approximate Chi Square Value	60.37714	
Adjusted Level of Significance	0.01222	
Adjusted Chi Square Value	54.26399	
Anderson-Darling Test Statistic	1.721064	
Anderson-Darling 5% Critical Value	0.697944	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.50726	
Kolmogrov-Smirnov 5% Critical Value	0.332247	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	0.07728	
95% Adjusted Gamma UCL	0.085986	
Lognormal Statistics		
Minimum of log data	-2.995732	
Maximum of log data	-2.302585	
Mean of log data	-2.880208	
Standard Deviation of log data	0.282976	
Variance of log data	0.080076	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.496293	
Shapiro-Wilk 5% Critical Value	0.788	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	0.058416	
MLE Standard Deviation	0.016867	
MLE Coefficient of Variation	0.288737	
MLE Skewness	0.890282	
MLE Median	0.056123	
MLE 80% Quantile	0.071283	
MLE 90% Quantile	0.080735	
MLE 95% Quantile	0.089393	
MLE 99% Quantile	0.108392	
MVU Estimate of Median	0.055749	
MVU Estimate of Mean	0.058018	
MVU Estimate of Standard Deviation	0.016417	
MVU Estimate of SE of Mean	0.006702	
95% H-UCL	0.077486	
95% Chebyshev (MVUE) UCL	0.087229	
97.5% Chebyshev (MVUE) UCL	0.099869	
99% Chebyshev (MVUE) UCL	0.124697	
Non-parametric Statisitics		
95% CLT UCL	0.07204	
95% Adjusted-CLT UCL	0.080945	
95% Modified-t UCL	0.076514	
95% Jackknife UCL	0.075125	
95% Chebyshev (Mean, Sd) UCL	0.094657	
97.5% Chebyshev (Mean, Sd) UCL	0.110375	
99% Chebyshev (Mean, Sd) UCL	0.141249	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/A	Not enough distinct data error
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	0.075125	95% Student's-t UCL
2nd Recommended UCL	0.076514	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC05-f.xls	
Variable:	Antimony	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	4.1	
Maximum	13	
Mean	7.275	
Standard Deviation	3.920353	
Variance	15.36917	
Coefficient of Variation	0.53888	
Skewness	1.676157	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.811287	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	11.88801	
Gamma Statistics		
k hat	5.447729	
k star (bias corrected)	1.528599	
Theta hat	1.335419	
Theta star	4.75926	
nu hat	43.58183	
nu star	12.22879	
5% Approximate Chi Square Value	5.377081	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.471305	
Anderson-Darling 5% Critical Value	0.658857	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.364167	
Kolmogrov-Smirnov 5% Critical Value	0.395804	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	16.54512	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.410987	
Maximum of log data	2.564949	
Mean of log data	1.889864	
Standard Deviation of log data	0.484532	
Variance of log data	0.234771	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892862	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.442816	
MLE Standard Deviation	3.828668	
MLE Coefficient of Variation	0.514411	
MLE Skewness	1.679357	
MLE Median	6.618467	
MLE 80% Quantile	9.967133	
MLE 90% Quantile	12.33557	
MLE 95% Quantile	14.68635	
MLE 99% Quantile	20.42754	
MVU Estimate of Median	6.425942	
MVU Estimate of Mean	7.216736	
MVU Estimate of Standard Deviation	3.437138	
MVU Estimate of SE of Mean	1.717864	
95% H-UCL	26.89668	
95% Chebyshev (MVUE) UCL	14.70473	
97.5% Chebyshev (MVUE) UCL	17.94479	
99% Chebyshev (MVUE) UCL	24.30926	
Non-parametric Statisitics		
95% CLT UCL	10.4992	
95% Adjusted-CLT UCL	12.25454	
95% Modified-t UCL	12.1618	
95% Jackknife UCL	11.88801	
95% Chebyshev (Mean, Sd) UCL	15.81921	
97.5% Chebyshev (Mean, Sd) UCL	19.5163	
99% Chebyshev (Mean, Sd) UCL	26.77851	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	11.88801	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC05-f.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	210	
Maximum	900	
Mean	535	
Standard Deviation	351.0461	
Variance	123233.3	
Coefficient of Variation	0.656161	
Skewness	0.09986	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.847332	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	948.0694	
Gamma Statistics		
k hat	2.744288	
k star (bias corrected)	0.852739	
Theta hat	194.9504	
Theta star	627.3904	
nu hat	21.9543	
nu star	6.821909	
5% Approximate Chi Square Value	2.072767	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.485734	
Anderson-Darling 5% Critical Value	0.659702	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level.
Kolmogrov-Smirnov Test Statistic	0.303694	
Kolmogrov-Smirnov 5% Critical Value	0.396903	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1760.797	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.347108	
Maximum of log data	6.802395	
Mean of log data	6.089144	
Standard Deviation of log data	0.741427	
Variance of log data	0.549714	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.847393	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	580.5642	
MLE Standard Deviation	496.97	
MLE Coefficient of Variation	0.856012	
MLE Skewness	3.195285	
MLE Median	441.0435	
MLE 80% Quantile	825.2193	
MLE 90% Quantile	1143.532	
MLE 95% Quantile	1493.37	
MLE 99% Quantile	2474.274	
MVU Estimate of Median	411.3562	
MVU Estimate of Mean	537.7525	
MVU Estimate of Standard Deviation	383.4465	
MVU Estimate of SE of Mean	191.3313	
95% H-UCL	10412.88	
95% Chebyshev (MVUE) UCL	1371.746	
97.5% Chebyshev (MVUE) UCL	1732.616	
99% Chebyshev (MVUE) UCL	2441.474	
Non-parametric Statisitics		
95% CLT UCL	823.7097	
95% Adjusted-CLT UCL	833.074	
95% Modified-t UCL	949.5301	
95% Jackknife UCL	948.0694	
95% Chebyshev (Mean, Sd) UCL	1300.087	
97.5% Chebyshev (Mean, Sd) UCL	1631.141	
99% Chebyshev (Mean, Sd) UCL	2281.432	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	948.0694	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC05-f.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	4.2	
Maximum	24	
Mean	12.05	
Standard Deviation	9.033825	
Variance	81.61	
Coefficient of Variation	0.749695	
Skewness	0.912149	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.912664	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	22.67994	
Gamma Statistics		
k hat	2.345413	
k star (bias corrected)	0.75302	
Theta hat	5.137688	
Theta star	16.00223	
nu hat	18.7633	
nu star	6.024159	
5% Approximate Chi Square Value	1.651725	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.286927	
Anderson-Darling 5% Critical Value	0.660156	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.266501	
Kolmogrov-Smirnov 5% Critical Value	0.397437	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	43.94867	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.435085	
Maximum of log data	3.178054	
Mean of log data	2.260989	
Standard Deviation of log data	0.792935	
Variance of log data	0.628746	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.951749	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	13.13607	
MLE Standard Deviation	12.28948	
MLE Coefficient of Variation	0.935552	
MLE Skewness	3.625505	
MLE Median	9.59257	
MLE 80% Quantile	18.74672	
MLE 90% Quantile	26.57339	
MLE 95% Quantile	35.35243	
MLE 99% Quantile	60.66432	
MVU Estimate of Median	8.856236	
MVU Estimate of Mean	12.01978	
MVU Estimate of Standard Deviation	9.11799	
MVU Estimate of SE of Mean	4.547078	
95% H-UCL	352.4015	
95% Chebyshev (MVUE) UCL	31.84004	
97.5% Chebyshev (MVUE) UCL	40.41628	
99% Chebyshev (MVUE) UCL	57.26264	
Non-parametric Statisitics		
95% CLT UCL	19.47966	
95% Adjusted-CLT UCL	21.68085	
95% Modified-t UCL	23.02328	
95% Jackknife UCL	22.67994	
95% Chebyshev (Mean, Sd) UCL	31.73877	
97.5% Chebyshev (Mean, Sd) UCL	40.25811	
99% Chebyshev (Mean, Sd) UCL	56.99271	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	22.67994	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC05-f.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	450	
Maximum	1600	
Mean	990	
Standard Deviation	595.035	
Variance	354066.7	
Coefficient of Variation	0.601045	
Skewness	0.088114	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.831032	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1690.167	
Gamma Statistics		
k hat	3.356596	
k star (bias corrected)	1.005816	
Theta hat	294.9417	
Theta star	984.2759	
nu hat	26.85276	
nu star	8.046525	
5% Approximate Chi Square Value	2.761306	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.526696	
Anderson-Darling 5% Critical Value	0.659221	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.31676	
Kolmogrov-Smirnov 5% Critical Value	0.396417	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	2884.888	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	6.109248	
Maximum of log data	7.377759	
Mean of log data	6.741411	
Standard Deviation of log data	0.661927	
Variance of log data	0.438148	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.824548	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1054.145	
MLE Standard Deviation	781.6565	
MLE Coefficient of Variation	0.741508	
MLE Skewness	2.632229	
MLE Median	846.7548	
MLE 80% Quantile	1481.395	
MLE 90% Quantile	1982.25	
MLE 95% Quantile	2515.637	
MLE 99% Quantile	3948.353	
MVU Estimate of Median	801.1354	
MVU Estimate of Mean	992.9021	
MVU Estimate of Standard Deviation	636.8868	
MVU Estimate of SE of Mean	318.0158	
95% H-UCL	10713.73	
95% Chebyshev (MVUE) UCL	2379.101	
97.5% Chebyshev (MVUE) UCL	2978.91	
99% Chebyshev (MVUE) UCL	4157.119	
Non-parametric Statisitics		
95% CLT UCL	1479.373	
95% Adjusted-CLT UCL	1493.379	
95% Modified-t UCL	1692.351	
95% Jackknife UCL	1690.167	
95% Chebyshev (Mean, Sd) UCL	2286.849	
97.5% Chebyshev (Mean, Sd) UCL	2847.996	
99% Chebyshev (Mean, Sd) UCL	3950.262	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1690.167	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC05-f.xls	
Variable	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	240	
Maximum	640	
Mean	397.5	
Standard Deviation	172.8921	
Variance	29891.67	
Coefficient of Variation	0.434949	
Skewness	1.275486	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.916091	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	600.9389	
Gamma Statistics		
k hat	7.732768	
k star (bias corrected)	2.099859	
Theta hat	51.40462	
Theta star	189.2985	
nu hat	61.86214	
nu star	16.79887	
5% Approximate Chi Square Value	8.52739	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.262471	
Anderson-Darling 5% Critical Value	0.657975	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.22305	
Kolmogrov-Smirnov 5% Critical Value	0.395365	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	783.0708	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.480639	
Maximum of log data	6.461468	
Mean of log data	5.919144	
Standard Deviation of log data	0.41286	
Variance of log data	0.170453	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.978048	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	405.1957	
MLE Standard Deviation	174.6774	
MLE Coefficient of Variation	0.431094	
MLE Skewness	1.373397	
MLE Median	372.093	
MLE 80% Quantile	527.4268	
MLE 90% Quantile	632.4924	
MLE 95% Quantile	733.8449	
MLE 99% Quantile	972.0965	
MVU Estimate of Median	364.2154	
MVU Estimate of Mean	396.3374	
MVU Estimate of Standard Deviation	161.5889	
MVU Estimate of SE of Mean	80.77661	
95% H-UCL	1059.045	
95% Chebyshev (MVUE) UCL	748.4344	
97.5% Chebyshev (MVUE) UCL	900.7871	
99% Chebyshev (MVUE) UCL	1200.054	
Non-parametric Statisitics		
95% CLT UCL	539.6911	
95% Adjusted-CLT UCL	598.5986	
95% Modified-t UCL	610.1273	
95% Jackknife UCL	600.9389	
95% Chebyshev (Mean, Sd) UCL	774.3095	
97.5% Chebyshev (Mean, Sd) UCL	937.3553	
99% Chebyshev (Mean, Sd) UCL	1257.627	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	600.9389	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC05-f.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	2	
Minimum	250	
Maximum	390	
Mean	355	
Standard Deviation	70	
Variance	4900	
Coefficient of Variation	0.197183	
Skewness	-2	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.629658	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	437.3677	
Gamma Statistics		
k hat	29.33297	
k star (bias corrected)	7.499909	
Theta hat	12.10242	
Theta star	47.33391	
nu hat	234.6638	
nu star	59.99927	
5% Approximate Chi Square Value	43.18423	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.960719	
Anderson-Darling 5% Critical Value	0.656732	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.468528	
Kolmogrov-Smirnov 5% Critical Value	0.394109	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	493.2296	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.521461	
Maximum of log data	5.966147	
Mean of log data	5.854975	
Standard Deviation of log data	0.222343	
Variance of log data	0.049436	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.629658	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	357.6996	
MLE Standard Deviation	80.52511	
MLE Coefficient of Variation	0.225119	
MLE Skewness	0.686767	
MLE Median	348.9663	
MLE 80% Quantile	421.0936	
MLE 90% Quantile	464.372	
MLE 95% Quantile	503.07	
MLE 99% Quantile	585.3119	
MVU Estimate of Median	346.8138	
MVU Estimate of Mean	355.4717	
MVU Estimate of Standard Deviation	78.7456	
MVU Estimate of SE of Mean	39.37204	
95% H-UCL	515.4981	
95% Chebyshev (MVUE) UCL	527.0904	
97.5% Chebyshev (MVUE) UCL	601.35	
99% Chebyshev (MVUE) UCL	747.2185	
Non-parametric Statisitics		
95% CLT UCL	412.5699	
95% Adjusted-CLT UCL	375.1719	
95% Modified-t UCL	431.5344	
95% Jackknife UCL	437.3677	
95% Chebyshev (Mean, Sd) UCL	507.5615	
97.5% Chebyshev (Mean, Sd) UCL	573.5749	
99% Chebyshev (Mean, Sd) UCL	703.2456	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/A	Not enough distinct data error
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	437.3677	95% Student's-t UCL
2nd Recommended UCL	431.5344	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC05-f.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	3.5	
Maximum	26	
Mean	11.325	
Standard Deviation	10.00612	
Variance	100.1225	
Coefficient of Variation	0.883543	
Skewness	1.728537	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.809809	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	23.09902	
Gamma Statistics		
k hat	2.026978	
k star (bias corrected)	0.673411	
Theta hat	5.587136	
Theta star	16.81737	
nu hat	16.21582	
nu star	5.387289	
5% Approximate Chi Square Value	1.334761	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.377001	
Anderson-Darling 5% Critical Value	0.660519	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.321088	
Kolmogrov-Smirnov 5% Critical Value	0.397864	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	45.70936	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.252763	
Maximum of log data	3.258097	
Mean of log data	2.160505	
Standard Deviation of log data	0.827015	
Variance of log data	0.683954	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.948504	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	12.21276	
MLE Standard Deviation	12.10048	
MLE Coefficient of Variation	0.990806	
MLE Skewness	3.94509	
MLE Median	8.675513	
MLE 80% Quantile	17.44987	
MLE 90% Quantile	25.10881	
MLE 95% Quantile	33.81633	
MLE 99% Quantile	59.3909	
MVU Estimate of Median	7.9526	
MVU Estimate of Mean	11.07825	
MVU Estimate of Standard Deviation	8.733146	
MVU Estimate of SE of Mean	4.35328	
95% H-UCL	434.0775	
95% Chebyshev (MVUE) UCL	30.05376	
97.5% Chebyshev (MVUE) UCL	38.26448	
99% Chebyshev (MVUE) UCL	54.39284	
Non-parametric Statisitics		
95% CLT UCL	19.5543	
95% Adjusted-CLT UCL	24.17455	
95% Modified-t UCL	23.81969	
95% Jackknife UCL	23.09902	
95% Chebyshev (Mean, Sd) UCL	33.13284	
97.5% Chebyshev (Mean, Sd) UCL	42.56911	
99% Chebyshev (Mean, Sd) UCL	61.10483	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	23.09902	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC05-f.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	34	
Maximum	61	
Mean	44.5	
Standard Deviation	11.61895	
Variance	135	
Coefficient of Variation	0.2611	
Skewness	1.377061	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.896761	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	58.17181	
Gamma Statistics		
k hat	21.29743	
k star (bias corrected)	5.491023	
Theta hat	2.089454	
Theta star	8.104137	
nu hat	170.3794	
nu star	43.92818	
5% Approximate Chi Square Value	29.72581	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.333643	
Anderson-Darling 5% Critical Value	0.65704	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.283801	
Kolmogrov-Smirnov 5% Critical Value	0.394222	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	65.76118	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.526361	
Maximum of log data	4.110874	
Mean of log data	3.771828	
Standard Deviation of log data	0.246441	
Variance of log data	0.060733	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.939821	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	44.79942	
MLE Standard Deviation	11.21019	
MLE Coefficient of Variation	0.250231	
MLE Skewness	0.766361	
MLE Median	43.45946	
MLE 80% Quantile	53.52085	
MLE 90% Quantile	59.65067	
MLE 95% Quantile	65.18467	
MLE 99% Quantile	77.09595	
MVU Estimate of Median	43.13028	
MVU Estimate of Mean	44.45603	
MVU Estimate of Standard Deviation	10.90632	
MVU Estimate of SE of Mean	5.453	
95% H-UCL	68.29701	
95% Chebyshev (MVUE) UCL	68.22511	
97.5% Chebyshev (MVUE) UCL	78.51001	
99% Chebyshev (MVUE) UCL	98.7127	
Non-parametric Statisitics		
95% CLT UCL	54.05574	
95% Adjusted-CLT UCL	58.32979	
95% Modified-t UCL	58.83847	
95% Jackknife UCL	58.17181	
95% Chebyshev (Mean, Sd) UCL	69.82291	
97.5% Chebyshev (Mean, Sd) UCL	80.78016	
99% Chebyshev (Mean, Sd) UCL	102.3035	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	58.17181	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC06-f.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	66	
Maximum	1700	
Mean	859	
Standard Deviation	768.0564	
Variance	589910.7	
Coefficient of Variation	0.894129	
Skewness	0.095614	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.924121	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1762.758	
Gamma Statistics		
k hat	0.999012	
k star (bias corrected)	0.41642	
Theta hat	859.8498	
Theta star	2062.823	
nu hat	7.992094	
nu star	3.331357	
5% Approximate Chi Square Value	0.476783	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.31202	
Anderson-Darling 5% Critical Value	0.666625	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.279821	
Kolmogrov-Smirnov 5% Critical Value	0.40246	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	6001.962	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.189655	
Maximum of log data	7.438384	
Mean of log data	6.177915	
Standard Deviation of log data	1.482829	
Variance of log data	2.198781	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.904975	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1447.084	
MLE Standard Deviation	4096.556	
MLE Coefficient of Variation	2.830904	
MLE Skewness	31.17964	
MLE Median	481.9861	
MLE 80% Quantile	1687.335	
MLE 90% Quantile	3240.07	
MLE 95% Quantile	5525.718	
MLE 99% Quantile	15168.48	
MVU Estimate of Median	360.0171	
MVU Estimate of Mean	990.1231	
MVU Estimate of Standard Deviation	1282.837	
MVU Estimate of SE of Mean	627.5988	
95% H-UCL	1.18E+08	
95% Chebyshev (MVUE) UCL	3725.763	
97.5% Chebyshev (MVUE) UCL	4909.476	
99% Chebyshev (MVUE) UCL	7234.652	
Non-parametric Statisitics		
95% CLT UCL	1490.67	
95% Adjusted-CLT UCL	1510.287	
95% Modified-t UCL	1765.818	
95% Jackknife UCL	1762.758	
95% Chebyshev (Mean, Sd) UCL	2532.94	
97.5% Chebyshev (Mean, Sd) UCL	3257.255	
99% Chebyshev (Mean, Sd) UCL	4680.032	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1762.758	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC06-f.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.8	
Maximum	48	
Mean	18.675	
Standard Deviation	20.96209	
Variance	439.4092	
Coefficient of Variation	1.122468	
Skewness	1.2937	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.901086	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	43.3407	
Gamma Statistics		
k hat	0.751657	
k star (bias corrected)	0.354581	
Theta hat	24.84511	
Theta star	52.66782	
nu hat	6.013255	
nu star	2.836647	
5% Approximate Chi Square Value	0.325561	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.19228	
Anderson-Darling 5% Critical Value	0.670276	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.168921	
Kolmogrov-Smirnov 5% Critical Value	0.404973	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	162.717	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-0.223144	
Maximum of log data	3.871201	
Mean of log data	2.131004	
Standard Deviation of log data	1.758007	
Variance of log data	3.090589	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.960041	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	39.49993	
MLE Standard Deviation	180.9684	
MLE Coefficient of Variation	4.581487	
MLE Skewness	109.91	
MLE Median	8.423323	
MLE 80% Quantile	37.20787	
MLE 90% Quantile	80.64393	
MLE 95% Quantile	151.855	
MLE 99% Quantile	502.768	
MVU Estimate of Median	5.526181	
MVU Estimate of Mean	22.19986	
MVU Estimate of Standard Deviation	32.69209	
MVU Estimate of SE of Mean	15.76753	
95% H-UCL	3.07E+08	
95% Chebyshev (MVUE) UCL	90.92891	
97.5% Chebyshev (MVUE) UCL	120.668	
99% Chebyshev (MVUE) UCL	179.0848	
Non-parametric Statisitics		
95% CLT UCL	35.91478	
95% Adjusted-CLT UCL	43.15895	
95% Modified-t UCL	44.47065	
95% Jackknife UCL	43.3407	
95% Chebyshev (Mean, Sd) UCL	64.36081	
97.5% Chebyshev (Mean, Sd) UCL	84.1291	
99% Chebyshev (Mean, Sd) UCL	122.9601	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	43.3407	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC06-f.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	41	
Maximum	950	
Mean	500.25	
Standard Deviation	429.6048	
Variance	184560.3	
Coefficient of Variation	0.85878	
Skewness	-0.032673	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.919569	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1005.758	
Gamma Statistics		
k hat	1.060093	
k star (bias corrected)	0.43169	
Theta hat	471.8926	
Theta star	1158.818	
nu hat	8.480743	
nu star	3.453519	
5% Approximate Chi Square Value	0.518339	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.331465	
Anderson-Darling 5% Critical Value	0.6661	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.286688	
Kolmogrov-Smirnov 5% Critical Value	0.402094	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	3332.999	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.713572	
Maximum of log data	6.856462	
Mean of log data	5.674266	
Standard Deviation of log data	1.44042	
Variance of log data	2.074809	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.89123	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	821.9422	
MLE Standard Deviation	2168.903	
MLE Coefficient of Variation	2.638754	
MLE Skewness	26.28996	
MLE Median	291.2744	
MLE 80% Quantile	983.7978	
MLE 90% Quantile	1854.193	
MLE 95% Quantile	3114.289	
MLE 99% Quantile	8305.571	
MVU Estimate of Median	221.3966	
MVU Estimate of Mean	577.0774	
MVU Estimate of Standard Deviation	730.906	
MVU Estimate of SE of Mean	358.2461	
95% H-UCL	35561456	
95% Chebyshev (MVUE) UCL	2138.636	
97.5% Chebyshev (MVUE) UCL	2814.324	
99% Chebyshev (MVUE) UCL	4141.581	
Non-parametric Statisitics		
95% CLT UCL	853.5685	
95% Adjusted-CLT UCL	849.819	
95% Modified-t UCL	1005.173	
95% Jackknife UCL	1005.758	
95% Chebyshev (Mean, Sd) UCL	1436.552	
97.5% Chebyshev (Mean, Sd) UCL	1841.69	
99% Chebyshev (Mean, Sd) UCL	2637.507	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1005.758	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC06-f.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	22	
Maximum	620	
Mean	343	
Standard Deviation	306.5877	
Variance	93996	
Coefficient of Variation	0.893842	
Skewness	-0.118408	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.839026	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	703.7561	
Gamma Statistics		
k hat	0.928651	
k star (bias corrected)	0.39883	
Theta hat	369.3528	
Theta star	860.0165	
nu hat	7.429212	
nu star	3.190636	
5% Approximate Chi Square Value	0.430868	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.410417	
Anderson-Darling 5% Critical Value	0.667663	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.318518	
Kolmogrov-Smirnov 5% Critical Value	0.403175	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2539.965	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.091042	
Maximum of log data	6.429719	
Mean of log data	5.210632	
Standard Deviation of log data	1.572567	
Variance of log data	2.472966	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.866588	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	630.8794	
MLE Standard Deviation	2078.799	
MLE Coefficient of Variation	3.295082	
MLE Skewness	45.6618	
MLE Median	183.2098	
MLE 80% Quantile	691.9063	
MLE 90% Quantile	1382.128	
MLE 95% Quantile	2434.518	
MLE 99% Quantile	7104.06	
MVU Estimate of Median	131.6018	
MVU Estimate of Mean	407.1511	
MVU Estimate of Standard Deviation	551.9042	
MVU Estimate of SE of Mean	268.8636	
95% H-UCL	2.09E+08	
95% Chebyshev (MVUE) UCL	1579.1	
97.5% Chebyshev (MVUE) UCL	2086.204	
99% Chebyshev (MVUE) UCL	3082.31	
Non-parametric Statisitics		
95% CLT UCL	595.1459	
95% Adjusted-CLT UCL	585.4485	
95% Modified-t UCL	702.2435	
95% Jackknife UCL	703.7561	
95% Chebyshev (Mean, Sd) UCL	1011.192	
97.5% Chebyshev (Mean, Sd) UCL	1300.32	
99% Chebyshev (Mean, Sd) UCL	1868.254	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	703.7561	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC06-f.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	110	
Maximum	1800	
Mean	775	
Standard Deviation	747.8191	
Variance	559233.3	
Coefficient of Variation	0.964928	
Skewness	1.125954	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.921735	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1654.945	
Gamma Statistics		
k hat	1.236502	
k star (bias corrected)	0.475792	
Theta hat	626.7682	
Theta star	1628.863	
nu hat	9.892015	
nu star	3.806337	
5% Approximate Chi Square Value	0.646439	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.197595	
Anderson-Darling 5% Critical Value	0.664604	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.178378	
Kolmogrov-Smirnov 5% Critical Value	0.40105	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4563.322	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.70048	
Maximum of log data	7.495542	
Mean of log data	6.196839	
Standard Deviation of log data	1.201177	
Variance of log data	1.442825	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.987622	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1010.552	
MLE Standard Deviation	1816.925	
MLE Coefficient of Variation	1.797953	
MLE Skewness	11.20599	
MLE Median	491.1941	
MLE 80% Quantile	1355.375	
MLE 90% Quantile	2299.28	
MLE 95% Quantile	3543.162	
MLE 99% Quantile	8028.685	
MVU Estimate of Median	407.2772	
MVU Estimate of Mean	803.5869	
MVU Estimate of Standard Deviation	878.3515	
MVU Estimate of SE of Mean	434.3143	
95% H-UCL	1730435	
95% Chebyshev (MVUE) UCL	2696.719	
97.5% Chebyshev (MVUE) UCL	3515.879	
99% Chebyshev (MVUE) UCL	5124.96	
Non-parametric Statisitics		
95% CLT UCL	1390.026	
95% Adjusted-CLT UCL	1614.951	
95% Modified-t UCL	1690.029	
95% Jackknife UCL	1654.945	
95% Chebyshev (Mean, Sd) UCL	2404.834	
97.5% Chebyshev (Mean, Sd) UCL	3110.064	
99% Chebyshev (Mean, Sd) UCL	4495.353	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1654.945	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC06-f.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.31	
Maximum	8.2	
Mean	4.7775	
Standard Deviation	3.949602	
Variance	15.59936	
Coefficient of Variation	0.826709	
Skewness	-0.280641	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.855556	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	9.424924	
Gamma Statistics		
k hat	1.008252	
k star (bias corrected)	0.41873	
Theta hat	4.738401	
Theta star	11.40951	
nu hat	8.066012	
nu star	3.349836	
5% Approximate Chi Square Value	0.482971	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.430224	
Anderson-Darling 5% Critical Value	0.66654	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.312863	
Kolmogrov-Smirnov 5% Critical Value	0.402401	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	33.13625	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.171183	
Maximum of log data	2.104134	
Mean of log data	0.991976	
Standard Deviation of log data	1.538404	
Variance of log data	2.366688	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.838034	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	8.805002	
MLE Standard Deviation	27.36928	
MLE Coefficient of Variation	3.108379	
MLE Skewness	39.35835	
MLE Median	2.696558	
MLE 80% Quantile	9.893992	
MLE 90% Quantile	19.46904	
MLE 95% Quantile	33.87411	
MLE 99% Quantile	96.57351	
MVU Estimate of Median	1.966699	
MVU Estimate of Mean	5.814037	
MVU Estimate of Standard Deviation	7.750005	
MVU Estimate of SE of Mean	3.781745	
95% H-UCL	1692138	
95% Chebyshev (MVUE) UCL	22.29828	
97.5% Chebyshev (MVUE) UCL	29.43103	
99% Chebyshev (MVUE) UCL	43.44192	
Non-parametric Statisitics		
95% CLT UCL	8.025759	
95% Adjusted-CLT UCL	7.729668	
95% Modified-t UCL	9.37874	
95% Jackknife UCL	9.424924	
95% Chebyshev (Mean, Sd) UCL	13.38546	
97.5% Chebyshev (Mean, Sd) UCL	17.11013	
99% Chebyshev (Mean, Sd) UCL	24.42652	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	9.424924	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC06-f.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	5.3	
Maximum	64	
Mean	35.325	
Standard Deviation	26.5623	
Variance	705.5558	
Coefficient of Variation	0.751941	
Skewness	-0.095866	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.958149	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	66.58037	
Gamma Statistics		
k hat	1.545434	
k star (bias corrected)	0.553025	
Theta hat	22.85766	
Theta star	63.87595	
nu hat	12.36347	
nu star	4.424201	
5% Approximate Chi Square Value	0.895758	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.29972	
Anderson-Darling 5% Critical Value	0.662205	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.264782	
Kolmogrov-Smirnov 5% Critical Value	0.399346	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	174.4722	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.667707	
Maximum of log data	4.158883	
Mean of log data	3.207414	
Standard Deviation of log data	1.123389	
Variance of log data	1.262003	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.90361	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	46.4518	
MLE Standard Deviation	73.92243	
MLE Coefficient of Variation	1.591379	
MLE Skewness	8.804289	
MLE Median	24.71509	
MLE 80% Quantile	63.859	
MLE 90% Quantile	104.6863	
MLE 95% Quantile	156.8655	
MLE 99% Quantile	337.1124	
MVU Estimate of Median	20.99668	
MVU Estimate of Mean	38.18894	
MVU Estimate of Standard Deviation	39.45075	
MVU Estimate of SE of Mean	19.55053	
95% H-UCL	31558.33	
95% Chebyshev (MVUE) UCL	123.4077	
97.5% Chebyshev (MVUE) UCL	160.282	
99% Chebyshev (MVUE) UCL	232.7142	
Non-parametric Statisitics		
95% CLT UCL	57.17055	
95% Adjusted-CLT UCL	56.49033	
95% Modified-t UCL	66.47427	
95% Jackknife UCL	66.58037	
95% Chebyshev (Mean, Sd) UCL	93.21619	
97.5% Chebyshev (Mean, Sd) UCL	118.2658	
99% Chebyshev (Mean, Sd) UCL	167.4708	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	66.58037	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC06-f.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	200	
Maximum	4600	
Mean	1950	
Standard Deviation	1913.984	
Variance	3663333	
Coefficient of Variation	0.98153	
Skewness	1.17834	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	*Shapiro Wilk method yields a more accurate result*
Shapiro-Wilk Test Statisitic	0.926743	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	4202.149	
Gamma Statistics		
k hat	1.107064	
k star (bias corrected)	0.443433	
Theta hat	1761.416	
Theta star	4397.512	
nu hat	8.856509	
nu star	3.54746	
5% Approximate Chi Square Value	0.55131	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.191741	
Anderson-Darling 5% Critical Value	0.665702	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.169258	
Kolmogrov-Smirnov 5% Critical Value	0.401816	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	12547.47	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.298317	
Maximum of log data	8.433812	
Mean of log data	7.060197	
Standard Deviation of log data	1.329992	
Variance of log data	1.768879	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.971844	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2820.406	
MLE Standard Deviation	6220.437	
MLE Coefficient of Variation	2.205511	
MLE Skewness	17.34475	
MLE Median	1164.674	
MLE 80% Quantile	3583.302	
MLE 90% Quantile	6433.26	
MLE 95% Quantile	10384.13	
MLE 99% Quantile	25687.47	
MVU Estimate of Median	923.7056	
MVU Estimate of Mean	2106.38	
MVU Estimate of Standard Deviation	2503.455	
MVU Estimate of SE of Mean	1232.479	
95% H-UCL	25570202	
95% Chebyshev (MVUE) UCL	7478.633	
97.5% Chebyshev (MVUE) UCL	9803.211	
99% Chebyshev (MVUE) UCL	14369.39	
Non-parametric Statisitics		
95% CLT UCL	3524.111	
95% Adjusted-CLT UCL	4126.573	
95% Modified-t UCL	4296.121	
95% Jackknife UCL	4202.149	
95% Chebyshev (Mean, Sd) UCL	6121.431	
97.5% Chebyshev (Mean, Sd) UCL	7926.412	
99% Chebyshev (Mean, Sd) UCL	11471.95	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	*Not enough distinct data warning*
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	4202.149	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC07-f.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	61	
Maximum	440	
Mean	207.75	
Standard Deviation	162.8709	
Variance	26526.92	
Coefficient of Variation	0.783975	
Skewness	1.41239	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.885635	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	399.3971	
Gamma Statistics		
k hat	2.2711	
k star (bias corrected)	0.734442	
Theta hat	91.47548	
Theta star	282.8679	
nu hat	18.1688	
nu star	5.875534	
5% Approximate Chi Square Value	1.576108	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.266923	
Anderson-Darling 5% Critical Value	0.660241	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.244255	
Kolmogrov-Smirnov 5% Critical Value	0.397537	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	774.4659	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.110874	
Maximum of log data	6.086775	
Mean of log data	5.10031	
Standard Deviation of log data	0.810087	
Variance of log data	0.656241	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.979161	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	227.7914	
MLE Standard Deviation	219.3824	
MLE Coefficient of Variation	0.963085	
MLE Skewness	3.782546	
MLE Median	164.0728	
MLE 80% Quantile	325.3279	
MLE 90% Quantile	464.644	
MLE 95% Quantile	621.9768	
MLE 99% Quantile	1079.844	
MVU Estimate of Median	150.9412	
MVU Estimate of Mean	207.5374	
MVU Estimate of Standard Deviation	160.5478	
MVU Estimate of SE of Mean	80.04714	
95% H-UCL	7030.094	
95% Chebyshev (MVUE) UCL	556.4548	
97.5% Chebyshev (MVUE) UCL	707.4316	
99% Chebyshev (MVUE) UCL	1003.996	
Non-parametric Statisitics		
95% CLT UCL	341.6994	
95% Adjusted-CLT UCL	403.1489	
95% Modified-t UCL	408.982	
95% Jackknife UCL	399.3971	
95% Chebyshev (Mean, Sd) UCL	562.7188	
97.5% Chebyshev (Mean, Sd) UCL	716.3141	
99% Chebyshev (Mean, Sd) UCL	1018.022	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	399.3971	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC07-f.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	2.7	
Maximum	25	
Mean	10.575	
Standard Deviation	9.870284	
Variance	97.4225	
Coefficient of Variation	0.93336	
Skewness	1.688779	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.82476	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	22.18918	
Gamma Statistics		
k hat	1.74444	
k star (bias corrected)	0.602777	
Theta hat	6.062117	
Theta star	17.54381	
nu hat	13.95552	
nu star	4.822213	
5% Approximate Chi Square Value	1.070567	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.327444	
Anderson-Darling 5% Critical Value	0.66148	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.292673	
Kolmogrov-Smirnov 5% Critical Value	0.398713	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	47.63355	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	0.993252	
Maximum of log data	3.218876	
Mean of log data	2.045274	
Standard Deviation of log data	0.913793	
Variance of log data	0.835018	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.96784	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	11.73744	
MLE Standard Deviation	13.40771	
MLE Coefficient of Variation	1.142303	
MLE Skewness	4.91745	
MLE Median	7.73128	
MLE 80% Quantile	16.73379	
MLE 90% Quantile	25.01558	
MLE 95% Quantile	34.7599	
MLE 99% Quantile	64.76451	
MVU Estimate of Median	6.949206	
MVU Estimate of Mean	10.39005	
MVU Estimate of Standard Deviation	8.962205	
MVU Estimate of SE of Mean	4.461617	
95% H-UCL	901.4	
95% Chebyshev (MVUE) UCL	29.83779	
97.5% Chebyshev (MVUE) UCL	38.25284	
99% Chebyshev (MVUE) UCL	54.78258	
Non-parametric Statisitics		
95% CLT UCL	18.69259	
95% Adjusted-CLT UCL	23.14528	
95% Modified-t UCL	22.88371	
95% Jackknife UCL	22.18918	
95% Chebyshev (Mean, Sd) UCL	32.08678	
97.5% Chebyshev (Mean, Sd) UCL	41.39495	
99% Chebyshev (Mean, Sd) UCL	59.67904	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	22.18918	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC07-f.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	77	
Maximum	910	
Mean	401.75	
Standard Deviation	357.0326	
Variance	127472.3	
Coefficient of Variation	0.888693	
Skewness	1.391597	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.887267	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	821.8637	
Gamma Statistics		
k hat	1.614589	
k star (bias corrected)	0.570314	
Theta hat	248.825	
Theta star	704.4367	
nu hat	12.91671	
nu star	4.562511	
5% Approximate Chi Square Value	0.955352	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.25864	
Anderson-Darling 5% Critical Value	0.661953	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.225307	
Kolmogrov-Smirnov 5% Critical Value	0.399126	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1918.653	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.343805	
Maximum of log data	6.813445	
Mean of log data	5.655246	
Standard Deviation of log data	1.0152	
Variance of log data	1.03063	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.967644	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	478.4546	
MLE Standard Deviation	642.4189	
MLE Coefficient of Variation	1.342696	
MLE Skewness	6.448741	
MLE Median	285.7869	
MLE 80% Quantile	673.9055	
MLE 90% Quantile	1053.399	
MLE 95% Quantile	1518.153	
MLE 99% Quantile	3030.856	
MVU Estimate of Median	250.3663	
MVU Estimate of Mean	409.7765	
MVU Estimate of Standard Deviation	387.9126	
MVU Estimate of SE of Mean	192.7381	
95% H-UCL	99715.36	
95% Chebyshev (MVUE) UCL	1249.902	
97.5% Chebyshev (MVUE) UCL	1613.426	
99% Chebyshev (MVUE) UCL	2327.497	
Non-parametric Statisitics		
95% CLT UCL	695.3832	
95% Adjusted-CLT UCL	828.1048	
95% Modified-t UCL	842.5656	
95% Jackknife UCL	821.8637	
95% Chebyshev (Mean, Sd) UCL	1179.884	
97.5% Chebyshev (Mean, Sd) UCL	1516.584	
99% Chebyshev (Mean, Sd) UCL	2177.965	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	821.8637	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC07-f.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	36	
Maximum	570	
Mean	236.5	
Standard Deviation	231.7089	
Variance	53689	
Coefficient of Variation	0.979742	
Skewness	1.515767	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.866915	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	509.1476	
Gamma Statistics		
k hat	1.334699	
k star (bias corrected)	0.500341	
Theta hat	177.1936	
Theta star	472.6773	
nu hat	10.67759	
nu star	4.002731	
5% Approximate Chi Square Value	0.722484	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.256608	
Anderson-Darling 5% Critical Value	0.663772	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.22916	
Kolmogrov-Smirnov 5% Critical Value	0.400469	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1310.266	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.583519	
Maximum of log data	6.345636	
Mean of log data	5.046704	
Standard Deviation of log data	1.135718	
Variance of log data	1.289855	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.970381	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	296.3767	
MLE Standard Deviation	480.8486	
MLE Coefficient of Variation	1.622424	
MLE Skewness	9.137913	
MLE Median	155.509	
MLE 80% Quantile	406.013	
MLE 90% Quantile	669.2121	
MLE 95% Quantile	1007.23	
MLE 99% Quantile	2182.843	
MVU Estimate of Median	131.6212	
MVU Estimate of Mean	242.4284	
MVU Estimate of Standard Deviation	252.7725	
MVU Estimate of SE of Mean	125.2243	
95% H-UCL	232151.2	
95% Chebyshev (MVUE) UCL	788.2684	
97.5% Chebyshev (MVUE) UCL	1024.454	
99% Chebyshev (MVUE) UCL	1488.394	
Non-parametric Statisitics		
95% CLT UCL	427.0636	
95% Adjusted-CLT UCL	520.8836	
95% Modified-t UCL	523.7816	
95% Jackknife UCL	509.1476	
95% Chebyshev (Mean, Sd) UCL	741.4978	
97.5% Chebyshev (Mean, Sd) UCL	960.0107	
99% Chebyshev (Mean, Sd) UCL	1389.237	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	509.1476	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC07-f.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	270	
Maximum	2600	
Mean	1060	
Standard Deviation	1045.785	
Variance	1093667	
Coefficient of Variation	0.98659	
Skewness	1.777326	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.796198	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2290.556	
Gamma Statistics		
k hat	1.630524	
k star (bias corrected)	0.574298	
Theta hat	650.0978	
Theta star	1845.733	
nu hat	13.04419	
nu star	4.594381	
5% Approximate Chi Square Value	0.969262	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.375355	
Anderson-Darling 5% Critical Value	0.661895	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.320587	
Kolmogrov-Smirnov 5% Critical Value	0.399075	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	5024.484	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.598422	
Maximum of log data	7.863267	
Mean of log data	6.62905	
Standard Deviation of log data	0.933607	
Variance of log data	0.871622	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.952843	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1170.12	
MLE Standard Deviation	1379.94	
MLE Coefficient of Variation	1.179315	
MLE Skewness	5.17812	
MLE Median	756.7632	
MLE 80% Quantile	1665.612	
MLE 90% Quantile	2511.75	
MLE 95% Quantile	3515.136	
MLE 99% Quantile	6638.357	
MVU Estimate of Median	676.9652	
MVU Estimate of Mean	1029.536	
MVU Estimate of Standard Deviation	905.203	
MVU Estimate of SE of Mean	450.4786	
95% H-UCL	108310.2	
95% Chebyshev (MVUE) UCL	2993.127	
97.5% Chebyshev (MVUE) UCL	3842.774	
99% Chebyshev (MVUE) UCL	5511.742	
Non-parametric Statisitics		
95% CLT UCL	1920.082	
95% Adjusted-CLT UCL	2416.594	
95% Modified-t UCL	2368.002	
95% Jackknife UCL	2290.556	
95% Chebyshev (Mean, Sd) UCL	3339.236	
97.5% Chebyshev (Mean, Sd) UCL	4325.463	
99% Chebyshev (Mean, Sd) UCL	6262.716	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2290.556	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC07-f.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.41	
Maximum	3.7	
Mean	1.6425	
Standard Deviation	1.456763	
Variance	2.122158	
Coefficient of Variation	0.886918	
Skewness	1.371205	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.893455	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	3.356646	
Gamma Statistics		
k hat	1.749495	
k star (bias corrected)	0.60404	
Theta hat	0.938842	
Theta star	2.719189	
nu hat	13.99596	
nu star	4.832324	
5% Approximate Chi Square Value	1.075136	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.221442	
Anderson-Darling 5% Critical Value	0.661462	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.194075	
Kolmogrov-Smirnov 5% Critical Value	0.398697	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	7.382406	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-0.891598	
Maximum of log data	1.308333	
Mean of log data	0.183979	
Standard Deviation of log data	0.93362	
Variance of log data	0.871647	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.99855	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.85856	
MLE Standard Deviation	2.191876	
MLE Coefficient of Variation	1.179341	
MLE Skewness	5.178302	
MLE Median	1.20199	
MLE 80% Quantile	2.645574	
MLE 90% Quantile	3.989559	
MLE 95% Quantile	5.583323	
MLE 99% Quantile	10.54424	
MVU Estimate of Median	1.075241	
MVU Estimate of Mean	1.635258	
MVU Estimate of Standard Deviation	1.437792	
MVU Estimate of SE of Mean	0.715524	
95% H-UCL	172.0565	
95% Chebyshev (MVUE) UCL	4.754155	
97.5% Chebyshev (MVUE) UCL	6.103704	
99% Chebyshev (MVUE) UCL	8.754633	
Non-parametric Statisitics		
95% CLT UCL	2.840581	
95% Adjusted-CLT UCL	3.374176	
95% Modified-t UCL	3.439876	
95% Jackknife UCL	3.356646	
95% Chebyshev (Mean, Sd) UCL	4.817441	
97.5% Chebyshev (Mean, Sd) UCL	6.191241	
99% Chebyshev (Mean, Sd) UCL	8.889804	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	3.356646	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC07-f.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	30	
Maximum	72	
Mean	44.25	
Standard Deviation	18.87459	
Variance	356.25	
Coefficient of Variation	0.426544	
Skewness	1.761767	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.806861	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	66.45938	
Gamma Statistics		
k hat	8.692927	
k star (bias corrected)	2.339898	
Theta hat	5.090345	
Theta star	18.91108	
nu hat	69.54342	
nu star	18.71919	
5% Approximate Chi Square Value	9.911188	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.479171	
Anderson-Darling 5% Critical Value	0.657605	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.348779	
Kolmogrov-Smirnov 5% Critical Value	0.395181	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	83.57465	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.401197	
Maximum of log data	4.276666	
Mean of log data	3.731236	
Standard Deviation of log data	0.379833	
Variance of log data	0.144273	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.873991	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	44.8522	
MLE Standard Deviation	17.6697	
MLE Coefficient of Variation	0.393954	
MLE Skewness	1.243003	
MLE Median	41.73066	
MLE 80% Quantile	57.52358	
MLE 90% Quantile	67.98735	
MLE 95% Quantile	77.94953	
MLE 99% Quantile	100.9604	
MVU Estimate of Median	40.98214	
MVU Estimate of Mean	44.02532	
MVU Estimate of Standard Deviation	16.54494	
MVU Estimate of SE of Mean	8.271149	
95% H-UCL	102.8553	
95% Chebyshev (MVUE) UCL	80.07842	
97.5% Chebyshev (MVUE) UCL	95.67863	
99% Chebyshev (MVUE) UCL	126.3222	
Non-parametric Statisitics		
95% CLT UCL	59.77297	
95% Adjusted-CLT UCL	68.6557	
95% Modified-t UCL	67.84491	
95% Jackknife UCL	66.45938	
95% Chebyshev (Mean, Sd) UCL	85.38621	
97.5% Chebyshev (Mean, Sd) UCL	103.1859	
99% Chebyshev (Mean, Sd) UCL	138.1499	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	66.45938	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC07-f.xls	
Variable	Zinc	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	460	
Maximum	4800	
Mean	2115	
Standard Deviation	1884.914	
Variance	3552900	
Coefficient of Variation	0.891212	
Skewness	1.420795	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.891789	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	4332.943	
Gamma Statistics		
k hat	1.685987	
k star (bias corrected)	0.588164	
Theta hat	1254.458	
Theta star	3595.939	
nu hat	13.4879	
nu star	4.705308	
5% Approximate Chi Square Value	1.018184	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.222833	
Anderson-Darling 5% Critical Value	0.661693	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.200418	
Kolmogrov-Smirnov 5% Critical Value	0.398899	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	9773.998	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	6.131226	
Maximum of log data	8.476371	
Mean of log data	7.331832	
Standard Deviation of log data	0.970395	
Variance of log data	0.941667	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.993407	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2447.115	
MLE Standard Deviation	3060.609	
MLE Coefficient of Variation	1.250701	
MLE Skewness	5.708515	
MLE Median	1528.178	
MLE 80% Quantile	3469.673	
MLE 90% Quantile	5317.665	
MLE 95% Quantile	7541.165	
MLE 99% Quantile	14602.84	
MVU Estimate of Median	1354.545	
MVU Estimate of Mean	2127.955	
MVU Estimate of Standard Deviation	1936.153	
MVU Estimate of SE of Mean	962.8775	
95% H-UCL	323841.3	
95% Chebyshev (MVUE) UCL	6325.04	
97.5% Chebyshev (MVUE) UCL	8141.123	
99% Chebyshev (MVUE) UCL	11708.46	
Non-parametric Statisitics		
95% CLT UCL	3665.204	
95% Adjusted-CLT UCL	4380.594	
95% Modified-t UCL	4444.53	
95% Jackknife UCL	4332.943	
95% Chebyshev (Mean, Sd) UCL	6223.074	
97.5% Chebyshev (Mean, Sd) UCL	8000.641	
99% Chebyshev (Mean, Sd) UCL	11492.33	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	4332.943	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC08-f.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	10	
Maximum	1250	
Mean	352.5	
Standard Deviation	601.4635	
Variance	361758.3	
Coefficient of Variation	1.706279	
Skewness	1.939451	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.70374	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1060.231	
Gamma Statistics		
k hat	0.389715	
k star (bias corrected)	0.264095	
Theta hat	904.5079	
Theta star	1334.745	
nu hat	3.117717	
nu star	2.112763	
5% Approximate Chi Square Value	0.166799	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.446558	
Anderson-Darling 5% Critical Value	0.693714	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.305973	
Kolmogrov-Smirnov 5% Critical Value	0.414567	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	4464.949	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.302585	
Maximum of log data	7.130899	
Mean of log data	4.169428	
Standard Deviation of log data	2.333583	
Variance of log data	5.44561	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.865652	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	984.5973	
MLE Standard Deviation	14956.11	
MLE Coefficient of Variation	15.19008	
MLE Skewness	3550.508	
MLE Median	64.67844	
MLE 80% Quantile	464.6598	
MLE 90% Quantile	1297.354	
MLE 95% Quantile	3005.418	
MLE 99% Quantile	14725.59	
MVU Estimate of Median	28.81597	
MVU Estimate of Mean	305.7824	
MVU Estimate of Standard Deviation	546.2951	
MVU Estimate of SE of Mean	253.0794	
95% H-UCL	1.29E+15	
95% Chebyshev (MVUE) UCL	1408.93	
97.5% Chebyshev (MVUE) UCL	1886.263	
99% Chebyshev (MVUE) UCL	2823.891	
Non-parametric Statisitics		
95% CLT UCL	847.1597	
95% Adjusted-CLT UCL	1158.768	
95% Modified-t UCL	1108.836	
95% Jackknife UCL	1060.231	
95% Chebyshev (Mean, Sd) UCL	1663.359	
97.5% Chebyshev (Mean, Sd) UCL	2230.569	
99% Chebyshev (Mean, Sd) UCL	3344.743	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	4464.949	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC08-f.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.7	
Maximum	22.4	
Mean	6.8625	
Standard Deviation	10.44664	
Variance	109.1323	
Coefficient of Variation	1.522279	
Skewness	1.902717	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.723458	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	19.15487	
Gamma Statistics		
k hat	0.621163	
k star (bias corrected)	0.321958	
Theta hat	11.04782	
Theta star	21.31492	
nu hat	4.969307	
nu star	2.57566	
5% Approximate Chi Square Value	0.258544	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.46771	
Anderson-Darling 5% Critical Value	0.675768	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.295451	
Kolmogrov-Smirnov 5% Critical Value	0.407706	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	68.36548	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-0.356675	
Maximum of log data	3.109061	
Mean of log data	0.936409	
Standard Deviation of log data	1.633971	
Variance of log data	2.66986	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.873266	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	9.692373	
MLE Standard Deviation	35.53011	
MLE Coefficient of Variation	3.66578	
MLE Skewness	60.25788	
MLE Median	2.550806	
MLE 80% Quantile	10.14636	
MLE 90% Quantile	20.82307	
MLE 95% Quantile	37.49813	
MLE 99% Quantile	114.0943	
MVU Estimate of Median	1.780797	
MVU Estimate of Mean	5.991129	
MVU Estimate of Standard Deviation	8.359269	
MVU Estimate of SE of Mean	4.059534	
95% H-UCL	8765574	
95% Chebyshev (MVUE) UCL	23.68623	
97.5% Chebyshev (MVUE) UCL	31.34291	
99% Chebyshev (MVUE) UCL	46.38298	
Non-parametric Statisitics		
95% CLT UCL	15.4541	
95% Adjusted-CLT UCL	20.76381	
95% Modified-t UCL	19.98308	
95% Jackknife UCL	19.15487	
95% Chebyshev (Mean, Sd) UCL	29.63042	
97.5% Chebyshev (Mean, Sd) UCL	39.48212	
99% Chebyshev (Mean, Sd) UCL	58.83388	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	68.36548	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC08-f.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	1.45	
Maximum	1410	
Mean	385.7375	
Standard Deviation	685.5243	
Variance	469943.6	
Coefficient of Variation	1.777178	
Skewness	1.954247	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.694495	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1192.381	
Gamma Statistics		
k hat	0.258643	
k star (bias corrected)	0.231327	
Theta hat	1491.389	
Theta star	1667.496	
nu hat	2.069145	
nu star	1.850619	
5% Approximate Chi Square Value	0.133718	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.413062	
Anderson-Darling 5% Critical Value	0.715871	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.314587	
Kolmogrov-Smirnov 5% Critical Value	0.420684	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	5338.499	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	0.371564	
Maximum of log data	7.251345	
Mean of log data	3.223977	
Standard Deviation of log data	3.415711	
Variance of log data	11.66708	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.856752	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	8582.821	
MLE Standard Deviation	2931587	
MLE Coefficient of Variation	341.5645	
MLE Skewness	39850109	
MLE Median	25.12786	
MLE 80% Quantile	450.4526	
MLE 90% Quantile	2024.678	
MLE 95% Quantile	6924.504	
MLE 99% Quantile	70892.57	
MVU Estimate of Median	1.55003	
MVU Estimate of Mean	411.7886	
MVU Estimate of Standard Deviation	921.4483	
MVU Estimate of SE of Mean	387.0048	
95% H-UCL	7.29E+29	
95% Chebyshev (MVUE) UCL	2098.703	
97.5% Chebyshev (MVUE) UCL	2828.633	
99% Chebyshev (MVUE) UCL	4262.438	
Non-parametric Statisitics		
95% CLT UCL	949.5311	
95% Adjusted-CLT UCL	1307.399	
95% Modified-t UCL	1248.201	
95% Jackknife UCL	1192.381	
95% Chebyshev (Mean, Sd) UCL	1879.803	
97.5% Chebyshev (Mean, Sd) UCL	2526.286	
99% Chebyshev (Mean, Sd) UCL	3796.178	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	5338.499	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC08-f.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	4.9	
Maximum	676	
Mean	185.475	
Standard Deviation	327.901	
Variance	107519	
Coefficient of Variation	1.767898	
Skewness	1.968306	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.684061	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	571.31	
Gamma Statistics		
k hat	0.372346	
k star (bias corrected)	0.259753	
Theta hat	498.1251	
Theta star	714.0431	
nu hat	2.97877	
nu star	2.078026	
5% Approximate Chi Square Value	0.161543	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.474912	
Anderson-Darling 5% Critical Value	0.695731	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.297804	
Kolmogrov-Smirnov 5% Critical Value	0.415245	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	2385.871	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.589235	
Maximum of log data	6.516193	
Mean of log data	3.435054	
Standard Deviation of log data	2.351013	
Variance of log data	5.527263	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.866694	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	492.1021	
MLE Standard Deviation	7787.893	
MLE Coefficient of Variation	15.82577	
MLE Skewness	4011.117	
MLE Median	31.0331	
MLE 80% Quantile	226.2546	
MLE 90% Quantile	636.5777	
MLE 95% Quantile	1483.963	
MLE 99% Quantile	7357.764	
MVU Estimate of Median	13.6219	
MVU Estimate of Mean	149.4931	
MVU Estimate of Standard Deviation	268.3487	
MVU Estimate of SE of Mean	124.1427	
95% H-UCL	9.78E+14	
95% Chebyshev (MVUE) UCL	690.6188	
97.5% Chebyshev (MVUE) UCL	924.7643	
99% Chebyshev (MVUE) UCL	1384.698	
Non-parametric Statisitics		
95% CLT UCL	455.1495	
95% Adjusted-CLT UCL	627.5569	
95% Modified-t UCL	598.2021	
95% Jackknife UCL	571.31	
95% Chebyshev (Mean, Sd) UCL	900.1186	
97.5% Chebyshev (Mean, Sd) UCL	1209.345	
99% Chebyshev (Mean, Sd) UCL	1816.762	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	2385.871	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC08-f.xls	
Variable:	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	25	
Maximum	591	
Mean	205.25	
Standard Deviation	265.5314	
Variance	70506.92	
Coefficient of Variation	1.293697	
Skewness	1.658172	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.800915	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	517.6959	
Gamma Statistics		
k hat	0.791148	
k star (bias corrected)	0.364454	
Theta hat	259.4333	
Theta star	563.1719	
nu hat	6.32918	
nu star	2.915628	
5% Approximate Chi Square Value	0.347704	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.356377	
Anderson-Darling 5% Critical Value	0.669693	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.291954	
Kolmogrov-Smirnov 5% Critical Value	0.404572	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1721.099	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.218876	
Maximum of log data	6.381816	
Mean of log data	4.57296	
Standard Deviation of log data	1.467177	
Variance of log data	2.152608	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.920873	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	284.0822	
MLE Standard Deviation	783.5357	
MLE Coefficient of Variation	2.75813	
MLE Skewness	29.25626	
MLE Median	96.83026	
MLE 80% Quantile	334.5292	
MLE 90% Quantile	637.9641	
MLE 95% Quantile	1081.891	
MLE 99% Quantile	2938.379	
MVU Estimate of Median	72.79971	
MVU Estimate of Mean	196.2596	
MVU Estimate of Standard Deviation	252.1864	
MVU Estimate of SE of Mean	123.4627	
95% H-UCL	18289049	
95% Chebyshev (MVUE) UCL	734.4209	
97.5% Chebyshev (MVUE) UCL	967.2837	
99% Chebyshev (MVUE) UCL	1424.698	
Non-parametric Statisitics		
95% CLT UCL	423.6301	
95% Adjusted-CLT UCL	541.246	
95% Modified-t UCL	536.0416	
95% Jackknife UCL	517.6959	
95% Chebyshev (Mean, Sd) UCL	783.9622	
97.5% Chebyshev (Mean, Sd) UCL	1034.371	
99% Chebyshev (Mean, Sd) UCL	1526.252	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	517.6959	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC08-f.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	0.0125	
Maximum	14	
Mean	3.75625	
Standard Deviation	6.845014	
Variance	46.85422	
Coefficient of Variation	1.8223	
Skewness	1.972743	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.680164	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	11.81065	
Gamma Statistics		
k hat	0.248981	
k star (bias corrected)	0.228912	
Theta hat	15.08651	
Theta star	16.40916	
nu hat	1.991846	
nu star	1.831295	
5% Approximate Chi Square Value	0.131916	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.42267	
Anderson-Darling 5% Critical Value	0.718614	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.311536	
Kolmogrov-Smirnov 5% Critical Value	0.421294	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	52.14549	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-4.382027	
Maximum of log data	2.639057	
Mean of log data	-1.531249	
Standard Deviation of log data	3.463623	
Variance of log data	11.99668	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.858873	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	87.10304	
MLE Standard Deviation	35081.51	
MLE Coefficient of Variation	402.7587	
MLE Skewness	65334551	
MLE Median	0.216265	
MLE 80% Quantile	4.037041	
MLE 90% Quantile	18.53213	
MLE 95% Quantile	64.48355	
MLE 99% Quantile	682.0733	
MVU Estimate of Median	0.010204	
MVU Estimate of Mean	3.75552	
MVU Estimate of Standard Deviation	8.468132	
MVU Estimate of SE of Mean	3.540147	
95% H-UCL	3.99E+28	
95% Chebyshev (MVUE) UCL	19.18666	
97.5% Chebyshev (MVUE) UCL	25.86373	
99% Chebyshev (MVUE) UCL	38.97954	
Non-parametric Statisitics		
95% CLT UCL	9.385773	
95% Adjusted-CLT UCL	12.99293	
95% Modified-t UCL	12.3733	
95% Jackknife UCL	11.81065	
95% Chebyshev (Mean, Sd) UCL	18.67461	
97.5% Chebyshev (Mean, Sd) UCL	25.1298	
99% Chebyshev (Mean, Sd) UCL	37.80977	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	52.14549	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC08-f.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	1.45	
Maximum	66.9	
Mean	20.4625	
Standard Deviation	31.3534	
Variance	983.0356	
Coefficient of Variation	1.532237	
Skewness	1.856771	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.740715	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	57.35547	
Gamma Statistics		
k hat	0.544115	
k star (bias corrected)	0.302695	
Theta hat	37.60694	
Theta star	67.60096	
nu hat	4.352919	
nu star	2.421563	
5% Approximate Chi Square Value	0.223832	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.434376	
Anderson-Darling 5% Critical Value	0.679038	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.3077	
Kolmogrov-Smirnov 5% Critical Value	0.40933	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	221.3768	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	0.371564	
Maximum of log data	4.203199	
Mean of log data	1.866284	
Standard Deviation of log data	1.844997	
Variance of log data	3.404016	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.870664	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	35.45596	
MLE Standard Deviation	191.2147	
MLE Coefficient of Variation	5.39302	
MLE Skewness	173.0332	
MLE Median	6.464228	
MLE 80% Quantile	30.73206	
MLE 90% Quantile	69.20723	
MLE 95% Quantile	134.4651	
MLE 99% Quantile	472.3629	
MVU Estimate of Median	4.044192	
MVU Estimate of Mean	18.51786	
MVU Estimate of Standard Deviation	28.23291	
MVU Estimate of SE of Mean	13.54562	
95% H-UCL	1.37E+09	
95% Chebyshev (MVUE) UCL	77.56184	
97.5% Chebyshev (MVUE) UCL	103.1102	
99% Chebyshev (MVUE) UCL	153.2951	
Non-parametric Statisitics		
95% CLT UCL	46.24838	
95% Adjusted-CLT UCL	61.79955	
95% Modified-t UCL	59.78114	
95% Jackknife UCL	57.35547	
95% Chebyshev (Mean, Sd) UCL	88.79565	
97.5% Chebyshev (Mean, Sd) UCL	118.3635	
99% Chebyshev (Mean, Sd) UCL	176.4437	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	221.3768	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC08-f.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	43	
Maximum	2650	
Mean	859.25	
Standard Deviation	1229.851	
Variance	1512534	
Coefficient of Variation	1.431308	
Skewness	1.680837	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.791254	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2306.393	
Gamma Statistics		
k hat	0.535009	
k star (bias corrected)	0.300419	
Theta hat	1606.048	
Theta star	2860.173	
nu hat	4.280072	
nu star	2.403351	
5% Approximate Chi Square Value	0.219989	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.359423	
Anderson-Darling 5% Critical Value	0.679424	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.301909	
Kolmogrov-Smirnov 5% Critical Value	0.409522	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	9387.216	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.7612	
Maximum of log data	7.882315	
Mean of log data	5.581123	
Standard Deviation of log data	1.959234	
Variance of log data	3.838598	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.905034	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1808.805	
MLE Standard Deviation	12195.73	
MLE Coefficient of Variation	6.742425	
MLE Skewness	326.7399	
MLE Median	265.3694	
MLE 80% Quantile	1389.467	
MLE 90% Quantile	3290.315	
MLE 95% Quantile	6661.252	
MLE 99% Quantile	25293.46	
MVU Estimate of Median	155.1601	
MVU Estimate of Mean	850.6517	
MVU Estimate of Standard Deviation	1352.77	
MVU Estimate of SE of Mean	644.259	
95% H-UCL	6.42E+11	
95% Chebyshev (MVUE) UCL	3658.912	
97.5% Chebyshev (MVUE) UCL	4874.048	
99% Chebyshev (MVUE) UCL	7260.948	
Non-parametric Statisitics		
95% CLT UCL	1870.713	
95% Adjusted-CLT UCL	2422.916	
95% Modified-t UCL	2392.526	
95% Jackknife UCL	2306.393	
95% Chebyshev (Mean, Sd) UCL	3539.649	
97.5% Chebyshev (Mean, Sd) UCL	4699.459	
99% Chebyshev (Mean, Sd) UCL	6977.683	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2306.393	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC09-f.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	31	
Maximum	89	
Mean	48	
Standard Deviation	27.62849	
Variance	763.3333	
Coefficient of Variation	0.575593	
Skewness	1.87769	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.741211	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	80.50993	
Gamma Statistics		
k hat	5.067954	
k star (bias corrected)	1.433655	
Theta hat	9.471278	
Theta star	33.48085	
nu hat	40.54363	
nu star	11.46924	
5% Approximate Chi Square Value	4.878582	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.605446	
Anderson-Darling 5% Critical Value	0.659004	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.347748	
Kolmogrov-Smirnov 5% Critical Value	0.395877	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	112.845	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.433987	
Maximum of log data	4.488636	
Mean of log data	3.76931	
Standard Deviation of log data	0.492781	
Variance of log data	0.242833	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.797411	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	48.94641	
MLE Standard Deviation	25.66096	
MLE Coefficient of Variation	0.524266	
MLE Skewness	1.716897	
MLE Median	43.35013	
MLE 80% Quantile	65.74012	
MLE 90% Quantile	81.65743	
MLE 95% Quantile	97.50794	
MLE 99% Quantile	136.3899	
MVU Estimate of Median	42.04621	
MVU Estimate of Mean	47.40695	
MVU Estimate of Standard Deviation	22.94984	
MVU Estimate of SE of Mean	11.46989	
95% H-UCL	184.3331	
95% Chebyshev (MVUE) UCL	97.40305	
97.5% Chebyshev (MVUE) UCL	119.0364	
99% Chebyshev (MVUE) UCL	161.5309	
Non-parametric Statisitics		
95% CLT UCL	70.72241	
95% Adjusted-CLT UCL	84.58044	
95% Modified-t UCL	82.67151	
95% Jackknife UCL	80.50993	
95% Chebyshev (Mean, Sd) UCL	108.2149	
97.5% Chebyshev (Mean, Sd) UCL	134.2699	
99% Chebyshev (Mean, Sd) UCL	185.45	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	112.845	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC09-f.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.28	
Maximum	1.2	
Mean	0.5625	
Standard Deviation	0.428048	
Variance	0.183225	
Coefficient of Variation	0.760974	
Skewness	1.913528	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.738789	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	1.066176	
Gamma Statistics		
k hat	3.014608	
k star (bias corrected)	0.920319	
Theta hat	0.186591	
Theta star	0.611201	
nu hat	24.11687	
nu star	7.36255	
5% Approximate Chi Square Value	2.371043	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.588899	
Anderson-Darling 5% Critical Value	0.659402	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.391328	
Kolmogrov-Smirnov 5% Critical Value	0.396554	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	1.746672	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-1.272966	
Maximum of log data	0.182322	
Mean of log data	-0.750297	
Standard Deviation of log data	0.64032	
Variance of log data	0.410009	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.834508	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	0.579672	
MLE Standard Deviation	0.412681	
MLE Coefficient of Variation	0.711921	
MLE Skewness	2.496588	
MLE Median	0.472226	
MLE 80% Quantile	0.811211	
MLE 90% Quantile	1.075208	
MLE 95% Quantile	1.353954	
MLE 99% Quantile	2.094023	
MVU Estimate of Median	0.448394	
MVU Estimate of Mean	0.548256	
MVU Estimate of Standard Deviation	0.340853	
MVU Estimate of SE of Mean	0.170225	
95% H-UCL	5.105791	
95% Chebyshev (MVUE) UCL	1.290248	
97.5% Chebyshev (MVUE) UCL	1.611309	
99% Chebyshev (MVUE) UCL	2.24197	
Non-parametric Statisitics		
95% CLT UCL	0.914538	
95% Adjusted-CLT UCL	1.133338	
95% Modified-t UCL	1.100304	
95% Jackknife UCL	1.066176	
95% Chebyshev (Mean, Sd) UCL	1.495409	
97.5% Chebyshev (Mean, Sd) UCL	1.899079	
99% Chebyshev (Mean, Sd) UCL	2.692011	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	1.746672	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC10-f.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	9.5	
Maximum	67	
Mean	26.875	
Standard Deviation	27.2714	
Variance	743.7292	
Coefficient of Variation	1.01475	
Skewness	1.786375	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.766651	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	58.96475	
Gamma Statistics		
k hat	1.615289	
k star (bias corrected)	0.570489	
Theta hat	16.63789	
Theta star	47.10872	
nu hat	12.92231	
nu star	4.563911	
5% Approximate Chi Square Value	0.955962	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.480124	
Anderson-Darling 5% Critical Value	0.66195	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level.
Kolmogrov-Smirnov Test Statistic	0.287856	
Kolmogrov-Smirnov 5% Critical Value	0.399123	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	128.3055	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.251292	
Maximum of log data	4.204693	
Mean of log data	2.950773	
Standard Deviation of log data	0.911139	
Variance of log data	0.830175	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.863875	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	28.9584	
MLE Standard Deviation	32.93781	
MLE Coefficient of Variation	1.137418	
MLE Skewness	4.883755	
MLE Median	19.12073	
MLE 80% Quantile	41.2927	
MLE 90% Quantile	61.65702	
MLE 95% Quantile	85.59247	
MLE 99% Quantile	159.1876	
MVU Estimate of Median	17.1974	
MVU Estimate of Mean	25.65463	
MVU Estimate of Standard Deviation	22.07159	
MVU Estimate of SE of Mean	10.9883	
95% H-UCL	2169.651	
95% Chebyshev (MVUE) UCL	73.55151	
97.5% Chebyshev (MVUE) UCL	94.27652	
99% Chebyshev (MVUE) UCL	134.9868	
Non-parametric Statisitics		
95% CLT UCL	49.30373	
95% Adjusted-CLT UCL	62.31742	
95% Modified-t UCL	60.99463	
95% Jackknife UCL	58.96475	
95% Chebyshev (Mean, Sd) UCL	86.31163	
97.5% Chebyshev (Mean, Sd) UCL	112.0299	
99% Chebyshev (Mean, Sd) UCL	162.5485	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	58.96475	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC11-f.xls	
Variable	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	97	
Maximum	110	
Mean	100.75	
Standard Deviation	6.238322	
Variance	38.91667	
Coefficient of Variation	0.061919	
Skewness	1.869017	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.735883	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	108.0905	
Gamma Statistics		
k hat	360.7459	
k star (bias corrected)	90.35313	
Theta hat	0.279282	
Theta star	1.115069	
nu hat	2885.967	
nu star	722.8251	
5% Approximate Chi Square Value	661.4296	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.686216	
Anderson-Darling 5% Critical Value	0.65652	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.373339	
Kolmogrov-Smirnov 5% Critical Value	0.39399	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	APPROX GAMMA	Data follow approximate gamma distribution at 5% significance level
95% Approximate Gamma UCL	110.1019	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.574711	
Maximum of log data	4.70048	
Mean of log data	4.611256	
Standard Deviation of log data	0.060256	
Variance of log data	0.003631	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.74118	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	100.7932	
MLE Standard Deviation	6.078936	
MLE Coefficient of Variation	0.060311	
MLE Skewness	0.181152	
MLE Median	100.6104	
MLE 80% Quantile	105.8658	
MLE 90% Quantile	108.7101	
MLE 95% Quantile	111.094	
MLE 99% Quantile	115.7476	
MVU Estimate of Median	100.5647	
MVU Estimate of Mean	100.7474	
MVU Estimate of Standard Deviation	6.069008	
MVU Estimate of SE of Mean	3.034504	
95% H-UCL	N/A	
95% Chebyshev (MVUE) UCL	113.9745	
97.5% Chebyshev (MVUE) UCL	119.6979	
99% Chebyshev (MVUE) UCL	130.9404	
Non-parametric Statisitics		
95% CLT UCL	105.8806	
95% Adjusted-CLT UCL	108.9952	
95% Modified-t UCL	108.5763	
95% Jackknife UCL	108.0905	
95% Chebyshev (Mean, Sd) UCL	114.3461	
97.5% Chebyshev (Mean, Sd) UCL	120.2292	
99% Chebyshev (Mean, Sd) UCL	131.7853	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	GAMMA	
1st Recommended UCL	110.1019	95% Approximate Gamma UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC11-f.xls	
Variable:	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	4.2	
Maximum	7.2	
Mean	5.9	
Standard Deviation	1.249	
Variance	1.56	
Coefficient of Variation	0.211695	
Skewness	-0.91971	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.937951	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	7.369675	
Gamma Statistics		
k hat	27.07082	
k star (bias corrected)	6.934371	
Theta hat	0.217947	
Theta star	0.850834	
nu hat	216.5665	
nu star	55.47497	
5% Approximate Chi Square Value	39.35541	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.365317	
Anderson-Darling 5% Critical Value	0.656819	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.310298	
Kolmogrov-Smirnov 5% Critical Value	0.394141	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	8.316577	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.435085	
Maximum of log data	1.974081	
Mean of log data	1.756369	
Standard Deviation of log data	0.228417	
Variance of log data	0.052174	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.902733	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	5.944437	
MLE Standard Deviation	1.375717	
MLE Coefficient of Variation	0.231429	
MLE Skewness	0.706683	
MLE Median	5.791368	
MLE 80% Quantile	7.024339	
MLE 90% Quantile	7.767006	
MLE 95% Quantile	8.432682	
MLE 99% Quantile	9.851927	
MVU Estimate of Median	5.753672	
MVU Estimate of Mean	5.905346	
MVU Estimate of Standard Deviation	1.343643	
MVU Estimate of SE of Mean	0.671807	
95% H-UCL	8.685469	
95% Chebyshev (MVUE) UCL	8.833685	
97.5% Chebyshev (MVUE) UCL	10.10078	
99% Chebyshev (MVUE) UCL	12.58974	
Non-parametric Statisitics		
95% CLT UCL	6.927211	
95% Adjusted-CLT UCL	6.620355	
95% Modified-t UCL	7.321812	
95% Jackknife UCL	7.369675	
95% Chebyshev (Mean, Sd) UCL	8.622132	
97.5% Chebyshev (Mean, Sd) UCL	9.8	
99% Chebyshev (Mean, Sd) UCL	12.11369	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	7.369675	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC11-f.xls	
Variable:	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	215	
Maximum	340	
Mean	261.25	
Standard Deviation	54.52446	
Variance	2972.917	
Coefficient of Variation	0.208706	
Skewness	1.556363	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.859956	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	325.4079	
Gamma Statistics		
k hat	33.37312	
k star (bias corrected)	8.509947	
Theta hat	7.828156	
Theta star	30.69937	
nu hat	266.985	
nu star	68.07957	
5% Approximate Chi Square Value	50.08518	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.417104	
Anderson-Darling 5% Critical Value	0.656577	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.3271	
Kolmogrov-Smirnov 5% Critical Value	0.394053	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	355.1108	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.370638	
Maximum of log data	5.828946	
Mean of log data	5.550421	
Standard Deviation of log data	0.196304	
Variance of log data	0.038535	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.89573	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	262.3524	
MLE Standard Deviation	52.00105	
MLE Coefficient of Variation	0.198211	
MLE Skewness	0.602419	
MLE Median	257.3458	
MLE 80% Quantile	303.7782	
MLE 90% Quantile	331.1833	
MLE 95% Quantile	355.4346	
MLE 99% Quantile	406.2727	
MVU Estimate of Median	256.108	
MVU Estimate of Mean	261.0808	
MVU Estimate of Standard Deviation	51.10396	
MVU Estimate of SE of Mean	25.55168	
95% H-UCL	357.5129	
95% Chebyshev (MVUE) UCL	372.458	
97.5% Chebyshev (MVUE) UCL	420.651	
99% Chebyshev (MVUE) UCL	515.3168	
Non-parametric Statisitics		
95% CLT UCL	306.0924	
95% Adjusted-CLT UCL	328.7609	
95% Modified-t UCL	328.9438	
95% Jackknife UCL	325.4079	
95% Chebyshev (Mean, Sd) UCL	380.0833	
97.5% Chebyshev (Mean, Sd) UCL	431.5026	
99% Chebyshev (Mean, Sd) UCL	532.5058	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	325.4079	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC11-f.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	250	
Maximum	1200	
Mean	577.5	
Standard Deviation	424.2935	
Variance	180025	
Coefficient of Variation	0.734707	
Skewness	1.735818	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.813663	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1076.758	
Gamma Statistics		
k hat	3.011028	
k star (bias corrected)	0.919424	
Theta hat	191.795	
Theta star	628.1109	
nu hat	24.08822	
nu star	7.355389	
5% Approximate Chi Square Value	2.367031	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.396842	
Anderson-Darling 5% Critical Value	0.659404	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.322842	
Kolmogrov-Smirnov 5% Critical Value	0.396556	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1794.542	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.521461	
Maximum of log data	7.090077	
Mean of log data	6.183557	
Standard Deviation of log data	0.658227	
Variance of log data	0.433262	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.933277	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	601.9585	
MLE Standard Deviation	443.2806	
MLE Coefficient of Variation	0.736397	
MLE Skewness	2.608526	
MLE Median	484.7131	
MLE 80% Quantile	845.3568	
MLE 90% Quantile	1129.329	
MLE 95% Quantile	1431.303	
MLE 99% Quantile	2240.81	
MVU Estimate of Median	458.8853	
MVU Estimate of Mean	567.395	
MVU Estimate of Standard Deviation	362.0365	
MVU Estimate of SE of Mean	180.7802	
95% H-UCL	5967.76	
95% Chebyshev (MVUE) UCL	1355.398	
97.5% Chebyshev (MVUE) UCL	1696.367	
99% Chebyshev (MVUE) UCL	2366.135	
Non-parametric Statisitics		
95% CLT UCL	926.4504	
95% Adjusted-CLT UCL	1123.19	
95% Modified-t UCL	1107.446	
95% Jackknife UCL	1076.758	
95% Chebyshev (Mean, Sd) UCL	1502.226	
97.5% Chebyshev (Mean, Sd) UCL	1902.356	
99% Chebyshev (Mean, Sd) UCL	2688.334	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1076.758	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC11-f.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	440	
Maximum	630	
Mean	518.75	
Standard Deviation	81.8917	
Variance	6706.25	
Coefficient of Variation	0.157864	
Skewness	1.008253	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.948151	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	615.1105	
Gamma Statistics		
k hat	55.70726	
k star (bias corrected)	14.09348	
Theta hat	9.312072	
Theta star	36.8078	
nu hat	445.6581	
nu star	112.7479	
5% Approximate Chi Square Value	89.23143	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.255556	
Anderson-Darling 5% Critical Value	0.656006	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.200934	
Kolmogrov-Smirnov 5% Critical Value	0.393839	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	655.4635	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	6.086775	
Maximum of log data	6.44572	
Mean of log data	6.24242	
Standard Deviation of log data	0.153522	
Variance of log data	0.023569	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.968565	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	520.1953	
MLE Standard Deviation	80.33427	
MLE Coefficient of Variation	0.154431	
MLE Skewness	0.466976	
MLE Median	514.101	
MLE 80% Quantile	585.3124	
MLE 90% Quantile	626.216	
MLE 95% Quantile	661.8	
MLE 99% Quantile	734.7364	
MVU Estimate of Median	512.5877	
MVU Estimate of Mean	518.6569	
MVU Estimate of Standard Deviation	79.48493	
MVU Estimate of SE of Mean	39.74229	
95% H-UCL	652.8521	
95% Chebyshev (MVUE) UCL	691.8895	
97.5% Chebyshev (MVUE) UCL	766.8474	
99% Chebyshev (MVUE) UCL	914.0876	
Non-parametric Statisitics		
95% CLT UCL	586.0999	
95% Adjusted-CLT UCL	608.1561	
95% Modified-t UCL	618.5508	
95% Jackknife UCL	615.1105	
95% Chebyshev (Mean, Sd) UCL	697.2288	
97.5% Chebyshev (Mean, Sd) UCL	774.4567	
99% Chebyshev (Mean, Sd) UCL	926.156	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	615.1105	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC11-f.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	1.7	
Maximum	2.2	
Mean	1.85	
Standard Deviation	0.238048	
Variance	0.056667	
Coefficient of Variation	0.128674	
Skewness	1.779179	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.763921	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.130106	
Gamma Statistics		
k hat	86.21735	
k star (bias corrected)	21.721	
Theta hat	0.021457	
Theta star	0.085171	
nu hat	689.7388	
nu star	173.768	
5% Approximate Chi Square Value	144.2766	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.611537	
Anderson-Darling 5% Critical Value	0.65636	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.335998	
Kolmogrov-Smirnov 5% Critical Value	0.393943	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.228156	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	0.530628	
Maximum of log data	0.788457	
Mean of log data	0.609375	
Standard Deviation of log data	0.122391	
Variance of log data	0.01498	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.7762	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.853109	
MLE Standard Deviation	0.227656	
MLE Coefficient of Variation	0.122851	
MLE Skewness	0.370406	
MLE Median	1.839282	
MLE 80% Quantile	2.039685	
MLE 90% Quantile	2.152538	
MLE 95% Quantile	2.249501	
MLE 99% Quantile	2.445028	
MVU Estimate of Median	1.83584	
MVU Estimate of Mean	1.849631	
MVU Estimate of Standard Deviation	0.226124	
MVU Estimate of SE of Mean	0.113062	
95% H-UCL	2.204662	
95% Chebyshev (MVUE) UCL	2.342457	
97.5% Chebyshev (MVUE) UCL	2.555703	
99% Chebyshev (MVUE) UCL	2.974583	
Non-parametric Statisitics		
95% CLT UCL	2.045777	
95% Adjusted-CLT UCL	2.158914	
95% Modified-t UCL	2.147753	
95% Jackknife UCL	2.130106	
95% Chebyshev (Mean, Sd) UCL	2.368813	
97.5% Chebyshev (Mean, Sd) UCL	2.593303	
99% Chebyshev (Mean, Sd) UCL	3.034272	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.130106	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC11-f.xls	
Variable	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	47.5	
Maximum	71	
Mean	58.125	
Standard Deviation	9.715752	
Variance	94.39583	
Coefficient of Variation	0.167153	
Skewness	0.672515	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.959583	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	69.55735	
Gamma Statistics		
k hat	48.73434	
k star (bias corrected)	12.35025	
Theta hat	1.192691	
Theta star	4.706382	
nu hat	389.8747	
nu star	98.80201	
5% Approximate Chi Square Value	76.86732	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.263462	
Anderson-Darling 5% Critical Value	0.655989	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level.
Kolmogrov-Smirnov Test Statistic	0.236934	
Kolmogrov-Smirnov 5% Critical Value	0.393838	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	74.71143	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.86073	
Maximum of log data	4.26268	
Mean of log data	4.052301	
Standard Deviation of log data	0.165077	
Variance of log data	0.02725	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973478	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	58.3189	
MLE Standard Deviation	9.693078	
MLE Coefficient of Variation	0.166208	
MLE Skewness	0.503216	
MLE Median	57.52968	
MLE 80% Quantile	66.14116	
MLE 90% Quantile	71.12403	
MLE 95% Quantile	75.47889	
MLE 99% Quantile	84.45936	
MVU Estimate of Median	57.33392	
MVU Estimate of Mean	58.11938	
MVU Estimate of Standard Deviation	9.574648	
MVU Estimate of SE of Mean	4.787296	
95% H-UCL	74.75579	
95% Chebyshev (MVUE) UCL	78.98672	
97.5% Chebyshev (MVUE) UCL	88.01603	
99% Chebyshev (MVUE) UCL	105.7524	
Non-parametric Statisitics		
95% CLT UCL	66.11549	
95% Adjusted-CLT UCL	67.86091	
95% Modified-t UCL	69.8296	
95% Jackknife UCL	69.55735	
95% Chebyshev (Mean, Sd) UCL	79.29999	
97.5% Chebyshev (Mean, Sd) UCL	88.46243	
99% Chebyshev (Mean, Sd) UCL	106.4603	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	69.55735	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC12-f.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	100	
Maximum	130	
Mean	112.5	
Standard Deviation	15	
Variance	225	
Coefficient of Variation	0.133333	
Skewness	0.37037	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.851201	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	130.1502	
Gamma Statistics		
k hat	75.79118	
k star (bias corrected)	19.11446	
Theta hat	1.484342	
Theta star	5.885596	
nu hat	606.3295	
nu star	152.9157	
5% Approximate Chi Square Value	125.326	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.476766	
Anderson-Darling 5% Critical Value	0.656239	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.333225	
Kolmogrov-Smirnov 5% Critical Value	0.393908	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	137.2661	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.60517	
Maximum of log data	4.867534	
Mean of log data	4.716342	
Standard Deviation of log data	0.132464	
Variance of log data	0.017547	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.844742	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	112.7435	
MLE Standard Deviation	15.00015	
MLE Coefficient of Variation	0.133047	
MLE Skewness	0.401495	
MLE Median	111.7587	
MLE 80% Quantile	124.995	
MLE 90% Quantile	132.4966	
MLE 95% Quantile	138.9681	
MLE 99% Quantile	152.0869	
MVU Estimate of Median	111.5137	
MVU Estimate of Mean	112.4955	
MVU Estimate of Standard Deviation	14.88199	
MVU Estimate of SE of Mean	7.440976	
95% H-UCL	136.3981	
95% Chebyshev (MVUE) UCL	144.9299	
97.5% Chebyshev (MVUE) UCL	158.9644	
99% Chebyshev (MVUE) UCL	186.5323	
Non-parametric Statisitics		
95% CLT UCL	124.8364	
95% Adjusted-CLT UCL	126.3205	
95% Modified-t UCL	130.3817	
95% Jackknife UCL	130.1502	
95% Chebyshev (Mean, Sd) UCL	145.1917	
97.5% Chebyshev (Mean, Sd) UCL	159.3375	
99% Chebyshev (Mean, Sd) UCL	187.1241	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	130.1502	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC12-f.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	9.3	
Maximum	11	
Mean	10.325	
Standard Deviation	0.830161	
Variance	0.689167	
Coefficient of Variation	0.080403	
Skewness	-0.578114	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.863234	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	11.30183	
Gamma Statistics		
k hat	202.5441	
k star (bias corrected)	50.8027	
Theta hat	0.050977	
Theta star	0.203237	
nu hat	1620.353	
nu star	406.4216	
5% Approximate Chi Square Value	360.681	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.434322	
Anderson-Darling 5% Critical Value	0.65652	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.324892	
Kolmogrov-Smirnov 5% Critical Value	0.39399	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	11.63439	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	2.230014	
Maximum of log data	2.397895	
Mean of log data	2.332098	
Standard Deviation of log data	0.081549	
Variance of log data	0.00665	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.864792	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	10.33383	
MLE Standard Deviation	0.844114	
MLE Coefficient of Variation	0.081685	
MLE Skewness	0.245599	
MLE Median	10.29952	
MLE 80% Quantile	11.03427	
MLE 90% Quantile	11.43739	
MLE 95% Quantile	11.77814	
MLE 99% Quantile	12.45074	
MVU Estimate of Median	10.29096	
MVU Estimate of Mean	10.32523	
MVU Estimate of Standard Deviation	0.841591	
MVU Estimate of SE of Mean	0.420795	
95% H-UCL	N/A	
95% Chebyshev (MVUE) UCL	12.15943	
97.5% Chebyshev (MVUE) UCL	12.95309	
99% Chebyshev (MVUE) UCL	14.51209	
Non-parametric Statisitics		
95% CLT UCL	11.00775	
95% Adjusted-CLT UCL	10.87954	
95% Modified-t UCL	11.28184	
95% Jackknife UCL	11.30183	
95% Chebyshev (Mean, Sd) UCL	12.13429	
97.5% Chebyshev (Mean, Sd) UCL	12.91718	
99% Chebyshev (Mean, Sd) UCL	14.455	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	11.30183	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC12-f.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	3	
Minimum	370	
Maximum	460	
Mean	397.5	
Standard Deviation	41.93249	
Variance	1758.333	
Coefficient of Variation	0.105491	
Skewness	1.922522	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.725152	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NOT NORMAL	Data not normal at 5% significance level
95% Student's-t UCL	446.8412	
Gamma Statistics		
k hat	127.4922	
k star (bias corrected)	32.03973	
Theta hat	3.117837	
Theta star	12.40647	
nu hat	1019.938	
nu star	256.3178	
5% Approximate Chi Square Value	220.2398	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.737209	
Anderson-Darling 5% Critical Value	0.65652	
Anderson-Darling 5% Gamma Test Result	NOT AD GAMMA	Data not gamma distributed at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.432589	
Kolmogrov-Smirnov 5% Critical Value	0.39399	
Kolmogrov-Smirnov 5% Gamma Test Result	NOT KS GAMMA	Data not gamma distributed at 5% significance level
5% Gamma Test Result	NOT GAMMA	Data not gamma distributed at 5% significance level
95% Approximate Gamma UCL	462.6154	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.913503	
Maximum of log data	6.131226	
Mean of log data	5.981268	
Standard Deviation of log data	0.10076	
Variance of log data	0.010153	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.734991	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	NOT LOGNORMAL	Data not lognormal at 5% significance level
MLE Mean	397.9571	
MLE Standard Deviation	40.20001	
MLE Coefficient of Variation	0.101016	
MLE Skewness	0.304079	
MLE Median	395.9421	
MLE 80% Quantile	431.1301	
MLE 90% Quantile	450.674	
MLE 95% Quantile	467.3216	
MLE 99% Quantile	500.5137	
MVU Estimate of Median	395.4398	
MVU Estimate of Mean	397.4513	
MVU Estimate of Standard Deviation	40.0166	
MVU Estimate of SE of Mean	20.00829	
95% H-UCL	457.4406	
95% Chebyshev (MVUE) UCL	484.6653	
97.5% Chebyshev (MVUE) UCL	522.403	
99% Chebyshev (MVUE) UCL	596.5312	
Non-parametric Statisitics		
95% CLT UCL	431.9864	
95% Adjusted-CLT UCL	453.5213	
95% Modified-t UCL	450.2002	
95% Jackknife UCL	446.8412	
95% Chebyshev (Mean, Sd) UCL	488.8897	
97.5% Chebyshev (Mean, Sd) UCL	528.4341	
99% Chebyshev (Mean, Sd) UCL	606.1115	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	Users must select one of the recommended UCLS
Appropriate Distribution	NON-PARAMETRIC	
1st Recommended UCL	446.8412	95% Student's-t UCL
2nd Recommended UCL	450.2002	95% Modified-t UCL
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC12-f.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	520	
Maximum	1300	
Mean	955	
Standard Deviation	361.6167	
Variance	130766.7	
Coefficient of Variation	0.378656	
Skewness	-0.42671	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.92716	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	1380.508	
Gamma Statistics		
k hat	8.220863	
k star (bias corrected)	2.221882	
Theta hat	116.1678	
Theta star	429.8157	
nu hat	65.76691	
nu star	17.77506	
5% Approximate Chi Square Value	9.22714	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.330166	
Anderson-Darling 5% Critical Value	0.657787	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.286684	
Kolmogrov-Smirnov 5% Critical Value	0.395272	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1839.701	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	6.253829	
Maximum of log data	7.17012	
Mean of log data	6.799659	
Standard Deviation of log data	0.421406	
Variance of log data	0.177583	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.913647	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	980.8808	
MLE Standard Deviation	432.3978	
MLE Coefficient of Variation	0.440826	
MLE Skewness	1.408143	
MLE Median	897.5414	
MLE 80% Quantile	1281.45	
MLE 90% Quantile	1542.51	
MLE 95% Quantile	1795.202	
MLE 99% Quantile	2391.917	
MVU Estimate of Median	877.7501	
MVU Estimate of Mean	958.5176	
MVU Estimate of Standard Deviation	398.677	
MVU Estimate of SE of Mean	199.2908	
95% H-UCL	2656.342	
95% Chebyshev (MVUE) UCL	1827.206	
97.5% Chebyshev (MVUE) UCL	2203.088	
99% Chebyshev (MVUE) UCL	2941.436	
Non-parametric Statisitics		
95% CLT UCL	1252.403	
95% Adjusted-CLT UCL	1211.184	
95% Modified-t UCL	1374.078	
95% Jackknife UCL	1380.508	
95% Chebyshev (Mean, Sd) UCL	1743.125	
97.5% Chebyshev (Mean, Sd) UCL	2084.148	
99% Chebyshev (Mean, Sd) UCL	2754.021	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	1380.508	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC12-f.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	470	
Maximum	960	
Mean	642.5	
Standard Deviation	224.258	
Variance	50291.67	
Coefficient of Variation	0.34904	
Skewness	1.417433	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.859973	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	906.3803	
Gamma Statistics		
k hat	12.2325	
k star (bias corrected)	3.224792	
Theta hat	52.524	
Theta star	199.2376	
nu hat	97.86002	
nu star	25.79834	
5% Approximate Chi Square Value	15.22235	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.384657	
Anderson-Darling 5% Critical Value	0.657098	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.271711	
Kolmogrov-Smirnov 5% Critical Value	0.394776	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1088.888	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	6.152733	
Maximum of log data	6.866933	
Mean of log data	6.423936	
Standard Deviation of log data	0.32405	
Variance of log data	0.105008	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.899084	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	649.6538	
MLE Standard Deviation	216.1696	
MLE Coefficient of Variation	0.332746	
MLE Skewness	1.035079	
MLE Median	616.4243	
MLE 80% Quantile	810.5861	
MLE 90% Quantile	934.8064	
MLE 95% Quantile	1050.475	
MLE 99% Quantile	1309.86	
MVU Estimate of Median	608.3649	
MVU Estimate of Mean	640.9863	
MVU Estimate of Standard Deviation	206.0994	
MVU Estimate of SE of Mean	103.0409	
95% H-UCL	1228.054	
95% Chebyshev (MVUE) UCL	1090.131	
97.5% Chebyshev (MVUE) UCL	1284.477	
99% Chebyshev (MVUE) UCL	1666.23	
Non-parametric Statisitics		
95% CLT UCL	826.9358	
95% Adjusted-CLT UCL	911.8482	
95% Modified-t UCL	919.6249	
95% Jackknife UCL	906.3803	
95% Chebyshev (Mean, Sd) UCL	1131.259	
97.5% Chebyshev (Mean, Sd) UCL	1342.745	
99% Chebyshev (Mean, Sd) UCL	1758.17	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	906.3803	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC12-f.xls	
Variable:	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	2.4	
Maximum	2.7	
Mean	2.55	
Standard Deviation	0.129099	
Variance	0.016667	
Coefficient of Variation	0.050627	
Skewness	1.03E-14	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.993956	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.701909	
Gamma Statistics		
k hat	519.546	
k star (bias corrected)	130.0532	
Theta hat	0.004908	
Theta star	0.019607	
nu hat	4156.368	
nu star	1040.425	
5% Approximate Chi Square Value	966.5318	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.200882	
Anderson-Darling 5% Critical Value	0.65652	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.176756	
Kolmogrov-Smirnov 5% Critical Value	0.39399	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.744954	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	0.875469	
Maximum of log data	0.993252	
Mean of log data	0.935131	
Standard Deviation of log data	0.050688	
Variance of log data	0.002569	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.9937	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	2.550821	
MLE Standard Deviation	0.12938	
MLE Coefficient of Variation	0.050721	
MLE Skewness	0.152293	
MLE Median	2.547546	
MLE 80% Quantile	2.659032	
MLE 90% Quantile	2.719003	
MLE 95% Quantile	2.769074	
MLE 99% Quantile	2.866328	
MVU Estimate of Median	2.546728	
MVU Estimate of Mean	2.550002	
MVU Estimate of Standard Deviation	0.12923	
MVU Estimate of SE of Mean	0.064615	
95% H-UCL	N/A	
95% Chebyshev (MVUE) UCL	2.831653	
97.5% Chebyshev (MVUE) UCL	2.953524	
99% Chebyshev (MVUE) UCL	3.192915	
Non-parametric Statisitics		
95% CLT UCL	2.656175	
95% Adjusted-CLT UCL	2.656175	
95% Modified-t UCL	2.701909	
95% Jackknife UCL	2.701909	
95% Chebyshev (Mean, Sd) UCL	2.831366	
97.5% Chebyshev (Mean, Sd) UCL	2.953113	
99% Chebyshev (Mean, Sd) UCL	3.192262	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.701909	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC12-f.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	64	
Maximum	86	
Mean	71.25	
Standard Deviation	9.979145	
Variance	99.58333	
Coefficient of Variation	0.140058	
Skewness	1.82263	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.782142	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	82.99228	
Gamma Statistics		
k hat	73.29625	
k star (bias corrected)	18.49073	
Theta hat	0.972083	
Theta star	3.853283	
nu hat	586.37	
nu star	147.9258	
5% Approximate Chi Square Value	120.8102	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.59567	
Anderson-Darling 5% Critical Value	0.65621	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.389649	
Kolmogrov-Smirnov 5% Critical Value	0.393899	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	87.24193	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.158883	
Maximum of log data	4.454347	
Mean of log data	4.259358	
Standard Deviation of log data	0.13253	
Variance of log data	0.017564	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.801663	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	71.38871	
MLE Standard Deviation	9.502823	
MLE Coefficient of Variation	0.133114	
MLE Skewness	0.4017	
MLE Median	70.76452	
MLE 80% Quantile	79.15004	
MLE 90% Quantile	83.90275	
MLE 95% Quantile	88.00284	
MLE 99% Quantile	96.31478	
MVU Estimate of Median	70.60925	
MVU Estimate of Mean	71.23153	
MVU Estimate of Standard Deviation	9.42789	
MVU Estimate of SE of Mean	4.713933	
95% H-UCL	86.37637	
95% Chebyshev (MVUE) UCL	91.77909	
97.5% Chebyshev (MVUE) UCL	100.67	
99% Chebyshev (MVUE) UCL	118.1346	
Non-parametric Statisitics		
95% CLT UCL	79.45712	
95% Adjusted-CLT UCL	84.31573	
95% Modified-t UCL	83.75012	
95% Jackknife UCL	82.99228	
95% Chebyshev (Mean, Sd) UCL	92.99904	
97.5% Chebyshev (Mean, Sd) UCL	102.4099	
99% Chebyshev (Mean, Sd) UCL	120.8956	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	82.99228	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC13-f.xls	
Variable:	Arsenic	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	45	
Maximum	120	
Mean	78.25	
Standard Deviation	33.34042	
Variance	1111.583	
Coefficient of Variation	0.426076	
Skewness	0.541848	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.959676	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	117.4811	
Gamma Statistics		
k hat	7.323236	
k star (bias corrected)	1.997476	
Theta hat	10.68517	
Theta star	39.17444	
nu hat	58.58589	
nu star	15.97981	
5% Approximate Chi Square Value	7.946674	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.238104	
Anderson-Darling 5% Critical Value	0.658133	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.226932	
Kolmogrov-Smirnov 5% Critical Value	0.395444	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	157.3513	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.806662	
Maximum of log data	4.787492	
Mean of log data	4.290082	
Standard Deviation of log data	0.434246	
Variance of log data	0.18857	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.975765	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	80.18745	
MLE Standard Deviation	36.52902	
MLE Coefficient of Variation	0.455545	
MLE Skewness	1.461172	
MLE Median	72.97245	
MLE 80% Quantile	105.3218	
MLE 90% Quantile	127.4965	
MLE 95% Quantile	149.0702	
MLE 99% Quantile	200.3647	
MVU Estimate of Median	71.26452	
MVU Estimate of Mean	78.24319	
MVU Estimate of Standard Deviation	33.50874	
MVU Estimate of SE of Mean	16.74987	
95% H-UCL	229.4099	
95% Chebyshev (MVUE) UCL	151.2542	
97.5% Chebyshev (MVUE) UCL	182.8461	
99% Chebyshev (MVUE) UCL	244.9023	
Non-parametric Statisitics		
95% CLT UCL	105.6701	
95% Adjusted-CLT UCL	110.4959	
95% Modified-t UCL	118.2338	
95% Jackknife UCL	117.4811	
95% Chebyshev (Mean, Sd) UCL	150.9138	
97.5% Chebyshev (Mean, Sd) UCL	182.3554	
99% Chebyshev (Mean, Sd) UCL	244.1165	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	117.4811	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC13-f.xls	
Variable	Cadmium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	3.95	
Maximum	12	
Mean	7.1625	
Standard Deviation	3.805561	
Variance	14.48229	
Coefficient of Variation	0.531317	
Skewness	0.707523	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.890341	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	11.64043	
Gamma Statistics		
k hat	4.811944	
k star (bias corrected)	1.369653	
Theta hat	1.488484	
Theta star	5.229428	
nu hat	38.49555	
nu star	10.95722	
5% Approximate Chi Square Value	4.547594	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.384393	
Anderson-Darling 5% Critical Value	0.659002	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.30877	
Kolmogrov-Smirnov 5% Critical Value	0.395941	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	17.25772	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	1.373716	
Maximum of log data	2.484907	
Mean of log data	1.861367	
Standard Deviation of log data	0.535422	
Variance of log data	0.286677	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.892072	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	7.42391	
MLE Standard Deviation	4.277578	
MLE Coefficient of Variation	0.576189	
MLE Skewness	1.919859	
MLE Median	6.432526	
MLE 80% Quantile	10.11277	
MLE 90% Quantile	12.79923	
MLE 95% Quantile	15.52012	
MLE 99% Quantile	22.34851	
MVU Estimate of Median	6.204484	
MVU Estimate of Mean	7.146695	
MVU Estimate of Standard Deviation	3.747423	
MVU Estimate of SE of Mean	1.872583	
95% H-UCL	34.92162	
95% Chebyshev (MVUE) UCL	15.3091	
97.5% Chebyshev (MVUE) UCL	18.84097	
99% Chebyshev (MVUE) UCL	25.77866	
Non-parametric Statisitics		
95% CLT UCL	10.2923	
95% Adjusted-CLT UCL	11.01155	
95% Modified-t UCL	11.75262	
95% Jackknife UCL	11.64043	
95% Chebyshev (Mean, Sd) UCL	15.45653	
97.5% Chebyshev (Mean, Sd) UCL	19.04536	
99% Chebyshev (Mean, Sd) UCL	26.09493	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	11.64043	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC13-f.xls	
Variable	Copper	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	210	
Maximum	460	
Mean	332.5	
Standard Deviation	121.2092	
Variance	14691.67	
Coefficient of Variation	0.364539	
Skewness	0.051804	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.895171	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	475.1246	
Gamma Statistics		
k hat	9.660013	
k star (bias corrected)	2.58167	
Theta hat	34.42024	
Theta star	128.7926	
nu hat	77.28011	
nu star	20.65336	
5% Approximate Chi Square Value	11.33267	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.387115	
Anderson-Darling 5% Critical Value	0.657231	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.2824	
Kolmogrov-Smirnov 5% Critical Value	0.394995	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	605.9686	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.347108	
Maximum of log data	6.131226	
Mean of log data	5.753988	
Standard Deviation of log data	0.378885	
Variance of log data	0.143554	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.89779	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	338.9203	
MLE Standard Deviation	133.1613	
MLE Coefficient of Variation	0.392898	
MLE Skewness	1.239347	
MLE Median	315.4462	
MLE 80% Quantile	434.4783	
MLE 90% Quantile	513.2975	
MLE 95% Quantile	588.3101	
MLE 99% Quantile	761.4885	
MVU Estimate of Median	309.8161	
MVU Estimate of Mean	332.7039	
MVU Estimate of Standard Deviation	124.7263	
MVU Estimate of SE of Mean	62.35331	
95% H-UCL	774.4324	
95% Chebyshev (MVUE) UCL	604.4956	
97.5% Chebyshev (MVUE) UCL	722.1001	
99% Chebyshev (MVUE) UCL	953.1114	
Non-parametric Statisitics		
95% CLT UCL	432.1857	
95% Adjusted-CLT UCL	433.863	
95% Modified-t UCL	475.3862	
95% Jackknife UCL	475.1246	
95% Chebyshev (Mean, Sd) UCL	596.6693	
97.5% Chebyshev (Mean, Sd) UCL	710.9756	
99% Chebyshev (Mean, Sd) UCL	935.5081	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	475.1246	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC13-f.xls	
Variable:	Lead	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	130	
Maximum	810	
Mean	370	
Standard Deviation	306.0501	
Variance	93666.67	
Coefficient of Variation	0.827162	
Skewness	1.54465	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.85715	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	730.1235	
Gamma Statistics		
k hat	2.231025	
k star (bias corrected)	0.724423	
Theta hat	165.8431	
Theta star	510.7515	
nu hat	17.8482	
nu star	5.795382	
5% Approximate Chi Square Value	1.53573	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.289324	
Anderson-Darling 5% Critical Value	0.660287	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.225476	
Kolmogrov-Smirnov 5% Critical Value	0.39759	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	1396.268	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	4.867534	
Maximum of log data	6.697034	
Mean of log data	5.672958	
Standard Deviation of log data	0.787851	
Variance of log data	0.620709	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.973244	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	396.7524	
MLE Standard Deviation	367.9858	
MLE Coefficient of Variation	0.927495	
MLE Skewness	3.580358	
MLE Median	290.8937	
MLE 80% Quantile	566.0554	
MLE 90% Quantile	800.5879	
MLE 95% Quantile	1063.13	
MLE 99% Quantile	1818.012	
MVU Estimate of Median	268.8432	
MVU Estimate of Mean	363.4923	
MVU Estimate of Standard Deviation	274.1166	
MVU Estimate of SE of Mean	136.7084	
95% H-UCL	10216.45	
95% Chebyshev (MVUE) UCL	959.3903	
97.5% Chebyshev (MVUE) UCL	1217.236	
99% Chebyshev (MVUE) UCL	1723.723	
Non-parametric Statisitics		
95% CLT UCL	621.7038	
95% Adjusted-CLT UCL	747.9863	
95% Modified-t UCL	749.821	
95% Jackknife UCL	730.1235	
95% Chebyshev (Mean, Sd) UCL	1037.021	
97.5% Chebyshev (Mean, Sd) UCL	1325.641	
99% Chebyshev (Mean, Sd) UCL	1892.58	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	730.1235	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC13-f.xls	
Variable	Manganese	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	180	
Maximum	370	
Mean	250	
Standard Deviation	83.666	
Variance	7000	
Coefficient of Variation	0.334664	
Skewness	1.502573	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.875576	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	348.4482	
Gamma Statistics		
k hat	13.35388	
k star (bias corrected)	3.505137	
Theta hat	18.72115	
Theta star	71.32388	
nu hat	106.8311	
nu star	28.0411	
5% Approximate Chi Square Value	16.95813	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.349244	
Anderson-Darling 5% Critical Value	0.657097	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% significance level
Kolmogrov-Smirnov Test Statistic	0.272523	
Kolmogrov-Smirnov 5% Critical Value	0.394699	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% significance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% significance level
95% Approximate Gamma UCL	413.3873	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	5.192957	
Maximum of log data	5.913503	
Mean of log data	5.483552	
Standard Deviation of log data	0.3098	
Variance of log data	0.095976	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.930301	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	252.5324	
MLE Standard Deviation	80.14992	
MLE Coefficient of Variation	0.317385	
MLE Skewness	0.984125	
MLE Median	240.7001	
MLE 80% Quantile	312.7277	
MLE 90% Quantile	358.3984	
MLE 95% Quantile	400.6841	
MLE 99% Quantile	494.7969	
MVU Estimate of Median	237.8227	
MVU Estimate of Mean	249.4571	
MVU Estimate of Standard Deviation	76.73307	
MVU Estimate of SE of Mean	38.36379	
95% H-UCL	456.8694	
95% Chebyshev (MVUE) UCL	416.681	
97.5% Chebyshev (MVUE) UCL	489.0389	
99% Chebyshev (MVUE) UCL	631.172	
Non-parametric Statisitics		
95% CLT UCL	318.8092	
95% Adjusted-CLT UCL	352.391	
95% Modified-t UCL	353.6863	
95% Jackknife UCL	348.4482	
95% Chebyshev (Mean, Sd) UCL	432.3458	
97.5% Chebyshev (Mean, Sd) UCL	511.247	
99% Chebyshev (Mean, Sd) UCL	666.2331	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	348.4482	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC13-f.xls	
Variable	Mercury	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	0.95	
Maximum	2.1	
Mean	1.5375	
Standard Deviation	0.596343	
Variance	0.355625	
Coefficient of Variation	0.387865	
Skewness	-0.030208	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.830347	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2.239206	
Gamma Statistics		
k hat	8.44378	
k star (bias corrected)	2.277612	
Theta hat	0.182087	
Theta star	0.675049	
nu hat	67.55024	
nu star	18.22089	
5% Approximate Chi Square Value	9.549303	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.505167	
Anderson-Darling 5% Critical Value	0.657701	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.319019	
Kolmogrov-Smirnov 5% Critical Value	0.395229	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	2.933683	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	-0.051293	
Maximum of log data	0.741937	
Mean of log data	0.369775	
Standard Deviation of log data	0.406491	
Variance of log data	0.165235	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.840212	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1.572069	
MLE Standard Deviation	0.66636	
MLE Coefficient of Variation	0.423875	
MLE Skewness	1.347782	
MLE Median	1.447409	
MLE 80% Quantile	2.040633	
MLE 90% Quantile	2.440287	
MLE 95% Quantile	2.824842	
MLE 99% Quantile	3.725766	
MVU Estimate of Median	1.417699	
MVU Estimate of Mean	1.538777	
MVU Estimate of Standard Deviation	0.617923	
MVU Estimate of SE of Mean	0.308897	
95% H-UCL	4.0037	
95% Chebyshev (MVUE) UCL	2.88523	
97.5% Chebyshev (MVUE) UCL	3.467841	
99% Chebyshev (MVUE) UCL	4.612268	
Non-parametric Statisitics		
95% CLT UCL	2.027948	
95% Adjusted-CLT UCL	2.023136	
95% Modified-t UCL	2.238455	
95% Jackknife UCL	2.239206	
95% Chebyshev (Mean, Sd) UCL	2.837199	
97.5% Chebyshev (Mean, Sd) UCL	3.39958	
99% Chebyshev (Mean, Sd) UCL	4.504269	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2.239206	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC13-f.xls	
Variable:	Vanadium	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	30	
Maximum	87	
Mean	48.25	
Standard Deviation	26.22181	
Variance	687.5833	
Coefficient of Variation	0.543457	
Skewness	1.826613	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.782528	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	79.10472	
Gamma Statistics		
k hat	5.573204	
k star (bias corrected)	1.559968	
Theta hat	8.657498	
Theta star	30.93013	
nu hat	44.58563	
nu star	12.47974	
5% Approximate Chi Square Value	5.543625	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.505169	
Anderson-Darling 5% Critical Value	0.658809	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.341213	
Kolmogrov-Smirnov 5% Critical Value	0.39578	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	108.6198	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	3.401197	
Maximum of log data	4.465908	
Mean of log data	3.784006	
Standard Deviation of log data	0.472151	
Variance of log data	0.222926	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.859586	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	49.17914	
MLE Standard Deviation	24.5762	
MLE Coefficient of Variation	0.499728	
MLE Skewness	1.623981	
MLE Median	43.99194	
MLE 80% Quantile	65.56051	
MLE 90% Quantile	80.69849	
MLE 95% Quantile	95.64984	
MLE 99% Quantile	131.9243	
MVU Estimate of Median	42.77628	
MVU Estimate of Mean	47.76289	
MVU Estimate of Standard Deviation	22.18571	
MVU Estimate of SE of Mean	11.08874	
95% H-UCL	167.3144	
95% Chebyshev (MVUE) UCL	96.09756	
97.5% Chebyshev (MVUE) UCL	117.012	
99% Chebyshev (MVUE) UCL	158.0944	
Non-parametric Statisitics		
95% CLT UCL	69.81552	
95% Adjusted-CLT UCL	82.61021	
95% Modified-t UCL	81.10044	
95% Jackknife UCL	79.10472	
95% Chebyshev (Mean, Sd) UCL	105.3991	
97.5% Chebyshev (Mean, Sd) UCL	130.1276	
99% Chebyshev (Mean, Sd) UCL	178.7019	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	NO	
Appropriate Distribution	NORMAL	
1st Recommended UCL	79.10472	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value		
Recommendation Warning!	NONE	
Alternative UCL	NONE	

Data File	J:\NE\WELLSG&H\OU3-2004\HHRA\Statistics\July 2004\Sed-SC13-f.xls	
Variable:	Zinc	
Raw Statistics		
Number of Observations	4	
Number of Missing Data	0	
Number of Valid Observations	4	
Number of Distinct Observations	4	
Minimum	815	
Maximum	2500	
Mean	1628.75	
Standard Deviation	845.1664	
Variance	714306.3	
Coefficient of Variation	0.518905	
Skewness	0.066634	
Too Few Distinct Observations?	NO	
Normal Statistics		
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.862071	
Shapiro-Wilk 5% Critical Value	0.748	
5% Normality Test Result	NORMAL	Data are normal at 5% significance level
95% Student's-t UCL	2623.242	
Gamma Statistics		
k hat	4.594009	
k star (bias corrected)	1.315169	
Theta hat	354.5378	
Theta star	1238.434	
nu hat	36.75207	
nu star	10.52135	
5% Approximate Chi Square Value	4.2693	
Adjusted Level of Significance	N/A	
Adjusted Chi Square Value	N/A	
Anderson-Darling Test Statistic	0.451017	
Anderson-Darling 5% Critical Value	0.658969	
Anderson-Darling 5% Gamma Test Result	AD GAMMA	Data follow gamma distribution at 5% signifcance level
Kolmogrov-Smirnov Test Statistic	0.296897	
Kolmogrov-Smirnov 5% Critical Value	0.396	
Kolmogrov-Smirnov 5% Gamma Test Result	KS GAMMA	Data follow gamma distribution at 5% signifcance level
5% Gamma Test Result	GAMMA	Data follow gamma distribution at 5% signifcance level
95% Approximate Gamma UCL	4013.925	
95% Adjusted Gamma UCL	N/A	
Lognormal Statistics		
Minimum of log data	6.703188	
Maximum of log data	7.824046	
Mean of log data	7.282801	
Standard Deviation of log data	0.559901	
Variance of log data	0.313489	
Lilliefors Test Statisitic	N/R	Shapiro Wilk method yields a more accurate result
Lilliefors 5% Critical Value	N/R	Shapiro Wilk method yields a more accurate result
Shapiro-Wilk Test Statisitic	0.866024	
Shapiro-Wilk 5% Critical Value	0.748	
5% Lognormality Test Result	LOGNORMAL	Data are lognormal at 5% significance level
MLE Mean	1701.975	
MLE Standard Deviation	1032.736	
MLE Coefficient of Variation	0.606786	
MLE Skewness	2.043772	
MLE Median	1455.057	
MLE 80% Quantile	2335.349	
MLE 90% Quantile	2987.74	
MLE 95% Quantile	3654.947	
MLE 99% Quantile	5351.484	
MVU Estimate of Median	1398.706	
MVU Estimate of Mean	1632.246	
MVU Estimate of Standard Deviation	893.3172	
MVU Estimate of SE of Mean	446.3396	
95% H-UCL	9172.986	
95% Chebyshev (MVUE) UCL	3577.796	
97.5% Chebyshev (MVUE) UCL	4419.636	
99% Chebyshev (MVUE) UCL	6073.269	
Non-parametric Statisitics		
95% CLT UCL	2323.838	
95% Adjusted-CLT UCL	2338.881	
95% Modified-t UCL	2625.588	
95% Jackknife UCL	2623.242	
95% Chebyshev (Mean, Sd) UCL	3470.747	
97.5% Chebyshev (Mean, Sd) UCL	4267.781	
99% Chebyshev (Mean, Sd) UCL	5833.4	
Bootstrap Statistics		
Number of Bootstrap Runs	2000	
95% Standard Bootstrap UCL	N/R	Not enough distinct data warning
95% Bootstrap-t UCL	N/R	Not enough distinct data warning
95% Hall's Bootstrap UCL	N/R	Not enough distinct data warning
95% Percentile Bootstrap UCL	N/R	Not enough distinct data warning
95% BCA Bootstrap UCL	N/R	Not enough distinct data warning
Recommendations		
Human Inspection Recommended?	YES	
Appropriate Distribution	NORMAL	
1st Recommended UCL	2623.242	95% Student's-t UCL
2nd Recommended UCL		
3rd Recommended UCL		
Recommended UCL > Max Data Value	YES	Recommended UCL exceeds the maximum data value
Recommendation Warning!	NONE	
Alternative UCL	NONE	

APPENDIX C.7

DERMAL APPENDIX

Updated Dermal Equations and Parameters

provided by USEPA Region 1

1999

Dermal Worksheet
Intermediate Variables for Calculating DA(event)
Wells G&H Superfund Site OU3

Chemical of Potential Concern	Media	Dermal Absorption Fraction (soil)	FA	Kp		T(event)		Tau		T*		B
			Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Heptachlor	Surface Water	--	0.8	8.6E-03	cm/hr	1	hr/event	12.99	hr	31.16	hr	0.1
Trichloroethylene	Surface Water	--	1	1.2E-02	cm/hr	1	hr/event	0.57	hr	1.37	hr	0.1
Chloroform	Surface Water	--	1	6.8E-03	cm/hr	1	hr/event	0.49	hr	1.18	hr	0.03
Tetrachloroethylene	Surface Water	--	1	3.3E-02	cm/hr	1	hr/event	0.89	hr	2.14	hr	0.2
Benzo(a)anthracene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Benzo(a)pyrene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Benzo(b)fluoranthene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Benzo(k)fluoranthene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Dibenz(a,h)anthracene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Indeno(1,2,3-cd)pyrene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Phenanthrene	Sediment/Soil	0.13	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Aroclor 1248	Sediment/Soil	0.14	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Aroclor 1254	Sediment/Soil	0.14	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Aroclor 1260	Sediment/Soil	0.14	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Arsenic	Sediment/Soil	0.03	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Cadmium	Sediment/Soil	0.01	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data

FA = Fraction Absorbed Water
Kp = Dermal Permeability Coefficient of Compound in Water

T(event) = Event Duration
Tau = Lag Time

T* = Time to Reach Steady-State
B = Dimensionless Ratio of the Permeability Coefficient of a Compound Through the Stratum Corneum Relative to its Permeability Coefficient Across the Viable Epidermis

TABLE C.7-1. DERMALLY ABSORBED DOSE CALCULATIONS

(Variable Definitions follow Table)

Reach	Station(s)	Timeframe	Receptor	Cancer/ Non-cancer	RME/ CT	A cm^2	t_event hr/event	EV event/day	EF days/yr	ED years	BW kg	AT days	Isc cm	IR cm^3/day	ABSGI	Chemical	CAS No	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Derm/Drink Kp
01	NR, 22/TT-22, WH, and WG	Current	Adult	Non-cancer	RME	5700	1	1	26	24	70	8760	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Cancer	RME	5700	1	1	26	24	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Child	Non-cancer	RME	2800	1	1	26	6	15	2190	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
				Cancer	RME	2800	1	1	26	6	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
	14	Current	Adult	Non-cancer	RME	5700	1	1	26	24	70	8760	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Cancer	RME	5700	1	1	26	24	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Child	Non-cancer	RME	2800	1	1	26	6	15	2190	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
				Cancer	RME	2800	1	1	26	6	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
	WS/WSS	Current	Adult	Non-cancer	RME	5700	1	1	104	24	70	8760	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	78	7	70	2555	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Cancer	RME	5700	1	1	104	24	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	78	7	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Child	Non-cancer	RME	2800	1	1	104	6	15	2190	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	78	2	15	730	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
				Cancer	RME	2800	1	1	104	6	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	78	2	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
	22/TT-22, 13/TT-27, WH, NT-1, NT-2, NT-3, WG, WW, and JY	Future	Adult	Non-cancer	RME	5700	1	1	78	24	70	8760	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Cancer	RME	5700	1	1	78	24	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Child	Non-cancer	RME	2800	1	1	78	6	15	2190	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
				Cancer	RME	2800	1	1	78	6	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
	NR and 14	Future	Adult	Non-cancer	RME	5700	1	1	52	24	70	8760	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	52	7	70	2555	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Cancer	RME	5700	1	1	52	24	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	52	7	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Child	Non-cancer	RME	2800	1	1	52	6	15	2190	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	52	2	15	730	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
				Cancer	RME	2800	1	1	52	6	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	52	2	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
	WS/WSS	Future	Adult	Non-cancer	RME	5700	1	1	104	24	70	8760	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	78	7	70	2555	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Cancer	RME	5700	1	1	104	24	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	20%
					CT	5700	0.5	1	78	7	70	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	14%
				Child	Non-cancer	RME	2800	1	1	104	6	15	2190	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	78	2	15	730	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
				Cancer	RME	2800	1	1	104	6	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	10%
					CT	2800	0.5	1	78	2	15	25550	1.0E-03	2000	1	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01	7%
U2	TT-30, CB-07, and AM	Current	Adult	Non-cancer	RME	5700	1	1	26	24	70	8760	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Cancer	RME	5700	1	1	26	24	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Child	Non-cancer	RME	2800	1	1	26	6	15	2190	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
				Cancer	RME	2800	1	1	26	6	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
	CB-01, CB-02, CB-03, CB-04, and CB-06	Current	Adult	Non-cancer	RME	5700	1	1	104	24	70	8760	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	78	7	70	2555	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Cancer	RME	5700	1	1	104	24	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	78	7	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Child	Non-cancer	RME	2800	1	1	104	6	15	2190	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	78	2	15	730	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
				Cancer	RME	2800	1	1	104	6	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	78	2	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
	16/TT-33, 09, and DA	Current	Adult	Non-cancer	RME	5700	1	1	78	24	70	8760	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Cancer	RME	5700	1	1	78	24	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%

TABLE C.7-1. DERMALLY ABSORBED DOSE CALCULATIONS

(Variable Definitions follow Table)

Reach	Station(s)	Timeframe	Receptor	Cancer/ Non-cancer	RME/ CT	A cm^2	t_event hr/event	EV event/day	EF days/yr	ED years	BW kg	AT days	lsc cm	IR cm^3/day	ABSGI	Chemical	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Derm/Drink Kp
U2 (cont.)	16/TT-33, 09, and DA (cont.)		Child	Non-cancer	RME	2800	1	1	78	6	15	2190	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
				Cancer	RME	2800	1	1	78	6	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
	TT-30, CB-07, and AM	Future	Adult	Non-cancer	RME	5700	1	1	26	24	70	8760	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Cancer	RME	5700	1	1	26	24	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
			Child	Non-cancer	RME	2800	1	1	26	6	15	2190	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
				Cancer	RME	2800	1	1	26	6	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
	TT-31	Future	Adult	Non-cancer	RME	5700	1	1	78	24	70	8760	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Cancer	RME	5700	1	1	78	24	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
			Child	Non-cancer	RME	2800	1	1	78	6	15	2190	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
				Cancer	RME	2800	1	1	78	6	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
	CB-01, CB-02, CB-03, CB-04, and CB-06	Future	Adult	Non-cancer	RME	5700	1	1	104	24	70	8760	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	78	7	70	2555	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Cancer	RME	5700	1	1	104	24	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	78	7	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
			Child	Non-cancer	RME	2800	1	1	104	6	15	2190	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	78	2	15	730	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
				Cancer	RME	2800	1	1	104	6	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	78	2	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
	16/TT-33, 09, and DA	Future	Adult	Non-cancer	RME	5700	1	1	78	24	70	8760	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
				Cancer	RME	5700	1	1	78	24	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	7%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	5%
			Child	Non-cancer	RME	2800	1	1	78	6	15	2190	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
				Cancer	RME	2800	1	1	78	6	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	4%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Trichloroethylene	79016	131.4	2.42	4.7E-04	1.2E-02		2.9E-01	3%
05	05	Current	Adult	Non-cancer	RME	5700	1	1	78	24	70	8760	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	4%
						5700	1	1	78	24	70	8760	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	25%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	3%
						5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	17%
				Cancer	RME	5700	1	1	78	24	70	25550	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	4%
						5700	1	1	78	24	70	25550	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	25%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	3%
						5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	17%
			Child	Non-cancer	RME	2800	1	1	78	6	15	2190	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	2%
						2800	1	1	78	6	15	2190	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	12%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	1%
						2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	9%
				Cancer	RME	2800	1	1	78	6	15	25550	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	2%
						2800	1	1	78	6	15	25550	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	12%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	1%
						2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	9%
		Future	Adult	Non-cancer	RME	5700	1	1	78	24	70	8760	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	4%
						5700	1	1	78	24	70	8760	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	25%
					CT	5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	3%
						5700	0.5	1	26	7	70	2555	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	17%
				Cancer	RME	5700	1	1	78	24	70	25550	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	4%
						5700	1	1	78	24	70	25550	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	25%
					CT	5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	3%
						5700	0.5	1	26	7	70	25550	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	17%
			Child	Non-cancer	RME	2800	1	1	78	6	15	2190	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	2%
						2800	1	1	78	6	15	2190	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	12%
					CT	2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	1%
						2800	0.5	1	26	2	15	730	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	9%
				Cancer	RME	2800	1	1	78	6	15	25550	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	2%
						2800	1	1	78	6	15	25550	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	12%
					CT	2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Chloroform	67663	119.4	1.97	2.8E-04	6.8E-03		1.7E-01	1%
						2800	0.5	1	26	2	15	25550	1.0E-03	2000	1	Tetrachloroethylene	127184	165.8	3.40	1.3E-03	3.3E-02		8.4E-01	9%

TABLE C.7-1. DERMALLY ABSORBED DOSE CALCULATIONS

(Variable Definitions follow Table)

Reach	Station(s)	Timeframe	Receptor	Cancer/ Non-cancer	RME/ CT	Chem Assess	B	tau (hr)	t_star (hr)	FA for tau>3	Conc mg/cm3	DA_event mg/cm2-evt	DAD mg/kg-day	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
01	NR, 22/TT-22, WH, and WG	Current	Adult	Non-cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	7.6E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	5.3E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	2.6E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	5.3E-11	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
			Child	Non-cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	1.7E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.2E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	1.5E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	3.5E-11	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
	14	Current	Adult	Non-cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	7.6E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	5.3E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	2.6E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	5.3E-11	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
			Child	Non-cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	1.7E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.2E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	1.5E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	3.5E-11	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
	WS/WSS	Current	Adult	Non-cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	3.0E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.6E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	1.0E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.6E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
			Child	Non-cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	6.9E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	3.7E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	5.9E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.0E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
	22/TT-22, 13/TT-27, WH, NT-1, NT-2, NT-3, WG, WW, and JY	Future	Adult	Non-cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	2.3E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	5.3E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	7.8E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	5.3E-11	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
			Child	Non-cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	5.2E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.2E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	4.5E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	3.5E-11	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
	NR and 14	Future	Adult	Non-cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	1.5E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.1E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	5.2E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.1E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
			Child	Non-cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	3.5E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	2.4E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	3.0E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	7.0E-11	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
	WS/WSS	Future	Adult	Non-cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	3.0E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.6E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	Y	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	1.0E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	Y	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.6E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
			Child	Non-cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	6.9E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	3.7E-09	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
				Cancer	RME	N	0.1	12.99	31.16	0.8	1.9E-09	1.3E-10	5.9E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
					CT	N	0.1	12.99	31.16	0.8	1.9E-09	9.2E-11	1.0E-10	-4.89E+00	1.28E-05	1.28E-08	3.4E-01	3.8E-01	N/A	31.16
U2	TT-30, CB-07, and AM	Current	Adult	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	3.0E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	1.0E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
			Child	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	6.8E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	4.8E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	5.8E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	1.4E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
	CB-01, CB-02, CB-03, CB-04, and CB-06	Current	Adult	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	1.2E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	6.3E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	4.1E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	6.3E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
			Child	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	2.7E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	1.4E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	2.3E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	4.1E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
	16/TT-33, 09, and DA	Current	Adult	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	8.9E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	3.0E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37

TABLE C.7-1. DERMALLY ABSORBED DOSE CALCULATIONS

(Variable Definitions follow Table)

Reach	Station(s)	Timeframe	Receptor	Cancer/ Non-cancer	RME/ CT	Chem Assess	B	tau (hr)	t_star (hr)	FA for tau>3	Conc mg/cm3	DA_event mg/cm2-evt	DAD mg/kg-day	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
U2 (cont.)	16/TT-33, 09, and DA (cont.)		Child	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	2.0E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	4.8E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	1.7E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	1.4E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
	TT-30, CB-07, and AM	Future	Adult	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	3.0E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	1.0E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
			Child	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	6.8E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	4.8E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	5.8E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	1.4E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
	TT-31	Future	Adult	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	8.9E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	3.0E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
			Child	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	2.0E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	4.8E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	1.7E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	1.4E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
	CB-01, CB-02, CB-03, CB-04, and CB-06	Future	Adult	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	1.2E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	6.3E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	4.1E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	6.3E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
			Child	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	2.7E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	1.4E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	2.3E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	4.1E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
	16/TT-33, 09, and DA	Future	Adult	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	8.9E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	3.0E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	2.1E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
			Child	Non-cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	2.0E-06	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	4.8E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
				Cancer	RME	N	0.1	0.57	1.37	1.0	2.0E-06	5.1E-08	1.7E-07	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
					CT	N	0.1	0.57	1.37	1.0	2.0E-06	3.6E-08	1.4E-08	-3.54E+00	2.91E-04	2.91E-07	3.4E-01	3.7E-01	N/A	1.37
05	05	Current	Adult	Non-cancer	RME	N	0.03	0.49	1.18	1.0	1.0E-06	1.3E-08	2.3E-07	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.7E-07	3.0E-06	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
					CT	N	0.03	0.49	1.18	1.0	1.0E-06	9.3E-09	5.4E-08	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.2E-07	7.1E-07	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
				Cancer	RME	N	0.03	0.49	1.18	1.0	1.0E-06	1.3E-08	7.9E-08	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.7E-07	1.0E-06	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
					CT	N	0.03	0.49	1.18	1.0	1.0E-06	9.3E-09	5.4E-09	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.2E-07	7.1E-08	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
			Child	Non-cancer	RME	N	0.03	0.49	1.18	1.0	1.0E-06	1.3E-08	5.2E-07	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.7E-07	6.9E-06	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
					CT	N	0.03	0.49	1.18	1.0	1.0E-06	9.3E-09	1.2E-07	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						N	0.2	0.89	2.14	1.0	2.0E-06	1.2E-07	1.6E-06	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
				Cancer	RME	N	0.03	0.49	1.18	1.0	1.0E-06	1.3E-08	4.5E-08	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.7E-07	5.9E-07	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
					CT	N	0.03	0.49	1.18	1.0	1.0E-06	9.3E-09	3.5E-09	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						N	0.2	0.89	2.14	1.0	2.0E-06	1.2E-07	4.6E-08	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
		Future	Adult	Non-cancer	RME	N	0.03	0.49	1.18	1.0	1.0E-06	1.3E-08	2.3E-07	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.7E-07	3.0E-06	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
					CT	N	0.03	0.49	1.18	1.0	1.0E-06	9.3E-09	5.4E-08	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.2E-07	7.1E-07	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
				Cancer	RME	N	0.03	0.49	1.18	1.0	1.0E-06	1.3E-08	7.9E-08	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.7E-07	1.0E-06	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
					CT	N	0.03	0.49	1.18	1.0	1.0E-06	9.3E-09	5.4E-09	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.2E-07	7.1E-08	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
			Child	Non-cancer	RME	N	0.03	0.49	1.18	1.0	1.0E-06	1.3E-08	5.2E-07	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.7E-07	6.9E-06	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
					CT	N	0.03	0.49	1.18	1.0	1.0E-06	9.3E-09	1.2E-07	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						N	0.2	0.89	2.14	1.0	2.0E-06	1.2E-07	1.6E-06	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
				Cancer	RME	N	0.03	0.49	1.18	1.0	1.0E-06	1.3E-08	4.5E-08	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						Y	0.2	0.89	2.14	1.0	2.0E-06	1.7E-07	5.9E-07	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14
					CT	N	0.03	0.49	1.18	1.0	1.0E-06	9.3E-09	3.5E-09	-3.47E+00	3.40E-04	3.40E-07	3.2E-01	3.5E-01	N/A	1.18
						N	0.2	0.89	2.14	1.0	2.0E-06	1.2E-07	4.6E-08	-3.73E+00	1.87E-04	1.87E-07	4.1E-01	4.5E-01	N/A	2.14

DERMAL ABSORPTION CALCULATION EXAMPLE

Note: This EPA spreadsheet utilized as basis for Table C.7-1 calculations.

FOR ORGANIC CHEMICALS IN WATER (updated on 11/99)

Worksheet to Calculate Dermal Absorption of Organic Chemicals from Aqueous Media (updated 11/99)

Enter the Following Exposure Conditions: for site specific conditions, change values in Cells G5-G18

Concentration (mg/L*L/1000 cm3):	Conc =	1.0E-03	mg/cm3 (default value for purpose of illustration)
Input site specific concentrations in Column marked "Conc"		= 1 mg/L (1 ppm)	= 1 ug/cm3 = 1000 ppb
Area exposed (cm2):	A =	5672.0	cm2
Event time (hr/event):	t_event =	0.5	hr/event (35 minutes/event)
Event frequency (events/day):	EV =	1.0	event/day
Exposure frequency (days/year):	EF =	26.0	days/yr
Exposure duration (years):	ED =	7.0	years
Body weight (kg):	BW =	70.0	kg
Averaging time (days):	AT =	2555.0	days
for carcinogenic effects, AT=70 years (25,550 days)			
for noncarcinogenic effects, AT=ED (in days)			
Skin thickness (assumed to be 10 um):	lsc =	1.0E-03	cm

Default conditions for screening purposes:

Compare Dermal to Drinking: Adults showering for 35 minutes/day, compared to drinking 2L water/day

Dermal (mg/day) = DA_event * A * EV	IR =	2000.0	(cm3/day = L/day * 1000 cm3/L)
Drinking (mg/day) = Conc * IR * ABSIG	ABSGI =	1.0	(assumed 100% GI absorption)

IR: Ingestion rate of drinking water
ABSIG: Absorption fraction in GI tract

Refer to Appendix A for equations to evaluate DA_event and DAD

(*): outside of the Effective Prediction Domain (EPD) determined by the Flynn's measured Kp data

95% LCI and UCI are evaluated by Dr. Paul Pinsky in NCEA using SAS

	CHEMICAL	CAS No.	MWT	logKow	Kp 95% LCI	Kp (cm/hr) predicted	Kp (cm/hr) measured	Kp 95% UCI	Chemicals outside EPD (*)	Derm/ Drink Kp	Chem Assess	B	tau (hr)	t_star (hr)
118	Heptachlor	76448	373.5	4.27	3.4E-04	8.6E-03		2.2E-01		**14%**	Y	0.1	**12.99**	31.16

FA for tau>3	Conc (mg/cm3)	DA_event (mg/cm2-evt)	DAD (mg/kg-day)	log(Ds/lsc)	Dsc/lsc	Dsc	b	c	t_star1 B>0.6	t_star3 B<=0.6
0.8	1.4E-09	**6.8E-11**	**3.9E-10**	-4.89E+00	1.28E-05	**1.28E-08**	3.4E-01	3.8E-01	#NUM!	31.16

APPENDIX C.8

TOXICITY PROFILES FOR COPCs

INTRODUCTION

This Appendix contains toxicity criteria and toxicity profiles for the chemicals selected as chemicals of potential concern (COPCs) for the Wells G&H Superfund Site OU3 baseline human health risk assessment. The chronic oral toxicity criteria for COPCs are summarized in Tables 3-5.1 and 3-6.1. Table C.8-1 presents the absolute oral bioavailability factors (i.e., oral to dermal adjustment factors) used to adjust the oral toxicity criteria for the COPCs evaluated in the dermal exposure pathways, as discussed in Section 3.0, subsection 3.4.3. Toxicity profiles for the COPCs are provided in the following pages.

VOLATILE ORGANICS

Chloroform

Chloroform is a colorless, volatile liquid that is widely used as a general solvent and as an intermediate in the production of refrigerants, plastics, and pharmaceuticals (Torkelson and Rowe, 1976; IARC, 1976). Chloroform is rapidly absorbed from the lungs and the gastrointestinal tract, and to some extent through the skin. It is extensively metabolized in the body, with carbon dioxide as the major end product. The primary sites of metabolism are the liver and kidneys. Excretion of chloroform occurs primarily via the lungs, either as unchanged chloroform or as carbon dioxide (ATSDR, 2002).

Target organs for chloroform toxicity are the liver, kidneys, and central nervous system. Liver effects (hepatomegaly, fatty liver, and hepatitis) were observed in individuals occupationally exposed to chloroform (Bomski et al., 1967). Several subchronic and chronic studies by the oral routes of exposure documented hepatotoxic effects in rats, mice, and dogs (Palmer et al., 1979; Munson et al., 1979; Heywood et al., 1979). Renal effects were reported in rats and mice following oral exposures (Roe et al., 1979; Reuber, 1976; Torkelson et al., 1976), but evidence for chloroform-induced renal toxicity in humans is sparse. Chloroform is a central nervous system depressant, inducing narcosis and anesthesia at high concentrations. Lower concentrations may cause irritability, lassitude, depression, gastrointestinal symptoms, and frequent and burning urination (ATSDR, 2002).

Developmental toxicity studies with rodents indicate that orally administered chloroform is toxic to dams and fetuses. Chloroform may cause sperm abnormalities in mice and gonadal atrophy in rats (Palmer et al, 1979; Reuber, 1979).

Epidemiological studies indicate a possible relationship between exposure to chloroform present in chlorinated drinking water and cancer of the bladder, large intestine, and rectum. Chloroform is one of several contaminants present in drinking water, but it has not been identified as the sole or primary cause of the excess cancer rate (ATSDR, 2002; U.S. EPA, 1985). In animal carcinogenicity studies, positive results included increased incidences of renal epithelial tumors in male rats, hepatocellular carcinomas in male and female mice, and kidney tumors in male mice (Jorgensen et al., 1985; Roe et al., 1979; NCI, 1976). Based on U.S. EPA guidelines, chloroform was assigned to weight-of-evidence Group B2, probable human carcinogen, on the basis of an increased incidence of several tumor types in rats and in three strains of mice.

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Tetrachloroethene

Tetrachloroethene (PCE) is readily absorbed following inhalation and oral exposure (ATSDR, 2002). Tetrachloroethene vapors and liquid also can be absorbed through the skin (USEPA 1985a,b). The principal toxic effects of tetrachloroethene in humans and animals following acute and longer-term exposures include CNS depression and fatty infiltration of the liver and kidney

with concomitant changes in serum enzyme activity levels indicative of tissue damage (U.S. EPA 1985a,b; Buben and O'Flaherty 1985). Mice subchronically exposed to tetrachloroethene did not show any adverse liver effects at 20 mg/kg/day (Buben and O'Flaherty 1985).

In an NCI (1977) bioassay, increased incidence of hepatocellular carcinoma were observed in both sexes of B6C3F1 mice administered tetrachloroethylene (386–1,072 mg/kg/day) in corn oil by gavage for 78 weeks. Tetrachloroethene is currently under review by the Carcinogen Risk Assessment Verification Endeavor (CRAVE) and estimates of cancer potency were withdrawn by USEPA (1995). However, the USEPA National Center for Environmental Assessment currently classifies tetrachloroethene as a Group B2/C carcinogen (Probable/Possible Human Carcinogen).

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for tetrachloroethene.* Draft. U.S. Department of Health and Human Services. October.

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U.S. Environmental Protection Agency (USEPA). 1985a. *Health assessment document for tetrachloroethylene (perchloroethylene).* Washington, D.C.: Office of Health and Environmental Assessment. July 1985. EPA 600/8-82-005F.

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U.S. Environmental Protection Agency (USEPA). 1995. *Health effects assessment summary tables.* Cincinnati, OH: Office of Health and Environmental Assessment, Environmental Assessment and Criteria Office, Washington, D.C.: Office of Solid Waste and Emergency Response, Office of Remedial Response. FY-1995.

Trichloroethene

Absorption of trichloroethene (TCE) from the gastrointestinal tract is virtually complete. Absorption following inhalation exposure is proportional to concentration and duration of

exposure (USEPA, 1985). TCE is a CNS depressant following acute and chronic exposures. In humans, single oral doses of 15–25 mL (21–35 grams) have resulted in vomiting and abdominal pain, followed by transient unconsciousness (Stephens, 1945). High-level exposure can result in death due to respiratory and cardiac failure (ATSDR, 2002). Hepatotoxicity has been reported in human and animal studies following acute exposure to TCE (ATSDR, 2002). Industrial use of TCE is often associated with adverse dermatological effects including reddening and skin burns on contact with the liquid form. These effects are usually the result of contact with concentrated solvent. However, no effects have been reported following exposure to TCE in dilute, aqueous solutions (USEPA, 1985).

TCE has caused significant increases in the incidence of hepatocellular carcinomas in mice (NCI, 1976), and renal tubular-cell neoplasms in rats exposed by gavage (NTP, 1983). TCE was mutagenic in *Salmonella typhimurium* and in *E. coli* (strain K-12), utilizing liver microsomes for activation (Greim *et al.*, 1977).

USEPA is currently reviewing the carcinogenicity of TCE. The National Center for Environmental Assessment (NCEA) currently classifies TCE as a Group B2/C (Probable/Possible Human Carcinogen) based on inadequate evidence in humans and sufficient evidence of carcinogenicity from animal studies.

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U.S. Environmental Protection Agency (USEPA). 1985. *Health assessment document for trichloroethylene.* Environmental Criteria and Assessment Office. EPA/600/8-82/006F.

Vinyl Chloride

Vinyl chloride, a colorless gas, is a halogenated aliphatic hydrocarbon with the empirical formula of C_2H_3Cl. It is used primarily as an intermediate in the manufacture of polyvinyl chloride

(PVC); limited quantities are used as a refrigerant and as an intermediate in the production of chlorinated compounds (ATSDR, 2002).

Vinyl chloride is rapidly absorbed from the gastrointestinal tract. Metabolism of vinyl chloride occurs primarily in the liver via oxidation by hepatic microsomal enzymes to polar compounds which can be conjugated with glutathione and/or cysteine. These covalently bound metabolites are then excreted in the urine (U.S. EPA, 1980, 1985).

For the oral route of exposure, the primary target organ of vinyl chloride toxicity in animals is the liver. Chronic oral administration of 1.7-14.1 mg/kg/day of vinyl chloride induced dose-related increases in nonneoplastic lesions of the liver of rats (Feron et al., 1981). Evidence of developmental toxicity was seen in rats exposed to vinyl chloride during the first trimester of gestation (Ungvary et al., 1978).

The carcinogenicity of vinyl chloride in humans has been demonstrated in a number of epidemiological studies and case reports, many of which associated occupational exposure to vinyl chloride to the development of angiosarcomas of the liver (U.S. EPA, 1985). Vinyl chloride has been shown to be carcinogenic in numerous animal studies. Oral administration of vinyl chloride induced liver, lung, and kidney tumors in rodents (Feron et al., 1981; Maltoni, 1977). EPA has classified vinyl chloride as a Group A chemical, human carcinogen (U.S. EPA, 1985).

SEMIVOLATILE ORGANICS

Polycyclic Aromatic Hydrocarbons (Carcinogenic)

Polycyclic aromatic hydrocarbons (PAHs) occur in the environment as complex mixtures containing numerous PAHs of varying carcinogenic potencies. Only a few components of these mixtures have been adequately characterized, and only limited information is available on the relative potencies of different compounds.

PAH absorption following oral exposure is inferred from the demonstrated toxicity of PAHs following ingestion (USEPA, 1984a). PAHs are also absorbed following dermal exposure (Kao *et al.*, 1985). Acute effects from direct contact with PAHs and related materials are limited primarily to phototoxicity; the primary effect is dermatitis (NIOSH, 1977). PAHs have also been shown to cause cytotoxicity in rapidly proliferating cells throughout the body; the hematopoietic system, lymphoid system, and testes are frequent targets (Santodonato *et al.*, 1981). Destruction of the sebaceous glands, hyperkeratosis, hyperplasia, and ulceration have been observed in mouse skin following dermal application of the cPAHs (Santodonato *et al.*, 1981). Benzo(a)pyrene has also been shown to have an immunosuppressive effect in animals (ATSDR, 2002). Nonneoplastic lesions have been observed in animals exposed to the more potent cPAHs, but only after exposure to levels well above those required to elicit a carcinogenic response. Benzo(a)pyrene has been demonstrated to induce adverse developmental and reproductive effects in experimental animals following oral exposure (ATSDR, 2002). These effects were manifested

as reduced pup weights during postnatal development, sterility, reduced fertility, and an increased incidence of stillborns and resorptions (ATSDR, 2002). cPAHs are believed to induce tumors both at the site of application and systemically. Studies in laboratory animals have demonstrated that the cPAHs benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene have the ability to induce skin tumors following dermal exposure (ATSDR, 2002). Neal and Rigdon (1967) reported that oral administration of 250 ppm benzo(a)pyrene for approximately 110 days led to forestomach tumors in mice.

Benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene are classified by USEPA in Group B2—Probable Human Carcinogen. USEPA has developed an oral slope factor for benzo(a)pyrene. Oral cancer slope factors for the other six cPAHs are derived by applying relative potency factors developed by USEPA (1993) to the oral slope factor for benzo(a)pyrene.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for polycyclic aromatic hydrocarbons (PAHs).* August 2002.

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Phenanthrene

Phenanthrene is a member of the polyaromatic hydrocarbons (PAH). PAHs constitute a class of non-polar compounds that contain two or more aromatic rings. They are ubiquitous in nature and are both naturally occurring and man-made. The database on the potential health effects of phenanthrene is limited.

Little data are available regarding the pharmacokinetics of phenanthrene. The intestinal absorption of phenanthrene is less dependent on the presence of bile in the stomach than is the absorption of the larger PAHs (such as benzo(a)pyrene) (Rahman et al, 1986).

Phenanthrene has been shown to be a skin photosensitizer in humans (Sax, 1984). Phenanthrene has a reported LD 50 of 700 mg/kg in mice (Simmon et al., 1979). Rats injected intraperitoneally evidenced liver effects (Yoshikawa et al, 1987).

There is equivocal evidence for cancer from dermal application of phenanthrene in rats (IARC, 1983). Phenanthrene is not a complete skin carcinogen (ATSDR, 2002). It is neither an initiator (LaVoie et al, 1981; Roe, 1962) nor a promoter (Roe and Grant, 1964). Higgins and Yang (1962) reported no tumor production within two months after the ingestion of 200 mg of phenanthrene by rats. There are limited data that suggest that phenanthrene is mutagenic (Wood et al., 1979). However, the majority of tests are negative (ATSDR, 2002).

Agency for Toxic Substances and Disease Registry (ATSDR) (2002) *Toxicological profile for polycyclic aromatic hydrocarbons.* U. S. Public Health Service.

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PESTICIDES AND POLYCHLORINATED BIPHENYLS

Aldrin

Aldrin is absorbed following ingestion (Farb *et al.*, 1973) and dermal exposure (Feldmann and Maibach, 1974). Aldrin is metabolically converted to dieldrin in fatty tissues (ACGIH, 1986) and both are considered to have similar chemical and toxic effects (USEPA, 1988). Acute symptoms of aldrin intoxication in humans and animals following ingestion indicate CNS stimulation manifested primarily as hyperexcitability, muscle twitching, convulsions, and depression (Borgmann *et al.*, 1952a; Hayes, 1982; Hodge *et al.*, 1967; Hoogendam *et al.*, 1962; Jager, 1970). Experimental studies indicate that dogs exposed for longer periods of time to levels as low as 1 mg/kg developed hepatic and renal toxicity (Fitzhugh *et al.*, 1964; Treon and Cleveland, 1955). Rats fed aldrin for 2 years developed hepatic lesions and nephritis at doses of 0.5 and 50 ppm, respectively (Fitzhugh *et al.*, 1964). Aldrin produced fetotoxic and/or teratogenic effects in hamsters fed a single oral dose of 50 mg/kg (approximately 84 ppm) and in mice fed a single oral dose of 25 mg/kg (approximately 6 ppm) (Ottolenghi *et al.*, 1974). Aldrin produced marked effects on fertility, gestation, viability, and lactation in mice given 25 mg/kg-day in a six-generation study (Deichmann, 1972).

Aldrin produces chromosomal aberrations in mouse, rat, and human cells and unscheduled DNA synthesis in rats and humans (Probst et al., 1981). Chronic oral exposure to aldrin has produced an increase in hepatocellular tumors in mice (Davis, 1965; NCI, 1978). In contrast, chronic feeding studies with aldrin in rats indicate that exposure was associated with nonneoplastic changes in the liver (NCI, 1978; Fitzhugh *et al.*, 1964). USEPA classified aldrin as a group B2 - Probable Human Carcinogen

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for Aldrin/Dieldrin.* April 2002.

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Fitzhugh, O., A. Nelson and M. Quaife. 1964. Chronic oral toxicity of aldrin and dieldrin in rats and dogs. *Food Cosmet. Toxicol.* 2:551-562.

Hayes, W. 1982. *Pesticides studied in man.* Baltimore, MD: The Williams and Wilkins Co. pps. 234-247.

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Hoogendam, I., J. Versteeg and M. Devlieger. 1962. Electroencephalograms in insecticide toxicity. *Arch. Environ. Health* 4:92-100.

Jager, K. 1970. *Aldrin, dieldrin, endrin, and telodrin: An epidemiological and toxicological study of long-term occupational exposure.* New York: Elsevier Publishing Co. pp. 121-131.
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Benzene Hexachlorides (BHCs)

Technical-grade benzene hexachloride (BHC; also known as hexachlorocyclohexane) is composed mainly of *alpha-* (55–80%), *beta-* (5–14%), *delta-* (2–16%), *gamma-* (8–15%), and *epsilon-* (1–5%) isomers (ATSDR, 2002). BHC is absorbed by humans and animals following oral and dermal exposure (USEPA, 1985; Hayes, 1982). Absorption of the various isomers of BHC following ingestion is greater than 90% of the administered dose (Albro and Thomas, 1974). The *alpha-*, *beta-*, and *delta*-isomers of BHC primarily act as depressants of the CNS producing symptoms of tremors, prostration, and flaccidity of the entire musculature. *gamma*-BHC is a stimulant causing convulsions (Hayes, 1982). All the isomers induce hepatic enzymes (Hayes, 1982). For example, rats exhibited liver and kidney toxicity after ingesting *gamma*-BHC (1.55 mg/kg-day) for 12 weeks in the diet (Zoecon, 1983). Hepatocellular tumors have been observed in mice exposed to *alpha-* and *beta*-BHC in the diet (Ito *et al.*, 1973; Munir *et al.*, 1983; Thorpe and Walker, 1973; USEPA, 1987). The most tumorigenic isomer is *alpha*-BHC, followed by the *gamma-*, *beta-*, *delta-*, and *epsilon*-isomers (Hayes, 1982; USEPA, 1985, 1987). Various reproductive and developmental effects from exposure to *beta-* and *gamma*-BHC have been demonstrated in rodents (Hayes, 1982; USEPA, 1985).

USEPA classified both *alpha*-BHC and technical-grade BHC in Group B2 — Probable Human Carcinogens, *beta*-BHC in Group C — Possible Human Carcinogen, and *delta*-BHC in Group D — not classified as to human carcinogenicity. USEPA classified *gamma*-BHC (lindane) as a Group B2 — Probable Human Carcinogen.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for alpha-, beta-, gamma- and delta-hexachlorocyclohexane.* May 2002.

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Chlordane

Chlordane is a manmade pesticide used in the United States from 1948 to 1988. It was used to treat field crops and as a soil treatment to kill termites. Chlordane is not water soluble, and in soil, adsorbs strongly to the upper layers of soil especially heavy clayey soils and organic soils. Breakdown is slow; most is lost by evaporation in the first two to three days after application. However, chlordane can persist up to 20 years (ATSDR, 2002).

The effects observed in humans and animals exposed to chlordane do not appear to be route dependent. Absorption occurs readily by any route of exposure. Gastrointestinal symptoms are an early and consistent observation in acute human oral and inhalation exposure (Curley and Garrettson, 1969; Dadey and Kramer, 1953; USEPA, 1980; Olanoff *et al.*, 1983). Chlordane causes neurological effects in humans following acute or prolonged oral, inhalation, or dermal exposures. Neurological effects, such as headache, dizziness, irritability, muscle tremors, confusion, convulsions, and coma are the first signs reported. Central nervous system effects have been reported in children following oral exposure (Aldrich and Holmes, 1969). Jaundice has been reported by persons lining in homes treated with chlordane (USEPA, 1980). Subtle serum enzyme level changes were observed in pesticide application workers in Japan (Ogata and Izushi, 1991). Acute oral and parenteral studies of animals exposed to low levels of chlordane are reported to show enzyme induction, minor histochemical and histomorphological changes, and liver hypertrophy within hours of exposure (Casterline and Williams, 1971; Cram *et al.*, 1956; Den Tonkelaar and Van Esch, 1974; Hart *et al.*, 1963; Johnson *et al.*, 1986; Truhaut *et al.*, 1974, 1975).

Chlordane is classified by USEPA as Group B2 - Probable Human Carcinogen based on inadequate evidence of carcinogenicity from human studies and sufficient evidence of carcinogenicity from animal studies. USEPA developed an oral cancer slope factor based on hepatocellular carcinomas in mice.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for chlordane*. May 2002.

Aldrich, F.D. and J.H. Holmes. 1969. Acute chlordane intoxication in a child: Case report with toxicological data. *Environ. Health* 19:129-132.

Casterline, J.L. and C.H. Williams. 1971. The effects of 28-day pesticide feeding on serum and tissue enzyme activities of rats fed diets of varying casein content. *Toxicol. Appl. Pharmacol.* 18:607-618.

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Dieldrin

Dieldrin is a chlorinated cyclodiene insecticide that is structurally related to aldrin. Both aldrin and dieldrin are well absorbed through the lungs, skin, and gastrointestinal tract (Shell, 1984; Heath and Vanderkar, 1964; Hunter and Robinson, 1967, 1969; Sundaram *et al.*, 1978a,b; Iatropoulous *et al.*, 1975). Aldrin is metabolically converted to dieldrin in fatty tissues (ACGIH, 1986) and both are considered to have similar chemical and toxic effects (USEPA, 1988). Several human and animal studies have shown that adipose tissue is the primary storage depot for dieldrin, followed by the liver, brain, and whole blood (ATSDR, 2002). Acute symptoms of dieldrin intoxication in humans and animals following ingestion or inhalation indicate CNS stimulation manifested primarily as irritability, salivation, tremors, and convulsions. Experimental studies indicate that dogs exposed for longer periods of time to levels as low as 1 mg/kg developed hepatic and renal toxicity (Fitzhugh *et al.*, 1964; Treon and Cleveland, 1955; Walker *et al.*, 1969). Rats fed dieldrin for 2 years developed hepatic lesions and nephritis at doses of 0.5 and 50 ppm, respectively (Fitzhugh *et al.*, 1964). Dieldrin produced fetotoxic and/or teratogenic effects in hamsters fed a single oral dose of 50 mg/kg (approximately 84 ppm) and in mice fed a single oral dose of 25 mg/kg (approximately 6 ppm) (Ottolenghi *et al.*, 1974). Dieldrin produced marked effects on fertility, gestation, viability, and lactation in mice given 25 mg/kg-day in a six-generation study (Deichmann, 1972). Dieldrin produces chromosomal aberrations in mouse, rat, and human cells and unscheduled DNA synthesis in rats and humans (Probst *et al.*, 1981). Chronic oral exposure to dieldrin has produced an increase in hepatocellular tumors in mice (Davis, 1965; Epstein, 1975; NCI, 1978). In contrast, chronic feeding studies with dieldrin in rats indicate that exposure was associated with nonneoplastic changes in the liver (NCI, 1978; Fitzhugh *et al.*, 1964). Ingestion of dieldrin by laboratory animals results in a decreased immune response (Loose 1982; Loose *et al.*, 1981).

USEPA classified dieldrin as group B2 - Probable Human Carcinogen and developed an oral cancer slope factor based on the increased incidence of liver carcinoma observed in male and female C3H mice (Davis, 1965; Epstein, 1975) and in male B6C3F1 mice (NCI, 1978).

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4,4'-DDT, 4,4'-DDE, 4,4'-DDD

DDT (1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane) was a chemical widely used to control insects on agricultural crops and insects that carry diseases like malaria and typhus. Technical grade DDT is a mixture of three forms, 4,4'-DDT (85%), 2,4'-DDT (15%), and 2,2'-DDT (trace amounts) (ATSDR, 2002). All of these are white, crystalline, tasteless, and almost odorless solids. Also, DDE (1,1-dichloro-2,2- bis(p -chlorophenyl)ethylene) and DDD (1,1-dichloro-2,2-bis(p -chlorophenyl)ethane) sometimes contaminate technical grade DDT. DDD was also used to kill pests; one form of DDD (2,4'-DDD) has been used medically to treat cancer of the adrenal gland (ATSDR, 2002). DDT is no longer used as a pesticide in the United States except in cases of public health emergency. The most prevalent isomers for DDT, DDE, or DDD in the environment are the 4,4'-isomers (ATSDR, 2002).

DDT is absorbed by humans and experimental animals from the gastrointestinal tract (USEPA, 1984, 1980). Jenson et al. (1957) reported that 95% of ingested DDT in rats is absorbed from the gastrointestinal tract. Absorption of DDT through the skin is minimal (USEPA, 1980). In humans, DDT and its metabolites, DDD and DDE, are stored primarily in adipose tissue; storage of DDT in human tissues can last up to 20 years (NIOSH, 1978). Acute oral exposure to DDT in humans and animals may cause dizziness, confusion, tremors, convulsions, and paresthesia of the extremities. Allergic reactions in humans following dermal exposure to DDT have also been reported (USEPA, 1980). Long-term occupational exposure to DDT results in increased activity

in hepatic microsomal enzymes, increased serum concentrations of enzymes and cholesterol, decreased serum concentrations of creatinine phosphokinase, increased blood pressure, and increased frequency of miscarriages (NIOSH, 1978). Blood, kidney, liver and neurological effects, immunosuppression, reduced fertility, embryotoxicity, and fetotoxicity have also been reported in animals following subchronic and chronic exposure to DDT (ATSDR, 2002; Laug *et al.*, 1950; NIOSH, 1978; McLachlan and Dixon, 1972; Schmidt, 1973). For example, monkeys subchronically exposed to 50 mg/kg-day DDT exhibited loss of equilibrium and rats chronically exposed to 16 mg/kg-day DDT exhibited tremors by week 26 (ATSDR, 2002). In addition, rats exposed, in a two-generation feeding study, to 0.35 mg/kg-day DDT had decreased fertility (Green, 1969). DDT has been shown to be carcinogenic in mice and rats at several dose levels or dosage regimens. The principal site of action is the liver, but an increased incidence of tumors of the lung and lymphatic system have also been reported in several investigations (NIOSH, 1978; Tomatis *et al.*, 1974; NCI, 1978).

4,4'-DDT, 4,4'-DDD, and 4,4'-DDE are classified by USEPA in Group B2 - Probable Human Carcinogen based on inadequate evidence of carcinogenicity from human studies and sufficient evidence of carcinogenicity from animal studies. For 4,4'-DDT, USEPA developed an oral cancer slope factor based on a number of carcinogenicity studies. USEPA developed an oral cancer slope factor for 4,4'-DDD based on an increased incidence of lung tumors in male and female mice, liver tumors in male mice, and thyroid tumors in male and female rats. USEPA developed an oral cancer slope factor for 4,4'-DDE based on an increased incidence of liver tumors in two strains of mice and hamsters, and thyroid tumors in male and female rats by diet.

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Heptachlor Epoxide

Heptachlor epoxide is a contaminant and metabolite of the insecticide, heptachlor. Heptachlor is readily absorbed from the gastrointestinal tract following oral exposure (ATSDR, 2002). Acute symptoms due to heptachlor exposure in humans include irritability, excessive salivation, labored respiration, muscle tremors, and convulsions (USEPA, 1987). Acute exposure of animals to heptachlor and heptachlor epoxide produced tremors, convulsions, paralysis, and hypothermia (USEPA, 1985). Chronic exposure of experimental animals to dietary concentrations of heptachlor or heptachlor epoxide has been associated with increased liver weight and hepatocellular carcinoma; heptachlor also induced hepatic lesions (USEPA, 1987; Velsicol, 1955; Dow Chemical, 1955; Davis, 1965; Epstein, 1976; NCI, 1977; Velsicol, 1973). In the presence of metabolic activation, both heptachlor and heptachlor epoxide induced unscheduled DNA synthesis in transformed human fibroblasts (Ahmed *et al.*, 1977). Heptachlor also increased the frequency of chromosomal aberrations in bone marrow cells of mice (Markarjan, 1966). Results of studies with rodents also indicate that heptachlor epoxide induces reproductive and developmental effects (USEPA, 1987).

Heptachlor epoxide is classified as Group B2 - Probable Human Carcinogens based on sufficient evidence of carcinogenicity in animal studies and inadequate evidence of carcinogenicity in humans. Using experiments in which mice exposed to dietary concentrations of heptachlor epoxide exhibited hepatocellular carcinomas (Davis, 1965; NCI, 1977; Velsicol, 1973), USEPA estimated an oral cancer slope factor for heptachlor epoxide.

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Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are complex mixtures of chlorinated biphenyls. There are 209 individual PCB congeners which comprise environmental and commercial mixtures of PCBs to varying degrees. The commercial PCB mixtures that were manufactured in the United States were given the trade name of "Aroclor." Aroclors are distinguished by a four-digit number (for example, Aroclor-1260). The last two digits in the Aroclor 1200 series represent the average percentage by weight of chlorine in the product. Each Aroclor contains numerous congeners; for example, Aroclor-1260 contains 80 individual congeners when analyzed by high resolution chromatography (Safe *et al.*, 1987). Not all of the congeners are equally toxic. In general, coplaner PCB molecules which are sterically similar to 2,3,7,8-tetrachloro-dibenzodioxin (TCDD) (3,3'4,4',5-penta-CB, 3,3',4,4',5,5'-hexa-CB and 3,3',4,4'-tetra-CB), exhibit the highest toxicity in laboratory animals (Kamrin and Fischer, 1991). The toxicity of an environmental mixture of PCBs will largely be determined by the quantities of the highly toxic congeners that are present in the mixture.

PCBs in pure form are readily and extensively absorbed through the gastrointestinal tract and somewhat less readily through the skin; PCBs are presumably readily absorbed from the lungs, but few data are available that experimentally define the extent of absorption after inhalation (USEPA, 1985). Studies have found oral absorption efficiency on the order of 75% to>90% in rats, monkeys and ferrets (Albro and Fishbein, 1972; Allen *et al.*, 1974; Tanabe *et al.*, 1981;

Bleavens *et al.*, 1984; Clevenger *et al.*, 1989). PCBs distribute preferentially to adipose tissue and concentrate in human breast milk due to its high fat content (ATSDR, 2002). The binding of PCBs to a soil or sediment matrix inhibits absorption by all routes (ATSDR, 2002).

Dermatitis and chloracne (a potentially disfiguring and long-term skin disease) have been the most prominent and consistent findings in studies of occupational exposure to PCBs. Several studies examining liver function in exposed humans have reported disturbances in blood levels of liver enzymes. Reduced birth weights, slow weight gain, reduced gestational ages, and behavioral deficits in infants were reported in a study of women who had consumed PCB-contaminated fish from Lake Michigan (USEPA, 1985). Reproductive, developmental, hepatic, immunotoxic, and immunosuppressive effects appear to be the most sensitive end points of PCB toxicity in nonrodent species, and the liver appears to be the most sensitive target organ for toxicity in rodents (USEPA, 1985). For example, adult monkeys exposed to dietary concentrations of 0.028 mg/kg-day Aroclor-1016 for approximately 22 months showed no evidence of overt toxicity; however, the offspring of these monkeys exhibited decreased birth weight and possible neurological impairment (Barsotti and Van Miller, 1984; Levin *et al.*, 1988; Schantz *et al.*, 1989, 1991).

A number of studies have suggested that PCB mixtures are capable of increasing the frequency of tumors including liver tumors in animals exposed to the mixtures for long periods (Kimbrough *et al.*, 1975; NCI, 1978; Schaeffer *et al.*, 1984; Norback and Weltman, 1985). In addition, studies have suggested that PCB mixtures can act to promote or inhibit the action of other carcinogens in rats and mice (USEPA, 1985). It is known that PCB congeners vary greatly in their potency in producing biological effects, such as cancer; however, USEPA generally considers Aroclor-1260 to be the Aroclor with the greatest tumorigenic potential and, therefore, conservatively uses this Aroclor to be representative of all PCB mixtures for the evaluation of carcinogenic effects. Nevertheless, USEPA has acknowledged that there is some evidence that mixtures containing highly chlorinated biphenyls are more potent inducers of hepatocellular carcinoma in rats than are mixtures containing less chlorine by weight following oral exposure. The responses are mostly limited to the livers in rats and mice, although there is a suggestion that some PCB mixtures may also affect the stomach of rats and monkeys (Chase *et al.*, 1989). Statistically significant increases in malignant tumors have not been observed in animal studies with PCB mixture containing less than 60 percent chlorine content (Chase *et al.*, 1989). There is some suggestive evidence that Aroclor-1254 induces hepatocellular adenomas and carcinomas combined in male rats based on the reclassification and reevaluation of the NCI (1978) tumor data conducted by Ward (1985). However, the majority of tumors were benign (statistically significant alone), while the few malignant tumors (carcinomas) were not statistically elevated by themselves. At present, there is uncertainty as to whether or not Aroclor-1248, -1242, or -1232 are tumorigenic in animals. This is because there are no valid cancer bioassays for these mixtures (Chase *et al.*, 1989).

Existing epidemiological data do not indicate a consistent tumorigenic effect among individuals exposed to PCBs. ATSDR (2002) concluded that occupational studies involving predominantly inhalation and dermal exposures to PCBs have suggested an association between the

development of liver, gastrointestinal, hematopoietic and skin cancer and PCB exposure. However, the majority of these studies were mortality studies that reported nonstatistically significant results, were confounded by concurrent exposure to other chemicals (many of which are considered to be potential carcinogens), had small sample sizes or number of deaths, or unquantified PCBs exposures. In addition, there is no consistent pattern of associations among the various studies, either with respect to type of human cancers observed or the nature and extent of PCB exposures.

USEPA classifies PCBs as Group B2 - Probable Human Carcinogens based on sufficient evidence in animal bioassays and inadequate evidence from studies in humans. USEPA recently revised the oral slope factor for PCBs to multiple possible slope factors corresponding to three different tiers. The appropriate tier for used depends on the level of risk and likely persistence of the congeners evaluated. The top tier, for "high risk and persistence," is considered most appropriate at this site. The criteria for use of this tier, suggested by USEPA, are as follows: (1) food chain exposures; (2) sediment or soil ingestion; (3) dust or aerosol inhalation; (4) dermal exposure, if an absorption factor has been applied; (5) presence of dioxin-like, tumor-promoting, or persistent congeners; and (6) early-life exposures. Dose-response data were generated based on the incidence of liver hepatocellular adenomas, carcinomas, cholangiomas, or cholangiocarcinomas in female Sprague-Dawley rats exposed to Aroclor-1260, -1254, -1242, and -1016 separately in one study (Brunner *et al.*, 1996) and only Aroclor-1260 in another study (Norback and Weltman, 1985).

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. *Toxicological profile for polychlorinated biphenyls.* August 2002.

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INORGANICS

Antimony

Antimony is a metal which occurs both in the trivalent and pentavalent oxidation states (USEPA, 1980). Absorption of this metal via oral routes of exposure is low (10% for antimony, tartrate; 1% for all other forms) (ATSDR, 2002). Organic antimony is more toxic than the inorganic compounds due to increased absorption. Humans and animals exposed acutely by oral or inhalation exposures to either the trivalent or pentavalent forms of antimony displayed electrocardiogram (ECG) changes and myocardial lesions (USEPA, 1980). Pneumoconiosis has been observed in humans exposed by acute inhalation and dermatitis has occurred in individuals exposed either orally or dermally. Following acute oral exposure to antimony trioxide or potassium antimony tartrate, both humans and laboratory animals (dogs) manifested nausea and vomiting (ATSDR, 2002). Humans and laboratory animals (i.e., rat and pig) chronically exposed to antimony compounds (antimony trioxide, pentoxide, and trisulfide) via inhalation manifested respiratory effects including macrophage proliferation, fibrosis and pneumonia at LOAELs ranging from 0.046 to 86.3 mg/m^3 (ATSDR, 2002). Chronic oral exposure in rats (0.35 mg/kg-day) resulted in altered blood glucose and blood cholesterol levels and decreased lifespan (Schroeder *et al.*, 1970). A single report (Balyeava, 1967) noted an increase in spontaneous abortions, premature births, and gynecological problems in 318 female workers exposed to a mixture of antimony metal, antimony trioxide, and antimony pentasulfide dusts. No change in

the incidence of cancer was observed in laboratory animals (i.e., rats, mice) fed 0.262 or 0.35 mg/kg-day antimony as potassium antimony tartrate for a lifetime.

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Arsenic

Arsenic is difficult to characterize as a single analyte because it has complex chemistry. It may be trivalent or pentavalent and is widely distributed in nature (ATSDR, 2002). Both inorganic and organic forms of arsenic are readily absorbed via oral and inhalation routes. Soluble forms are more readily absorbed than insoluble forms (USEPA, 1984). Approximately 95% of soluble inorganic arsenic administered to rats is absorbed from the gastrointestinal tract (Coulson *et al.*, 1935; Ray-Bettley and O'Shea, 1975). Approximately 70–80% of arsenic deposited in the respiratory tract of humans has been shown to be absorbed (Holland *et al.*, 1959). Dermal absorption of the insoluble forms of arsenic is not significant (USEPA, 1984). At mining sites, arsenic is expected to occur in naturally occurring mineral assemblages with considerably lower bioavailability than expected in soluble inorganic arsenic salts (Davis *et al.*, 1992).

Acute exposure in humans by ingestion of metallic arsenic has been associated with gastrointestinal effects, hemolysis, and neuropathy (USEPA, 1984). Chronic human arsenicism (by drinking water ingestion) is associated with increased risk of nonmelanoma, typically nonlethal, skin cancer and a peripheral vascular disorder that results in gangrene of the extremities, especially feet, known as blackfoot disease (Tseng, 1977). Additionally, there is strong evidence to suggest ingested inorganic arsenic causes cancers of the bladder, kidney, lung, and liver, and possibly other sites (Bates *et al.*, 1992; Chen *et al.*, 1992; Chen *et al.*, 1986). It is well known that hyperpigmentation and keratosis are also associated with chronic arsenicism (Neubauer, 1947) and arsenic can produce toxic effects on both the peripheral and CNS, precancerous dermal lesions, and cardiovascular damage (USEPA, 1984; Tseng, 1977). Arsenic is embryotoxic, fetotoxic, and teratogenic in several animal species (USEPA, 1984). No evidence of reproductive toxicity was found (Calabrese and Kenyon, 1991). Epidemiological studies of workers in smelters and in plants manufacturing arsenical pesticides have shown inhalation of arsenic is strongly associated with lung cancer and less so, with hepatic angiosarcoma (USEPA, 1984).

There is substantial evidence that establishes the nutritional essentiality of trace levels of arsenic. Deficiency has been shown to depress growth and impair reproduction in rats, minipigs, chickens, and goats (USEPA, 1988; NRC, 1989). Methylation of arsenic to less toxic, more rapidly excreted chemical species provides an effective detoxification mechanism *in vivo*. In humans, this system may become saturated at daily oral intake rates greater than 250–1,000 µg/day. For this reason, the dose-response curve for arsenic, for carcinogenicity and systemic toxicity, may have nonlinearities, i.e., a portion of the dose-response curve exists over which increases in dose do not result in comparable increases in physiological response (Petito and Beck, 1990).

USEPA classified arsenic as Group A - Human Carcinogen and derived an oral cancer slope factor based on two epidemiological studies (Tseng *et al.*, 1968; Tseng, 1977) which indicated an increased incidence of skin cancer in individuals exposed to arsenic in drinking water.

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Barium

The soluble salts of barium, an alkaline earth metal, are toxic in mammalian systems. They are absorbed rapidly from the gastrointestinal tract and are deposited in the muscles, lungs, and bone. Barium is excreted primarily in the feces.

At low doses, barium acts as a muscle stimulant and at higher doses affects the nervous system eventually leading to paralysis. Acute and subchronic oral doses of barium cause vomiting and diarrhea, followed by decreased heart rate and elevated blood pressure. Higher doses result in cardiac irregularities, weakness, tremors, anxiety, and dyspnea. A drop in serum potassium may account for some of the symptoms. Death can occur from cardiac and respiratory failure. Acute doses around 800 milligrams can be fatal to humans.

Subchronic and chronic oral or inhalation exposure primarily affects the cardiovascular system resulting in elevated blood pressure. A lowest-observed-adverse-effect level (LOAEL) of 0.51 mg barium/kg/day based on increased blood pressure was observed in chronic oral rat studies (Perry et al. 1983), whereas human studies identified a no-observed-adverse-effect level (NOAEL) of 0.21 mg barium/kg/day (Wones et al. 1990, Brenniman and Levy 1984). In the Wones et al. study, human volunteers were given barium up to 10 mg/L in drinking water for 10 weeks. No clinically significant effects were observed. An epidemiological study was conducted by Brenniman and Levy in which human populations ingesting 2 to 10 mg/L of barium in drinking water were compared to a population ingesting 0 to 0.2 mg/L. No significant individual differences were seen; however, a significantly higher mortality rate from all combined cardiovascular diseases was observed with the higher barium level in the 65+ age group. The average barium concentration was 7.3 mg/L, which corresponds to a dose of 0.20 mg/kg/day.

Subchronic and chronic inhalation exposure of human populations to barium-containing dust can result in a benign pneumoconiosis called "baritosis." This condition is often accompanied by an elevated blood pressure but does not result in a change in pulmonary function. Exposure to an air concentration of 5.2 mg barium carbonate/m^3 for 4 hours/day for 6 months has been reported to result in elevated blood pressure and decreased body weight gain in rats (Tarasenko et al. 1977). Reproduction and developmental effects were also observed. Increased fetal mortality was seen after untreated females were mated with males exposed to 5.2 mg/m^3 of barium carbonate. Similar results were obtained with female rats treated with 13.4 mg barium carbonate/m^3.

Barium has not been evaluated by the USEPA for evidence of human carcinogenic potential

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Cadmium

Gastrointestinal absorption of cadmium in humans ranges from 5 to 6% (USEPA, 1985a). Based on a comprehensive model for inhaled cadmium, the deposition rate of particulate airborne cadmium is 5–50% (i.e., 5% of particles greater than 10 microns and up to 50% of particles less than 0.1 microns), and 50–100% of the cadmium deposited was absorbed (Nordberg *et al.*, 1985). Cadmium bioaccumulates in humans, particularly in the kidney and liver (USEPA, 1985a,b). Acute oral exposure to cadmium in laboratory animals resulted in systemic, immunological, neurological, developmental, and reproductive effects at doses of 2–138 mg/kg-day (ATSDR, 2002). Chronic oral or inhalation exposure of humans to cadmium has been associated with renal dysfunction, itai-itai disease (bone damage), hypertension, anemia, endocrine alterations, and immunosuppression. Renal toxicity occurs in humans chronically exposed to cadmium in food at LOAEL of 0.0075 mg/kg-day. In laboratory animals (i.e., rat, mouse) chronic oral exposure to cadmium results in increased blood pressure, hematological, and renal effects at LOAELs ranging from 0.014 to 57 mg/kg-day (ATSDR, 2002). Teratogenic and reproductive effects (i.e., deceased fetal and birth weight, delayed ossification, behavioral impairment, and reduced fertility) were reported in laboratory animals (i.e., rat, mice, dogs) subchronically exposed to cadmium in drinking water at LOAELs ranging from 0.04 to

40 mg/kg-day (ATSDR, 2002). Epidemiological studies have demonstrated a strong association between inhalation exposure to cadmium and cancers of the lung, kidney, and prostate (USEPA, 1985b; Thun *et al.*, 1985). In experimental animals, cadmium induces injection-site sarcomas and testicular tumors. When administered by inhalation, cadmium chloride is a potent pulmonary carcinogen in rats. Cadmium is a well-documented animal teratogen (USEPA, 1985b).

USEPA classified cadmium as Group B1 - Probable Human Carcinogen by inhalation. This classification applies to agents for which there is limited evidence of carcinogenicity in humans from epidemiologic studies.

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Chromium

Chromium exists in two states, as chromium (III) and as chromium (VI). Following oral exposure, absorption of chromium (III) has been reported to be 0.4% while absorption of chromium (VI) has been observed to be as high as 10% (ATSDR, 2002). However, chromium (VI) is rapidly reduced to chromium (III) after penetration of biological membranes and in the gastric environment (ATSDR, 2002). Chromium is an essential micronutrient and is not toxic in trace quantities (USEPA, 1980).

Alterations in liver enzyme activities were noted in rats administered an oral dose of 13.5 mg/kg-day chromium (VI) for 20 days (Kumar *et al.*, 1985). Rats subchronically administered higher

concentrations of chromium VI (98 mg/kg-day) have exhibited adverse effects on renal function (Diaz-Mayans *et al.*, 1986). No significant changes, however, were detected in the livers or kidneys of rats exposed to 2.7 mg/kg-day or 3.5 mg/kg-day chromium (III) or chromium (VI), respectively, in the drinking water for 1 year (MacKenzie *et al.*, 1958; ATSDR, 2002). CNS effects including hypoactivity have been reported in rats when exposed to subchronic levels of 98 mg/kg-day chromium VI in drinking water (Diaz-Mayans *et al.*, 1986).

Workers exposed to 2 $\mu g/m^3$ chromic acid vapors (mean duration of 2.5 years), a soluble chromium (VI) compound, exhibited atrophy and ulceration of the nasal mucosa and transient decrease in lung function (Lindberg and Hedenstierna, 1983). There is, however, insufficient scientific evidence that chromium (III) compounds by themselves elicit atrophy of the nasal mucosa or adverse respiratory effects in humans (ATSDR, 2002). Furthermore, epidemiological studies of worker populations have clearly established that inhaled chromium (VI) is a human carcinogen; the respiratory passages and the lungs are the target organs (Mancuso, 1975; USEPA, 1984).

Inhalation of chromium (III) or ingestion of chromium (VI) or (III) has not been associated with carcinogenicity in humans or experimental animals (USEPA, 1984). Oral exposure of pregnant mice (gestational days, 1 to 19) to 57 mg/kg-day chromium (VI) resulted in embryolethal effects (e.g., increased resorptions and postimplantation loss), reduced ossification and gross anomalies (Trivedi *et al.*, 1989). Chromium (III) does not appear to cause fetotoxic or teratogenic effects in rats (ATSDR, 2002). Reproductive effects in the form of decreased sperm count were noted in mice administered oral doses of 4.6 mg/kg-day chromium (VI) (225 ppm) and 3.5 mg/kg-day chromium (III) (172 ppm) for 7 weeks (Zahid *et al.*, 1990).

USEPA classified inhaled chromium (VI) in Group A—Human Carcinogen by the inhalation route. Inhaled chromium (III) and ingested chromium (III) and (VI) have not been classified with respect to carcinogenicity. Because carcinogenicity by the oral route of exposure can not be determined, chromium is classified as Group D for the oral exposure route.

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Copper

Copper is a reddish metal that occurs naturally in rock, soil, water, sediment, and air. Its average concentration in the earth's crust is about 50 parts copper per million parts soil. Copper also occurs naturally in plants and animals. It is an essential element for all known living organisms including humans and other animals.

Chromosomal aberrations were induced in isolated rat hepatocytes when incubated with copper sulfate (Sina et al., 1983). Casto et al. (1979) showed enhanced cell transformation in Syrian hamster embryo cells infected with simian adeno virus with the addition of cuprous sulfide and copper sulfate. High concentrations of copper compounds have been reported to induce mitosis in rat ascites cells and recessive lethals in Drosophila melanogaster. Law (1938) reported increases in the percent lethals observed in Drosophila larvae and eggs when exposed to copper by microinjection (0.1% copper sulfate) or immersion (concentrated aqueous copper sulfate), respectively.

Hematological effects in workers employed in a copper processing factory have been reported by Finelli et al. (1981). However, interpretation of the study results is limited by the finding of elevated iron, lead, and cadmium in hair samples of exposed workers.

Metal fume fever, has been reported in factory workers exposed to copper dust or fumes (Armstrong et al. 1983; Gleason 1968; Stokinger 1981).

Moriya et al. (1983) reported no increase in mutations in E. coli and S. typhimurium strains TA98, TA1535, TA1537 and TA1538 incubated with up to 5 mg copper quinolinolate/plate and in S. typhimurium TA98 and TA100 incubated with up to 5 mg copper sulfate/plate.

Demerec et al. (1951) reported dose-related mutagenic effects in E. coli with 2 to 10 ppm copper sulfate in a reverse mutation assay. Negative results were obtained with copper sulfate or copper chloride in assays using S. cerevisiae (Singh, 1983) and Bacillus subtilis (Nishioka, 1975, Matsui, 1980, Kanematsu et al., 1980). Errors in DNA synthesis from poly(c)templates have been induced in viruses incubated with copper chloride or copper acetate (Sirover and Loeb, 1976).

Bionetics Research Labs (1968) studied the carcinogenicity of a copper-containing compound, copper hydroxyquinoline, in two strains of mice (B6C3F1 and B6AKF1). Groups of 18 male and 18 female 7-day-old mice were administered 1000 mg copper hydroxyquinoline/kg bw (180.6 mg Cu/kg) suspended in 0.5% gelatin daily until they were 28 days old, after which they were administered 2800 ppm (505.6 ppm Cu) in the feed for 50 additional weeks. No statistically significant increases in tumor incidence were observed in the treated 78-week-old animals. In the same study, Bionetics Research Labs (1968) administered a single subcutaneous injection of gelatin (control) or 1000 mg of copper hydroxyquinoline/kg bw (180.6 mg Cu/kg) suspended in 0.5% gelatin to groups of 28-day-old mice of both strains. After 50 days of observation, the male B6C3F1 had an increased incidence of reticulum cell sarcomas compared with controls. No tumors were observed in the treated male B6AKF1 mice, and a low incidence of reticulum cell sarcomas was observed in the treated female mice of both strains.

Gilman (1962) administered intramuscular injections containing 20 mg of cupric oxide (16 mg Cu), cupric sulfide (13.3 mg Cu), and cuprous sulfide (16 mg Cu) into the left and right thighs of 2- to 3-month-old Wistar rats. After 20 months of observations, no injection-site tumors were observed in any animals, but other tumors were observed at very low incidence in the animals receiving cupric sulfide (2/30) and cuprous sulfide (1/30). As the relevance of the organic copper compound to the observation of sarcoma induction is uncertain and the incidence of tumors in rats treated i.m. with inorganic copper was very low, data are considered inadequate for classification.

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Lead

Lead is used extensively in the manufacture of storage batteries and was used in gasoline and paint. Lead is also a natural constituent of many soils, for which concentrations normally range from 10 to 30 mg lead per kilogram of soil (USEPA, 1980).

Lead can be absorbed by the oral, inhalation or dermal exposure routes (see section on Relative Absorption Factors). Gastrointestinal absorption of lead varies considerably depending upon chemical form, dietary intake, and age (Forbes and Reina, 1974; Barltrop and Meek, 1975). The deposition and absorption of inhaled lead depends upon particle size, chemical form and the rate and depth of breathing (Randall et al., 1975; Nozaki, 1966; Chamberlain et al., 1975). Once absorbed, lead is distributed to the various organs of the body, with most distribution occurring into mineralized tissues (ATSDR, 2002). Placental transfer to the developing fetus is possible (Bellinger et al., 1987). Inorganic lead is not known to be biotransformed within the body. Absorbed lead is excreted via the urinary or fecal routes (ATSDR, 2002)

Cases of acute lead poisoning in humans are not common and have not been studied in experimental animals as thoroughly as chronic lead poisoning. Symptoms of acute lead poisoning from deliberate ingestion by humans may include vomiting, abdominal pain, hemolysis, liver damage, and reversible tubular necrosis (USEPA, 1984). Subacute exposures in humans reportedly may produce a variety of neurological effects including dullness, restlessness, irritability, poor attention span, headaches, muscular tremor, hallucinations, and loss of memory. Nortier et al., (1980) report encephalopathy and renal damage to be the most serious complications of chronic toxicity in man and the hematopoietic system to be the most sensitive. For this reason, most data on the effects of lead exposure in humans are based upon blood lead levels. The effects of lead on the formation of hemoglobin and other hemoproteins, causing decreased levels, are reportedly detectable at lower levels of lead exposure than in any other organ system (Betts et al., 1973). Peripheral nerve dysfunction is observed in adults at levels of 30 to 50 mg/dL-blood. Children's nervous systems are reported to be affected at levels of 15 mg/dL-blood and higher (Benignus et al., 1981). In high doses, lead compounds may potentially cause abortions, premature delivery, and early membrane rupture (Rom, 1976).

Acute oral lethal doses of lead in animals depend upon chemical form, but generally range from 500 to 30,000 mg/kg. Several reproduction studies on the effects of subchronic oral exposure to lead in rats have been conducted (Kimmel et al., 1976; Grant et al., 1980; Fowler et al., 1980). These studies report that lead acetate administered in drinking water at various concentrations caused depressed body weights at 50 and 250 mg-Pb/L water, histological changes in the kidneys of offspring, cytokaryomegaly of the tubular epithelial cells of the inner cortex at concentrations greater than or equal to 25 mg/L and postnatal developmental delays at 50 to 250 mg/L. Higher oral doses of lead may result in decreased fertility and fetotoxic effects in a variety of species (Hilderbrand et al., 1973). A reduction in the number of offspring of rats and mice exposed to 25 mg Pb/L drinking water with a chromium deficient diet was reported by Schroeder et al. (1970). Chronic oral exposure of female Long-Evans rats to lead (5 mg/PB/L-water) reportedly resulted in slight effects on tissue excitability, systolic blood pressure, and cardiac ATP concentrations (Kopp et al., 1980a,b).

Results of *in vitro* studies with human lymphocyte cultures using lead acetate were nearly equally positive and negative. Results of in vivo tests are also contradictory but suggest that lead may have an effect on chromosomes (sister chromatid exchange). Results for gene mutations, DNA modification, and recombinations in various microorganisms using lead acetate, lead nitrate and

lead chloride were consistently negative with or without metabolic activation. Lead chloride has been reported to inhibit both DNA and RNA synthesis. In *in vitro* mammalian test systems, lead acetate gave conflicting results.

No epidemiological data regarding the oral carcinogenic potential of lead could be located in the available literature. Chronic inhalation may result in a statistically significant increase in deaths due to tumors in the digestive organs and respiratory systems in lead smelter workers and battery plant workers (Kang et al., 1980). Several studies have reported tumor formation in experimental animals orally administered specific lead salts, not normally ingested by humans (Zawirska and Medras, 1972; Boyland et al., 1962; Ito, 1973). The carcinogenicity of inhaled lead in experimental animals could not be located in the available literature. The USEPA has classified lead and lead compounds as Group B2 - Probable Human Carcinogens. Because the carcinogenic potential of lead appears to be weak, USEPA bases risk management decisions for this compound on neurodevelopmental effects rather than carcinogenicity.

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Manganese

Manganese is considered to be among the least toxic of the trace metals and, in fact, is considered to be an essential element (NRC, 1989). The oral absorption of dietary manganese ranges from 3 to 10%. However, manganese is absorbed to a greater extent following inhalation exposures. The National Research Council has established a provisional recommended dietary allowance for adults of 2 to 5 mg/day (NRC, 1989).

The effects following acute exposure to manganese are unknown. Chronic occupational exposure to manganese dust (0.02–2.6 mg/m^3) has been associated with respiratory symptoms and pneumonitis (Chandra *et al.*, 1981) and higher levels have been associated with a condition known as manganism, a progressive neurological disease characterized by speech disturbances, tremors, and difficulties in walking. For example, male workers exposed to manganese dioxide, tetroxide and various salts (TWA of total airborne manganese dust ranged from 0.07 to 8.61 mg/m^3) experienced an increased incidence of psychomotor disturbances (e.g., reaction time, hand-eye coordination and hand steadiness) (Roels *et al.*, 1987). Other effects observed in humans occupationally exposed to manganese dust include hematological (Chandra *et al.*, 1981; Flinn *et al.*, 1941; Kesic and Hausler, 1954), cardiovascular (Saric and Hrustic, 1975) and reproductive effects (Cook *et al.*, 1974; Emara *et al.*, 1971; Lauwerys *et al.*, 1985; Rodier, 1955).

In adults, a safe intake of manganese from dietary sources ranges from 2 to 10 mg/day (10 mg/day = 0.14 mg/kg-day) (WHO, 1973; NRC, 1989; Schroeder *et al.*, 1966). Individuals who chronically ingested drinking water from natural wells containing manganese concentrations of 1,600–2,300 µg/L (0.06 mg/kg-day), showed a statistically significant increase in minor neurologic effects (neurologic exam scores) (Kondakis *et al.*, 1989). The dietary intake of manganese was unaccounted for in this study, and therefore, USEPA withdrew its previous assessment that used this study to determine a quantitative dose-response relationship for manganese in drinking water. Higher concentrations in drinking water (0.8 mg/kg-day) have resulted in symptoms including lethargy, increased muscle tonus, tremor and mental disturbances (Kawamura *et al.*, 1941).

Chronic oral exposure of rats to manganese chloride can also result in CNS dysfunction (Leung *et al.*, 1981; Lai *et al.*, 1982). Chronic inhalation exposure of experimental animals (monkeys, rats, mice, hamsters) has resulted in respiratory effects; however, other studies have demonstrated that these effects may be immunological in origin (ATSDR, 2002). Manganese has not been reported to be teratogenic; however, this metal has been observed to cause depressed reproductive performance and reduced fertility in humans and experimental animals (USEPA, 1984a).

Certain manganese compounds have been shown to be mutagenic in a variety of bacterial tests. Manganese chloride and potassium permanganate can cause chromosomal aberrations in mouse mammary carcinoma cells. Manganese was moderately effective in enhancing viral transformation of Syrian hamster embryo cells (USEPA, 1984a,b). USEPA established a weight-of-evidence classification for manganese of D (not classifiable as to human carcinogenicity).

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Mercury

In humans, inorganic mercury is absorbed following inhalation and oral exposure; however, only 7–15% of administered inorganic mercury is absorbed following oral exposure (USEPA, 1984; Rahola *et al.*, 1971; Task Group on Metal Accumulation, 1973; ATSDR, 2002). Organic mercury is almost completely absorbed from the gastrointestinal tract and is assumed to be well absorbed via inhalation in humans (USEPA, 1984).

A primary target organ for inorganic compounds is the kidney. Acute and chronic exposures of humans to inorganic mercury compounds have been associated with anuria, polyuria, proteinuria, and renal lesions (Goyer, 1996). Chronic occupational exposure of workers to elemental mercury vapors (0.026–0.2 mg/m^3) has been associated with mental disturbances, tremors, and gingivitis (USEPA, 1984; ATSDR, 2002). Animals exposed to inorganic mercury for 12 weeks have exhibited proteinuria, nephrotic syndrome and renal disease (Druet *et al.*, 1978). Rats chronically administered inorganic mercury (as mercuric acetate) in their diet for 2 years exhibited a dose-related increase in glomerular nephritis at concentrations as low as 1.27 mg/kg-day (Fitzhugh *et al.*, 1950).

The CNS is a major target for organic mercury compounds. Adverse effects in humans, resulting from subchronic and chronic oral exposures to organic mercury compounds, have included destruction of cortical cerebral neurons, damage to Purkinje cells, and lesions of the cerebellum. Clinical symptoms following exposure to organic mercury compounds have included paresthesia, loss of sensation in extremities, ataxia, and hearing and visual impairment (WHO, 1976; ATSDR, 2002). Adverse kidney effects are also prominent in animals following chronic ingestion of organic mercury (0.5 ppm phenyl mercuric acetate or 0.015 mg Hg/kg-day) (Fitzhugh *et al.*, 1950). Embryotoxic and teratogenic effects, including malformations of the

skeletal and genitourinary systems, have been observed in animals exposed orally to organic mercury (USEPA, 1984).

Both organic and inorganic compounds are reported to be genotoxic in eukaryotic systems (Leonard *et al.*, 1984). Elevated incidence of fetal resorption was observed in hamsters exposed to 31.4 mg/kg-day inorganic mercury (Gale, 1974). There is evidence to suggest methylmercury chloride induces renal tumors, mostly adenocarcinomas in two strains of male mice (ICR and B6C3F1) (Hirano *et al.*, 1986; Mitsumori *et al.*, 1981, 1990). However, monkeys, cats and rats chronically administered methyl mercury in the diet did not develop an elevated tumor incidence (Ikeda *et al.*, 1973; Charbonneau *et al.*, 1976; Vershuuren *et al.*, 1976). Furthermore, elevated cancer incidence has not been reported in humans who ingested methylmercury-contaminated fish in the Minamata area of Japan (Katsuna, 1968) or in humans who ingested methylmercury fungicide-treated grains in Iraq and were followed for 13 years (Greenwood, 1985).

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Nickel

Nickel in the ambient atmosphere typically exists as a constituent of suspended particulate matter (U.S. EPA, 1985). The greatest volume of nickel emitted into the atmosphere is the result of fossil fuel combustion. Other sources of nickel emissions are primary production, incinerators, metallurgy, chemical manufacturing, cement manufacturing, coke ovens, nickel recovery, asbestos mining/milling and cooling towers.

Studies of nickel absorption have shown that it is absorbed by all routes of exposure to varying degrees, primarily dependent on the chemical form (see section on Relative Absorption Factors). Absorbed nickel is bound to serum components and distributed to body organs, reaching highest concentrations in kidney and lung tissue (Whanger, 1973). Nickel is not known to be biotransformed. Excretion of absorbed nickel is primarily through urine, with minor excretory routes through hair and sweat (ATSDR, 2002).

Nickel carbonyl $Ni(CO)_4$ is a particularly toxic form of nickel upon inhalation and causes chest pain, dry coughing, hyperpnea, cyanosis, occasional gastrointestinal symptoms, sweating, visual disturbances and severe weakness. This is often followed by pulmonary hemorrhage, edema and cellular derangement. Survivors may be left with pulmonary fibrosis. In the workplace, nickel dermatitis may result at high nickel concentrations. At lower concentrations some susceptible individuals develop eczema-like lesions. The threshold for these health effects is much greater than exposures which occur in the ambient environment. The major adverse effects of nickel in man are dermatitis, chemical pneumonitis, and lung and nasal cancers.

Deaths occurred in rats and mice at concentrations greater than 3.3 and 1.7 mg/m^3 nickel, respectively, upon extended inhalation exposure to $NiSO_4$ (Dunnick et al., 1987). Mice exposed to Ni_3S_2 died due to necrotizing pneumonia at 7.3 mg/m^3 nickel (Benson et al., 1987). Prolonged exposure of hamsters to nickel oxide at 41.7 mg/m^3 resulted in decreased survival due to emphysema (Wehner et al., 1975). Oral LD_{50}s in rats vary depending upon the nickel-containing compound to which the rats were exposed. These range from 355 mg compound/kg (118 mg Ni/kg) for nickel acetate (Haro, 1968) to greater than 5000 mg compound/kg for nickel oxide, nickel sulfide, and nickel subsulfide (Mastromatteo, 1986). Rats fed diets containing nickel sulfate hexahydrate at 0, 250, 500 and 1000 ppm nickel showed no adverse effects over three generations in fertility, gestation, viability or lactation.

Weak evidence exists for the mutagenicity of nickel in bacterial and mammalian cells. Nickel appears to induce chromosomal aberrations in cultured mammalian cells (Larramendy et al., 1981), but not in vivo (Waksvik and Boysen, 1982). Occupational studies of human exposure indicate that certain nickel compounds appear to be carcinogenic via inhalation. However, there is no evidence of carcinogenicity in mammals through ingestion or dermal exposure (U.S. EPA, 1985). Nickel subsulfide has been found to be carcinogenic via the inhalation route in rats (Ottolenghi et al., 1974). Studies on nickel exposure via the oral route are inadequate to reach conclusions on carcinogenicity (ATSDR, 2002).

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Selenium

Human and animal data suggest that many chemical forms of selenium produce similar effects. Selenium is known to be an essential micronutrient for humans and animals; therefore, inadequate as well as excessive selenium intake can cause negative health effects (ATSDR, 2002). One proposed mechanism of intermediate and chronic toxicity for selenium compounds

is that under conditions of excess body levels of selenium, selenium atoms begin to replace the sulfur atoms in structural and enzymatic proteins (Shamberger, 1970), destroying the protein structural and functional integrity. This mechanism of action is unlikely to be organ specific; therefore, under this proposed mechanism, toxic levels of selenium would be expected to affect multiple organ systems. Furthermore, differential sensitivities of the various organ systems to selenium exposure would be expected on the basis of differential accumulation or retention of selenium compounds (Goyer, 1996).

The primary target organ in humans and in animals upon acute exposure to high concentrations of selenium by inhalation or oral routes is the lung, with cardiovascular, hepatic, and renal systems also affected. Lesser effects are observed in all other organ systems except the musculoskeletal system. The liver is the primary target organ for the oral toxicity of sodium selenite, sodium selenate, and organic forms of selenium in animals following intermediate and chronic exposure. In humans, liver cirrhosis or dysfunction are the result of chronic selenosis (ATSDR, 2002). Endocrine effects were found following intermediate oral exposure. Following chronic oral exposure to selenium compounds, the primary effects in humans are dermal and neurological. As evidenced by populations in China, chronic exposure to high selenium levels in the diet can cause diseased nails and skin as well as hair loss. Higher levels can cause neurological problems including unsteady gait and paralysis. However, studies of populations living in areas of naturally occuring high selenium concentrations in the United States have not revealed adverse health effects in those populations (Yang *et al.*, 1989a,b). Following intermediate and chronic oral exposure to selenium compounds, the primary effects in livestock exposed to naturally occuring selenium in range plants are also dermal and neurological. Studies in animals with high selenium concentrations demonstrate that many organ systems retain selenium and are affected. The primary effects in laboratory animals exposed to inorganic selenium salts or to selenium-containing amino acids are cardiovascular, gastrointestinal, hematological, hepatic, dermal, immunological, neurological, and reproductive (ATSDR, 2002). Selenium is a teratogen in birds. However, studies of Chinese populations and laboratory animals have not found evidence of teratogenic effects in mammals (ATSDR, 2002).

USEPA has determined that selenium is not classifiable as to human carcingenicity (Class D).

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Thallium

Thallium and its salts are readily and rapidly absorbed through the skin, lungs, and mucous membranes of the mouth and gastrointestinal tract (ATSDR, 2002). Percutaneous absorption has also been reported to occur through rubber gloves (Rumack, 1986).

Thallium is acutely toxic to humans regardless of the chemical form of the compound or route of administration. Hundreds of cases of thallotoxicosis due to ingestion of thallium-based pesticides have been reported (ACGIH, 1986). Children poisoned by thallium ingestion have exhibited neurological abnormalities including mental retardation and psychoses (ACGIH, 1986). The effects of thallium toxicity are similar in humans and animals. The most commonly noted response to thallium exposure is alopecia, but neurological and gastrointestinal findings are frequently found. Such effects include ataxia, lethargy, painful extremities, peripheral neuropathies, convulsions, endocrine disorders, psychoses, nausea, vomiting, and abdominal pains (Bank, 1980). It has been noted that the degree and duration of exposure to thallium and its salts can influence the clinical picture of thallium intoxication. Subchronic feeding studies conducted with rats observed marked growth depression and a nearly complete loss of hair (USEPA, 1986; Clayton and Clayton, 1981).

Exposure to thallium salts during critical developmental stages in chicks and rats has been reported to be associated with the induction of adverse developmental outcomes (Karnofsky *et al.*, 1950). Pre- and postnatally exposed rat pups have exhibited hydronephrosis, fetal weight reduction and growth retardation (Clayton and Clayton, 1981; Gibson and Becker, 1970). Thallium has also been shown to cross the placenta and, presumably, enter the fetal blood system (Clayton and Clayton, 1981).

Thallium has not been demonstrated to be carcinogenic in humans or experimental animals and may have some antitumor activity (Clayton and Clayton, 1981).

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Vanadium

The absorption of vanadium through the gastrointestinal tract of animals is low (2.6% for vanadium pentoxide in rats) (Conklin *et al.*, 1982). Soluble vanadium compounds that are inhaled and deposited are readily absorbed (50–100%) (ATSDR, 2002). Because vanadium has low solubility, its absorption through skin is thought to be quite low, although no specific studies were located regarding dermal absorption (ATSDR, 2002).

Pentavalent vanadium compounds are generally considered to be more toxic than other valence states. Many incidents of short-term and long-term occupational exposures to vanadium, mainly vanadium pentoxide dust, have been reported. Inhalation causes respiratory tract irritation, coughing, wheezing, labored breathing, bronchitis, chest pains, eye and skin irritation and discoloration of the tongue (NIOSH, 1977; NAS, 1974). Humans subchronically exposed to vanadium pentoxide (0.1 mg/m^3) via inhalation experienced respiratory irritation (Zenz and Berg, 1967). Experimental animals (i.e., rats, monkeys) subchronically exposed to vanadium compounds (vanadium pentoxide, bismuth orthovanadate) manifested alveolar proteinosis and increased pulmonary resistance at concentrations of 2.5–4.7 mg/m^3 (Lee and Gillies, 1986; Knecht *et al.*, 1985). Effects seen in experimental animals following chronic inhalation exposure include fatty degeneration of the liver and kidneys, hemorrhage, and bone marrow changes (Browning, 1969).

Humans subchronically exposed to ammonium vanadyl tartrate (1.3 mg/kg-day) via capsules did not manifest any adverse effects (Dimond *et al.*, 1963). However, experimental animals (i.e., rats, mice) orally exposed to vanadium compounds (sodium metavanadate, sodium orthovanadate, ammonium metavanadate) exhibited mild systemic effects (decreased weight gain, vascular infiltration, spleen hypertrophy and increased ventricular pressure) at doses as low as 0.57 mg/kg-day (ATSDR, 2002). Rats chronically administered 0.77 mg/kg-day (5 ppm) vanadium in their drinking water showed no adverse effects (Schroeder *et al.*, 1970). Pre- and postnatally exposed rat pups have exhibited reduced pup weight and length and facial hemorrhage (ATSDR, 2002). Vanadium has not been demonstrated to be carcinogenic in humans or experimental animals.

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Zinc

Zinc is absorbed in humans following oral exposure (approximately 20–30%) (ATSDR, 2002); however, insufficient data are available to evaluate absorption following inhalation exposure (USEPA, 1984). Zinc is an essential trace element that is necessary for normal health and metabolism and therefore is nontoxic in trace quantities (Goyer, 1996). The National Research Council (NRC) recommends a dietary allowance of 10–15 mg/day for adults (NRC, 1989).

Exposure to zinc at concentrations that exceed recommended levels, however, has been associated with a variety of adverse effects. In humans, acute inhalation exposure to relatively high levels of zinc has been associated with gastrointestinal disturbances, dermatitis, and metal fume fever, a condition characterized by chest pain, cough, and dyspnea, as well as impaired pulmonary function characterized by reduced lung volumes (ATSDR, 2002).

Eighteen healthy women given supplements of zinc gluconate (1 mg/kg-day) for 10 weeks developed slight alterations in blood chemistry (decreased enzyme levels) (Yadrick *et al.*, 1989). Chronic oral exposure of humans to zinc (2 mg/kg-day) may cause decreased red blood cell count (Hale *et al.*, 1988). Experimental animals (rats, rabbits, mice) administered zinc in the diet (68–1,110 mg/kg-day) for durations up to 1 year manifested blood, liver, renal, and reproductive effects (ATSDR, 2002). An increased incidence of fetal resorption was noted in pregnant rats administered 200 mg/kg-day (Schlicker and Cox, 1968). In addition, increased preimplantation loss was observed in rats fed the same concentration for 18 days (Pal and Pal, 1987). There is no evidence that zinc is carcinogenic (ATSDR, 2002).

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TABLE C.8-1. ABSOLUTE ORAL BIOAVAILABILITY FACTORS

Chemical	Absolute Oral Bioavailability Factor	Reference
Antimony	0.15	ATSDR, 2002
Cadmium	0.01	McLellan *et al.*, 1978
Chromium	0.013	Donaldson and Barreras, 1996
Manganese	0.04	Davidson *et al.*. 1989
Mercury (inorganic)	0.07	USEPA, 2004
Vanadium	0.026	Conklin *et al.*, 1982

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APPENDIX C.9

RELATIVE BIOAVAILABILITY OF ARSENIC IN SEDIMENTS FROM THE ABERJONA RIVER

RELATIVE BIOAVAILABILITY OF ARSENIC IN SEDIMENTS FROM THE ABERJONA RIVER

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- Margaret E. Dunsmore, BS, helped with all aspects of animal handling and dosing, as well as urine collection and sample preparation.

- Dr. John Drexler at the University of Colorado, Boulder, performed the characterization of the sediment samples and test materials, including *in vitro* testing of bioaccessibility and electron microprobe and particle size analyses of the test materials.

- Dr. Edward Hinderberger of L.E.T., Inc., Columbia, Missouri, provided prompt and reliable chemical analysis of all of the samples for total arsenic concentrations.

EXECUTIVE SUMMARY

The gastrointestinal absorption of arsenic from two composite sediment samples collected from the banks of the Aberjona River was measured using young swine. Groups of animals (four animals per dose group) were given oral doses of a reference material (sodium arsenate) or site sediment twice a day for 12 days. Urine excreted by each animal was collected on days 6/7, 8/9 and 10/11. The urinary excretion fraction (UEF) (the ratio of the amount excreted per 48 hours divided by the dose given per 48 hours) was calculated for sodium arsenate and each test material using linear regression analysis. The relative bioavailability (RBA) of arsenic in a test material compared to that in sodium arsenate was calculated as:

$$RBA = \frac{UEF(test\ material)}{UEF(sodium\ arsenate)}$$

The results are summarized below:

Test Material	Description	Arsenic Conc. (ppm)	Relative Bioavailability	
			Best Est.	90% CI
TM1	Composite sample of three sediments with arsenic concentrations greater than 500 ppm	676	37%	32% – 41%
TM2	Composite sample of three sediments with arsenic concentrations of 180-460 ppm	313	51%	46% – 56%

These data indicate that arsenic in site sediments is absorbed less extensively than arsenic in drinking water. Use of these site-specific data is likely to improve the accuracy of risk estimates for humans who may be exposed to the sediments.

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RELATIVE BIOAVAILABILITY OF ARSENIC IN ABERJONA RIVER SEDIMENTS

1.0 INTRODUCTION

Accurate assessment of the health risks resulting from oral exposure to any chemical frequently requires knowledge of the amount of the chemical absorbed from the gastrointestinal tract into the body. This information on absorption may be described either in absolute or relative terms:

Absolute Bioavailability (ABA) is the ratio of the amount of chemical absorbed compared to the amount of chemical ingested:

$$ABA = \frac{Absorbed\ Dose}{Ingested\ Dose}$$

This ratio is also referred to as the oral absorption fraction (AF_0).

Relative Bioavailability (RBA) is the ratio of the absolute bioavailability of some test material compared to the absolute bioavailability of some appropriate reference material, usually the chemical dissolved in water or some fully soluble form that completely dissolves when ingested:

$$RBA = \frac{ABA\ (test\ material)}{ABA\ (reference\ material)}$$

For example, if 100 ug of arsenic dissolved in drinking water were ingested and a total of 90 ug entered the body, the ABA would be 0.90 (90%). Likewise, if 100 ug of arsenic contained in soil were ingested and 30 ug entered the body, the ABA for soil would be 0.30 (30%). If the arsenic dissolved in water was used as the reference substance for describing the relative amount of arsenic absorbed from soil, the RBA would be 0.30/0.90 = 0.33 (33%).

Using Relative Bioavailability Data to Improve Risk Calculations for Arsenic

When reliable data are available on the relative bioavailability of arsenic in a site medium (e.g., soil, sediment), this information can be used to improve the accuracy of exposure and risk calculations for that medium at that site as follows:

$$RfD(adjusted) = \frac{RfD\ (IRIS)}{RBA}$$

$$SF(adjusted) = SF(IRIS) \cdot RBA$$

Alternatively, it is also acceptable to adjust the dose (rather than the toxicity factors) as follows:

$$Dose(adjusted) = Dose(default) \cdot RBA$$

This adjustment in dose is mathematically equivalent to adjusting the toxicity factors as described above.

Purpose of This Study

USEPA Region 1 is currently investigating potential human health risks from arsenic in sediment samples from along the Aberjona River and associated wetlands and floodplain areas. This study was performed to obtain site-specific data on the relative bioavailability of arsenic in sediment samples from the site in order to improve accuracy and decrease uncertainty in human health risk evaluations.

2.0 STUDY DESIGN

This investigation of arsenic relative bioavailability was performed according to the basic design presented in Table 2-1. As shown, the study investigated arsenic absorption from sodium arsenate (the reference material) and from two site-specific sediments, each administered to groups of animals at three different dose levels for 12 days. All doses were administered orally.

2.1 Test Materials

2.1.1 Preliminary Characterization of Site Sediment Samples

Preparation of the two test materials for this study began by collecting 12 sediment samples from multiple locations along the Aberjona River. Each of these samples was characterized in order to support decisions as to which samples should be selected for use as dose material in the animal study, as well as to answer questions about how the dose material should be prepared and administered. Figure 2-1 is a flow chart that summarizes this characterization process.

Sample Description

The sampling locations of the 12 sediment samples span four basic regions of the Aberjona River. Sediment samples 1-3 were collected from the Halls Brook Holding Area, samples 4-6 were collected from the Wells G&H 38-acre Wetland, samples 7-9 were collected from the Cranberry Bog, and samples 10-12 were from Davidson Park. Samples were selected to cover a range of arsenic concentrations in sediments, and were also selected to provide reasonable spatial representativeness across the site.

Sample Preparation

One portion of each of the 12 samples was coarse-sieved through a 1 cm screen to remove large debris (sticks, leaf matter, stones, etc.). This screening was performed on the moist (un-dried) samples. A portion of this coarse-sieved material was removed for arsenic analysis, and a second portion was removed for *in vitro* bioaccessibility analysis (see below). The remaining portion was air dried and fine-sieved (using a 2 mm screen). This step was performed because it is considered probable that the fine-grained portion of the sediment is more likely to adhere to skin and be ingested by humans than the coarse-grained fraction.

Arsenic Concentration

The concentration of arsenic was measured in both the coarse- and fine-sieved samples by inductively coupled plasma atomic absorption spectrometry (ICP-AES). The results from these analyses are shown below:

River Segment	Sample	Arsenic Concentration (ppm)	
		Fine-sieved	Coarse-sieved
Halls Brook Holding Area	1	459	583
	2	527	590
	3	144	269
Wells G&H Wetland	4	145	411
	5	775	605
	6	176	156
Cranberry Bog	7	301	315
	8	832	560
	9	407	388
Davidson Park	10	43.4	37.0
	11	64.0	91.8
	12	67.1	74.9

As seen, the concentration of arsenic in the sediment samples is quite variable, both within a segment of river and between segments. In general, the concentration of arsenic in coarse-sieved and fine-sieved material tends to be similar (Figure 2-2). Thus, RBA results based on tests using fine-sieved material can be extrapolated to samples for which only bulk sample results are available.

In Vitro Bioaccessibility

In vivo absorption of arsenic from a solid medium such as sediment depends on the rate and extent to which arsenic dissolves from the solid medium into the fluids of the gastrointestinal tract. Dr. John Drexler at the University of Colorado has developed a standard procedure to measure the amount of arsenic that dissolves from a test material into a fluid that is similar to the gastric fluid of humans. The amount of arsenic that solubilizes in this test after a specified period of time (usually one hour) is referred to as the *in vitro* bioaccessibility (IVBA), and this value may be used as a preliminary qualitative indicator of potential *in vivo* RBA.

Figure 2-3 shows the IVBA for each of the 12 dried and fine-sieved sediment samples from the site. As seen, there is a range of values, and the IVBA appears to be inversely correlated with concentration (i.e., the most concentrated samples tend to have the lowest *in vitro* bioaccessibility, while the least concentrated samples tend to have the highest *in vitro* bioaccessibility). The basis for this apparent relationship is not known.

Effect of Drying

Each of the sediment samples collected in the field contained considerable moisture content. *A priori*, it was considered possible that drying the samples might alter (increase) the binding of

arsenic to the sediment particles, potentially resulting in a change (decrease) in bioavailability. In order to investigate this possibility, the IVBA of the dried and un-dried samples were compared. Because the moist, un-dried material could not be effectively sieved through the 2mm screen, the moist sample was selected manually to include as few coarse particles as possible. The results are shown in the following table and in Figure 2-4:

River Segment	Sample	*In Vitro* Bioaccessibility of Arsenic (%)	
		Dry	Moist (Un-dried)
Halls Brook Holding Area	1	40	2
	2	31	5
	3	70	5
Wells G&H Wetland	4	40	26
	5	12	16
	6	55	9
Cranberry Bog	7	37	12
	8	13	12
	9	15	13
Davidson Park	10	39	53
	11	49	53
	12	59	9
Average		38	18

As seen, drying the moist material does not appear to significantly influence the IVBA for some samples, and tends to increase rather than decrease the IVBA for other samples. The basis for this apparent change in IVBA is not known, but the results suggest that dried sediment will be as bioavailable or more bioavailable than un-dried sediments. On this basis, it was decided that the *in vivo* test of RBA would be performed using the dried materials.

Evaluation of Methyl Arsenic

Studies at other sites (e.g., Sanders et al. 1994) have revealed that arsenic in sediments may become methylated by microbial action at times when the oxygen tension in the sediments is low. Because methylated forms of arsenic might have different bioavailability (and different toxicity) than the inorganic forms, aliquots of the dried fine-sieved samples were analyzed for organic methyl arsenic. Samples were sent to West Coast Analytical Services, where they were extracted with carbonate buffer and analyzed for As+3, As+5, MMA, and DMA by ion chromatography-ICPMS. The results are summarized below:

Sample	Total Arsenic (ppm)		Extracted Arsenic (WCAS) (ppm)			
	WCAS	Drexler	As+3	DMA	MMA	As+5
1	630	459	ND	ND	ND	20
2	600	527	ND	ND	ND	ND
3	168	144	ND	ND	ND	ND
4	169	145	ND	ND	ND	ND
5	670	775	ND	ND	ND	ND
6	167	176	ND	ND	ND	ND
7	292	301	ND	ND	ND	ND
8	520	832	ND	ND	ND	ND
9	296	407	ND	ND	ND	ND
10	51	43.4	ND	ND	ND	ND
11	87	64	ND	ND	ND	10
12	83	67.1	ND	ND	ND	11
Detection Limit (ppm)	1		5	5	5	5

WCAS = West Coast Analytical Services

As seen, very low levels were observed for each analyte. Recovery of matrix spikes for As+3 and As+5 was poor, suggesting that recoveries of these species may be low. However, recovery of matrix spikes of MMA and DMA were high (89%). These results indicate that if MMA or DMA are present in the samples, they constitute only a very small fraction of the total arsenic.

Mineral Phase Speciation

Each of the 12 dried fine-sieved samples was characterized by electron microprobe analysis (EMPA) in order to provide preliminary data on the identity and relative abundance of the different mineral forms of arsenic present in the samples. The results are summarized in Table 2-2. As seen, these data suggest that arsenic exists mainly in association with particles of iron oxide, iron sulfate, and zinc-iron sulfate. The preliminary data are too limited to draw firm conclusions, but suggest that the presence of iron oxide is associated with higher arsenic concentrations and lower *in vitro* bioaccessibility, and that the presence of the iron-zinc sulfate complexes is associated with lower arsenic concentrations and higher *in vitro* bioaccessibility.

2.1.2 Test Material Selection and Preparation

Test materials for use in the *in vivo* study were selected by considering the results of the preliminary characterization of 12 site sediment samples (Section 2.1.1, above). Specifically, factors that were considered included the concentration level of arsenic in a sample and the degree to which different samples appear to be similar or dissimilar based on speciation and *in vitro* bioaccessibility testing. Based on the conclusion that the only clear pattern of difference among samples is the *in vitro* bioaccessibility (inversely related to concentration), three test materials were prepared by compositing samples with similar arsenic concentrations, as described below.

Test Material 1

Test Material 1 was prepared by compositing equal masses of dried fine-sieved material from samples 2, 5, and 8. These three samples were selected because they have the highest measured arsenic concentration values (all >500 ppm) and they tend to have low bioaccessibility (average = 19%). In addition, the three samples represent each of the three reaches of river (excluding the Davidson Park area), providing good spatial representativeness. These samples tend to be relatively enriched in the iron oxide form of arsenic.

Test Material 2

Test Material 2 was prepared by compositing equal masses of dried fine-sieved material from samples 1, 6, and 7. These three samples were selected because they have intermediate arsenic concentration values (180-460 ppm), intermediate bioaccessibility values (average = 44%), and represent each of the three upstream reaches of the river. These samples tend to be relatively enriched in the zinc-iron sulfate form of arsenic.

Test Material 3

Test Material 3 was prepared by compositing equal masses of all samples with an arsenic concentration less than 150 ppm (samples 3, 4, 10, 11, and 12). These are the samples with the highest apparent bioaccessibility (average = 51%), but the arsenic levels are too low (average = 93 ppm) to permit effective testing in animals. Although Test Material 3 was not used in the *in vivo* portion of the study, it underwent all of the same detailed characterization efforts as Test Materials 1 and 2.

Test Material Preparation

Each test material was prepared by combining equal masses of the appropriate sediment samples, as indicated above. The samples for a given test material were composited using a stainless steel bowl and mixing spoon, and characterized as detailed below.

2.1.3 Detailed Characterization of Test Materials

Arsenic Concentration

After compositing, the concentration of arsenic in each test material was measured by ICP/AES and by ICP/MS. The results are shown below:

Analytical Method	Arsenic Concentration (mg/kg)		
	TM1	TM2	TM3
ICP/MS	590	290	80
ICP/MS	652	318	93.6
ICP/AES	733	319	--
ICP/AES	730	324	--
Average	676.3	312.8	86.8
Standard Deviation	68.6	15.4	9.6

-- = Not measured

Concentration of Other Inorganics, Organic Carbon, and Sulfide

Each sample was analyzed for EPA's Target Analyte List (TAL) of inorganic chemicals, as well as for total organic content (TOC) and total sulfide content. Results are shown in Table 2-3.

Particle Speciation, Size, and Matrix Association

Each test material was characterized by electron microprobe analysis (EMPA) in order to identify the different mineral forms of arsenic that were present in the sample and to estimate how much of the total arsenic was present in each form. In addition, the size distribution of the particles was characterized along with the matrix association of each particle. The detailed data are presented in Appendix A and the results are summarized below.

Arsenic Phases

Speciation of the three test materials indicated that the arsenic in these samples is associated with four different types of mineral phase: iron oxide, iron pyrite, iron sulfate, and zinc sulfate. Estimates of the relative arsenic mass (an approximation of the fraction of the total arsenic present in each phase) are presented below:

Arsenic Speciation Data

Test Material	Number of Particles Counted	Relative Arsenic Mass			
		Iron Oxide	Pyrite	Iron Sulfate	Zinc Sulfate
TM1	186	69%	0%	29%	2%
TM2	123	16%	2%	27%	55%
TM3	57	24%	1%	59%	16%

As seen, arsenic in primarily associated with iron oxide in TM1, with zinc sulfate in TM2, and iron sulfate in TM3. These differences in mineral phase may influence the RBA of the arsenic in the materials.

It is important to note that these quantitative estimates of relative arsenic mass are based on examination of a limited number of arsenic-bearing particles in each sample (N = 57 to 186). Consequently, the quantitative values reported should not be considered to be highly precise, and apparent differences between samples may be partly due to random variation in the analysis rather than authentic differences in composition.

Particle Size Distribution

Particle size is a potentially important contributor to RBA because the fraction of a particle that undergoes dissolution in gastrointestinal fluids is likely related to the surface area to volume ratio (this ratio is larger for small particles than large particles). The distribution of particle sizes for arsenic-bearing grains in these test materials is summarized below:

Particle Size Distribution

Test Material	Percent of Particles by Size Class		
	≤25 um	26-100 um	>100 um
TM1	79%	15%	6%
TM2	85%	14%	2%
TM3	72%	26%	2%

As seen above, in these test materials, a large majority of all arsenic-containing particles are small: an average of 79% of all particles are 25 um or less in size. This predominance of small particles may tend to increase the RBA compared to what would be expected for larger particles of similar composition.

Matrix Association

Arsenic-containing particles may be characterized according to their association with other particles into four types, as follows:

Matrix Association	Description
Liberated	A grain of arsenic-containing material that is not attached to or contained within any other particle
Rimming	Arsenic is present on the outer surface of a particle, usually as a consequence of adsorption or precipitation
Cemented	The arsenic-containing particle is loosely bound to or associated with other particles or phases that do not contain arsenic
Included	The arsenic-containing particle is entirely contained within another particle

In the first three types of matrix association, the arsenic is exposed at the surface of some or all of the particle, and hence the arsenic is available to be dissolved by gastrointestinal fluids. Particles that are fully included in other particles are not exposed to external fluids and are not likely to have high bioavailability. The distribution of matrix associations for arsenic-bearing particles in the test materials from this site is summarized below:

Particle Matrix Associations

Test Material	Percent of Particles by Matrix Class			
	Liberated	Rimming	Cemented	Included
TM1	27%	2%	67%	4%
TM2	22%	0%	78%	0%
TM3	37%	11%	53%	0%

As seen, relative few particles are fully included, and 96-100% of the particles are entirely or partially exposed to external fluids. This suggests that the RBA of the arsenic is likely to be determined primarily by mineral phase and/or particle size rather than by matrix association.

In Vitro Bioaccessibility

The details of the method used to measure the *in vitro* bioaccessibility of arsenic are described in USEPA (1999). In brief, 1.00 g of test substrate is placed into a 125-mL wide-mouth HDPE bottle. To this is added 100 mL of the extraction fluid (0.4 M glycine, pH 1.5). Each bottle is placed into a heated water bath (water temperature = 37°C) and rotated end-over-end. After a specified period of time (1, 2 or 4 hours), the bottles are removed, dried, and placed upright on the bench top to allow the soil to settle to the bottom. A 15-mL sample of supernatant fluid is removed directly from the extraction bottle into a disposable 20-cc syringe. After withdrawal of the sample into the syringe, a Luer-Lok attachment fitted with a 0.45-µm cellulose acetate disk filter (25 mm diameter) is attached, and the 15 mL aliquot of fluid is filtered through the attachment to remove any particulate matter. This filtered sample of extraction fluid is then analyzed for arsenic. The fraction of arsenic originally present in the sample that occurs in the dissolved phase at the end of the extraction procedure is the *in vitro* bioaccessibility (IVBA). IVBA results for the three test materials in this study are summarized below:

Test Material	Concentration (ppm)	IVBA		
		1 hr.	2 hr.	4 hr.
TM1	676	14%	16%	19%
TM2	313	35%	47%	51%
TM3	86.8	49%	57%	66%

As seen, IVBA values tend to increase slowly as a function of extraction time. In all cases, an inverse relationship is observed between IVBA and arsenic concentration in the sediment

sample, similar to the pattern that was observed previously during the preliminary characterization of the 12 site sediments samples (see Section 2.1, above).

2.2 Experimental Animals

Young swine were selected for use in these studies because they are considered to be a good physiological model for gastrointestinal absorption in children (Weis and LaVelle 1991). The animals were intact males of the Pig Improvement Corporation (PIC) genetically defined Line 26, and were purchased from Chinn Farms, Clarence, MO.

The animals were housed in individual stainless steel cages. All animals were held for several days prior to beginning exposure to test materials in order to allow them to adapt to their new environment and to ensure that all of the animals were healthy. Animals were assigned to dose groups at random. When exposure began (day zero), the animals were about 6 weeks old and weighed an average of about 12.1 kg. Animals were weighed every three days during the course of the study. On average, animals gained about 0.4 kg/day and the rate of weight gain was comparable in all groups, ranging from 0.38 to 0.46 kg/day. These body weight data are summarized in Figure 2-5.

2.3 Diet

Animals provided by the supplier were weaned onto standard pig chow purchased from MFA Inc., Columbia, MO. In order to minimize arsenic exposure from the diet, the animals were gradually transitioned from the MFA feed to a special feed (Zeigler Brothers, Inc., Gardners, PA) over the time interval from day -7 to day -3, and this feed was then maintained for the duration of the study. The feed was nutritionally complete and met all requirements of the National Institutes of Health-National Research Council. The typical nutritional components and chemical analysis of the feed is presented in Table 2-4. Each day every animal was given an amount of feed equal to 5% of the mean body weight of all animals on study. Feed was administered in two equal portions of 2.5% of the mean body weight at each feeding. Feed was provided at 11:00 AM and 5:00 PM daily. Previous analysis of feed samples indicated the arsenic level was generally below the detection limit (0.1 ppm), which corresponds to a dose contribution from food of less than 5 ug/kg-day (less than 50 ug/day).

Drinking water was provided *ad libitum* via self-activated watering nozzles within each cage. Previous analysis of samples from randomly selected drinking water nozzles indicated the arsenic concentration was less than the quantitation limit (about 1 ug/L). Assuming water intake of about 0.1 L/kg-day, this corresponds to a dose contribution from water of less than 0.1 ug/kg-day (1 ug/day).

2.4 Dosing

Animals were exposed to sodium arsenate (abbreviated in this report as "NaAs") or a test material (site sediment) for 12 days, with the dose for each day being administered in two equal portions given at 9:00 AM and 3:00 PM (two hours before feeding). Dose material was placed in the

center of a small portion (about 5 grams) of moistened feed (this is referred to as a "doughball"), and this was administered to the animals by hand.

The dose levels administered were based on the arsenic content of the test material, with target doses of 300, 600, and 900 ug/day for NaAs and each test material. The mass of each test material needed to provide these doses of arsenic were calculated based on a preliminary estimation of the arsenic concentration in the test materials. Actual administered arsenic doses were re-calculated after the study was completed using the mean of two ICP-AES measurements and two ICP-MS measurements. These actual administered doses are presented in Appendix B.

2.5 Collection and Preparation of Samples

Urine

Samples of urine were collected from each animal for three consecutive 48-hour periods, on days 6/7, 8/9 and 10/11 of the study. Collection began at 9AM and ended 48 hours later. The urine was collected in a stainless steel pan placed beneath each cage, which drained into a plastic storage bottle. Each collection pan was fitted with a nylon screen to minimize contamination with feces, spilled food, or other debris. Plastic diverters were used to minimize urine dilution with drinking water spilled by the animals from the watering nozzle into the collection pan, although this was not always effective in preventing dilution of the urine with water. Due to the length of the collection period, collection containers were emptied at least twice daily into a separate holding container. This ensured that there was no loss of sample due to overflow.

At the end of each collection period, the urine volume was measured and 60-mL portions were removed for analysis. A separate 250-mL aliquot was retained as an archive sample. Each sample was acidified by the addition of concentrated nitric acid. The samples were stored refrigerated until arsenic analysis.

2.6 Arsenic Analysis

Urine samples were assigned random sample numbers and submitted to the laboratory for analysis in a blind fashion. Details of urine sample preparation and analysis are provided in USEPA (1999). In brief, 25 mL samples of urine were digested by refluxing and then heating to dryness in the presence of magnesium nitrate and concentrated nitric acid. Following magnesium nitrate digestion, samples were transferred to a muffle furnace and ashed at 500°C. The digested and ashed residue was dissolved in hydrochloric acid and analyzed by the hydride generation technique using a Perkin-Elmer 3100 atomic absorption spectrometer. Preliminary tests of this method established that each of the different forms of arsenic that may occur in urine, including trivalent inorganic arsenic (As+3), pentavalent inorganic arsenic (As+5), monomethyl arsenic (MMA) and dimethyl arsenic (DMA), are all recovered with high efficiency.

Laboratory Quality Assurance

A number of quality assurance steps were taken during this project to evaluate the accuracy of the analytical procedures. Steps performed by the analytical laboratory included:

Spike Recovery

Randomly selected samples were spiked with known amounts of arsenic (usually 40 ug, as sodium arsenate) and the recovery of the added arsenic was measured. Recovery for individual samples ranged from 95% to 110%, with an average across all analyses of 103 ± 4.5% (N = 7).

Duplicate Analysis

Random samples were selected for duplicate analysis by the laboratory analyst. Duplicate results had a relative percent difference (RPD) of 0-17%, with an average of 2.6 ± 5.0% (N = 13).

Laboratory Control Standards

Four different types of laboratory control standards (LCS) were tested periodically during the analysis. These are samples for which a certified concentration of arsenic has been established. Results for these four types of LCS are summarized below:

LCS Type	Certified Value	Average Recovery	SEM	N
E.R.A. P081 - Metals WasteWatR	366 ng/mL	97%	1.7%	42
N.R.C.C. Dolt-2 Dogfish Liver	16.6 +/- 1.1 ug/g dry wt	84%	0.0%	2
N.R.C.C. Tort-2 Lobster	21.6 +/- 1.8 ug/g dry wt	99%	3.3%	3
N.I.S.T. Oyster 1566b	7.65 +/- 0.65 ug/g dry wt	97%	0.8%	3

As seen, recovery of arsenic from these standards was good in all cases, and no samples were outside the acceptance criteria specified by the suppliers.

Blanks

Blank samples run along with each batch of samples never yielded a measurable level of arsenic, with all values being reported as less than 0.03 ug of arsenic.

Blind Quality Assurance Samples

In addition to these laboratory-sponsored QA samples, an additional series of QA samples were submitted to the laboratory in a blind fashion. This included a number of Performance Evaluation (PE) samples (urines of known arsenic concentration) and a number of blind duplicates.

The results for the PE samples are shown in Figure 2-6. As seen, the PE samples included several different concentrations each of four different types of arsenic (As+3, As+5, MMA, and DMA). In all cases, there was good recovery of the arsenic.

The results for blind duplicates are shown in Figure 2-7. As seen, there was good agreement between results for the duplicate pairs.

Based on the results of all of the quality assurance samples and steps described above, it is concluded that the analytical results for samples of urine are of high quality and are suitable for derivation of reliable estimates of arsenic absorption from test materials.

3.0 DATA ANALYSIS

Figure 3-1 shows a conceptual model for the toxicokinetic fate of ingested arsenic. Key points of this model are as follows:

- In most animals (including humans), absorbed arsenic is excreted mainly in the urine over the course of several days. Thus, the urinary excretion fraction (UEF), defined as the amount excreted in the urine divided by the amount given, is usually a reasonable approximation of the oral absorption fraction or ABA. However, this ratio will underestimate total absorption, because some absorbed arsenic is excreted in the feces via the bile, and some absorbed arsenic enters tissue compartments (e.g., skin, hair) from which it is cleared very slowly or not at all. Thus the urinary excretion fraction should not be equated with the absolute absorption fraction.

- The relative bioavailability (RBA) of two orally administered materials (i.e., test material and reference material) can be calculated from the ratio of the urinary excretion fraction of the two materials. This calculation is independent of the extent of tissue binding and of biliary excretion:

$$RBA(test\ vs\ ref) = \frac{AF_o(test)}{AF_o(ref)} = \frac{D \cdot AF_o(test) \cdot K_u}{D \cdot AF_o(ref) \cdot K_u} = \frac{UEF(test)}{UEF(ref)}$$

Based on the conceptual model above, raw data from this study were reduced and analyzed as follows:

- The amount of arsenic excreted in urine by each animal over each collection period was calculated by multiplying the urine volume by the urine concentration:

  Excreted (ug/48hr) = Concentration (ug/L) · Volume (L/48hr)

- For each test material, the amount of arsenic excreted by each animal was plotted as a function of the amount administered (ug/48 hours), and the best fit straight line (calculated by linear regression) through the data (ug excreted per ug administered) was used as the best estimate of the urinary excretion fraction (UEF).

- The relative bioavailability of arsenic in a test material was calculated as:

  RBA = UEF(test) / UEF(NaAs)

  where sodium arsenate (NaAs) is used as the frame of reference.

- As noted above, each RBA value is calculated as the ratio of two slopes (UEFs), each of which is estimated by linear regression through a set of data points. Because of the variability in the data, there is uncertainty in the estimated slope (UEF) for each material. This uncertainty in the slope is described by the standard

error of the mean (SEM) for the slope parameter. Given the best estimate and the SEM for each slope, the uncertainty in the ratio may be calculated using Monte Carlo simulation. The probability density function describing the confidence around each slope (UEF) term was assumed to be characterized by a t-distribution with n-2 degrees of freedom :

$$\frac{UEF(measured) - UEF(true)}{SEM} \sim t_{n-2}$$

For convenience, this PDF is abbreviated T(slope, sem, n), where slope = best estimate of the slope derived by linear regression, sem = standard deviation in the best estimate of the slope, and n = number of data points upon which the regression analysis was performed. Thus, the confidence distribution around each ratio was simulated as:

$$PDF(RBA) = \frac{T(slope, sem, n)_{test}}{T(slope, sem, n)_{ref}}$$

Using this equation, a Monte Carlo simulation was run for each RBA calculation. The 5th and 95th percentile values from the simulated distribution of RBA values were then taken to be the 90% confidence interval for the RBA.

4.0 RESULTS

4.1 Clinical Signs

The doses of arsenic administered in this study are below a level that is expected to cause toxicological responses in swine, and no clinical signs of arsenic-induced toxicity were noted in any of the animals used in the study.

4.2 Urinary Excretion Fractions

Detailed results from the study are presented in Appendix B. The results for urinary excretion of arsenic are summarized in Figures 4-1 to 4-3. Although there is variability in the data, most dose-response curves are approximately linear, with the slope of the best-fit straight line being equal to the best estimate of the urinary excretion fraction (UEF). The following table summarizes the best fit slopes (urinary excretion fractions) for sodium arsenate and each of the test materials.

Summary of UEF Values

Test Material	Slope (UEF) ± SEM
NaAs	0.892 ± 0.033
TM1	0.326 ± 0.021
TM2	0.456 ± 0.021

4.3 Calculation of Relative Bioavailability

As discussed above, the relative bioavailability of arsenic in a specific test material is calculated as follows:

RBA(test *vs.* NaAs) = UEF(test) / UEF(NaAs)

The results are summarized below:

Test Material	Relative Bioavailability	
	Best Estimate	90% Confidence Interval
TM1	37%	32% - 41%
TM2	51%	46% - 56%

5.0 DISCUSSION AND RECOMMENDATIONS

The *in vivo* RBA results for two composite sediments collected from the Aberjona River study area range from 37% to 51%. These results clearly indicate that arsenic in Aberjona River site sediments is not as well absorbed as soluble arsenic, and it is appropriate to take this into account when evaluating potential risks to humans from incidental ingestion of sediments. Because each sediment sample tested during this study is a composite of three sub-samples collected from differing locations along the Aberjona River, each test material represents a fairly large spatial area, and the results for these two samples may be assumed to be generally applicable to the entire site.

Although RBA values can be applied in the site risk assessment process without any understanding of what factors are responsible for the observed RBA values, it is a matter of some interest to investigate the degree to which the RBA value is correlated with other factors. The following table compares the measured values for RBA with the arsenic concentration in the sample, the IVBA, and the primary mineral phase present in each test material:

Test Material	Concentration (ppm)	RBA	IVBA		Primary Form
			1 hr	4 hrs	
TM1	676	37%	14%	19%	Iron oxide
TM2	313	51%	35%	51%	Zinc sulfate
TM3	86.8	–	49%	66%	Iron sulfate

As seen, both RBA and IVBA show an inverse correlation with concentration in the sediment. This is plotted graphically in Figure 5-1. The basis of this apparent relationship is not known. Absolute values of IVBA at one hour tend to be lower than the measured RBA values, but the difference between RBA and IVBA tends to decrease after longer extraction times. Although the values for TM2 at 4 hours happen to be equal, the values for TM1 are not equivalent. These data suggest that IVBA is a good screen to evaluate the relative *in vivo* bioavailability of arsenic at different locations, but that it should not be used as a quantitative surrogate for *in vivo* RBA at this site. The data are not sufficient to establish an empiric relationship between mineral form and RBA, but the results suggest that arsenic in association with iron oxide is likely to be less bioavailable that other forms.

6.0 REFERENCES

Sanders J.G., Riedel G.F., and Osmann R.W. 1994. Arsenic Cycling and its Impact in Estuarine and Coastal Marine Ecosystems. In: Nriagu JO, ed. Arsenic in the environment, Part I: Cycling and Characterization. New York, NY: John Wiley & Sons, Inc., 289-308.

USEPA. 1999. Quality Assurance Project Plan for Vasquez Blvd-I70. Bioavailability of Arsenic in Site Soils Using Juvenile Swine as an Animal Model. Report prepared by ISSI Consulting Group for USEPA Region VIII. United States Environmental Protection Agency. September, 1999.

Weis, C.P., and LaVelle, J.M. 1991. Characteristics to consider when choosing an animal model for the study of lead bioavailability. In: The Proceedings of the International Symposium on the Bioavailability and Dietary Uptake of Lead. Science and Technology Letters 3:113-119.

TABLE 2-1 STUDY DESIGN

Group	Number of Animals	Material Administered	Target Dose (ug As/day)
1	3	Control	0
2	4	Sodium Arsenate	300
3	4	Sodium Arsenate	600
4	4	Sodium Arsenate	900
5	4	Test Material 1	300
6	4	Test Material 1	600
7	4	Test Material 1	900
8	4	Test Material 2	300
9	4	Test Material 2	600
10	4	Test Material 2	900

TABLE 2-2 PRELIMINARY (SEMI-QUANTITATIVE) SPECIATION RESULTS

Sample	Arsenic Concentration (ppm)	Bioaccesibility (%)	PARTICLE FREQUENCY* Phase						PARTICLE SIZE (um) Phase					
			Iron sulfide	Iron oxide	Iron sulfate	Zinc-Iron Sulfate	Tin oxide	Sodium sulfate	Iron sulfide	Iron oxide	Iron sulfate	Zinc-Iron Sulfate	Tin oxide	Sodium sulfate
1	459	40	3	2					2-8	20		5-80		
2	527	31	Tr	2		2		Tr		4-100	8-110	12-25		
3	144	70	3	1		Tr				1-8		8-30		
4	145	40	1		2	1			1-40	8-150	15-125	7-35		
5	775	12	Tr			Tr	Tr			8-250				
6	176	55	3		Tr				3-7			12-40		
7	301	37	3	1	2			2	2-10		3-22	4-80		8-35
8	832	13	Tr			2				35-220		15		
9	407	15				2				30-225		7-30		
10	43.4	39	2	1	Tr				3-7					
11	64.0	49	1		Tr				2-10	15-35				
12	67.1	59	1	1					1-15	14				

* Code: 3 = Most Common
2 = Common
1 = Relatively Infrequent
Tr = Trace
■ = Majority of arsenic in probably in this phase

TABLE 2-3 COMPOSITION OF TEST MATERIALS

Analyte	Concentration (mg/kg)[a]		
	TM1	TM2	TM3
Aluminum	15000	11000	11000
Antimony	4.3	3.7	<1
Barium	75	98	60
Beryllium	0.96	0.62	0.54
Cadmium	15	16	1.9
Calcium	9100	10000	4100
Chromium	680	620	140
Cobalt	32	46	14
Copper	840	540	150
Iron	73000	38000	22000
Lead	410	350	130
Magnesium	2000	2600	4300
Manganese	510	610	430
Mercury	2.9	1.1	0.61
Nickel	28	35	22
Potassium	690	770	1300
Selenium	5.8	3.8	1.6
Silver	0.88	1.1	<1
Sodium	ND	<500	ND
Sulfides, Total	5.9	63	7.2
Thallium	1.7	4.4	1.4
Total Organic Carbon	210 g/kg	220 g/kg	120 g/kg
Vanadium	49	43	35
Zinc	3300	4500	830

ND = Not detected

[a] All values are in units of mg/kg except where noted otherwise. All metals except mercury were measured by USEPA method 6010B. Mercury was measured by USEPA method 7471A, total sulfides were measured by USEPA method 9030B/9034, and total organic carbon was measured by USEPA method 9060. All data are based on single measurements except arsenic, which is based on the average of duplicate analysis by ICP-MS and duplicate analysis by ICP-AES.

Table 2-4 Typical Feed Composition

Nutrient Name	Amount	Nutrient Name	Amount
Protein	20.1021%	Chlorine	0.1911%
Arginine	1.2070%	Magnesium	0.0533%
Lysine	1.4690%	Sulfur	0.0339%
Methionine	0.8370%	Manganese	20.4719 ppm
Met+Cys	0.5876%	Zinc	118.0608 ppm
Tryptophan	0.2770%	Iron	135.3710 ppm
Histidine	0.5580%	Copper	8.1062 ppm
Leucine	1.8160%	Cobalt	0.0110 ppm
Isoleucine	1.1310%	Iodine	0.2075 ppm
Phenylalanine	1.1050%	Selenium	0.3196 ppm
Phe+Tyr	2.0500%	Nitrogen Free Extract	60.2340%
Threonine	0.8200%	Vitamin A	5.1892 kIU/kg
Valine	1.1910%	Vitamin D3	0.6486 kIU/kg
Fat	4.4440%	Vitamin E	87.2080 IU/kg
Saturated Fat	0.5590%	Vitamin K	0.9089 ppm
Unsaturated Fat	3.7410%	Thiamine	9.1681 ppm
Linoleic 18:2:6	1.9350%	Riboflavin	10.2290 ppm
Linoleic 18:3:3	0.0430%	Niacin	30.1147 ppm
Crude Fiber	3.8035%	Pantothenic Acid	19.1250 ppm
Ash	4.3347%	Choline	1019.8600 ppm
Calcium	0.8675%	Pyridoxine	8.2302 ppm
Phos Total	0.7736%	Folacin	2.0476 ppm
Available Phosphorous	0.7005%	Biotin	0.2038 ppm
Sodium	0.2448%	Vitamin B12	23.4416 ppm
Potassium	0.3733%		

Feed obtained from and nutritional values provided by Zeigler Bros., Inc

FIGURE 2-1 SAMPLE CHARACTERIZATION AND PREPARATION FLOW CHART

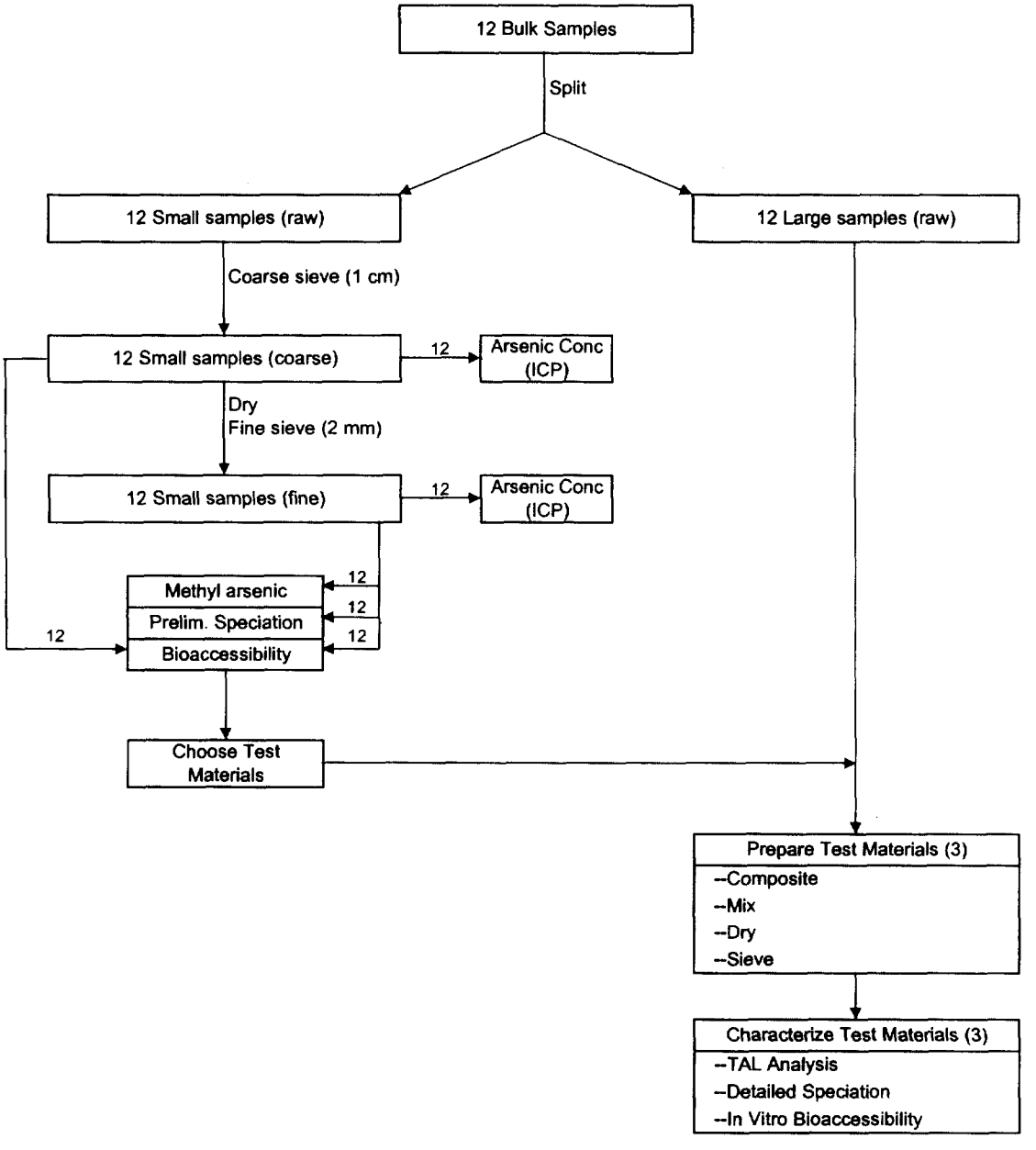


Fig 2-1_Flow Chart.xls

FIGURE 2-2 COMPARISON OF ARSENIC CONCENTRATIONS IN COARSE- AND FINE-SIEVED SAMPLES

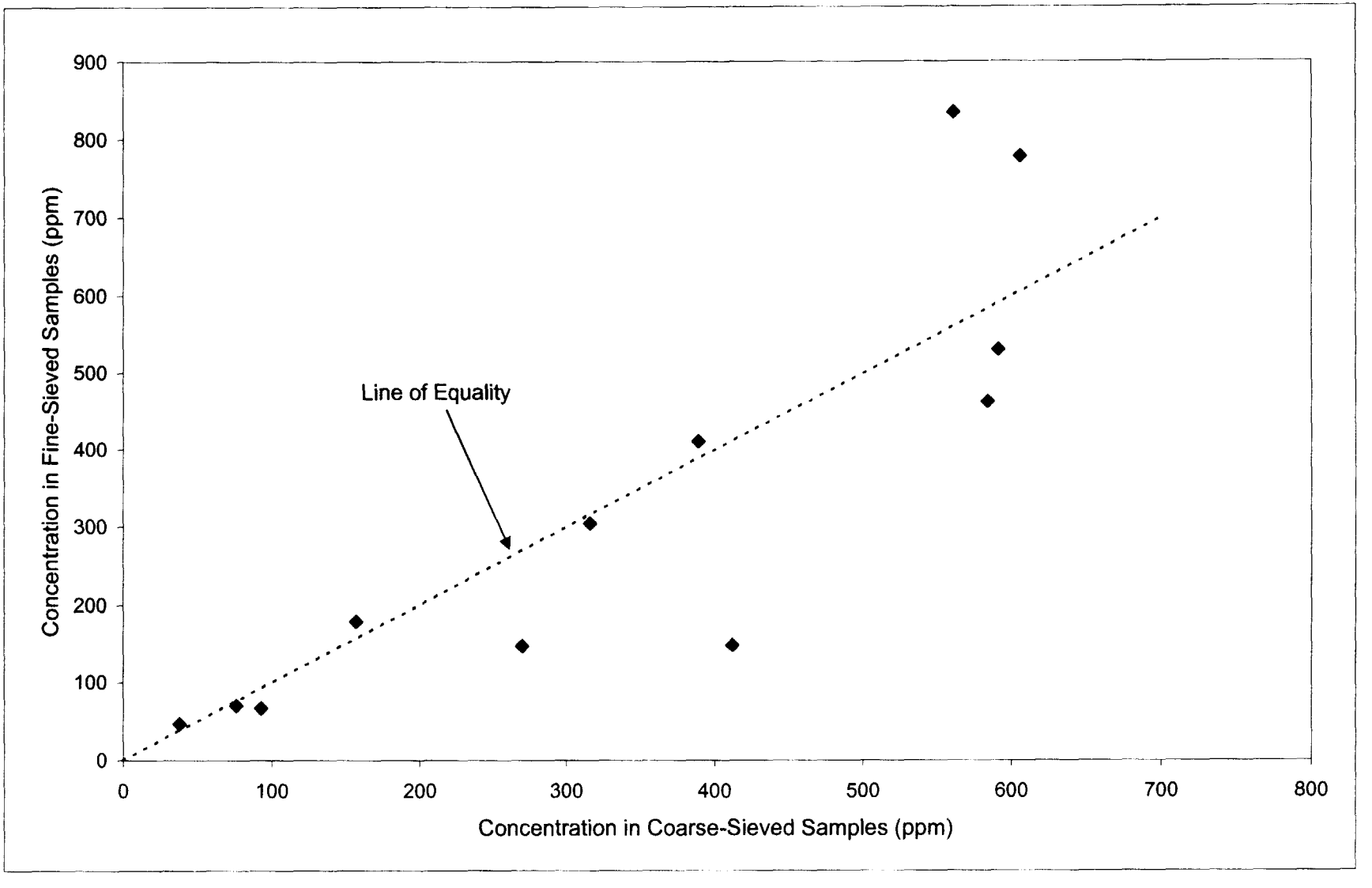


FIGURE 2-3 IN VITRO BIOACCESSIBILITY OF DRIED FINE-SIEVED SAMPLES

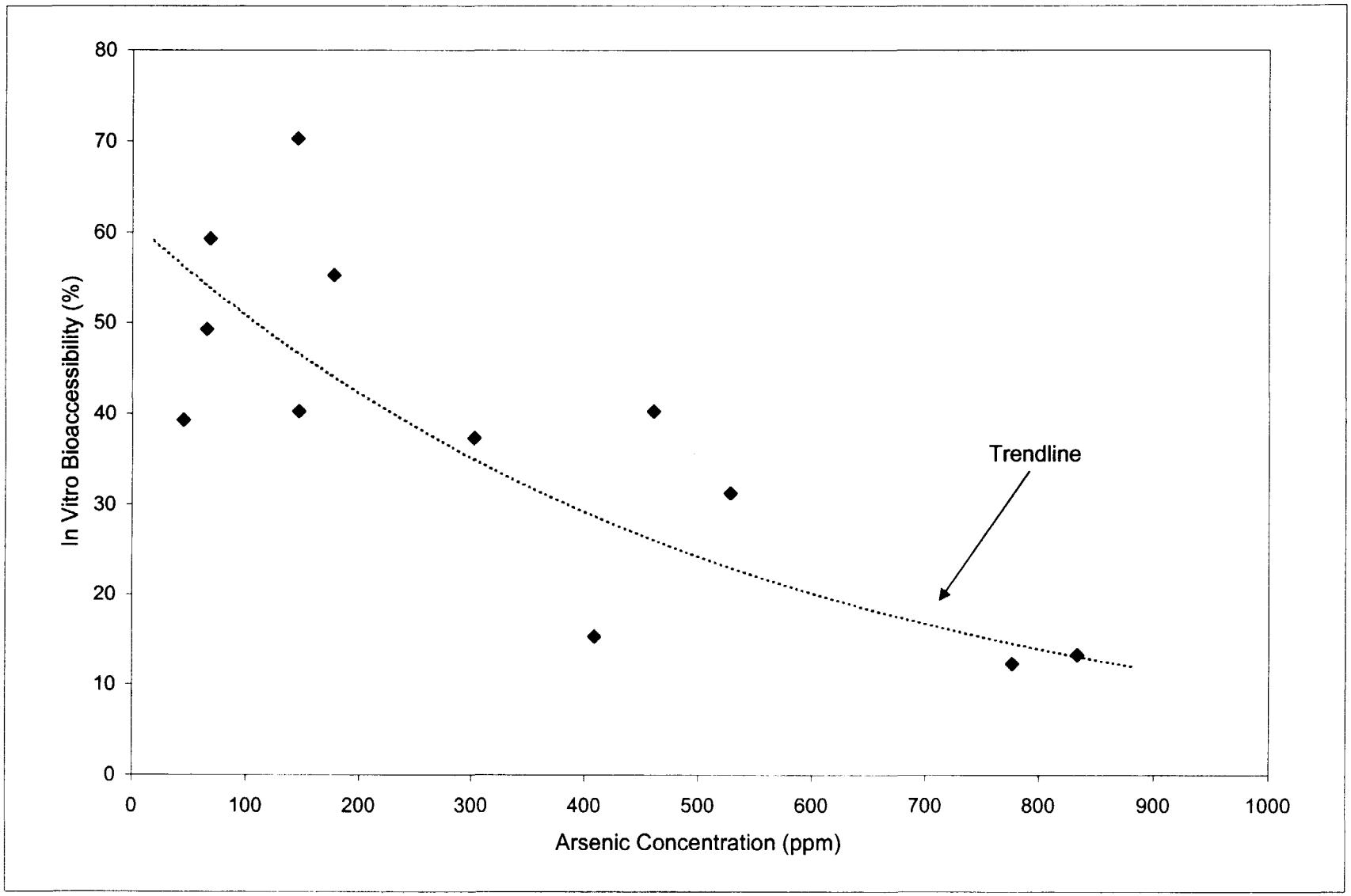


FIGURE 2-4 COMPARISON OF IN VITRO BIOACCESSIBILITY OF DRIED AND UN-DRIED FINE-SIEVED SAMPLES

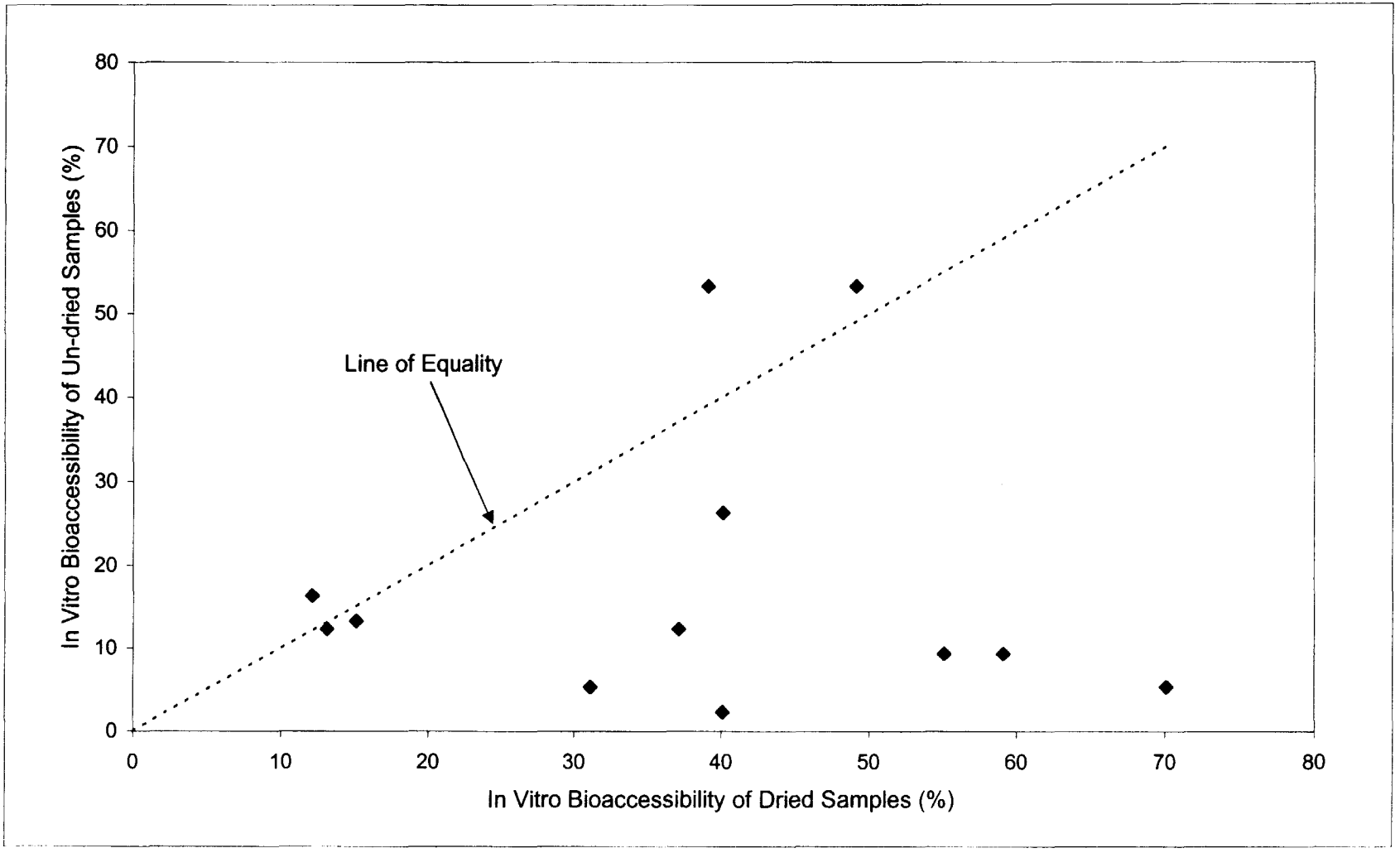
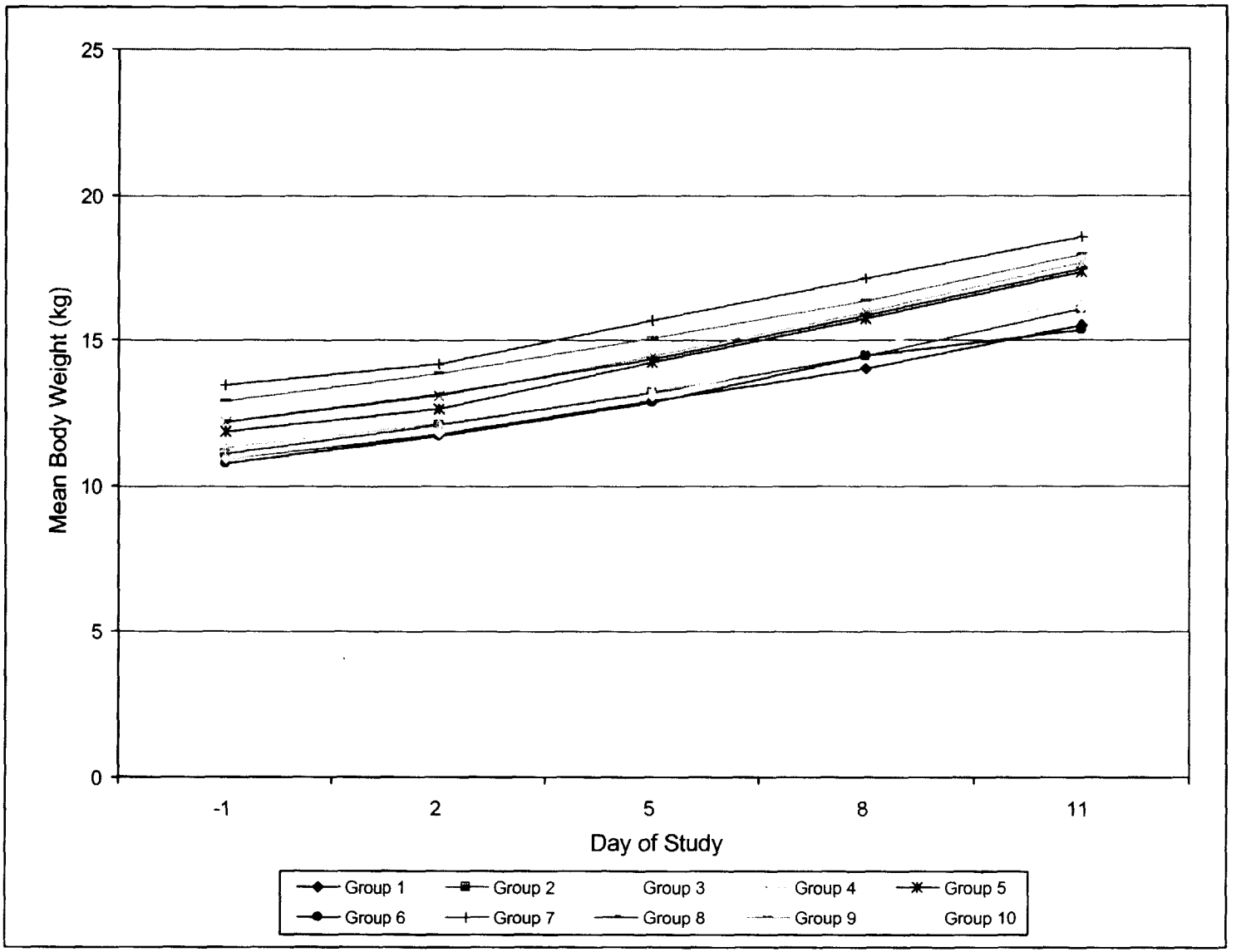
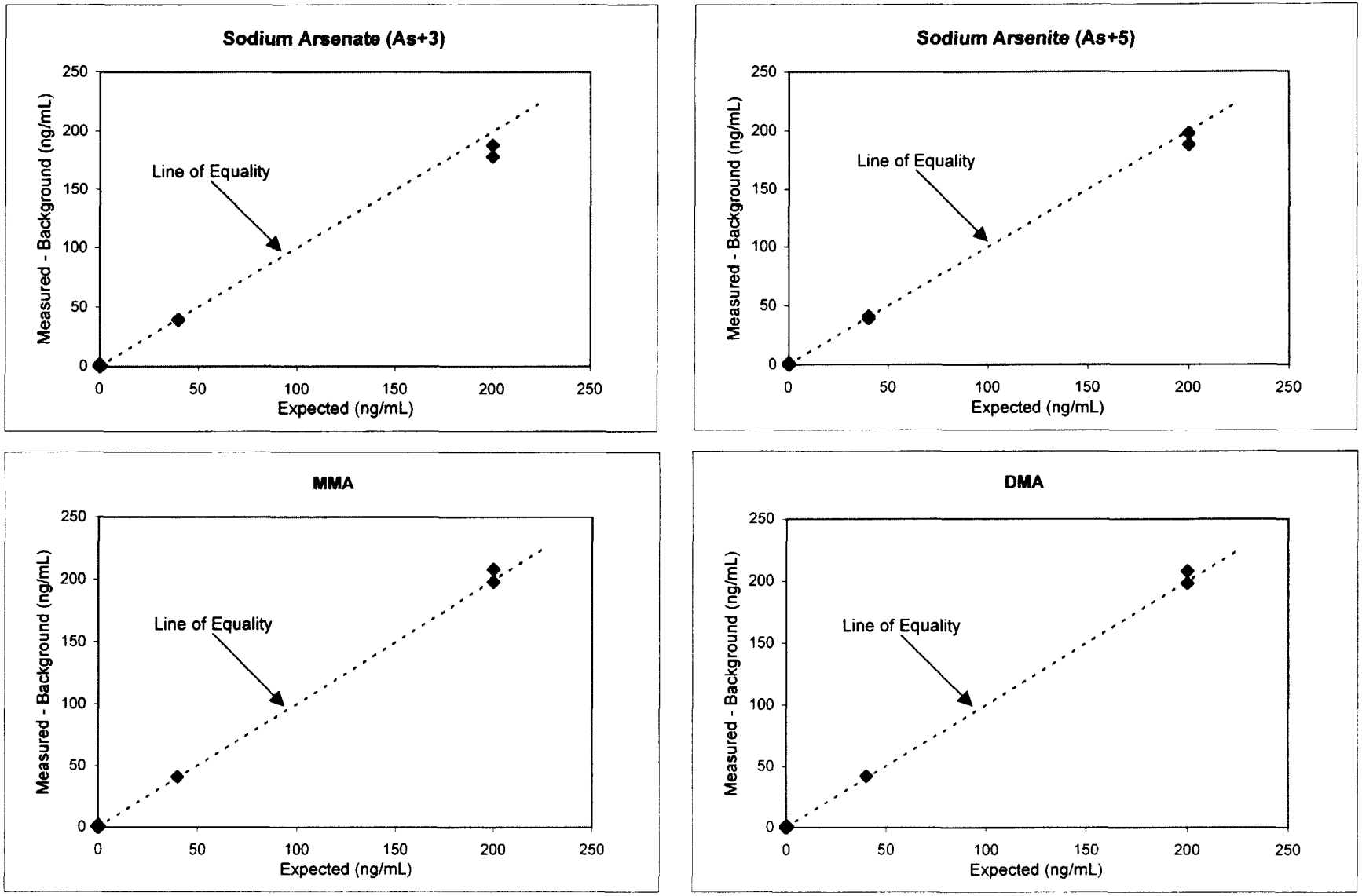


FIGURE 2-5 BODY WEIGHT GAIN



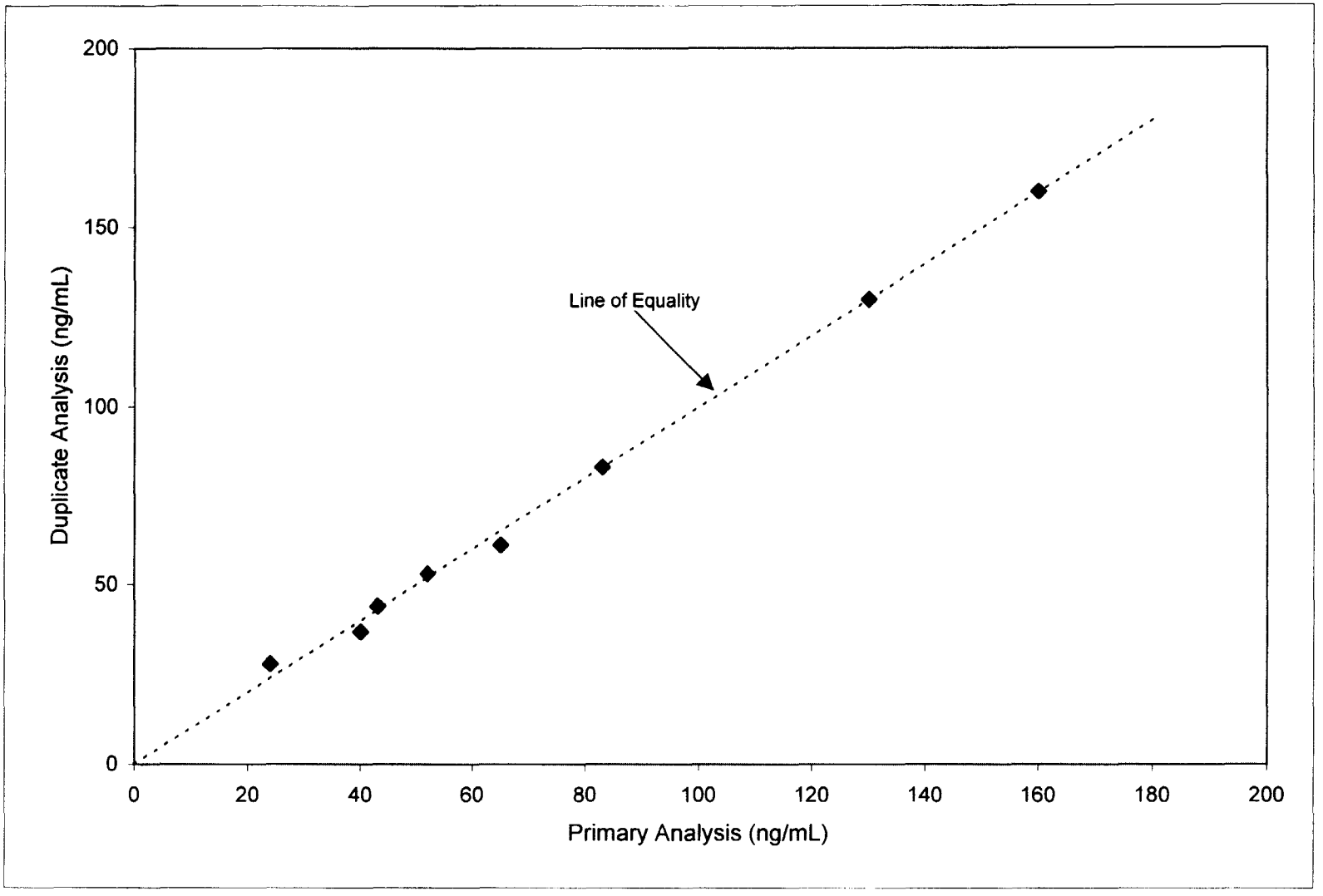
weights.xls (Fig2-5_group weights)

FIGURE 2-6 PERFORMANCE EVALUATION SAMPLES



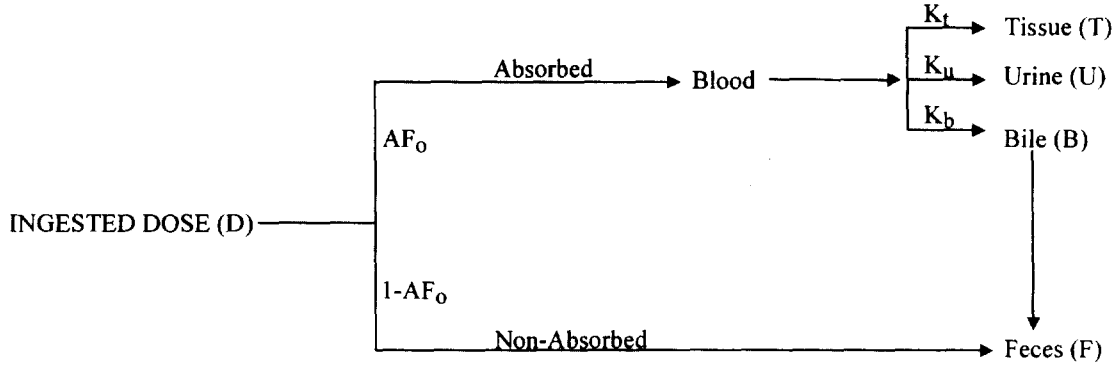
Blind QC analysis.xls (Fig2-6_PE)

FIGURE 2-7 BLIND DUPLICATE SAMPLES



Blind QC analysis.xls (Fig2-7_Dup)

Figure 3-1. Conceptual Model for Arsenic Toxicokinetics



where:

D = Ingested dose (ug)

AF_o = Oral Absorption Fraction

K_t = Fraction of absorbed arsenic which is retained in tissues

K_u = Fraction of absorbed arsenic which is excreted in urine

K_b = Fraction of absorbed arsenic which is excreted in the bile

BASIC EQUATIONS:

Amount Absorbed (ug) $= D \cdot AF_o$

Amount Excreted (ug) $=$ Amount absorbed $\cdot K_u$

$= D \cdot AF_o \cdot K_u$

Urinary Excretion Fraction (UEF) $=$ Amount excreted / Amount ingested

$= (D \cdot AF_o \cdot K_u) / D$

$= AF_o \cdot K_u$

Relative Bioavailability (x vs. y) $= UEF(x) / UEF(y)$

$= (AF_o(x) \cdot K_u) / (AF_o(y) \cdot K_u)$

$= AF_o(x) / AF_o(y)$

Fig 3-1_Toxicokinetics.doc

FIGURE 4-1 URINARY EXCRETION OF ARSENIC FROM SODIUM ARSENATE

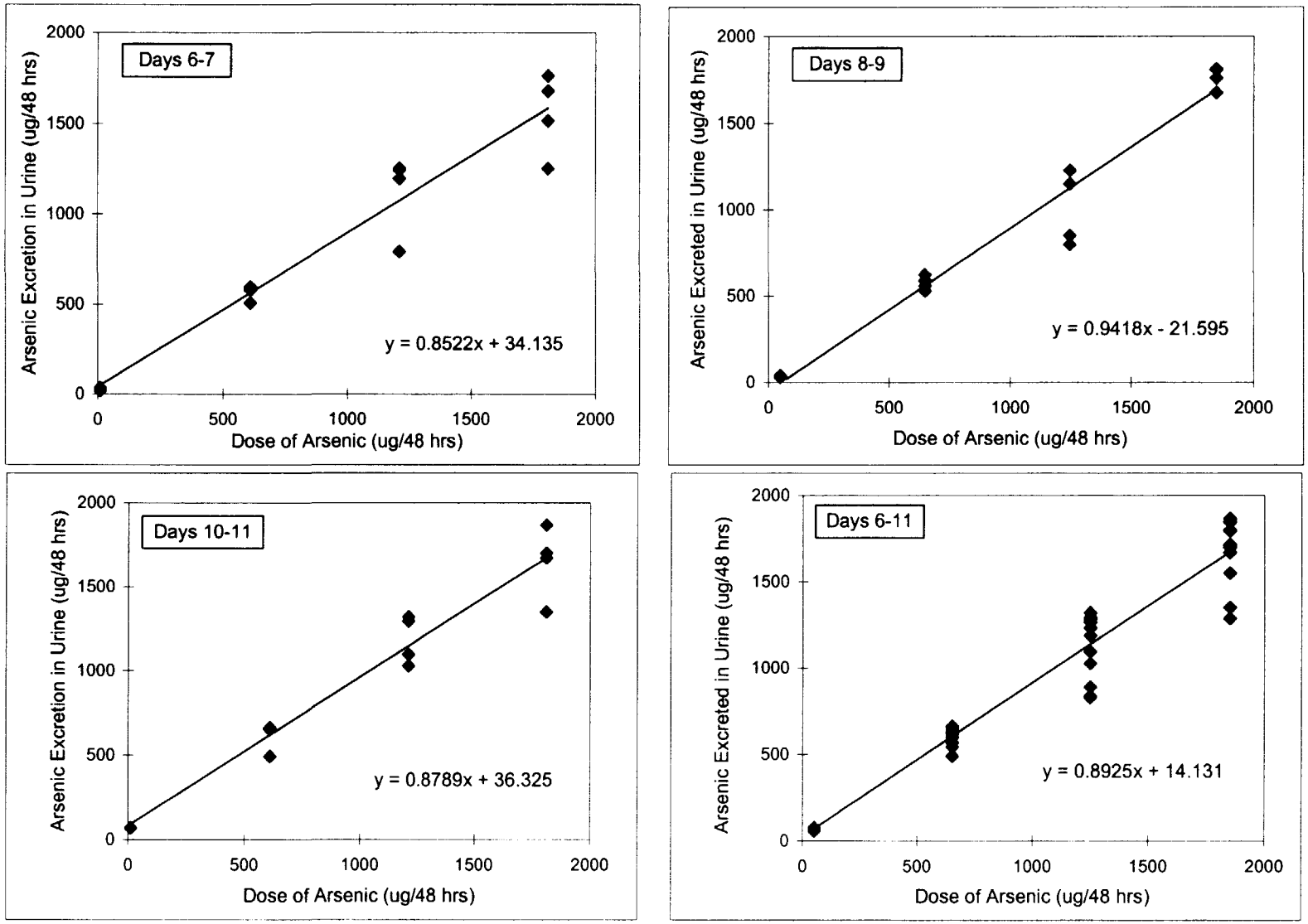


FIGURE 4-2 URINARY EXCRETION OF ARSENIC FROM TEST MATERIAL 1

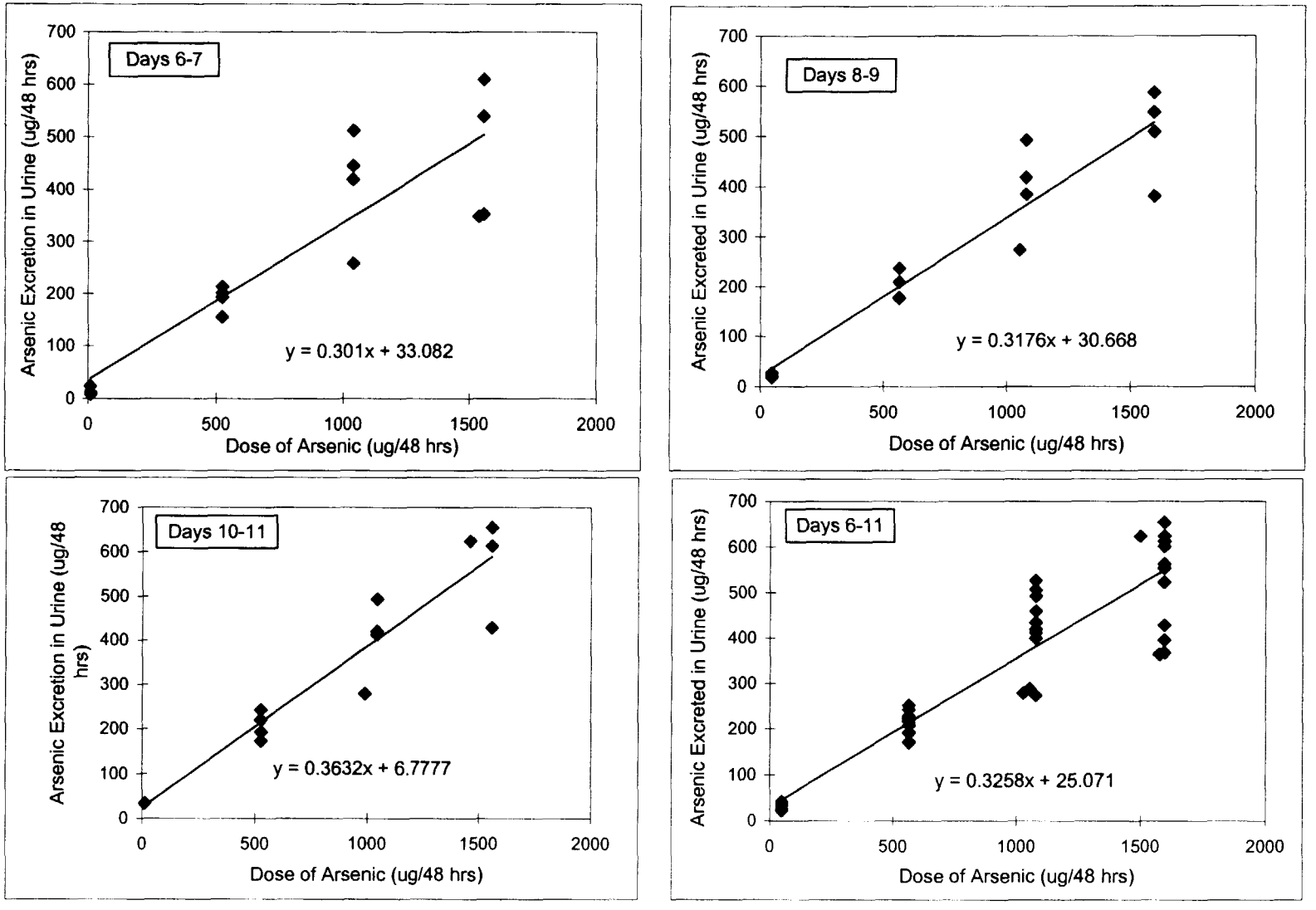


FIGURE 4-3 URINARY EXCRETION OF ARSENIC FROM TEST MATERIAL 2

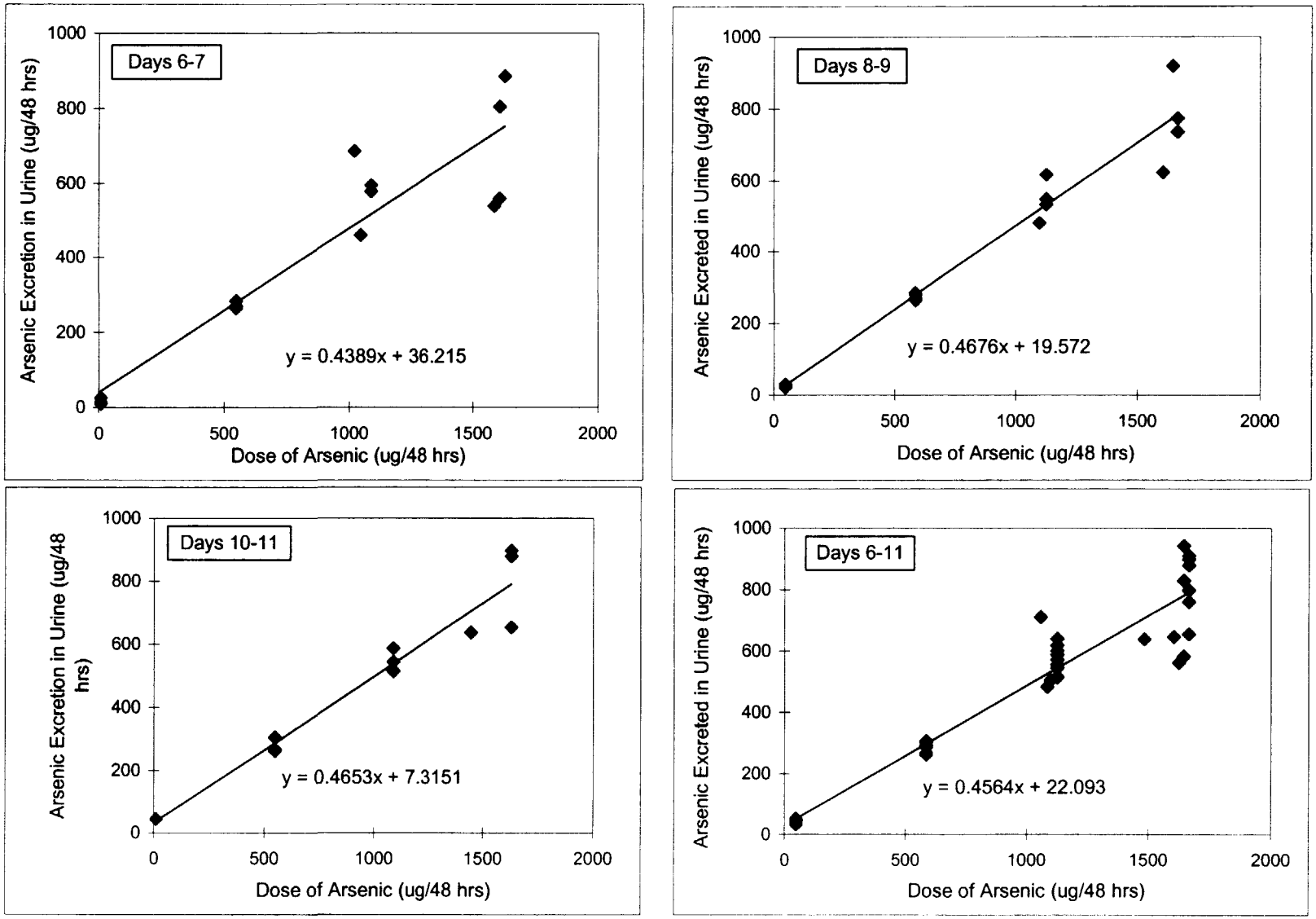
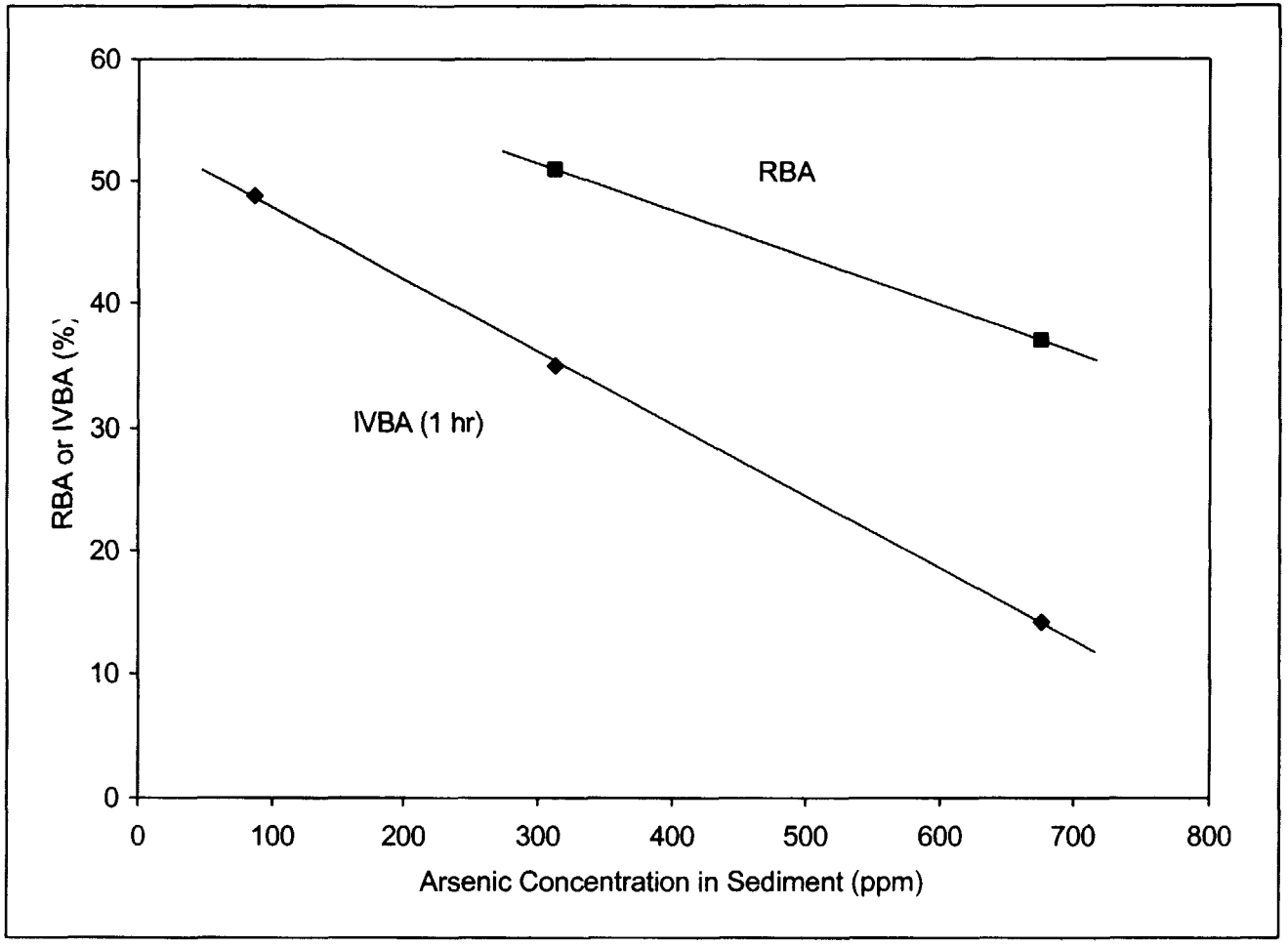


Figure 5-1. RBA and IVBA as a Function of Sediment Concentration

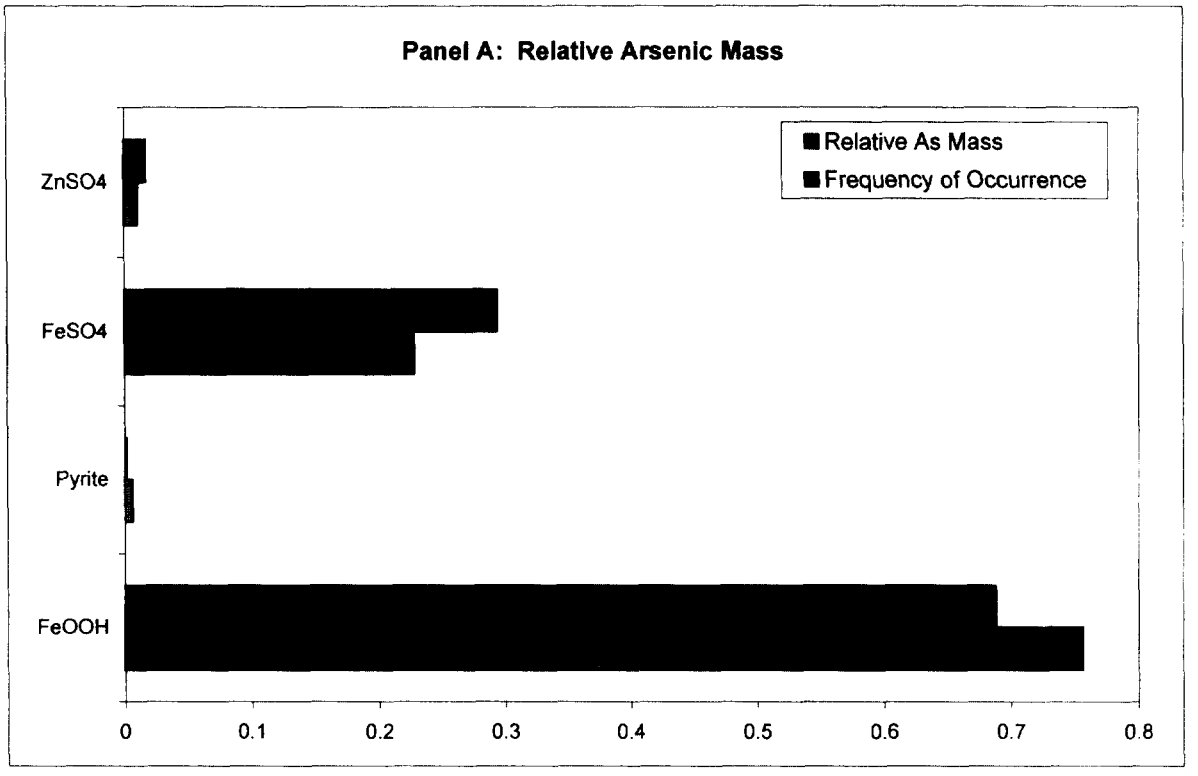


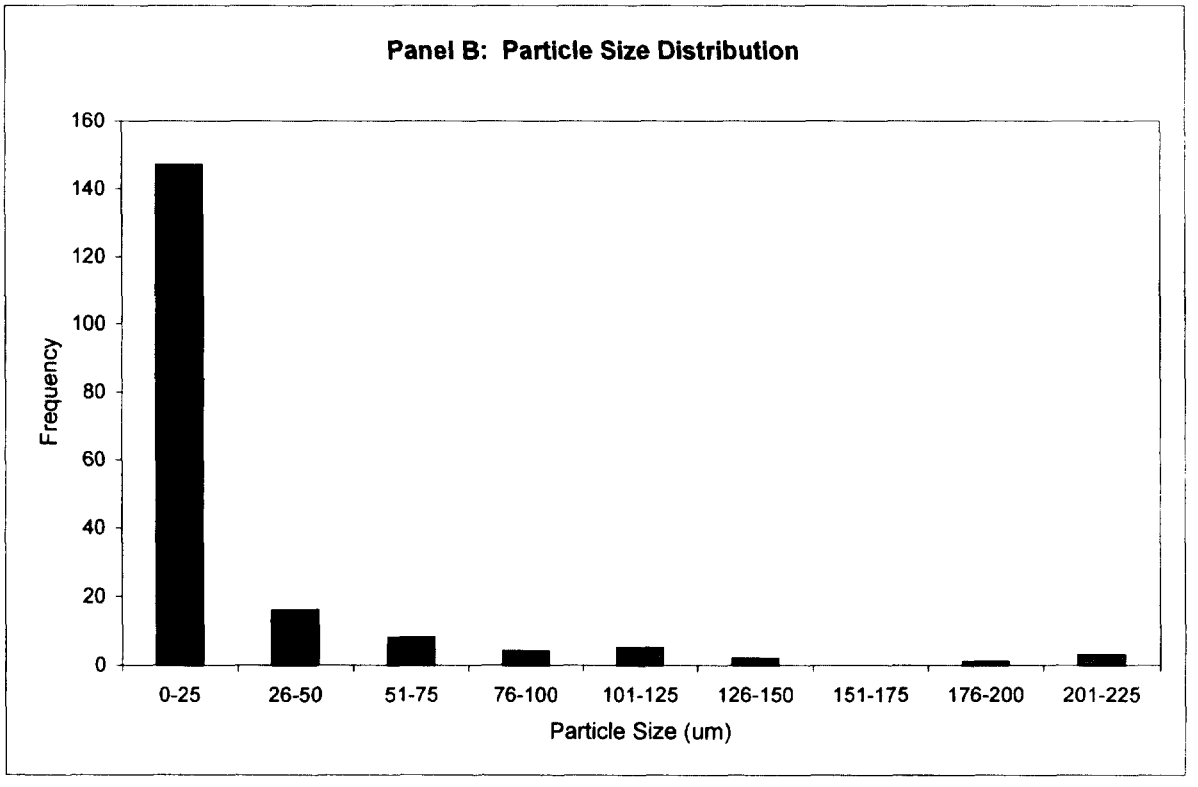
IVBA Results.xls (Summary and Graph)

APPENDIX A

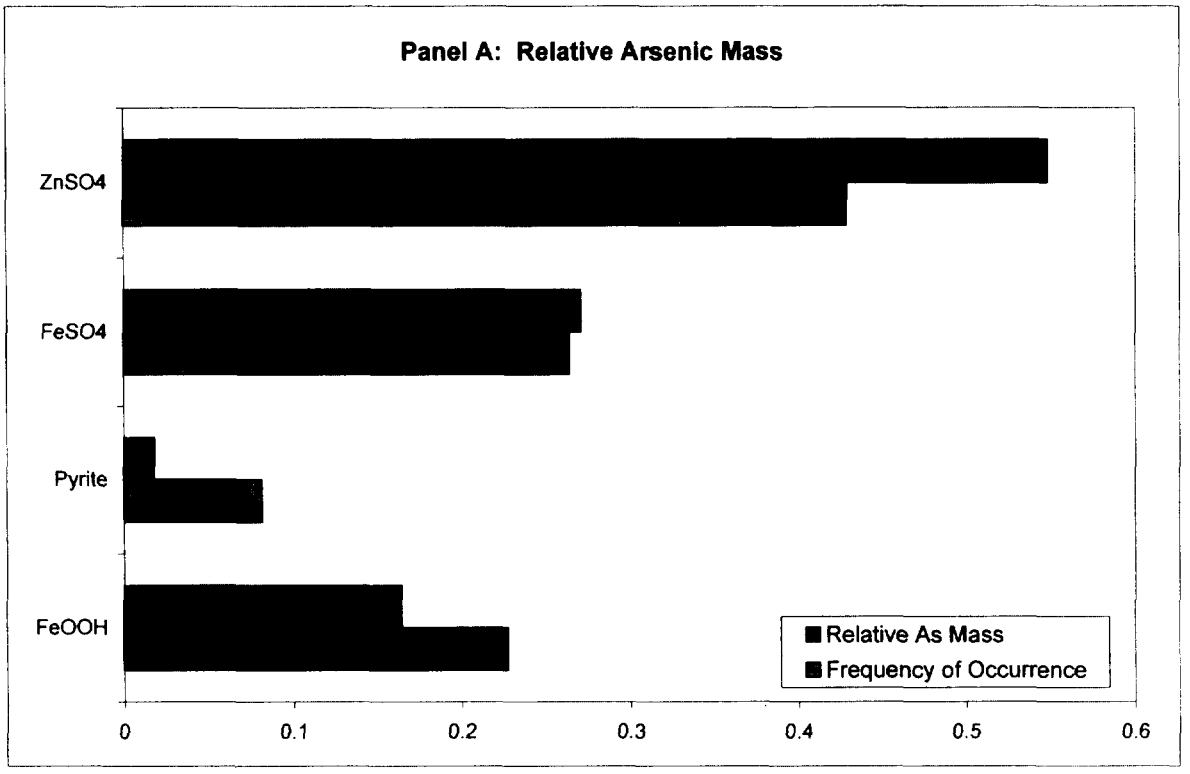
DETAILED ARSENIC SPECIATION RESULTS

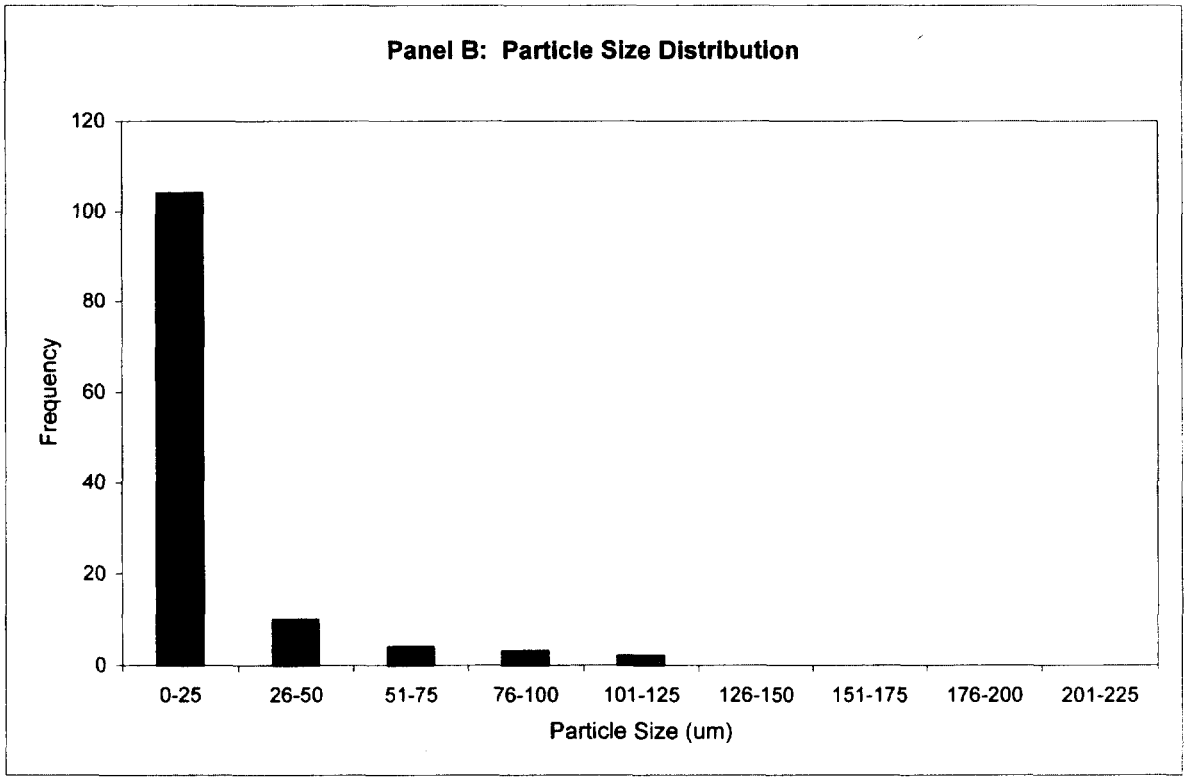
TEST MATERIAL 1 - SPECIATION AND PARTICLE SIZE DATA



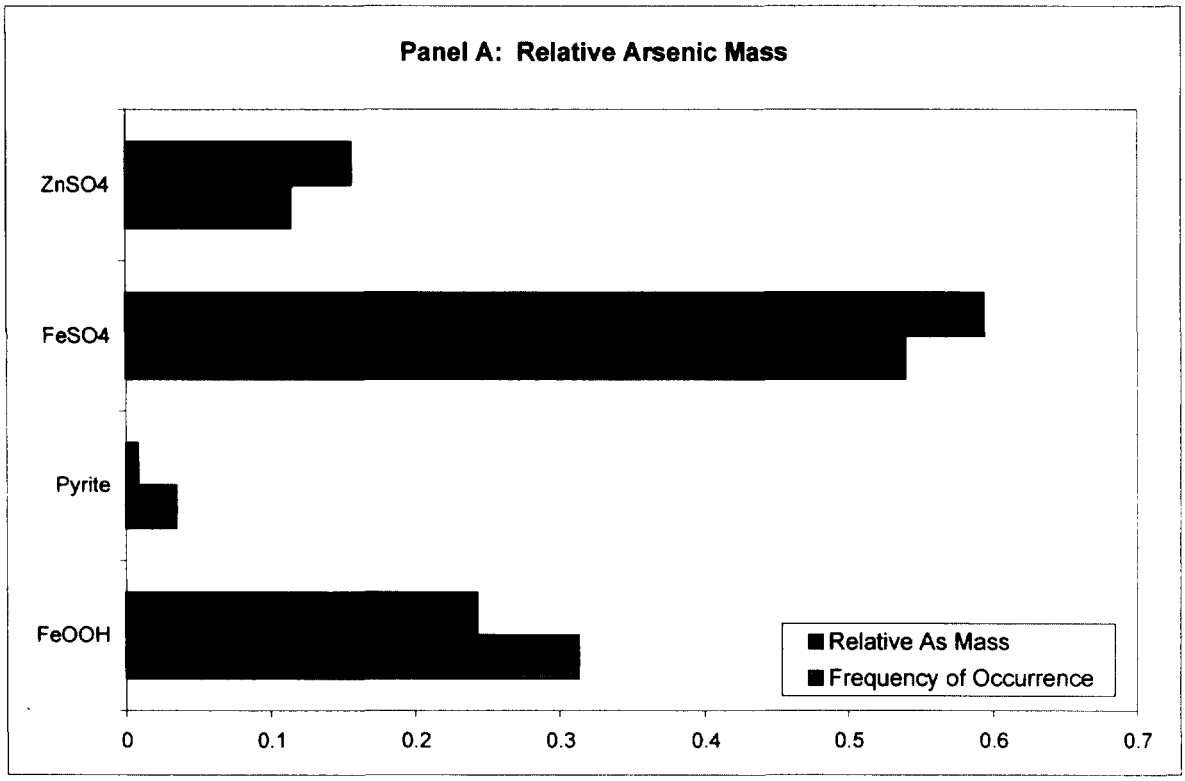


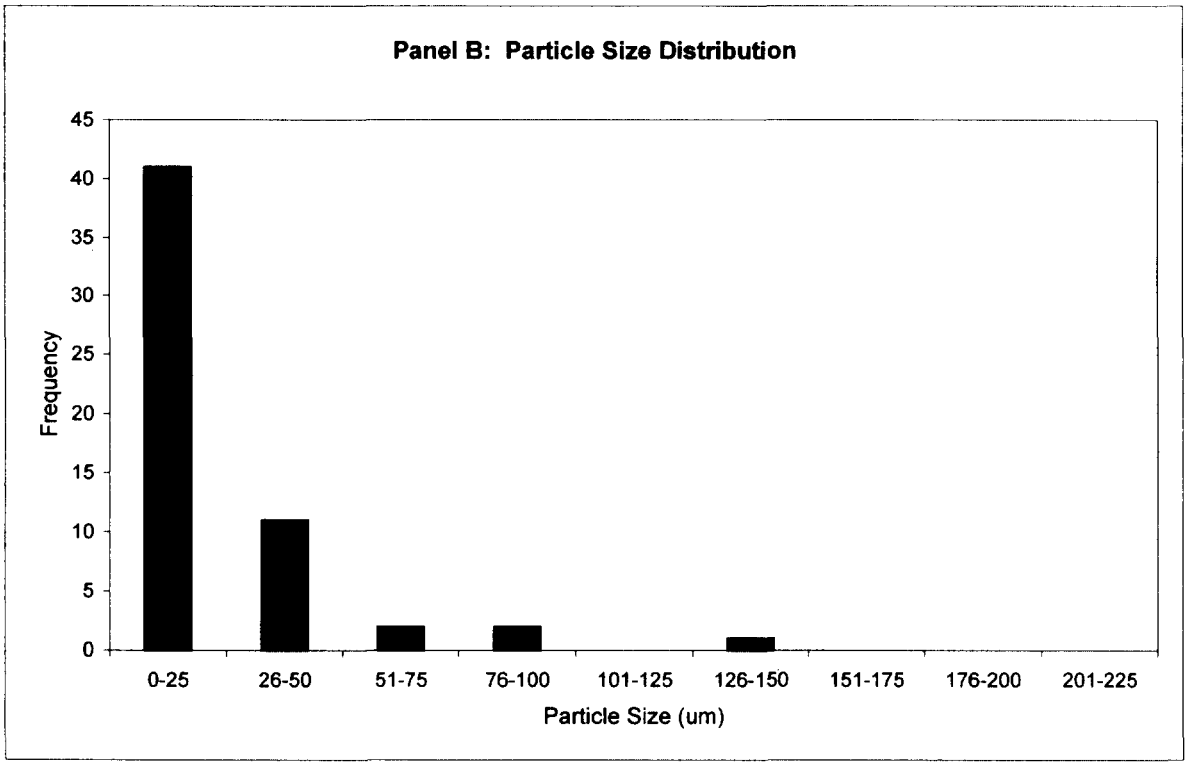
TEST MATERIAL 2 - SPECIATION AND PARTICLE SIZE DATA





TEST MATERIAL 3 - SPECIATION AND PARTICLE SIZE DATA





APPENDIX B

DETAILED RESULTS

TABLE B-1 SCHEDULE

Study Day	Day	Date	Dose Administration	Feed Special Diet	Weigh	Dose Prep	Cull Pigs/ Assign Dose Group	48 hr Urine Collection	Sacrifice
-8	Tuesday	8/27/02							
-7	Wednesday	8/28/02			X		X		
-6	Thursday	8/29/02							
-5	Friday	8/30/02							
-4	Saturday	8/31/02			X				
-3	Sunday	9/1/02							
-2	Monday	9/2/02		X					
-1	Tuesday	9/3/02	X	X	X	X			
0	Wednesday	9/4/02	X	X					
1	Thursday	9/5/02	X	X					
2	Friday	9/6/02	X	X	X	X			
3	Saturday	9/7/02	X	X					
4	Sunday	9/8/02	X	X					
5	Monday	9/9/02	X	X	X	X			
6	Tuesday	9/10/02	X	X				↕	
7	Wednesday	9/11/02	X	X				↕	
8	Thursday	9/12/02	X	X	X	X		↕	
9	Friday	9/13/02	X	X				↕	
10	Saturday	9/14/02	X	X				↕	
11	Sunday	9/15/02	X	X	X			↕	
12	Monday	9/16/02							X

TABLE B-2 GROUP ASSIGNMENTS

Pig Number	Dose Group	Material Administered	Target Dose of Arsenic (ug/day)
324 338 349	1	Control	0
326 330 339 350	2	NaAs	300
310 316 322 340	3	NaAs	600
303 315 329 341	4	NaAs	900
301 318 344 347	5	TM1	300
309 327 343 346	6	TM1	600
306 308 317 331	7	TM1	900
304 311 314 321	8	TM2	300
307 313 325 332	9	TM2	600
328 337 342 348	10	TM2	900

TABLE B-3 BODY WEIGHTS AND ADMINISTERED DOSES, BY DAY

Body weights were measured on days -7, -4, -1, 2, 5, 8, and 11. Weights for other days are estimated, based on linear interpolation between measured values.

Group	Pig #	Day -7		Day -4		Day -1		Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8		Day 9		Day 10		Day 11	
		BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day	BW kg	ugAs per day
1	324	10.15	0	10.25	0	11.15	0	11.48	0	11.82	0	12.15	0	12.57	0	12.98	0	13.40	0	13.75	0	14.10	0	14.45	0	14.87	0	15.28	0	15.70	0
1	338	8.9	0	9.45	0	10.9	0	11.0	0	11.2	0	11.3	0	11.7	0	12.1	0	12.45	0	12.8	0	13.1	0	13.45	0	14.1	0	14.8	0	15.4	0
1	349	10	0	9.45	0	10.75	0	11.1	0	11.4	0	11.75	0	12.1	0	12.5	0	12.85	0	13.3	0	13.8	0	14.2	0	14.6	0	15.0	0	15.4	0
2	328	11.05	300	11.2	300	11.9	300	12.3	300	12.6	300	13	300	13.3	300	13.7	300	14	300	14.4	300	14.8	300	15.25	300	15.8	300	16.4	300	16.9	300
2	330	9.65	300	10.3	300	11.35	300	11.5	300	11.7	300	11.85	300	12.3	300	12.7	300	13.15	300	13.5	300	13.9	300	14.25	300	14.8	300	15.4	300	16	300
2	339	8.2	300	9	300	9.85	300	10.3	300	10.8	300	11.2	300	11.5	300	11.8	300	12.15	300	12.6	300	13.0	300	13.45	300	14.0	300	14.5	300	15.05	300
2	350	10.55	300	10.45	300	11.25	300	11.6	300	12.0	300	12.3	300	12.7	300	13.1	300	13.45	300	13.9	300	14.4	300	14.9	300	15.4	300	15.9	300	16.35	300
3	310	11.55	600	11.65	600	12.65	600	12.8	600	13.0	600	13.2	600	13.5	600	13.9	600	14.2	600	14.8	600	15.5	600	16.1	600	16.5	600	16.9	600	17.3	600
3	316	9.65	600	10.2	600	11.7	600	12.0	600	12.3	600	12.55	600	12.9	600	13.3	600	13.65	600	14.0	600	14.4	600	14.75	600	15.4	600	16.1	600	16.7	600
3	322	10.45	600	10.95	600	11.8	600	12.2	600	12.5	600	12.9	600	13.3	600	13.8	600	14.2	600	14.9	600	15.6	600	16.25	600	16.9	600	17.6	600	18.3	600
3	340	7.8	600	8.2	600	9.05	600	9.3	600	9.6	600	9.85	600	10.2	600	10.5	600	10.85	600	11.2	600	11.5	600	11.75	600	12.2	600	12.7	600	13.2	600
4	303	11.35	900	11.25	900	12.5	900	12.70	900	12.9	900	13.1	900	13.6	900	14.1	900	14.65	900	15.2	900	15.8	900	16.4	900	16.9	900	17.4	900	17.85	900
4	315	10.45	900	10.75	900	11.95	900	12.2	900	12.5	900	12.75	900	13.2	900	13.7	900	14.2	900	14.6	900	14.9	900	15.25	900	15.8	900	16.4	900	16.95	900
4	329	11.05	900	11.8	900	12.9	900	13.4	900	13.8	900	14.25	900	14.7	900	15.2	900	15.6	900	16.0	900	16.5	900	16.9	900	17.4	900	18.0	900	18.5	900
4	341	8.85	900	9.95	900	11.45	900	11.7	900	12.0	900	12.3	900	12.7	900	13.0	900	13.4	900	14.0	900	14.6	900	15.15	900	15.9	900	16.7	900	17.45	900
5	301	13.1	257.802	13.45	257.802	14.65	257.802	15.0	258	15.3	258	15.6	257.802	16.2	258	16.9	258	17.5	257.802	18.2	258	18.8	258	19.45	257.802	20.0	258	20.6	258	21.1	257.802
5	318	11.2	257.802	11.3	257.802	12.35	257.802	12.5	258	12.7	258	12.9	257.802	13.4	258	13.9	258	14.45	257.802	15.0	258	15.6	258	16.1	257.802	16.6	258	17.2	258	17.7	257.802
5	344	10.6	257.802	10.25	257.802	11.1	257.802	11.3	258	11.5	258	11.75	257.802	12.3	258	12.8	258	13.3	257.802	13.8	258	14.2	258	14.7	257.802	15.2	258	15.6	258	16.1	257.802
5	347	8.35	257.802	8.4	257.802	9.45	257.802	9.8	258	10.1	258	10.4	257.802	10.8	258	11.3	258	11.7	257.802	12.0	258	12.4	258	12.7	257.802	13.3	258	13.8	258	14.35	257.802
6	309	8.7	515.604	9.9	515.604	10.8	515.604	11.0	516	11.3	516	11.5	515.604	11.8	516	12.2	516	12.5	515.604	13.1	516	13.7	516	14.3	515.604	14.7	516	15.1	516	15.5	515.604
6	327	9.85	515.604	10.15	515.604	11.25	515.604	11.6	516	11.9	516	12.15	515.604	12.6	516	13.1	516	13.6	515.604	14.2	516	14.8	516	15.4	515.604	15.7	516	15.9	516	16.2	515.604
6	343	9.4	515.604	9.1	515.604	10.1	515.604	10.4	516	10.7	516	10.95	515.604	11.4	516	11.8	516	12.15	515.604	12.6	516	13.0	516			13.6	516	13.8	516		
6	346	9.4	515.604	9.9	515.604	11	515.604	11.4	516	11.8	516	12.25	515.604	12.6	516	12.9	516	13.25	515.604	13.7	516	14.2	516	14.7	515.604	15.0	516	15.4	516	15.7	515.604
7	308	9.7	773.405	13.6	773.405	14.8	773.405	15.0	773	15.2	773	15.45	773.405	16.1	773	16.7	773	17.25	773.405	17.7	773	18.1	773	18.45	773.405	19.0	773	19.6	773	20.15	773.405
7	308	11.15	773.405	11.95	773.405	12.7	773.405	12.9	773	13.1	773	13.3	773.405	13.7	773	14.1	773	14.45	773.405	15.0	773	15.5	773	15.95	773.405	16.4	773	16.8	773	17.2	773.405
7	317	12.75	773.405	12.25	773.405	12.6	773.405	12.9	773	13.1	773	13.4	773.405	13.9	773	14.4	773	14.95	773.405	15.4	773	15.8	773	16.25	773.405	16.8	773	17.3	773	17.75	773.405
7	331	12.85	773.405	12.85	773.405	13.8	773.405	14.1	773	14.3	773	14.6	773.405			15.6	773	16.15	773.405			17.2	773	17.7	773.405	18.1	773				
8	304	10.1	269.655	10.8	269.655	12.1	269.655	12.4	270	12.7	270	13.05	269.655	13.4	270	13.7	270	14	269.655	14.3	270	14.7	270	15	269.655	15.7	270	16.3	270	17	269.655
8	311	11.4	269.655	11.95	269.655	12.75	269.655	13.0	270	13.3	270	13.5	269.655	13.9	270	14.4	270	14.8	269.655	15.3	270	15.8	270	16.3	269.655	16.9	270	17.6	270	18.2	269.655
8	314	10.45	269.655	10.8	269.655	11.5	269.655	11.9	270	12.3	270	12.65	269.655	13.0	270	13.4	270	13.8	269.655	14.5	270	15.1	270	15.8	269.655	16.2	270	16.5	270	16.9	269.655
8	321	11.95	269.655	12.1	269.655	12.45	269.655	12.8	270	13.1	270	13.4	269.655	13.9	270	14.3	270	14.75	269.655	15.2	270	15.7	270	16.15	269.655	16.7	270	17.2	270	17.65	269.655
9	307	13.7	539.31	13	539.31	13.6	539.31	14.0	539	14.3	539	14.65	539.31	14.9	539	15.2	539			15.8	539			16.45	539.31	16.9	539	17.4	539	17.85	539.31
9	313	12.55	539.31	12.9	539.31	13.4	539.31			14.2	539			15.0	539	15.4	539	15.85	539.31	16.1	539	16.4	539	16.6	539.31	17.4	539	18.2	539	19	539.31
9	325	11.45	539.31	11.7	539.31	12.25	539.31	12.5	539	12.7	539	12.95	539.31	13.4	539	13.9	539	14.35	539.31									17.4	539	17.95	539.31
9	332	11.95	539.31	11.5	539.31	12.4	539.31	12.7	539	12.9	539	13.2	539.31	13.7	539	14.2	539	14.65	539.31	15.2	539	15.7	539	16.15	539.31	16.4	539	16.7	539	16.9	539.31
10	326	11.05	808.986	11.25	808.986	12.1	808.986	12.5	809	12.8	809	13.15	808.986	13.6	809	14.1	809	14.5	808.986	15.1	809	15.7	809			16.8	809	17.3	809	17.75	808.986
10	337	8.5	808.986	9.1	808.986	9.75	808.986			10.4	809			11.2	809			12.1	808.986			13.0	809								
10	342	10.9	808.986	11.15	808.986	11.8	808.986	12.1	809	12.4	809	12.75	808.986	13.1	809	13.4	809	13.75	808.986	14.5	809			15.9	808.986	16.3	809	16.8	809	16.95	808.986
10	348	9.05	808.986	9.2	808.986	10.1	808.986	10.3	809	10.5	809	10.65	808.986			11.6	809	12.05	808.986			13.1	809	13.55	808.986	14.0	809	14.5	809	15	808.986

Missed Doses:

Day 0 - Pig 313 did not eat entire afternoon dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 0 - Pig 337 did not eat entire afternoon dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 2 - Pig 313 did not eat entire afternoon dose (ate approximately 90%). Daily dose adjusted to 95%.
Day 2 - Pig 337 did not eat entire morning dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 3 - Pig 331 did not eat entire afternoon dose (ate approximately 90%). Daily dose adjusted to 95%.
Day 3 - Pig 348 did not eat entire afternoon dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 4 - Pig 337 did not eat entire afternoon dose (ate approximately 90%). Daily dose adjusted to 95%.
Day 5 - Pig 307 did not eat entire morning dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 6 - Pig 331 did not eat entire morning dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 6 - Pig 325 did not eat entire afternoon dose (ate approximately 90%). Daily dose adjusted to 95%.
Day 6 - Pig 337 did not eat entire morning dose (ate approximately 90%). Daily dose adjusted to 95%.
Day 6 - Pig 348 did not eat entire afternoon dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 7 - Pig 307 did not eat entire afternoon dose (ate approximately 75%). Daily dose adjusted to 87.5%.
Day 7 - Pig 325 did not eat entire morning dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 7 - Pig 342 did not eat entire morning dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 8 - Pig 343 did not eat entire morning dose (ate approximately 90%). Daily dose adjusted to 95%.
Day 8 - Pig 325 did not eat entire morning dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 8 - Pig 328 did not eat entire morning dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 8 - Pig 337 did not eat entire afternoon dose (ate approximately 90%). Daily dose adjusted to 95%.
Day 9 - Pig 325 did not eat entire afternoon dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 9 - Pig 337 did not eat entire afternoon dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 10 - Pig 331 did not eat entire afternoon dose (ate approximately 95%). Daily dose adjusted to 97.5%.
Day 10 - Pig 337 did not eat entire morning or afternoon dose (ate approximately 70% and 95%, respectively). Daily dose adjusted to 82.5%.
Day 11 - Pig 343 did not eat entire afternoon dose (ate approximately 80%). Daily dose adjusted to 90%.
Day 11 - Pig 331 did not eat entire afternoon dose (ate approximately 80%). Daily dose adjusted to 90%.
Day 11 - Pig 337 did not eat entire afternoon dose (ate approximately 90%). Daily dose adjusted to 95%.

TABLE B-4 URINE VOLUMES - 48 HOUR COLLECTIONS

Units of Volume: mls

Group	Pig ID	Day		
		6-7 9/10-9/11	8-9 9/12-9/13	10-11 9/14-9/15
1	324	5400	6780	11620
	338	6960	7280	13800
	349	6100	4340	4460
2	326	6870	7640	14940
	330	3060	1900	3350
	339	19330	8320	18380
	350	12850	7640	10100
3	310	11150	3260	14060
	316	24060	50480	40840
	322	16940	8720	12400
	340	4840	3480	8100
4	303	10270	12800	13490
	315	12220	23700	16150
	329	21400	21620	26660
	341	5540	7260	8990
5	301	3360	2240	2020
	318	4960	4830	3440
	344	3440	4380	4010
	347	10700	10740	11690
6	309	18340	16790	19700
	327	6280	6360	9800
	343	7040	4480	9240
	346	22050	15820	16650
7	306	8220	8220	11620
	308	15500	11400	12200
	317	2520	2350	2150
	331	8180	8680	11180
8	304	5660	6600	4440
	311	23820	23920	29080
	314	6000	5250	4660
	321	10300	14600	7440
9	307	17000	21760	18000
	313	24830	16420	14660
	325	4360	4840	4050
	332	8910	6760	4290
10	328	15700	14470	21760
	337	3320	1400	3800
	342	14000	14200	33350
	348	3680	3840	4800

Volume measured by:	TE, CL, HH	HH, BL	HH,TN
Date:	9/12/02-9/13/02	9/14/02	9/16/02

TABLE B-5 URINE ANALYTICAL RESULTS

R1-01-0194	324	1	6/7	Control	0	<	1	1	ng/mL
R1-01-0265	338	1	6/7	Control	0		1	1	ng/mL
R1-01-0173	349	1	6/7	Control	0		3	1	ng/mL
R1-01-0163	326	2	6/7	NaAs	300		83	1	ng/mL
R1-01-0200	330	2	6/7	NaAs	300		160	2	ng/mL
R1-01-0191	339	2	6/7	NaAs	300		29	1	ng/mL
R1-01-0228	350	2	6/7	NaAs	300		45	1	ng/mL
R1-01-0232	310	3	6/7	NaAs	600		110	2	ng/mL
R1-01-0199	316	3	6/7	NaAs	600		49	1	ng/mL
R1-01-0112	322	3	6/7	NaAs	600		73	1	ng/mL
R1-01-0250	340	3	6/7	NaAs	600		160	2	ng/mL
R1-01-0167	303	4	6/7	NaAs	900		170	2	ng/mL
R1-01-0220	315	4	6/7	NaAs	900		101	1	ng/mL
R1-01-0263	329	4	6/7	NaAs	900		70	1	ng/mL
R1-01-0233	341	4	6/7	NaAs	900		300	4	ng/mL
R1-01-0136	301	5	6/7	TM1	300		56	1	ng/mL
R1-01-0261	318	5	6/7	TM1	300		42	1	ng/mL
R1-01-0260	344	5	6/7	TM1	300		57	1	ng/mL
R1-01-0159	347	5	6/7	TM1	300		14	1	ng/mL
R1-01-0148	309	6	6/7	TM1	600		24	1	ng/mL
R1-01-0187	327	6	6/7	TM1	600		66	1	ng/mL
R1-01-0156	343	6	6/7	TM1	600		36	1	ng/mL
R1-01-0208	346	6	6/7	TM1	600		23	1	ng/mL
R1-01-0121	306	7	6/7	TM1	900		65	1	ng/mL
R1-01-0165	308	7	6/7	TM1	900		39	1	ng/mL
R1-01-0193	317	7	6/7	TM1	900		138	1	ng/mL
R1-01-0171	331	7	6/7	TM1	900		42	1	ng/mL
R1-01-0225	304	8	6/7	TM2	300		49	1	ng/mL
R1-01-0183	311	8	6/7	TM2	300		11	1	ng/mL
R1-01-0117	314	8	6/7	TM2	300		44	1	ng/mL
R1-01-0118	321	8	6/7	TM2	300		25	1	ng/mL
R1-01-0177	307	9	6/7	TM2	600		40	1	ng/mL
R1-01-0152	313	9	6/7	TM2	600		23	1	ng/mL
R1-01-0234	325	9	6/7	TM2	600		104	1	ng/mL
R1-01-0172	332	9	6/7	TM2	600		66	1	ng/mL
R1-01-0114	328	10	6/7	TM2	900		56	1	ng/mL
R1-01-0164	337	10	6/7	TM2	900		160	2	ng/mL
R1-01-0147	342	10	6/7	TM2	900		57	1	ng/mL
R1-01-0186	348	10	6/7	TM2	900		150	2	ng/mL
R1-01-0120	324	1	8/9	Control	0		2	1	ng/mL
R1-01-0237	338	1	8/9	Control	0		3	1	ng/mL
R1-01-0123	349	1	8/9	Control	0		3.6	1	ng/mL
R1-01-0139	326	2	8/9	NaAs	300		75	1	ng/mL
R1-01-0221	330	2	8/9	NaAs	300		270	5	ng/mL
R1-01-0107	339	2	8/9	NaAs	300		73	1	ng/mL
R1-01-0243	350	2	8/9	NaAs	300		71	1	ng/mL
R1-01-0189	310	3	8/9	NaAs	600		240	5	ng/mL
R1-01-0213	316	3	8/9	NaAs	600		24	1	ng/mL
R1-01-0111	322	3	8/9	NaAs	600		130	2	ng/mL

R1-01-0145	340	3	8/9	NaAs	600		240	5	ng/mL
R1-01-0132	303	4	8/9	NaAs	900		140	2	ng/mL
R1-01-0257	315	4	8/9	NaAs	900		70	1	ng/mL
R1-01-0240	329	4	8/9	NaAs	900		83	1	ng/mL
R1-01-0188	341	4	8/9	NaAs	900		240	5	ng/mL
R1-01-0215	301	5	8/9	TM1	300		77	1	ng/mL
R1-01-0133	318	5	8/9	TM1	300		48	1	ng/mL
R1-01-0218	344	5	8/9	TM1	300		39	1	ng/mL
R1-01-0255	347	5	8/9	TM1	300		19	1	ng/mL
R1-01-0138	309	6	8/9	TM1	600		29	1	ng/mL
R1-01-0170	327	6	8/9	TM1	600		65	1	ng/mL
R1-01-0251	343	6	8/9	TM1	600		60	1	ng/mL
R1-01-0141	346	6	8/9	TM1	600		24	1	ng/mL
R1-01-0127	306	7	8/9	TM1	900		66	1	ng/mL
R1-01-0258	308	7	8/9	TM1	900		51	1	ng/mL
R1-01-0205	317	7	8/9	TM1	900		160	5	ng/mL
R1-01-0161	331	7	8/9	TM1	900		58	1	ng/mL
R1-01-0242	304	8	8/9	TM2	300		39	1	ng/mL
R1-01-0253	311	8	8/9	TM2	300		11	1	ng/mL
R1-01-0166	314	8	8/9	TM2	300		52	1	ng/mL
R1-01-0262	321	8	8/9	TM2	300		19	1	ng/mL
R1-01-0105	307	9	8/9	TM2	600		28	1	ng/mL
R1-01-0134	313	9	8/9	TM2	600		32	1	ng/mL
R1-01-0185	325	9	8/9	TM2	600		98	1	ng/mL
R1-01-0113	332	9	8/9	TM2	600		80	1	ng/mL
R1-01-0144	328	10	8/9	TM2	900		63	1	ng/mL
R1-01-0101	337	10	8/9	TM2	900		440	10	ng/mL
R1-01-0210	342	10	8/9	TM2	900		54	1	ng/mL
R1-01-0196	348	10	8/9	TM2	900		190	5	ng/mL
R1-01-0202	324	1	10/11	Control	0	<	1	1	ng/mL
R1-01-0239	338	1	10/11	Control	0		1	1	ng/mL
R1-01-0142	349	1	10/11	Control	0		3	1	ng/mL
R1-01-0192	326	2	10/11	NaAs	300		40	1	ng/mL
R1-01-0224	330	2	10/11	NaAs	300		130	2	ng/mL
R1-01-0229	339	2	10/11	NaAs	300		33	1	ng/mL
R1-01-0108	350	2	10/11	NaAs	300		60	1	ng/mL
R1-01-0209	310	3	10/11	NaAs	600		74	1	ng/mL
R1-01-0207	316	3	10/11	NaAs	600		31	1	ng/mL
R1-01-0131	322	3	10/11	NaAs	600		100	1	ng/mL
R1-01-0219	340	3	10/11	NaAs	600		120	2	ng/mL
R1-01-0254	303	4	10/11	NaAs	900		96	1	ng/mL
R1-01-0125	315	4	10/11	NaAs	900		102	1	ng/mL
R1-01-0236	329	4	10/11	NaAs	900		68	1	ng/mL
R1-01-0264	341	4	10/11	NaAs	900		180	5	ng/mL
R1-01-0109	301	5	10/11	TM1	300		110	2	ng/mL
R1-01-0231	318	5	10/11	TM1	300		58	1	ng/mL
R1-01-0176	344	5	10/11	TM1	300		43	1	ng/mL
R1-01-0128	347	5	10/11	TM1	300		13	1	ng/mL
R1-01-0227	309	6	10/11	TM1	600		24	1	ng/mL
R1-01-0129	327	6	10/11	TM1	600		40	1	ng/mL
R1-01-0115	343	6	10/11	TM1	600		28	1	ng/mL
R1-01-0204	346	6	10/11	TM1	600		24	1	ng/mL

R1-01-0160	306	7	10/11	TM1	900		51	1	ng/mL
R1-01-0150	308	7	10/11	TM1	900		52	1	ng/mL
R1-01-0143	317	7	10/11	TM1	900		190	5	ng/mL
R1-01-0248	331	7	10/11	TM1	900		54	1	ng/mL
R1-01-0238	304	8	10/11	TM2	300		62	1	ng/mL
R1-01-0178	311	8	10/11	TM2	300		9.5	1	ng/mL
R1-01-0217	314	8	10/11	TM2	300		50	1	ng/mL
R1-01-0214	321	8	10/11	TM2	300		32	1	ng/mL
R1-01-0252	307	9	10/11	TM2	600		31	1	ng/mL
R1-01-0245	313	9	10/11	TM2	600		33	1	ng/mL
R1-01-0256	325	9	10/11	TM2	600		120	2	ng/mL
R1-01-0216	332	9	10/11	TM2	600		120	2	ng/mL
R1-01-0149	328	10	10/11	TM2	900		39	1	ng/mL
R1-01-0246	337	10	10/11	TM2	900		160	5	ng/mL
R1-01-0174	342	10	10/11	TM2	900		26	1	ng/mL
R1-01-0103	348	10	10/11	TM2	900		130	2	ng/mL
R1-01-0222	2340	3	6/7	NaAs	600		160	2	ng/mL
R1-01-0180	2306	7	6/7	TM1	900		61	1	ng/mL
R1-01-0244	2307	9	6/7	TM2	600		37	1	ng/mL
R1-01-0104	2329	4	8/9	NaAs	900		83	1	ng/mL
R1-01-0247	2346	6	8/9	TM1	600		28	1	ng/mL
R1-01-0110	2314	8	8/9	TM2	300		53	1	ng/mL
R1-01-0212	2330	2	10/11	NaAs	300		130	2	ng/mL
R1-01-0182	2344	5	10/11	TM1	300		44	1	ng/mL
R1-01-0151	2348	10	10/11	TM2	900		130	2	ng/mL
R1-01-0157	AsCtrl	PE		Control	0		3	1	ng/mL
R1-01-0206	AsCtrl	PE		Control	0		2	1	ng/mL
R1-01-0119	AsIA200	PE		Sodium arsenate	200		180	4	ng/mL
R1-01-0124	AsIA200	PE		Sodium arsenate	200		190	5	ng/mL
R1-01-0198	AsIA40	PE		Sodium arsenate	40		42	1	ng/mL
R1-01-0158	AsIA40	PE		Sodium arsenate	40		41	1	ng/mL
R1-01-0122	AsIB200	PE		Sodium arsenite	200		190	4	ng/mL
R1-01-0175	AsIB200	PE		Sodium arsenite	200		200	5	ng/mL
R1-01-0106	AsIB40	PE		Sodium arsenite	40		43	1	ng/mL
R1-01-0230	AsIB40	PE		Sodium arsenite	40		41	1	ng/mL
R1-01-0241	AsOA200	PE		MMA	200		200	4	ng/mL
R1-01-0130	AsOA200	PE		MMA	200		210	5	ng/mL
R1-01-0135	AsOA40	PE		MMA	40		43	1	ng/mL
R1-01-0169	AsOA40	PE		MMA	40		43	1	ng/mL
R1-01-0116	AsOB200	PE		DMA	200		200	4	ng/mL
R1-01-0203	AsOB200	PE		DMA	200		210	5	ng/mL
R1-01-0249	AsOB40	PE		DMA	40		44	1	ng/mL
R1-01-0154	AsOB40	PE		DMA	40		44	1	ng/mL

LETTER OF TRANSMITTAL

TETRA TECH NUS, Inc.
55 Jonspin Road
Wilmington, Massachusetts 01887
(978) 658-7899

Correspondence No. RAC1-EPA-5235

TO: Diane Silverman
Metcalf & Eddy, Inc
701 Edgewater Drive
Wakefield, MA 01880-5371

DATE: 06-24-04 JOB NO.: N4123-0132
ATTENTION:
REGARDING: Arsenic Bioavailability Study
Industri-plex Site
Woburn, MA

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:
☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change Order ☐ Submittals ☐ _____

COPIES	DATE	NUMBER	DESCRIPTION
1			Arsenic Bioavailability Sample Log Sheets

THESE ARE TRANSMITTED as checked below:
☐ For approval ☐ Approved as submitted ☐ Resubmit __ copies for approval
☒ For your use/File ☐ Approved as noted ☐ Submit ____copies for distribution
☐ As requested ☐ Return for corrections ☐ Return ____ corrected prints
☐ For review and comment ☐ _____

REMARKS:

COPY TO: N4123-1.0

SIGNED: Gordon Bullard

Bioavailability Study - T-312 - Resample 8/15/02

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-01-081502

Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/15/2002 1115 hours (military) Duplicate: NA hours

Sampler(s): J. Daniels / K. O'Neill / J. Lambert / G. Bullard (circle appropriate)

Data Recorded By: J. Daniels (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

- ___ Soil
- X Sediment
- ___ Lagoon/Pond
- X Grab
- ___ Trip Blank*
- ___ Rinsate Blank*
- ___ Field Duplicate collected
- ___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Wet, Muck, abundant organics. Sandy.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old HBO108 Location

DO 17.57
DO% 236.9%
Temp 30.13°C
Bar. 765.7

~ 0.4ft of Surface Water over muck.

Resample of Location Sampled on 7/8/02
See sketch on 7/8/02 Log Sheet
Sample ~5ft South of Sample Collected on 7/8/02

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-02-081502
Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 8/15/2001 1320 hours (military) Duplicate: NA hours
Sampler(s): J. Danieli / K. O'Neill/ J. Lambert / G. Bullard (circle appropriate)
Data Recorded By: J. Danieli (Signature)
Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Mucky Peat - Wet Brown - Black

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old HB02-04 Location

DO 1.03 mg/L
DO% 13.6 %
Temp 28.53 °C
Bar Pressure 765.3 mmHg
Surface Water @ Sediment Surface

Resample of location sampled on 7/8/02 See Sketch on 7/8/02 Log Sheet Sample ~ 3ft West of Sample collected on 7/8/02.

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-03-081502
Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/15/2002 1054 hours (military) Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neill/ J. Lambert G. Bullard (circle appropriate)

Data Recorded By: J Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Wet. Black. muck.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old HB03-0809 location 8/15/02

DO 0.89 mg/L
DO% 11.7 %
temp 26.77 °C
Bar. Pressure 766.7 mmHg
~ 0.15 ft of S. water over muck.

Re-sample of location Sampled on 7/8/02 See sketch on 7/8/02 Log Sheet.
Sample 2 ~~ft~~ 5ft South From sample Collected on 7/8/02.

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-04-081502

Tetra Tech NUS Job No./PMS: N4123- 0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/16/2002 0827 hours (military) Duplicate: NA hours

Sampler(s): J. Daniel / (K. O'Neil) / J. Lambert / (G. Bullard) (circle appropriate)

Data Recorded By: J Daniels (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) No standing Water
Mucky Peat- Abundant Organics
DK Brown. Moist.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old SD-12-01 Location

DO 0.65 mg/L
DO% 7.2%
Temp 20.98°C
Bar. 766.4 mmHg
Pressure.

Re-Sample of location Sampled on 7/8/02
See sketch on 7/8/02 Log Sheet
Sample 2 Ft from sample location on 7/8/02.

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-05-081502 Tetra Tech NUS Job No./PMS: N4123- 0322
Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/15/2002 0853 hours (military) Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neill / J. Lambert / G. Bullard (circle appropriate)

Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) No Standing Water
Peak - abundant Organics
Dk. Brown

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old NG-07 Location

DO 0.28 mg/L
DO% 3.1%
Temp. 20.36 °C
Bar. Pressure = 766.1 mmHg
Depth to water below surface = 0.55 ft

Re-sample of location Sampled on 7/8/02. See sketch on 7/8/02 Log Sheet.
Sample 5 ft from sample location on 7/8/02.

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD - ABS - 016 - 081502

Tetra Tech NUS Job No./PMS: N4123- 0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop.

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/15/2002 0919 hours (military) Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neill / J. Lambert / G. Bullard (circle appropriate)

Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

- ___ Soil
- X Sediment
- ___ Lagoon/Pond
- X Grab
- ___ Trip Blank*
- ___ Rinsate Blank*
- ___ Field Duplicate collected
- ___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) No Standing Water. Sulfide odor
Wet - DK Brown - Mucky Peat

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old WS08 Location

DO 1.65 mg/L
DO% 19.8%
Temp. 24.23 °C
Bar. Pressure 766-3 mmHg
Depth to water = 0.1 ft from Surface of Sediment.

Re-sample of location sampled on 7/8/02
See Sketch on 7/8/02 Log Sheet
Sample 5 ft South from 7/8/02 location

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-07-081502

Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/15/2002 0949 hours (military) Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neil / J. Lambert / G. Bullard (circle appropriate)

Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

- [X] Soil
- [X] Sediment
- [ ] Lagoon/Pond
- [X] Grab
- [ ] Trip Blank*
- [ ] Rinsate Blank*
- [ ] Field Duplicate collected
- [ ] Composite

Other

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) muck - wet - abundant decompose
No standing water plant fiber material

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old CB03-06 Location

DO 0.19 mg/L
DO% 2.2 %
Temp 24.13 °C
Bar. Pressure 766.0 mmHg

Depth to water = 0.3ft - below Surface of Sediment.

Resample of location sampled on 7/8/02
See sketch on 7/8/02 log sheet
Sample 2ft West of sample Collected on 7/8/02.

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD - ABS - 08 - 081502

Tetra Tech NUS Job No./PMS: N4123- 0322
QC Information: NA (if applicable)

Sample Method: _____

Depth Sampled: 0 - 0.5 feet

Sample Date & Time: 8/15/2002 1000 hours (military) Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neill / J. Lambert / G. Bullard (circle appropriate)

Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other _____

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Muck - abundant decomposed leaves & Root matter DK Brown

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old CB03-11 location

~~DO 3.0 08/15/02~~ mg/L
DO% 3.0 %
Temp. 20.63 °C
Bar. Pressure. 766.4 mmHg
Depth to Water = 0.3 Ft below Surface of Sediment

Resample of location sampled on 7/8/02. See sketch on 7/8/02 log sheet. Sample 2ft South of Sample Collected on 7/8/02

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-09-081502

Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/15/2002 1014 hours (military) Duplicate: NA hours

Sampler(s): J. Daniell / K. O'Neill / J. Lambert / G. Bullard (circle appropriate)

Data Recorded By: J. Daniell (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) NO Standing Water
Muck - Moist - Decayed Leaves

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old CB03-09 Location

DO 2.02
DO% 22.1%
Temp 20.52°C
Bar Pressure: 7660 mmHg

Depth to water From surface of Sed: 0.3ft

Resample of location sampled on 7/8/02
See Sample log Sheet for 7/8/02 for Sketch
Sample ~~2ft ft~~ NORTH From Sample Collected on 7/8/02

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-10-081502

Tetra Tech NUS Job No./PMS: N4123- 0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ stainless steel scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/15/2002 1446 hours (military) Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neill/ J. Lambert / G. Bullard (circle appropriate)

Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

- ___ Soil
- X Sediment
- ___ Lagoon/Pond
- X Grab
- ___ Trip Blank*
- ___ Rinsate Blank*
- ___ Field Duplicate collected
- ___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Muck - w/ Roots - trace sand + Gravel
No standing water @ Sample location
*include DIUF lot # in "other"

water w/in 1ft of sample location.

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old SD07-10 location

DO 10.06mg/L
100% 141.3%
Temp. 33.17°C
Bar.
Pressure 765.0mmHg

Resample of location sampled on 7/8/02. See Sketch on 7/8/02 log sheet.
Sample ~3ft South of sample collected on 7/8/02

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-11-081502 QC Information: NA (if applicable)
Tetra Tech NUS Job No./PMS: N4123-0322

Sample Method: Scoop w/ Stainless Steel Scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 8/15/2001 1430 hours (military) Duplicate: NA hours
Sampler(s): J. Daniel / K. O'Neill/ J. Lambert / G. Bullard (circle appropriate)
Data Recorded By: J. Daniell. (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Muck - Roots

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old SD07-04 location

DO 8.81 mg/L
DO % 117.3 %
Temp 30.50 °C
Bar. Pressure 765.3 mmHg

Resample of location sampled on 7/8/02 See Sketch on 7/8/02 log sheet

water depth 0.46'

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-12-081502 QC Information: NA (if applicable)
Tetra Tech NUS Job No./PMS: N4123-0322

Sample Method: Scoop W/ Stainless Steel Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 8/15/2002 1405 hours (military) Duplicate: NA hours

Sampler(s): J. Daniels / K. O'Neill/ J. Lambert / G. Bullard (circle appropriate)

Data Recorded By: J Daniels (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) ___

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old SD07-05 location

DO = 1.86 mg/L
DO% = 26.1 %
Temp = 30.75 °C
Bar. Pressure = 766.7 mmHg

Resample of location Sampled on 7/8/02
See Sketch on 7/8/02 log Sheet

water depth 0.5'
Sample ~ 2-5ft East of Sample Collected on 7/8/02

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-01-070802 QC Information: NA (if applicable)
Tetra Tech NUS Job No./PMS: N4123- 0322

Sample Method: Scoop w/ stainless steel scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 7/8/2002 1630 hours (military) Duplicate: NA hours
Sampler(s): J. Danieli / K. O'Neill / J. Lambert (circle appropriate)
Data Recorded By: J. Danieli (Signature)
Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

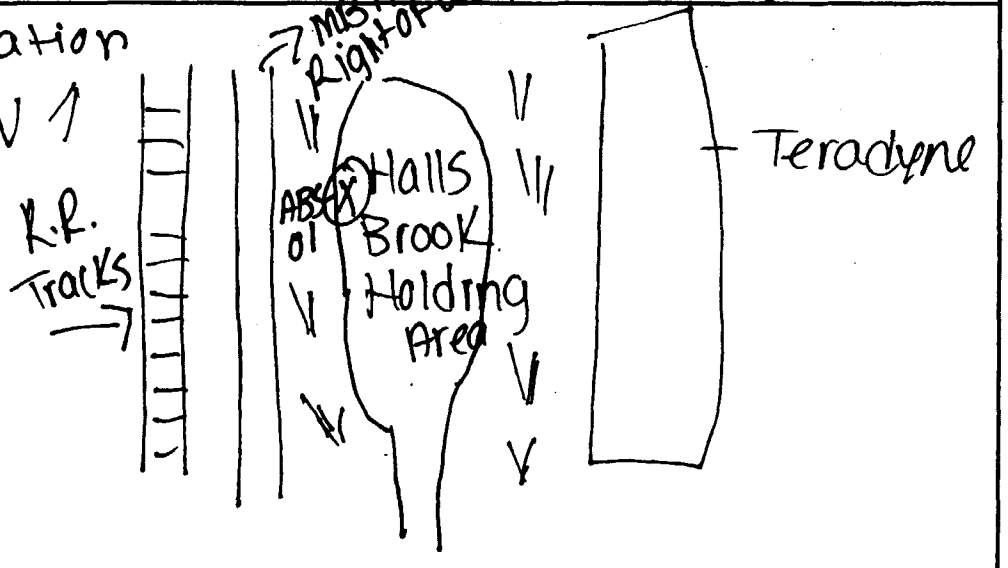
___ Soil	___ Trip Blank*
_X_ Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
_X_ Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Organic muck, wet, Black, Trace silt + Sand ~12" of water over sediment
*include DIUF lot # in "other" Blue sheen on water

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old HBO1-08 location
DO: 2.78
DO%: 32.7%
Temp: 26.99°C
Bar. Pressure 762.2 mmHg



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-02-070802 QC Information: NA (if applicable)
Tetra Tech NUS Job No./PMS: N4123- 0322

Sample Method: Scoop w/ stainless steel scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 1/8/2002 1705 hours (military) Duplicate: NA hours
Sampler(s): J. Danieli / K. O'Neill/ J. Lambert (circle appropriate)
Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

- \ Soil
- X Sediment
- ___ Lagoon/Pond
- X Grab
- ___ Trip Blank*
- ___ Rinsate Blank*
- ___ Field Duplicate collected
- ___ Composite

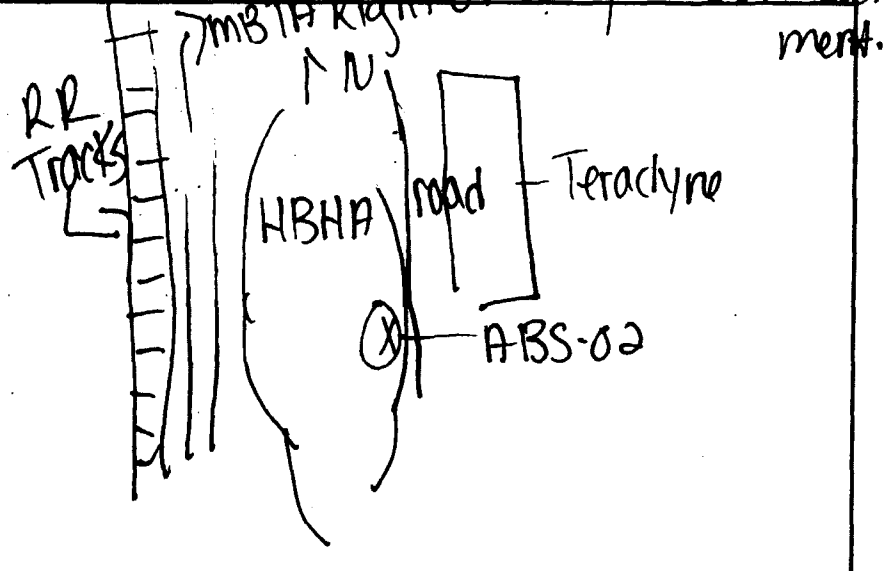
Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) DK Brown, organic muck w/ Fine Root matter & phragmites (decayed) - soupy. Initially 2" of water flush over debris - more water over sediment.
*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old HB02-04 Location

Temp: 26.92 °C
Bar. Pressure: 762.5 mmHg
DO: 1.58 mg/L
DO%: 19.1%



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-03-070802
Tetra Tech NUS Job No./PMS: N4123- 0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 7/8/2002 1610 hours (military)
Duplicate: NA hours
Sampler(s): J. Daniel / K. O'Neill / J. Lambert (circle appropriate)
Data Recorded By: J. Daniel (Signature)
Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

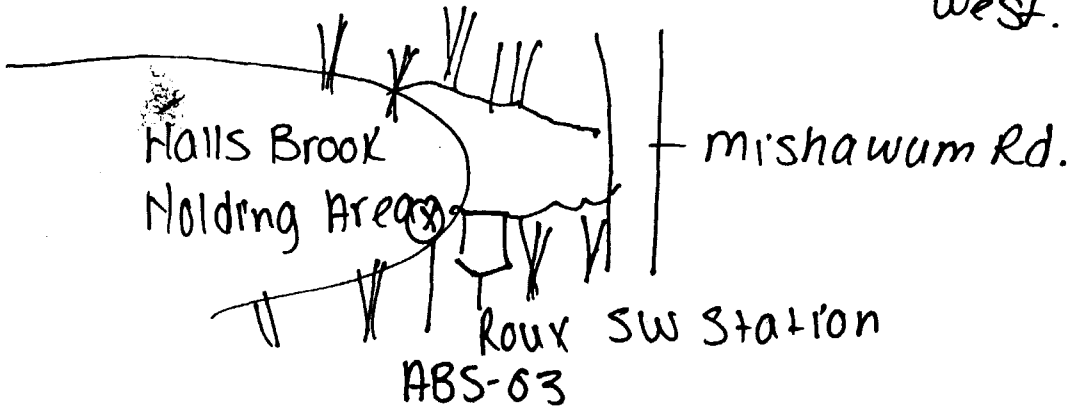
___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Wet, dk. brown, organic muck w/ sticks and sand. ~ +6" of water over sediments.
*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old ABS03-09 location = ~5ft from old location - closer to phragmites to west.



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-04-020802 QC Information: NA (if applicable)
Tetra Tech NUS Job No./PMS: N4123.0822

Sample Method: Scoop w/Stainless steel shovel
Depth Sampled: 0 - 0.5 feet
Sample Date & Time: 7/8/2002 1045 hours (military) Duplicate: NA hours
Sampler(s): J. Danieli / K. O'Neill/ J. Lambert (circle appropriate)
Data Recorded By: J. Danieli (Signature)
Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

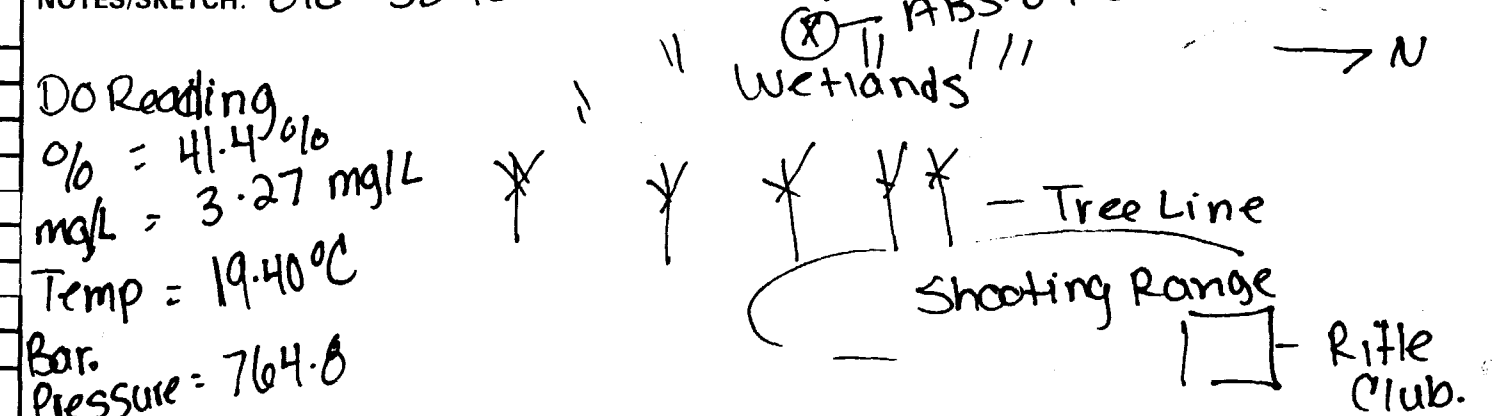
Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Brown, wet, muck, abundant organics, water - ~2" over sediment.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old SD-12-ME Location



DO Reading
% = 41.4%
mg/L = 3.27 mg/L
Temp = 19.40°C
Bar. Pressure = 764.8

Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-05-070802
Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: N/A (if applicable)

Sample Method: scoop w/ stainless steel scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 7/8/2002 1115 hours (military) Duplicate: N/A hours
Sampler(s): (J. Danieli) / (K. O'Neill) / (J. Lambert) (circle appropriate)
Data Recorded By: J. Danieli (Signature)
Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
_X_ Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
_X_ Grab	___ Composite

Other ___

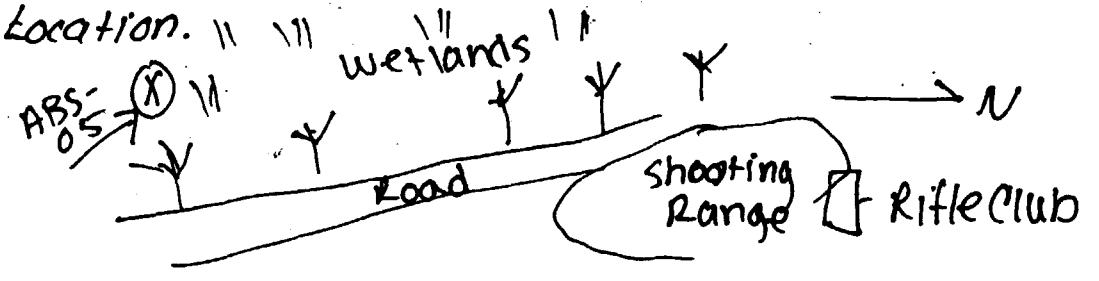
Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Brown, Peat, trace sand and silt roots - abundant organics.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old WG-07 Location.

DO 8.50 mg/L
DO% 62.4 %
Temp 19.24 °C
Bar. Pressure 765.4 mmHg



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-06-070802

Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 7/8/2002 1145 hours (military) Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neill / J. Lambert (circle appropriate)

Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___	Soil	___	Trip Blank*
X	Sediment	___	Rinsate Blank*
___	Lagoon/Pond	___	Field Duplicate collected
X	Grab	___	Composite

Other ___

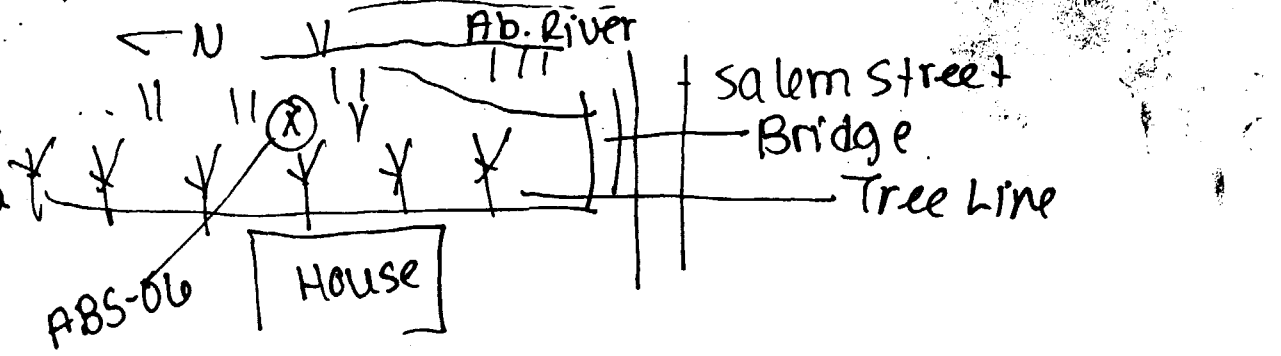
Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Moist, (Abundant) organics - Roots, Peat,

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old WS-08 Location

DO: 1.93 mg/L
DO%: 22.0%
Temp: 21.88°C
Bar. Pressure: 766.2



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-07-070802

Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ Stainless Steel Scoop

Depth Sampled: 0-0.5 feet

Sample Date & Time: 7/8/2002 1237 hours (military)

Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neill / J. Lambert (circle appropriate)

Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

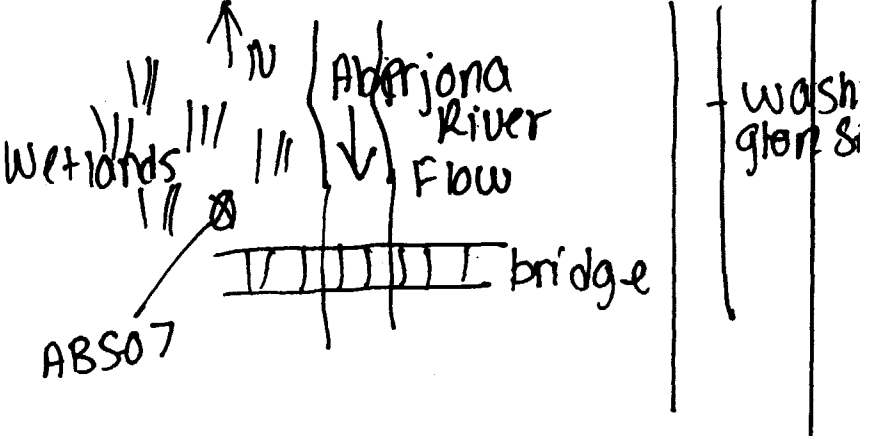
Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Water over Sed. - 3-8" wet, muck, abundant organics

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old CB03-06 location.
DO 4.38 mg/L
DO% 51.9%
Temp 23.77°C
Bar. Pressure 764.3



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-08-070802
Tetra Tech NUS Job No./PMS: N4123- 0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ stainless steel scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 7 / 8 /2002 1315 hours (military) Duplicate: NA hours
Sampler(s): J. Daneli / K. O'Neill / J. Lambert (circle appropriate)
Data Recorded By: J. Daneli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

- ___ Soil
- X Sediment
- ___ Lagoon/Pond
- X Grab
- ___ Trip Blank*
- ___ Rinsate Blank*
- ___ Field Duplicate collected
- ___ Composite

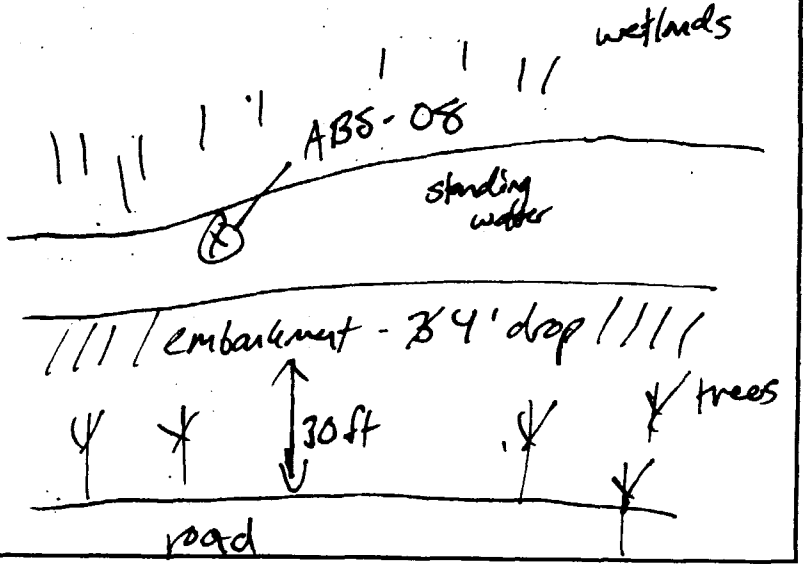
Other: ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) ~4 inches of water over sediment water has a green / manganese flock (natural) - 2-3" partially decayed leaves over sediment removed organic muck.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old CB03-11 location
DO = 0.73
DO% = 8.7
Temp = 20.53
Bar. Pressure = 763.5



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-09-070802
Tetra Tech NUS Job No./PMS: N4123-0322
QC Information: NA (if applicable)

Sample Method: Scoop with Stainless Steel Scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 7/8/2002 1308 hours (military)
Duplicate: NA hours
Sampler(s): J. Daniel / K. O'Neil / J. Lambert (circle appropriate)
Data Recorded By: J. Daniel (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

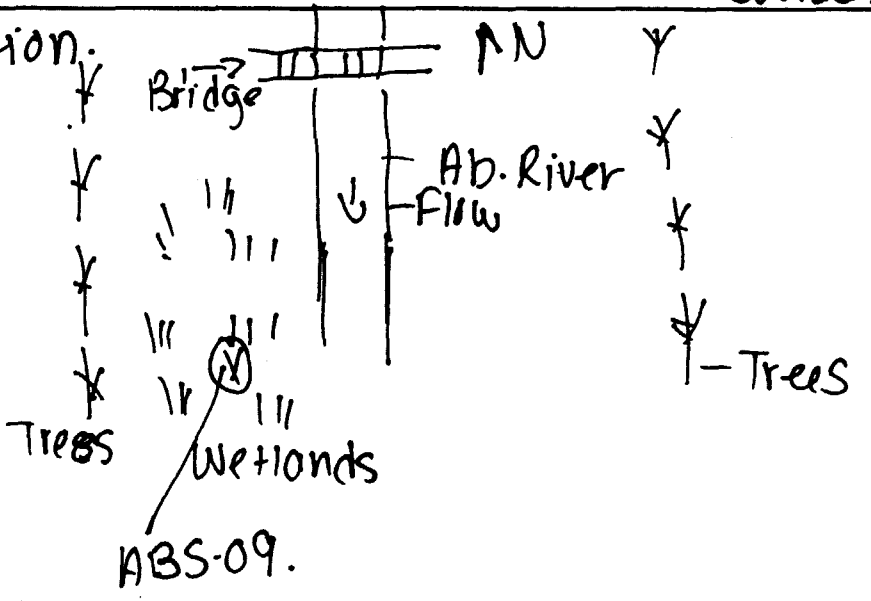
___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) ~1" of Water over sediment, ~~~3" [illegible]~~~ abundant organic muck, drown. Floc. on water surface.
*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old CB03-09 location.
DO: 3.59 mg/L
DO%: 25.8%
Temp: 18.91
Bar. Pressure: 763.9 mmHg



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-10-070802

Tetra Tech NUS Job No./PMS: N4123- 0322
QC Information: NA (if applicable)

Sample Method: Scoop w/ stainless steel scoop.

Depth Sampled: 0-0.5 feet

Sample Date & Time: 7/8/2002 1447 ~~1500~~ ~~1610~~ 1718 hours (military) Duplicate: NA hours

Sampler(s): J. Daniel / K. O'Neill / J. Lambert (circle appropriate)

Data Recorded By: J. Daniell (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Organic muck w/ wooded debris - sticks - trace silt. ~12" of water over sediment.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old SD07-~~02~~ 10 location. ~~10~~ 512103 - See Notes Section 6.0

SD07-04 (FW) location

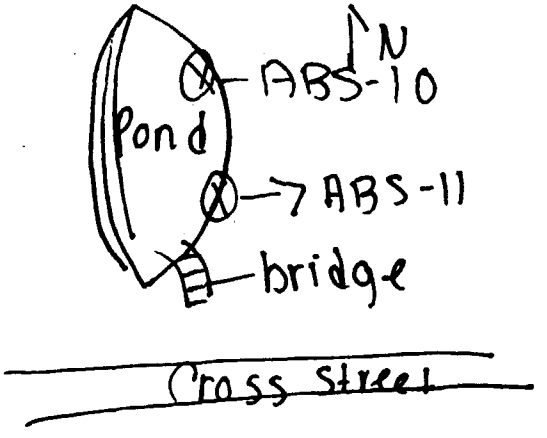
DO: 0.85 mg/L 14.16 ? mg/L

DO%: 82.0 % 190.5% ?

Temp: 24.98 °C 31.06

Bar. Pressure: ~~763.4~~ mmHg 763.8 mmHg

7/8/02



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD-ABS-11-070802 QC Information: NA (if applicable)
Tetra Tech NUS Job No./PMS: N4123- 0322

Sample Method: Scoop w/ Stainless Steel Scoop
Depth Sampled: 0-0.5 feet
Sample Date & Time: 7 / 8 /2001 1447 hours (military) Duplicate: NA hours
Sampler(s): J. Danieli/ K. O'Neill/ J. Lambert (circle appropriate)
Data Recorded By: J. Danieli (Signature)
Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

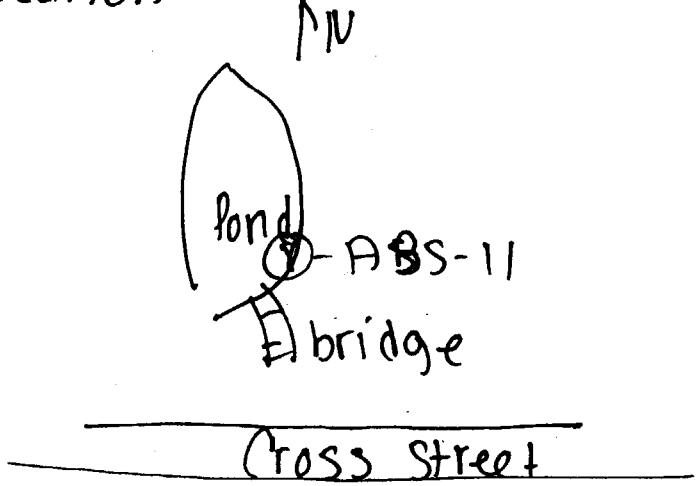
Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) Organic muck w/ fine sand (20%) and wooded debris - sticks ~12" of water over sediment.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old SP07-04CFW) location

DO: 6.85 mg/L
DO%: 82.6 %
Temp: 24.98 °C
Bar. Pressure: 763.4 mmHg



Tt NUS Form 0005A

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - SEDIMENT

Site Name: **Industri-Plex**
Sample ID: IPSD - ABS-12 - 070802 QC Information: NA (if applicable)
Tetra Tech NUS Job No./PMS: N4123- 0322

Sample Method: Scoop w/ Stainless Steel Scoop

Depth Sampled: 0-0.5 ~~1.0~~ ~~1.02~~ feet

Sample Date & Time: 7/2 / 8 /2002 1420 hours (military) Duplicate: NA hours

Sampler(s): J. Danieli / K. O'Neill / J. Lambert (circle appropriate)

Data Recorded By: J. Danieli (Signature)

Survey Meter/Monitor Reading: **Not used**

TYPE OF SAMPLE: (Check all that apply)

___ Soil	___ Trip Blank*
X Sediment	___ Rinsate Blank*
___ Lagoon/Pond	___ Field Duplicate collected
X Grab	___ Composite

Other ___

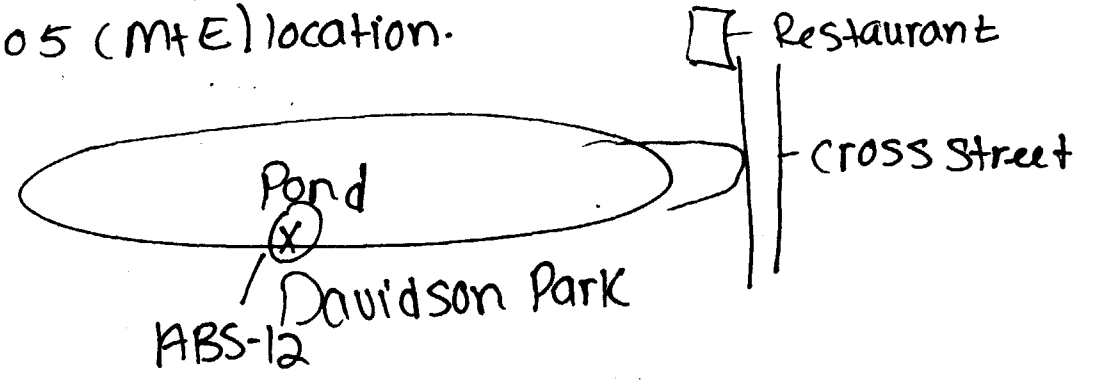
Description: (Sand, Clay, Muck, Peat, Dry, Moist, Wet, Etc.) ~6' of water over sediment Silty, Sandy, Organic mack w/ partial decayed leaves + sticks.

*include DIUF lot # in "other"

ANALYSIS	Check
As - Bioavailability	X

NOTES/SKETCH: Old SD07-05 (M+E) location.

DO = 6.61 ← N
DO% = ~~80.1~~ 80.1%
Temp = 24.93
Bar. Pressure = 764.6mmHg



Tt NUS Form 0005A

APPENDIX C.10

LEAD MODEL CALCULATIONS

IEUBK Model Information

Adult Lead Model Information

TABLE C.10-1 (RAGS D IEUBK LEAD WORKSHEET)
Site Name: Wells G&H Superfund Site OU3
Receptor: Young Child (1 to 6 years) Exposure to Media as Described

1. Lead Screening Questions

Medium	Lead Concentration Used in Model Run		Basis for Lead Concentration Used For Model Run	Lead Screening Concentration		Basis for Lead Screening Level
	Value	Units		Value	Units	
Sediment	337	mg/kg	Average Detected Value	400	mg/kg	Recommended Soil Screening Level
Water	4	ug/L	Model Default	15	ug/L	Recommended Drinking Water Action Level

2. Lead Model Questions

Question	Response for Residential Lead Model
What lead model (version and date) was used?	IEUBKwin32 Model 1.0 build 252
Where are the input values located in the risk assessment report?	Located in Appendix C.10, Tables C.10-3 and C.10-4
What range of media concentrations were used for the model?	Refer to Table C.10-3
What statistics were used to represent the exposure concentration terms and where are the data on concentrations in the risk assessment that support use of these statistics?	Arithmetic mean concentrations from Tables 3-3.2.RME/CT and 3-3.3.RME/CT
Was soil sample taken from top 2 cm? If not, why?	No
Was soil sample sieved? What size screen was used? If not sieved, provide rationale.	No
What was the point of exposure/location?	The maximum exposure scenario occurred at Station 22/TT-22
Where are the output values located in the risk assessment report?	Located in Appendix C.10, Table C.10-4 and Figure C.10-1
Was the model run using default values only?	No
Was the default soil bioavailability used?	Yes
Was the default soil ingestion rate used?	Yes
If non-default values were used, where are the rationale for the values located in the risk assessment report?	Located in Appendix C.10, Table C.10-3

3. Final Result

Medium	Result	Comment/PRG [1]
Sediment	Input value of 337 mg/Kg in sediment results in 1.472% of young children above a blood lead level of 10 ug/dL. Geometric mean blood lead = 3.594 ug/dL. This does not exceed the blood lead goal as described in the 1994 OSWER Directive of no more than 5% of children exceeding 10 ug/dL blood lead.	Based on site conditions, a PRG calculation is not necessary.

1. Attach the IEUBK text output file and graph upon which the PRG was based as an appendix. For additional information, see www.epa.gov/superfund/programs/lead

TABLE C.10-2 (RAGS D ADULT LEAD WORKSHEET)
Site Name: Wells G&H Superfund Site OU3
Receptor: Adult Non-Resident, Exposure to Media as Described

1. Lead Screening Questions

Medium	Lead Concentration used in Model Run		Basis for Lead Concentration Used For Model Run	Lead Screening Concentration		Basis for Lead Screening Level
	Value	Units		Value	Units	
Sediment	6765	mg/kg	Average Detected Value	750	mg/kg	Recommended Soil Screening Level

2. Lead Model Questions

Question	Response
What lead model was used? Provide reference and version	Adult Model associated with EPA-540-R-03-001
If the EPA Adult Lead Model (ALM) was not used provide rationale for model selected.	N/A
Where are the input values located in the risk assessment report?	Located in Appendix C.10, Table C.10-5
What statistics were used to represent the exposure concentration terms and where are the data on concentrations in the risk assessment that support use of these statistics?	Arithmetic mean concentrations from Tables 3-3.2.RME/CT and 3-3.3.RME/CT
What was the point of exposure and location?	The maximum exposure scenario occurred at Station 22/TT-22
Where are the output values located in the risk assessment report?	Located in Appendix C.10
What GSD value was used? If this is outside the recommended range of 1.8-2.1), provide rationale in Appendix C.10.	1.8
What baseline blood lead concentration (PbB_0) value was used? If this is outside the default range of 1.7 to 2.2 provide rationale in Appendix C.10	2.0
Was the default exposure frequency (EF; 219 days/year) used?	No
Was the default BKSF used (0.4 ug/dL per ug/day) used?	Yes
Was the default absorption fraction (AF; 0.12) used?	Yes
Was the default soil ingestion rate (IR; 50 mg/day) used?	Yes
If non-default values were used for any of the parameters listed above, where are the rationale for the values located in the risk assessment report?	Located in Appendix C.10

3. Final Result

Medium	Result	Comment/RBRG [1]
Sediment	Input value of 6765 ppm in soil results in 0.2% of receptors above a blood lead level of 10 ug/dL and geometric mean blood lead = 2.0 ug/dL. This does not exceed the blood lead goal as described in the 1994 OSWER Directive of no more than 5% of children (fetuses of exposed women) exceeding 10 ug/dL blood lead.	Based on site conditions, a RBRG calculation is not necessary.

1. Attach the ALM spreadsheet output file upon which the Risk Based Remediation Goal (RBRG) was based and description of rationale for parameters used. For additional information, see www.epa.gov/superfund/programs/lead

TABLE C.10-3. SEDIMENT/SOIL AND SURFACE WATER IEUBK MODEL INPUTS

Sediment

	Average Concentration (mg/Kg)		CT Exposure Frequency (days/yr)[1]		Time-weighted conc. (mg/Kg)[2]	
Station	Current	Future	Current	Future	Current	Future
NR	161		13		102	
14	68		13		68	
22/TT-22	6765		13		337	
13/TT-27	--	700	--	13	--	121
WH	1493		13		150	
NT-1	--	468	--	13	--	113
NT-2	--	420	--	13	--	111
NT-3	--	466	--	13	--	113
WG	429		13		112	
WW	--	300	--	13	--	107
JY	--	523	--	13	--	115
WS/WSS	295		39		121	
TT-30	425		13		112	
TT-31	--	277	--	13	--	106
CB-01	317		39		123	
CB-02	119		39		102	
CB-03	196		39		110	
CB-04	208		39		112	
CB-06	137		39		104	
CB-07	149		13		102	
16/TT-33	117		13		101	
09	30		13		30	
AM	150		13		102	
KF	97		13		97	
08	43		13		43	
07/DP	251		13		105	
LP	82	83	13		82	83
AS	573		13		117	
05	266		13		106	
03	124		13		101	
01	19		13		19	

Sediment/Soil

AJRW-SD	185	13	103
AJRW-SO	298	13	107
		Sum =	210

Surface Water[3]

Reach	Average conc (ug/L)	SA[4] (cm^2)	PC (cm/hr)	ET (hrs/event)	EV (events/day)	EF[4] (days/yr)	ED (yrs)	CF1 (L/cm^3)	AT-N (days)	Intake[5] (ug/day)
01	13	2800	1E-03	0.5	1	78	2	0.001	730	4E-03
Upper 02	4.8	2800	1E-03	0.5	1	78	2	0.001	730	1E-03
Lower 02	0.43	2800	1E-03	0.5	1	78	2	0.001	730	1E-04
03	4.3	2800	1E-03	0.5	1	78	2	0.001	730	1E-03
04	5.7	2800	1E-03	0.5	1	78	2	0.001	730	2E-03
05	0.42	2800	1E-03	0.5	1	78	2	0.001	730	1E-04
Upper 06	3.2	2800	1E-03	0.5	1	78	2	0.001	730	1E-03
Lower 06	4.1	6600	1E-03	0.5	1	5	2	0.001	730	2E-04

Notes

(1) Adjusted by fraction ingested term (50%)

(2) Time-weighted over one year using MADEP background value (MADEP, 2002) of 100 mg/Kg. If average concentration is less than 100 mg/Kg, the average concentration is used.
Time-weighted conc = (Average Conc. * Exposure Freq. + Bkgd. Conc * (365 - Exposure Freq.)) / 365

(3) Parameters for intake calculation are CT values defined in Table 3-4.1.CT

(4) Maximum CT exposure frequency (EF) from stations within reach used

(5) Intake = EPC * SA * PC * ET * EV * EF * ED * CF1 / AT. Surface water intakes (ug/day) are 2-3 orders of magnitude less than the water consumption intakes. Therefore, these intakes are considered negligible and have not been included in the model run.

Indoor Dust Lead Levels = MADEP Bkgd (100 mg/Kg) * 0.7 = 70 mg/Kg [Assumption]

TABLE C.10-4. IEUBK TEXT OUTPUT FOR STATION 22/TT-22 (MAXIMUM)

LEAD MODEL FOR WINDOWS Version 1.0 Build 252

```
================================================================================
===
     Model Version: 1.0 Build 252
     User Name:
     Date:
     Site Name:
     Operable Unit:
     Run Mode: Research

================================================================================
===
     The time step used in this model run: 1 - Every 4 Hours (6 times a day).

     ****** Air ******

     Indoor Air Pb Concentration: 30.000 percent of outdoor.
     Other Air Parameters:
```

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (ug Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

```
     ****** Diet ******
```

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

```
     ****** Drinking Water ******

     Water Consumption:
```

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

```
     Drinking Water Concentration: 4.000 ug Pb/L
```

****** Soil & Dust ******

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	337.000	70.000
1-2	337.000	70.000
2-3	337.000	70.000
3-4	337.000	70.000
4-5	337.000	70.000
5-6	337.000	70.000
6-7	337.000	70.000

****** Alternate Intake ******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 2.500 ug Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (ug/dL)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	2.542	0.000	0.368
1-2	0.034	2.633	0.000	0.911
2-3	0.062	2.988	0.000	0.958
3-4	0.067	2.907	0.000	0.988
4-5	0.067	2.855	0.000	1.045
5-6	0.093	3.034	0.000	1.110
6-7	0.093	3.360	0.000	1.133

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	4.457	7.387	4.0
1-2	7.016	10.595	4.4
2-3	7.091	11.098	4.1
3-4	7.176	11.138	3.9
4-5	5.420	9.387	3.3
5-6	4.913	9.150	2.9
6-7	4.655	9.242	2.6

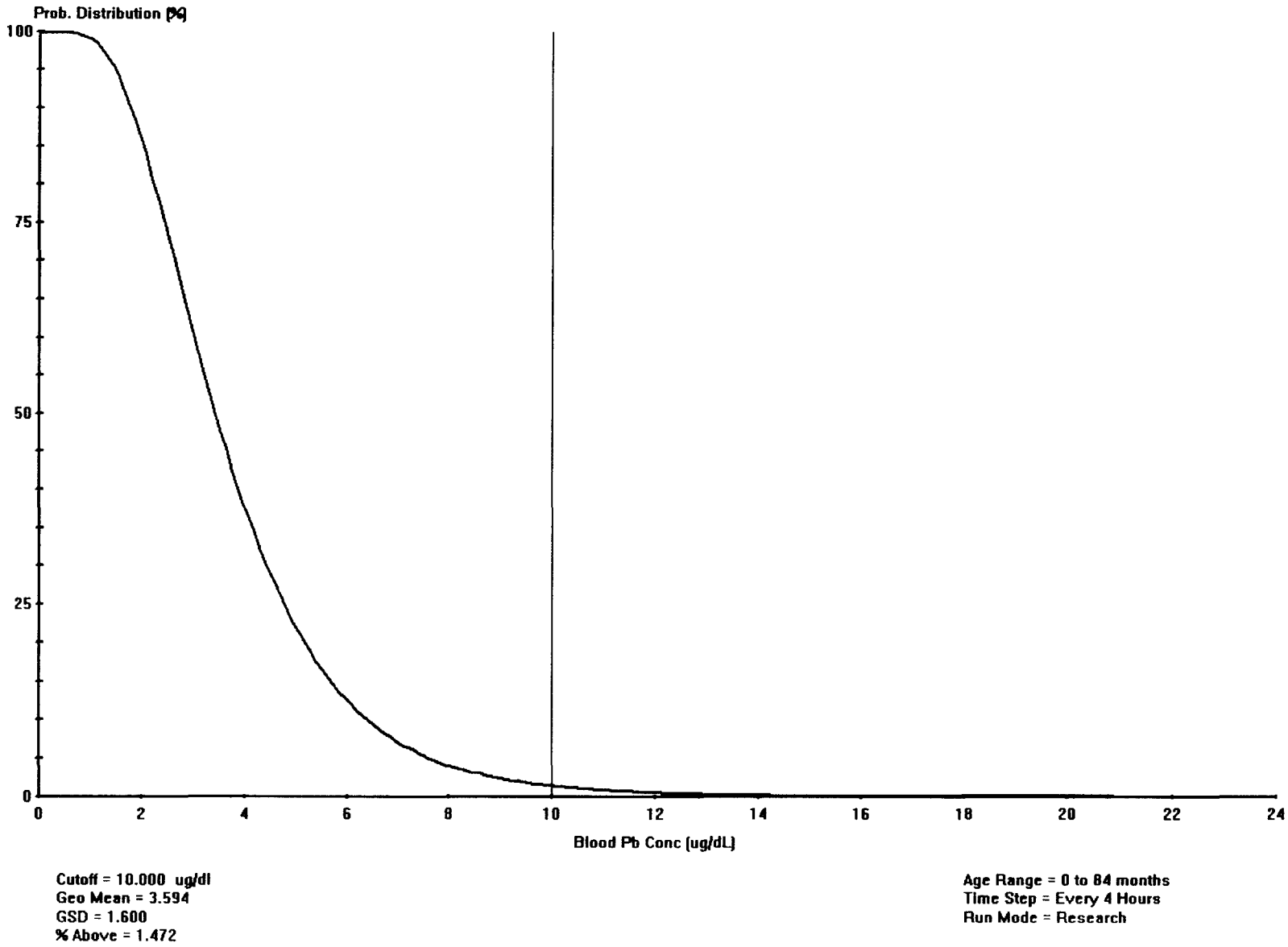


FIGURE C.10-1. IEUBK GRAPHICAL OUTPUT FOR STATION 22/TT-22 (MAXIMUM)

TABLE C.10-5. SEDIMENT/SOIL ADULT LEAD MODEL INPUTS

Sediment/Soil

	Average Concentration (mg/Kg)		CT Exposure Frequency (days/yr)[1]	
Station	Current	Future	Current	Future
NR	161		13	
14	68		13	
22/TT-22	6765		13	
13/TT-27	--	700	--	13
WH	1493		13	
NT-1	--	468	--	13
NT-2	--	420	--	13
NT-3	--	466	--	13
WG	429		13	
WW	--	300	--	13
JY	--	523	--	13
WS/WSS	295		39	
TT-30	425		13	
TT-31	--	277	--	13
CB-01	317		39	
CB-02	119		39	
CB-03	196		39	
CB-04	208		39	
CB-06	137		39	
CB-07	149		13	
16/TT-33	117		13	
09	30		13	
AM	150		13	
KF	97		13	
08	43		13	
07/DP	251		13	
LP	82	83	13	
AS	573		13	
05	266		13	
03	124		13	
01	19		13	
AJRW-SD	185		13	
AJRW-SO	298		13	
SC05	398		83	
SC06	343		83	
SC07	237		83	
SC08	185		83	
SC11	578		83	
SC12	955		83	
SC13	370		83	

Notes

(1) Adjusted by fraction ingested term (50%)

Calculations of Preliminary Remediation Goals (PRGs)

PbS	X	X	Soil lead concentration	ug/g or ppm
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day
GSD_i	X	X	Geometric standard deviation PbB	--
PbB_0	X	X	Baseline PbB	ug/dL
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--
K_{SD}		X	Mass fraction of soil in dust	--
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--
$EF_{S,D}$	X	X	Exposure frequency (same for soil and dust)	days/yr
$AT_{S,D}$	X	X	Averaging time (same for soil and dust)	days/yr
PbB_{adult}	**PbB of adult worker, geometric mean**			**ug/dL**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adult workers**			**ug/dL**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

PbS	ug/g or ppm	6765		6765	
$R_{fetal/maternal}$	--	0.9		0.9	
BKSF	ug/dL per ug/day	0.4		0.4	
GSD_i	--	1.8		1.8	
PbB_0	ug/dL	2.0		2.0	
IR_S	g/day	0.050		--	
IR_{S+D}	g/day	--		0.050	
W_S	--	--		1.0	
K_{SD}	--	--		0.7	
$AF_{S,D}$	--	0.12		0.12	
$EF_{S,D}$	days/yr	13		13	
$AT_{S,D}$	days/yr	365		365	
PbB_{adult}	**ug/dL**	**2.6**		**2.6**	
$PbB_{fetal,\ 0.95}$	**ug/dL**	**6.1**		**6.1**	
PbB_t	**ug/dL**	**10.0**		**10.0**	
$P(PbB_{fetal} > PbB_t)$	**%**	**0.6%**		**0.6%**	

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil Printed 6/23/2004 3:13 PM

Calculations of Preliminary Remediation Goals (PRGs)

PbS	ug/g or ppm	317		317	
$R_{fetal/maternal}$	--	0.9		0.9	
BKSF	ug/dL per ug/day	0.4		0.4	
GSD_i	--	1.8		1.8	
PbB_0	ug/dL	2.0		2.0	
IR_S	g/day	0.050		--	
IR_{S+D}	g/day	--		0.050	
W_S	--	--		1.0	
K_{SD}	--	--		0.7	
$AF_{S,D}$	--	0.12		0.12	
$EF_{S,D}$	days/yr	39		39	
$AT_{S,D}$	days/yr	365		365	
PbB_{adult}	**ug/dL**	**2.1**		**2.1**	
$PbB_{fetal,\ 0.95}$	**ug/dL**	**4.9**		**4.9**	
PbB_t	**ug/dL**	**10.0**		**10.0**	
$P(PbB_{fetal} > PbB_t)$	**%**	**0.2%**		**0.2%**	

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil Printed 6/23/2004 3:13 PM

Calculations of Preliminary Remediation Goals (PRGs)

PbS	ug/g or ppm	955		955	
$R_{fetal/maternal}$	--	0.9		0.9	
BKSF	ug/dL per ug/day	0.4		0.4	
GSD_i	--	1.8		1.8	
PbB_0	ug/dL	2.0		2.0	
IR_S	g/day	0.050		--	
IR_{S+D}	g/day	--		0.050	
W_S	--	--		1.0	
K_{SD}	--	--		0.7	
$AF_{S,D}$	--	0.12		0.12	
$EF_{S,D}$	days/yr	83		83	
$AT_{S,D}$	days/yr	365		365	
PbB_{adult}	**ug/dL**	**2.5**		**2.5**	
$PbB_{fetal,0.95}$	**ug/dL**	**6.0**		**6.0**	
PbB_t	**ug/dL**	**10.0**		**10.0**	
$P(PbB_{fetal} > PbB_t)$	**%**	**0.6%**		**0.6%**	

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil Printed 7/26/2004 10:08 AM