Chemical of Potential Concern	Max. Conc.	95% UCL (Distribution) (1)		Value	Statistic (2)	Rationale (3)	Description	Mean
1,1,2-Trichloroethane	0.05	0.04589071	(NP)	0.045891	95% UCL-NP	(d)	CLT	0.042857143
1,1-Dichloroethane	5	3.398407611	(NP)	3.398408	95% UCL-NP	(d)	Jackknife	1.785714286
1,1-Dichloroethene	0.194	0.105804352	(NP)	0.105804	95% UCL-NP	(d)	Jackknife	0.063428571
1,2,4-Trichlorobenzene	5	3.398407611	(NP)	3.398408	95% UCL-NP	(d)	Jackknife	1.785714286
1,3-Dichlorobenzene	0.5	0.532697904	(NP)	0.500000	95% UCL-NP	(d)	Jackknife	0.371428571
1,4-Dichlorobenzene	0.484	0.468258196	(NP)	0.468258	95% UCL-NP	(d)	Chebyshev (Mean, Std)	0.159142857
Benzene	0.32	0.26116426	(NP)	0.261164	95% UCL-NP	(d)	Chebyshev (Mean, Std)	0.091428571
Bromomethane	0.5	0.532697904	(NP)	0.500000	Max	(d & e)	Jackknife	0.371428571
Chlorobenzene	5	3.398407611	(NP)	3.398408	95% UCL-NP	(d)	Jackknife	1.785714286
Chlorodibromomethane	1.03	0.918159734	(T)	0.918160	95% UCL-NP	(c)	95% Chebyshev (MVUE) UCL	0.301428571
Chloroethane	1	0.82204529	(NP)	0.822045	95% UCL-NP	(d)	Jackknife	0.642857143
cis-1,2-Dichloroethene	29	45.66997743	(T)	29.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	6.785714286
Ethylbenzene	1	0.82204529	(NP)	0.822045	95% UCL-NP	(d)	Jackknife	0.642857143
1,2,4-Trichlorobenzene	5	3.398407611	(NP)	3.3984	95% UCL-NP	(d)	Jackknife	1.785714286
Chloromethane	0.5	0.532697904	(NP)	0.5000	Max	(d & e)	Jackknife	0.371428571
Acetone	5	4.11022645	(NP)	4.1102	95% UCL-NP	(d)	Jackknife	3.214285714
1,1,1-Trichloroethane	5	3.273839314	(NP)	3.2738	95% UCL-NP	(d)	Jackknife	1.535714286
Methyl cyclohexane	5	3.398407611	(NP)	3.3984	95% UCL-NP	(d)	Jackknife	1.785714286
1,2-Dichlorobenzene	5	3.398407611	(NP)	3.3984	95% UCL-NP	(d)	Jackknife	1.785714286
Dibenzofuran	5.5	N/A	(<4)	5.5	Max	(a)	Too Few Observations To Calculate UCLs	5.5
Methyl tert-butyl ether	14	14.65238193	(T)	14.000000	Max	(c & e)	95% Chebyshev (MVUE) UCL	4.214285714
Methylene chloride	1	0.82204529	(NP)	0.822045	95% UCL-NP	(d)	Jackknife	0.642857143
Tetrachloroethene	0.5	0.547186814	(NP)	0.500000	Max	(d & e)	Jackknife	0.424
Toluene	1	0.82204529	(NP)	0.822045	95% UCL-NP	(d)	Jackknife	0.642857143
trans-1,2-Dichloroethene	5	3.398407611	(NP)	3.398408	95% UCL-NP	(d)	Jackknife	1.785714286
Trichloroethene	25	93.55154286	(T)	25.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	7.507142857
Vinyl chloride	0.24	0.217194872	(NP)	0.217195	95% UCL-NP	(d)	Chebyshev (Mean, Std)	0.086142857
Xylenes (total)	5	3.576362321	(NP)	3.576362	95% UCL-NP	(d)	Jackknife	2.142857143
4-Methylphenol	5.5	N/A	(<4)	5.500000	Max	(a)	Too Few Observations To Calculate UCLs	5.5
Naphthalene	2.7	N/A	(<4)	2.700000	Max	(a)	Too Few Observations To Calculate UCLs	1.3185
2-Methylnaphthalene	5.5	N/A	(<4)	5.500000	Max	(a)	Too Few Observations To Calculate UCLs	2.683333333
Acenaphthylene	5.5	N/A	(<4)	5.500000	Max	(a)	Too Few Observations To Calculate UCLs	2.166666667
Acetophenone	5.5	N/A	(<4)	5.500000	Max	(a)	Too Few Observations To Calculate UCLs	5.5
Phenanthrene	5.5	N/A	(<4)	5.500000	Max	(a)	Too Few Observations To Calculate UCLs	2.833333333
Benzo(a)Pyrene	0.5	N/A	(<4)	0.500000	Max	(a)	Too Few Observations To Calculate UCLs	0.337
Dibenz(a,h) anthracene	0.5	N/A	(<4)	0.500000	Max	(a)	Too Few Observations To Calculate UCLs	0.337666667
C9-C18 Aliphatic	25	N/A	(<4)	25.000000	Max	(a)	Too Few Observations To Calculate UCLs	25
C11-C22 Aromatic	25	N/A	(<4)	25.000000	Max	(a)	Too Few Observations To Calculate UCLs	25
C19-C36 Aliphatic	25	N/A	(<4)	25.000000	Max	(a)	Too Few Observations To Calculate UCLs	25
C5-C8 Aliphatic	25	N/A	(<4)	25.000000	Max	(a)	Too Few Observations To Calculate UCLs	25
C9-C10 Aromatic		N/A	(<4)		Max	(a)	Too Few Observations To Calculate UCLs	25
C9-C12 Aliphatic		N/A	(<4)		Max	(a)	Too Few Observations To Calculate UCLs	25
Arsenic	2.5	1.884341774	(N)	1.884342	95% UCL-NP	(b)	Student's-t	1.280833333
Chromium	13	12.54572622	(NP)	12.545726	95% UCL-NP	(d)	Chebyshev (Mean, Std)	3.841666667
Lead	2.1	1.397317767	(N)	1.397318	95% UCL-NP	(b)	Student's-t	0.838666667
Manganese	824	597.6704818	(N)	597.670482	95% UCL-NP	(b)	Student's-t	405.3333333
TEQ (no 170/193/180) Humans*		N/A	(<4)			(a)	Too Few Observations To Calculate UCLs	
Dieldrin	1.40E-02	N/A	(<4)	0.014000	Max	(a)	Too Few Observations To Calculate UCLs	1.40E-02
4,4'-DDD	0.005	N/A	(<4)	0.005000	Max	(a)	Too Few Observations To Calculate UCLs	0.005

(1) T - Transformed; N - Normal; NP - Non-parametric; <4 - sample size too small to calculate 95% UCL
(2) Statistics: Maximum Detected Value (Max); 95% UCL of Transformed Data (95% UCL - T); 95% of Normal Data (95% UCL - N); 95% of Non-parametric Data (95% UCL - NP).
(3) Rationale

(a) Due to small sample size (<4), the maximum detected concentration is used.
(b) Shapiro-Wilk W Test indicates data are normally distributed.
(c) Shapiro-Wilk W Test indicates data are log-normally distributed.
(d) Shapiro-Wilk W Test indicates data are neither normally nor log-normally distributed.
(e) Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

From File

Summary Statistics for	1,1,2-Trichloroethane	
Number of Samples		7
Minimum		0.04
Maximum		0.05
Mean		0.042857143
Median		0.04
Standard Deviation		0.0048795
Variance		2.38E-05
Coefficient of Variation		0.113855009
Skewness		1.229634092
Shapiro-Wilk Test Statisitic		0.600751872
Shapiro-Wilk 5% Critical Val		0.803
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		0.046440906
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		0.046806579
Modified-t		0.046583763
95 % Non-parametric UCL		
CLT		0.04589071
Jackknife		0.046440906
Standard Bootstrap		0.045653163
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		0.050896163

From File

Summary Statistics for	1,1-Dichloroethane	
Number of Samples		7
Minimum		0.5
Maximum		5
Mean		1.785714286
Median		0.5
Standard Deviation		2.195775164
Variance		4.821428571
Coefficient of Variation		1.229634092
Skewness		1.229634092
Shapiro-Wilk Test Statisitic		0.600751872
Shapiro-Wilk 5% Critical Val		0.803
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		3.398407611
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		3.562960739
Modified-t		3.462693325
95 % Non-parametric UCL		
CLT		3.150819437
Jackknife		3.398407611
Standard Bootstrap		3.032913387
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		5.403273503

From File

Summary Statistics for	1,1-Dichloroethene	
Number of Samples		7
Minimum		0.04
Maximum		0.194
Mean		0.063428571
Median		0.04
Standard Deviation		0.057697074
Variance		0.003328952
Coefficient of Variation		0.909638559
Skewness		2.623276539
Shapiro-Wilk Test Statisitic		0.490885262
Shapiro-Wilk 5% Critical Val		0.803
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		0.105804352
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		0.122402256
Modified-t		0.109408052
95 % Non-parametric UCL		
CLT		0.099298625
Jackknife		0.105804352
Standard Bootstrap		0.096169757
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		0.158485017

From File

Summary Statistics for	1,2,4-Trichlorobenzene
Number of Samples	7
Minimum	0.5
Maximum	5
Mean	1.785714286
Median	0.5
Standard Deviation	2.195775164
Variance	4.821428571
Coefficient of Variation	1.229634092
Skewness	1.229634092

Shapiro-Wilk Test Statisitic	0.600751872
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	3.398407611

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.562960739
Modified-t	3.462693325

95 % Non-parametric UCL

CLT	3.150819437
Jackknife	3.398407611
Standard Bootstrap	3.016787604
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	5.403273503

From File

Summary Statistics for	1,3-Dichlorobenzene
Number of Samples	7
Minimum	0.05
Maximum	0.5
Mean	0.371428571
Median	0.5
Standard Deviation	0.219577516
Variance	0.048214286
Coefficient of Variation	0.591170237
Skewness	-1.229634092

Shapiro-Wilk Test Statisitic	0.600751872
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	0.532697904

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	0.466724956
Modified-t	0.526269333

95 % Non-parametric UCL

CLT	0.507939087
Jackknife	0.532697904
Standard Bootstrap	0.496640828
Bootstrap-t	0.488797691
Chebyshev (Mean, Std)	0.733184493

From File

Summary Statistics for	1,4-Dichlorobenzene
Number of Samples	7
Minimum	0.04
Maximum	0.484
Mean	0.159142857
Median	0.055
Standard Deviation	0.187625894
Variance	0.035203476
Coefficient of Variation	1.178977791
Skewness	1.336045771

Shapiro-Wilk Test Statisitic	0.687556677
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	0.29694523

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	0.314053708
Modified-t	0.302913725

95 % Non-parametric UCL

CLT	0.275789169
Jackknife	0.29694523
Standard Bootstrap	0.266584752
Bootstrap-t	1.916995264
Chebyshev (Mean, Std)	0.468258196

From File

Summary Statistics for	Benzene
Number of Samples	7
Minimum	0.04
Maximum	0.32
Mean	0.091428571
Median	0.05
Standard Deviation	0.103025656
Variance	0.010614286
Coefficient of Variation	1.126843108
Skewness	2.430760425

Shapiro-Wilk Test Statisitic	0.59164101
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	0.167096058

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	0.193706207
Modified-t	0.173058693

95 % Non-parametric UCL

CLT	0.155479234
Jackknife	0.167096058
Standard Bootstrap	0.151960594
Bootstrap-t	1.026476098
Chebyshev (Mean, Std)	0.26116426

From File

Summary Statistics for	Bromomethane
Number of Samples	7
Minimum	0.05
Maximum	0.5
Mean	0.371428571
Median	0.5
Standard Deviation	0.219577516
Variance	0.048214286
Coefficient of Variation	0.591170237
Skewness	-1.229634092

Shapiro-Wilk Test Statisitic	0.600751872
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	0.532697904

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	0.466724956
Modified-t	0.526269333

95 % Non-parametric UCL

CLT	0.507939087
Jackknife	0.532697904
Standard Bootstrap	0.497053087
Bootstrap-t	0.488797691
Chebyshev (Mean, Std)	0.733184493

From File

Summary Statistics for	Chlorobenzene	
Number of Samples		7
Minimum		0.5
Maximum		5
Mean		1.785714286
Median		0.5
Standard Deviation		2.195775164
Variance		4.821428571
Coefficient of Variation		1.229634092
Skewness		1.229634092
Shapiro-Wilk Test Statisitic		0.600751872
Shapiro-Wilk 5% Critical Val		0.803
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		3.398407611
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		3.562960739
Modified-t		3.462693325
95 % Non-parametric UCL		
CLT		3.150819437
Jackknife		3.398407611
Standard Bootstrap		3.0678
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		5.403273503

From File

Summary Statistics for	Chlorodibromomethane
Number of Samples	7
Minimum	0.04
Maximum	1.03
Mean	0.301428571
Median	0.165
Standard Deviation	0.360563382
Variance	0.130005952
Coefficient of Variation	1.196181836
Skewness	1.698618932

95 % UCL (Assuming Normal Data)	
Student's-t	0.566245375
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.619078348
Modified-t	0.58082775
95 % Non-parametric UCL	
CLT	0.525589468
Jackknife	0.566245375
Standard Bootstrap	0.515455661
Bootstrap-t	1.022095286
Chebyshev (Mean, Std)	0.895459967

Summary Statistics for	ln(Chlorodibromomethar
Minimum	-3.218875825
Maximum	0.029558802
Mean	-1.85017248
Standard Deviation	1.270168701
Variance	1.61332853
Shapiro-Wilk Test Statisitic	0.905358289
Shapiro-Wilk 5% Critical Val	0.803

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	0.352216859
MLE Standard Deviation	0.706147896
MLE Coefficient of Variation	2.004866823
MLE Skewness	14.07314457
MLE Median	0.157210048
MLE 80% Quantile	0.459838505
MLE 90% Quantile	0.804120859
MLE 95% Quantile	1.270302465
MLE 99% Quantile	3.016930485
MVU Estimate of Median	0.13985862
MVU Estimate of Mean	0.298348455
MVU Estimate of Std. Dev.	0.389604102
MVU Estimate of SE of Mea	0.14219446

UCL Assuming Lognormal Distribution	
95% H-UCL	3.606368449
95% Chebyshev (MVUE) UC	0.918159734
99% Chebyshev (MVUE) UC	1.713165463

Recommended UCL to use:

95 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Chloroethane	
Number of Samples		7
Minimum		0.5
Maximum		1
Mean		0.642857143
Median		0.5
Standard Deviation		0.243975018
Variance		0.05952381
Coefficient of Variation		0.379516695
Skewness		1.229634092
Shapiro-Wilk Test Statisitic		0.600751872
Shapiro-Wilk 5% Critical Val		0.803
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		0.82204529
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		0.840328971
Modified-t		0.829188147
95 % Non-parametric UCL		
CLT		0.794535493
Jackknife		0.82204529
Standard Bootstrap		0.78417159
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		1.044808167

From File

Summary Statistics for	cis-1,2-Dichloroethene
Number of Samples	7
Minimum	0.5
Maximum	29
Mean	6.785714286
Median	1
Standard Deviation	10.39574089
Variance	108.0714286
Coefficient of Variation	1.53200392
Skewness	2.082491462

95 % UCL (Assuming Normal Data)

Student's-t	14.4208958

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	16.55332362
Modified-t	14.93634917

95 % Non-parametric UCL

CLT	13.24870725
Jackknife	14.4208958
Standard Bootstrap	12.84433377
Bootstrap-t	25.81588945
Chebyshev (Mean, Std)	23.91279036

99 % Non-parametric UCL

Chebyshev (Mean, Std)	45.88096688

Summary Statistics for	ln(cis-1,2-Dichloroethen
Minimum	-0.693147181
Maximum	3.36729583
Mean	0.778105339
Standard Deviation	1.692633996
Variance	2.865009845
Shapiro-Wilk Test Statisitic	0.822291222
Shapiro-Wilk 5% Critical Val	0.803

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	9.121281061
MLE Standard Deviation	37.10604623
MLE Coefficient of Variation	4.068073989
MLE Skewness	79.52769771
MLE Median	2.177343028
MLE 80% Quantile	9.100970586
MLE 90% Quantile	19.16604117
MLE 95% Quantile	35.25080136
MLE 99% Quantile	111.6280111
MVU Estimate of Median	1.764593793
MVU Estimate of Mean	6.435791828
MVU Estimate of Std. Dev.	11.32280672
MVU Estimate of SE of Mea	3.943184018

UCL Assuming Lognormal Distribution

95% H-UCL	495.1767321
95% Chebyshev (MVUE) UC	23.62373248
99% Chebyshev (MVUE) UC	45.66997743

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Ethylbenzene	
Number of Samples		7
Minimum		0.5
Maximum		1
Mean		0.642857143
Median		0.5
Standard Deviation		0.243975018
Variance		0.05952381
Coefficient of Variation		0.379516695
Skewness		1.229634092
Shapiro-Wilk Test Statisitic		0.600751872
Shapiro-Wilk 5% Critical Val		0.803
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		0.82204529
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		0.840328971
Modified-t		0.829188147
95 % Non-parametric UCL		
CLT		0.794535493
Jackknife		0.82204529
Standard Bootstrap		0.781403885
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		1.044808167

From File

Summary Statistics for	Methyl tert-butyl ether
Number of Samples	7
Minimum	0.5
Maximum	14
Mean	4.214285714
Median	4
Standard Deviation	4.803272694
Variance	23.07142857
Coefficient of Variation	1.139759622
Skewness	1.651415326

95 % UCL (Assuming Normal Data)	
Student's-t	7.742063029

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	8.411272065
Modified-t	7.930924889

95 % Non-parametric UCL	
CLT	7.200462262
Jackknife	7.742063029
Standard Bootstrap	6.98971992
Bootstrap-t	10.474331
Chebyshev (Mean, Std)	12.12772043

Summary Statistics for	ln(Methyl tert-butyl ether
Minimum	-0.693147181
Maximum	2.63905733
Mean	0.737826568
Standard Deviation	1.396284305
Variance	1.949609861
Shapiro-Wilk Test Statisitic	0.820190838
Shapiro-Wilk 5% Critical Val	0.803

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	5.54353009
MLE Standard Deviation	13.60814804
MLE Coefficient of Variation	2.454780225
MLE Skewness	22.15671363
MLE Median	2.091385087
MLE 80% Quantile	6.805198502
MLE 90% Quantile	12.57929112
MLE 95% Quantile	20.79503487
MLE 99% Quantile	53.81670182
MVU Estimate of Median	1.814936129
MVU Estimate of Mean	4.48813995
MVU Estimate of Std. Dev.	6.465166326
MVU Estimate of SE of Mea	2.331837034

UCL Assuming Lognormal Distribution	
95% H-UCL	88.79582631
95% Chebyshev (MVUE) UC	14.65238193
99% Chebyshev (MVUE) UC	27.68962549

Recommended UCL to use:

95 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Methylene chloride
Number of Samples	7
Minimum	0.5
Maximum	1
Mean	0.642857143
Median	0.5
Standard Deviation	0.243975018
Variance	0.05952381
Coefficient of Variation	0.379516695
Skewness	1.229634092
Shapiro-Wilk Test Statisitic	0.600751872
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)	
Student's-t	0.82204529
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	0.840328971
Modified-t	0.829188147
95 % Non-parametric UCL	
CLT	0.794535493
Jackknife	0.82204529
Standard Bootstrap	0.783968164
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	1.044808167

From File

Summary Statistics for	Tetrachloroethene
Number of Samples	7
Minimum	0.05
Maximum	0.5
Mean	0.424
Median	0.5
Standard Deviation	0.167725967
Variance	0.028132
Coefficient of Variation	0.395580111
Skewness	-2.478437221

Shapiro-Wilk Test Statisitic	0.552348613
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	0.547186814

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	0.464820369
Modified-t	0.537289236

95 % Non-parametric UCL

CLT	0.528274602
Jackknife	0.547186814
Standard Bootstrap	0.521515513
Bootstrap-t	0.505484889
Chebyshev (Mean, Std)	0.70033003

From File

Summary Statistics for	Toluene	
Number of Samples		7
Minimum		0.5
Maximum		1
Mean		0.642857143
Median		0.5
Standard Deviation		0.243975018
Variance		0.05952381
Coeificient of Variation		0.379516695
Skewness		1.229634092
Shapiro-Wilk Test Statisitic		0.600751872
Shapiro-Wilk 5% Critical Val		0.803
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		0.82204529
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		0.840328971
Modified-t		0.829188147
95 % Non-parametric UCL		
CLT		0.794535493
Jackknife		0.82204529
Standard Bootstrap		0.780904573
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		1.044808167

From File

Summary Statistics for	trans-1,2-Dichloroethene
Number of Samples	7
Minimum	0.5
Maximum	5
Mean	1.785714286
Median	0.5
Standard Deviation	2.195775164
Variance	4.821428571
Coefficient of Variation	1.229634092
Skewness	1.229634092

Shapiro-Wilk Test Statisitic	0.600751872
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	3.398407611

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.562960739
Modified-t	3.462693325

95 % Non-parametric UCL

CLT	3.150819437
Jackknife	3.398407611
Standard Bootstrap	3.086627216
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	5.403273503

From File

Summary Statistics for	Trichloroethene
Number of Samples	7
Minimum	0.05
Maximum	25
Mean	7.507142857
Median	2.5
Standard Deviation	9.859446763
Variance	97.20869048
Coefficient of Variation	1.3133421
Skewness	1.328080802

95 % UCL (Assuming Normal Data)

Student's-t	14.74844162

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	15.63547812
Modified-t	15.06020691

95 % Non-parametric UCL

CLT	13.63672379
Jackknife	14.74844162
Standard Bootstrap	13.23172131
Bootstrap-t	44.87340551
Chebyshev (Mean, Std)	23.75066956

99 % Non-parametric UCL

Chebyshev (Mean, Std)	44.58555467

Summary Statistics for	ln(Trichloroethene)
Minimum	-2.995732274
Maximum	3.218875825
Mean	0.805606279
Standard Deviation	2.130268155
Variance	4.538042412
Shapiro-Wilk Test Statisitic	0.927581586
Shapiro-Wilk 5% Critical Val	0.803

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	21.64181851
MLE Standard Deviation	208.152864
MLE Coefficient of Variation	9.618085648
MLE Skewness	918.600003
MLE Median	2.238052972
MLE 80% Quantile	13.54046853
MLE 90% Quantile	34.57050487
MLE 95% Quantile	74.43285129
MLE 99% Quantile	317.5419728
MVU Estimate of Median	1.595288384
MVU Estimate of Mean	11.35712102
MVU Estimate of Std. Dev.	25.39027072
MVU Estimate of SE of Mea	8.260850215

UCL Assuming Lognormal Distribution

95% H-UCL	10949.58011
95% Chebyshev (MVUE) UC	47.36533229
99% Chebyshev (MVUE) UC	93.55154286

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Vinyl chloride
Number of Samples	7
Minimum	0.04
Maximum	0.24
Mean	0.086142857
Median	0.04
Standard Deviation	0.079545435
Variance	0.006327476
Coefficient of Variation	0.923413007
Skewness	1.622904215

Shapiro-Wilk Test Statisitic	0.676934271
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	0.144565228

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	0.155301593
Modified-t	0.14763891

95 % Non-parametric UCL

CLT	0.135595954
Jackknife	0.144565228
Standard Bootstrap	0.132672113
Bootstrap-t	1.02718826
Chebyshev (Mean, Std)	0.217194672

From File

Summary Statistics for	Xylenes (total)
Number of Samples	7
Minimum	1
Maximum	5
Mean	2.142857143
Median	1
Standard Deviation	1.951800146
Variance	3.80952381
Coefficient of Variation	0.910840068
Skewness	1.229634092

Shapiro-Wilk Test Statisitic	0.600751872
Shapiro-Wilk 5% Critical Val	0.803

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	3.576362321

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.722631768
Modified-t	3.633505178

95 % Non-parametric UCL

CLT	3.356283944
Jackknife	3.576362321
Standard Bootstrap	3.252840784
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	5.358465336

From File

Summary Statistics for	4-Methylphenol
Number of Samples	1
Minimum	5.5
Maximum	5.5
Mean	5.5
Median	5.5

Too Few Observations To Calculate UCLs

C.8-4.1 Shallow Groundwater Future Aberjona Runs

From File

Summary Statistics for	Naphthalene	
Number of Samples		3
Minimum		0.0055
Maximum		2.7
Mean		1.3185
Median		1.25

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	2-Methylnaphthalene
Number of Samples	3
Minimum	0.5
Maximum	5.5
Mean	2.683333333
Median	2.05

Too Few Observations To Calculate UCLs

C.8-4.1 Shallow Groundwater Future Aberjona Runs

From File

Summary Statistics for	Acenaphthylene
Number of Samples	3
Minimum	0.5
Maximum	5.5
Mean	2.166666667
Median	0.5

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	Phenanthrene
Number of Samples	3
Minimum	0.9
Maximum	5.5
Mean	2.833333333
Median	2.1

Too Few Observations To Calculate UCLs

C.8-4.1 Shallow Groundwater Future Aberjona Runs

From File

Summary Statistics for	Benzo(a)Pyrene
Number of Samples	3
Minimum	0.011
Maximum	0.5
Mean	0.337
Median	0.5

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	Dibenz(a,h) anthracene
Number of Samples	3
Minimum	0.013
Maximum	0.5
Mean	0.337666667
Median	0.5

Too Few Observations To Calculate UCLs

C.8-4.1 Shallow Groundwater Future Aberjona Runs

From File

Summary Statistics for	C9-C18 Aliphatic	
Number of Samples		2
Minimum		25
Maximum		25
Mean		25
Median		25

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	C11-C22 Aromatic
Number of Samples	2
Minimum	25
Maximum	25
Mean	25
Median	25

Too Few Observations To Calculate UCLs

C.8-4.1 Shallow Groundwater Future Aberjona Runs

From File

Summary Statistics for	C19-C36 Aliphatic	
Number of Samples		2
Minimum		25
Maximum		25
Mean		25
Median		25

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	C5-C8 Aliphatic	
Number of Samples		2
Minimum		25
Maximum		25
Mean		25
Median		25

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	Arsenic	
Number of Samples		6
Minimum		0.185
Maximum		2.5
Mean		1.280833333
Median		1.25
Standard Deviation		0.733623995
Variance		0.538204167
Coefficient of Variation		0.572770849
Skewness		0.376922836
Shapiro-Wilk Test Statisitic		0.823648572
Shapiro-Wilk 5% Critical Val		0.788
Data are Normal at 5% Significance Level		
Recommended UCL to use	Student's-t	
95 % UCL (Assuming Normal Data)		
Student's-t		1.884341774
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		1.822712422
Modified-t		1.892022875
95 % Non-parametric UCL		
CLT		1.773468215
Jackknife		1.884341774
Standard Bootstrap		1.726419953
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		2.586326801

From File

Summary Statistics for	Chromium
Number of Samples	6
Minimum	0.9
Maximum	13
Mean	3.841666667
Median	1.15
Standard Deviation	4.891259211
Variance	23.92441667
Coefficient of Variation	1.27321281
Skewness	1.764302519

Shapiro-Wilk Test Statisitic	0.704370473
Shapiro-Wilk 5% Critical Val	0.788

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	7.865412126

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	8.663009312
Modified-t	8.10512493

95 % Non-parametric UCL

CLT	7.126189691
Jackknife	7.865412126
Standard Bootstrap	6.786316415
Bootstrap-t	113.3355102
Chebyshev (Mean, Std)	12.54572622

From File

Summary Statistics for	Lead
Number of Samples	6
Minimum	0.032
Maximum	2.1
Mean	0.838666667
Median	0.725
Standard Deviation	0.679095477
Variance	0.461170667
Coefficient of Variation	0.809732286
Skewness	1.409759007
Shapiro-Wilk Test Statisitic	0.821589722
Shapiro-Wilk 5% Critical Val	0.788
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t
95 % UCL (Assuming Normal Data)	
Student's-t	1.397317767
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	1.465177518
Modified-t	1.423911127
95 % Non-parametric UCL	
CLT	1.294685175
Jackknife	1.397317767
Standard Bootstrap	1.240213907
Bootstrap-t	2.099182567
Chebyshev (Mean, Std)	2.047125924

From File

Summary Statistics for	Manganese
Number of Samples	6
Minimum	116
Maximum	824
Mean	405.3333333
Median	395
Standard Deviation	233.8047619
Variance	54664.66667
Coefficient of Variation	0.576820959
Skewness	1.115056345

Shapiro-Wilk Test Statisitic	0.884756346
Shapiro-Wilk 5% Critical Val	0.788

Data are Normal at 5% Significance Level

Recommended UCL to use Student's-t

95 % UCL (Assuming Normal Data)

Student's-t	597.6704818

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	608.7631916
Modified-t	604.9123007

95 % Non-parametric UCL

CLT	562.3352607
Jackknife	597.6704818
Standard Bootstrap	550.7205921
Bootstrap-t	647.715594
Chebyshev (Mean, Std)	821.3919563

C.8-4.1 Shallow Groundwater Future Aberjona Runs

From File

Summary Statistics for	Dieldrin	
Number of Samples		1
Minimum		1.40E-02
Maximum		1.40E-02
Mean		1.40E-02
Median		1.40E-02

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	4,4'-DDD	
Number of Samples		1
Minimum		0.005
Maximum		0.005
Mean		0.005
Median		0.005

Too Few Observations To Calculate UCLs

Chemical of Potential Concern	Max. Conc.	95% UCL (Distribution) (1)		Value	Statistic (2)	Rationale (3)	Description	Mean
1,1,2-Trichloroethane	5	3.146791166	(NP)	3.146791	95% UCL-NP	(d)	Jackknife	1.032
1,1-Dichloroethane	120	131.1907583	(T)	120.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	25.4
1,1-Dichloroethene	5	3.146791166	(NP)	3.146791	95% UCL-NP	(d)	Jackknife	1.032
1,2,4-Trichlorobenzene	23	38.13541571	(T)	23.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	5.9
1,3-Dichlorobenzene	19	33.32220588	(T)	19.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	5.1
1,4-Dichlorobenzene	197	417.7781615	(T)	197.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	41.146
Benzene	86	302.1970587	(T)	86.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	21.25
Bromomethane	5	3.31866134	(NP)	3.318661	95% UCL-NP	(d)	Jackknife	1.4
Chlorobenzene	18	32.08539711	(T)	18.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	4.9
Chlorodibromomethane	5	9.355023249	(T)	5.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	1.285
Chloroethane	5	3.31866134	(NP)	3.318661	95% UCL-NP	(d)	Jackknife	1.4
cis-1,2-Dichloroethene	480	1049.142541	(T)	480.000000	Max	(c & e)	Chebyshev (Mean, Std)	97.4
Ethylbenzene	40	71.98689876	(T)	40.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	10.1
Methyl tert-butyl ether	540	883.450246	(T)	540.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	127.8
Methylene chloride	5	3.31866134	(NP)	3.318661	95% UCL-NP	(d)	Jackknife	1.4
Tetrachloroethene	5	3.31866134	(NP)	3.318661	95% UCL-NP	(d)	Jackknife	1.4
1,1,1-Trichloroethane	5	4.622638352	(NP)	4.6226	95% UCL-NP	(d)	Jackknife	2.09
Chloromethane	5	3.31866134	(NP)	3.3187	95% UCL-NP	(d)	Jackknife	1.4
Acetone	5	4.065922967	(NP)	4.0659	95% UCL-NP	(d)	Jackknife	3
Methyl cyclohexane	5	3.31866134	(NP)	3.3187	95% UCL-NP	(d)	Jackknife	1.4
1,2-Dichlorobenzene	10	7.43436064	(N)	7.4344	95% UCL-N	(b)	Student's-t	3.6
Dibenzofuran	5.5	N/A	(<4)	5.5000	Max	(a)	Too Few Observations To Calculate UCLs	5.166666667
Toluene	1200	1339.81802	(T)	1200.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	245
trans-1,2-Dichloroethene	15	28.27905053	(T)	15.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	4.3
Acetophenone	5.5	N/A	(<4)	5.500000	Max	(a)	Too Few Observations To Calculate UCLs	3.9
Trichloroethene	5	4.006048961	(N)	4.006049	95% UCL-NP	(b)	Student's-t	2.6
Vinyl chloride	420	454.5724904	(T)	420.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	85.024
Xylenes (total)	42.5	29.20494892	(N)	29.204949	95% UCL-NP	(b)	Student's-t	12.7
4-Methylphenol	5.5	N/A	(<4)	5.500000	Max	(a)	Too Few Observations To Calculate UCLs	4.1
Naphthalene	13.6	9.598047744	(N)	9.598048	95% UCL-NP	(b)	Student's-t	4.301
2-Methylnaphthalene	5	13.52240161	(T)	5.000000	Max	(c & e)	95% H-UCL	3.67
Acenaphthylene	5	5.619896509	(NP)	5.000000	Max	(d & e)	Jackknife	3.74
Phenanthrene	5	6.406470623	(T)	5.000000	Max	(c & e)	95% H-UCL	4.1
Benzo(a)Pyrene	5	15.52351006	(T)	5.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	1.204
Dibenz(a,h) anthracene	5	17.13895014	(NP)	5.000000	Max	(c & e)	99% Chebyshev (MVUE) UCL	1.2023
C9-C18 Aliphatic	59	N/A	(<4)	59.000000	Max	(a)	Too Few Observations To Calculate UCLs	49.5
C11-C22 Aromatic	85	N/A	(<4)	85.000000			Too Few Observations To Calculate UCLs	45
C19-C36 Aliphatic	150	N/A	(<4)	150.000000	Max	(a)	Too Few Observations To Calculate UCLs	78.66666667
C5-C8 Aliphatic	448	N/A	(<4)	448.000000	Max	(a)	Too Few Observations To Calculate UCLs	164.3333333
C9-C10 Aromatic		N/A	(<4)		Max	(a)	Too Few Observations To Calculate UCLs	43.33333333
C9-C12 Aliphatic		N/A	(<4)		Max	(a)	Too Few Observations To Calculate UCLs	26.66666667
Arsenic	3.5	2.535882758	(N)	2.535883	95% UCL-NP	(b)	Student's-t	1.591666667
Chromium	23	20.77618556	(T)	20.776186	95% UCL-NP	(c)	95% Chebyshev (MVUE) UCL	6.875
Lead	2.1	1.639225342	(N)	1.639225	95% UCL-NP	(b)	Student's-t	1.15725
Manganese	2635	1690.370736	(N)	1690.370736	95% UCL-NP	(b)	Student's-t	886.2666667
TEQ (no 170/193/180) Humans	1.40E-06	N/A	(<4)	0.000001	Max	(a)	Too Few Observations To Calculate UCLs	8.92E-07
Dieldrin		N/A	(<4)				Too Few Observations To Calculate UCLs	
4,4'-DDD	0.558	N/A	(<4)	0.558000	Max	(a)	Too Few Observations To Calculate UCLs	0.2815

(1) T - Transformed; N - Normal; NP - Non-parametric; <4 - sample size too small to calculate 95% UCL
(2) Statistics: Maximum Detected Value (Max); 95% UCL of Transformed Data (95% UCL - T); 95% of Normal Data (95% UCL - N); 95% of Non-parametric Data (95% UCL - NP).
(3) Rationale

(a) Due to small sample size (<4), the maximum detected concentration is used.
(b) Shapiro-Wilk W Test indicates data are normally distributed.
(c) Shapiro-Wilk W Test indicates data are log-normally distributed.
(d) Shapiro-Wilk W Test indicates data are neither normally nor log-normally distributed.
(e) Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	1,1,2-Trichloroethane
Number of Samples	5
Minimum	0.04
Maximum	5
Mean	1.032
Median	0.04
Standard Deviation	2.218179434
Variance	4.92032
Coefficient of Variation	2.149398676
Skewness	2.236067977

Shapiro-Wilk Test Statisitic	0.55211645
Shapiro-Wilk 5% Critical Valu	0.762

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	3.146791166

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.723661169
Modified-t	3.312124499

95 % Non-parametric UCL

CLT	2.663694799
Jackknife	3.146791166
Standard Bootstrap	2.468220624
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	5.356027752

From File

Summary Statistics for	1,1-Dichloroethane
Number of Samples	5
Minimum	0.5
Maximum	120
Mean	25.4
Median	1
Standard Deviation	52.91667979
Variance	2800.175
Coefficient of Variation	2.08333385
Skewness	2.229043456

95 % UCL (Assuming Normal Data)

Student's-t	75.850259

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	89.53257906
Modified-t	79.78204496

95 % Non-parametric UCL

CLT	64.32555754
Jackknife	75.850259
Standard Bootstrap	60.22299947
Bootstrap-t	4798.042547
Chebyshev (Mean, Std)	128.5535991

99 % Non-parametric UCL

Chebyshev (Mean, Std)	260.8643604

Summary Statistics for	ln(1,1-Dichloroethane)
Minimum	-0.693147181
Maximum	4.787491743
Mean	1.002127059
Standard Deviation	2.315706177
Variance	5.3624951

Shapiro-Wilk Test Statisitic	0.821613509
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	39.78041114
MLE Standard Deviation	579.5616538
MLE Coefficient of Variation	14.56902121
MLE Skewness	3136.074754
MLE Median	2.724069927
MLE 80% Quantile	19.27673211
MLE 90% Quantile	53.39993329
MLE 95% Quantile	122.9113938
MLE 99% Quantile	594.939445

MVU Estimate of Median	1.502273912
MVU Estimate of Mean	14.60984237
MVU Estimate of Std. Dev.	29.35126128
MVU Estimate of SE of Mean	11.71682291

UCL Assuming Lognormal Distribution

95% H-UCL	11068199.57
95% Chebyshev (MVUE) UCl	65.68228936
99% Chebyshev (MVUE) UCl	131.1907583

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	1,1-Dichloroethene
Number of Samples	5
Minimum	0.04
Maximum	5
Mean	1.032
Median	0.04
Standard Deviation	2.218179434
Variance	4.92032
Coefficient of Variation	2.149398676
Skewness	2.236067977

Shapiro-Wilk Test Statisitic	0.55211645
Shapiro-Wilk 5% Critical Valu	0.762

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	3.146791166

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.723661169
Modified-t	3.312124499

95 % Non-parametric UCL

CLT	2.663694799
Jackknife	3.146791166
Standard Bootstrap	2.499753301
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	5.356027752

From File

Summary Statistics for	1,2,4-Trichlorobenzene
Number of Samples	5
Minimum	0.5
Maximum	23
Mean	5.9
Median	0.5
Standard Deviation	9.755767525
Variance	95.175
Coefficient of Variation	1.653519919
Skewness	2.03153149

95 % UCL (Assuming Normal Data)

Student's-t	15.20105593

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	17.31176097
Modified-t	15.86169423

95 % Non-parametric UCL

CLT	13.07635142
Jackknife	15.20105593
Standard Bootstrap	12.31705969
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	24.91749195

99 % Non-parametric UCL

Chebyshev (Mean, Std)	49.31042502

Summary Statistics for	ln(1,2,4-Trichlorobenzer
Minimum	-0.693147181
Maximum	3.135494216
Mean	0.533098117
Standard Deviation	1.763661348
Variance	3.11050135
Shapiro-Wilk Test Statisitic	0.772447737
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	8.071576306
MLE Standard Deviation	37.36737799
MLE Coefficient of Variation	4.629501918
MLE Skewness	113.1093242
MLE Median	1.704203962
MLE 80% Quantile	7.563938017
MLE 90% Quantile	16.43483142
MLE 95% Quantile	31.01035046
MLE 99% Quantile	103.0665002
MVU Estimate of Median	1.226310413
MVU Estimate of Mean	4.91100798
MVU Estimate of Std. Dev.	7.898065471
MVU Estimate of SE of Mean	3.339178615

UCL Assuming Lognormal Distribution

95% H-UCL	12308.95281
95% Chebyshev (MVUE) UCI	19.46615012
99% Chebyshev (MVUE) UCI	38.13541571

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	1,3-Dichlorobenzene
Number of Samples	5
Minimum	0.5
Maximum	19
Mean	5.1
Median	0.5
Standard Deviation	8.010930033
Variance	64.175
Coefficient of Variation	1.570770595
Skewness	1.93996249

95 % UCL (Assuming Normal Data)

Student's-t	12.73754447

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	14.31398354
Modified-t	13.25557459

95 % Non-parametric UCL

CLT	10.99284738
Jackknife	12.73754447
Standard Bootstrap	10.41994083
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	20.71617751

99 % Non-parametric UCL

Chebyshev (Mean, Std)	40.74638832

Summary Statistics for	ln(1,3-Dichlorobenzene)
Minimum	-0.693147181
Maximum	2.944438979
Mean	0.49488707
Standard Deviation	1.693871621
Variance	2.869201069
Shapiro-Wilk Test Statisitic	0.770218067
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	6.885980993
MLE Standard Deviation	28.07499243
MLE Coefficient of Variation	4.077123137
MLE Skewness	80.00511445
MLE Median	1.640312988
MLE 80% Quantile	6.863438738
MLE 90% Quantile	14.46182043
MLE 95% Quantile	26.61050033
MLE 99% Quantile	84.33799381
MVU Estimate of Median	1.212594243
MVU Estimate of Mean	4.397905561
MVU Estimate of Std. Dev.	6.834698467
MVU Estimate of SE of Mean	2.90700156

UCL Assuming Lognormal Distribution

95% H-UCL	6009.093476
95% Chebyshev (MVUE) UCl	17.06923159
99% Chebyshev (MVUE) UCl	33.32220588

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	1,4-Dichlorobenzene
Number of Samples	5
Minimum	0.04
Maximum	197
Mean	41.146
Median	3.64
Standard Deviation	87.15257759
Variance	7595.57178
Coefficient of Variation	2.118130015
Skewness	2.232539712

95 % UCL (Assuming Normal Data)

Student's-t	124.2364382

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	146.8360275
Modified-t	130.7221579

95 % Non-parametric UCL

CLT	105.2555149
Jackknife	124.2364382
Standard Bootstrap	98.4378863
Bootstrap-t	2116.092589
Chebyshev (Mean, Std)	211.0376501

Summary Statistics for	ln(1,4-Dichlorobenzene)
Minimum	-3.218875825
Maximum	5.283203729
Mean	0.394003445
Standard Deviation	3.561289574
Variance	12.68278343
Shapiro-Wilk Test Statisitic	0.901235866
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	841.6760155
MLE Standard Deviation	477722.512
MLE Coefficient of Variation	567.5847989
MLE Skewness	182850566.9
MLE Median	1.482905657
MLE 80% Quantile	30.06293853
MLE 90% Quantile	144.0644181
MLE 95% Quantile	519.2184989
MLE 99% Quantile	5869.724596
MVU Estimate of Median	0.248817519
MVU Estimate of Mean	40.32555311
MVU Estimate of Std. Dev.	112.2121529
MVU Estimate of SE of Mean	37.93541449

UCL Assuming Lognormal Distribution

95% H-UCL	5.32E+15
95% Chebyshev (MVUE) UCl	205.6821912
99% Chebyshev (MVUE) UCl	417.7781615

Recommended UCL to use:

Needs further investigation.

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	Benzene
Number of Samples	5
Minimum	0.04
Maximum	86
Mean	21.25
Median	2.5
Standard Deviation	36.82936193
Variance	1356.4019
Coefficient of Variation	1.733146444
Skewness	2.059357498

95 % UCL (Assuming Normal Data)	
Student's-t	56.36276323

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	64.54997029
Modified-t	58.89092398

95 % Non-parametric UCL	
CLT	48.34171197
Jackknife	56.36276323
Standard Bootstrap	45.26414216
Bootstrap-t	652.1652432
Chebyshev (Mean, Std)	93.04364331

99 % Non-parametric UCL	
Chebyshev (Mean, Std)	185.1303149

Summary Statistics for	ln(Benzene)
Minimum	-3.218875825
Maximum	4.454347296
Mean	0.987820812
Standard Deviation	2.919928978
Variance	8.525985234
Shapiro-Wilk Test Statisitic	0.981948661
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	190.7213437
MLE Standard Deviation	13544.10819
MLE Coefficient of Variation	71.01516762
MLE Skewness	358353.4745
MLE Median	2.685376152
MLE 80% Quantile	31.66337969
MLE 90% Quantile	114.4261399
MLE 95% Quantile	327.3742397
MLE 99% Quantile	2391.259788
MVU Estimate of Median	0.961507013
MVU Estimate of Mean	30.73369288
MVU Estimate of Std. Dev.	73.81867251
MVU Estimate of SE of Mean	27.28309481

UCL Assuming Lognormal Distribution	
95% H-UCL	8.01E+10
95% Chebyshev (MVUE) UCl	149.657946
99% Chebyshev (MVUE) UCl	302.1970587

Recommended UCL to use:
Greater of
99 % Chebyshev (MVUE) UCL
99 % Chebyshev (Mean, Std)

From File

Summary Statistics for	Bromomethane	
Number of Samples		5
Minimum		0.5
Maximum		5
Mean		1.4
Median		0.5
Standard Deviation		2.01246118
Variance		4.05
Coefficient of Variation		1.437472271
Skewness		2.236067977

Shapiro-Wilk Test Statisitic	0.55211645
Shapiro-Wilk 5% Critical Valu	0.762

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	3.31866134

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.842031302
Modified-t	3.46866134

95 % Non-parametric UCL

CLT		2.880368265
Jackknife		3.31866134
Standard Bootstrap		2.696156092
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		5.323009049

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	Chlorobenzene
Number of Samples	5
Minimum	0.5
Maximum	18
Mean	4.9
Median	0.5
Standard Deviation	7.577928477
Variance	57.425
Coefficient of Variation	1.546516016
Skewness	1.907850328

95 % UCL (Assuming Normal Data)	
Student's-t	12.12472491
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	13.56395208
Modified-t	12.60664335
95 % Non-parametric UCL	
CLT	10.47433105
Jackknife	12.12472491
Standard Bootstrap	9.816682022
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	19.67210208
99 % Non-parametric UCL	
Chebyshev (Mean, Std)	38.61965302

Summary Statistics for	ln(Chlorobenzene)
Minimum	-0.693147181
Maximum	2.890371758
Mean	0.484073626
Standard Deviation	1.674385108
Variance	2.80356549
Shapiro-Wilk Test Statisitic	0.769311803
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	6.591997218
MLE Standard Deviation	25.95555242
MLE Coefficient of Variation	3.937433764
MLE Skewness	72.85585143
MLE Median	1.622671112
MLE 80% Quantile	6.678737963
MLE 90% Quantile	13.95249701
MLE 95% Quantile	25.49384698
MLE 99% Quantile	79.7337841
MVU Estimate of Median	1.208326669
MVU Estimate of Mean	4.265118006
MVU Estimate of Std. Dev.	6.563193381
MVU Estimate of SE of Mean	2.796043253

UCL Assuming Lognormal Distribution	
95% H-UCL	4942.311354
95% Chebyshev (MVUE) UCl	16.45278799
99% Chebyshev (MVUE) UCl	32.08539711

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Chlorodibromomethane
Number of Samples	5
Minimum	0.04
Maximum	5
Mean	1.285
Median	0.17
Standard Deviation	2.115661835
Variance	4.476025
Coefficient of Variation	1.646429444
Skewness	2.047644787

Summary Statistics for	ln(Chlorodibromometha
Minimum	-3.218875825
Maximum	1.609437912
Mean	-1.026882879
Standard Deviation	1.87534929
Variance	3.516934959
Shapiro-Wilk Test Statisitic	0.949853603
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

95 % UCL (Assuming Normal Data)

Student's-t	3.302051863

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.767070195
Modified-t	3.446455994

95 % Non-parametric UCL

CLT	2.841282761
Jackknife	3.302051863
Standard Bootstrap	2.641323539
Bootstrap-t	37.44601961
Chebyshev (Mean, Std)	5.409184162

99 % Non-parametric UCL

Chebyshev (Mean, Std)	10.69910086

Estimates Assuming Lognormal Distribution

MLE Mean	2.078371388
MLE Standard Deviation	11.88149433
MLE Coefficient of Variation	5.716733013
MLE Skewness	203.9789584
MLE Median	0.358121531
MLE 80% Quantile	1.746803019
MLE 90% Quantile	3.986608855
MLE 95% Quantile	7.830815873
MLE 99% Quantile	28.08342569
MVU Estimate of Median	0.246101935
MVU Estimate of Mean	1.162124327
MVU Estimate of Std. Dev.	1.967681541
MVU Estimate of SE of Mean	0.823417323

UCL Assuming Lognormal Distribution

95% H-UCL	8112.306921
95% Chebyshev (MVUE) UCl	4.751317228
99% Chebyshev (MVUE) UCl	9.355023249

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Chloroethane	
Number of Samples		5
Minimum		0.5
Maximum		5
Mean		1.4
Median		0.5
Standard Deviation		2.01246118
Variance		4.05
Coefficient of Variation		1.437472271
Skewness		2.236067977

Shapiro-Wilk Test Statisitic	0.55211645
Shapiro-Wilk 5% Critical Valu	0.762

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	3.31866134

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.842031302
Modified-t	3.46866134

95 % Non-parametric UCL

CLT		2.880368265
Jackknife		3.31866134
Standard Bootstrap		2.696888351
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		5.323009049

From File

Summary Statistics for	cis-1,2-Dichloroethene
Number of Samples	5
Minimum	0.5
Maximum	480
Mean	97.4
Median	1
Standard Deviation	213.8882302
Variance	45748.175
Coefficient of Variation	2.195977722
Skewness	2.235633949

95 % UCL (Assuming Normal Data)	
Student's-t	301.3190035

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	356.9239271
Modified-t	317.2581964

95 % Non-parametric UCL	
CLT	254.7363757
Jackknife	301.3190035
Standard Bootstrap	244.0937284
Bootstrap-t	75621.00798
Chebyshev (Mean, Std)	514.3449184

99 % Non-parametric UCL	
Chebyshev (Mean, Std)	1049.142541

Summary Statistics for	ln(cis-1,2-Dichloroethen
Minimum	-0.693147181
Maximum	6.173786104
Mean	1.279385931
Standard Deviation	2.893211428
Variance	8.370672369
Shapiro-Wilk Test Statisitic	0.782733642
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	236.2102068
MLE Standard Deviation	15520.89573
MLE Coefficient of Variation	65.70798078
MLE Skewness	283893.8764
MLE Median	3.594431819
MLE 80% Quantile	41.4359801
MLE 90% Quantile	147.9926509
MLE 95% Quantile	419.3553833
MLE 99% Quantile	3007.894807
MVU Estimate of Median	1.317323966
MVU Estimate of Mean	39.72875716
MVU Estimate of Std. Dev.	94.76542171
MVU Estimate of SE of Mean	35.15139666

UCL Assuming Lognormal Distribution	
95% H-UCL	6.93E+10
95% Chebyshev (MVUE) UCl	192.9501429
99% Chebyshev (MVUE) UCl	389.4807379

Recommended UCL to use:
Greater of
99 % Chebyshev (MVUE) UCL
99 % Chebyshev (Mean, Std)

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	Ethylbenzene
Number of Samples	5
Minimum	0.5
Maximum	40
Mean	10.1
Median	2.5
Standard Deviation	16.92409525
Variance	286.425
Coefficient of Variation	1.675652995
Skewness	2.105272558

95 % UCL (Assuming Normal Data)	
Student's-t	26.23527138

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	30.16357838
Modified-t	27.42293249

95 % Non-parametric UCL	
CLT	22.54937978
Jackknife	26.23527138
Standard Bootstrap	21.18074324
Bootstrap-t	146.0557281
Chebyshev (Mean, Std)	43.09113517

99 % Non-parametric UCL	
Chebyshev (Mean, Std)	85.40746975

Summary Statistics for	ln(Ethylbenzene)
Minimum	-0.693147181
Maximum	3.688879454
Mean	1.032957195
Standard Deviation	1.861443649
Variance	3.464972459
Shapiro-Wilk Test Statisitic	0.908817238
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	15.88608271
MLE Standard Deviation	88.41511918
MLE Coefficient of Variation	5.565570872
MLE Skewness	189.0934936
MLE Median	2.809361392
MLE 80% Quantile	13.54309845
MLE 90% Quantile	30.7199501
MLE 95% Quantile	60.04126031
MLE 99% Quantile	213.2947737
MVU Estimate of Median	1.942083396
MVU Estimate of Mean	8.980826773
MVU Estimate of Std. Dev.	15.11217135
MVU Estimate of SE of Mean	6.332348494

UCL Assuming Lognormal Distribution	
95% H-UCL	54985.56881
95% Chebyshev (MVUE) UCI	36.58289393
99% Chebyshev (MVUE) UCI	71.98689876

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	Methyl tert-butyl ether
Number of Samples	5
Minimum	4
Maximum	540
Mean	127.8
Median	21
Standard Deviation	231.9368449
Variance	53794.7
Coefficient of Variation	1.814842291
Skewness	2.166181198

95 % UCL (Assuming Normal Data)

Student's-t	348.926381

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	405.7809712
Modified-t	365.6736221

95 % Non-parametric UCL

CLT	298.412953
Jackknife	348.926381
Standard Bootstrap	277.8669925
Bootstrap-t	3092.422156
Chebyshev (Mean, Std)	579.9281456

99 % Non-parametric UCL

Chebyshev (Mean, Std)	1159.853807

Summary Statistics for	ln(Methyl tert-butyl ether
Minimum	1.386294361
Maximum	6.29156914
Mean	3.313186071
Standard Deviation	2.025259844
Variance	4.101677436
Shapiro-Wilk Test Statisitic	0.923914279
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	213.5828448
MLE Standard Deviation	1646.68896
MLE Coefficient of Variation	7.709837192
MLE Skewness	481.4144893
MLE Median	27.47251557
MLE 80% Quantile	152.0988501
MLE 90% Quantile	370.7933765
MLE 95% Quantile	768.72901
MLE 99% Quantile	3053.184638
MVU Estimate of Median	17.64369647
MVU Estimate of Mean	105.1734121
MVU Estimate of Std. Dev.	189.7299959
MVU Estimate of SE of Mean	78.21976488

UCL Assuming Lognormal Distribution

95% H-UCL	3223839.398
95% Chebyshev (MVUE) UCl	446.1254626
99% Chebyshev (MVUE) UCl	883.450246

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Methylene chloride
Number of Samples	5
Minimum	0.5
Maximum	5
Mean	1.4
Median	0.5
Standard Deviation	2.01246118
Variance	4.05
Coefficient of Variation	1.437472271
Skewness	2.236067977

Chapiro-Wilk Test Statisitic	0.55211645
Shapiro-Wilk 5% Critical Valu	0.762

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	3.31866134

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.842031302
Modified-t	3.46866134

95 % Non-parametric UCL

CLT	2.880368265
Jackknife	3.31866134
Standard Bootstrap	2.736138005
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	5.323009049

From File

Summary Statistics for	Tetrachloroethene	
Number of Samples		5
Minimum		0.5
Maximum		5
Mean		1.4
Median		0.5
Standard Deviation		2.01246118
Variance		4.05
Coefficient of Variation		1.437472271
Skewness		2.236067977
Shapiro-Wilk Test Statisitic		0.55211645
Shapiro-Wilk 5% Critical Valu		0.762
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		3.31866134
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		3.842031302
Modified-t		3.46866134
95 % Non-parametric UCL		
CLT		2.880368265
Jackknife		3.31866134
Standard Bootstrap		2.700582237
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		5.323009049

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	Toluene
Number of Samples	5
Minimum	0.5
Maximum	1200
Mean	245
Median	5
Standard Deviation	533.9151384
Variance	285065.375
Coefficient of Variation	2.179245463
Skewness	2.234943877

95 % UCL (Assuming Normal Data)

Student's-t	754.0296127

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	892.753794
Modified-t	793.8052917

95 % Non-parametric UCL

CLT	637.748459
Jackknife	754.0296127
Standard Bootstrap	606.0342626
Bootstrap-t	52818.73963
Chebyshev (Mean, Std)	1285.79221

Summary Statistics for	ln(Toluene)
Minimum	-0.693147181
Maximum	7.090076836
Mean	2.051531873
Standard Deviation	3.218935838
Variance	10.36154793
Shapiro-Wilk Test Statisitic	0.883273213
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	1383.408747
MLE Standard Deviation	245994.3856
MLE Coefficient of Variation	177.8175728
MLE Skewness	5622963.147
MLE Median	7.779809665
MLE 80% Quantile	118.1001102
MLE 90% Quantile	486.8053862
MLE 95% Quantile	1551.040581
MLE 99% Quantile	13887.94718
MVU Estimate of Median	2.068635378
MVU Estimate of Mean	132.4317043
MVU Estimate of Std. Dev.	342.0949015
MVU Estimate of SE of Mean	121.3468905

UCL Assuming Lognormal Distribution

95% H-UCL	4.07E+13
95% Chebyshev (MVUE) UCl	661.3705372
99% Chebyshev (MVUE) UCl	1339.81802

Recommended UCL to use:

Needs further investigation.

From File

Summary Statistics for	trans-1,2-Dichloroethen
Number of Samples	5
Minimum	0.5
Maximum	15
Mean	4.3
Median	0.5
Standard Deviation	6.290866395
Variance	39.575
Coefficient of Variation	1.462992185
Skewness	1.775327996

95 % UCL (Assuming Normal Data)

Student's-t	10.29765216

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.31427603
Modified-t	10.66993054

95 % Non-parametric UCL

CLT	8.927567014
Jackknife	10.29765216
Standard Bootstrap	8.395551937
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	16.5631562

99 % Non-parametric UCL

Chebyshev (Mean, Std)	32.2925883

Summary Statistics for	ln(trans-1,2-Dichloroeth
Minimum	-0.693147181
Maximum	2.708050201
Mean	0.447609314
Standard Deviation	1.609612907
Variance	2.590853709
Shapiro-Wilk Test Statisitic	0.765204835
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	5.714667806
MLE Standard Deviation	20.0756176
MLE Coefficient of Variation	3.512998179
MLE Skewness	53.89345383
MLE Median	1.564567322
MLE 80% Quantile	6.096605985
MLE 90% Quantile	12.37850993
MLE 95% Quantile	22.09657338
MLE 99% Quantile	66.12645773
MVU Estimate of Median	1.19274498
MVU Estimate of Mean	3.85361009
MVU Estimate of Std. Dev.	5.73246126
MVU Estimate of SE of Mean	2.45484913

UCL Assuming Lognormal Distribution

95% H-UCL	2619.948407
95% Chebyshev (MVUE) UCl	14.55404937
99% Chebyshev (MVUE) UCl	28.27905053

Recommended UCL to use:

99 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Trichloroethene
Number of Samples	5
Minimum	1
Maximum	5
Mean	2.6
Median	2.5
Standard Deviation	1.47478812
Variance	2.175
Coefficient of Variation	0.5672262
Skewness	1.23532259

Shapiro-Wilk Test Statisitic	0.887714816
Shapiro-Wilk 5% Critical Valu	0.762
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t

95 % UCL (Assuming Normal Data)

Student's-t	4.006048961

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.074187766
Modified-t	4.066776931

95 % Non-parametric UCL

CLT	3.684855476
Jackknife	4.006048961
Standard Bootstrap	3.578625955
Bootstrap-t	4.578635894
Chebyshev (Mean, Std)	5.474891302

From File

Summary Statistics for	Vinyl chloride
Number of Samples	5
Minimum	0.04
Maximum	420
Mean	85.024
Median	0.04
Standard Deviation	187.269593
Variance	35069.90048
Coefficient of Variation	2.202549786
Skewness	2.23533563

95 % UCL (Assuming Normal Data)

Student's-t	263.5650481

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	312.2379361
Modified-t	277.5187279

95 % Non-parametric UCL

CLT	222.7796821
Jackknife	263.5650481
Standard Bootstrap	207.289409
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	450.0796421

Summary Statistics for	ln(Vinyl chloride)
Minimum	-3.218875825
Maximum	6.040254711
Mean	-0.40138697
Standard Deviation	4.163919266
Variance	17.33822365
Shapiro-Wilk Test Statisitic	0.772328645
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	3896.074765
MLE Standard Deviation	22676431.09
MLE Coefficient of Variation	5820.327498
MLE Skewness	1.97E+11
MLE Median	0.669390977
MLE 80% Quantile	22.5813605
MLE 90% Quantile	141.0690217
MLE 95% Quantile	631.602488
MLE 99% Quantile	10763.21135
MVU Estimate of Median	0.015740792
MVU Estimate of Mean	42.74293548
MVU Estimate of Std. Dev.	133.2528141
MVU Estimate of SE of Mean	41.39042761

UCL Assuming Lognormal Distribution

95% H-UCL	1.18E+21
95% Chebyshev (MVUE) UCl	223.1596267
99% Chebyshev (MVUE) UCl	454.5724904

Recommended UCL to use:

Needs further investigation.

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	Xylenes (total)
Number of Samples	5
Minimum	1
Maximum	42.5
Mean	12.7
Median	5
Standard Deviation	17.31184566
Variance	299.7
Coefficient of Variation	1.363137453
Skewness	1.861573259

Shapiro-Wilk Test Statisitic	0.762568668
Shapiro-Wilk 5% Critical Valu	0.762
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t

95 % UCL (Assuming Normal Data)

Student's-t	29.20494892

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	32.32167007
Modified-t	30.27919122

95 % Non-parametric UCL

CLT	25.43460933
Jackknife	29.20494892
Standard Bootstrap	24.09403547
Bootstrap-t	102.4596362
Chebyshev (Mean, Std)	46.44699987

From File

Summary Statistics for	4-Methylphenol	
Number of Samples		3
Minimum		1.8
Maximum		5.5
Mean		4.1
Median		5

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	Naphthalene
Number of Samples	5
Minimum	0.005
Maximum	13.6
Mean	4.301
Median	2.4
Standard Deviation	5.556010709
Variance	30.869255
Coefficient of Variation	1.291795096
Skewness	1.611589556

Shapiro-Wilk Test Statisitic	0.829598917
Shapiro-Wilk 5% Critical Valu	0.762

Data are Normal at 5% Significance Level

Recommended UCL to use Student's-t

95 % UCL (Assuming Normal Data)

Student's-t	9.598047744

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	10.30150413
Modified-t	9.896514705

95 % Non-parametric UCL

CLT	8.388006506
Jackknife	9.598047744
Standard Bootstrap	8.030712216
Bootstrap-t	18.83698215
Chebyshev (Mean, Std)	15.13165875

From File

Summary Statistics for	2-Methylnaphthalene
Number of Samples	5
Minimum	1.1
Maximum	5
Mean	3.67
Median	5
Standard Deviation	1.86601179
Variance	3.482
Coefficient of Variation	0.508450079
Skewness	-0.819549977

95 % UCL (Assuming Normal Data)	
Student's-t	5.449037885

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	4.715826275
Modified-t	5.398061555

95 % Non-parametric UCL	
CLT	5.042639961
Jackknife	5.449037885
Standard Bootstrap	4.860239165
Bootstrap-t	5.226680941
Chebyshev (Mean, Std)	7.307526632

Summary Statistics for	ln(2-Methylnaphthalene)
Minimum	0.09531018
Maximum	1.609437912
Mean	1.146910827
Standard Deviation	0.682008212
Variance	0.465135202
Shapiro-Wilk Test Statisitic	0.772639403
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	3.972828968
MLE Standard Deviation	3.057347949
MLE Coefficient of Variation	0.769564452
MLE Skewness	2.764452086
MLE Median	3.148451758
MLE 80% Quantile	5.602471087
MLE 90% Quantile	7.563177298
MLE 95% Quantile	9.667931096
MLE 99% Quantile	15.38298346
MVU Estimate of Median	3.00425923
MVU Estimate of Mean	3.771710868
MVU Estimate of Std. Dev.	2.532971596
MVU Estimate of SE of Mean	1.130011892

UCL Assuming Lognormal Distribution	
95% H-UCL	13.52240161
95% Chebyshev (MVUE) UCI	8.697318508
99% Chebyshev (MVUE) UCI	15.01518723

Recommended UCL to use:

H-UCL

From File

Summary Statistics for	Acenaphthylene
Number of Samples	5
Minimum	0.5
Maximum	5
Mean	3.74
Median	5
Standard Deviation	1.971801207
Variance	3.888
Coefficient of Variation	0.527219574
Skewness	-1.530960621

Shapiro-Wilk Test Statisitic	0.754301633
Shapiro-Wilk 5% Critical Valu	0.762

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.619896509

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.545343132
Modified-t	5.519271509

95 % Non-parametric UCL

CLT	5.190458752
Jackknife	5.619896509
Standard Bootstrap	5.010259474
Bootstrap-t	5.013333705
Chebyshev (Mean, Std)	7.583748171

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	Phenanthrene
Number of Samples	5
Minimum	2.4
Maximum	5
Mean	4.1
Median	5
Standard Deviation	1.256980509
Variance	1.58
Coefficient of Variation	0.306580612
Skewness	-0.781710559

95 % UCL (Assuming Normal Data)	
Student's-t	5.298393257

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	4.814652615
Modified-t	5.265640092

95 % Non-parametric UCL	
CLT	5.024636
Jackknife	5.298393257
Standard Bootstrap	4.914394737
Bootstrap-t	5.16187433
Chebyshev (Mean, Std)	6.550306103

Summary Statistics for	ln(Phenanthrene)
Minimum	0.875468737
Maximum	1.609437912
Mean	1.367036917
Standard Deviation	0.34403407
Variance	0.118359441
Shapiro-Wilk Test Statisitic	0.768390414
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	4.162919528
MLE Standard Deviation	1.475628102
MLE Coefficient of Variation	0.354469524
MLE Skewness	1.107947185
MLE Median	3.923707184
MLE 80% Quantile	5.247468166
MLE 90% Quantile	6.105076858
MLE 95% Quantile	6.91002297
MLE 99% Quantile	8.734320617
MVU Estimate of Median	3.877449268
MVU Estimate of Mean	4.112425118
MVU Estimate of Std. Dev.	1.409245644
MVU Estimate of SE of Mean	0.630121187

UCL Assuming Lognormal Distribution	
95% H-UCL	6.406470623
95% Chebyshev (MVUE) UCl	6.859059695
99% Chebyshev (MVUE) UCl	10.38205177

Recommended UCL to use:
Student's-t or H-UCL

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	Benzo(a)Pyrene
Number of Samples	5
Minimum	0.005
Maximum	5
Mean	1.204
Median	0.5
Standard Deviation	2.136127922
Variance	4.5630425
Coefficient of Variation	1.774192626
Skewness	2.162854314

95 % UCL (Assuming Normal Data)

Student's-t	3.240564036

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.762673545
Modified-t	3.394568485

95 % Non-parametric UCL

CLT	2.775337633
Jackknife	3.240564036
Standard Bootstrap	2.636200144
Bootstrap-t	11.8850442
Chebyshev (Mean, Std)	5.36807991

99 % Non-parametric UCL

Chebyshev (Mean, Std)	10.7091692

Summary Statistics for	ln(Benzo(a)Pyrene)
Minimum	-5.298317367
Maximum	1.609437912
Mean	-1.854975779
Standard Deviation	2.830910206
Variance	8.014052596
Shapiro-Wilk Test Statisitic	0.922169454
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	8.602479875
MLE Standard Deviation	472.912981
MLE Coefficient of Variation	54.97402934
MLE Skewness	166304.3496
MLE Median	0.156456732
MLE 80% Quantile	1.711111819
MLE 90% Quantile	5.946149317
MLE 95% Quantile	16.47545192
MLE 99% Quantile	113.2639982
MVU Estimate of Median	0.060432554
MVU Estimate of Mean	1.595008594
MVU Estimate of Std. Dev.	3.742550173
MVU Estimate of SE of Mean	1.399867068

UCL Assuming Lognormal Distribution

95% H-UCL	1104110717
95% Chebyshev (MVUE) UCI	7.696887679
99% Chebyshev (MVUE) UCI	15.52351006

Recommended UCL to use:
Greater of

99 % Chebyshev (MVUE) UCL
99 % Chebyshev (Mean, Std)

From File

Summary Statistics for	Dibenz(a,h) anthracene
Number of Samples	5
Minimum	0.0057
Maximum	5
Mean	1.2023
Median	0.5
Standard Deviation	2.137313716
Variance	4.56810992
Coefficient of Variation	1.777687529
Skewness	2.161684057

95 % UCL (Assuming Normal Data)

Student's-t	3.23999456

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	3.761859385
Modified-t	3.394001126

95 % Non-parametric UCL

CLT	2.774509904
Jackknife	3.23999456
Standard Bootstrap	2.615332709
Bootstrap-t	11.81657292
Chebyshev (Mean, Std)	5.368691448

Summary Statistics for	ln(Dibenz(a,h) anthracei
Minimum	-5.167289104
Maximum	1.609437912
Mean	-2.018808583
Standard Deviation	3.016437281
Variance	9.098893867
Shapiro-Wilk Test Statisitic	0.855262459
Shapiro-Wilk 5% Critical Valu	0.762

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution

MLE Mean	12.56152224
MLE Standard Deviation	1188.00343
MLE Coefficient of Variation	94.57479812
MLE Skewness	846197.8337
MLE Median	0.132813607
MLE 80% Quantile	1.69906979
MLE 90% Quantile	6.406501427
MLE 95% Quantile	18.97705739
MLE 99% Quantile	148.0314175
MVU Estimate of Median	0.043538111
MVU Estimate of Mean	1.72546802
MVU Estimate of Std. Dev.	4.246734667
MVU Estimate of SE of Mean	1.54911324

UCL Assuming Lognormal Distribution

95% H-UCL	1.99E+10
95% Chebyshev (MVUE) UCl	8.477896085
99% Chebyshev (MVUE) UCl	17.13895014

Recommended UCL to use:

Needs further investigation.

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	C9-C18 Aliphatic	
Number of Samples		3
Minimum		30.5
Maximum		59
Mean		49.5
Median		59

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	C11-C22 Aromatic	
Number of Samples		3
Minimum		25
Maximum		85
Mean		45
Median		25

Too Few Observations To Calculate UCLs

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	C19-C36 Aliphatic
Number of Samples	3
Minimum	41
Maximum	150
Mean	78.66666667
Median	45

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	C5-C8 Aliphatic
Number of Samples	3
Minimum	20
Maximum	448
Mean	164.3333333
Median	25

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	Arsenic
Number of Samples	6
Minimum	0.1
Maximum	3.5
Mean	1.591666667
Median	1.25
Standard Deviation	1.147787727
Variance	1.317416667
Coefficient of Variation	0.721123179
Skewness	0.741224644

Shapiro-Wilk Test Statisitic	0.913568019
Shapiro-Wilk 5% Critical Valu	0.788
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t

95 % UCL (Assuming Normal Data)

Student's-t	2.535882758

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	2.513925843
Modified-t	2.559515218

95 % Non-parametric UCL

CLT	2.36241609
Jackknife	2.535882758
Standard Bootstrap	2.318696652
Bootstrap-t	2.992922317
Chebyshev (Mean, Std)	3.634169897

From File

Summary Statistics for	Chromium
Number of Samples	6
Minimum	0.8
Maximum	23
Mean	6.875
Median	4.3
Standard Deviation	8.279719198
Variance	68.55375
Coefficient of Variation	1.204322792
Skewness	1.983403689

95 % UCL (Assuming Normal Data)	
Student's-t	13.68622817

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	15.35943203
Modified-t	14.14239555

95 % Non-parametric UCL	
CLT	12.43490332
Jackknife	13.68622817
Standard Bootstrap	12.01294291
Bootstrap-t	22.89773089
Chebyshev (Mean, Std)	21.6088683

Summary Statistics for	ln(Chromium)
Minimum	-0.223143551
Maximum	3.135494216
Mean	1.353590737
Standard Deviation	1.201506403
Variance	1.443617636
Shapiro-Wilk Test Statisitic	0.985767258
Shapiro-Wilk 5% Critical Valu	0.788

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	7.967729372
MLE Standard Deviation	14.33304029
MLE Coefficient of Variation	1.798886436
MLE Skewness	11.21784216
MLE Median	3.871301431
MLE 80% Quantile	10.68524318
MLE 90% Quantile	18.12924654
MLE 95% Quantile	27.94026309
MLE 99% Quantile	63.32591405
MVU Estimate of Median	3.425148151
MVU Estimate of Mean	6.759873695
MVU Estimate of Std. Dev.	8.065874486
MVU Estimate of SE of Mean	3.215562474

UCL Assuming Lognormal Distribution	
95% H-UCL	119.0886408
95% Chebyshev (MVUE) UCl	20.77618556
99% Chebyshev (MVUE) UCl	38.75431634

Recommended UCL to use:

95 % Chebyshev (MVUE) UCL

From File

Summary Statistics for	Lead
Number of Samples	6
Minimum	0.4435
Maximum	2.1
Mean	1.15725
Median	1.025
Standard Deviation	0.585888535
Variance	0.343265375
Coefficient of Variation	0.506276548
Skewness	0.722195771

Shapiro-Wilk Test Statisitic	0.954775936
Shapiro-Wilk 5% Critical Valu	0.788
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t

95 % UCL (Assuming Normal Data)

Student's-t	1.639225342

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	1.626031987
Modified-t	1.650978848

95 % Non-parametric UCL

CLT	1.550679237
Jackknife	1.639225342
Standard Bootstrap	1.522846736
Bootstrap-t	1.956808396
Chebyshev (Mean, Std)	2.199846289

From File

Summary Statistics for	Manganese
Number of Samples	6
Minimum	29.8
Maximum	2635
Mean	886.2666667
Median	633.5
Standard Deviation	977.4677543
Variance	955443.2107
Coefficient of Variation	1.102904793
Skewness	1.353872837

Shapiro-Wilk Test Statisitic	0.870992476
Shapiro-Wilk 5% Critical Valu	0.788
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t

95 % UCL (Assuming Normal Data)

Student's-t	1690.370736

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	1778.317559
Modified-t	1727.130932

95 % Non-parametric UCL

CLT	1542.64475
Jackknife	1690.370736
Standard Bootstrap	1470.89076
Bootstrap-t	2552.249109
Chebyshev (Mean, Std)	2625.683284

C.8-4.2 Shallow Groundwater Future Whitney Runs

From File

Summary Statistics for	TEQ (no 170/193/180) I
Number of Samples	3
Minimum	9.06E-09
Maximum	1.40E-06
Mean	8.92E-07
Median	1.26E-06

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	4,4'-DDD	
Number of Samples		2
Minimum		0.005
Maximum		0.558
Mean		0.2815
Median		0.2815

Too Few Observations To Calculate UCLs

Chemical of Potential Concern	Max. Conc.	95% UCL (Distribution) (1)		Value	Statistic (2)	Rationale (3)	Description	Mean
Acetophenone	5.5	5.25853328	(NP)	5.2585333	95% UCL-NP	(d)	Bootstrap-t	5.157894737
1,1,2-Trichloroethane	100	32.65970593	(NP)	32.659706	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.02095238
1,1-Dichloroethane	220	72.35937033	(NP)	72.359370	95% UCL-NP	(d)	Bootstrap-t	35.4047619
1,1-Dichloroethene	100	28.99046635	(NP)	28.990466	95% UCL-NP	(d)	Chebyshev (Mean, Std)	9.099047619
1,2,4-Trichlorobenzene	100	32.79603936	(NP)	32.796039	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.23809524
1,3-Dichlorobenzene	100	32.67380441	(NP)	32.673804	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.04761905
1,4-Dichlorobenzene	100	32.65080765	(NP)	32.650808	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.00404762
Benzene	16	6.539774061	(NP)	6.539774	95% UCL-NP	(d)	Chebyshev (Mean, Std)	3.21047619
Bromomethane	100	32.42119839	(NP)	32.421198	95% UCL-NP	(d)	Chebyshev (Mean, Std)	10.66190476
Chlorobenzene	100	32.67380441	(NP)	32.673804	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.04761905
Chlorodibromomethane	100	32.65667032	(NP)	32.656670	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.0152381
Chloroethane	100	30.46827108	(NP)	30.468271	95% UCL-NP	(d)	Bootstrap-t	13.47619048
1,1,1-Trichloroethane	150	52.70268369	(NP)	52.7027	95% UCL-NP	(d)	Chebyshev (Mean, Std)	18.91190476
Chloromethane	100	32.67380441	(NP)	32.6738	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.04761905
Acetone	70	24.23755129	(NP)	24.2376	95% UCL-NP	(d)	Chebyshev (Mean, Std)	9.595238095
Methyl cyclohexane	100	32.58229294	(NP)	32.5823	95% UCL-NP	(d)	Chebyshev (Mean, Std)	10.89047619
1,2-Dichlorobenzene	100	32.54706953	(NP)	32.5471	95% UCL-NP	(d)	Chebyshev (Mean, Std)	10.85238095
Dibenzofuran	5.5	5.25853328	(NP)	5.2585	95% UCL-NP	(d)	Bootstrap-t	5.157894737
cis-1,2-Dichloroethene	1900	743.346385	(NP)	743.346385	95% UCL-NP	(d)	Chebyshev (Mean, Std)	218.6904762
Ethylbenzene	23	7.612246101	(NP)	7.612246	95% UCL-NP	(d)	Chebyshev (Mean, Std)	3.285714286
Methyl tert-butyl ether	7.5	5.417780831	(NP)	5.417781	95% UCL-NP	(d)	Jackknife	4.80952381
Methylene chloride	90	15.87534457	(T)	15.875345	95% UCL-NP	(c)	95% Chebyshev (MVUE) UCL	7.538095238
Tetrachloroethene	100	32.65236708	(NP)	32.652367	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11
Toluene	52	17.1493111	(NP)	17.149311	95% UCL-NP	(d)	Bootstrap-t	7.847619048
trans-1,2-Dichloroethene	28	12.76951256	(NP)	12.769513	95% UCL-NP	(d)	Bootstrap-t	6.969047619
Trichloroethene	100	33.10076274	(NP)	33.100763	95% UCL-NP	(d)	Chebyshev (Mean, Std)	12.11904762
Vinyl chloride	600	185.0176463	(NP)	185.017646	95% UCL-NP	(d)	Bootstrap-t	57.09714286
Xylenes (total)	110	31.71132611	(NP)	31.711326	95% UCL-NP	(d)	Chebyshev (Mean, Std)	9.761904762
4-Methylphenol	25	10.71376661	(NP)	10.713767	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.105263158
Naphthalene	25	9.092340115	(NP)	9.092340	95% UCL-NP	(d)	Bootstrap-t	5.325605263
2-Methylnaphthalene	11	5.889070081	(NP)	5.889070	95% UCL-NP	(d)	Jackknife	5.342105263
Acenaphthylene	5.5	5.071949038	(NP)	5.071949	95% UCL-NP	(d)	Jackknife	5.026315789
Phenanthrene	10	5.737229588	(NP)	5.737230	95% UCL-NP	(d)	Bootstrap-t	5.047368421
Benzo(a)Pyrene	5.5	5.224091124	(NP)	5.224091	95% UCL-NP	(d)	Jackknife	4.763421053
Dibenz(a,h) anthracene	5.5	5.224167499	(NP)	5.224167	95% UCL-NP	(d)	Jackknife	4.763315789
C9-C18 Aliphatic	3100	950.5761704	(NP)	950.576170	95% UCL-NP	(d)	Chebyshev (Mean, Std)	208.5277778
C11-C22 Aromatic	1200	418.6301708	(NP)	418.630171	95% UCL-NP	(d)	Chebyshev (Mean, Std)	149.1666667
C19-C36 Aliphatic	24000	7687.957871	(NP)	7687.957871	95% UCL-NP	(d)	Chebyshev (Mean, Std)	1806.472222
C5-C8 Aliphatic	258	115.4548995	(NP)	115.454900	95% UCL-NP	(d)	Bootstrap-t	63.31666667
C9-C10 Aromatic	200	71.76967066	(NP)	#REF!	95% UCL-NP	(d)	Chebyshev (Mean, Std)	21.72222222
C9-C12 Aliphatic	95.9	33.01090701	(NP)	0.000000	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.02222222
Arsenic	175	53.05006359	(NP)	53.050064	95% UCL-NP	(d)	Chebyshev (Mean, Std)	13.89105263
Chromium	113	38.59559591	(NP)	38.595596	95% UCL-NP	(d)	Chebyshev (Mean, Std)	12.44210526
Lead	148	51.75582489	(NP)	51.755825	95% UCL-NP	(d)	Chebyshev (Mean, Std)	15.80973684
Manganese	470	N/A	(<4)	470.000000	Max	(a)	Too Few Observations To Calculate UCLs	292.8333333
TEQ (no 170/193/180) Humans	1.20E-06	N/A	(<4)	0.000001	Max	(a)	Too Few Observations To Calculate UCLs	1.20E-06
Dieldrin		N/A	(<4)					
4,4'-DDD		N/A	(<4)					

(1) T - Transformed; N - Normal; NP - Non-parametric; <4 - sample size too small to calculate 95% UCL
(2) Statistics: Maximum Detected Value (Max); 95% UCL of Transformed Data (95% UCL - T); 95% of Normal Data (95% UCL - N); 95% of Non-parametric Data (95% UCL - NP).
(3) Rationale

(a) Due to small sample size (<4), the maximum detected concentration is used.
(b) Shapiro-Wilk W Test indicates data are normally distributed.
(c) Shapiro-Wilk W Test indicates data are log-normally distributed.
(d) Shapiro-Wilk W Test indicates data are neither normally nor log-normally distributed.
(e) Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	1,1,2-Trichloroethane
Number of Samples	21
Minimum	0.04
Maximum	100
Mean	11.02095238
Median	5
Standard Deviation	22.74914546
Variance	517.523619
Coefficient of Variation	2.064172376
Skewness	3.55180538

Shapiro-Wilk Test Statisitic	0.386390716
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	19.58291939

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	23.29771479
Modified-t	20.22419349

95 % Non-parametric UCL

CLT	19.18645077
Jackknife	19.58291939
Standard Bootstrap	19.13063665
Bootstrap-t	104.1805235
Chebyshev (Mean, Std)	32.65970593

From File

Summary Statistics for	1,1-Dichloroethane
Number of Samples	21
Minimum	0.5
Maximum	220
Mean	35.4047619
Median	5
Standard Deviation	58.62329295
Variance	3436.690476
Coefficient of Variation	1.655802491
Skewness	2.077729408

Shapiro-Wilk Test Statisitic	0.634297906
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	57.46847859

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	62.64435476
Modified-t	58.43517176

95 % Non-parametric UCL

CLT	56.44680082
Jackknife	57.46847859
Standard Bootstrap	55.79149038
Bootstrap-t	72.35937033
Chebyshev (Mean, Std)	91.16663617

From File

Summary Statistics for	1,1-Dichloroethene
Number of Samples	21
Minimum	0.04
Maximum	100
Mean	9.099047619
Median	5
Standard Deviation	20.91214621
Variance	437.317859
Coefficient of Variation	2.298278576
Skewness	4.521037273

Shapiro-Wilk Test Statisitic	0.286274644
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	16.96963363

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	21.41576407
Modified-t	17.71998753

95 % Non-parametric UCL

CLT	16.60517994
Jackknife	16.96963363
Standard Bootstrap	16.38431521
Bootstrap-t	77.58276788
Chebyshev (Mean, Std)	28.99046635

From File

Summary Statistics for	1,2,4-Trichlorobenzene
Number of Samples	21
Minimum	0.5
Maximum	100
Mean	11.23809524
Median	5
Standard Deviation	22.66418929
Variance	513.6654762
Coefficient of Variation	2.016728708
Skewness	3.564784805

Shapiro-Wilk Test Statisitic	0.373734259
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	19.76808778

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	23.48397811
Modified-t	20.40930172

95 % Non-parametric UCL

CLT	19.37309976
Jackknife	19.76808778
Standard Bootstrap	19.14138193
Bootstrap-t	122.8650977
Chebyshev (Mean, Std)	32.79603936

From File

Summary Statistics for	1,3-Dichlorobenzene
Number of Samples	21
Minimum	0.5
Maximum	100
Mean	11.04761905
Median	5
Standard Deviation	22.73593233
Variance	516.922619
Coefficient of Variation	2.057993875
Skewness	3.555020157

Shapiro-Wilk Test Statisitic	0.383843218
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	19.60461311

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	23.32096987
Modified-t	20.24609484

95 % Non-parametric UCL

CLT	19.20837476
Jackknife	19.60461311
Standard Bootstrap	18.92886702
Bootstrap-t	108.4296763
Chebyshev (Mean, Std)	32.67380441

From File

Summary Statistics for	1,4-Dichlorobenzene
Number of Samples	21
Minimum	0.04
Maximum	100
Mean	11.00404762
Median	5
Standard Deviation	22.75756279
Variance	517.906664
Coefficient of Variation	2.068108352
Skewness	3.549746425

Shapiro-Wilk Test Statisitic	0.387486813
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	19.56918261

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	23.28296836
Modified-t	20.21032211

95 % Non-parametric UCL

CLT	19.17256729
Jackknife	19.56918261
Standard Bootstrap	19.01187115
Bootstrap-t	109.7939372
Chebyshev (Mean, Std)	32.65080765

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	Benzene	
Number of Samples		21
Minimum		0.04
Maximum		16
Mean		3.21047619
Median		2.5
Standard Deviation		3.500140677
Variance		12.25098476
Coefficient of Variation		1.090224773
Skewness		2.997244212

Shapiro-Wilk Test Statisitic	0.544653668
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4.52780431

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.000592325
Modified-t	4.61106444

95 % Non-parametric UCL

CLT	4.466804394
Jackknife	4.52780431
Standard Bootstrap	4.409886583
Bootstrap-t	7.535389284
Chebyshev (Mean, Std)	6.539774061

From File

Summary Statistics for	Bromomethane
Number of Samples	21
Minimum	0.5
Maximum	100
Mean	10.66190476
Median	5
Standard Deviation	22.87587105
Variance	523.3054762
Coefficient of Variation	2.145570755
Skewness	3.538626323

Shapiro-Wilk Test Statisitic	0.398268977
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	19.27156676

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	22.99171575
Modified-t	19.91402041

95 % Non-parametric UCL

CLT	18.87288959
Jackknife	19.27156676
Standard Bootstrap	18.83124887
Bootstrap-t	93.30326495
Chebyshev (Mean, Std)	32.42119839

From File

Summary Statistics for	Chlorobenzene
Number of Samples	21
Minimum	0.5
Maximum	100
Mean	11.04761905
Median	5
Standard Deviation	22.73593233
Variance	516.922619
Coefficient of Variation	2.057993875
Skewness	3.555020157

Shapiro-Wilk Test Statisitic	0.383843218
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	19.60461311

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	23.32096987
Modified-t	20.24609484

95 % Non-parametric UCL

CLT	19.20837476
Jackknife	19.60461311
Standard Bootstrap	18.75839996
Bootstrap-t	108.4296763
Chebyshev (Mean, Std)	32.67380441

From File

Summary Statistics for	Chlorodibromomethane
Number of Samples	21
Minimum	0.04
Maximum	100
Mean	11.0152381
Median	5
Standard Deviation	22.75196159
Variance	517.6517562
Coefficient of Variation	2.065498847
Skewness	3.551126734

Shapiro-Wilk Test Statisitic	0.386762136
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	19.578265

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	23.29273461
Modified-t	20.21949594

95 % Non-parametric UCL

CLT	19.18174729
Jackknife	19.578265
Standard Bootstrap	18.81324365
Bootstrap-t	103.3515626
Chebyshev (Mean, Std)	32.65667032

From File

Summary Statistics for	Chloroethane	
Number of Samples		21
Minimum		0.5
Maximum		100
Mean		13.47619048
Median		5
Standard Deviation		24.14408633
Variance		582.9369048
Coefficient of Variation		1.791610646
Skewness		2.867669773
Shapiro-Wilk Test Statisitic		0.493692541
Shapiro-Wilk 5% Critical Valu		0.908
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		22.56316348
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		25.66528986
Modified-t		23.11266559
95 % Non-parametric UCL		
CLT		22.14238404
Jackknife		22.56316348
Standard Bootstrap		21.9266122
Bootstrap-t		30.46827108
Chebyshev (Mean, Std)		36.44179746

From File

Summary Statistics for	cis-1,2-Dichloroethene
Number of Samples	21
Minimum	1
Maximum	1900
Mean	218.6904762
Median	5
Standard Deviation	551.578609
Variance	304238.9619
Coefficient of Variation	2.522188522
Skewness	2.817749456

Shapiro-Wilk Test Statisitic	0.439621632
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	426.2849927

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	495.7529389
Modified-t	438.6199953

95 % Non-parametric UCL

CLT	416.6721652
Jackknife	426.2849927
Standard Bootstrap	417.1503612
Bootstrap-t	1223.48769
Chebyshev (Mean, Std)	743.346385

From File

Summary Statistics for	Ethylbenzene
Number of Samples	21
Minimum	0.5
Maximum	23
Mean	3.285714286
Median	2.5
Standard Deviation	4.548547649
Variance	20.68928571
Coefficient of Variation	1.384340589
Skewness	4.473664026

Shapiro-Wilk Test Statisitic	0.295267931
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4.997625398

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.953727955
Modified-t	5.159122811

95 % Non-parametric UCL

CLT	4.918354006
Jackknife	4.997625398
Standard Bootstrap	4.904327361
Bootstrap-t	15.19660794
Chebyshev (Mean, Std)	7.612246101

From File

Summary Statistics for	Methyl tert-butyl ether
Number of Samples	21
Minimum	0.5
Maximum	7.5
Mean	4.80952381
Median	5
Standard Deviation	1.616138844
Variance	2.611904762
Coefficient of Variation	0.336028869
Skewness	-1.584168378

Shapiro-Wilk Test Statisitic	0.574791558
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.417780831

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.259345996
Modified-t	5.397461497

95 % Non-parametric UCL

CLT	5.389615011
Jackknife	5.417780831
Standard Bootstrap	5.37239745
Bootstrap-t	5.264103813
Chebyshev (Mean, Std)	6.346778482

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	Methylene chloride
Number of Samples	21
Minimum	0.1
Maximum	90
Mean	7.538095238
Median	1.5
Standard Deviation	19.73989555
Variance	389.6634762
Coefficient of Variation	2.618684817
Skewness	4.053246651

95 % UCL (Assuming Normal Data)

Student's-t	14.9674879

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	18.69453808
Modified-t	15.60249319

95 % Non-parametric UCL

CLT	14.62346403
Jackknife	14.9674879
Standard Bootstrap	14.19958107
Bootstrap-t	65.09076642
Chebyshev (Mean, Std)	26.31448118

Summary Statistics for
Minimum
Maximum
Mean
Standard Deviation
Variance

Shapiro-Wilk Test Statisitic
Shapiro-Wilk 5% Critical Valu
Data are Lognormal at 5% Si

Estimates Assuming Lognorm
MLE Mean
MLE Standard Deviation
MLE Coefficient of Variation
MLE Skewness
MLE Median
MLE 80% Quantile
MLE 90% Quantile
MLE 95% Quantile
MLE 99% Quantile

MVU Estimate of Median
MVU Estimate of Mean
MVU Estimate of Std. Dev.
MVU Estimate of SE of Mean

UCL Assuming Lognormal
95% H-UCL
95% Chebyshev (MVUE) UCI
99% Chebyshev (MVUE) UCI
Recommended UCL to use:
95 % Chebyshev (

From File

ln(Methylene chloride)	Summary Statistics for	Tetrachloroethene
-2.302585093	Number of Samples	21
4.49980967	Minimum	0.5
0.600391044	Maximum	100
1.576826587	Mean	11
2.486382086	Median	5
	Standard Deviation	22.76345756
0.951041834	Variance	518.175
0.908	Coefficient of Variation	2.069405233
gnificance Level	Skewness	3.547367957
nal Distribution	Shapiro-Wilk Test Statisitic	0.397039817
6.319133451	Shapiro-Wilk 5% Critical Valu	0.908
20.97506712	Data not Normal at 5% Significance Level	
3.31929485	Data not Lognormal: Try Non-parametric UCL	
46.52894017		
1.822831468	95 % UCL (Assuming Normal Data)	
6.908893604	Student's-t	19.56735357
13.82686181		
24.39237978	95 % UCL (Adjusted for Skewness)	
71.38513721	Adjusted-CLT	23.27934644
	Modified-t	20.20822945
1.717777173		
5.628405816	95 % Non-parametric UCL	
12.76330611	CLT	19.17063552
2.350808974	Jackknife	19.56735357
	Standard Bootstrap	19.09294608
Distribution	Bootstrap-t	100.7655421
21.20977508	Chebyshev (Mean, Std)	32.65236708
15.87534457		
29.01865977		

(MVUE) UCL

From File

Summary Statistics for	Toluene	
Number of Samples		21
Minimum		0.3
Maximum		52
Mean		7.847619048
Median		5
Standard Deviation		11.35793199
Variance		129.002619
Coefficient of Variation		1.447309295
Skewness		3.307112301

Shapiro-Wilk Test Statisitic	0.530203902
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	12.12233957

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	13.83560931
Modified-t	12.42045034

95 % Non-parametric UCL

CLT	11.92439527
Jackknife	12.12233957
Standard Bootstrap	11.87898409
Bootstrap-t	17.1493111
Chebyshev (Mean, Std)	18.65116732

From File

Summary Statistics for	trans-1,2-Dichloroethen
Number of Samples	21
Minimum	0.5
Maximum	28
Mean	6.969047619
Median	5
Standard Deviation	7.106519475
Variance	50.50261905
Coefficient of Variation	1.019726061
Skewness	2.234954348

Shapiro-Wilk Test Statisitic	0.64179693
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.643688097

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	10.32797699
Modified-t	9.769741642

95 % Non-parametric UCL

CLT	9.519836764
Jackknife	9.643688097
Standard Bootstrap	9.425818012
Bootstrap-t	12.76951256
Chebyshev (Mean, Std)	13.72869597

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	Trichloroethene
Number of Samples	21
Minimum	2
Maximum	100
Mean	12.11904762
Median	5
Standard Deviation	22.05839113
Variance	486.572619
Coefficient of Variation	1.820142293
Skewness	3.587253595

Shapiro-Wilk Test Statisitic	0.46410592
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	20.42103933

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	24.06282471
Modified-t	21.04904761

95 % Non-parametric UCL

CLT	20.03660907
Jackknife	20.42103933
Standard Bootstrap	19.56860281
Bootstrap-t	44.50332809
Chebyshev (Mean, Std)	33.10076274

From File

Summary Statistics for	Vinyl chloride
Number of Samples	21
Minimum	0.04
Maximum	600
Mean	57.09714286
Median	5
Standard Deviation	137.7884689
Variance	18985.66217
Coefficient of Variation	2.413228789
Skewness	3.4399735

Shapiro-Wilk Test Statisitic	0.450088447
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	108.9558084

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	130.6717745
Modified-t	112.7176233

95 % Non-parametric UCL

CLT	106.554452
Jackknife	108.9558084
Standard Bootstrap	106.115663
Bootstrap-t	185.0176463
Chebyshev (Mean, Std)	188.1601196

From File

Summary Statistics for	Xylenes (total)
Number of Samples	21
Minimum	1
Maximum	110
Mean	9.761904762
Median	5
Standard Deviation	23.07575516
Variance	532.4904762
Coefficient of Variation	2.363857846
Skewness	4.512237423

Shapiro-Wilk Test Statisitic	0.298124876
Shapiro-Wilk 5% Critical Valu	0.908

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	18.44679601

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	23.34259907
Modified-t	19.2731713

95 % Non-parametric UCL

CLT	18.04463529
Jackknife	18.44679601
Standard Bootstrap	17.80494616
Bootstrap-t	78.41177119
Chebyshev (Mean, Std)	31.71132611

From File

Summary Statistics for	4-Methylphenol
Number of Samples	19
Minimum	3
Maximum	25
Mean	6.105263158
Median	5
Standard Deviation	4.608503455
Variance	21.23830409
Coefficient of Variation	0.754841083
Skewness	4.250060653

Shapiro-Wilk Test Statisitic	0.325928864
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	7.93862462

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	8.945799669
Modified-t	8.110435315

95 % Non-parametric UCL

CLT	7.844306372
Jackknife	7.93862462
Standard Bootstrap	7.823911119
Bootstrap-t	24.38940446
Chebyshev (Mean, Std)	10.71376661

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	Naphthalene
Number of Samples	19
Minimum	0.0865
Maximum	25
Mean	5.325605263
Median	5
Standard Deviation	5.064792007
Variance	25.65211807
Coefficient of Variation	0.951026551
Skewness	3.466471517

Shapiro-Wilk Test Statisitic	0.459098826
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	7.340488092

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	8.224192598
Modified-t	7.494496489

95 % Non-parametric UCL

CLT	7.236831381
Jackknife	7.340488092
Standard Bootstrap	7.205290486
Bootstrap-t	9.092340115
Chebyshev (Mean, Std)	10.39039727

From File

Summary Statistics for	2-Methylnaphthalene
Number of Samples	19
Minimum	5
Maximum	11
Mean	5.342105263
Median	5
Standard Deviation	1.374900315
Variance	1.890350877
Coefficient of Variation	0.257370502
Skewness	4.310795544

Shapiro-Wilk Test Statisitic	0.272746336
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.889070081

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	6.194246641
Modified-t	5.941060556

95 % Non-parametric UCL

CLT	5.860931187
Jackknife	5.889070081
Standard Bootstrap	5.869829448
Bootstrap-t	1.#INF
Chebyshev (Mean, Std)	6.717005579

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	Acenaphthylene	
Number of Samples		19
Minimum		5
Maximum		5.5
Mean		5.026315789
Median		5
Standard Deviation		0.114707867
Variance		0.013157895
Coefficient of Variation		0.02282146
Skewness		4.358898944
Shapiro-Wilk Test Statisitic		0.244011342
Shapiro-Wilk 5% Critical Valu		0.901
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		5.071949038
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		5.097720214
Modified-t		5.076335003
95 % Non-parametric UCL		
CLT		5.069601411
Jackknife		5.071949038
Standard Bootstrap		5.068728632
Bootstrap-t	1.#INF	
Chebyshev (Mean, Std)		5.141023656

From File

Summary Statistics for	Phenanthrene
Number of Samples	19
Minimum	0.4
Maximum	10
Mean	5.047368421
Median	5
Standard Deviation	1.604981281
Variance	2.575964912
Coefficient of Variation	0.317983778
Skewness	0.318358013

Shapiro-Wilk Test Statisitic	0.492208313
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.685864379

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.681751708
Modified-t	5.690346472

95 % Non-parametric UCL

CLT	5.653016617
Jackknife	5.685864379
Standard Bootstrap	5.641693735
Bootstrap-t	5.737229588
Chebyshev (Mean, Std)	6.652349702

From File

Summary Statistics for	Benzo(a)Pyrene
Number of Samples	19
Minimum	0.005
Maximum	5.5
Mean	4.763421053
Median	5
Standard Deviation	1.157982024
Variance	1.340922368
Coefficient of Variation	0.243098817
Skewness	-4.283411582

Shapiro-Wilk Test Statisitic	0.289193263
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.224091124

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.921446801
Modified-t	5.180581356

95 % Non-parametric UCL

CLT	5.200391709
Jackknife	5.224091124
Standard Bootstrap	5.197902465
Bootstrap-t	5.086170932
Chebyshev (Mean, Std)	5.921403077

From File

Summary Statistics for	Dibenz(a,h) anthracene
Number of Samples	19
Minimum	0.003
Maximum	5.5
Mean	4.763315789
Median	5
Standard Deviation	1.158438607
Variance	1.341980006
Coefficient of Variation	0.243200043
Skewness	-4.283472575

Shapiro-Wilk Test Statisitic	0.289175731
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.224167499

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.921399873
Modified-t	5.180639956

95 % Non-parametric UCL

CLT	5.20045874
Jackknife	5.224167499
Standard Bootstrap	5.18315864
Bootstrap-t	5.0861942
Chebyshev (Mean, Std)	5.921754396

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	C9-C18 Aliphatic
Number of Samples	18
Minimum	30
Maximum	3100
Mean	208.5277778
Median	30.5
Standard Deviation	722.2568688
Variance	521654.9845
Coefficient of Variation	3.463600276
Skewness	4.230268017

Shapiro-Wilk Test Statisitic	0.268967158
Shapiro-Wilk 5% Critical Valu	0.897

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	504.6741688

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	669.9145171
Modified-t	532.9643552

95 % Non-parametric UCL

CLT	488.5436732
Jackknife	504.6741688
Standard Bootstrap	481.7068277
Bootstrap-t	116974.9651
Chebyshev (Mean, Std)	950.5761704

From File

Summary Statistics for	C11-C22 Aromatic
Number of Samples	18
Minimum	85
Maximum	1200
Mean	149.1666667
Median	85
Standard Deviation	262.2765155
Variance	68788.97059
Coefficient of Variation	1.758278316
Skewness	4.241383309

Shapiro-Wilk Test Statisitic	0.261902955
Shapiro-Wilk 5% Critical Valu	0.897

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	256.707691

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	316.8852483
Modified-t	267.0078321

95 % Non-parametric UCL

CLT	250.8501487
Jackknife	256.707691
Standard Bootstrap	250.2205478
Bootstrap-t	5881.023912
Chebyshev (Mean, Std)	418.6301708

From File

Summary Statistics for	C19-C36 Aliphatic
Number of Samples	18
Minimum	40
Maximum	24000
Mean	1806.472222
Median	40.75
Standard Deviation	5724.617761
Variance	32771248.51
Coefficient of Variation	3.168948679
Skewness	3.8554476

Shapiro-Wilk Test Statisitic	0.357796634
Shapiro-Wilk 5% Critical Valu	0.897

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4153.732544

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5336.056713
Modified-t	4358.09332

95 % Non-parametric UCL

CLT	4025.882016
Jackknife	4153.732544
Standard Bootstrap	3926.655154
Bootstrap-t	27774.08968
Chebyshev (Mean, Std)	7687.957871

From File

Summary Statistics for	C5-C8 Aliphatic
Number of Samples	18
Minimum	20
Maximum	258
Mean	63.31666667
Median	20
Standard Deviation	82.5444212
Variance	6813.581471
Coefficient of Variation	1.303676039
Skewness	1.74715484

Shapiro-Wilk Test Statisitic	0.584813166
Shapiro-Wilk 5% Critical Valu	0.897

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	97.16228794

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	103.8798353
Modified-t	98.49763872

95 % Non-parametric UCL

CLT	95.31878532
Jackknife	97.16228794
Standard Bootstrap	95.38465102
Bootstrap-t	115.4548995
Chebyshev (Mean, Std)	148.1229976

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	Arsenic	
Number of Samples		19
Minimum		0.68
Maximum		175
Mean		13.69105263
Median		2.3
Standard Deviation		39.35901095
Variance		1549.131743
Coefficient of Variation		2.874798017
Skewness		4.253992951

Shapiro-Wilk Test Statisitic	0.325356953
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	29.34891089

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	37.95941242
Modified-t	30.81762102

95 % Non-parametric UCL

CLT	28.5433841
Jackknife	29.34891089
Standard Bootstrap	28.61370424
Bootstrap-t	150.0627015
Chebyshev (Mean, Std)	53.05006359

From File

Summary Statistics for	Chromium
Number of Samples	19
Minimum	0.45
Maximum	113
Mean	12.44210526
Median	1.7
Standard Deviation	26.15349065
Variance	684.0050731
Coefficient of Variation	2.1020149
Skewness	3.490338259

Shapiro-Wilk Test Statisitic	0.502342234
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	22.84652447

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	27.44488687
Modified-t	23.64726595

95 % Non-parametric UCL

CLT	22.31126363
Jackknife	22.84652447
Standard Bootstrap	22.11130445
Bootstrap-t	40.68393208
Chebyshev (Mean, Std)	38.59559591

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	Lead	
Number of Samples		19
Minimum		1
Maximum		148
Mean		15.80973684
Median		1.15
Standard Deviation		35.94608805
Variance		1292.121246
Coefficient of Variation		2.273667703
Skewness		3.19619151

Shapiro-Wilk Test Statisitic	0.485855491
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	30.1098612

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	35.83535484
Modified-t	31.11767332

95 % Non-parametric UCL

CLT	29.37418376
Jackknife	30.1098612
Standard Bootstrap	28.88897043
Bootstrap-t	57.08492323
Chebyshev (Mean, Std)	51.75582489

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	Manganese
Number of Samples	3
Minimum	201
Maximum	470
Mean	292.8333333
Median	207.5

Too Few Observations To Calculate UCLs

C.8-4.3 Shallow Groundwater Future Murphy Runs

From File

Summary Statistics for	TEQ (no 170/193/180) I
Number of Samples	1
Minimum	1.20E-06
Maximum	1.20E-06
Mean	1.20E-06
Median	1.20E-06

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	Acetophenone
Number of Samples	19
Minimum	5
Maximum	5.5
Mean	5.157894737
Median	5
Standard Deviation	0.238783467
Variance	0.057017544
Coefficient of Variation	0.046294754
Skewness	0.862213603

Shapiro-Wilk Test Statisitic	0.59067391
Shapiro-Wilk 5% Critical Valu	0.901

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)	
Student's-t	5.252887918
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	5.259579274
Modified-t	5.254693904
95 % Non-parametric UCL	
CLT	5.248000944
Jackknife	5.252887918
Standard Bootstrap	5.24589357
Bootstrap-t	5.25853328
Chebyshev (Mean, Std)	5.396678203

Chemical of Potential Concern	Max. Conc.	95% UCL (Distribution) (1)		Value	Statistic (2)	Rationale (3)	Description	Mean
Chlorodibromomethane	100	15.1819528	(NP)	15.181953	95% UCL-NP	(d)	Chebyshev (Mean, Std)	5.7331
4-Methylphenol	25	8.326832829	(NP)	8.326833	95% UCL-NP	(d)	Chebyshev (Mean, Std)	5.63030303
Benzo(a)Pyrene	5.5	4.448374022	(NP)	4.448374	95% UCL-NP	(d)	Jackknife	3.865972973
Dibenz(a,h) anthracene	5.5	4.448264737	(NP)	4.448265	95% UCL-NP	(d)	Jackknife	3.865743243
Cyanide	16	5.037847536	(NP)	5.037848	95% UCL-NP	(d)	Chebyshev (Mean, Std)	2.511111111
Arsenic	175	22.72477116	(NP)	22.724771	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.856041667
Chromium	133	25.89784847	(NP)	25.897848	95% UCL-NP	(d)	Chebyshev (Mean, Std)	10.21875
Lead	148	21.27756978	(NP)	21.277570	95% UCL-NP	(d)	Bootstrap-t	8.513
Manganese	2635	804.5390838	(NP)	804.539084	95% UCL-NP	(d)	Bootstrap-t	459.5333333
Nickel	93.1	10.19531675	(T)	10.195317	95% UCL-T	(c)	95% H-UCL	7.073333333
TEQ (no 170/193/180) Humans	2.90E-06	2.34E-06	(N)	0.000002	95% UCL-N	(b)	Student's-t	1.35E-06
Dieldrin	0.014	N/A	(<4)	0.014000	Max	(a)	Too Few Observations To Calculate UCLs	0.014
4,4'-DDD	0.558	N/A	(<4)	0.558000	Max	(a)	Too Few Observations To Calculate UCLs	0.189333333
1,1,1-Trichloroethane	150	22.61151279	(NP)	22.611513	95% UCL-NP	(d)	Bootstrap-t	9.392
1,1,2-Trichloro-1,2,2-Trifluoroethane	15	4.572856842	(NP)	4.572857	95% UCL-NP	(d)	Bootstrap-t	3.83
1,1,2-Trichloroethane	100	15.11214425	(NP)	15.112144	95% UCL-NP	(d)	Chebyshev (Mean, Std)	5.6446
1,1-Dichloroethane	220	35.10640611	(NP)	35.106406	95% UCL-NP	(d)	Bootstrap-t	19.55
1,1-Dichloroethene	100	13.37059784	(NP)	13.370598	95% UCL-NP	(d)	Chebyshev (Mean, Std)	4.75028
1,2,4-Trichlorobenzene	100	16.10871289	(NP)	16.108713	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.63
1,2-Dichlorobenzene	100	15.62577708	(NP)	15.625777	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.238
1,3-Dichlorobenzene	100	15.66216159	(NP)	15.662162	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.173
1,4-Dichlorobenzene	197	28.82006416	(NP)	28.820064	95% UCL-NP	(d)	Chebyshev (Mean, Std)	9.66748
Acetone	70	12.45699253	(NP)	12.456993	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.09
Benzene	86	11.53166457	(NP)	11.531665	95% UCL-NP	(d)	Chebyshev (Mean, Std)	3.9442
Bromomethane	100	15.01189398	(NP)	15.011894	95% UCL-NP	(d)	Chebyshev (Mean, Std)	5.551
Carbon disulfide	100	15.19804284	(NP)	15.198043	95% UCL-NP	(d)	Chebyshev (Mean, Std)	5.763
Chlorobenzene	100	15.88308063	(NP)	15.883081	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.45
Chloroethane	100	14.57629203	(NP)	14.576292	95% UCL-NP	(d)	Bootstrap-t	6.88
Chloroform	100	15.10904263	(NP)	15.109043	95% UCL-NP	(d)	Chebyshev (Mean, Std)	5.64064
cis-1,2-Dichloroethene	1900	340.0543604	(NP)	340.054360	95% UCL-NP	(d)	Chebyshev (Mean, Std)	110.13
Dichlorodifluoromethane	100	15.59976237	(NP)	15.599762	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.23
Ethylbenzene	40	6.861084031	(NP)	6.861084	95% UCL-NP	(d)	Chebyshev (Mean, Std)	3.02
Isopropylbenzene	100	15.46203115	(NP)	15.462031	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.076
Methyl tert-butyl ether	540	63.41907676	(NP)	63.419077	95% UCL-NP	(d)	Chebyshev (Mean, Std)	16.46
Methylene chloride	90	11.92678897	(NP)	11.926789	95% UCL-NP	(d)	Chebyshev (Mean, Std)	3.886
Tetrachloroethene	100	16.41852902	(NP)	16.418529	95% UCL-NP	(d)	Bootstrap-t	7.35036
Toluene	1200	133.1054314	(NP)	133.105431	95% UCL-NP	(d)	Chebyshev (Mean, Std)	28.796
trans-1,2-Dichloroethene	28	6.915488636	(NP)	6.915489	95% UCL-NP	(d)	Bootstrap-t	4.797
Trichloroethene	160	28.23986188	(NP)	28.239862	95% UCL-NP	(d)	Chebyshev (Mean, Std)	11.832
Vinyl chloride	600	100.1769279	(NP)	100.176928	95% UCL-NP	(d)	Chebyshev (Mean, Std)	33.79086
Xylenes (total)	110	16.71443016	(NP)	16.714430	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.81
Acetophenone	5.5	5.283433193	(NP)	5.283433	95% UCL-NP	(d)	Jackknife	5.066666667
Naphthalene	25	6.614881785	(NP)	6.614882	95% UCL-NP	(d)	Bootstrap-t	4.639243243
2-Methylnaphthalene	11	5.253835057	(NP)	5.253835	95% UCL-NP	(d)	Jackknife	4.821621622
1,1'-Biphenyl	7	5.376305628	(NP)	5.376306	95% UCL-NP	(d)	Jackknife	5.106060606
Acenaphthylene	5.5	4.984130753	(NP)	4.984131	95% UCL-NP	(d)	Jackknife	4.627027027
Acenaphthene	5.5	4.965407057	(NP)	4.965407	95% UCL-NP	(d)	Jackknife	4.675675676
Fluorene	5.5	5.012240843	(NP)	5.012241	95% UCL-NP	(d)	Jackknife	4.72972973
Phenanthrene	10	5.154317963	(NP)	5.154318	95% UCL-NP	(d)	Jackknife	4.740540541
C9-C18 Aliphatic	3100	549.8895537	(NP)	549.889554	95% UCL-NP	(d)	Chebyshev (Mean, Std)	132.1875
C11-C22 Aromatic	1200	272.3029139	(NP)	272.302914	95% UCL-NP	(d)	Chebyshev (Mean, Std)	118.125
C5-C8 Aliphatic	448	109.6613443	(NP)	109.661344	95% UCL-NP	(d)	Bootstrap-t	60.834375
C9-C10 Aromatic	200	46.01905979	(NP)	46.019060	95% UCL-NP	(d)	Bootstrap-t	19.25
C19-C36 Aliphatic	24000	4373.975342	(NP)	4373.97534	Max	(d & e)	Chebyshev (Mean, Std)	1036.65625
2-Butanone (MEK)	100	17.82317009	(NP)	17.8231701	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.432432432
Cyclohexane	100	17.5400733	(NP)	17.5400733	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.054054054
Methylene chloride	90	14.4681888	(NP)	14.4681888	95% UCL-NP	(d)	Chebyshev (Mean, Std)	3.981081081
Phenol	5.5	5.249203768	(NP)	5.24920377	95% UCL-NP	(d)	Jackknife	4.957575758
2-Methylphenol	5.5	5.191589752	(NP)	5.19158975	95% UCL-NP	(d)	Jackknife	4.860606061
2,4-Dimethylphenol	8	5.439187157	(NP)	5.43918716	95% UCL-NP	(d)	Jackknife	5.166666667
2,4-Dichlorophenol	5.5	5.262927438	(NP)	5.26292744	95% UCL-NP	(d)	Jackknife	5.103030303
2,4,5-Trichlorophenol	14	12.57738748	(NP)	12.5773875	95% UCL-NP	(d)	Jackknife	11.64545455
Diethyl phthalate	5.5	4.759070006	(NP)	4.75907001	95% UCL-NP	(d)	Jackknife	4.257575758
Anthracene	5.5	4.947420508	(NP)	4.94742051	95% UCL-NP	(d)	Jackknife	4.640540541
Pyrene	18	6.391780069	(NP)	6.39178007	95% UCL-NP	(d)	Bootstrap-t	5.135135135
Benzo(a)Anthracene	5.5	4.448839299	(NP)	4.4488393	95% UCL-NP	(d)	Jackknife	3.866945946
Chrysene	5.5	4.479047859	(NP)	4.47904786	95% UCL-NP	(d)	Jackknife	3.920459459
Bis(2-ethylhexyl) phthalate	5.5	5.803806359	(NP)	5.5	Max	(d & e)	Chebyshev (Mean, Std)	4.646969697
Benzo(b)Fluoranthene	5.5	4.448377874	(NP)	4.44837787	95% UCL-NP	(d)	Jackknife	3.865981081
Benzo(k)Fluoranthene	5.5	4.448396525	(NP)	4.44839653	95% UCL-NP	(d)	Jackknife	3.86602027
Indeno(1,2,3-cd)pyrene	5.5	4.448317436	(NP)	4.44831744	95% UCL-NP	(d)	Jackknife	3.865854054
Methyl cyclohexane	100	15.4367645	(NP)	15.4367645	95% UCL-NP	(d)	Chebyshev (Mean, Std)	6.034
C9-C12 Aliphatic	95.9	24.75467947	(NP)	24.754679	95% UCL-NP	(d)	Bootstrap-t	11.66875

(1) T - Transformed; N - Normal; NP - Non-parametric; <4 - sample size too small to calculate 95% UCL
(2) Statistics: Maximum Detected Value (Max); 95% UCL of Transformed Data (95% UCL - T); 95% of Normal Data (95% UCL - N); 95% of Non-parametric Data (95% UCL - NP).
(3) Rationale

(a) Due to small sample size (<4), the maximum detected concentration is used.
(b) Shapiro-Wilk W Test indicates data are normally distributed.
(c) Shapiro-Wilk W Test indicates data are log-normally distributed.
(d) Shapiro-Wilk W Test indicates data are neither normally nor log-normally distributed.
(e) Recommended UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

From File

Summary Statistics for	Chlorodibromomethane
Number of Samples	50
Minimum	0.04
Maximum	100
Mean	5.7331
Median	5
Standard Deviation	15.3280633
Variance	234.9495244
Coefficient of Variation	2.673608222
Skewness	5.435620715

Shapiro-Wilk Test Statisitic	0.319536681
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.367384603

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.07919464
Modified-t	9.645109731

95 % Non-parametric UCL

CLT	9.298674704
Jackknife	9.367384603
Standard Bootstrap	9.273350591
Bootstrap-t	24.92726276
Chebyshev (Mean, Std)	15.1819528

From File

Summary Statistics for	4-Methylphenol	
Number of Samples		33
Minimum		1.8
Maximum		25
Mean		5.63030303
Median		5
Standard Deviation		3.553737896
Variance		12.62905303
Coefficient of Variation		0.631180574
Skewness		5.328095994
Shapiro-Wilk Test Statisitic		0.305375817
Shapiro-Wilk 5% Critical Value		0.931
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
	95 % UCL (Assuming Normal Data)	
Student's-t		6.678187116
	95 % UCL (Adjusted for Skewness)	
Adjusted-CLT		7.26094239
Modified-t		6.773816695
	95 % Non-parametric UCL	
CLT		6.647852847
Jackknife		6.678187116
Standard Bootstrap		6.614070137
Bootstrap-t		10.15864801
Chebyshev (Mean, Std)		8.326832829

From File

Summary Statistics for	Benzo(a)Pyrene
Number of Samples	37
Minimum	0.005
Maximum	5.5
Mean	3.865972973
Median	5
Standard Deviation	2.098331222
Variance	4.402993916
Coefficient of Variation	0.542769242
Skewness	-1.24900135

Shapiro-Wilk Test Statisitic	0.572677353
Shapiro-Wilk 5% Critical Value	0.936

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4.448374022

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.357701468
Modified-t	4.436568533

95 % Non-parametric UCL

CLT	4.433387483
Jackknife	4.448374022
Standard Bootstrap	4.415110244
Bootstrap-t	4.34992628
Chebyshev (Mean, Std)	5.36963413

From File

Summary Statistics for	Dibenz(a,h) anthracene
Number of Samples	37
Minimum	0.003
Maximum	5.5
Mean	3.865743243
Median	5
Standard Deviation	2.098765171
Variance	4.404815241
Coefficient of Variation	0.542913753
Skewness	-1.249084626

Shapiro-Wilk Test Statisitic	0.572694944
Shapiro-Wilk 5% Critical Value	0.936

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4.448264737

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.357568384
Modified-t	4.436456019

95 % Non-parametric UCL

CLT	4.433275099
Jackknife	4.448264737
Standard Bootstrap	4.418927954
Bootstrap-t	4.350050905
Chebyshev (Mean, Std)	5.369715368

From File

Summary Statistics for	Cyanide	
Number of Samples		27
Minimum		1.5
Maximum		16
Mean		2.511111111
Median		1.5
Standard Deviation		3.012069737
Variance		9.072564103
Coefficient of Variation		1.199496798
Skewness		3.887997795
Shapiro-Wilk Test Statisitic		0.396829492
Shapiro-Wilk 5% Critical Value		0.923
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		3.499811794
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		3.928043617
Modified-t		3.572101427
95 % Non-parametric UCL		
CLT		3.464588498
Jackknife		3.499811794
Standard Bootstrap		3.466693254
Bootstrap-t		5.281081245
Chebyshev (Mean, Std)		5.037847536

From File

Summary Statistics for	Arsenic	
Number of Samples		48
Minimum		0.075
Maximum		175
Mean		6.856041667
Median		2.2
Standard Deviation		25.22237482
Variance		636.1681914
Coefficient of Variation		3.678853782
Skewness		6.581671007
Shapiro-Wilk Test Statisitic		0.239062204
Shapiro-Wilk 5% Critical Value		0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)	
Student's-t	12.96459342
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	16.53958975
Modified-t	13.54100096
95 % Non-parametric UCL	
CLT	12.84419088
Jackknife	12.96459342
Standard Bootstrap	12.77569957
Bootstrap-t	41.02978521
Chebyshev (Mean, Std)	22.72477116

From File

Summary Statistics for	Chromium	
Number of Samples		48
Minimum		0.45
Maximum		133
Mean		10.21875
Median		1.625
Standard Deviation		24.9209679
Variance		621.054641
Coefficient of Variation		2.438749152
Skewness		4.199166117

Shapiro-Wilk Test Statisitic	0.419307889
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	16.25430467

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	18.46486467
Modified-t	16.61766329

95 % Non-parametric UCL

CLT	16.13534094
Jackknife	16.25430467
Standard Bootstrap	16.02365908
Bootstrap-t	28.88328891
Chebyshev (Mean, Std)	25.89784847

From File

Summary Statistics for	Lead	
Number of Samples		48
Minimum		0.032
Maximum		148
Mean		8.513
Median		1.15
Standard Deviation		24.05812209
Variance		578.7932385
Coefficient of Variation		2.826045118
Skewness		4.687405938

Shapiro-Wilk Test Statisitic	0.384542604
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	14.33958393

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	16.73508444
Modified-t	14.73114707

95 % Non-parametric UCL

CLT	14.22473912
Jackknife	14.33958393
Standard Bootstrap	14.33794946
Bootstrap-t	21.27756978
Chebyshev (Mean, Std)	23.64923655

From File

Summary Statistics for	Manganese
Number of Samples	27
Minimum	2.3
Maximum	2635
Mean	459.5333333
Median	233
Standard Deviation	592.5530596
Variance	351119.1285
Coefficient of Variation	1.28946698
Skewness	2.554359272

Shapiro-Wilk Test Statisitic	0.680581869
Shapiro-Wilk 5% Critical Value	0.923

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	654.0366702

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	707.0071942
Modified-t	663.3798393

95 % Non-parametric UCL

CLT	647.1073247
Jackknife	654.0366702
Standard Bootstrap	639.1648974
Bootstrap-t	804.5390838
Chebyshev (Mean, Std)	956.6086105

From File

Summary Statistics for	Nickel
Number of Samples	27
Minimum	0.465
Maximum	93.1
Mean	7.073333333
Median	2.6
Standard Deviation	17.59256033
Variance	309.4981788
Coefficient of Variation	2.48716687
Skewness	4.849290783

95 % UCL (Assuming Normal Data)	
Student's-t	12.8480258

95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	16.01846455
Modified-t	13.37463963

95 % Non-parametric UCL	
CLT	12.64229751
Jackknife	12.8480258
Standard Bootstrap	12.48475809
Bootstrap-t	40.45750818
Chebyshev (Mean, Std)	21.83121308

Summary Statistics for	ln(Nickel)
Minimum	-0.765717873
Maximum	4.533674184
Mean	1.069431018
Standard Deviation	1.1440755
Variance	1.308908749
Shapiro-Wilk Test Statisitic	0.92334327
Shapiro-Wilk 5% Critical Value	0.923

Data are Lognormal at 5% Significance Level

Estimates Assuming Lognormal Distribution	
MLE Mean	5.606268758
MLE Standard Deviation	9.215675157
MLE Coefficient of Variation	1.643816156
MLE Skewness	9.37325597
MLE Median	2.913721173
MLE 80% Quantile	7.661247392
MLE 90% Quantile	12.67419498
MLE 95% Quantile	19.13339457
MLE 99% Quantile	41.70206428
MVU Estimate of Median	2.843884611
MVU Estimate of Mean	5.398933473
MVU Estimate of Std. Dev.	7.768439102
MVU Estimate of SE of Mean	1.394993527

UCL Assuming Lognormal Distribution	
95% H-UCL	10.19531675
95% Chebyshev (MVUE) UCL	11.47956928
99% Chebyshev (MVUE) UCL	19.27894381

Recommended UCL to use:

H-UCL

From File

Summary Statistics for	TEQ (no 170/193/180) H
Number of Samples	5
Minimum	9.06E-09
Maximum	2.90E-06
Mean	1.35E-06
Median	1.26E-06
Standard Deviation	1.03E-06
Variance	1.06E-12
Coefficient of Variation	0.759262889
Skewness	0.476975355

Shapiro-Wilk Test Statisitic	0.916876902
Shapiro-Wilk 5% Critical Value	0.762
Data are Normal at 5% Significance Level	
Recommended UCL to use	Student's-t

95 % UCL (Assuming Normal Data)

Student's-t	2.34E-06

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	2.22E-06
Modified-t	2.35E-06

95 % Non-parametric UCL

CLT	2.11E-06
Jackknife	2.34E-06
Standard Bootstrap	2.01E-06
Bootstrap-t	2.47E-06
Chebyshev (Mean, Std)	3.36E-06

From File

Summary Statistics for	Dieldrin	
Number of Samples		1
Minimum		0.014
Maximum		0.014
Mean		0.014
Median		0.014

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	4,4'-DDD	
Number of Samples		3
Minimum		0.005
Maximum		0.558
Mean		0.189333333
Median		0.005

Too Few Observations To Calculate UCLs

From File

Summary Statistics for	1,1,1-Trichloroethane
Number of Samples	50
Minimum	0.15
Maximum	150
Mean	9.392
Median	5
Standard Deviation	24.1977216
Variance	585.5297306
Coefficient of Variation	2.576418399
Skewness	4.735693676

Shapiro-Wilk Test Statisitic	0.379297561
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	15.12928105

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	17.46969738
Modified-t	15.5112577

95 % Non-parametric UCL

CLT	15.02081183
Jackknife	15.12928105
Standard Bootstrap	14.7653945
Bootstrap-t	22.61151279
Chebyshev (Mean, Std)	24.30847739

From File

Summary Statistics for	1,1,2-Trichloro-1,2,2-triflu
Number of Samples	50
Minimum	0.5
Maximum	15
Mean	3.83
Median	5
Standard Deviation	2.920039838
Variance	8.526632653
Coefficient of Variation	0.76241249
Skewness	1.081321448

Shapiro-Wilk Test Statisitic	0.737641516
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4.522341597

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.576728891
Modified-t	4.532866603

95 % Non-parametric UCL

CLT	4.509252165
Jackknife	4.522341597
Standard Bootstrap	4.488515439
Bootstrap-t	4.572856842
Chebyshev (Mean, Std)	5.630033446

From File

Summary Statistics for	1,1,2-Trichloroethane
Number of Samples	50
Minimum	0.04
Maximum	100
Mean	5.6446
Median	5
Standard Deviation	15.35838483
Variance	235.8799845
Coefficient of Variation	2.720898705
Skewness	5.419382927

Shapiro-Wilk Test Statisitic	0.320426449
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.28607384

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	10.99594067
Modified-t	9.563517068

95 % Non-parametric UCL

CLT	9.217228021
Jackknife	9.28607384
Standard Bootstrap	9.201303716
Bootstrap-t	23.70706562
Chebyshev (Mean, Std)	15.11214425

From File

Summary Statistics for	1,1-Dichloroethane
Number of Samples	50
Minimum	0.5
Maximum	220
Mean	19.55
Median	5
Standard Deviation	43.51111165
Variance	1893.216837
Coefficient of Variation	2.225632309
Skewness	3.050240177

Shapiro-Wilk Test Statisitic	0.491730292
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	29.86648683

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	32.50769377
Modified-t	30.30888463

95 % Non-parametric UCL

CLT	29.67144301
Jackknife	29.86648683
Standard Bootstrap	29.50685602
Bootstrap-t	35.10640611
Chebyshev (Mean, Std)	46.37205059

From File

Summary Statistics for	1,1-Dichloroethene
Number of Samples	50
Minimum	0.04
Maximum	100
Mean	4.75028
Median	5
Standard Deviation	13.98400211
Variance	195.5523149
Coefficient of Variation	2.943826913
Skewness	6.700703311

Shapiro-Wilk Test Statisitic	0.26482829
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	8.065887625

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	10.0056554
Modified-t	8.37822979

95 % Non-parametric UCL

CLT	8.003202644
Jackknife	8.065887625
Standard Bootstrap	8.053594037
Bootstrap-t	17.65381196
Chebyshev (Mean, Std)	13.37059784

From File

Summary Statistics for	1,2,4-Trichlorobenzene
Number of Samples	50
Minimum	0.5
Maximum	100
Mean	6.63
Median	5
Standard Deviation	15.37650275
Variance	236.4368367
Coefficient of Variation	2.319231184
Skewness	5.238731711

Shapiro-Wilk Test Statisitic	0.340649808
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	10.2757696

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.92829147
Modified-t	10.54428084

95 % Non-parametric UCL

CLT	10.20684256
Jackknife	10.2757696
Standard Bootstrap	10.10868635
Bootstrap-t	19.53652838
Chebyshev (Mean, Std)	16.10871289

From File

Summary Statistics for	1,2-Dichlorobenzene
Number of Samples	50
Minimum	0.5
Maximum	100
Mean	6.238
Median	5
Standard Deviation	15.22898539
Variance	231.9219959
Coefficient of Variation	2.441325006
Skewness	5.445366066

Shapiro-Wilk Test Statisitic	0.31900501
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.848793226

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.55271002
Modified-t	10.12521789

95 % Non-parametric UCL

CLT	9.780527456
Jackknife	9.848793226
Standard Bootstrap	9.733519126
Bootstrap-t	25.99042967
Chebyshev (Mean, Std)	15.62577708

From File

Summary Statistics for	1,3-Dichlorobenzene
Number of Samples	50
Minimum	0.05
Maximum	100
Mean	6.173
Median	5
Standard Deviation	15.39345279
Variance	236.9583888
Coefficient of Variation	2.493674516
Skewness	5.293792841

Shapiro-Wilk Test Statisitic	0.342367101
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.822788455

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.49524501
Modified-t	10.09442096

95 % Non-parametric UCL

CLT	9.75378544
Jackknife	9.822788455
Standard Bootstrap	9.724853615
Bootstrap-t	22.01702389
Chebyshev (Mean, Std)	15.66216159

From File

Summary Statistics for	1,4-Dichlorobenzene
Number of Samples	50
Minimum	0.04
Maximum	197
Mean	9.66748
Median	5
Standard Deviation	31.06959421
Variance	965.3196843
Coefficient of Variation	3.213825548
Skewness	5.214428501

Shapiro-Wilk Test Statisitic	0.30439276
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	17.0340824

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	20.35701361
Modified-t	17.57411632

95 % Non-parametric UCL

CLT	16.89480918
Jackknife	17.0340824
Standard Bootstrap	17.0566448
Bootstrap-t	93.9623808
Chebyshev (Mean, Std)	28.82006416

From File

Summary Statistics for	Acetone	
Number of Samples		50
Minimum		2
Maximum		70
Mean		6.09
Median		5
Standard Deviation		10.32862577
Variance		106.6805102
Coefficient of Variation		1.695997663
Skewness		5.485181693

Shapiro-Wilk Test Statisitic	0.322231847
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)	
Student's-t	8.538917705
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	9.703339096
Modified-t	8.727765668
95 % Non-parametric UCL	
CLT	8.49261839
Jackknife	8.538917705
Standard Bootstrap	8.392586538
Bootstrap-t	19.42644462
Chebyshev (Mean, Std)	12.45699253

From File

Summary Statistics for	Benzene	
Number of Samples		50
Minimum		0.04
Maximum		86
Mean		3.9442
Median		2.5
Standard Deviation		12.30849285
Variance		151.4989963
Coefficient of Variation		3.120656369
Skewness		6.331501508
Shapiro-Wilk Test Statisitic		0.290042919
Shapiro-Wilk 5% Critical Value		0.947
Data not Normal at 5% Significance Level		
Data not Lognormal: Try Non-parametric UCL		
95 % UCL (Assuming Normal Data)		
Student's-t		6.862544294
95 % UCL (Adjusted for Skewness)		
Adjusted-CLT		8.472783184
Modified-t		7.122315098
95 % Non-parametric UCL		
CLT		6.807369985
Jackknife		6.862544294
Standard Bootstrap		6.734698157
Bootstrap-t		15.81225144
Chebyshev (Mean, Std)		11.53166457

From File

Summary Statistics for	Bromomethane
Number of Samples	50
Minimum	0.05
Maximum	100
Mean	5.551
Median	3
Standard Deviation	15.34759667
Variance	235.5487235
Coefficient of Variation	2.764834564
Skewness	5.451899606

Shapiro-Wilk Test Statisitic	0.313340845
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.189915966

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	10.90924664
Modified-t	9.468827821

95 % Non-parametric UCL

CLT	9.121118507
Jackknife	9.189915966
Standard Bootstrap	9.097808757
Bootstrap-t	25.71801116
Chebyshev (Mean, Std)	15.01189398

From File

Summary Statistics for	Carbon disulfide
Number of Samples	50
Minimum	0.05
Maximum	100
Mean	5.763
Median	5
Standard Deviation	15.30566058
Variance	234.2632459
Coefficient of Variation	2.655849485
Skewness	5.455367104

Shapiro-Wilk Test Statisitic	0.313967925
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.391972919

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.10773984
Modified-t	9.670299576

95 % Non-parametric UCL

CLT	9.323363443
Jackknife	9.391972919
Standard Bootstrap	9.341288831
Bootstrap-t	25.84551869
Chebyshev (Mean, Std)	15.19804284

From File

Summary Statistics for	Chlorobenzene
Number of Samples	50
Minimum	0.5
Maximum	100
Mean	6.45
Median	5
Standard Deviation	15.30247746
Variance	234.1658163
Coefficient of Variation	2.372477125
Skewness	5.333549278

Shapiro-Wilk Test Statisitic	0.333983386
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	10.0782182

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.75379162
Modified-t	10.35027326

95 % Non-parametric UCL

CLT	10.00962299
Jackknife	10.0782182
Standard Bootstrap	9.947688794
Bootstrap-t	22.91525867
Chebyshev (Mean, Std)	15.88308063

From File

Summary Statistics for	Chloroethane	
Number of Samples		50
Minimum		0.5
Maximum		100
Mean		6.88
Median		5
Standard Deviation		16.51392733
Variance		272.7097959
Coefficient of Variation		2.400280135
Skewness		4.542217133

Shapiro-Wilk Test Statisitic	0.376641701
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	10.79545303

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	12.32440944
Modified-t	11.04548584

95 % Non-parametric UCL

CLT	10.72142735
Jackknife	10.79545303
Standard Bootstrap	10.64355855
Bootstrap-t	14.57629203
Chebyshev (Mean, Std)	17.05986849

From File

Summary Statistics for	Chloroform	
Number of Samples		50
Minimum		0.04
Maximum		100
Mean		5.64064
Median		5
Standard Deviation		15.35977731
Variance		235.9227591
Coefficient of Variation		2.723055772
Skewness		5.41861718

Shapiro-Wilk Test Statisitic	0.32040806
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)	
Student's-t	9.282443998
95 % UCL (Adjusted for Skewness)	
Adjusted-CLT	10.99221451
Modified-t	9.559873175
95 % Non-parametric UCL	
CLT	9.213591937
Jackknife	9.282443998
Standard Bootstrap	9.184757647
Bootstrap-t	24.19384728
Chebyshev (Mean, Std)	15.10904263

From File

Summary Statistics for	cis-1,2-Dichloroethene
Number of Samples	50
Minimum	0.5
Maximum	1900
Mean	110.13
Median	5
Standard Deviation	372.986565
Variance	139118.9777
Coefficient of Variation	3.386784391
Skewness	4.339592438

Shapiro-Wilk Test Statisitic	0.329880327
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	198.5651339

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	231.4833342
Modified-t	203.9604995

95 % Non-parametric UCL

CLT	196.8931765
Jackknife	198.5651339
Standard Bootstrap	195.2111575
Bootstrap-t	419.2822422
Chebyshev (Mean, Std)	340.0543604

From File

Summary Statistics for	Dichlorodifluoromethane
Number of Samples	50
Minimum	0.5
Maximum	100
Mean	6.23
Median	5
Standard Deviation	15.19976168
Variance	231.0327551
Coefficient of Variation	2.43976913
Skewness	5.479199837

Shapiro-Wilk Test Statisitic	0.305996371
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.833864283

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.54550134
Modified-t	10.11147272

95 % Non-parametric UCL

CLT	9.765729512
Jackknife	9.833864283
Standard Bootstrap	9.748724465
Bootstrap-t	27.05948008
Chebyshev (Mean, Std)	15.59976237

From File

Summary Statistics for	Ethylbenzene
Number of Samples	50
Minimum	0.5
Maximum	40
Mean	3.02
Median	2.5
Standard Deviation	6.231061101
Variance	38.82612245
Coefficient of Variation	2.063265265
Skewness	5.125712874

Shapiro-Wilk Test Statisitic	0.344219719
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4.497384911

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.151991203
Modified-t	4.603847011

95 % Non-parametric UCL

CLT	4.469453425
Jackknife	4.497384911
Standard Bootstrap	4.508161767
Bootstrap-t	11.01358994
Chebyshev (Mean, Std)	6.861084031

From File

Summary Statistics for	Isopropylbenzene
Number of Samples	50
Minimum	0.3
Maximum	100
Mean	6.076
Median	5
Standard Deviation	15.22615312
Variance	231.8357388
Coefficient of Variation	2.505950151
Skewness	5.48127168

Shapiro-Wilk Test Statisitic	0.308879732
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	9.686121695

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	11.40140483
Modified-t	9.964317301

95 % Non-parametric UCL

CLT	9.61786862
Jackknife	9.686121695
Standard Bootstrap	9.56511237
Bootstrap-t	27.24677787
Chebyshev (Mean, Std)	15.46203115

From File

Summary Statistics for	Methyl tert-butyl ether
Number of Samples	50
Minimum	0.5
Maximum	540
Mean	16.46
Median	5
Standard Deviation	76.17768166
Variance	5803.039184
Coefficient of Variation	4.628048704
Skewness	6.902999429

Shapiro-Wilk Test Statisitic	0.191694336
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	34.52173228

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	45.41791946
Modified-t	36.27458059

95 % Non-parametric UCL

CLT	34.1802566
Jackknife	34.52173228
Standard Bootstrap	33.75537087
Bootstrap-t	324.1477707
Chebyshev (Mean, Std)	63.41907676

From File

Summary Statistics for	Methylene chloride
Number of Samples	50
Minimum	0.1
Maximum	90
Mean	3.886
Median	1
Standard Deviation	13.04388214
Variance	170.1428612
Coefficient of Variation	3.356634621
Skewness	6.223572502

Shapiro-Wilk Test Statisitic	0.276401694
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	6.978705132

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	8.655064773
Modified-t	7.249303619

95 % Non-parametric UCL

CLT	6.920234352
Jackknife	6.978705132
Standard Bootstrap	6.892381642
Bootstrap-t	22.50070345
Chebyshev (Mean, Std)	11.92678897

From File

Summary Statistics for	Tetrachloroethene
Number of Samples	50
Minimum	0.05
Maximum	100
Mean	7.35036
Median	5
Standard Deviation	16.08034046
Variance	258.5773493
Coefficient of Variation	2.187694271
Skewness	4.582508709

Shapiro-Wilk Test Statisitic	0.422294541
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	11.16300956

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	12.66566781
Modified-t	11.40863723

95 % Non-parametric UCL

CLT	11.09092749
Jackknife	11.16300956
Standard Bootstrap	11.12713924
Bootstrap-t	16.41852902
Chebyshev (Mean, Std)	17.26294759

From File

Summary Statistics for	Toluene
Number of Samples	50
Minimum	0.3
Maximum	1200
Mean	28.796
Median	5
Standard Deviation	169.212242
Variance	28632.78284
Coefficient of Variation	5.876241214
Skewness	7.045642791

Shapiro-Wilk Test Statisitic	0.165745976
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	68.91623136

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	93.63556901
Modified-t	72.8902614

95 % Non-parametric UCL

CLT	68.15771701
Jackknife	68.91623136
Standard Bootstrap	67.25434957
Bootstrap-t	977.6467433
Chebyshev (Mean, Std)	133.1054314

From File

Summary Statistics for	trans-1,2-Dichloroethene
Number of Samples	50
Minimum	0.5
Maximum	28
Mean	4.797
Median	5
Standard Deviation	5.58635738
Variance	31.20738878
Coefficient of Variation	1.164552299
Skewness	2.612225728

Shapiro-Wilk Test Statisitic	0.655042935
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	6.121525625

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	6.408337031
Modified-t	6.17016838

95 % Non-parametric UCL

CLT	6.096484102
Jackknife	6.121525625
Standard Bootstrap	6.131370432
Bootstrap-t	6.915488636
Chebyshev (Mean, Std)	8.240661966

From File

Summary Statistics for	Trichloroethene
Number of Samples	50
Minimum	0.05
Maximum	160
Mean	11.832
Median	5
Standard Deviation	26.61706672
Variance	708.4682408
Coefficient of Variation	2.249583056
Skewness	4.472062859

Shapiro-Wilk Test Statisitic	0.421306834
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	18.1429079

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	20.56736755
Modified-t	18.53968522

95 % Non-parametric UCL

CLT	18.02359368
Jackknife	18.1429079
Standard Bootstrap	17.84225308
Bootstrap-t	29.26062941
Chebyshev (Mean, Std)	28.23986188

From File

Summary Statistics for	Vinyl chloride
Number of Samples	50
Minimum	0.04
Maximum	600
Mean	33.79086
Median	5
Standard Deviation	107.6924227
Variance	11597.65791
Coefficient of Variation	3.18702817
Skewness	4.193127677

Shapiro-Wilk Test Statisitic	0.356678378
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	59.32473901

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	68.49213535
Modified-t	60.82996594

95 % Non-parametric UCL

CLT	58.8419947
Jackknife	59.32473901
Standard Bootstrap	57.75412433
Bootstrap-t	103.1353859
Chebyshev (Mean, Std)	100.1769279

From File

Summary Statistics for	Xylenes (total)
Number of Samples	50
Minimum	1
Maximum	110
Mean	6.81
Median	5
Standard Deviation	16.06710736
Variance	258.1519388
Coefficient of Variation	2.359340287
Skewness	5.848465552

Shapiro-Wilk Test Statisitic	0.314926234
Shapiro-Wilk 5% Critical Value	0.947

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	10.61951199

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	12.55561099
Modified-t	10.9327384

95 % Non-parametric UCL

CLT	10.54748923
Jackknife	10.61951199
Standard Bootstrap	10.67539723
Bootstrap-t	27.01003075
Chebyshev (Mean, Std)	16.71443016

From File

Summary Statistics for	Acetophenone
Number of Samples	33
Minimum	1.2
Maximum	5.5
Mean	5.066666667
Median	5
Standard Deviation	0.735130374
Variance	0.540416667
Coefficient of Variation	0.145091521
Skewness	-4.759558085

Shapiro-Wilk Test Statisitic	0.406857097
Shapiro-Wilk 5% Critical Value	0.931

Data not Normal at 5% Significance Level

Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.283433193

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.163866673
Modified-t	5.265762003

95 % Non-parametric UCL

CLT	5.277158211
Jackknife	5.283433193
Standard Bootstrap	5.272576464
Bootstrap-t	5.218802346
Chebyshev (Mean, Std)	5.624473972

From File

Summary Statistics for	Naphthalene
Number of Samples	37
Minimum	0.005
Maximum	25
Mean	4.639243243
Median	5
Standard Deviation	4.262578384
Variance	18.16957448
Coefficient of Variation	0.918808987
Skewness	3.2240624

Shapiro-Wilk Test Statisitic	0.579008237
Shapiro-Wilk 5% Critical Value	0.936

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.8223406

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	6.188772442
Modified-t	5.884245189

95 % Non-parametric UCL

CLT	5.791896743
Jackknife	5.8223406
Standard Bootstrap	5.779530013
Bootstrap-t	6.614881785
Chebyshev (Mean, Std)	7.693800827

From File

Summary Statistics for	2-Methylnaphthalene
Number of Samples	37
Minimum	0.5
Maximum	11
Mean	4.821621622
Median	5
Standard Deviation	1.557220661
Variance	2.424936186
Coefficient of Variation	0.322966168
Skewness	0.516260777

Shapiro-Wilk Test Statisitic	0.559390112
Shapiro-Wilk 5% Critical Value	0.936

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.253835057

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.265929762
Modified-t	5.257456372

95 % Non-parametric UCL

CLT	5.242713196
Jackknife	5.253835057
Standard Bootstrap	5.235606081
Bootstrap-t	5.25253431
Chebyshev (Mean, Std)	5.937523724

From File

Summary Statistics for	1,1'-Biphenyl
Number of Samples	33
Minimum	0.5
Maximum	7
Mean	5.106060606
Median	5
Standard Deviation	0.916494474
Variance	0.839962121
Coefficient of Variation	0.179491499
Skewness	-3.898519519

Shapiro-Wilk Test Statisitic	0.480384915
Shapiro-Wilk 5% Critical Value	0.931

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.376305628

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.252792486
Modified-t	5.358260316

95 % Non-parametric UCL

CLT	5.368482544
Jackknife	5.376305628
Standard Bootstrap	5.362591575
Bootstrap-t	5.299488301
Chebyshev (Mean, Std)	5.801484617

From File

Summary Statistics for	Acenaphthylene
Number of Samples	37
Minimum	0.5
Maximum	5.5
Mean	4.627027027
Median	5
Standard Deviation	1.286608083
Variance	1.65536036
Coefficient of Variation	0.278063663
Skewness	-2.89862744

Shapiro-Wilk Test Statisitic	0.419408516
Shapiro-Wilk 5% Critical Value	0.936

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4.984130753

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.867241228
Modified-t	4.967331665

95 % Non-parametric UCL

CLT	4.97494164
Jackknife	4.984130753
Standard Bootstrap	4.964629804
Bootstrap-t	4.9055029
Chebyshev (Mean, Std)	5.549008542

From File

Summary Statistics for	Acenaphthene
Number of Samples	37
Minimum	0.5
Maximum	5.5
Mean	4.675675676
Median	5
Standard Deviation	1.043872439
Variance	1.08966967
Coefficient of Variation	0.223255955
Skewness	-2.795610999

Shapiro-Wilk Test Statisitic	0.499596881
Shapiro-Wilk 5% Critical Value	0.936

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	4.965407057

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.873675797
Modified-t	4.952261736

95 % Non-parametric UCL

CLT	4.957951592
Jackknife	4.965407057
Standard Bootstrap	4.942572359
Bootstrap-t	4.890037069
Chebyshev (Mean, Std)	5.423713175

From File

Summary Statistics for	Fluorene	
Number of Samples		37
Minimum		0.5
Maximum		5.5
Mean		4.72972973
Median		5
Standard Deviation		1.017858554
Variance		1.036036036
Coefficient of Variation		0.21520438
Skewness		-2.966433721

Shapiro-Wilk Test Statisitic	0.476092224
Shapiro-Wilk 5% Critical Value	0.936

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.012240843

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	4.917774328
Modified-t	4.998639897

95 % Non-parametric UCL

CLT	5.004971173
Jackknife	5.012240843
Standard Bootstrap	5.006331917
Bootstrap-t	4.950005541
Chebyshev (Mean, Std)	5.459125716

From File

Summary Statistics for	Phenanthrene
Number of Samples	37
Minimum	0.4
Maximum	10
Mean	4.740540541
Median	5
Standard Deviation	1.490797598
Variance	2.222477477
Coefficient of Variation	0.314478399
Skewness	-0.237368564

Shapiro-Wilk Test Statisitic	0.61144841
Shapiro-Wilk 5% Critical Value	0.936

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	5.154317963

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	5.133451218
Modified-t	5.152723961

95 % Non-parametric UCL

CLT	5.143670504
Jackknife	5.154317963
Standard Bootstrap	5.140509919
Bootstrap-t	5.137029155
Chebyshev (Mean, Std)	5.80884397

From File

Summary Statistics for	C9-C18 Aliphatic
Number of Samples	32
Minimum	25
Maximum	3100
Mean	132.1875
Median	30.5
Standard Deviation	542.0817661
Variance	293852.6411
Coefficient of Variation	4.100854968
Skewness	5.639990553

Shapiro-Wilk Test Statisitic	0.197898583
Shapiro-Wilk 5% Critical Value	0.93

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	294.664665

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	391.8973299
Modified-t	310.5882902

95 % Non-parametric UCL

CLT	289.8095847
Jackknife	294.664665
Standard Bootstrap	287.5169679
Bootstrap-t	7827.588158
Chebyshev (Mean, Std)	549.8895537

From File

Summary Statistics for	C11-C22 Aromatic
Number of Samples	32
Minimum	25
Maximum	1200
Mean	118.125
Median	85
Standard Deviation	200.0876824
Variance	40035.08065
Coefficient of Variation	1.693863978
Skewness	5.426403217

Shapiro-Wilk Test Statisitic	0.27570412
Shapiro-Wilk 5% Critical Value	0.93

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	178.0969109

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	212.559431
Modified-t	183.7518924

95 % Non-parametric UCL

CLT	176.3048533
Jackknife	178.0969109
Standard Bootstrap	172.9584249
Bootstrap-t	508.3939782
Chebyshev (Mean, Std)	272.3029139

From File

Summary Statistics for	C5-C8 Aliphatic
Number of Samples	32
Minimum	20
Maximum	448
Mean	60.834375
Median	20
Standard Deviation	96.14532216
Variance	9243.922974
Coefficient of Variation	1.580443987
Skewness	2.829169367

Shapiro-Wilk Test Statisitic	0.50635072
Shapiro-Wilk 5% Critical Value	0.93

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	89.65183456

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	97.87347608
Modified-t	91.0685606

95 % Non-parametric UCL

CLT	88.79072229
Jackknife	89.65183456
Standard Bootstrap	88.18965221
Bootstrap-t	109.6613443
Chebyshev (Mean, Std)	134.9193213

From File

Summary Statistics for	C9-C10 Aromatic
Number of Samples	32
Minimum	5
Maximum	200
Mean	19.25
Median	5
Standard Deviation	39.79787642
Variance	1583.870968
Coefficient of Variation	2.067422152
Skewness	3.658210724

Shapiro-Wilk Test Statisitic	0.424055086
Shapiro-Wilk 5% Critical Value	0.93

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	31.17854388

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	35.68347393
Modified-t	31.93682002

95 % Non-parametric UCL

CLT	30.82209971
Jackknife	31.17854388
Standard Bootstrap	30.8899799
Bootstrap-t	46.01905979
Chebyshev (Mean, Std)	49.91632334

From File

Summary Statistics for	C9-C12 Aliphatic
Number of Samples	32
Minimum	5
Maximum	95.9
Mean	11.66875
Median	5
Standard Deviation	18.17622406
Variance	330.375121
Coefficient of Variation	1.557683904
Skewness	3.746241401

Shapiro-Wilk Test Statisitic	0.436402464
Shapiro-Wilk 5% Critical Value	0.93

Data not Normal at 5% Significance Level
Data not Lognormal: Try Non-parametric UCL

95 % UCL (Assuming Normal Data)

Student's-t	17.11667601

95 % UCL (Adjusted for Skewness)

Adjusted-CLT	19.22756591
Modified-t	17.47132457

95 % Non-parametric UCL

CLT	16.95388318
Jackknife	17.11667601
Standard Bootstrap	16.86604337
Bootstrap-t	24.75467947
Chebyshev (Mean, Std)	25.67447126