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OPERATION/CONSTRUCTION MANAGERS

**Municipal Services**

PO Box 97, Garner, North Carolina 27529 (919) 772-5393

CIVIL/SANITARY ENGINEERS

**Engineering Company, P.A.**

PO Box 349, Boone, North Carolina 28607 (828) 262-1767

January 24, 2000

Fac/Permit/Co ID # | Disp | Doc ID#
RL 05 B 0 DIN

Mr. Larry Rose
Solid Waste Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources
401 Oberlin Road, Suite 150
Raleigh, NC 27605

JAN 2000 Section

Re: Groundwater Sampling and Statistical Analysis
Alexander County Sanitary Landfill
MESCO Project No. G99006.0

Dear Mr. Rose:

The Alexander County Sanitary Landfill was sampled on May 13, 1999 by Municipal Engineering Services Company, P.A. (MESCO) for the Appendix I list of constituents and select Appendix II constituents. Lab analysis was conducted by Pace Analytical Services, Inc. of Huntersville. MESCO completed inter-well/intra-well statistical analysis for inter-well intra-well comparisons, and comparisons to North Carolina Groundwater Standard. The results are included in this report.

Monitoring well MW-1A was not sampled as the bailer was stuck in the well during the sampling and could not be retrieved. Surface water monitoring points SW-1, SW-2 and SW-4 were not sampled due to dryness.

## Comparison with North Carolina Groundwater Standard

The analysis results were compared with North Carolina Groundwater Standard to check for regulatory exceedances. The following table summarizes the exceedance results.

**Table 1.** Exceedance Summary

| Well | Chromium | Lead | Nickel | Mercury | Benzene | Bromoform |
|---|---|---|---|---|---|---|
| MW-1 | | | | | x | |
| MW-3 | x | x | x | | x | |
| MW-5 | x | x | x | | | x |
| MW-6 | x | | | x | | |
| MW-7 | x | | | | | |

x = concentration greater than Standard

Barium and cobalt were detected at all monitoring locations. Chromium, lead, nickel, vanadium and zinc were detected at the majority of the monitoring points. Arsenic and cadmium were detected in the MW-5 and MW-4R, respectively. Mercury was detected in the wells MW-6 and MW-8, and at the SW-3 monitoring point. Antimony, cyanide, nickel, selenium, silver and thallium were not detected at any locations.

1,1-Dichloroethane, carbon disulfide, and cis-1,2-dichloroethene were detected frequently at several locations. Bromoform and bromomethane were detected at the MW-5 and SW-3, respectively. A total of five VOCs inclusive of one Appendix II constituent were detected in the MW-3. It should be noted that the well MW-1, one of the background wells located upgradient of the site, showed four VOC detections, and that several VOCs were also detected in equipment and field blanks. This suggests the possibility that some of the observed VOC detections may have originated from sources other than the landfill itself.

## Statistical Analysis

Inter-well statistical analysis was conducted to determine those constituents with levels significantly higher than their background levels. The monitoring wells MW-1 and MW-1A were defined as the background well for the entire landfill site, and all historical sampling data from those wells were pooled and used as the background data. The analysis was run only on detected constituents.

A total of 12 metals were detected during this sampling event, for which the background data were summarized in order to determine the appropriate analysis method. For arsenic and cadmium, Poisson tolerance interval was used due to their high non-detects rates (%ND > 90%).[1] For chromium and zinc, parametric Poisson tolerance interval was used with Cohen's adjustment as their background data exhibited log-normality and the rates of non-detects were less than 50%. For all other metals, non-parametric tolerance interval was used with non-detects replaced with half their detection limits. The results depict statistical significance against the background levels for lead and nickel in MW-3, and mercury in MW-6. No other detected metals show statistical significance.

For each monitoring well, all detected VOCs were pooled and compared statistically against their background levels in terms of detections per scan. Historical VOC detections in the background wells (MW-1 and MW-1A) were summarized in order to determine the overall rate of detections, from which the expected number of detections in a single downgradient monitoring point ($y^*$) was calculated by using Poisson prediction interval.[2]

[1] Generally, Poisson prediction/tolerance interval is recommended when the rate of non-detects exceeds 90%.

[2] The upper Poisson prediction limit is defined by the following equation:

$$y^* = cy + \frac{t^2 c}{2} + tc\sqrt{y(1+\frac{1}{c}) + \frac{t^2}{4}}$$

where

The results reveal the well MW-3 shows VOC detections significantly higher than its background level.

Stewhart-CUSUM control charts were generated for those constituents with levels found to be significantly higher than the background levels, and are included in this report. For VOCs in the well MW-3, a control chart was generated for each detected VOC. A control chart was not generated for mercury in the well MW-6 as it requires at least eight historical samples at a given monitoring point. The results show the increase of lead and cis-1,2-Dichloroethene in the well MW-3 in recent years are statistically significant. Historically, MW-3 exhibited relatively high concentrations of cis-1,2-Dichloroethene, which started to gradually increase since 1996. Concentrations of lead, on the other hand, had been below its detection limit until its first detection back in 1997, after which the levels showed immediate increase.

## Conclusion

The above evidence indicates the contamination of groundwater is present at the site. The monitoring well MW-3 in particular shows detections of many constituents whose concentrations show an increasing trend. The well MW-6 shows the increased levels of mercury in recent years, which may require further monitoring of the constituent in order to determine its long-term trend.

Please call me at 919.772.5393 for questions and comments.

Sincerely,
MUNICIPAL ENGINEERING SERVICES CO., P.A.

Kohei Yoshida
Hydrogeologist

Enclosures

cc: Mr. Rick French
Alexander County Manager

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$c =$ $1/n$ ($n$ = number of background samples)
$t =$ one-sided value of Student's $t$-Statistic at 95% confidence
$y =$ number of events observed in $n$ previous samples
$y^* =$ expected number of events in a single future sample

# Alexander County Sanitary Landfill

**Table 1**

**HYDROLOGIC PORPERTIES AT MONITORING WELL LOCATIONS**

| Monitoring Well | Permeability (cm/sec) | Effective Porosity (%) | Change in Head/ Change in distance | Groundwater Flow Rate (ft/year) | Groundwater Flow Direction |
|---|---|---|---|---|---|
| 1 | 5.60E-05 | 1.0% | 0.073 | 421.0 | S57W |
| 1A | 5.60E-05 | 15.0% | 0.050 | 19.4 | N56E |
| 3 | 3.90E-06 | 1.0% | 0.091 | 36.6 | S43W |
| 4R | 4.90E-04 | 15.0% | 0.075 | 254.2 | S09W |
| 5 | 6.40E-05 | 15.0% | 0.047 | 20.9 | S02E |
| 6 | 2.40E-05 | 1.0% | 0.028 | 68.7 | S50W |
| 7 | 1.60E-06 | 1.0% | 0.115 | 19.1 | S36W |
| 8 | 1.30E-05 | 1.0% | 0.054 | 72.9 | S10W |

Note: Data for permeability and effective porosity obtained from GAI Consultants Sampling Report (April, 1995).
Other data obtained from November 18, 1998 sampling event.

2000 Section

JUL 2000
Section

# Summary of Detections and Statistical Analyses

**Exceedance Scan**
**Alexander County Landfill**

"Background" well

| Well ID | Parameter Name | Sample Date | Result | Unit | PQL | MCL | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-1 | Barium, total | 5/13/99 | 0.032 | mg/l | 0.005 | 2 | |
| MW-1 | Cobalt, total | 5/13/99 | 0.012 | mg/l | 0.005 | - | |
| MW-1 | Nickel, total | 5/13/99 | 0.014 | mg/l | 0.005 | 0.1 | |
| MW-1 | Zinc, total | 5/13/99 | 0.023 | mg/l | 0.01 | 2.1 | |
| MW-1 | 1,1-Dichloroethane | 5/13/99 | 20 | ug/l | 5 | 700 | |
| **MW-1** | **Benzene** | **5/13/99** | **5.7** | **ug/l** | **5** | **1** | **4.7** |
| MW-1 | Carbon disulfide | 5/13/99 | 7.5 | ug/l | 5 | - | |
| MW-1 | cis-1,2-Dichloroethene | 5/13/99 | 8.3 | ug/l | 5 | 70 | |
| MW-3 | Barium, total | 5/13/99 | 0.16 | mg/l | 0.005 | 2 | |
| **MW-3** | **Chromium, total** | **5/13/99** | **0.068** | **mg/l** | **0.002** | **0.05** | **0.018** |
| MW-3 | Cobalt, total | 5/13/99 | 0.012 | mg/l | 0.005 | - | |
| MW-3 | Copper, total | 5/13/99 | 0.021 | mg/l | 0.002 | 1 | |
| **MW-3** | **Lead, total** | **5/13/99** | **0.11** | **mg/l** | **0.005** | **0.015** | **0.095** |
| **MW-3** | **Nickel, total** | **5/13/99** | **0.25** | **mg/l** | **0.005** | **0.1** | **0.15** |
| MW-3 | Vanadium | 5/13/99 | 0.021 | mg/l | 0.005 | - | |
| MW-3 | Zinc, total | 5/13/99 | 0.045 | mg/l | 0.01 | 2.1 | |
| * MW-3 | 1,2,4-Trimethylbenzene | 5/13/99 | 5.8 | ug/l | 5 | - | |
| MW-3 | 1,4-Dichlorobenzene | 5/13/99 | 7.4 | ug/l | 5 | 75 | |
| **MW-3** | **Benzene** | **5/13/99** | **7.9** | **ug/l** | **5** | **1** | **6.9** |
| MW-3 | cis-1,2-Dichloroethene | 5/13/99 | 20 | ug/l | 5 | 70 | |
| MW-3 | Xylenes | 5/13/99 | 11 | ug/l | 5 | 530 | |
| MW-4R | Barium, total | 5/13/99 | 0.11 | mg/l | 0.005 | 2 | |
| MW-4R | Cadmium, total | 5/13/99 | 0.0023 | mg/l | 0.001 | 0.005 | |
| MW-4R | Chromium, total | 5/13/99 | 0.0052 | mg/l | 0.002 | 0.05 | |
| MW-4R | Cobalt, total | 5/13/99 | 0.21 | mg/l | 0.005 | - | |
| MW-4R | Lead, total | 5/13/99 | 0.0099 | mg/l | 0.005 | 0.015 | |
| MW-4R | Nickel, total | 5/13/99 | 0.02 | mg/l | 0.005 | 0.1 | |
| MW-4R | Zinc, total | 5/13/99 | 0.038 | mg/l | 0.01 | 2.1 | |
| MW-4R | 1,1-Dichloroethane | 5/13/99 | 15 | ug/l | 5 | 700 | |
| MW-4R | Carbon disulfide | 5/13/99 | 5.9 | ug/l | 5 | - | |
| MW-4R | cis-1,2-Dichloroethene | 5/13/99 | 16 | ug/l | 5 | 70 | |
| MW-5 | Arsenic, total | 5/13/99 | 0.0056 | mg/l | 0.005 | 0.05 | |
| MW-5 | Barium, total | 5/13/99 | 0.32 | mg/l | 0.005 | 2 | |
| MW-5 | Beryllium, total | 5/13/99 | 0.006 | mg/l | 0.001 | - | |
| **MW-5** | **Chromium, total** | **5/13/99** | **0.24** | **mg/l** | **0.002** | **0.05** | **0.19** |
| MW-5 | Cobalt, total | 5/13/99 | 0.081 | mg/l | 0.005 | - | |
| MW-5 | Copper, total | 5/13/99 | 0.12 | mg/l | 0.002 | 1 | |
| **MW-5** | **Lead, total** | **5/13/99** | **0.024** | **mg/l** | **0.005** | **0.015** | **0.009** |
| **MW-5** | **Nickel, total** | **5/13/99** | **0.15** | **mg/l** | **0.005** | **0.1** | **0.05** |
| MW-5 | Vanadium | 5/13/99 | 0.17 | mg/l | 0.005 | - | |
| MW-5 | Zinc, total | 5/13/99 | 0.35 | mg/l | 0.01 | 2.1 | |
| MW-5 | 1,1-Dichloroethane | 5/13/99 | 15 | ug/l | 5 | 700 | |
| **MW-5** | **Bromoform** | **5/13/99** | **7.4** | **ug/l** | **5** | **0.19** | **7.21** |
| MW-5 | cis-1,2-Dichloroethene | 5/13/99 | 7.4 | ug/l | 5 | 70 | |
| MW-6 | Barium, total | 5/13/99 | 0.34 | mg/l | 0.005 | 2 | |
| **MW-6** | **Chromium, total** | **5/13/99** | **0.06** | **mg/l** | **0.002** | **0.05** | **0.01** |
| MW-6 | Cobalt, total | 5/13/99 | 0.028 | mg/l | 0.005 | - | |
| MW-6 | Copper, total | 5/13/99 | 0.029 | mg/l | 0.002 | 1 | |
| MW-6 | Lead, total | 5/13/99 | 0.0062 | mg/l | 0.005 | 0.015 | |
| **MW-6** | **Mercury** | **5/13/99** | **0.0065** | **mg/l** | **0.0002** | **0.0011** | **0.0054** |
| MW-6 | Nickel, total | 5/13/99 | 0.04 | mg/l | 0.005 | 0.1 | |



* not an App I or II parameter

| Well ID | Parameter Name | Sample Date | Result | Unit | PQL | MCL | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-6 | Vanadium | 5/13/99 | 0.026 | mg/l | 0.005 | - | |
| MW-6 | Zinc, total | 5/13/99 | 0.057 | mg/l | 0.01 | 2.1 | |
| MW-7 | Barium, total | 5/13/99 | 0.057 | mg/l | 0.005 | 2 | |
| MW-7 | Beryllium, total | 5/13/99 | 0.0025 | mg/l | 0.001 | - | |
| **MW-7** | **Chromium, total** | **5/13/99** | **0.056** | **mg/l** | **0.002** | **0.05** | **0.006** |
| MW-7 | Cobalt, total | 5/13/99 | 0.0095 | mg/l | 0.005 | - | |
| MW-7 | Copper, total | 5/13/99 | 0.032 | mg/l | 0.002 | 1 | |
| MW-7 | Lead, total | 5/13/99 | 0.0084 | mg/l | 0.005 | 0.015 | |
| MW-7 | Nickel, total | 5/13/99 | 0.038 | mg/l | 0.005 | 0.1 | |
| MW-7 | Vanadium | 5/13/99 | 0.034 | mg/l | 0.005 | - | |
| MW-7 | Zinc, total | 5/13/99 | 0.1 | mg/l | 0.01 | 2.1 | |
| MW-7 | 1,1-Dichloroethane | 5/13/99 | 13 | ug/l | 5 | 700 | |
| MW-7 | Carbon disulfide | 5/13/99 | 8 | ug/l | 5 | - | |
| MW-8 | Barium, total | 5/13/99 | 0.089 | mg/l | 0.005 | 2 | |
| MW-8 | Chromium, total | 5/13/99 | 0.0052 | mg/l | 0.002 | 0.05 | |
| MW-8 | Cobalt, total | 5/13/99 | 0.0056 | mg/l | 0.005 | - | |
| MW-8 | Mercury | 5/13/99 | 0.00065 | mg/l | 0.0002 | 0.0011 | |
| MW-8 | Nickel, total | 5/13/99 | 0.0085 | mg/l | 0.005 | 0.1 | |
| MW-8 | 1,1-Dichloroethane | 5/13/99 | 9.3 | ug/l | 5 | 700 | |
| MW-8 | Carbon disulfide | 5/13/99 | 6.2 | ug/l | 5 | - | |
| SW-3 | Barium, total | 5/13/99 | 0.065 | mg/l | 0.005 | 2 | |
| SW-3 | Chromium, total | 5/13/99 | 0.014 | mg/l | 0.002 | 0.05 | |
| SW-3 | Cobalt, total | 5/13/99 | 0.0071 | mg/l | 0.005 | - | |
| SW-3 | Lead, total | 5/13/99 | 0.0052 | mg/l | 0.005 | 0.015 | |
| SW-3 | Mercury | 5/13/99 | 0.00026 | mg/l | 0.0002 | 0.0011 | |
| SW-3 | Nickel, total | 5/13/99 | 0.0092 | mg/l | 0.005 | 0.1 | |
| SW-3 | Vanadium | 5/13/99 | 0.012 | mg/l | 0.005 | - | |
| SW-3 | Zinc, total | 5/13/99 | 0.02 | mg/l | 0.01 | 2.1 | |
| SW-3 | Bromomethane (methyl bromide) | 5/13/99 | 11 | ug/l | 10 | - | |
| SW-5 | Barium, total | 5/13/99 | 0.042 | mg/l | 0.005 | 2 | |
| SW-5 | Cobalt, total | 5/13/99 | 0.0063 | mg/l | 0.005 | - | |

PQL = Practical Quantitation Limit

MCL = Maximam Contaminant Level (North Carolina Groundwater Standard)

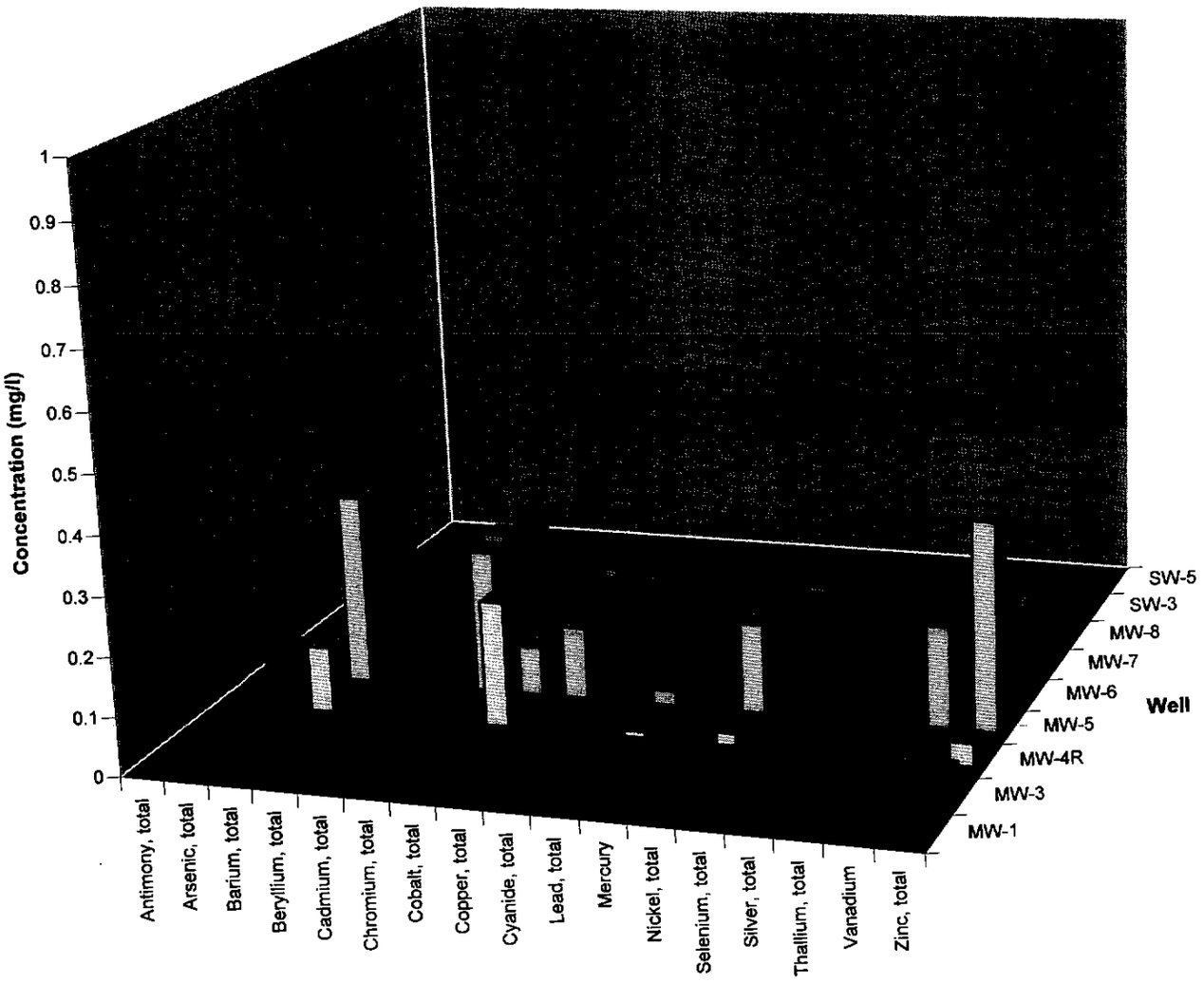
**Results Summary**
**Alexander County Landfill**

| Parameter Name | PQL | Unit | MW-1 | MW-3 | MW-4R | MW-5 | MW-6 | MW-7 | MW-8 | SW-3 | SW-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Antimony, total | 0.005 | mg/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Arsenic, total | 0.005 | mg/l | ND | ND | ND | 0.0056 | ND | ND | ND | ND | ND |
| Barium, total | 0.005 | mg/l | 0.032 | 0.16 | 0.11 | 0.32 | 0.34 | 0.057 | 0.089 | 0.065 | 0.042 |
| Beryllium, total | 0.001 | mg/l | ND | ND | ND | 0.006 | ND | 0.0025 | ND | ND | ND |
| Cadmium, total | 0.001 | mg/l | ND | ND | 0.0023 | ND | ND | ND | ND | ND | ND |
| Chromium, total | 0.002 | mg/l | ND | 0.068 | 0.0052 | 0.24 | 0.06 | 0.056 | 0.0052 | 0.014 | ND |
| Cobalt, total | 0.005 | mg/l | 0.012 | 0.012 | 0.21 | 0.081 | 0.028 | 0.0095 | 0.0056 | 0.0071 | 0.0063 |
| Copper, total | 0.002 | mg/l | ND | 0.021 | ND | 0.12 | 0.029 | 0.032 | ND | ND | ND |
| Cyanide, total | 0.002 | mg/l | ND | ND | ND | ND | ND | ND | ND | | |
| Lead, total | 0.005 | mg/l | ND | 0.11 | 0.0099 | 0.024 | 0.0062 | 0.0084 | ND | 0.0052 | ND |
| Mercury | 0.0002 | mg/l | ND | ND | ND | ND | 0.0065 | ND | 0.00065 | 0.00026 | ND |
| Nickel, total | 0.005 | mg/l | 0.014 | 0.25 | 0.02 | 0.15 | 0.04 | 0.038 | 0.0085 | 0.0092 | ND |
| Selenium, total | 0.005 | mg/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Silver, total | 0.002 | mg/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Thallium, total | 0.002 | mg/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Vanadium | 0.005 | mg/l | ND | 0.021 | ND | 0.17 | 0.026 | 0.034 | ND | 0.012 | ND |
| Zinc, total | 0.01 | mg/l | 0.023 | 0.045 | 0.038 | 0.35 | 0.057 | 0.1 | ND | 0.02 | ND |
| 1,1,1,2-Tetrachloroethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1,2,2-Tetrachloroethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1,2-Trichloroethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1-Dichloroethane | 5 | ug/l | 20 | ND | 15 | 15 | ND | 13 | 9.3 | ND | ND |
| 1,1-Dichloroethene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2,3-Trichloropropane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2,4-Trimethylbenzene | 5 | ug/l | ND | 5.8 | ND | ND | ND | ND | ND | | |
| 1,2-Dibromo-3-chloropropane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-Dibromoethane | 2 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-Dichlorobenzene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-Dichloroethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-Dichloropropane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,3,5-Trimethylbenzene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | | |
| 1,4-Dichlorobenzene | 5 | ug/l | ND | 7.4 | ND | ND | ND | ND | ND | ND | ND |
| 2-Butanone | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-Hexanone | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Methylisobutylketone | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Acetone | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Acrylonitrile | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Benzene | 5 | ug/l | 5.7 | 7.9 | ND | ND | ND | ND | ND | | |
| BHC, alpha | 0.05 | ug/l | ND | ND | ND | ND | ND | ND | ND | | |

| Parameter Name | PQL | Unit | MW-1 | MW-3 | MW-4R | MW-5 | MW-6 | MW-7 | MW-8 | SW-3 | SW-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BHC, beta | 0.05 | ug/l | ND | ND | ND | ND | ND | ND | ND | | |
| BHC, gamma | 0.05 | ug/l | ND | ND | ND | ND | ND | ND | ND | | |
| Bis(2-ethylhexyl) phthalate | 12 | ug/l | ND | ND | ND | ND | ND | ND | ND | | |
| Bromochloromethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Bromodichloromethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Bromoform | 5 | ug/l | ND | ND | ND | 7.4 | ND | ND | ND | ND | ND |
| Bromomethane | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | 11 | ND |
| Carbon disulfide | 5 | ug/l | 7.5 | ND | 5.9 | ND | ND | 8 | 6.2 | ND | ND |
| Carbon tetrachloride | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chlorobenzene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chloroethane | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chloroform | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chloromethane | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| cis-1,2-Dichloroethene | 5 | ug/l | 8.3 | 20 | 16 | 7.4 | ND | ND | ND | ND | ND |
| cis-1,3-Dichloropropene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chlorodibromomethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dibromomethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Ethylbenzene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Heptachlor | 0.05 | ug/l | ND | ND | ND | ND | ND | ND | ND | | |
| Iodomethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Isobutyl alcohol | 200 | ug/l | ND | ND | ND | ND | ND | ND | ND | | |
| Methyl methacrylate | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | | |
| Dichloromethane | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Styrene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Tetrachloroethylene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Toluene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| trans-1,2-Dichloroethene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| trans-1,3-Dichloropropene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| trans-1,4-Dichloro-2-butene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Trichloroethylene | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Trichlorofluoromethane | 10 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Vinyl acetate | 5 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Vinyl chloride | 2 | ug/l | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Xylenes | 5 | ug/l | ND | 11 | ND | ND | ND | ND | ND | ND | ND |

ND = Compound not detected

PQL = Practical Quantitation Limit




**Inorganics - Alexander County Landfill**

Inter–Well Analysis Summary
Alexander County Sanitary Landfill

**Arsenic, total**

| %ND | Normality | Method | ND Adj. | Upper Limit (α = 95%) | Unit |
|---|---|---|---|---|---|
| 100.00 | – | Poisson Tolerance Interval | ½ DL | 8.5 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW–5 | 5.6 | no |

**Barium, total**

| %ND | Normality | Method | ND Adj. | Upper Limit (α = 95%) | Unit |
|---|---|---|---|---|---|
| 39.13 | no | Non–parametric Tolerance Interval | ½ DL | 1000 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW–3 | 160 | no |
| MW–4R | 110 | no |
| MW–5 | 320 | no |
| MW–6 | 340 | no |
| MW–7 | 57 | no |
| MW–8 | 89 | no |
| SW–3 | 65 | no |
| SW–5 | 42 | no |

**Beryllium, total**

| %ND | Normality | Method | ND Adj. | Upper Limit (α = 95%) | Unit |
|---|---|---|---|---|---|
| 82.61 | – | Non–parametric Tolerance Interval | ½ DL | 12.5 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW–5 | 6 | no |
| MW–7 | 2.5 | no |

**Cadmium, total**

| %ND | Normality | Method | ND Adj. | Upper Limit (α = 95%) | Unit |
|---|---|---|---|---|---|
| 95.65 | – | Poisson Tolerance Interval | ½ DL | 2.5 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW–4R | 2.3 | no |

**Chromium, total**

| %ND | Normality | Method | ND Adj. | Upper Limit ($\alpha$ = 95%) | Unit |
|---|---|---|---|---|---|
| 21.74 | log-normal | Parametric Tolerance Interval | Cohen | 6.10344 | log(ug/l) |

| Well | Result | Significance |
|---|---|---|
| MW-3 | 4.21951 | no |
| MW-4R | 1.64866 | no |
| MW-5 | 5.48064 | no |
| MW-6 | 4.09434 | no |
| MW-7 | 4.02535 | no |
| MW-8 | 1.64866 | no |
| SW-3 | 2.63906 | no |

**Cobalt, total**

| %ND | Normality | Method | ND Adj. | Upper Limit ($\alpha$ = 95%) | Unit |
|---|---|---|---|---|---|
| 26.09 | no | Non-parametric Tolerance Interval | ½ DL | 220 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW-3 | 12 | no |
| MW-4R | 210 | no |
| MW-5 | 81 | no |
| MW-6 | 28 | no |
| MW-7 | 9.5 | no |
| MW-8 | 5.6 | no |
| SW-3 | 7.1 | no |
| SW-5 | 6.3 | no |

**Copper, total**

| %ND | Normality | Method | ND Adj. | Upper Limit ($\alpha$ = 95%) | Unit |
|---|---|---|---|---|---|
| 69.57 | - | Non-parametric Tolerance Interval | ½ DL | 260 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW-3 | 21 | no |
| MW-5 | 120 | no |
| MW-6 | 29 | no |
| MW-7 | 32 | no |

**Lead, total**

| %ND | Normality | Method | ND Adj. | Upper Limit ($\alpha$ = 95%) | Unit |
|---|---|---|---|---|---|
| 60.87 | – | Non–parametric Tolerance Interval | ½ DL | 75 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW–3 | 110 | yes |
| MW–4R | 9.9 | no |
| MW–5 | 24 | no |
| MW–6 | 6.2 | no |
| MW–7 | 8.4 | no |
| SW–3 | 5.2 | no |

**Mercury**

| %ND | Normality | Method | ND Adj. | Upper Limit ($\alpha$ = 95%) | Unit |
|---|---|---|---|---|---|
| 54.55 | – | Non–parametric Tolerance Interval | ½ DL | 1.7 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW–6 | 6.5 | yes |
| MW–8 | 0.65 | no |
| SW–3 | 0.26 | no |

**Nickel, total**

| %ND | Normality | Method | ND Adj. | Upper Limit ($\alpha$ = 95%) | Unit |
|---|---|---|---|---|---|
| 69.57 | – | Non–parametric Tolerance Interval | ½ DL | 190 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW–3 | 250 | yes |
| MW–4R | 20 | no |
| MW–5 | 150 | no |
| MW–6 | 40 | no |
| MW–7 | 38 | no |
| MW–8 | 8.5 | no |
| SW–3 | 9.2 | no |

**Vanadium**

| %ND | Normality | Method | ND Adj. | Upper Limit ($\alpha$ = 95%) | Unit |
|---|---|---|---|---|---|
| 52.17 | – | Non–parametric Tolerance Interval | ½ DL | 330 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW–3 | 21 | no |
| MW–5 | 170 | no |
| MW–6 | 26 | no |
| MW–7 | 34 | no |
| SW–3 | 12 | no |

**Zinc, total**

| %ND | Normality | Method | ND Adj. | Upper Limit ($\alpha$ = 95%) | Unit |
|---|---|---|---|---|---|
| 21.74 | log–normal | Parametric Tolerance Interval | Cohen | 6.10994 | log(ug/l) |

| Well | Result | Significance |
|---|---|---|
| MW–3 | 3.80666 | no |
| MW–4R | 3.63759 | no |
| MW–5 | 5.85793 | no |
| MW–6 | 4.04305 | no |
| MW–7 | 4.60517 | no |
| SW–3 | 2.99573 | no |

**Summary of Background VOC Detections (MW-1 and MW-1A)**
**Alexander County Sanitary Landfill**

| Constituent | Samples | NDs | % NDs |
|---|---|---|---|
| 1,1,1,2-Tetrachloroethane | 23 | 23 | 100.00 |
| 1,1,1-Trichloroethane | 23 | 23 | 100.00 |
| 1,1,2,2-Tetrachloroethane | 23 | 23 | 100.00 |
| 1,1,2-Trichloroethane | 23 | 23 | 100.00 |
| 1,1-Dichloroethane | 23 | 10 | 43.48 |
| 1,1-Dichloroethene | 23 | 23 | 100.00 |
| 1,2,3-Trichloropropane | 23 | 23 | 100.00 |
| 1,2-Dibromo-3-chloropropane | 23 | 23 | 100.00 |
| 1,2-Dibromoethane | 23 | 23 | 100.00 |
| 1,2-Dichlorobenzene | 23 | 23 | 100.00 |
| 1,2-Dichloroethane | 23 | 23 | 100.00 |
| 1,2-Dichloropropane | 23 | 23 | 100.00 |
| 1,4-Dichlorobenzene | 23 | 23 | 100.00 |
| 2-Butanone | 23 | 23 | 100.00 |
| 2-Hexanone | 23 | 23 | 100.00 |
| Methylisobutylketone | 23 | 23 | 100.00 |
| Acetone | 23 | 23 | 100.00 |
| Acrylonitrile | 23 | 21 | 91.30 |
| Benzene | 23 | 23 | 100.00 |
| Bromochloromethane | 23 | 23 | 100.00 |
| Bromodichloromethane | 23 | 23 | 100.00 |
| Bromoform | 23 | 23 | 100.00 |
| Bromomethane | 23 | 21 | 91.30 |
| Carbon disulfide | 23 | 23 | 100.00 |
| Carbon tetrachloride | 23 | 23 | 100.00 |
| Chlorobenzene | 23 | 21 | 91.30 |
| Chloroethane | 23 | 23 | 100.00 |
| Chloroform | 23 | 23 | 100.00 |
| Chloromethane | 23 | 21 | 91.30 |
| cis-1,2-Dichloroethene | 23 | 23 | 100.00 |
| cis-1,3-Dichloropropene | 23 | 23 | 100.00 |
| Chlorodibromomethane | 23 | 23 | 100.00 |
| Dibromomethane | 23 | 23 | 100.00 |
| Ethylbenzene | 23 | 23 | 100.00 |
| Iodomethane | 23 | 23 | 100.00 |
| Dichloromethane | 23 | 23 | 100.00 |
| Styrene | 23 | 23 | 100.00 |
| Tetrachloroethylene | 23 | 23 | 100.00 |
| Toluene | 23 | 23 | 100.00 |
| trans-1,2-Dichloroethene | 23 | 23 | 100.00 |
| trans-1,3-Dichloropropene | 21 | 21 | 100.00 |
| trans-1,4-Dichloro-2-butene | 23 | 23 | 100.00 |
| Trichloroethylene | 23 | 23 | 100.00 |
| Trichlorofluoromethane | 21 | 21 | 100.00 |
| Vinyl acetate | 23 | 23 | 100.00 |
| Vinyl chloride | 23 | 21 | 91.30 |
| Xylene | | | |
| **Total** | **1077** | **1054** | **97.86** |

**Poisson Prediction Interval for Pooled VOC Scan**
**Alexander County Sanitary Landfill**

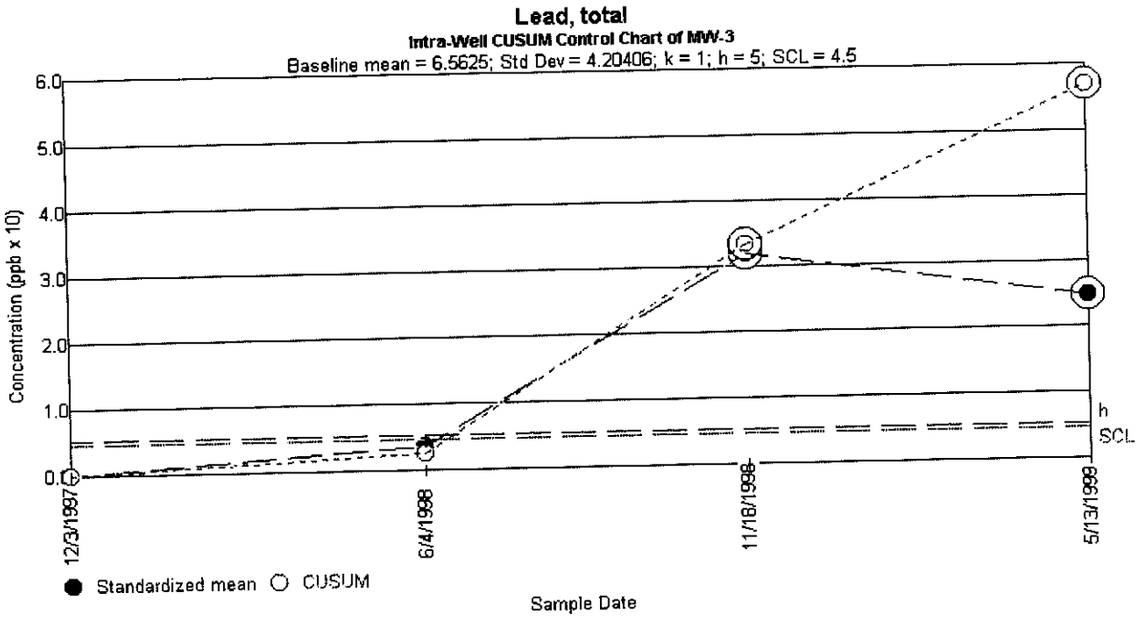
| Constituent | MW-1 | MW-3* | MW-4R | MW-5 | MW-6 | MW-7 | MW-8 | SW-3 | SW-5 |
|---|---|---|---|---|---|---|---|---|---|
| 1,1-Dichloroethane | x | | x | x | | x | x | | |
| 1,4-Dichlorobenzene | | x | | | | | | | |
| Benzene | x | x | | | | | | | |
| Bromoform | | | | x | | | | | |
| Bromomethane | | | | | | | | x | |
| Carbon disulfide | x | | x | | | x | x | | |
| cis-1,2-Dichloroethene | x | x | x | x | | | | | |
| Xylenes | | x | | | | | | | |
| **Detection(s) per Scan** | – | **4.00** | 3.00 | 3.00 | 0.00 | 2.00 | 2.00 | 1.00 | 0.00 |

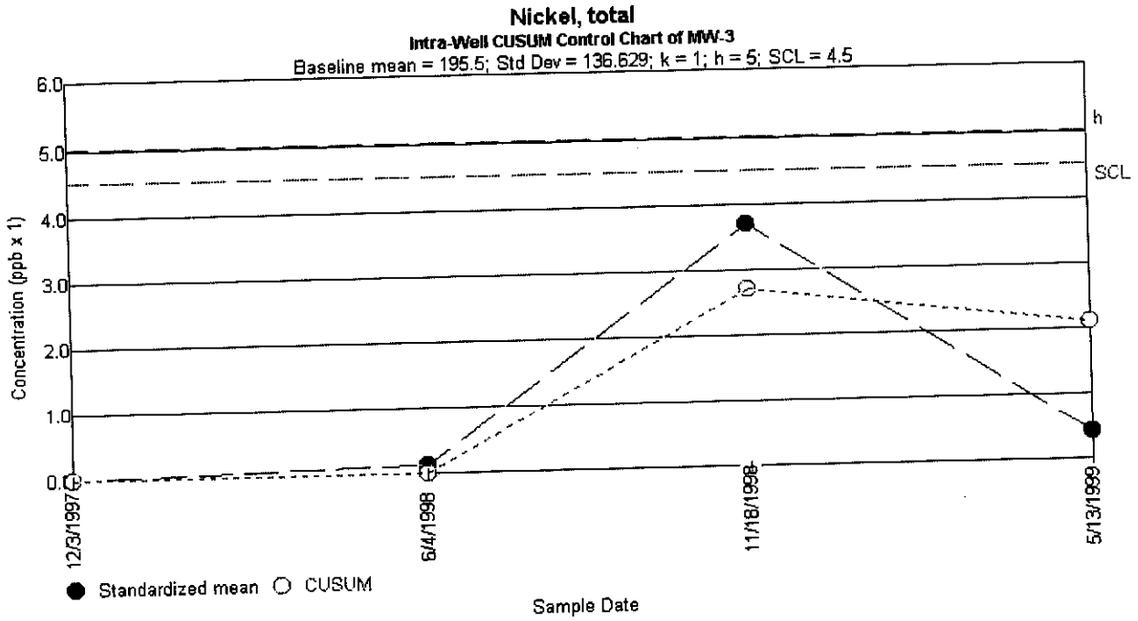
| | |
|---|---|
| Total number of sampling events [n] = | 23 |
| Total number of detections in background wells [y] = | 23 |
| Number of comparisons [k] = | 8 |
| One-sided value of Student's t-statistic (95% confidence) [t] = | 2.71 |
| Expected number of detections in a single future sample [y*] = | **3.93** |

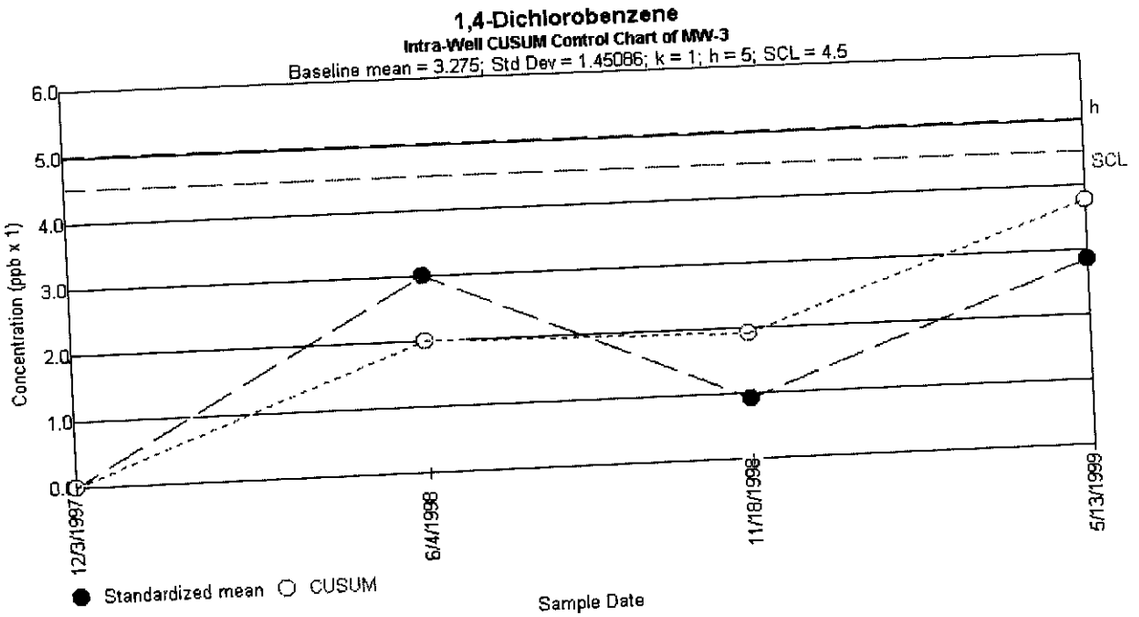
**Evidence of possible contamination in MW-3 at 95% confidence level.**

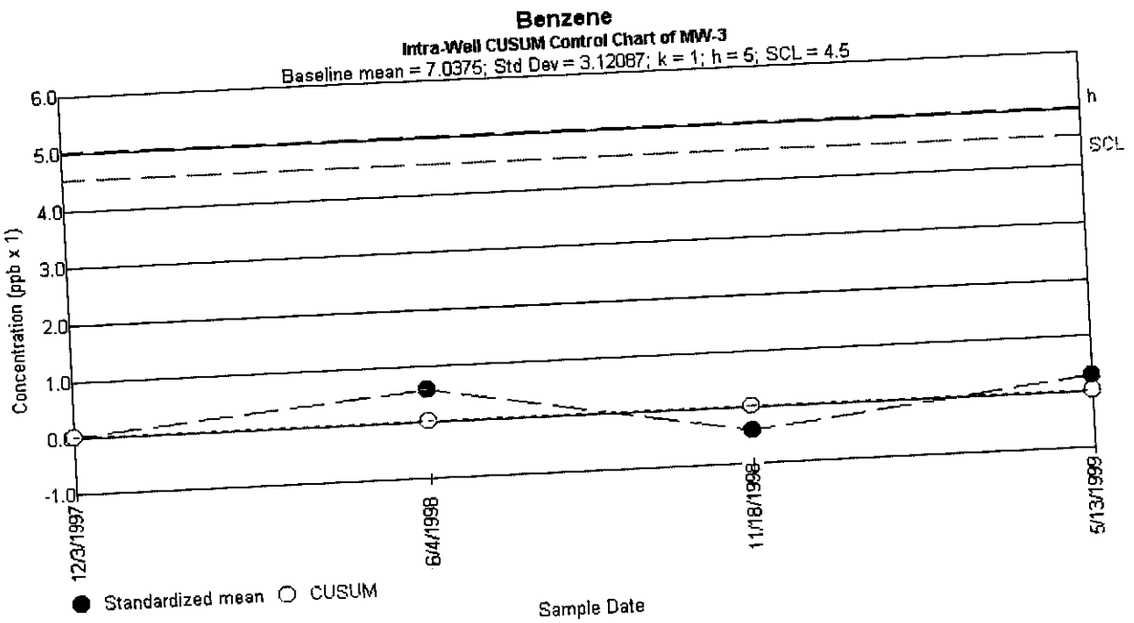
* The detection of 1,3,5-Trimethylbenzene is not included due to the lack of the equal number of samples in the background wells.

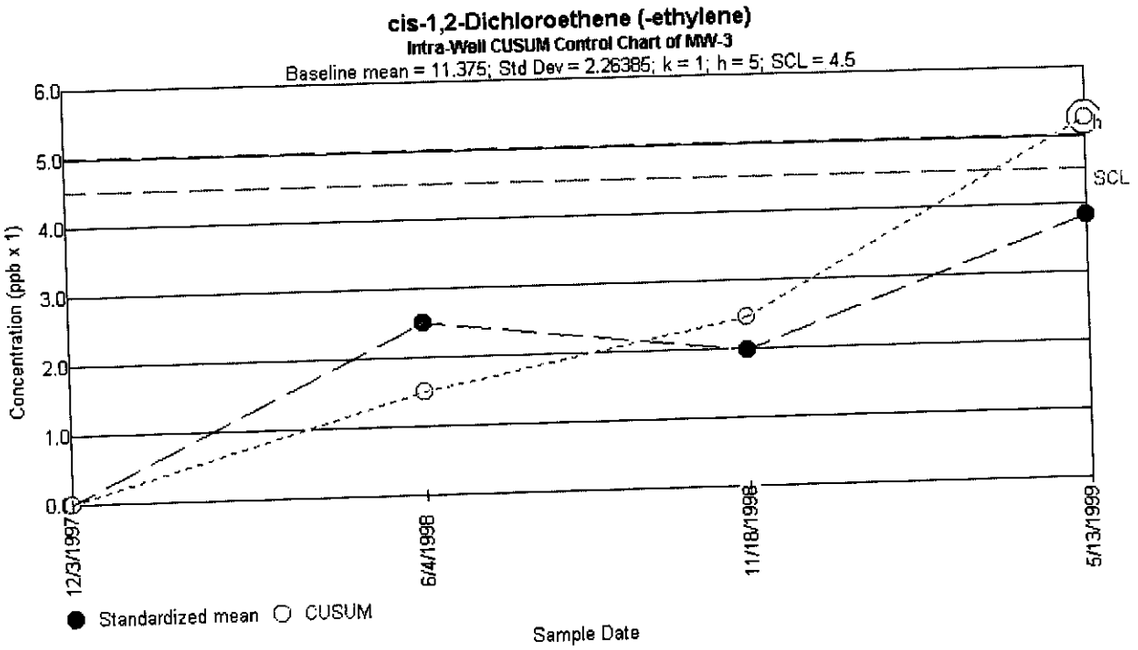
**Stewhart-CUSUM Control Charts for Intra-Well Analysis**
**Alexander County Sanitary Landfill**

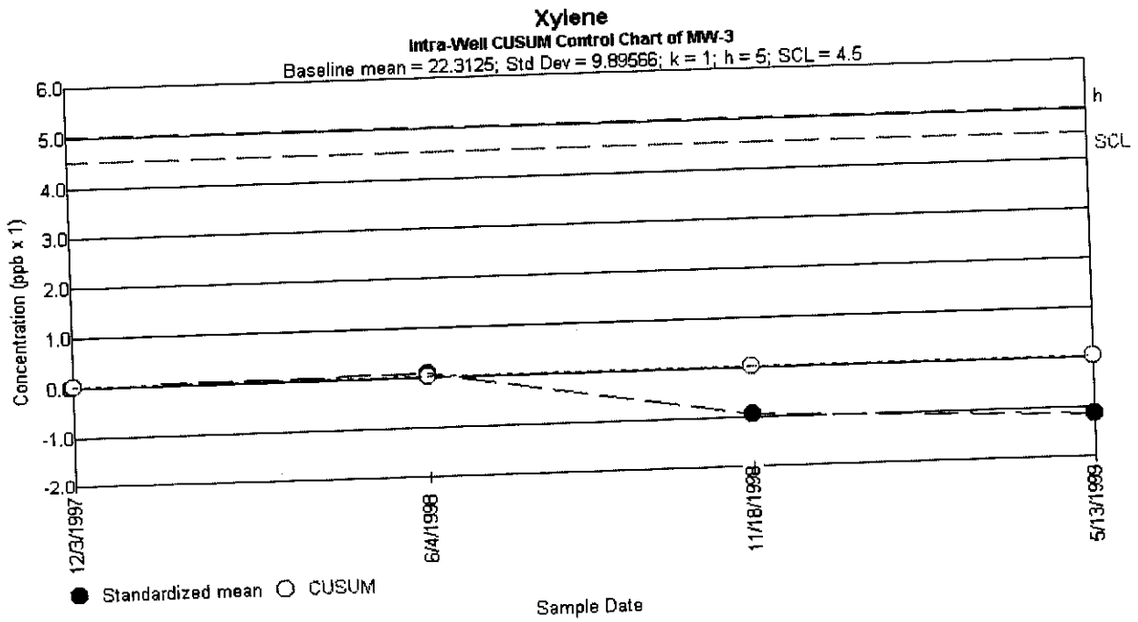


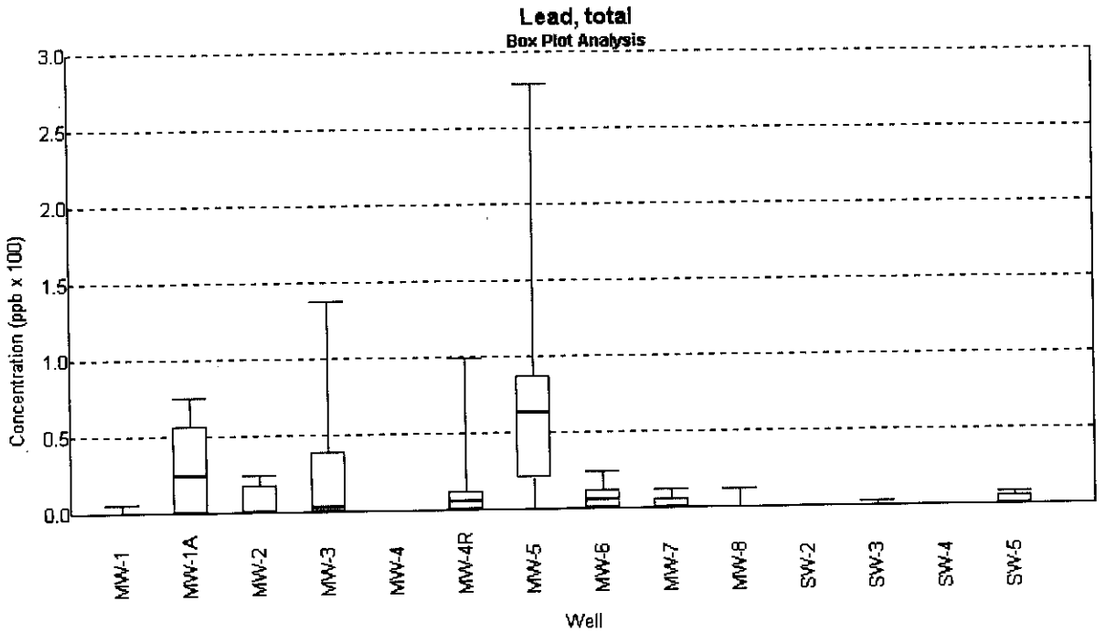

1,4-Dichlorobenzene
Intra-Well CUSUM Control Chart of MW-3
Baseline mean = 3.275; Std Dev = 1.45086; k = 1; h = 5; SCL = 4.5
Concentration (ppb x 1)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
h
SCL
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Standardized mean
CUSUM
Sample Date

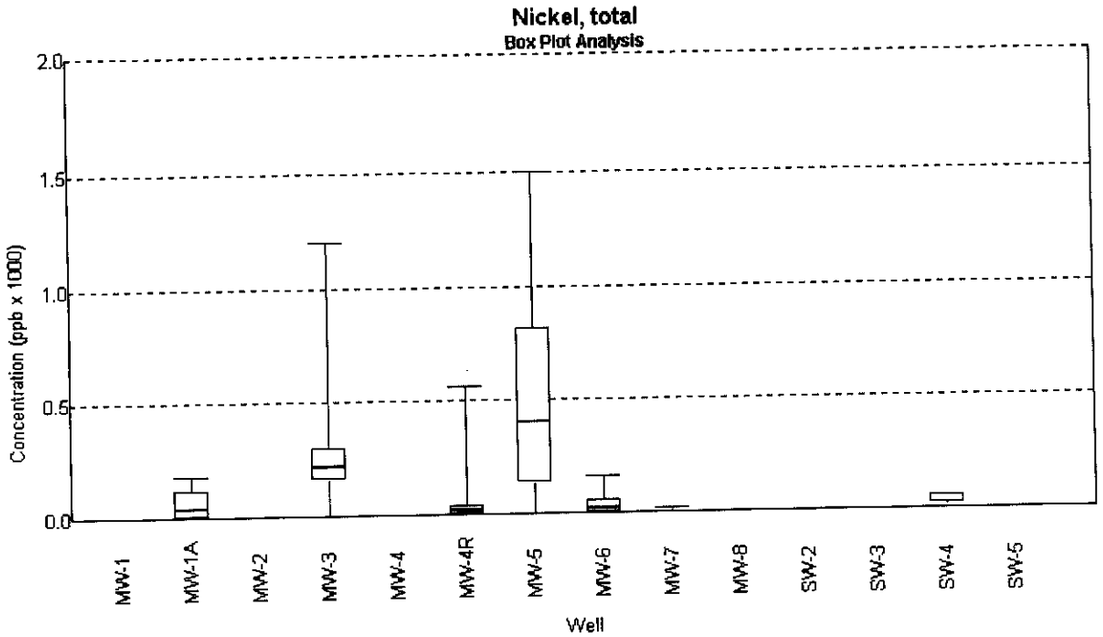

Benzene
Intra-Well CUSUM Control Chart of MW-3
Baseline mean = 7.0375; Std Dev = 3.12087; k = 1; h = 5; SCL = 4.5
Concentration (ppb x 1)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
h
SCL
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Standardized mean
CUSUM
Sample Date

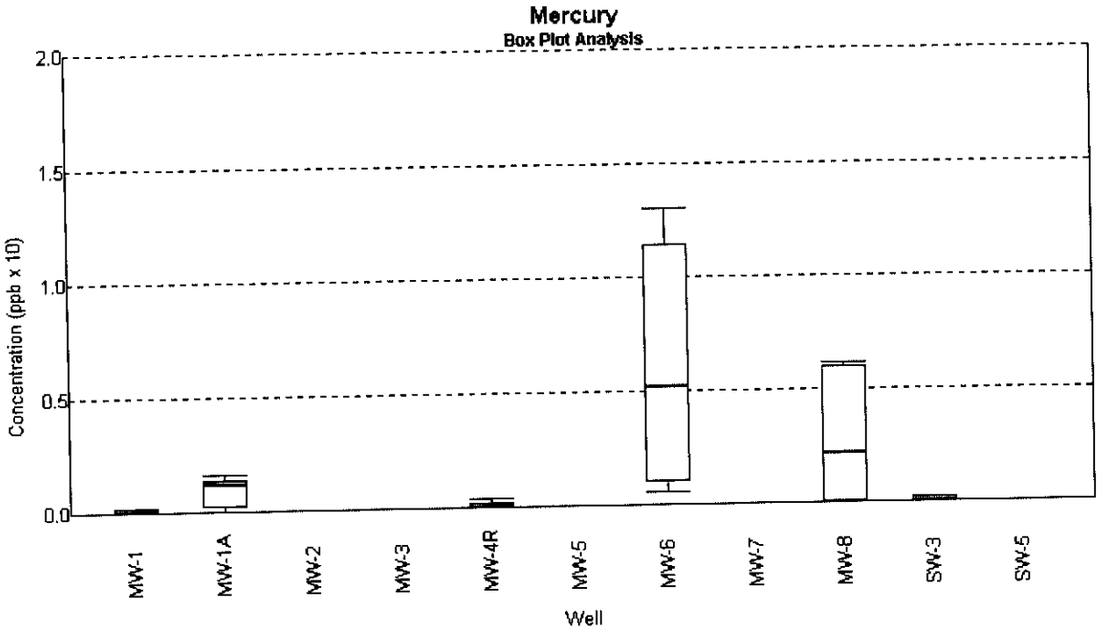

cis-1,2-Dichloroethene (-ethylene)
Intra-Well CUSUM Control Chart of MW-3
Baseline mean = 11.375; Std Dev = 2.26385; k = 1; h = 5; SCL = 4.5
Concentration (ppb x 1)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
h
SCL
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Standardized mean
CUSUM
Sample Date

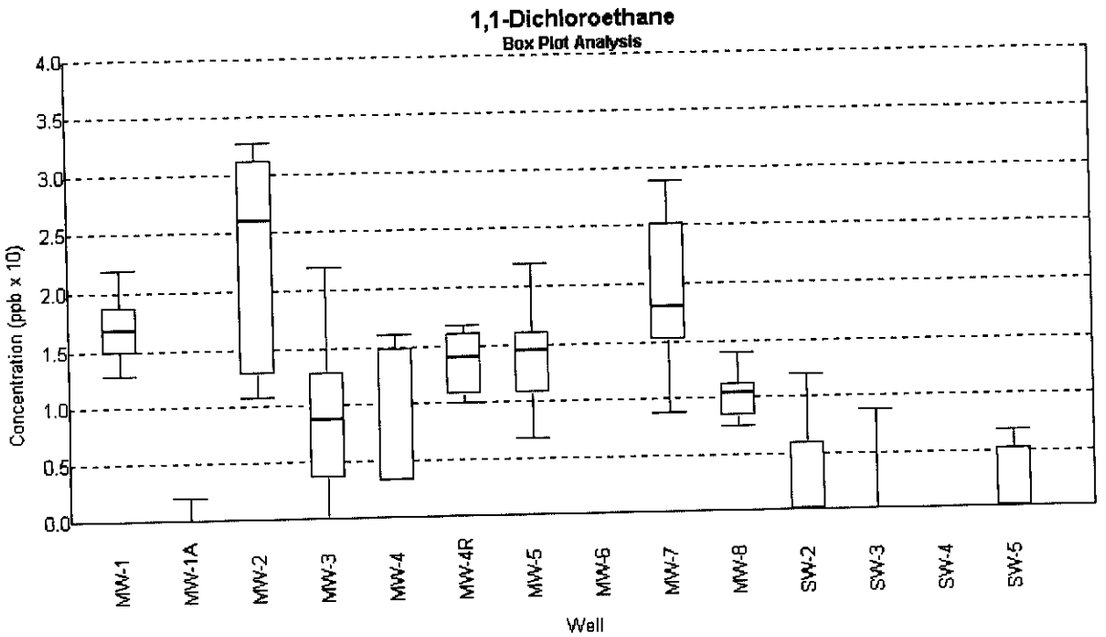

Xylene
Intra-Well CUSUM Control Chart of MW-3
Baseline mean = 22.3125; Std Dev = 9.89566; k = 1; h = 5; SCL = 4.5
Concentration (ppb x 1)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
h
SCL
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Standardized mean
CUSUM
Sample Date

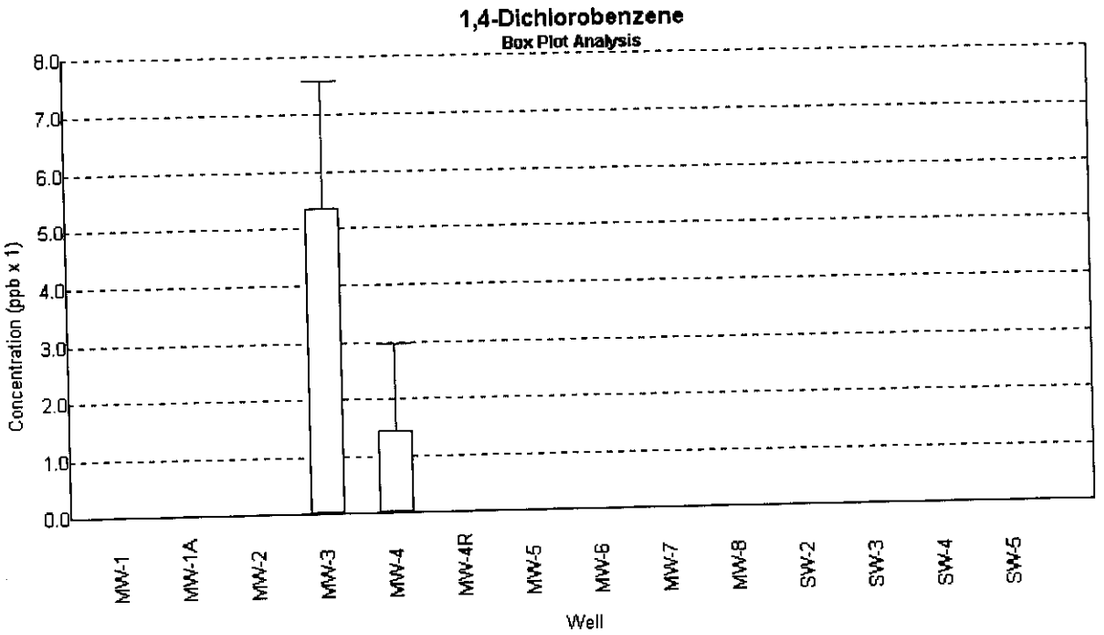
**Boxplots for Select Constituents**
**Alexander County Sanitary Landfill**

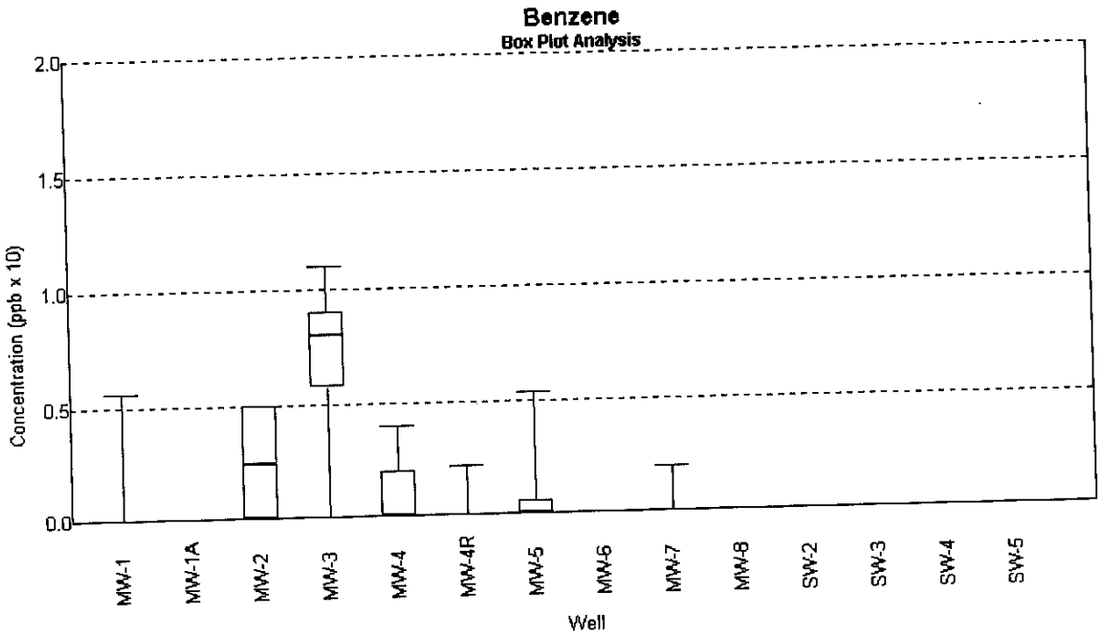


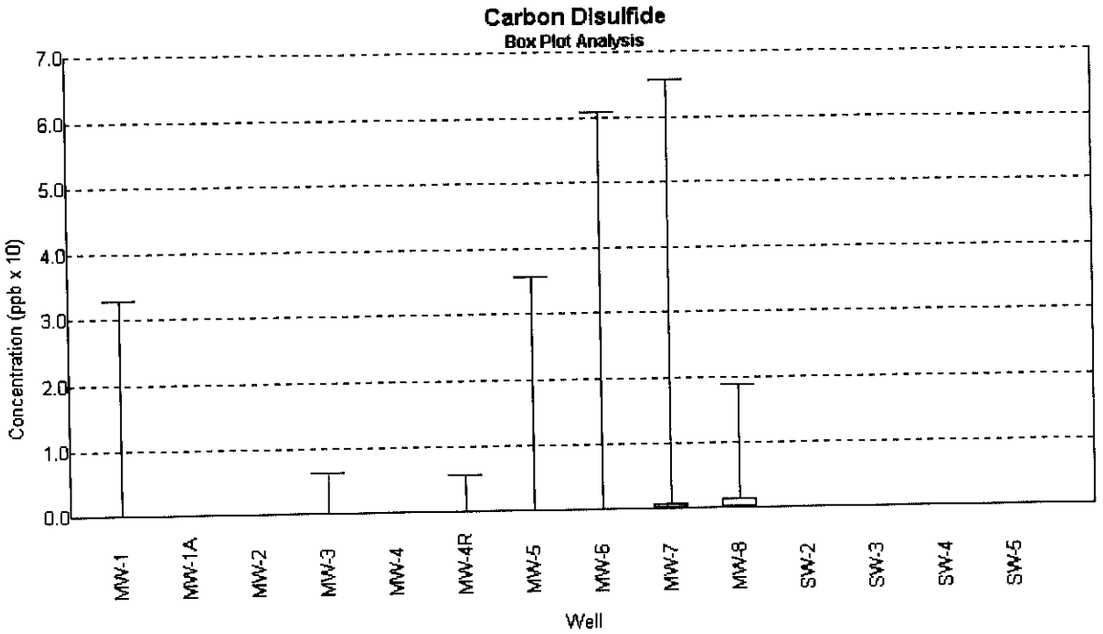



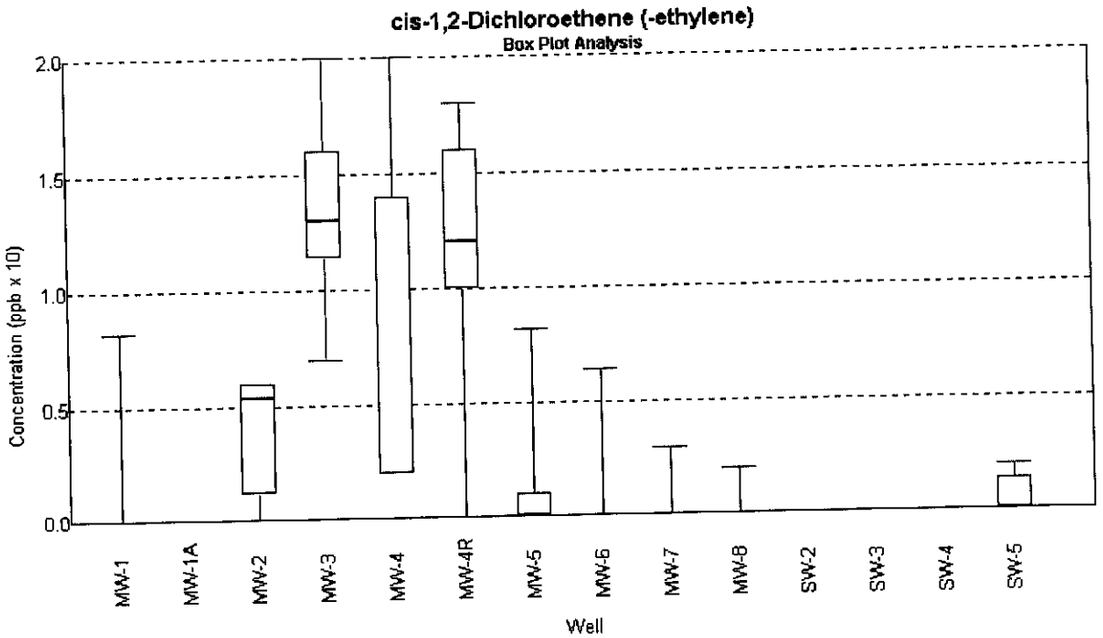

Mercury
Box Plot Analysis
Concentration (ppb x 10)
2.0
1.5
1.0
0.5
0.0
MW-1
MW-1A
MW-2
MW-3
MW-4R
MW-5
MW-6
MW-7
MW-8
SW-3
SW-5
Well


1,1-Dichloroethane
Box Plot Analysis
Concentration (ppb x 10)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
MW-1
MW-1A
MW-2
MW-3
MW-4
MW-4R
MW-5
MW-6
MW-7
MW-8
SW-2
SW-3
SW-4
SW-5
Well

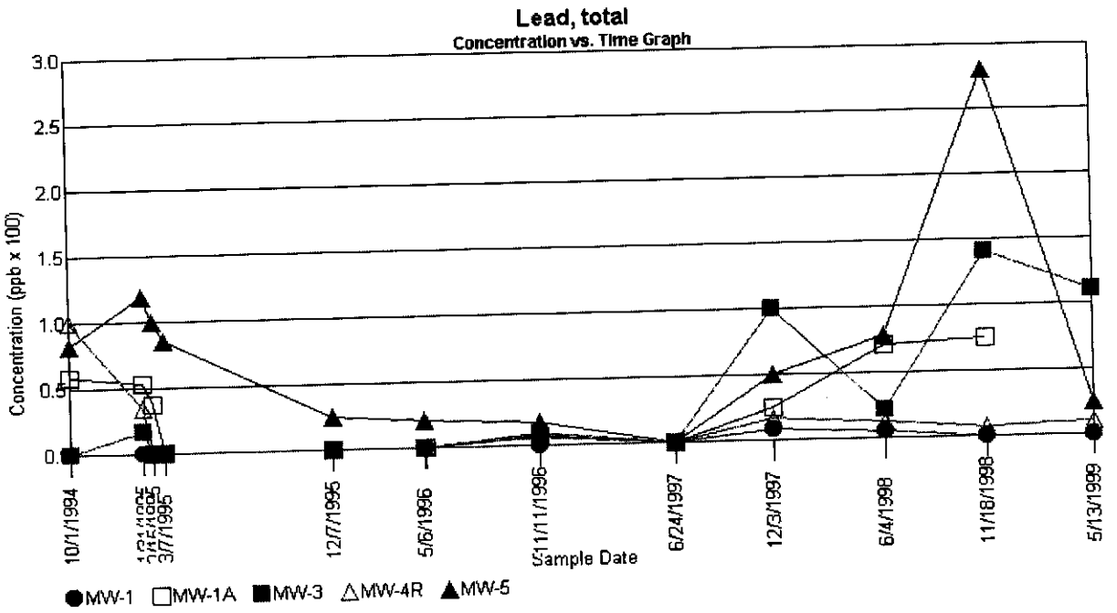

1,4-Dichlorobenzene
Box Plot Analysis
Concentration (ppb x 1)
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
MW-1
MW-1A
MW-2
MW-3
MW-4
MW-4R
MW-5
MW-6
MW-7
MW-8
SW-2
SW-3
SW-4
SW-5
Well

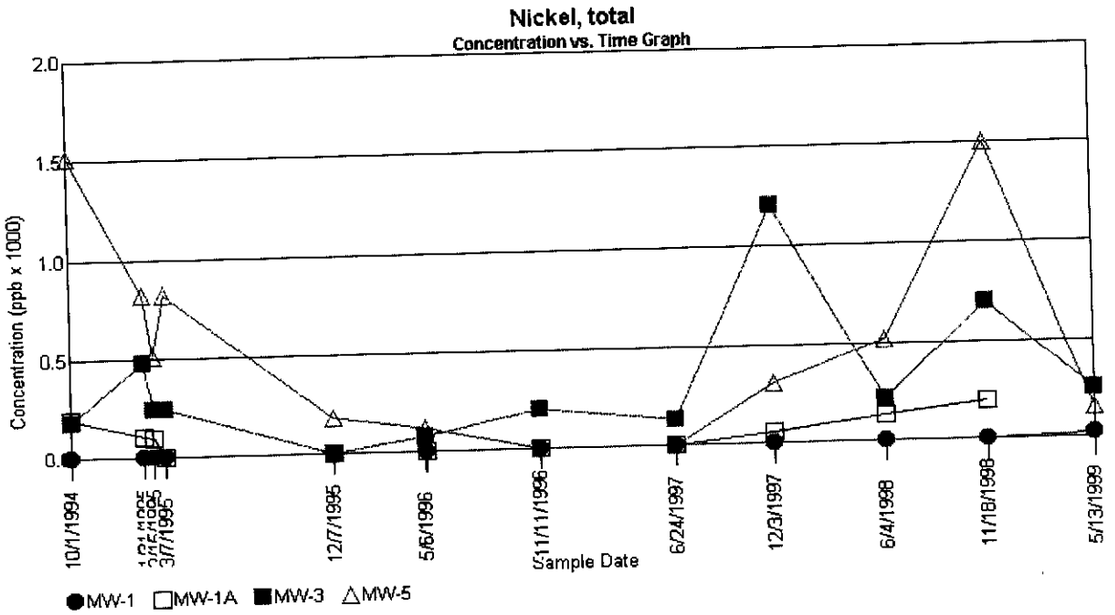

Benzene
Box Plot Analysis
Concentration (ppb x 10)
2.0
1.5
1.0
0.5
0.0
MW-1
MW-1A
MW-2
MW-3
MW-4
MW-4R
MW-5
MW-6
MW-7
MW-8
SW-2
SW-3
SW-4
SW-5
Well

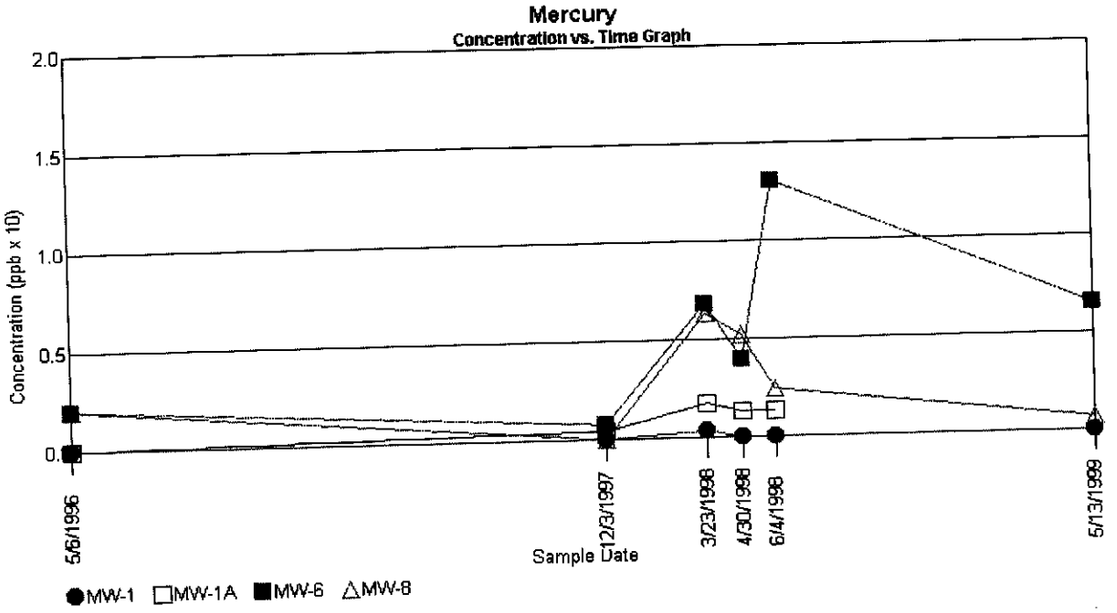

Carbon Disulfide
Box Plot Analysis
Concentration (ppb x 10)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
MW-1
MW-1A
MW-2
MW-3
MW-4
MW-4R
MW-5
MW-6
MW-7
MW-8
SW-2
SW-3
SW-4
SW-5
Well

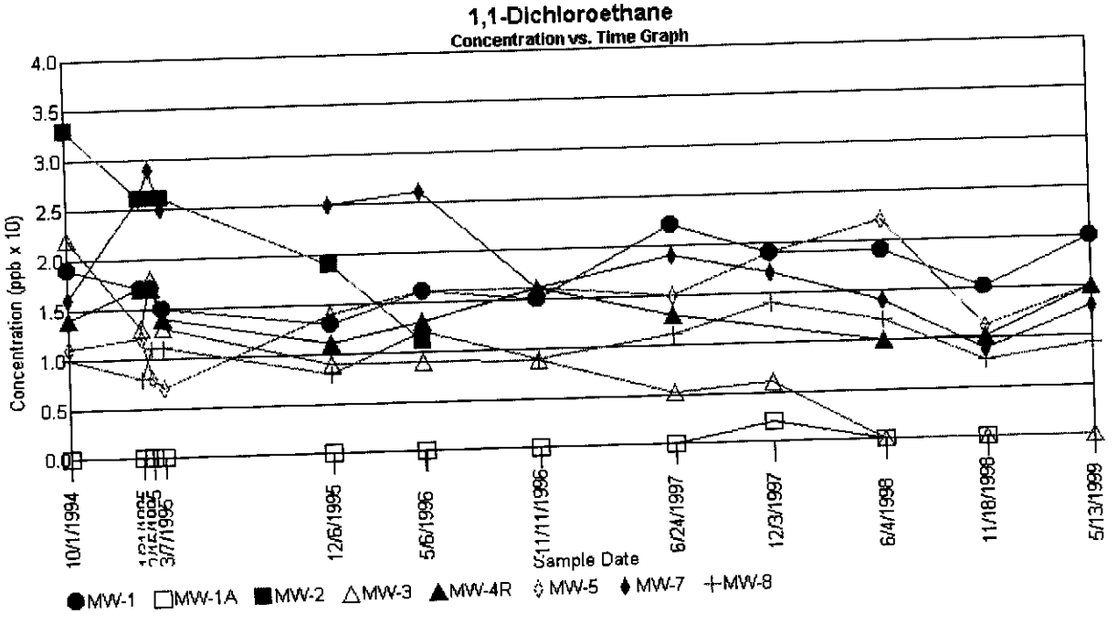

cis-1,2-Dichloroethene (-ethylene)
Box Plot Analysis
Concentration (ppb x 10)
2.0
1.5
1.0
0.5
0.0
MW-1
MW-1A
MW-2
MW-3
MW-4
MW-4R
MW-5
MW-6
MW-7
MW-8
SW-2
SW-3
SW-4
SW-5
Well

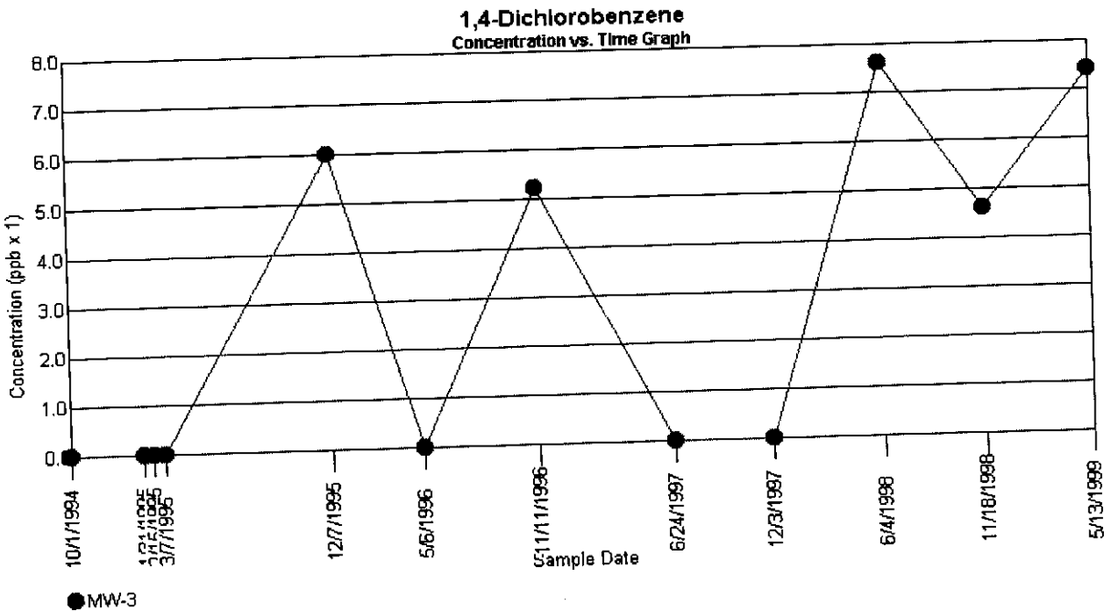
**Time-Series Plots for Select Constituents**
**Alexander County Sanitary Landfill**

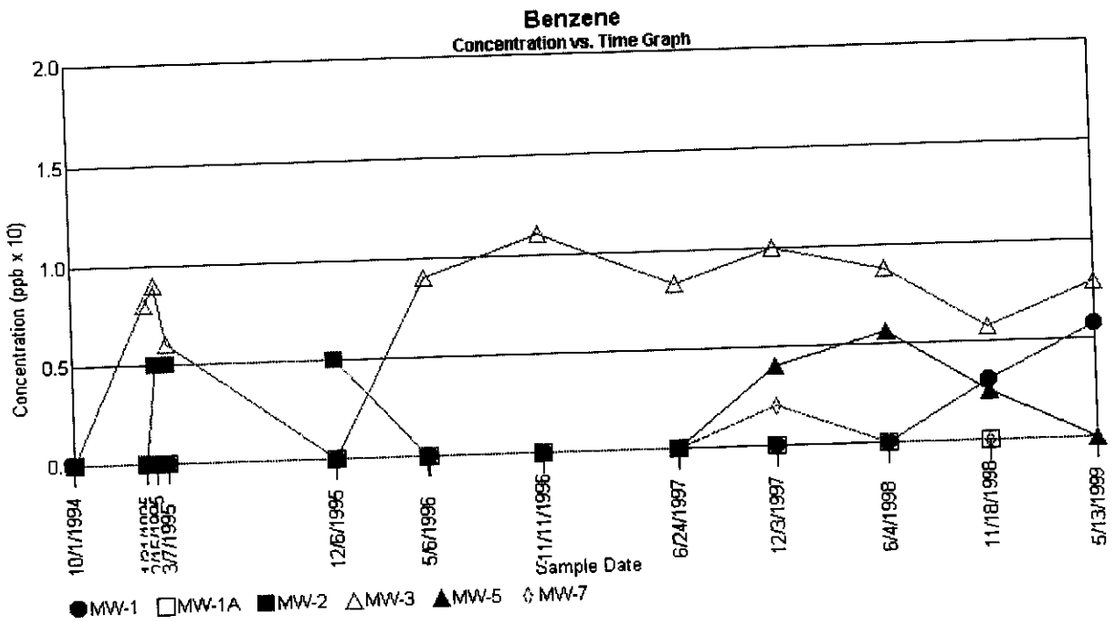


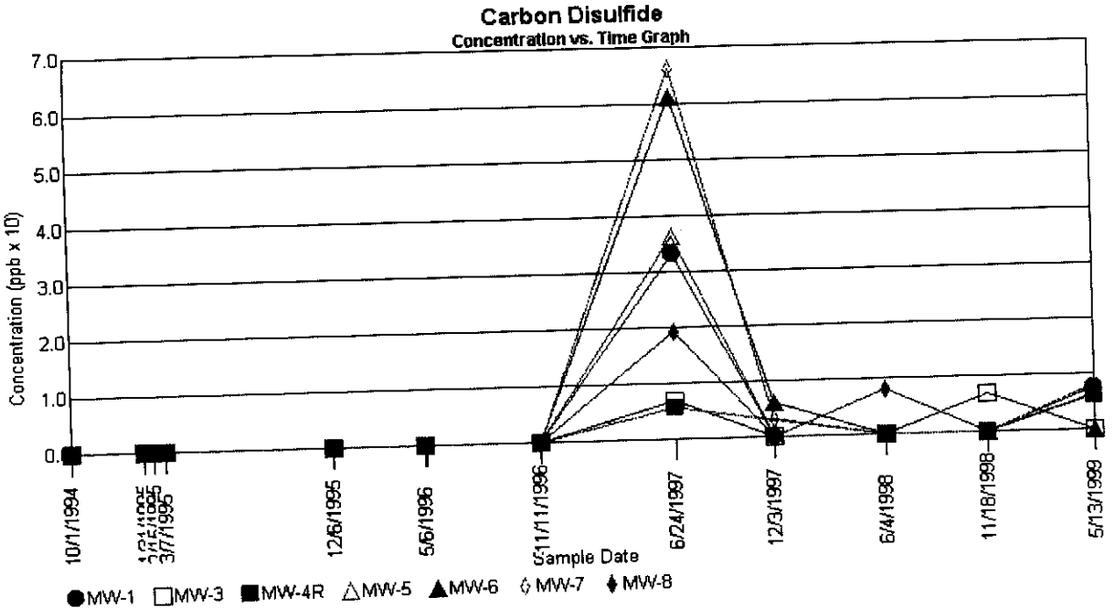



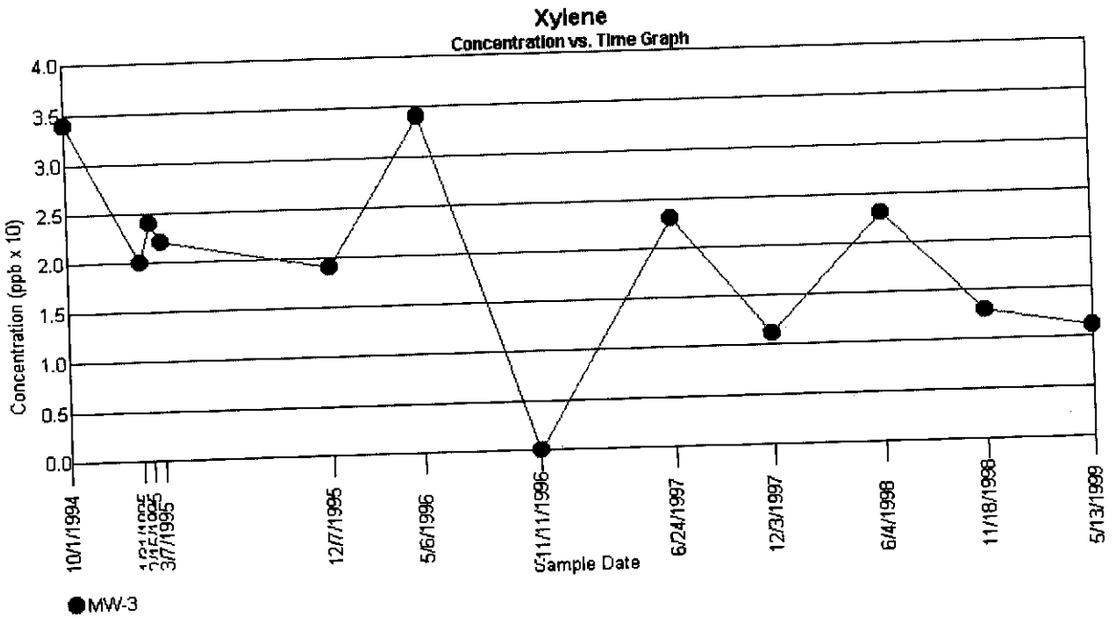

Mercury
Concentration vs. Time Graph
Concentration (ppb x 10)
2.0
1.5
1.0
0.5
0.
5/6/1996
12/3/1997
3/23/1998
4/30/1998
6/4/1998
5/13/1999
Sample Date
MW-1
MW-1A
MW-6
MW-8

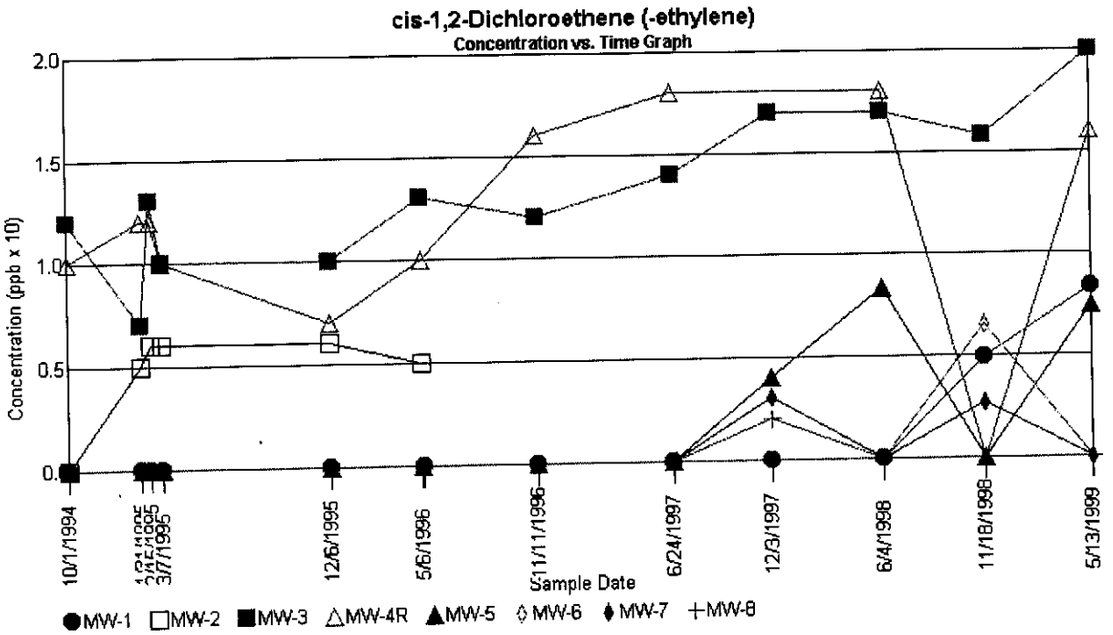

1,1-Dichloroethane
Concentration vs. Time Graph
Concentration (ppb x 10)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
10/1/1994
3/7/1995
12/6/1995
5/6/1996
11/11/1996
6/24/1997
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Sample Date
MW-1
MW-1A
MW-2
MW-3
MW-4R
MW-5
MW-7
MW-8


1,4-Dichlorobenzene
Concentration vs. Time Graph
Concentration (ppb x 1)
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.
10/1/1994
12/7/1995
5/6/1996
5/11/11/1996
6/24/1997
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Sample Date
MW-3


Benzene
Concentration vs. Time Graph
Concentration (ppb x 10)
2.0
1.5
1.0
0.5
0.
10/1/1994
12/6/1995
5/6/1996
5/11/11/1996
6/24/1997
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Sample Date
MW-1
MW-1A
MW-2
MW-3
MW-5
MW-7


Carbon Disulfide
Concentration vs. Time Graph
Concentration (ppb x 10)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.
10/1/1994
12/6/1995
5/6/1996
5/11/11/1996
6/24/1997
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Sample Date
MW-1
MW-3
MW-4R
MW-5
MW-6
MW-7
MW-8


Xylene
Concentration vs. Time Graph
Concentration (ppb x 10)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
10/1/1994
12/7/1995
5/6/1996
5/11/11/1996
6/24/1997
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Sample Date
MW-3


cis-1,2-Dichloroethene (-ethylene)
Concentration vs. Time Graph
Concentration (ppb x 10)
2.0
1.5
1.0
0.5
0.
10/1/1994
3/7/1995
12/6/1995
5/6/1996
5/11/11/1996
6/24/1997
12/3/1997
6/4/1998
11/18/1998
5/13/1999
Sample Date
MW-1
MW-2
MW-3
MW-4R
MW-5
MW-6
MW-7
MW-8

JAN 2000
Section

# Statistical Analysis Results

## Basic Statistics

**Parameter: Arsenic, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 119 |
| Pooled Mean | 8.09431 |
| Pooled Std Dev | 3.32485 |
| Background Mean | 8.26087 |
| Background Std Dev | 3.5703 |

### Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 12 | 100 | 90 |
| MW-1A | 11 | 11 | 100 | 100 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 7.5 | 2.61116 | 0 | 720 | 60 |
| MW-1A | 9.09091 | 4.36931 | 0 | 660 | 60 |

### Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 6 | 100 | 60 |
| MW-3 | 12 | 12 | 100 | 90 |
| MW-4 | 1 | 1 | 100 | 10 |
| MW-4R | 12 | 12 | 100 | 90 |
| MW-5 | 12 | 8 | 66.6667 | 115.6 |
| MW-6 | 12 | 12 | 100 | 105 |
| MW-7 | 12 | 12 | 100 | 90 |
| MW-8 | 12 | 12 | 100 | 90 |
| SW-2 | 2 | 2 | 100 | 20 |
| SW-3 | 12 | 12 | 100 | 90 |
| SW-4 | 1 | 1 | 100 | 10 |
| SW-5 | 6 | 6 | 100 | 35 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 10 | 0 | 1.73913 | 1.52845 | 360 | 60 |
| MW-3 | 7.5 | 2.61116 | -0.76087 | 1.18733 | 720 | 60 |
| MW-4 | 10 | 0 | 1.73913 | 3.40591 | 60 | 60 |
| MW-4R | 7.5 | 2.61116 | -0.76087 | 1.18733 | 720 | 60 |
| MW-5 | 9.63333 | 5.59014 | 1.37246 | 1.18733 | 966 | 80.5 |
| MW-6 | 8.75 | 4.33013 | 0.48913 | 1.18733 | 720 | 60 |
| MW-7 | 7.5 | 2.61116 | -0.76087 | 1.18733 | 720 | 60 |
| MW-8 | 7.5 | 2.61116 | -0.76087 | 1.18733 | 720 | 60 |
| SW-2 | 10 | 0 | 1.73913 | 2.458 | 120 | 60 |
| SW-3 | 7.5 | 2.61116 | -0.76087 | 1.18733 | 720 | 60 |
| SW-4 | 10 | 0 | 1.73913 | 3.40591 | 60 | 60 |
| SW-5 | 5.83333 | 2.04124 | -2.42754 | 1.52845 | 360 | 60 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 136.927 |
| SS Total | 1348.67 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 60 |
| Background Rank Sum | 1380 |
| Background Rank Mean | 60 |
| H Statistic | 3.58065 |
| H Adjusted for Ties | 37.9198 |

# Basic Statistics

**Parameter: Barium, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 50 |
| Pooled Mean | 454.602 |
| Pooled Std Dev | 522.25 |
| Background Mean | 389.826 |
| Background Std Dev | 301.806 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 6 | 50 | 2842 |
| MW-1A | 11 | 3 | 27.2727 | 6124 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 236.833 | 233.538 | 0 | 522 | 43.5 |
| MW-1A | 556.727 | 285.775 | 0 | 874.5 | 79.5 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 5 | 83.3333 | 2880 |
| MW-3 | 12 | 5 | 41.6667 | 3837 |
| MW-4 | 1 | 0 | 0 | 100 |
| MW-4R | 12 | 5 | 41.6667 | 4870 |
| MW-5 | 12 | 2 | 16.6667 | 17160 |
| MW-6 | 12 | 4 | 33.3333 | 6823 |
| MW-7 | 12 | 5 | 41.6667 | 2865 |
| MW-8 | 12 | 6 | 50 | 3345 |
| SW-2 | 2 | 2 | 100 | 600 |
| SW-3 | 12 | 5 | 41.6667 | 3274 |
| SW-4 | 1 | 1 | 100 | 500 |
| SW-5 | 6 | 1 | 16.6667 | 696 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 480 | 48.9898 | 90.1739 | 189.252 | 229.5 | 38.25 |
| MW-3 | 319.75 | 183.731 | -70.0761 | 147.014 | 750.5 | 62.5417 |
| MW-4 | 100 | 0 | -289.826 | 421.718 | 79 | 79 |
| MW-4R | 405.833 | 387.895 | 16.0072 | 147.014 | 775.5 | 64.625 |
| MW-5 | 1430 | 1034.4 | 1040.17 | 147.014 | 1192 | 99.3333 |
| MW-6 | 568.583 | 358.643 | 178.757 | 147.014 | 918 | 76.5 |
| MW-7 | 238.75 | 231.41 | -151.076 | 147.014 | 591.5 | 49.2917 |
| MW-8 | 278.75 | 198.439 | -111.076 | 147.014 | 659 | 54.9167 |
| SW-2 | 300 | 282.843 | -89.8261 | 304.349 | 51 | 25.5 |
| SW-3 | 272.833 | 244.687 | -116.993 | 147.014 | 608.5 | 50.7083 |
| SW-4 | 500 | 0 | 110.174 | 421.718 | 25.5 | 25.5 |
| SW-5 | 116 | 188.154 | -273.826 | 189.252 | 349.5 | 58.25 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 1.46973e+007 |
| SS Total | 3.32749e+007 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 25.5 |
| Background Rank Sum | 1396.5 |
| Background Rank Mean | 60.7174 |
| H Statistic | 24.5452 |
| H Adjusted for Ties | 26.3121 |

# Basic Statistics

**Parameter: Beryllium, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 92 |
| Pooled Mean | 5.84634 |
| Pooled Std Dev | 11.8194 |
| Background Mean | 3.88261 |
| Background Std Dev | 6.7446 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 12 | 100 | 41 |
| MW-1A | 11 | 7 | 63.6364 | 48.3 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 3.41667 | 6.8152 | 0 | 558 | 46.5 |
| MW-1A | 4.39091 | 6.95995 | 0 | 744.5 | 67.6818 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 6 | 100 | 35 |
| MW-3 | 12 | 10 | 83.3333 | 46.6 |
| MW-4 | 1 | 1 | 100 | 25 |
| MW-4R | 12 | 9 | 75 | 44 |
| MW-5 | 12 | 0 | 0 | 264 |
| MW-6 | 12 | 9 | 75 | 46.5 |
| MW-7 | 12 | 5 | 41.6667 | 50.7 |
| MW-8 | 12 | 12 | 100 | 41 |
| SW-2 | 2 | 2 | 100 | 27 |
| SW-3 | 12 | 12 | 100 | 41 |
| SW-4 | 1 | 1 | 100 | 2 |
| SW-5 | 6 | 6 | 100 | 7 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 5.83333 | 9.38971 | 1.95072 | 4.98012 | 279 | 46.5 |
| MW-3 | 3.88333 | 6.74063 | 0.000724638 | 3.86865 | 681 | 56.75 |
| MW-4 | 25 | 0 | 21.1174 | 11.0974 | 46.5 | 46.5 |
| MW-4R | 3.66667 | 6.77339 | -0.215942 | 3.86865 | 721.5 | 60.125 |
| MW-5 | 22 | 27.1963 | 18.1174 | 3.86865 | 1391 | 115.917 |
| MW-6 | 3.875 | 6.68827 | -0.0076087 | 3.86865 | 733.5 | 61.125 |
| MW-7 | 4.225 | 6.79895 | 0.342391 | 3.86865 | 936.5 | 78.0417 |
| MW-8 | 3.41667 | 6.8152 | -0.465942 | 3.86865 | 558 | 46.5 |
| SW-2 | 13.5 | 16.2635 | 9.61739 | 8.00887 | 93 | 46.5 |
| SW-3 | 3.41667 | 6.8152 | -0.465942 | 3.86865 | 558 | 46.5 |
| SW-4 | 2 | 0 | -1.88261 | 11.0974 | 46.5 | 46.5 |
| SW-5 | 1.16667 | 0.408248 | -2.71594 | 4.98012 | 279 | 46.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 4178.75 |
| SS Total | 17043.1 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 46.5 |
| Background Rank Sum | 1302.5 |
| Background Rank Mean | 56.6304 |
| H Statistic | 38.2591 |
| H Adjusted for Ties | 65.7863 |

# Basic Statistics

**Parameter: Cadmium, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 105 |
| Pooled Mean | 1.44878 |
| Pooled Std Dev | 1.72856 |
| Background Mean | 1 |
| Background Std Dev | 0 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 11 | 91.6667 | 12 |
| MW-1A | 11 | 11 | 100 | 11 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 1 | 0 | 0 | 689 | 57.4167 |
| MW-1A | 1 | 0 | 0 | 583 | 53 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 5 | 83.3333 | 9 |
| MW-3 | 12 | 12 | 100 | 12 |
| MW-4 | 1 | 1 | 100 | 1 |
| MW-4R | 12 | 2 | 16.6667 | 56.2 |
| MW-5 | 12 | 7 | 58.3333 | 20 |
| MW-6 | 12 | 12 | 100 | 12 |
| MW-7 | 12 | 12 | 100 | 12 |
| MW-8 | 12 | 11 | 91.6667 | 12 |
| SW-2 | 2 | 2 | 100 | 2 |
| SW-3 | 12 | 12 | 100 | 12 |
| SW-4 | 1 | 1 | 100 | 1 |
| SW-5 | 6 | 6 | 100 | 6 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 1.5 | 1.22474 | 0.5 | 0.650766 | 382 | 63.6667 |
| MW-3 | 1 | 0 | 0 | 0.505528 | 636 | 53 |
| MW-4 | 1 | 0 | 0 | 1.45013 | 53 | 53 |
| MW-4R | 4.68333 | 4.19412 | 3.68333 | 0.505528 | 1269 | 105.75 |
| MW-5 | 1.66667 | 1.30268 | 0.666667 | 0.505528 | 937 | 78.0833 |
| MW-6 | 1 | 0 | 0 | 0.505528 | 636 | 53 |
| MW-7 | 1 | 0 | 0 | 0.505528 | 636 | 53 |
| MW-8 | 1 | 0 | 0 | 0.505528 | 692 | 57.6667 |
| SW-2 | 1 | 0 | 0 | 1.04654 | 106 | 53 |
| SW-3 | 1 | 0 | 0 | 0.505528 | 636 | 53 |
| SW-4 | 1 | 0 | 0 | 1.45013 | 53 | 53 |
| SW-5 | 1 | 0 | 0 | 0.650766 | 318 | 53 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 144.864 |
| SS Total | 364.527 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 53 |
| Background Rank Sum | 1272 |
| Background Rank Mean | 55.3043 |
| H Statistic | 25.2116 |
| H Adjusted for Ties | 66.7104 |

# Basic Statistics

**Parameter: Chromium, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 40 |
| Pooled Mean | 88.572 |
| Pooled Std Dev | 240.217 |
| Background Mean | 63.4913 |
| Background Std Dev | 116.529 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 4 | 33.3333 | 108.3 |
| MW-1A | 11 | 1 | 9.09091 | 1352 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 9.025 | 6.63244 | 0 | 523 | 43.5833 |
| MW-1A | 122.909 | 149.606 | 0 | 961.5 | 87.4091 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 3 | 50 | 125 |
| MW-3 | 12 | 3 | 25 | 483 |
| MW-4 | 1 | 0 | 0 | 15 |
| MW-4R | 12 | 3 | 25 | 498.2 |
| MW-5 | 12 | 0 | 0 | 6697 |
| MW-6 | 12 | 1 | 8.33333 | 1087 |
| MW-7 | 12 | 2 | 16.6667 | 240 |
| MW-8 | 12 | 3 | 25 | 168 |
| SW-2 | 2 | 2 | 100 | 15 |
| SW-3 | 12 | 11 | 91.6667 | 77.18 |
| SW-4 | 1 | 1 | 100 | 10 |
| SW-5 | 6 | 6 | 100 | 18.67 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 20.8333 | 21.5074 | -42.658 | 87.2756 | 290.5 | 48.4167 |
| MW-3 | 40.25 | 52.1573 | -23.2413 | 67.7974 | 774.5 | 64.5417 |
| MW-4 | 15 | 0 | -48.4913 | 194.48 | 68 | 68 |
| MW-4R | 41.5167 | 78.6421 | -21.9746 | 67.7974 | 737.5 | 61.4583 |
| MW-5 | 558.083 | 566.37 | 494.592 | 67.7974 | 1310 | 109.167 |
| MW-6 | 90.5833 | 92.6101 | 27.092 | 67.7974 | 1045.5 | 87.125 |
| MW-7 | 20 | 13.7576 | -43.4913 | 67.7974 | 772 | 64.3333 |
| MW-8 | 14 | 9.77604 | -49.4913 | 67.7974 | 666.5 | 55.5417 |
| SW-2 | 7.5 | 3.53553 | -55.9913 | 140.354 | 41 | 20.5 |
| SW-3 | 6.43167 | 4.67718 | -57.0596 | 67.7974 | 292.5 | 24.375 |
| SW-4 | 10 | 0 | -53.4913 | 194.48 | 20.5 | 20.5 |
| SW-5 | 3.11167 | 3.41626 | -60.3796 | 87.2756 | 123 | 20.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 3.08904e+006 |
| SS Total | 7.03991e+006 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 20.5 |
| Background Rank Sum | 1484.5 |
| Background Rank Mean | 64.5435 |
| H Statistic | 54.0505 |
| H Adjusted for Ties | 55.9745 |

# Basic Statistics

**Parameter: Cobalt, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 26 |
| Pooled Mean | 108.005 |
| Pooled Std Dev | 198.161 |
| Background Mean | 44.5565 |
| Background Std Dev | 60.6607 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 6 | 50 | 191.8 |
| MW-1A | 11 | 0 | 0 | 833 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 15.9833 | 26.6745 | 0 | 312 | 26 |
| MW-1A | 75.7273 | 72.5549 | 0 | 830 | 75.4545 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 0 | 0 | 1044 |
| MW-3 | 12 | 1 | 8.33333 | 318.7 |
| MW-4 | 1 | 0 | 0 | 320 |
| MW-4R | 12 | 0 | 0 | 3797 |
| MW-5 | 12 | 0 | 0 | 5208 |
| MW-6 | 12 | 1 | 8.33333 | 601 |
| MW-7 | 12 | 3 | 25 | 209.2 |
| MW-8 | 12 | 5 | 41.6667 | 207.7 |
| SW-2 | 2 | 2 | 100 | 110 |
| SW-3 | 12 | 6 | 50 | 364.7 |
| SW-4 | 1 | 1 | 100 | 10 |
| SW-5 | 6 | 1 | 16.6667 | 69.5 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 174 | 49.8076 | 129.443 | 67.3062 | 596 | 99.3333 |
| MW-3 | 26.5583 | 24.8931 | -17.9982 | 52.2847 | 703.5 | 58.625 |
| MW-4 | 320 | 0 | 275.443 | 149.981 | 112 | 112 |
| MW-4R | 316.417 | 149.909 | 271.86 | 52.2847 | 1308 | 109 |
| MW-5 | 434 | 421.608 | 389.443 | 52.2847 | 1269 | 105.75 |
| MW-6 | 50.0833 | 33.4676 | 5.52681 | 52.2847 | 859.5 | 71.625 |
| MW-7 | 17.4333 | 26.2687 | -27.1232 | 52.2847 | 466.5 | 38.875 |
| MW-8 | 17.3083 | 26.5912 | -27.2482 | 52.2847 | 430.5 | 35.875 |
| SW-2 | 55 | 63.6396 | 10.4435 | 108.24 | 27 | 13.5 |
| SW-3 | 30.3917 | 56.7895 | -14.1649 | 52.2847 | 435 | 36.25 |
| SW-4 | 10 | 0 | -34.5565 | 149.981 | 13.5 | 13.5 |
| SW-5 | 11.5833 | 8.20352 | -32.9732 | 67.3062 | 263.5 | 43.9167 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 2.44095e+006 |
| SS Total | 4.79068e+006 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 13.5 |
| Background Rank Sum | 1142 |
| Background Rank Mean | 49.6522 |
| H Statistic | 76.0641 |
| H Adjusted for Ties | 76.7884 |

# Basic Statistics

**Parameter: Copper, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 85 |
| Pooled Mean | 146.951 |
| Pooled Std Dev | 178.263 |
| Background Mean | 126.304 |
| Background Std Dev | 92.3198 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 10 | 83.3333 | 1186 |
| MW-1A | 11 | 6 | 54.5455 | 1719 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 98.8333 | 92.9602 | 0 | 620 | 51.6667 |
| MW-1A | 156.273 | 85.7392 | 0 | 794 | 72.1818 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 5 | 83.3333 | 1220 |
| MW-3 | 12 | 7 | 58.3333 | 1333 |
| MW-4 | 1 | 1 | 100 | 100 |
| MW-4R | 12 | 7 | 58.3333 | 1343 |
| MW-5 | 12 | 3 | 25 | 5495 |
| MW-6 | 12 | 8 | 66.6667 | 1369 |
| MW-7 | 12 | 7 | 58.3333 | 1203 |
| MW-8 | 12 | 10 | 83.3333 | 1213 |
| SW-2 | 2 | 2 | 100 | 300 |
| SW-3 | 12 | 12 | 100 | 1152 |
| SW-4 | 1 | 1 | 100 | 200 |
| SW-5 | 6 | 6 | 100 | 242 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 203.333 | 8.16497 | 77.029 | 69.0035 | 329 | 54.8333 |
| MW-3 | 111.083 | 84.181 | -15.221 | 53.6033 | 796 | 66.3333 |
| MW-4 | 100 | 0 | -26.3043 | 153.764 | 43 | 43 |
| MW-4R | 111.917 | 99.9076 | -14.3877 | 53.6033 | 798 | 66.5 |
| MW-5 | 457.917 | 395.763 | 331.612 | 53.6033 | 1182 | 98.5 |
| MW-6 | 114.083 | 80.6017 | -12.221 | 53.6033 | 763 | 63.5833 |
| MW-7 | 100.25 | 91.2032 | -26.0543 | 53.6033 | 767 | 63.9167 |
| MW-8 | 101.083 | 91.2812 | -25.221 | 53.6033 | 631 | 52.5833 |
| SW-2 | 150 | 70.7107 | 23.6957 | 110.969 | 86 | 43 |
| SW-3 | 96 | 95.3043 | -30.3043 | 53.6033 | 516 | 43 |
| SW-4 | 200 | 0 | 73.6957 | 153.764 | 43 | 43 |
| SW-5 | 40.3333 | 78.2858 | -85.971 | 69.0035 | 258 | 43 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 1.40715e+006 |
| SS Total | 3.87689e+006 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 43 |
| Background Rank Sum | 1414 |
| Background Rank Mean | 61.4783 |
| H Statistic | 20.3383 |
| H Adjusted for Ties | 30.3556 |

# Basic Statistics

**Parameter: Lead, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 74 |
| Pooled Mean | 21.2175 |
| Pooled Std Dev | 35.4242 |
| Background Mean | 19.6957 |
| Background Std Dev | 22.2923 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 10 | 83.3333 | 93 |
| MW-1A | 11 | 4 | 36.3636 | 360 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 7.75 | 2.49089 | 0 | 533 | 44.4167 |
| MW-1A | 32.7273 | 26.9892 | 0 | 890 | 80.9091 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 5 | 83.3333 | 74 |
| MW-3 | 12 | 6 | 50 | 451 |
| MW-4 | 1 | 1 | 100 | 10 |
| MW-4R | 12 | 5 | 41.6667 | 229.5 |
| MW-5 | 12 | 1 | 8.33333 | 884 |
| MW-6 | 12 | 5 | 41.6667 | 148.2 |
| MW-7 | 12 | 8 | 66.6667 | 104.4 |
| MW-8 | 12 | 10 | 83.3333 | 99 |
| SW-2 | 2 | 2 | 100 | 20 |
| SW-3 | 12 | 11 | 91.6667 | 90.2 |
| SW-4 | 1 | 1 | 100 | 10 |
| SW-5 | 6 | 5 | 83.3333 | 36.45 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 12.3333 | 5.71548 | -7.36232 | 14.142 | 289.5 | 48.25 |
| MW-3 | 37.5833 | 48.6667 | 17.8877 | 10.9858 | 865 | 72.0833 |
| MW-4 | 10 | 0 | -9.69565 | 31.5133 | 37.5 | 37.5 |
| MW-4R | 19.125 | 26.5764 | -0.570652 | 10.9858 | 843.5 | 70.2917 |
| MW-5 | 73.6667 | 74.8639 | 53.971 | 10.9858 | 1259.5 | 104.958 |
| MW-6 | 12.35 | 6.42559 | -7.34565 | 10.9858 | 845.5 | 70.4583 |
| MW-7 | 8.7 | 2.26194 | -10.9957 | 10.9858 | 638 | 53.1667 |
| MW-8 | 8.25 | 2.83244 | -11.4457 | 10.9858 | 547 | 45.5833 |
| SW-2 | 10 | 0 | -9.69565 | 22.7428 | 75 | 37.5 |
| SW-3 | 7.51667 | 2.59434 | -12.179 | 10.9858 | 488.5 | 40.7083 |
| SW-4 | 10 | 0 | -9.69565 | 31.5133 | 37.5 | 37.5 |
| SW-5 | 6.075 | 3.86701 | -13.6207 | 14.142 | 276.5 | 46.0833 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 49358.3 |
| SS Total | 153094 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 37.5 |
| Background Rank Sum | 1423 |
| Background Rank Mean | 61.8696 |
| H Statistic | 31.247 |
| H Adjusted for Ties | 39.9442 |

# Basic Statistics

**Parameter: Mercury**

| | |
|---|---|
| Total Observations | 53 |
| Total Non-Detects | 34 |
| Pooled Mean | 1.29453 |
| Pooled Std Dev | 2.32529 |
| Background Mean | 0.709091 |
| Background Std Dev | 0.561168 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 6 | 5 | 83.3333 | 2.1 |
| MW-1A | 5 | 1 | 20 | 5.7 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 0.35 | 0.320936 | 0 | 123.5 | 20.5833 |
| MW-1A | 1.14 | 0.482701 | 0 | 184.5 | 36.9 |

## Compliance Wells

There are 9 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 1 | 1 | 100 | 1 |
| MW-3 | 6 | 6 | 100 | 2 |
| MW-4R | 6 | 4 | 66.6667 | 2.3 |
| MW-5 | 6 | 6 | 100 | 2 |
| MW-6 | 6 | 0 | 0 | 32.9 |
| MW-7 | 6 | 6 | 100 | 2 |
| MW-8 | 6 | 1 | 16.6667 | 16.75 |
| SW-3 | 3 | 2 | 66.6667 | 1.46 |
| SW-5 | 2 | 2 | 100 | 0.4 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 1 | 0 | 0.290909 | 1.844 | 17.5 | 17.5 |
| MW-3 | 0.333333 | 0.326599 | -0.375758 | 0.896023 | 105 | 17.5 |
| MW-4R | 0.383333 | 0.312517 | -0.325758 | 0.896023 | 146 | 24.3333 |
| MW-5 | 0.333333 | 0.326599 | -0.375758 | 0.896023 | 105 | 17.5 |
| MW-6 | 5.48333 | 4.39973 | 4.77424 | 0.896023 | 290 | 48.3333 |
| MW-7 | 0.333333 | 0.326599 | -0.375758 | 0.896023 | 105 | 17.5 |
| MW-8 | 2.79167 | 2.45732 | 2.08258 | 0.896023 | 249.5 | 41.5833 |
| SW-3 | 0.486667 | 0.445571 | -0.222424 | 1.14994 | 70 | 23.3333 |
| SW-5 | 0.2 | 0 | -0.509091 | 1.35715 | 35 | 17.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 150.25 |
| SS Total | 281.163 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 17.5 |
| Background Rank Sum | 308 |
| Background Rank Mean | 28 |
| H Statistic | 25.1403 |
| H Adjusted for Ties | 34.1519 |

# Basic Statistics

**Parameter: Nickel, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 78 |
| Pooled Mean | 137.656 |
| Pooled Std Dev | 247.625 |
| Background Mean | 70.4783 |
| Background Std Dev | 44.8481 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 11 | 91.6667 | 614 |
| MW-1A | 11 | 5 | 45.4545 | 1007 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 51.1667 | 18.5366 | 0 | 515.5 | 42.9583 |
| MW-1A | 91.5455 | 55.7788 | 0 | 787.5 | 71.5909 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 6 | 100 | 350 |
| MW-3 | 12 | 1 | 8.33333 | 3949 |
| MW-4 | 1 | 1 | 100 | 100 |
| MW-4R | 12 | 5 | 41.6667 | 1163 |
| MW-5 | 12 | 2 | 16.6667 | 6532 |
| MW-6 | 12 | 6 | 50 | 889 |
| MW-7 | 12 | 11 | 91.6667 | 638 |
| MW-8 | 12 | 11 | 91.6667 | 608.5 |
| SW-2 | 2 | 2 | 100 | 150 |
| SW-3 | 12 | 11 | 91.6667 | 609.2 |
| SW-4 | 1 | 0 | 0 | 67 |
| SW-5 | 6 | 6 | 100 | 255 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 58.3333 | 20.4124 | -12.1449 | 93.1596 | 237 | 39.5 |
| MW-3 | 329.083 | 326.88 | 258.605 | 72.3682 | 1239.5 | 103.292 |
| MW-4 | 100 | 0 | 29.5217 | 207.592 | 39.5 | 39.5 |
| MW-4R | 96.9167 | 147.081 | 26.4384 | 72.3682 | 845.5 | 70.4583 |
| MW-5 | 544.333 | 524.099 | 473.855 | 72.3682 | 1212 | 101 |
| MW-6 | 74.0833 | 38.0776 | 3.60507 | 72.3682 | 797 | 66.4167 |
| MW-7 | 53.1667 | 15.1468 | -17.3116 | 72.3682 | 517.5 | 43.125 |
| MW-8 | 50.7083 | 19.5779 | -19.7699 | 72.3682 | 513.5 | 42.7917 |
| SW-2 | 75 | 35.3553 | 4.52174 | 149.816 | 79 | 39.5 |
| SW-3 | 50.7667 | 19.4413 | -19.7116 | 72.3682 | 514.5 | 42.875 |
| SW-4 | 67 | 0 | -3.47826 | 207.592 | 91 | 91 |
| SW-5 | 42.5 | 18.3712 | -27.9783 | 93.1596 | 237 | 39.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 2.97926e+006 |
| SS Total | 7.48082e+006 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 39.5 |
| Background Rank Sum | 1303 |
| Background Rank Mean | 56.6522 |
| H Statistic | 48.7719 |
| H Adjusted for Ties | 65.4649 |

# Basic Statistics

**Parameter: Vanadium**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 64 |
| Pooled Mean | 96.6106 |
| Pooled Std Dev | 238.735 |
| Background Mean | 69.8478 |
| Background Std Dev | 88.642 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 8 | 66.6667 | 315.5 |
| MW-1A | 11 | 4 | 36.3636 | 1291 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 26.2917 | 18.0082 | 0 | 551 | 45.9167 |
| MW-1A | 117.364 | 110.315 | 0 | 853 | 77.5455 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 5 | 83.3333 | 340 |
| MW-3 | 12 | 6 | 50 | 486 |
| MW-4 | 1 | 1 | 100 | 50 |
| MW-4R | 12 | 3 | 25 | 994 |
| MW-5 | 12 | 0 | 0 | 6515 |
| MW-6 | 12 | 5 | 41.6667 | 601 |
| MW-7 | 12 | 5 | 41.6667 | 414 |
| MW-8 | 12 | 7 | 58.3333 | 394.6 |
| SW-2 | 2 | 2 | 100 | 90 |
| SW-3 | 12 | 11 | 91.6667 | 287 |
| SW-4 | 1 | 1 | 100 | 40 |
| SW-5 | 6 | 6 | 100 | 65 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 56.6667 | 40.8248 | -13.1812 | 90.0931 | 271.5 | 45.25 |
| MW-3 | 40.5 | 26.8684 | -29.3478 | 69.9861 | 719 | 59.9167 |
| MW-4 | 50 | 0 | -19.8478 | 200.758 | 32.5 | 32.5 |
| MW-4R | 82.8333 | 161.987 | 12.9855 | 69.9861 | 917.5 | 76.4583 |
| MW-5 | 542.917 | 584.029 | 473.069 | 69.9861 | 1364 | 113.667 |
| MW-6 | 50.0833 | 39.1325 | -19.7645 | 69.9861 | 786.5 | 65.5417 |
| MW-7 | 34.5 | 13.4941 | -35.3478 | 69.9861 | 773.5 | 64.4583 |
| MW-8 | 32.8833 | 19.2953 | -36.9645 | 69.9861 | 631.5 | 52.625 |
| SW-2 | 45 | 7.07107 | -24.8478 | 144.885 | 65 | 32.5 |
| SW-3 | 23.9167 | 18.8412 | -45.9312 | 69.9861 | 433.5 | 36.125 |
| SW-4 | 40 | 0 | -29.8478 | 200.758 | 32.5 | 32.5 |
| SW-5 | 10.8333 | 14.2887 | -59.0145 | 90.0931 | 195 | 32.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 2.74324e+006 |
| SS Total | 6.95333e+006 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 32.5 |
| Background Rank Sum | 1404 |
| Background Rank Mean | 61.0435 |
| H Statistic | 42.7323 |
| H Adjusted for Ties | 49.7377 |

# Basic Statistics

**Parameter: Zinc, total**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 36 |
| Pooled Mean | 207.545 |
| Pooled Std Dev | 523.408 |
| Background Mean | 104.13 |
| Background Std Dev | 100.44 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 4 | 33.3333 | 654 |
| MW-1A | 11 | 1 | 9.09091 | 1741 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 54.5 | 33.7221 | 0 | 595 | 49.5833 |
| MW-1A | 158.273 | 121.502 | 0 | 879.5 | 79.9545 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 3 | 50 | 493 |
| MW-3 | 12 | 5 | 41.6667 | 803 |
| MW-4 | 1 | 1 | 100 | 50 |
| MW-4R | 12 | 1 | 8.33333 | 1631 |
| MW-5 | 12 | 0 | 0 | 16313 |
| MW-6 | 12 | 4 | 33.3333 | 1050 |
| MW-7 | 12 | 2 | 16.6667 | 892 |
| MW-8 | 12 | 3 | 25 | 768 |
| SW-2 | 2 | 2 | 100 | 100 |
| SW-3 | 12 | 6 | 50 | 403 |
| SW-4 | 1 | 1 | 100 | 50 |
| SW-5 | 6 | 3 | 50 | 580 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 82.1667 | 63.2785 | -21.9638 | 173.594 | 301.5 | 50.25 |
| MW-3 | 66.9167 | 35.8163 | -37.2138 | 134.851 | 601.5 | 50.125 |
| MW-4 | 50 | 0 | -54.1304 | 386.826 | 18.5 | 18.5 |
| MW-4R | 135.917 | 203.374 | 31.7862 | 134.851 | 884.5 | 73.7083 |
| MW-5 | 1359.42 | 1159.02 | 1255.29 | 134.851 | 1388 | 115.667 |
| MW-6 | 87.5 | 51.5479 | -16.6304 | 134.851 | 741 | 61.75 |
| MW-7 | 74.3333 | 40.7795 | -29.7971 | 134.851 | 762 | 63.5 |
| MW-8 | 64 | 39.1129 | -40.1304 | 134.851 | 706.5 | 58.875 |
| SW-2 | 50 | 0 | -54.1304 | 279.168 | 37 | 18.5 |
| SW-3 | 33.5833 | 20.6153 | -70.5471 | 134.851 | 410 | 34.1667 |
| SW-4 | 50 | 0 | -54.1304 | 386.826 | 18.5 | 18.5 |
| SW-5 | 96.6667 | 164.691 | -7.46377 | 173.594 | 282.5 | 47.0833 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 1.7792e+007 |
| SS Total | 3.34226e+007 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 18.5 |
| Background Rank Sum | 1474.5 |
| Background Rank Mean | 64.1087 |
| H Statistic | 44.9839 |
| H Adjusted for Ties | 46.1399 |

# Basic Statistics

**Parameter: 1,1-Dichloroethane**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 43 |
| Pooled Mean | 11.2049 |
| Pooled Std Dev | 6.93801 |
| Background Mean | 11.1348 |
| Background Std Dev | 6.84036 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 0 | 0 | 207.1 |
| MW-1A | 11 | 10 | 90.9091 | 49 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 17.2583 | 2.59035 | 0 | 1170 | 97.5 |
| MW-1A | 4.45455 | 1.21356 | 0 | 264 | 24 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 0 | 0 | 141 |
| MW-3 | 12 | 3 | 25 | 116 |
| MW-4 | 2 | 0 | 0 | 30 |
| MW-4R | 11 | 0 | 0 | 150.1 |
| MW-5 | 12 | 0 | 0 | 166.2 |
| MW-6 | 12 | 12 | 100 | 53 |
| MW-7 | 12 | 0 | 0 | 234.8 |
| MW-8 | 12 | 0 | 0 | 123 |
| SW-2 | 2 | 1 | 50 | 17 |
| SW-3 | 12 | 11 | 91.6667 | 57 |
| SW-4 | 1 | 1 | 100 | 5 |
| SW-5 | 6 | 5 | 83.3333 | 29 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 23.5 | 7.55645 | 12.3652 | 1.76634 | 648 | 108 |
| MW-3 | 9.66667 | 5.8864 | -1.46812 | 1.37213 | 689 | 57.4167 |
| MW-4 | 15 | 1.41421 | 3.86522 | 2.84058 | 173 | 86.5 |
| MW-4R | 13.6455 | 2.52641 | 2.51067 | 1.41252 | 889 | 80.8182 |
| MW-5 | 13.85 | 4.31246 | 2.71522 | 1.37213 | 977 | 81.4167 |
| MW-6 | 4.41667 | 1.37895 | -6.71812 | 1.37213 | 264 | 22 |
| MW-7 | 19.5667 | 6.41863 | 8.43188 | 1.37213 | 1219 | 101.583 |
| MW-8 | 10.25 | 1.93132 | -0.884783 | 1.37213 | 758 | 63.1667 |
| SW-2 | 8.5 | 4.94975 | -2.63478 | 2.84058 | 95 | 47.5 |
| SW-3 | 4.75 | 1.91288 | -6.38478 | 1.37213 | 300 | 25 |
| SW-4 | 5 | 0 | -6.13478 | 3.93602 | 22 | 22 |
| SW-5 | 4.83333 | 1.60208 | -6.30145 | 1.76634 | 158 | 26.3333 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 4254.3 |
| SS Total | 5872.6 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 22 |
| Background Rank Sum | 1434 |
| Background Rank Mean | 62.3478 |
| H Statistic | 68.1907 |
| H Adjusted for Ties | 71.2327 |

# Basic Statistics

**Parameter: 1,4-Dichlorobenzene**

| | |
|---|---|
| Total Observations | 124 |
| Total Non-Detects | 118 |
| Pooled Mean | 5.14355 |
| Pooled Std Dev | 1.65565 |
| Background Mean | 5.17391 |
| Background Std Dev | 1.74908 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 12 | 100 | 62 |
| MW-1A | 11 | 11 | 100 | 57 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 5.16667 | 1.74946 | 0 | 714 | 59.5 |
| MW-1A | 5.18182 | 1.83402 | 0 | 654.5 | 59.5 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 6 | 100 | 30 |
| MW-3 | 12 | 7 | 58.3333 | 70.8 |
| MW-4 | 2 | 1 | 50 | 8 |
| MW-4R | 12 | 12 | 100 | 62 |
| MW-5 | 12 | 12 | 100 | 62 |
| MW-6 | 12 | 12 | 100 | 62 |
| MW-7 | 12 | 12 | 100 | 62 |
| MW-8 | 12 | 12 | 100 | 62 |
| SW-2 | 2 | 2 | 100 | 10 |
| SW-3 | 12 | 12 | 100 | 53 |
| SW-4 | 1 | 1 | 100 | 5 |
| SW-5 | 6 | 6 | 100 | 32 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 5 | 0 | -0.173913 | 0.782959 | 357 | 59.5 |
| MW-3 | 5.9 | 1.62369 | 0.726087 | 0.608217 | 1026.5 | 85.5417 |
| MW-4 | 4 | 1.41421 | -1.17391 | 1.25913 | 178.5 | 89.25 |
| MW-4R | 5.16667 | 1.74946 | -0.00724638 | 0.608217 | 714 | 59.5 |
| MW-5 | 5.16667 | 1.74946 | -0.00724638 | 0.608217 | 714 | 59.5 |
| MW-6 | 5.16667 | 1.74946 | -0.00724638 | 0.608217 | 714 | 59.5 |
| MW-7 | 5.16667 | 1.74946 | -0.00724638 | 0.608217 | 714 | 59.5 |
| MW-8 | 5.16667 | 1.74946 | -0.00724638 | 0.608217 | 714 | 59.5 |
| SW-2 | 5 | 0 | -0.173913 | 1.25913 | 119 | 59.5 |
| SW-3 | 4.41667 | 1.37895 | -0.757246 | 0.608217 | 714 | 59.5 |
| SW-4 | 5 | 0 | -0.173913 | 1.7447 | 59.5 | 59.5 |
| SW-5 | 5.33333 | 2.58199 | 0.15942 | 0.782959 | 357 | 59.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 16.2785 |
| SS Total | 337.165 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 59.5 |
| Background Rank Sum | 1368.5 |
| Background Rank Mean | 59.5 |
| H Statistic | 6.80682 |
| H Adjusted for Ties | 49.2333 |

# Basic Statistics

**Parameter: Benzene**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 102 |
| Pooled Mean | 4.85203 |
| Pooled Std Dev | 1.58613 |
| Background Mean | 4.5087 |
| Background Std Dev | 1.2236 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 10 | 83.3333 | 55.7 |
| MW-1A | 11 | 11 | 100 | 48 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 4.64167 | 1.04225 | 0 | 734 | 61.1667 |
| MW-1A | 4.36364 | 1.43337 | 0 | 566.5 | 51.5 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 3 | 50 | 30 |
| MW-3 | 12 | 2 | 16.6667 | 93.7 |
| MW-4 | 2 | 1 | 50 | 9 |
| MW-4R | 11 | 10 | 90.9091 | 52.3 |
| MW-5 | 12 | 9 | 75 | 57.1 |
| MW-6 | 12 | 12 | 100 | 53 |
| MW-7 | 12 | 11 | 91.6667 | 54 |
| MW-8 | 12 | 12 | 100 | 53 |
| SW-2 | 2 | 2 | 100 | 10 |
| SW-3 | 12 | 12 | 100 | 53 |
| SW-4 | 1 | 1 | 100 | 5 |
| SW-5 | 6 | 6 | 100 | 23 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 5 | 0 | 0.491304 | 0.595121 | 484.5 | 80.75 |
| MW-3 | 7.80833 | 1.96767 | 3.29964 | 0.462301 | 1288 | 107.333 |
| MW-4 | 4.5 | 0.707107 | -0.00869565 | 0.957054 | 158.5 | 79.25 |
| MW-4R | 4.75455 | 0.814081 | 0.24585 | 0.47591 | 619 | 56.2727 |
| MW-5 | 4.75833 | 0.792531 | 0.249638 | 0.462301 | 788.5 | 65.7083 |
| MW-6 | 4.41667 | 1.37895 | -0.092029 | 0.462301 | 618 | 51.5 |
| MW-7 | 4.5 | 1.16775 | -0.00869565 | 0.462301 | 669.5 | 55.7917 |
| MW-8 | 4.41667 | 1.37895 | -0.092029 | 0.462301 | 618 | 51.5 |
| SW-2 | 5 | 0 | 0.491304 | 0.957054 | 103 | 51.5 |
| SW-3 | 4.41667 | 1.37895 | -0.092029 | 0.462301 | 618 | 51.5 |
| SW-4 | 5 | 0 | 0.491304 | 1.32613 | 51.5 | 51.5 |
| SW-5 | 3.83333 | 1.83485 | -0.675362 | 0.595121 | 309 | 51.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 123.223 |
| SS Total | 306.927 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 51.5 |
| Background Rank Sum | 1300.5 |
| Background Rank Mean | 56.5435 |
| H Statistic | 26.7508 |
| H Adjusted for Ties | 62.2486 |

# Basic Statistics

**Parameter: Bromoform**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 122 |
| Pooled Mean | 4.45854 |
| Pooled Std Dev | 1.32039 |
| Background Mean | 4.43478 |
| Background Std Dev | 1.27301 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 12 | 100 | 54 |
| MW-1A | 11 | 11 | 100 | 48 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 4.5 | 1.16775 | 0 | 738 | 61.5 |
| MW-1A | 4.36364 | 1.43337 | 0 | 676.5 | 61.5 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 6 | 100 | 30 |
| MW-3 | 12 | 12 | 100 | 53 |
| MW-4 | 2 | 2 | 100 | 6 |
| MW-4R | 11 | 11 | 100 | 52 |
| MW-5 | 12 | 11 | 91.6667 | 55.4 |
| MW-6 | 12 | 12 | 100 | 53 |
| MW-7 | 12 | 12 | 100 | 53 |
| MW-8 | 12 | 12 | 100 | 53 |
| SW-2 | 2 | 2 | 100 | 10 |
| SW-3 | 12 | 12 | 100 | 53 |
| SW-4 | 1 | 1 | 100 | 5 |
| SW-5 | 6 | 6 | 100 | 23 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 5 | 0 | 0.565217 | 0.624271 | 369 | 61.5 |
| MW-3 | 4.41667 | 1.37895 | -0.0181159 | 0.484946 | 738 | 61.5 |
| MW-4 | 3 | 2.82843 | -1.43478 | 1.00393 | 123 | 61.5 |
| MW-4R | 4.72727 | 0.904534 | 0.29249 | 0.499221 | 676.5 | 61.5 |
| MW-5 | 4.61667 | 1.62359 | 0.181884 | 0.484946 | 799.5 | 66.625 |
| MW-6 | 4.41667 | 1.37895 | -0.0181159 | 0.484946 | 738 | 61.5 |
| MW-7 | 4.41667 | 1.37895 | -0.0181159 | 0.484946 | 738 | 61.5 |
| MW-8 | 4.41667 | 1.37895 | -0.0181159 | 0.484946 | 738 | 61.5 |
| SW-2 | 5 | 0 | 0.565217 | 1.00393 | 123 | 61.5 |
| SW-3 | 4.41667 | 1.37895 | -0.0181159 | 0.484946 | 738 | 61.5 |
| SW-4 | 5 | 0 | 0.565217 | 1.39109 | 61.5 | 61.5 |
| SW-5 | 3.83333 | 1.83485 | -0.601449 | 0.624271 | 369 | 61.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 10.5579 |
| SS Total | 212.699 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 61.5 |
| Background Rank Sum | 1414.5 |
| Background Rank Mean | 61.5 |
| H Statistic | 0.22379 |
| H Adjusted for Ties | 9.25 |

# Basic Statistics

**Parameter: Bromomethane**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 122 |
| Pooled Mean | 8.63415 |
| Pooled Std Dev | 3.14217 |
| Background Mean | 8.56522 |
| Background Std Dev | 3.20264 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 12 | 100 | 104 |
| MW-1A | 11 | 11 | 100 | 93 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 8.66667 | 3.114 | 0 | 738 | 61.5 |
| MW-1A | 8.45455 | 3.44568 | 0 | 676.5 | 61.5 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 6 | 100 | 60 |
| MW-3 | 12 | 12 | 100 | 103 |
| MW-4 | 2 | 2 | 100 | 11 |
| MW-4R | 11 | 11 | 100 | 102 |
| MW-5 | 12 | 12 | 100 | 103 |
| MW-6 | 12 | 12 | 100 | 103 |
| MW-7 | 12 | 12 | 100 | 103 |
| MW-8 | 12 | 12 | 100 | 103 |
| SW-2 | 2 | 2 | 100 | 20 |
| SW-3 | 12 | 11 | 91.6667 | 104 |
| SW-4 | 1 | 1 | 100 | 10 |
| SW-5 | 6 | 6 | 100 | 43 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 10 | 0 | 1.43478 | 1.4891 | 369 | 61.5 |
| MW-3 | 8.58333 | 3.31548 | 0.0181159 | 1.15677 | 738 | 61.5 |
| MW-4 | 5.5 | 6.36396 | -3.06522 | 2.39473 | 123 | 61.5 |
| MW-4R | 9.27273 | 2.41209 | 0.70751 | 1.19082 | 676.5 | 61.5 |
| MW-5 | 8.58333 | 3.31548 | 0.0181159 | 1.15677 | 738 | 61.5 |
| MW-6 | 8.58333 | 3.31548 | 0.0181159 | 1.15677 | 738 | 61.5 |
| MW-7 | 8.58333 | 3.31548 | 0.0181159 | 1.15677 | 738 | 61.5 |
| MW-8 | 8.58333 | 3.31548 | 0.0181159 | 1.15677 | 738 | 61.5 |
| SW-2 | 10 | 0 | 1.43478 | 2.39473 | 123 | 61.5 |
| SW-3 | 8.66667 | 3.3665 | 0.101449 | 1.15677 | 799.5 | 66.625 |
| SW-4 | 10 | 0 | 1.43478 | 3.31824 | 61.5 | 61.5 |
| SW-5 | 7.16667 | 4.40076 | -1.39855 | 1.4891 | 369 | 61.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 54.3775 |
| SS Total | 1204.54 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 61.5 |
| Background Rank Sum | 1414.5 |
| Background Rank Mean | 61.5 |
| H Statistic | 0.22379 |
| H Adjusted for Ties | 9.25 |

# Basic Statistics

**Parameter: Carbon Disulfide**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 108 |
| Pooled Mean | 56.3854 |
| Pooled Std Dev | 47.1209 |
| Background Mean | 55.3261 |
| Background Std Dev | 48.0912 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 10 | 83.3333 | 654.5 |
| MW-1A | 11 | 11 | 100 | 618 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 54.5417 | 48.1529 | 0 | 781 | 65.0833 |
| MW-1A | 56.1818 | 50.3584 | 0 | 599.5 | 54.5 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 6 | 100 | 600 |
| MW-3 | 12 | 10 | 83.3333 | 629.3 |
| MW-4 | 2 | 2 | 100 | 101 |
| MW-4R | 11 | 9 | 81.8182 | 623.4 |
| MW-5 | 12 | 11 | 91.6667 | 654 |
| MW-6 | 12 | 10 | 83.3333 | 684 |
| MW-7 | 12 | 9 | 75 | 689 |
| MW-8 | 12 | 9 | 75 | 641.2 |
| SW-2 | 2 | 2 | 100 | 200 |
| SW-3 | 12 | 12 | 100 | 623 |
| SW-4 | 1 | 1 | 100 | 100 |
| SW-5 | 6 | 6 | 100 | 118 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 100 | 0 | 44.6739 | 21.7323 | 327 | 54.5 |
| MW-3 | 52.4417 | 49.6926 | -2.88442 | 16.8821 | 774 | 64.5 |
| MW-4 | 50.5 | 70.0036 | -4.82609 | 34.9493 | 109 | 54.5 |
| MW-4R | 56.6727 | 49.7888 | 1.34664 | 17.3791 | 711.5 | 64.6818 |
| MW-5 | 54.5 | 48.367 | -0.826087 | 16.8821 | 720.5 | 60.0417 |
| MW-6 | 57 | 47.528 | 1.67391 | 16.8821 | 779 | 64.9167 |
| MW-7 | 57.4167 | 47.5996 | 2.09058 | 16.8821 | 839.5 | 69.9583 |
| MW-8 | 53.4333 | 48.8337 | -1.89275 | 16.8821 | 840.5 | 70.0417 |
| SW-2 | 100 | 0 | 44.6739 | 34.9493 | 109 | 54.5 |
| SW-3 | 51.9167 | 50.2366 | -3.40942 | 16.8821 | 654 | 54.5 |
| SW-4 | 100 | 0 | 44.6739 | 48.4271 | 54.5 | 54.5 |
| SW-5 | 19.6667 | 39.3937 | -35.6594 | 21.7323 | 327 | 54.5 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 25911.9 |
| SS Total | 270886 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 54.5 |
| Background Rank Sum | 1380.5 |
| Background Rank Mean | 60.0217 |
| H Statistic | 2.80057 |
| H Adjusted for Ties | 8.66876 |

# Basic Statistics

**Parameter: cis-1,2-Dichloroethene (-ethylene)**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 84 |
| Pooled Mean | 6.35691 |
| Pooled Std Dev | 3.97457 |
| Background Mean | 4.70435 |
| Background Std Dev | 1.39625 |

## Background Wells

There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 10 | 83.3333 | 60.2 |
| MW-1A | 11 | 11 | 100 | 48 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 5.01667 | 1.34491 | 0 | 616 | 51.3333 |
| MW-1A | 4.36364 | 1.43337 | 0 | 467.5 | 42.5 |

## Compliance Wells

There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 1 | 16.6667 | 33 |
| MW-3 | 12 | 0 | 0 | 160.8 |
| MW-4 | 2 | 0 | 0 | 28 |
| MW-4R | 11 | 1 | 9.09091 | 131 |
| MW-5 | 12 | 9 | 75 | 61.7 |
| MW-6 | 12 | 11 | 91.6667 | 57.5 |
| MW-7 | 12 | 10 | 83.3333 | 55.7 |
| MW-8 | 12 | 11 | 91.6667 | 54 |
| SW-2 | 2 | 2 | 100 | 10 |
| SW-3 | 12 | 12 | 100 | 53 |
| SW-4 | 1 | 1 | 100 | 5 |
| SW-5 | 6 | 5 | 83.3333 | 24 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 5.5 | 0.547723 | 0.795652 | 1.07425 | 507.5 | 84.5833 |
| MW-3 | 13.4 | 3.61713 | 8.69565 | 0.834499 | 1334 | 111.167 |
| MW-4 | 14 | 8.48528 | 9.29565 | 1.72758 | 223 | 111.5 |
| MW-4R | 11.9091 | 4.90825 | 7.20474 | 0.859064 | 1153.5 | 104.864 |
| MW-5 | 5.14167 | 1.54946 | 0.437319 | 0.834499 | 672.5 | 56.0417 |
| MW-6 | 4.79167 | 1.26954 | 0.0873188 | 0.834499 | 563.5 | 46.9583 |
| MW-7 | 4.64167 | 0.839327 | -0.0626812 | 0.834499 | 600 | 50 |
| MW-8 | 4.5 | 1.16775 | -0.204348 | 0.834499 | 552.5 | 46.0417 |
| SW-2 | 5 | 0 | 0.295652 | 1.72758 | 85 | 42.5 |
| SW-3 | 4.41667 | 1.37895 | -0.287681 | 0.834499 | 510 | 42.5 |
| SW-4 | 5 | 0 | 0.295652 | 2.3938 | 42.5 | 42.5 |
| SW-5 | 4 | 1.54919 | -0.704348 | 1.07425 | 298.5 | 49.75 |

## Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 1328.69 |
| SS Total | 1927.26 |

## Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 42.5 |
| Background Rank Sum | 1083.5 |
| Background Rank Mean | 47.1087 |
| H Statistic | 60.4316 |
| H Adjusted for Ties | 88.6725 |

## Basic Statistics
**Parameter: Xylene**

| | |
|---|---|
| Total Observations | 123 |
| Total Non-Detects | 110 |
| Pooled Mean | 6.00976 |
| Pooled Std Dev | 5.44058 |
| Background Mean | 4.75652 |
| Background Std Dev | 1.09537 |

### Background Wells
There are 2 background wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 12 | 12 | 100 | 54 |
| MW-1A | 11 | 9 | 81.8182 | 55.4 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 4.5 | 1.16775 | 0 | 666 | 55.5 |
| MW-1A | 5.03636 | 0.987191 | 0 | 722.5 | 65.6818 |

### Compliance Wells
There are 12 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 6 | 6 | 100 | 30 |
| MW-3 | 12 | 1 | 8.33333 | 238.8 |
| MW-4 | 2 | 2 | 100 | 6 |
| MW-4R | 11 | 11 | 100 | 52 |
| MW-5 | 12 | 12 | 100 | 53 |
| MW-6 | 12 | 12 | 100 | 53 |
| MW-7 | 12 | 12 | 100 | 53 |
| MW-8 | 12 | 12 | 100 | 53 |
| SW-2 | 2 | 2 | 100 | 10 |
| SW-3 | 12 | 12 | 100 | 53 |
| SW-4 | 1 | 1 | 100 | 5 |
| SW-5 | 6 | 6 | 100 | 23 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 5 | 0 | 0.243478 | 1.41059 | 333 | 55.5 |
| MW-3 | 19.9 | 8.89188 | 15.1435 | 1.09577 | 1353.5 | 112.792 |
| MW-4 | 3 | 2.82843 | -1.75652 | 2.26846 | 111 | 55.5 |
| MW-4R | 4.72727 | 0.904534 | -0.029249 | 1.12803 | 610.5 | 55.5 |
| MW-5 | 4.41667 | 1.37895 | -0.339855 | 1.09577 | 666 | 55.5 |
| MW-6 | 4.41667 | 1.37895 | -0.339855 | 1.09577 | 666 | 55.5 |
| MW-7 | 4.41667 | 1.37895 | -0.339855 | 1.09577 | 666 | 55.5 |
| MW-8 | 4.41667 | 1.37895 | -0.339855 | 1.09577 | 666 | 55.5 |
| SW-2 | 5 | 0 | 0.243478 | 2.26846 | 111 | 55.5 |
| SW-3 | 4.41667 | 1.37895 | -0.339855 | 1.09577 | 666 | 55.5 |
| SW-4 | 5 | 0 | 0.243478 | 3.14327 | 55.5 | 55.5 |
| SW-5 | 3.83333 | 1.83485 | -0.923188 | 1.41059 | 333 | 55.5 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 2579.12 |
| SS Total | 3611.19 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 55.5 |
| Background Rank Sum | 1388.5 |
| Background Rank Mean | 60.3696 |
| H Statistic | 27.3302 |
| H Adjusted for Ties | 95.9783 |

# Poisson Tolerance Limit

**Parameter: Arsenic, total**

Poisson Count of 23 background Samples = 95
Degrees of Freedom = 192

**95% Confidence Values**
Chi-Squared Value (95% Confidence) = 225.329
Lambda (from Zack's formula) = 4.89845
Smallest Degrees of Freedom = 19
Upper Tolerance Limit (95%) = 8.5

**99% Confidence Values**
Chi-Squared Value (99% Confidence) = 240.505
Lambda (from Zack's formula) = 5.22836
Smallest Degrees of Freedom = 24
Upper Tolerance Limit (99%) = 11

| | Date | Result | Impacted 95% | Impacted 99% |
|---|---|---|---|---|
| MW-5 | 10/1/1994 | ND<5 | FALSE | FALSE |
| | 1/31/1995 | ND<5 | FALSE | FALSE |
| | 2/15/1995 | ND<5 | FALSE | FALSE |
| | 3/7/1995 | ND<5 | FALSE | FALSE |
| | 12/7/1995 | ND<5 | FALSE | FALSE |
| | 5/6/1996 | ND<5 | FALSE | FALSE |
| | 11/11/1996 | ND<2.5 | FALSE | FALSE |
| | 6/24/1997 | ND<2.5 | FALSE | FALSE |
| | 12/3/1997 | 6 | FALSE | FALSE |
| | 6/4/1998 | 8 | FALSE | FALSE |
| | 11/18/1998 | 26 | TRUE | TRUE |
| | 5/13/1999 | 5.6 | FALSE | FALSE |

# Non-Parametric Tolerance Interval

**Parameter: Barium, total**

Total Percent Non-Detects = 37.1681%
Background Samples (n) = 23
Maximum Background Concentration = 1000
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

| Well | Sample | Result | Impacted |
|---|---|---|---|
| MW-5 | 10/1/1994 | 3490 | TRUE |
| MW-5 | 1/31/1995 | 1980 | TRUE |
| MW-5 | 2/15/1995 | 1450 | TRUE |
| MW-5 | 3/7/1995 | 1820 | TRUE |
| MW-5 | 12/7/1995 | ND<250 | FALSE |
| MW-5 | 5/6/1996 | ND<250 | FALSE |
| MW-5 | 11/11/1996 | 1600 | TRUE |
| MW-5 | 6/24/1997 | 180 | FALSE |
| MW-5 | 12/3/1997 | 720 | FALSE |
| MW-5 | 6/4/1998 | 1800 | TRUE |
| MW-5 | 11/18/1998 | 2800 | TRUE |
| MW-5 | 5/13/1999 | 320 | FALSE |
| MW-3 | 10/1/1994 | 110 | FALSE |
| MW-3 | 1/31/1995 | ND<250 | FALSE |
| MW-3 | 2/15/1995 | ND<250 | FALSE |
| MW-3 | 3/7/1995 | ND<250 | FALSE |
| MW-3 | 12/7/1995 | ND<250 | FALSE |
| MW-3 | 5/6/1996 | ND<250 | FALSE |
| MW-3 | 11/11/1996 | 150 | FALSE |
| MW-3 | 6/24/1997 | 97 | FALSE |
| MW-3 | 12/3/1997 | 440 | FALSE |
| MW-3 | 6/4/1998 | 110 | FALSE |
| MW-3 | 11/18/1998 | 270 | FALSE |
| MW-3 | 5/13/1999 | 160 | FALSE |
| MW-4R | 10/1/1994 | 1500 | TRUE |
| MW-4R | 1/31/1995 | ND<250 | FALSE |
| MW-4R | 2/15/1995 | ND<250 | FALSE |
| MW-4R | 3/7/1995 | ND<250 | FALSE |
| MW-4R | 12/6/1995 | ND<250 | FALSE |
| MW-4R | 5/6/1996 | ND<250 | FALSE |
| MW-4R | 11/11/1996 | 160 | FALSE |
| MW-4R | 6/24/1997 | 120 | FALSE |
| MW-4R | 12/3/1997 | 200 | FALSE |
| MW-4R | 6/4/1998 | 150 | FALSE |
| MW-4R | 11/18/1998 | 130 | FALSE |
| MW-4R | 5/13/1999 | 110 | FALSE |
| MW-6 | 10/1/1994 | 420 | FALSE |
| MW-6 | 1/31/1995 | ND<250 | FALSE |
| MW-6 | 2/15/1995 | ND<250 | FALSE |
| MW-6 | 3/7/1995 | 554 | FALSE |
| MW-6 | 12/6/1995 | ND<250 | FALSE |
| MW-6 | 5/6/1996 | ND<250 | FALSE |
| MW-6 | 11/11/1996 | 190 | FALSE |
| MW-6 | 6/24/1997 | 49 | FALSE |
| MW-6 | 12/3/1997 | 1300 | TRUE |
| MW-6 | 6/4/1998 | 1100 | TRUE |
| MW-6 | 11/18/1998 | 870 | FALSE |
| MW-6 | 5/13/1999 | 340 | FALSE |

| | | | |
|---|---|---|---|
| MW-7 | 10/1/1994 | 100 | FALSE |
| MW-7 | 1/31/1995 | ND<250 | FALSE |
| MW-7 | 2/15/1995 | ND<250 | FALSE |
| MW-7 | 3/7/1995 | ND<250 | FALSE |
| MW-7 | 12/6/1995 | ND<250 | FALSE |
| MW-7 | 5/6/1996 | ND<250 | FALSE |
| MW-7 | 11/11/1996 | 72 | FALSE |
| MW-7 | 6/24/1997 | 37 | FALSE |
| MW-7 | 12/3/1997 | 34 | FALSE |
| MW-7 | 6/4/1998 | 31 | FALSE |
| MW-7 | 11/18/1998 | 34 | FALSE |
| MW-7 | 5/13/1999 | 57 | FALSE |
| MW-8 | 10/1/1994 | ND<50 | FALSE |
| MW-8 | 1/31/1995 | ND<250 | FALSE |
| MW-8 | 2/15/1995 | ND<250 | FALSE |
| MW-8 | 3/7/1995 | ND<250 | FALSE |
| MW-8 | 12/6/1995 | ND<250 | FALSE |
| MW-8 | 5/6/1996 | ND<250 | FALSE |
| MW-8 | 11/11/1996 | 66 | FALSE |
| MW-8 | 6/24/1997 | 170 | FALSE |
| MW-8 | 12/3/1997 | 200 | FALSE |
| MW-8 | 6/4/1998 | 100 | FALSE |
| MW-8 | 11/18/1998 | 120 | FALSE |
| MW-8 | 5/13/1999 | 89 | FALSE |
| SW-3 | 10/1/1994 | 540 | FALSE |
| SW-3 | 1/31/1995 | ND<250 | FALSE |
| SW-3 | 2/15/1995 | ND<250 | FALSE |
| SW-3 | 3/7/1995 | ND<250 | FALSE |
| SW-3 | 12/7/1995 | ND<250 | FALSE |
| SW-3 | 5/6/1996 | ND<250 | FALSE |
| SW-3 | 11/11/1996 | 20 | FALSE |
| SW-3 | 6/24/1997 | 41 | FALSE |
| SW-3 | 12/3/1997 | 36 | FALSE |
| SW-3 | 6/4/1998 | 41 | FALSE |
| SW-3 | 11/18/1998 | 31 | FALSE |
| SW-3 | 5/13/1999 | 65 | FALSE |
| SW-5 | 12/7/1995 | ND<0 | FALSE |
| SW-5 | 6/24/1997 | 40 | FALSE |
| SW-5 | 12/3/1997 | 43 | FALSE |
| SW-5 | 6/4/1998 | 38 | FALSE |
| SW-5 | 11/18/1998 | 33 | FALSE |
| SW-5 | 5/13/1999 | 42 | FALSE |

# Non-Parametric Tolerance Interval

**Parameter: Beryllium, total**

Total Percent Non-Detects = 51.0638%
Background Samples (n) = 23
Maximum Background Concentration = 12.5
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

| Well | Sample | Result | Impacted |
|---|---|---|---|
| MW-5 | 10/1/1994 | 80 | TRUE |
| MW-5 | 1/31/1995 | 19 | TRUE |
| MW-5 | 2/15/1995 | 16 | TRUE |
| MW-5 | 3/7/1995 | 16 | TRUE |
| MW-5 | 12/7/1995 | 5 | FALSE |
| MW-5 | 5/6/1996 | 4 | FALSE |
| MW-5 | 11/11/1996 | 9 | FALSE |
| MW-5 | 6/24/1997 | 2 | FALSE |
| MW-5 | 12/3/1997 | 16 | TRUE |
| MW-5 | 6/4/1998 | 13 | TRUE |
| MW-5 | 11/18/1998 | 78 | TRUE |
| MW-5 | 5/13/1999 | 6 | FALSE |
| MW-7 | 10/1/1994 | ND<12.5 | FALSE |
| MW-7 | 1/31/1995 | ND<1 | FALSE |
| MW-7 | 2/15/1995 | ND<1 | FALSE |
| MW-7 | 3/7/1995 | 2 | FALSE |
| MW-7 | 12/6/1995 | ND<1 | FALSE |
| MW-7 | 5/6/1996 | ND<1 | FALSE |
| MW-7 | 11/11/1996 | 8 | FALSE |
| MW-7 | 6/24/1997 | 1 | FALSE |
| MW-7 | 12/3/1997 | 1 | FALSE |
| MW-7 | 6/4/1998 | 2 | FALSE |
| MW-7 | 11/18/1998 | 1.2 | FALSE |
| MW-7 | 5/13/1999 | 2.5 | FALSE |

# Poisson Tolerance Limit

**Parameter: Cadmium, total**

Poisson Count of 23 background Samples = 12
Degrees of Freedom = 26

**95% Confidence Values**
Chi-Squared Value (95% Confidence) = 38.8851
Lambda (from Zack's formula) = 0.845329
Smallest Degrees of Freedom = 7
Upper Tolerance Limit (95%) = 2.5

**99% Confidence Values**
Chi-Squared Value (99% Confidence) = 45.6416
Lambda (from Zack's formula) = 0.992209
Smallest Degrees of Freedom = 9
Upper Tolerance Limit (99%) = 3.5

| | Date | Result | Impacted 95% | Impacted 99% |
|---|---|---|---|---|
| MW-4R | 10/1/1994 | 2 | FALSE | FALSE |
| | 1/31/1995 | ND<0.5 | FALSE | FALSE |
| | 2/15/1995 | 5 | TRUE | TRUE |
| | 3/7/1995 | ND<0.5 | FALSE | FALSE |
| | 12/6/1995 | 2 | FALSE | FALSE |
| | 5/6/1996 | 3 | TRUE | FALSE |
| | 11/11/1996 | 7 | TRUE | TRUE |
| | 6/24/1997 | 5 | TRUE | TRUE |
| | 12/3/1997 | 10 | TRUE | TRUE |
| | 6/4/1998 | 15 | TRUE | TRUE |
| | 11/18/1998 | 2.9 | TRUE | FALSE |
| | 5/13/1999 | 2.3 | FALSE | FALSE |

# Shapiro-Wilks Test of Normality

**Parameter: Chromium, total**
**Background Wells**
**Normality Test of Parameter Concentrations**
K = 11; Samples = 23

| i | x(i) | x(n-i+1) | x(n-1+1)-x(i) | a(n-i+1) | b(i) |
|---|---|---|---|---|---|
| 1 | 0.693147 | 6.01616 | 5.32301 | 0.4542 | 2.41771 |
| 2 | 0.693147 | 5.99146 | 5.29832 | 0.3126 | 1.65625 |
| 3 | 0.832909 | 5.20401 | 4.3711 | 0.2563 | 1.12031 |
| 4 | 1.09861 | 4.78749 | 3.68888 | 0.2139 | 0.789051 |
| 5 | 1.09861 | 4.40672 | 3.30811 | 0.1787 | 0.591159 |
| 6 | 1.09861 | 4.30407 | 3.20545 | 0.148 | 0.474407 |
| 7 | 1.79176 | 3.49651 | 1.70475 | 0.1201 | 0.20474 |
| 8 | 2.19722 | 3.21888 | 1.02165 | 0.0941 | 0.0961374 |
| 9 | 2.30259 | 3.21888 | 0.916291 | 0.0696 | 0.0637738 |
| 10 | 2.30259 | 3.04452 | 0.741937 | 0.0459 | 0.0340549 |
| 11 | 2.30259 | 2.63906 | 0.336472 | 0.0228 | 0.00767157 |
| 12 | 2.63906 | 2.63906 | 0 | | |
| 13 | 2.63906 | 2.30259 | -0.336472 | | |
| 14 | 3.04452 | 2.30259 | -0.741937 | | |
| 15 | 3.21888 | 2.30259 | -0.916291 | | |
| 16 | 3.21888 | 2.19722 | -1.02165 | | |
| 17 | 3.49651 | 1.79176 | -1.70475 | | |
| 18 | 4.30407 | 1.09861 | -3.20545 | | |
| 19 | 4.40672 | 1.09861 | -3.30811 | | |
| 20 | 4.78749 | 1.09861 | -3.68888 | | |
| 21 | 5.20401 | 0.832909 | -4.3711 | | |
| 22 | 5.99146 | 0.693147 | -5.29832 | | |
| 23 | 6.01616 | 0.693147 | -5.32301 | | |

Sum of b values = 7.45527
Sample Standard Deviation = 1.6454
W Statistic = 0.933169
5% Critical value of 0.914 is less than 0.933169
Data is normally distributed at 95% level of significance
1% Critical value of 0.881 is less than 0.933169
Data is normally distributed at 99% level of significance

# Parametric Tolerance Interval Analysis

**Parameter: Chromium, total**

Background mean = 3.17136
Background standard deviation = 1.67158
One-sided normal tolerance factor at 95% confidence = 1.75408
Tolerance factor calculation follows USEPA 1992 Guidance
Upper tolerance limit = 6.10344

| Well | Date | Result | Impacted |
|---|---|---|---|
| MW-4R | 10/1/1994 | 5.63479 | FALSE |
| | 1/31/1995 | 4.49981 | FALSE |
| | 2/15/1995 | 2.83321 | FALSE |
| | 3/7/1995 | 2.94444 | FALSE |
| | 12/6/1995 | ND<2.30259 | FALSE |
| | 5/6/1996 | ND<2.30259 | FALSE |
| | 11/11/1996 | ND<0.693147 | FALSE |
| | 6/24/1997 | 2.07944 | FALSE |
| | 12/3/1997 | 3.4012 | FALSE |
| | 6/4/1998 | 2.70805 | FALSE |
| | 11/18/1998 | 2.48491 | FALSE |
| | 5/13/1999 | 1.64866 | FALSE |
| MW-3 | 10/1/1994 | ND<1.60944 | FALSE |
| | 1/31/1995 | 3.63759 | FALSE |
| | 2/15/1995 | 2.56495 | FALSE |
| | 3/7/1995 | 2.83321 | FALSE |
| | 12/7/1995 | ND<2.30259 | FALSE |
| | 5/6/1996 | ND<2.30259 | FALSE |
| | 11/11/1996 | 1.09861 | FALSE |
| | 6/24/1997 | 2.07944 | FALSE |
| | 12/3/1997 | 4.94164 | FALSE |
| | 6/4/1998 | 3.04452 | FALSE |
| | 11/18/1998 | 5.01064 | FALSE |
| | 5/13/1999 | 4.21951 | FALSE |
| MW-6 | 10/1/1994 | 4.74493 | FALSE |
| | 1/31/1995 | 3.7612 | FALSE |
| | 2/15/1995 | 3.3322 | FALSE |
| | 3/7/1995 | 4.47734 | FALSE |
| | 12/6/1995 | 3.17805 | FALSE |
| | 5/6/1996 | 2.94444 | FALSE |
| | 11/11/1996 | 2.07944 | FALSE |
| | 6/24/1997 | ND<0.693147 | FALSE |
| | 12/3/1997 | 5.34711 | FALSE |
| | 6/4/1998 | 5.43808 | FALSE |
| | 11/18/1998 | 5.56068 | FALSE |
| | 5/13/1999 | 4.09434 | FALSE |
| MW-8 | 10/1/1994 | 3.2581 | FALSE |
| | 1/31/1995 | 3.29584 | FALSE |
| | 2/15/1995 | 2.48491 | FALSE |
| | 3/7/1995 | 2.63906 | FALSE |
| | 12/6/1995 | ND<2.30259 | FALSE |
| | 5/6/1996 | ND<2.30259 | FALSE |
| | 11/11/1996 | ND<0.693147 | FALSE |
| | 6/24/1997 | 2.77259 | FALSE |
| | 12/3/1997 | 3.49651 | FALSE |
| | 6/4/1998 | 1.79176 | FALSE |
| | 11/18/1998 | 1.91692 | FALSE |
| | 5/13/1999 | 1.64866 | FALSE |
| SW-3 | 10/1/1994 | ND<1.60944 | FALSE |
| | 1/31/1995 | ND<2.30259 | FALSE |
| | 2/15/1995 | ND<2.30259 | FALSE |

| | | | |
|---|---|---|---|
| | 3/7/1995 | ND<2.30259 | FALSE |
| | 12/7/1995 | ND<2.30259 | FALSE |
| | 5/6/1996 | ND<2.30259 | FALSE |
| | 11/11/1996 | ND<0.693147 | FALSE |
| | 6/24/1997 | ND<0.693147 | FALSE |
| | 12/3/1997 | ND<0.693147 | FALSE |
| | 6/4/1998 | ND<0.693147 | FALSE |
| | 11/18/1998 | ND<-1.7148 | FALSE |
| | 5/13/1999 | 2.63906 | FALSE |
| MW-5 | 10/1/1994 | 6.53669 | TRUE |
| | 1/31/1995 | 6.23832 | TRUE |
| | 2/15/1995 | 6.25767 | TRUE |
| | 3/7/1995 | 5.97126 | FALSE |
| | 12/7/1995 | 4.63473 | FALSE |
| | 5/6/1996 | 4.96284 | FALSE |
| | 11/11/1996 | 2.07944 | FALSE |
| | 6/24/1997 | 4.20469 | FALSE |
| | 12/3/1997 | 6.57925 | TRUE |
| | 6/4/1998 | 7.49554 | TRUE |
| | 11/18/1998 | 7.31322 | TRUE |
| | 5/13/1999 | 5.48064 | FALSE |
| MW-7 | 10/1/1994 | 2.70805 | FALSE |
| | 1/31/1995 | 3.61092 | FALSE |
| | 2/15/1995 | 3.09104 | FALSE |
| | 3/7/1995 | 3.13549 | FALSE |
| | 12/6/1995 | ND<2.30259 | FALSE |
| | 5/6/1996 | ND<2.30259 | FALSE |
| | 11/11/1996 | 2.56495 | FALSE |
| | 6/24/1997 | 2.48491 | FALSE |
| | 12/3/1997 | 2.48491 | FALSE |
| | 6/4/1998 | 2.3979 | FALSE |
| | 11/18/1998 | 2.94444 | FALSE |
| | 5/13/1999 | 4.02535 | FALSE |

# Non-Parametric Tolerance Interval

**Parameter: Cobalt, total**

Total Percent Non-Detects = 20.354%
Background Samples (n) = 23
Maximum Background Concentration = 220
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

| Well | Sample | Result | Impacted |
|---|---|---|---|
| MW-4R | 10/1/1994 | 700 | TRUE |
| MW-4R | 1/31/1995 | 262 | TRUE |
| MW-4R | 2/15/1995 | 291 | TRUE |
| MW-4R | 3/7/1995 | 225 | TRUE |
| MW-4R | 12/6/1995 | 301 | TRUE |
| MW-4R | 5/6/1996 | 278 | TRUE |
| MW-4R | 11/11/1996 | 210 | FALSE |
| MW-4R | 6/24/1997 | 120 | FALSE |
| MW-4R | 12/3/1997 | 450 | TRUE |
| MW-4R | 6/4/1998 | 390 | TRUE |
| MW-4R | 11/18/1998 | 360 | TRUE |
| MW-4R | 5/13/1999 | 210 | FALSE |
| MW-3 | 10/1/1994 | ND<50 | FALSE |
| MW-3 | 1/31/1995 | 17 | FALSE |
| MW-3 | 2/15/1995 | 32 | FALSE |
| MW-3 | 3/7/1995 | 26 | FALSE |
| MW-3 | 12/7/1995 | 19 | FALSE |
| MW-3 | 5/6/1996 | 21 | FALSE |
| MW-3 | 11/11/1996 | 10.7 | FALSE |
| MW-3 | 6/24/1997 | 3 | FALSE |
| MW-3 | 12/3/1997 | 37 | FALSE |
| MW-3 | 6/4/1998 | 18 | FALSE |
| MW-3 | 11/18/1998 | 23 | FALSE |
| MW-3 | 5/13/1999 | 12 | FALSE |
| MW-6 | 10/1/1994 | ND<50 | FALSE |
| MW-6 | 1/31/1995 | 25 | FALSE |
| MW-6 | 2/15/1995 | 27 | FALSE |
| MW-6 | 3/7/1995 | 37 | FALSE |
| MW-6 | 12/6/1995 | 71 | FALSE |
| MW-6 | 5/6/1996 | 34 | FALSE |
| MW-6 | 11/11/1996 | 13 | FALSE |
| MW-6 | 6/24/1997 | 20 | FALSE |
| MW-6 | 12/3/1997 | 88 | FALSE |
| MW-6 | 6/4/1998 | 48 | FALSE |
| MW-6 | 11/18/1998 | 110 | FALSE |
| MW-6 | 5/13/1999 | 28 | FALSE |
| MW-8 | 10/1/1994 | ND<50 | FALSE |
| MW-8 | 1/31/1995 | 19 | FALSE |
| MW-8 | 2/15/1995 | 16 | FALSE |
| MW-8 | 3/7/1995 | 14 | FALSE |
| MW-8 | 12/6/1995 | ND<5 | FALSE |
| MW-8 | 5/6/1996 | ND<5 | FALSE |
| MW-8 | 11/11/1996 | ND<1 | FALSE |
| MW-8 | 6/24/1997 | ND<1.5 | FALSE |
| MW-8 | 12/3/1997 | 15 | FALSE |
| MW-8 | 6/4/1998 | 5 | FALSE |
| MW-8 | 11/18/1998 | 8.1 | FALSE |
| MW-8 | 5/13/1999 | 5.6 | FALSE |

| | | | |
|---|---|---|---|
| SW-3 | 10/1/1994 | 160 | FALSE |
| SW-3 | 1/31/1995 | ND<5 | FALSE |
| SW-3 | 2/15/1995 | ND<5 | FALSE |
| SW-3 | 3/7/1995 | 11 | FALSE |
| SW-3 | 12/7/1995 | 143 | FALSE |
| SW-3 | 5/6/1996 | ND<5 | FALSE |
| SW-3 | 11/11/1996 | ND<1 | FALSE |
| SW-3 | 6/24/1997 | ND<1.5 | FALSE |
| SW-3 | 12/3/1997 | ND<1 | FALSE |
| SW-3 | 6/4/1998 | 3 | FALSE |
| SW-3 | 11/18/1998 | 3.6 | FALSE |
| SW-3 | 5/13/1999 | 7.1 | FALSE |
| MW-5 | 10/1/1994 | 900 | TRUE |
| MW-5 | 1/31/1995 | 496 | TRUE |
| MW-5 | 2/15/1995 | 454 | TRUE |
| MW-5 | 3/7/1995 | 320 | TRUE |
| MW-5 | 12/7/1995 | 88 | FALSE |
| MW-5 | 5/6/1996 | 157 | FALSE |
| MW-5 | 11/11/1996 | 76 | FALSE |
| MW-5 | 6/24/1997 | 36 | FALSE |
| MW-5 | 12/3/1997 | 350 | TRUE |
| MW-5 | 6/4/1998 | 1400 | TRUE |
| MW-5 | 11/18/1998 | 850 | TRUE |
| MW-5 | 5/13/1999 | 81 | FALSE |
| MW-7 | 10/1/1994 | ND<50 | FALSE |
| MW-7 | 1/31/1995 | 15 | FALSE |
| MW-7 | 2/15/1995 | 14 | FALSE |
| MW-7 | 3/7/1995 | 15 | FALSE |
| MW-7 | 12/6/1995 | ND<5 | FALSE |
| MW-7 | 5/6/1996 | ND<5 | FALSE |
| MW-7 | 11/11/1996 | 12 | FALSE |
| MW-7 | 6/24/1997 | 5 | FALSE |
| MW-7 | 12/3/1997 | 8 | FALSE |
| MW-7 | 6/4/1998 | 3 | FALSE |
| MW-7 | 11/18/1998 | 7.7 | FALSE |
| MW-7 | 5/13/1999 | 9.5 | FALSE |
| SW-5 | 12/7/1995 | ND<5 | FALSE |
| SW-5 | 6/24/1997 | 27 | FALSE |
| SW-5 | 12/3/1997 | 14 | FALSE |
| SW-5 | 6/4/1998 | 5 | FALSE |
| SW-5 | 11/18/1998 | 7.2 | FALSE |
| SW-5 | 5/13/1999 | 6.3 | FALSE |

# Non-Parametric Tolerance Interval

**Parameter: Copper, total**

Total Percent Non-Detects = 57.7465%
Background Samples (n) = 23
Maximum Background Concentration = 260
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

| Well | Sample | Result | Impacted |
|---|---|---|---|
| MW-3 | 10/1/1994 | ND<50 | FALSE |
| MW-3 | 1/31/1995 | ND<100 | FALSE |
| MW-3 | 2/15/1995 | ND<100 | FALSE |
| MW-3 | 3/7/1995 | ND<100 | FALSE |
| MW-3 | 12/7/1995 | ND<100 | FALSE |
| MW-3 | 5/6/1996 | ND<100 | FALSE |
| MW-3 | 11/11/1996 | ND<5 | FALSE |
| MW-3 | 6/24/1997 | 10 | FALSE |
| MW-3 | 12/3/1997 | 100 | FALSE |
| MW-3 | 6/4/1998 | 22 | FALSE |
| MW-3 | 11/18/1998 | 70 | FALSE |
| MW-3 | 5/13/1999 | 21 | FALSE |
| MW-6 | 10/1/1994 | ND<50 | FALSE |
| MW-6 | 1/31/1995 | ND<100 | FALSE |
| MW-6 | 2/15/1995 | ND<100 | FALSE |
| MW-6 | 3/7/1995 | ND<100 | FALSE |
| MW-6 | 12/6/1995 | ND<100 | FALSE |
| MW-6 | 5/6/1996 | ND<100 | FALSE |
| MW-6 | 11/11/1996 | ND<5 | FALSE |
| MW-6 | 6/24/1997 | ND<5 | FALSE |
| MW-6 | 12/3/1997 | 65 | FALSE |
| MW-6 | 6/4/1998 | 64 | FALSE |
| MW-6 | 11/18/1998 | 91 | FALSE |
| MW-6 | 5/13/1999 | 29 | FALSE |
| MW-5 | 10/1/1994 | 1070 | TRUE |
| MW-5 | 1/31/1995 | 757 | TRUE |
| MW-5 | 2/15/1995 | 464 | TRUE |
| MW-5 | 3/7/1995 | 676 | TRUE |
| MW-5 | 12/7/1995 | ND<100 | FALSE |
| MW-5 | 5/6/1996 | ND<100 | FALSE |
| MW-5 | 11/11/1996 | ND<5 | FALSE |
| MW-5 | 6/24/1997 | 38 | FALSE |
| MW-5 | 12/3/1997 | 270 | TRUE |
| MW-5 | 6/4/1998 | 490 | TRUE |
| MW-5 | 11/18/1998 | 1200 | TRUE |
| MW-5 | 5/13/1999 | 120 | FALSE |
| MW-7 | 10/1/1994 | ND<50 | FALSE |
| MW-7 | 1/31/1995 | ND<100 | FALSE |
| MW-7 | 2/15/1995 | ND<100 | FALSE |
| MW-7 | 3/7/1995 | ND<100 | FALSE |
| MW-7 | 12/6/1995 | ND<100 | FALSE |
| MW-7 | 5/6/1996 | ND<100 | FALSE |
| MW-7 | 11/11/1996 | ND<5 | FALSE |
| MW-7 | 6/24/1997 | 19 | FALSE |
| MW-7 | 12/3/1997 | 11 | FALSE |
| MW-7 | 6/4/1998 | 13 | FALSE |
| MW-7 | 11/18/1998 | 18 | FALSE |
| MW-7 | 5/13/1999 | 32 | FALSE |

# Non-Parametric Tolerance Interval

**Parameter: Lead, total**

Total Percent Non-Detects = 52.6316%
Background Samples (n) = 23
Maximum Background Concentration = 75
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

| Well | Sample | Result | Impacted |
|---|---|---|---|
| MW-3 | 10/1/1994 | ND<5 | FALSE |
| MW-3 | 1/31/1995 | 16 | FALSE |
| MW-3 | 2/15/1995 | ND<5 | FALSE |
| MW-3 | 3/7/1995 | ND<5 | FALSE |
| MW-3 | 12/7/1995 | ND<5 | FALSE |
| MW-3 | 5/6/1996 | ND<5 | FALSE |
| MW-3 | 11/11/1996 | 9 | FALSE |
| MW-3 | 6/24/1997 | ND<2.5 | FALSE |
| MW-3 | 12/3/1997 | 100 | TRUE |
| MW-3 | 6/4/1998 | 21 | FALSE |
| MW-3 | 11/18/1998 | 140 | TRUE |
| MW-3 | 5/13/1999 | 110 | TRUE |
| MW-6 | 10/1/1994 | 14 | FALSE |
| MW-6 | 1/31/1995 | 11 | FALSE |
| MW-6 | 2/15/1995 | ND<5 | FALSE |
| MW-6 | 3/7/1995 | 13 | FALSE |
| MW-6 | 12/6/1995 | ND<5 | FALSE |
| MW-6 | 5/6/1996 | ND<5 | FALSE |
| MW-6 | 11/11/1996 | ND<2.5 | FALSE |
| MW-6 | 6/24/1997 | ND<2.5 | FALSE |
| MW-6 | 12/3/1997 | 23 | FALSE |
| MW-6 | 6/4/1998 | 16 | FALSE |
| MW-6 | 11/18/1998 | 25 | FALSE |
| MW-6 | 5/13/1999 | 6.2 | FALSE |
| MW-5 | 10/1/1994 | 82 | TRUE |
| MW-5 | 1/31/1995 | 118 | TRUE |
| MW-5 | 2/15/1995 | 100 | TRUE |
| MW-5 | 3/7/1995 | 85 | TRUE |
| MW-5 | 12/7/1995 | 25 | FALSE |
| MW-5 | 5/6/1996 | 20 | FALSE |
| MW-5 | 11/11/1996 | 17 | FALSE |
| MW-5 | 6/24/1997 | ND<2.5 | FALSE |
| MW-5 | 12/3/1997 | 50 | FALSE |
| MW-5 | 6/4/1998 | 78 | TRUE |
| MW-5 | 11/18/1998 | 280 | TRUE |
| MW-5 | 5/13/1999 | 24 | FALSE |
| MW-7 | 10/1/1994 | ND<5 | FALSE |
| MW-7 | 1/31/1995 | ND<5 | FALSE |
| MW-7 | 2/15/1995 | ND<5 | FALSE |
| MW-7 | 3/7/1995 | ND<5 | FALSE |
| MW-7 | 12/6/1995 | ND<5 | FALSE |
| MW-7 | 5/6/1996 | ND<5 | FALSE |
| MW-7 | 11/11/1996 | 12 | FALSE |
| MW-7 | 6/24/1997 | ND<2.5 | FALSE |
| MW-7 | 12/3/1997 | 6 | FALSE |
| MW-7 | 6/4/1998 | 8 | FALSE |
| MW-7 | 11/18/1998 | ND<2.5 | FALSE |
| MW-7 | 5/13/1999 | 8.4 | FALSE |

| | | | |
|---|---|---|---|
| MW-4R | 10/1/1994 | 100 | TRUE |
| MW-4R | 1/31/1995 | 34 | FALSE |
| MW-4R | 2/15/1995 | ND<5 | FALSE |
| MW-4R | 3/7/1995 | ND<5 | FALSE |
| MW-4R | 12/6/1995 | ND<5 | FALSE |
| MW-4R | 5/6/1996 | ND<5 | FALSE |
| MW-4R | 11/11/1996 | 6 | FALSE |
| MW-4R | 6/24/1997 | ND<2.5 | FALSE |
| MW-4R | 12/3/1997 | 16 | FALSE |
| MW-4R | 6/4/1998 | 12 | FALSE |
| MW-4R | 11/18/1998 | 6.6 | FALSE |
| MW-4R | 5/13/1999 | 9.9 | FALSE |
| | | | |
| SW-3 | 10/1/1994 | ND<5 | FALSE |
| SW-3 | 1/31/1995 | ND<5 | FALSE |
| SW-3 | 2/15/1995 | ND<5 | FALSE |
| SW-3 | 3/7/1995 | ND<5 | FALSE |
| SW-3 | 12/7/1995 | ND<5 | FALSE |
| SW-3 | 5/6/1996 | ND<5 | FALSE |
| SW-3 | 11/11/1996 | ND<2.5 | FALSE |
| SW-3 | 6/24/1997 | ND<2.5 | FALSE |
| SW-3 | 12/3/1997 | ND<2.5 | FALSE |
| SW-3 | 6/4/1998 | ND<2.5 | FALSE |
| SW-3 | 11/18/1998 | ND<2.5 | FALSE |
| SW-3 | 5/13/1999 | 5.2 | FALSE |

# Non-Parametric Tolerance Interval

**Parameter: Mercury**

Total Percent Non-Detects = 34.6154%
Background Samples (n) = 11
Maximum Background Concentration = 1.7
Minimum Coverage = 76.2%
Average Coverage = 91.6667%

| Well | Sample | Result | Impacted |
|---|---|---|---|
| MW-6 | 5/6/1996 | 2 | TRUE |
| MW-6 | 12/3/1997 | 0.7 | FALSE |
| MW-6 | 3/23/1998 | 6.8 | TRUE |
| MW-6 | 4/30/1998 | 3.9 | TRUE |
| MW-6 | 6/4/1998 | 13 | TRUE |
| MW-6 | 5/13/1999 | 6.5 | TRUE |
| SW-3 | 5/6/1996 | ND<0.5 | FALSE |
| SW-3 | 12/3/1997 | ND<0.1 | FALSE |
| SW-3 | 5/13/1999 | 0.26 | FALSE |
| MW-8 | 5/6/1996 | 2 | TRUE |
| MW-8 | 12/3/1997 | ND<0.1 | FALSE |
| MW-8 | 3/23/1998 | 6.3 | TRUE |
| MW-8 | 4/30/1998 | 5.2 | TRUE |
| MW-8 | 6/4/1998 | 2.4 | TRUE |
| MW-8 | 5/13/1999 | 0.65 | FALSE |

# Non-Parametric Tolerance Interval

**Parameter: Nickel, total**

Total Percent Non-Detects = 58.8785%
Background Samples (n) = 23
Maximum Background Concentration = 190
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

| Well | Sample | Result | Impacted |
|---|---|---|---|
| MW-6 | 10/1/1994 | ND<50 | FALSE |
| MW-6 | 1/31/1995 | ND<25 | FALSE |
| MW-6 | 2/15/1995 | ND<25 | FALSE |
| MW-6 | 3/7/1995 | ND<25 | FALSE |
| MW-6 | 12/6/1995 | 52 | FALSE |
| MW-6 | 5/6/1996 | 69 | FALSE |
| MW-6 | 11/11/1996 | ND<25 | FALSE |
| MW-6 | 6/24/1997 | ND<25 | FALSE |
| MW-6 | 12/3/1997 | 130 | FALSE |
| MW-6 | 6/4/1998 | 88 | FALSE |
| MW-6 | 11/18/1998 | 160 | FALSE |
| MW-6 | 5/13/1999 | 40 | FALSE |
| SW-3 | 10/1/1994 | ND<50 | FALSE |
| SW-3 | 1/31/1995 | ND<25 | FALSE |
| SW-3 | 2/15/1995 | ND<25 | FALSE |
| SW-3 | 3/7/1995 | ND<25 | FALSE |
| SW-3 | 12/7/1995 | ND<25 | FALSE |
| SW-3 | 5/6/1996 | ND<25 | FALSE |
| SW-3 | 11/11/1996 | ND<25 | FALSE |
| SW-3 | 6/24/1997 | ND<25 | FALSE |
| SW-3 | 12/3/1997 | ND<25 | FALSE |
| SW-3 | 6/4/1998 | ND<25 | FALSE |
| SW-3 | 11/18/1998 | ND<25 | FALSE |
| SW-3 | 5/13/1999 | 9.2 | FALSE |
| MW-8 | 10/1/1994 | ND<50 | FALSE |
| MW-8 | 1/31/1995 | ND<25 | FALSE |
| MW-8 | 2/15/1995 | ND<25 | FALSE |
| MW-8 | 3/7/1995 | ND<25 | FALSE |
| MW-8 | 12/6/1995 | ND<25 | FALSE |
| MW-8 | 5/6/1996 | ND<25 | FALSE |
| MW-8 | 11/11/1996 | ND<25 | FALSE |
| MW-8 | 6/24/1997 | ND<25 | FALSE |
| MW-8 | 12/3/1997 | ND<25 | FALSE |
| MW-8 | 6/4/1998 | ND<25 | FALSE |
| MW-8 | 11/18/1998 | ND<25 | FALSE |
| MW-8 | 5/13/1999 | 8.5 | FALSE |
| MW-3 | 10/1/1994 | 180 | FALSE |
| MW-3 | 1/31/1995 | 474 | TRUE |
| MW-3 | 2/15/1995 | 243 | TRUE |
| MW-3 | 3/7/1995 | 240 | TRUE |
| MW-3 | 12/7/1995 | ND<25 | FALSE |
| MW-3 | 5/6/1996 | 72 | FALSE |
| MW-3 | 11/11/1996 | 200 | TRUE |
| MW-3 | 6/24/1997 | 130 | FALSE |
| MW-3 | 12/3/1997 | 1200 | TRUE |
| MW-3 | 6/4/1998 | 210 | TRUE |
| MW-3 | 11/18/1998 | 700 | TRUE |
| MW-3 | 5/13/1999 | 250 | TRUE |

| | | | |
|---|---|---|---|
| MW-5 | 10/1/1994 | 1510 | TRUE |
| MW-5 | 1/31/1995 | 826 | TRUE |
| MW-5 | 2/15/1995 | 508 | TRUE |
| MW-5 | 3/7/1995 | 820 | TRUE |
| MW-5 | 12/7/1995 | 180 | FALSE |
| MW-5 | 5/6/1996 | 118 | FALSE |
| MW-5 | 11/11/1996 | ND<25 | FALSE |
| MW-5 | 6/24/1997 | ND<25 | FALSE |
| MW-5 | 12/3/1997 | 300 | TRUE |
| MW-5 | 6/4/1998 | 520 | TRUE |
| MW-5 | 11/18/1998 | 1500 | TRUE |
| MW-5 | 5/13/1999 | 150 | FALSE |
| MW-7 | 10/1/1994 | ND<50 | FALSE |
| MW-7 | 1/31/1995 | ND<25 | FALSE |
| MW-7 | 2/15/1995 | ND<25 | FALSE |
| MW-7 | 3/7/1995 | ND<25 | FALSE |
| MW-7 | 12/6/1995 | ND<25 | FALSE |
| MW-7 | 5/6/1996 | ND<25 | FALSE |
| MW-7 | 11/11/1996 | ND<25 | FALSE |
| MW-7 | 6/24/1997 | ND<25 | FALSE |
| MW-7 | 12/3/1997 | ND<25 | FALSE |
| MW-7 | 6/4/1998 | ND<25 | FALSE |
| MW-7 | 11/18/1998 | ND<25 | FALSE |
| MW-7 | 5/13/1999 | 38 | FALSE |
| MW-4R | 10/1/1994 | 560 | TRUE |
| MW-4R | 1/31/1995 | 105 | FALSE |
| MW-4R | 2/15/1995 | 67 | FALSE |
| MW-4R | 3/7/1995 | ND<25 | FALSE |
| MW-4R | 12/6/1995 | 56 | FALSE |
| MW-4R | 5/6/1996 | 55 | FALSE |
| MW-4R | 11/11/1996 | ND<25 | FALSE |
| MW-4R | 6/24/1997 | ND<25 | FALSE |
| MW-4R | 12/3/1997 | 50 | FALSE |
| MW-4R | 6/4/1998 | ND<25 | FALSE |
| MW-4R | 11/18/1998 | ND<25 | FALSE |
| MW-4R | 5/13/1999 | 20 | FALSE |

# Non-Parametric Tolerance Interval

**Parameter: Vanadium**

Total Percent Non-Detects = 46.988%
Background Samples (n) = 23
Maximum Background Concentration = 330
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

| Well | Sample | Result | Impacted |
|---|---|---|---|
| MW-6 | 10/1/1994 | ND<25 | FALSE |
| MW-6 | 1/31/1995 | ND<20 | FALSE |
| MW-6 | 2/15/1995 | ND<20 | FALSE |
| MW-6 | 3/7/1995 | 100 | FALSE |
| MW-6 | 12/6/1995 | ND<20 | FALSE |
| MW-6 | 5/6/1996 | ND<20 | FALSE |
| MW-6 | 11/11/1996 | 9 | FALSE |
| MW-6 | 6/24/1997 | 8 | FALSE |
| MW-6 | 12/3/1997 | 18 | FALSE |
| MW-6 | 6/4/1998 | 100 | FALSE |
| MW-6 | 11/18/1998 | 130 | FALSE |
| MW-6 | 5/13/1999 | 26 | FALSE |
| SW-3 | 10/1/1994 | ND<25 | FALSE |
| SW-3 | 1/31/1995 | ND<20 | FALSE |
| SW-3 | 2/15/1995 | ND<20 | FALSE |
| SW-3 | 3/7/1995 | ND<20 | FALSE |
| SW-3 | 12/7/1995 | ND<20 | FALSE |
| SW-3 | 5/6/1996 | ND<20 | FALSE |
| SW-3 | 11/11/1996 | ND<2.5 | FALSE |
| SW-3 | 6/24/1997 | ND<2.5 | FALSE |
| SW-3 | 12/3/1997 | ND<2.5 | FALSE |
| SW-3 | 6/4/1998 | ND<2.5 | FALSE |
| SW-3 | 11/18/1998 | ND<2.5 | FALSE |
| SW-3 | 5/13/1999 | 12 | FALSE |
| MW-3 | 10/1/1994 | ND<25 | FALSE |
| MW-3 | 1/31/1995 | ND<20 | FALSE |
| MW-3 | 2/15/1995 | ND<20 | FALSE |
| MW-3 | 3/7/1995 | ND<20 | FALSE |
| MW-3 | 12/7/1995 | ND<20 | FALSE |
| MW-3 | 5/6/1996 | ND<20 | FALSE |
| MW-3 | 11/11/1996 | 10 | FALSE |
| MW-3 | 6/24/1997 | 15 | FALSE |
| MW-3 | 12/3/1997 | 110 | FALSE |
| MW-3 | 6/4/1998 | 17 | FALSE |
| MW-3 | 11/18/1998 | 63 | FALSE |
| MW-3 | 5/13/1999 | 21 | FALSE |
| MW-5 | 10/1/1994 | 1770 | TRUE |
| MW-5 | 1/31/1995 | 489 | TRUE |
| MW-5 | 2/15/1995 | 392 | TRUE |
| MW-5 | 3/7/1995 | 533 | TRUE |
| MW-5 | 12/7/1995 | 137 | FALSE |
| MW-5 | 5/6/1996 | 112 | FALSE |
| MW-5 | 11/11/1996 | 52 | FALSE |
| MW-5 | 6/24/1997 | 160 | FALSE |
| MW-5 | 12/3/1997 | 480 | TRUE |
| MW-5 | 6/4/1998 | 520 | TRUE |
| MW-5 | 11/18/1998 | 1700 | TRUE |
| MW-5 | 5/13/1999 | 170 | FALSE |

Original Data

Non-Detects Replaced with 1/2 DL

| | | | |
|---|---|---|---|
| MW-7 | 10/1/1994 | ND<25 | FALSE |
| MW-7 | 1/31/1995 | ND<20 | FALSE |
| MW-7 | 2/15/1995 | ND<20 | FALSE |
| MW-7 | 3/7/1995 | 58 | FALSE |
| MW-7 | 12/6/1995 | ND<20 | FALSE |
| MW-7 | 5/6/1996 | ND<20 | FALSE |
| MW-7 | 11/11/1996 | 39 | FALSE |
| MW-7 | 6/24/1997 | 20 | FALSE |
| MW-7 | 12/3/1997 | 17 | FALSE |
| MW-7 | 6/4/1998 | 16 | FALSE |
| MW-7 | 11/18/1998 | 20 | FALSE |
| MW-7 | 5/13/1999 | 34 | FALSE |

# Shapiro-Wilks Test of Normality

**Parameter: Zinc, total**
**Background Wells**
**Normality Test of Parameter Concentrations**
K = 11; Samples = 23

| i | x(i) | x(n-i+1) | x(n-1+1)-x(i) | a(n-i+1) | b(i) |
|---|---|---|---|---|---|
| 1 | 2.30259 | 5.76832 | 3.46574 | 0.4542 | 1.57414 |
| 2 | 2.30259 | 5.66988 | 3.3673 | 0.3126 | 1.05262 |
| 3 | 3.13549 | 5.65948 | 2.52399 | 0.2563 | 0.646898 |
| 4 | 3.3673 | 5.57973 | 2.21243 | 0.2139 | 0.47324 |
| 5 | 3.71357 | 5.52146 | 1.80789 | 0.1787 | 0.32307 |
| 6 | 3.91202 | 4.94164 | 1.02962 | 0.148 | 0.152384 |
| 7 | 3.91202 | 4.5326 | 0.620576 | 0.1201 | 0.0745312 |
| 8 | 3.91202 | 4.38203 | 0.470004 | 0.0941 | 0.0442273 |
| 9 | 3.91202 | 4.38203 | 0.470004 | 0.0696 | 0.0327123 |
| 10 | 3.91202 | 4.11087 | 0.198851 | 0.0459 | 0.00912725 |
| 11 | 3.93183 | 4.07754 | 0.145712 | 0.0228 | 0.00332223 |
| 12 | 4.02535 | 4.02535 | 0 | | |
| 13 | 4.07754 | 3.93183 | -0.145712 | | |
| 14 | 4.11087 | 3.91202 | -0.198851 | | |
| 15 | 4.38203 | 3.91202 | -0.470004 | | |
| 16 | 4.38203 | 3.91202 | -0.470004 | | |
| 17 | 4.5326 | 3.91202 | -0.620576 | | |
| 18 | 4.94164 | 3.91202 | -1.02962 | | |
| 19 | 5.52146 | 3.71357 | -1.80789 | | |
| 20 | 5.57973 | 3.3673 | -2.21243 | | |
| 21 | 5.65948 | 3.13549 | -2.52399 | | |
| 22 | 5.66988 | 2.30259 | -3.3673 | | |
| 23 | 5.76832 | 2.30259 | -3.46574 | | |

Sum of b values = 4.38627
Sample Standard Deviation = 0.97526
W Statistic = 0.919447
5% Critical value of 0.914 is less than 0.919447
Data is normally distributed at 95% level of significance
1% Critical value of 0.881 is less than 0.919447
Data is normally distributed at 99% level of significance

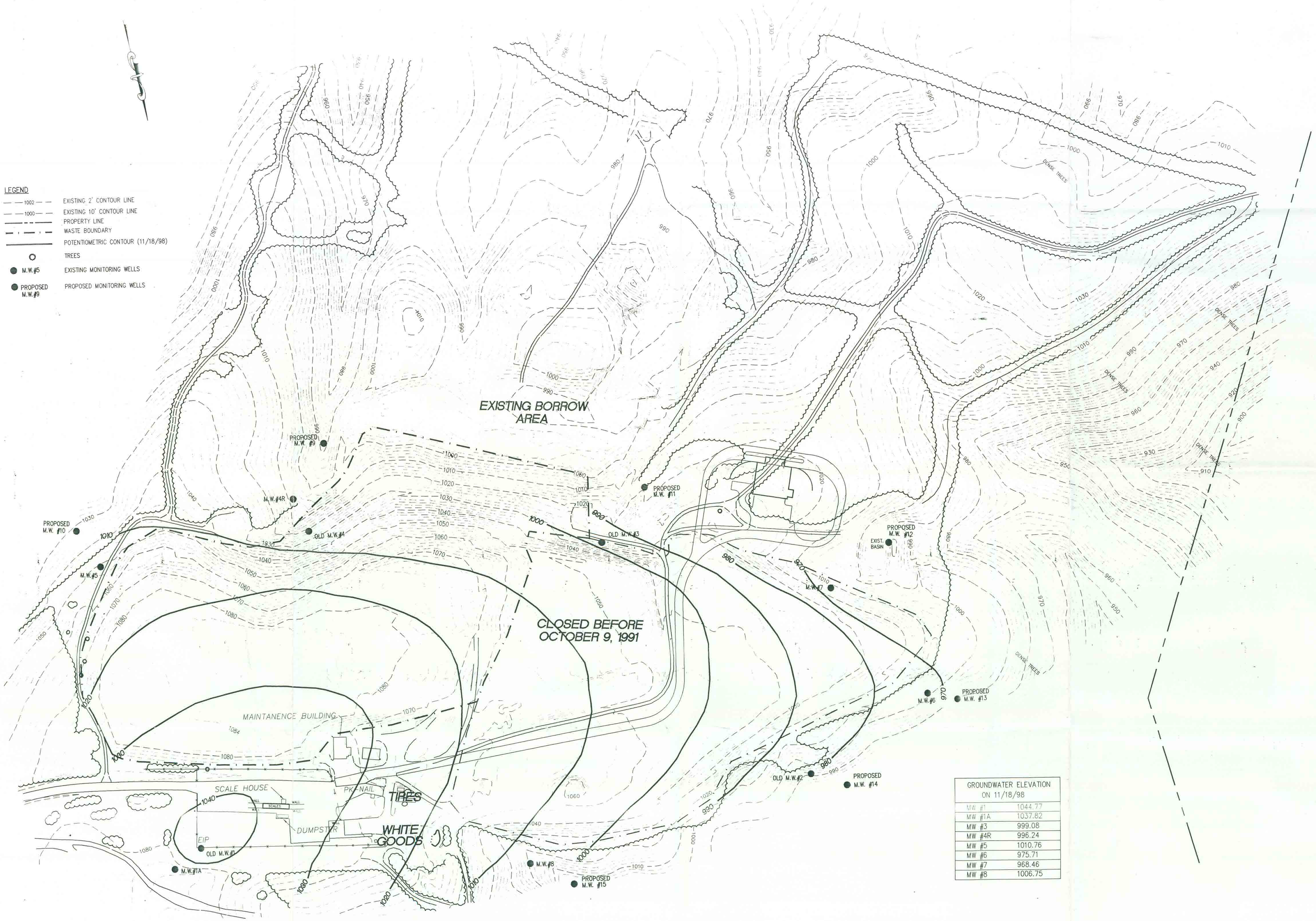
# Parametric Tolerance Interval Analysis

**Parameter: Zinc, total**

Background mean = 4.38965
Background standard deviation = 0.980736
One-sided normal tolerance factor at 95% confidence = 1.75408
Tolerance factor calculation follows USEPA 1992 Guidance
Upper tolerance limit = 6.10994

| Well | Date | Result | Impacted |
|---|---|---|---|
| MW-6 | 10/1/1994 | 4.86753 | FALSE |
| | 1/31/1995 | ND<3.91202 | FALSE |
| | 2/15/1995 | ND<3.91202 | FALSE |
| | 3/7/1995 | 4.79579 | FALSE |
| | 12/6/1995 | ND<3.91202 | FALSE |
| | 5/6/1996 | ND<3.91202 | FALSE |
| | 11/11/1996 | 2.70805 | FALSE |
| | 6/24/1997 | 4.20469 | FALSE |
| | 12/3/1997 | 5.19296 | FALSE |
| | 6/4/1998 | 4.94164 | FALSE |
| | 11/18/1998 | 4.94164 | FALSE |
| | 5/13/1999 | 4.04305 | FALSE |
| SW-3 | 10/1/1994 | 4.09434 | FALSE |
| | 1/31/1995 | ND<3.91202 | FALSE |
| | 2/15/1995 | ND<3.91202 | FALSE |
| | 3/7/1995 | ND<3.91202 | FALSE |
| | 12/7/1995 | ND<3.91202 | FALSE |
| | 5/6/1996 | 4.00733 | FALSE |
| | 11/11/1996 | ND<2.30259 | FALSE |
| | 6/24/1997 | 3.3322 | FALSE |
| | 12/3/1997 | 2.30259 | FALSE |
| | 6/4/1998 | 2.30259 | FALSE |
| | 11/18/1998 | ND<2.30259 | FALSE |
| | 5/13/1999 | 2.99573 | FALSE |
| MW-3 | 10/1/1994 | ND<3.91202 | FALSE |
| | 1/31/1995 | 4.75359 | FALSE |
| | 2/15/1995 | ND<3.91202 | FALSE |
| | 3/7/1995 | ND<3.91202 | FALSE |
| | 12/7/1995 | ND<3.91202 | FALSE |
| | 5/6/1996 | ND<3.91202 | FALSE |
| | 11/11/1996 | 3.3322 | FALSE |
| | 6/24/1997 | 4.70048 | FALSE |
| | 12/3/1997 | 4.94164 | FALSE |
| | 6/4/1998 | 3.58352 | FALSE |
| | 11/18/1998 | 4.35671 | FALSE |
| | 5/13/1999 | 3.80666 | FALSE |
| MW-5 | 10/1/1994 | 8.27129 | TRUE |
| | 1/31/1995 | 7.81601 | TRUE |
| | 2/15/1995 | 7.40853 | TRUE |
| | 3/7/1995 | 7.69166 | TRUE |
| | 12/7/1995 | 6.23441 | TRUE |
| | 5/6/1996 | 5.8944 | FALSE |
| | 11/11/1996 | 5.43808 | FALSE |
| | 6/24/1997 | 5.1358 | FALSE |
| | 12/3/1997 | 6.75693 | TRUE |
| | 6/4/1998 | 7.31322 | TRUE |
| | 11/18/1998 | 7.64969 | TRUE |
| | 5/13/1999 | 5.85793 | FALSE |
| MW-7 | 10/1/1994 | 4.09434 | FALSE |
| | 1/31/1995 | 4.34381 | FALSE |
| | 2/15/1995 | 5.24175 | FALSE |

| | | | |
|---|---|---|---|
| | 3/7/1995 | 4.33073 | FALSE |
| | 12/6/1995 | ND<3.91202 | FALSE |
| | 5/6/1996 | ND<3.91202 | FALSE |
| | 11/11/1996 | 3.91202 | FALSE |
| | 6/24/1997 | 4.54329 | FALSE |
| | 12/3/1997 | 4.06044 | FALSE |
| | 6/4/1998 | 3.78419 | FALSE |
| | 11/18/1998 | 3.78419 | FALSE |
| | 5/13/1999 | 4.60517 | FALSE |
| MW-4R | 10/1/1994 | 6.64639 | TRUE |
| | 1/31/1995 | 5.04343 | FALSE |
| | 2/15/1995 | 4.85203 | FALSE |
| | 3/7/1995 | 4.7185 | FALSE |
| | 12/6/1995 | ND<3.91202 | FALSE |
| | 5/6/1996 | 4.12713 | FALSE |
| | 11/11/1996 | 3.3673 | FALSE |
| | 6/24/1997 | 4.35671 | FALSE |
| | 12/3/1997 | 4.60517 | FALSE |
| | 6/4/1998 | 4.14313 | FALSE |
| | 11/18/1998 | 3.82864 | FALSE |
| | 5/13/1999 | 3.63759 | FALSE |




| GROUNDWATER ELEVATION ON 11/18/98 | |
|---|---|
| MW #1 | 1044.77 |
| MW #1A | 1037.82 |
| MW #3 | 999.08 |
| MW #4R | 996.24 |
| MW #5 | 1010.76 |
| MW #6 | 975.71 |
| MW #7 | 968.46 |
| MW #8 | 1006.75 |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# MUNICIPAL SOLID WASTE LANDFILL FACILITY
## ALEXANDER COUNTY TAYLORSVILLE, NC

| DATE | BY | REV. | DESCRIPTION |
|---|---|---|---|
| | | | |

| | |
|---|---|
| SCALE: | 1" = 100' |
| DATE: | 4/28/99 |
| DRWN. BY: | L. HAMPTON |
| CHKD. BY: | J. SKINNER |
| PROJECT NUMBER | G99006.0 |
| DRAWING NO. | MW |
| SHEET NO. | 1 OF 1 |

C:\Mwgs\ALEXANDER\99006-MW.dwg Wed Apr 28 16:0 99 1999 LCH