9601-MSWLF-1981 Stats only 96-01 8-09-01

OPERATION/CONSTRUCTION MANAGERS
**Municipal Services**
PO Box 97, Garner, North Carolina 27529 (919) 772-5393

CIVIL/SANITARY ENGINEERS
**Engineering Company, P.A.**
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Carmen Johnson
Fac/Perm/Co.ID# | Date | Doc ID#
96-01 | 7/19/12 | DIN

February 11, 2002

RECEIVED FEB 2002

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

Re: Groundwater Sampling and Statistical Analysis
Wayne County Closed Sanitary Landfill (Dudley)
MESCO Project No. G02016.0

Dear Mr. Rose:

Municipal Engineering Services Company, P.A. (MESCO) completed the statistical analyses for the Wayne County Closed Sanitary Landfill located in Dudley, North Carolina. The purpose of these analyses is to determine, in comparison to background levels, statistical significance of constituents detected during the August-2001 sampling event.

The analysis results were compared with North Carolina Groundwater Standard (Standard) to check for regulatory exceedances. Lead was the most prevalently detected inorganic constituent detected above the MCL within compliance wells MW-2, MW-6, MW-7 and MW-8. Chromium was found in exceedance of the Standard within MW-6 and MW-7. Mercury was also found in exceedance at MW-8. VOCs were detected within MW-2, MW-6, and MW-8, but all were found far below the Standard.

## Statistical Analysis Methodology

### Metals

An interwell statistical analysis was conducted upon metals detected during the August 9, 2001 sampling event. Monitoring well MW-1 was defined as the background well, and an upper tolerance limit (UTL) with 95% coverage was computed for the detected constituent from the background data at a 95% confidence level. For each tested constituent, an appropriate statistical analysis method was selected based on the percentages of non-detects (%ND) in the historical background data. The following table (Table 1) summarizes the methods used for four different %ND ranges.

**Table 1.** Statistical Analysis Methods for Various %ND Ranges

| %ND | Analysis Method | ND Substitution |
|---|---|---|
| %ND<15% | Parametric tolerance limit | 1/2 ND |
| 15%<%ND<50% | Parametric tolerance limit | Cohen or 1/2 ND |
| 50%<%ND<90% | Non-parametric tolerance limit | 1/2 ND |
| 90%<%ND | Poisson tolerance limit | - |

NOTE: For parametric tolerance interval, normality of the background data was checked by the Shapiro-Wilks normality test, as the method requires that the data be normally distributed.

A total of four metals were tested for statistical significance. The Poisson tolerance limit with no ND substitution was utilized upon all constituents except for vanadium since none of the detected metals have ever been found within the background well MW-1 (ND=100%). The Poisson count of background samples exceeded the maximum 420 for Vanadium, therefore ½ ND substitution had to be utilized prior to completing the Poisson tolerance limit analysis.

**VOCs**

All historical Appendix I VOC detections in the background well MW-1 were pooled in order to determine the total number of detections, from which the expected number of detections in a single down gradient monitoring point ($y^*$) was derived by utilizing the Poisson prediction interval. The parameter $y^*$ is defined by the following equation:

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

where

$c = 1/n$ ($n$=number of background samples)
$t$ = one-sided value of students $t$-Statistic at 95% confidence [a]
$y$ = number of events observed in $n$ previous samples
$y^*$ = expected number of events in a single future sample

[a] Gibbons, R.D., 1994, Statistical methods for groundwater monitoring: John Wiley & Sons, Inc., p.12.

For each monitoring location showing any VOC detections, the number of detected VOCs was counted with each detection being considered a "hit". The number was then compared with the expected number of detections derived from the background VOC data. The value of Student's $t$-Statistic was derived from tabulated values included in Gibbons (1994).

## Intrawell Analyses

Intrawell analyses were conducted only upon those constituents that were initially found to be statistically significant by interwell analysis. In general, intrawell analysis is conducted in order to differentiate true contamination from spatial variability. Shewhart-CUSUM control charts were generated for each of the triggered constituents to determine its baseline levels. Baseline levels in this context are defined as the background level derived from the data in a given downgradient well.

## Results

Interwell analysis was performed upon all four inorganic constituents detected within the compliance wells. Historical data compiled for monitoring well MW-1 was used as the baseline. Data distributions were reviewed using time series and box and whiskers plots (enclosed charts). Table 2 summarizes those metals that were found to be significantly higher than their background levels by interwell analysis.

**Table 2**. Interwell Analyses Summary

| Well | Cr | Pb | Va |
|---|---|---|---|
| MW-2 | x | x | |
| MW-6 | x | x | x |
| MW-7 | x | x | x |
| MW-8 | | x | x |

x=level significantly higher than the background level

The metals chromium, lead, and vanadium were detected at statistically significant levels within MW-6 and MW-7. Compliance well MW-2, located west of the cohesive capped landfill, contained significant concentrations of chromium and lead. Both lead and vanadium were found to be elevated above background concentrations within MW-8. All wells that were found to contain detectable concentrations of VOCs exceeded the expected number of

VOC detections determined from the background data, indicating the possible presence of contamination in those wells at a 95% confidence level.

Intrawell statistical analysis was conducted upon the constituents that were found to be statistically elevated compared to the background. Shewhart-CUSUM control charts were generated for all the inorganic constituents within table 2 as well as the 3 detected VOCs. It is recommended that since the Shewhart-CUSUM control chart is the sole statistical intrawell method, only when both the CUSUM line and the standardized mean line go out of control should an indication of a possible release be concluded. As the enclosed charts indicate only lead within MW-2 and vanadium within MW-8 was found to be statistically significant based upon its own background levels. In this instance, however, the statistical insignificance of the majority of the wells may not necessarily suggest the absence of contamination originating from the landfill. Since intrawell comparisons require the assumption that the site had no previous contamination prior to the inception of monitoring, the intrawell analysis results may only reflect the conditions after the first sampling event took place back in 1994. To date, the landfill facility had long been in operation for more than 20 years prior to its closure. The eastern portion of the landfill was closed prior to 1991, and the western portion was capped in 1998.

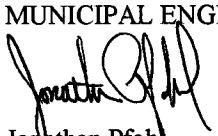
The enclosed time series plots for MW-2, MW-6, and MW-8 illustrate consistent historical VOC detections below the MCL and without an evident increasing trend. The relative locations of the aforementioned compliance wells make it unlikely that a single external source of the benzene derivatives contributed to the possible release. No Appendix II Semi-VOCs were detected over the entire site during this sampling event.

## Conclusion

The interwell statistical analysis results on metals show that monitoring wells MW-2, MW-6, MW-7 and MW-8 contained levels of inorganics that exceeded the background levels during this sampling event. Intrawell analysis conducted solely through Shewhart-CUSUM control charts indicate that lead within MW-2 and vanadium within MW-8 were found to be significant. VOCs were found within MW-2, MW-6, and MW-8 in concentrations above the background established by upgradient MW-1 but were found to not be above their own historical background levels.

Overall, the observed levels of VOCs remain significantly higher than the background levels. The type and historical consistency of the VOCs suggests that the groundwater may have been impacted by the landfill. Since the landfill has ceased operation levels of VOCs are expected to diminish through natural attenuation. We therefore recommend that the monitoring program continue with Appendix II analyses within MW-2, MW-6, and MW-8, and that all other wells and surface waters be sampled for the Appendix I constituents for all future sampling events provided that no VOC detections occur in those monitoring locations. The Wayne County Closed Landfill is scheduled to be sampled by Environment I of Greenville, NC in February 2002. The results report and statistical analysis will be submitted to the section upon completion. If you have any questions or comments regarding this report, please contact me by phone at (919) 772-5393 or by email at jpfohl@mesco.com.

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



Jonathan Pfohl
Environmental Technician

Enclosures
cc: Mr. Lloyd Cook
Wayne County

**Exceedance Scan**
**Wayne County Closed Landfill (Dudley)**

| Well ID | Parameter Name [1] | Sample Date | Result | Unit | PQL [2] | MCL [3] | Exceedance |
|---|---|---|---|---|---|---|---|
| MW-2 | Chromium, total | 8/9/2001 | 0.018 | mg/l | 0.01 | 0.05 | |
| **MW-2** | **Lead, total** | **8/9/2001** | **0.031** | **mg/l** | **0.01** | **0.015** | **0.016** |
| MW-2 | Chlorobenzene | 8/9/2001 | 14.00 | ug/l | 5 | 50 | |
| MW-4 | Lead, total | 8/9/2001 | 0.010 | mg/l | 0.01 | 0.015 | |
| **MW-6** | **Chromium, total** | **8/9/2001** | **0.110** | **mg/l** | **0.01** | **0.05** | **0.06** |
| **MW-6** | **Lead, total** | **8/9/2001** | **0.043** | **mg/l** | **0.01** | **0.015** | **0.028** |
| MW-6 | Vanadium | 8/9/2001 | 0.119 | mg/l | 0.04 | - | |
| MW-6 | 1,4-Dichlorobenzene | 8/9/2001 | 10.00 | ug/l | 5 | 75 | |
| MW-6 | Chlorobenzene | 8/9/2001 | 9.70 | ug/l | 5 | 50 | |
| MW-6 | Xylene | 8/9/2001 | 65.00 | ug/l | 5 | 530 | |
| **MW-7** | **Chromium, total** | **8/9/2001** | **0.052** | **mg/l** | **0.01** | **0.05** | **0.002** |
| **MW-7** | **Lead, total** | **8/9/2001** | **0.023** | **mg/l** | **0.01** | **0.015** | **0.008** |
| MW-7 | Vanadium | 8/9/2001 | 0.104 | mg/l | 0.04 | - | |
| **MW-8** | **Lead, total** | **8/9/2001** | **0.021** | **mg/l** | **0.01** | **0.015** | **0.006** |
| **MW-8** | **Mercury** | **8/9/2001** | **0.0012** | **mg/l** | **0.0005** | **0.0011** | **1E-04** |
| MW-8 | Vanadium | 8/9/2001 | 0.109 | mg/l | 0.04 | - | |
| MW-8 | 1,4-Dichlorobenzene | 8/9/2001 | 29.00 | ug/l | 5 | 75 | |
| MW-8 | Chlorobenzene | 8/9/2001 | 15.00 | ug/l | 5 | 50 | |

[1] Table only contains detected constituents.

[2] PQL = Practical Quantitation Limit

[3] MCL = Maximum Contaminant Level (North Carolina Groundwater Standard)

# Statistical Analyses Summary

**Inter-Well Analyses Summary**
**Wayne County Closed Sanitary Landfill (Dudley)**

**Background Well: MW-1**

**Chromium, total**

| %ND | Normality | Method | ND Adj. | Upper Limit (a = 95%) | Unit |
|---|---|---|---|---|---|
| 100 | - | Poisson tolerance interval | ND | 17 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW-2 | 18 | yes |
| **MW-6** | 110 | yes |
| **MW-7** | 52 | yes |

**Lead, total**

| %ND | Normality | Method | ND Adj. | Upper Limit (a = 95%) | Unit |
|---|---|---|---|---|---|
| 100 | - | Poisson tolerance interval | ND | 17 | ug/l |

| Well | Result | Significance |
|---|---|---|
| **MW-2** | 31 | yes |
| MW-4 | 10 | no |
| **MW-6** | 43 | yes |
| **MW-7** | 23 | yes |
| **MW-8** | 21 | yes |

**Mercury**

| %ND | Normality | Method | ND Adj. | Upper Limit (a = 95%) | Unit |
|---|---|---|---|---|---|
| 100 | - | Poisson tolerance interval | ND | 3 | ug/l |

| Well | Result | Significance |
|---|---|---|
| **MW-8** | 1.2 | no |

**Vanadium, total**

| %ND | Normality | Method | ND Adj. | Upper Limit (a = 95%) | Unit |
|---|---|---|---|---|---|
| 100 | - | Poisson tolerance interval | 1/2 ND | 29.5 | ug/l |

| Well | Result | Significance |
|---|---|---|
| MW-6 | 119 | yes |
| MW-7 | 104 | yes |
| MW-8 | 109 | yes |

NOTE: Bold-faced monitoring points indicate detected levels exceed North Carolina Groundwater Standard.

**Summary of Pooled VOCs in Background Well (MW-1)**
**Wayne County Closed Sanitary Landfill (Dudley)**

| Constituent | Samples | NDs | % NDs |
|---|---|---|---|
| 1,1,1,2-Tetrachloroethane | 17 | 17 | 100.00 |
| 1,1,1-Trichloroethane | 17 | 17 | 100.00 |
| 1,1,2,2-Tetrachloroethane | 17 | 17 | 100.00 |
| 1,1,2-Trichloroethane | 17 | 17 | 100.00 |
| 1,1-Dichloroethane | 17 | 17 | 100.00 |
| 1,1-Dichloroethene | 17 | 17 | 100.00 |
| 1,2,3-Trichloropropane | 17 | 17 | 100.00 |
| 1,2-Dibromo-3-chloropropane | 17 | 17 | 100.00 |
| 1,2-Dibromoethane | 17 | 17 | 100.00 |
| 1,2-Dichlorobenzene | 17 | 17 | 100.00 |
| 1,2-Dichloroethane | 17 | 17 | 100.00 |
| 1,2-Dichloropropane | 17 | 17 | 100.00 |
| 1,4-Dichlorobenzene | 17 | 17 | 100.00 |
| 2-Butanone | 17 | 17 | 100.00 |
| 2-Hexanone | 17 | 17 | 100.00 |
| 4-Methyl-2-Pentanone | 17 | 17 | 100.00 |
| Acetone | 17 | 17 | 100.00 |
| Acrylonitrile | 17 | 17 | 100.00 |
| Benzene | 17 | 17 | 100.00 |
| Bromochloromethane | 17 | 17 | 100.00 |
| Bromodichloromethane | 17 | 17 | 100.00 |
| Bromoform | 17 | 17 | 100.00 |
| Bromomethane | 17 | 17 | 100.00 |
| Carbon disulfide | 17 | 17 | 100.00 |
| Carbon tetrachloride | 17 | 17 | 100.00 |
| Chlorobenzene | 17 | 17 | 100.00 |
| Chloroethane | 17 | 17 | 100.00 |
| Chloroform | 17 | 17 | 100.00 |
| Chloromethane | 17 | 17 | 100.00 |
| cis-1,2-Dichloroethene | 17 | 17 | 100.00 |
| cis-1,3-Dichloropropene | 17 | 17 | 100.00 |
| Chlorodibromomethane | 17 | 17 | 100.00 |
| Dibromomethane | 17 | 17 | 100.00 |
| Ethylbenzene | 17 | 17 | 100.00 |
| Iodomethane | 17 | 17 | 100.00 |
| Dichloromethane | 17 | 17 | 100.00 |
| Styrene | 17 | 17 | 100.00 |
| Tetrachloroethylene | 17 | 17 | 100.00 |
| Toluene | 17 | 17 | 100.00 |
| trans-1,2-Dichloroethene | 17 | 17 | 100.00 |
| trans-1,3-Dichloropropene | 17 | 17 | 100.00 |
| trans-1,4-Dichloro-2-butene | 17 | 17 | 100.00 |
| Trichloroethylene | 17 | 17 | 100.00 |
| Trichlorofluoromethane | 17 | 17 | 100.00 |
| Vinyl acetate | 17 | 17 | 100.00 |
| Vinyl chloride | 17 | 17 | 100.00 |
| Xylene | 17 | 17 | 100.00 |
| **Total** | **799** | **799** | **100.00** |

**Poisson Prediction Interval Based upon Pooled Background VOCs**
**Wayne County Closed Sanitary Landfill (Dudley)**

**All detected VOCs (Background Well: MW-1)**

| Constituent | MW-2 | MW-6 | MW-8 |
|---|---|---|---|
| 1,4-dichlorobenzene | | x | x |
| Chlorobenzene | x | x | x |
| Xylene | | x | |
| **Detection(s) per Scan** | 1.00 | 3.00 | 2.00 |

Total number of sampling events [n] = 17
Total number of detections in background wells [y] = 0
Number of comparisons (downgradient wells) [k] = 8
One-sided value of Student's t-statistic (95% confidence) [t] = 2.786
Expected number of detections in a single future sample [y*] = **0.4566**

**Statistically significant VOC detections at 95% confidence level within MW-2, MW-6, & MW-8**

**Intra-Well Analysis Summary (VOCs & Metals)**
**Wayne County Closed Sanitary Landfill (Dudley)**

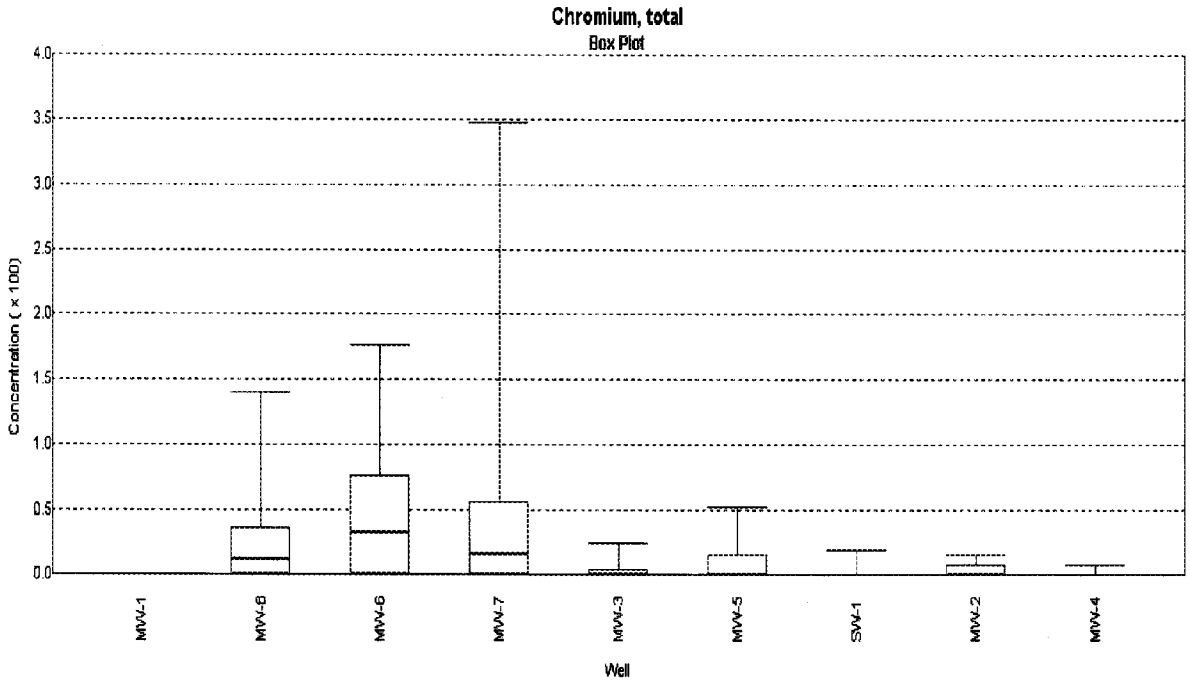
| Well | Chromium | Lead | Vanadium | Chlorobenzene | Xylene | 1,4-Dichlorobenzene |
|---|---|---|---|---|---|---|
| MW-2 | no | yes | | no | | |
| MW-6 | no | no | no | no | no | no |
| MW-7 | no | no | no | | | |
| MW-8 | | no | yes | no | | no |

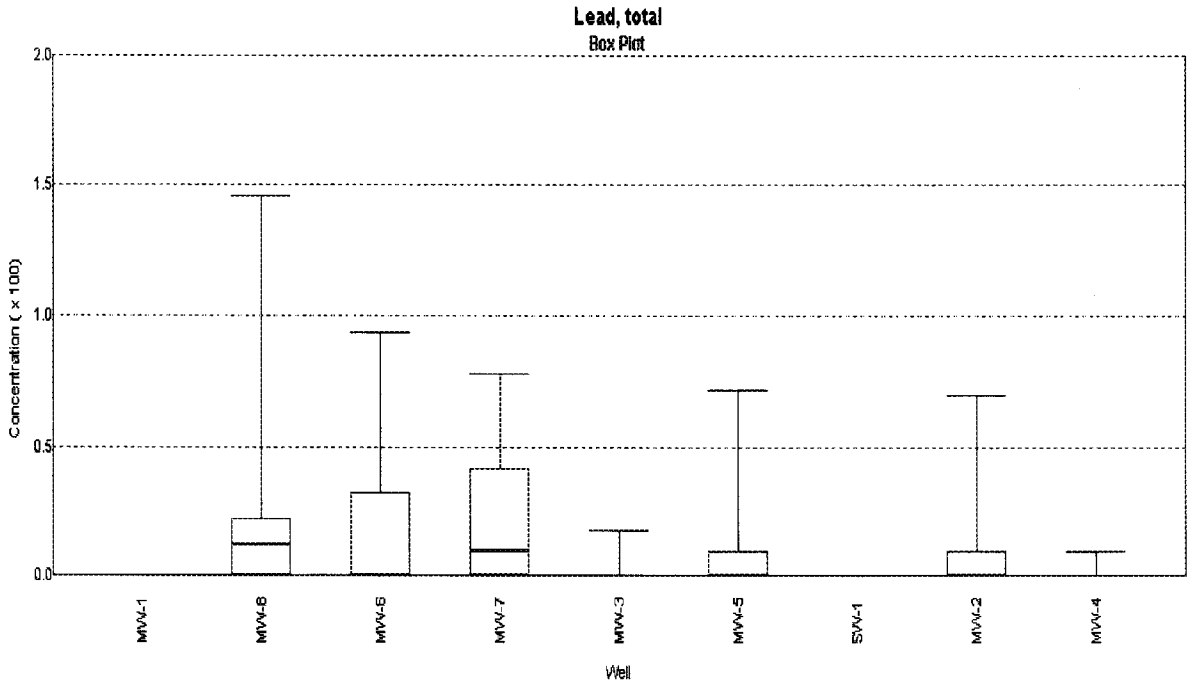
EXPLANATION

yes=detection statistically significant by intrawell analysis
no=detection not statistically significant by intrawell analysis

**Lead within MW-2 and Vanadium within MW-8 Statistically significant increase by Intrawell**

**Box Plots for Select Constituents**
**Wayne County Closed Sanitary Landfill (Dudley)**



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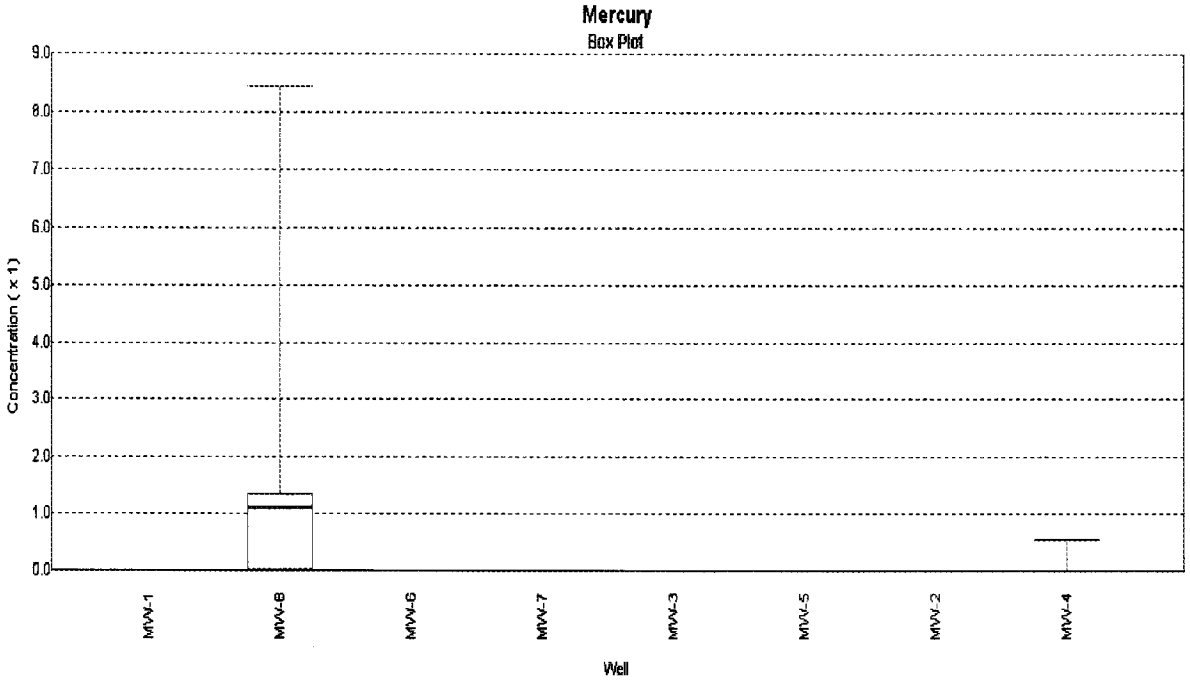
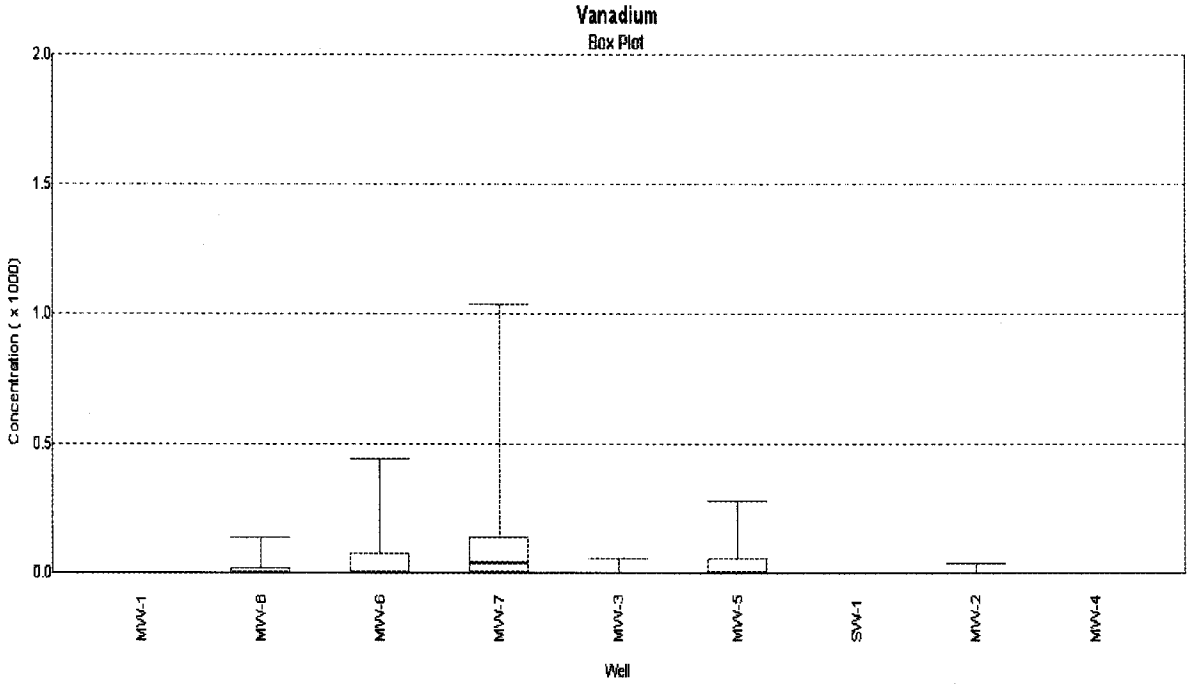
**Wayne County Closed Sanitary Landfill (Dudley)**



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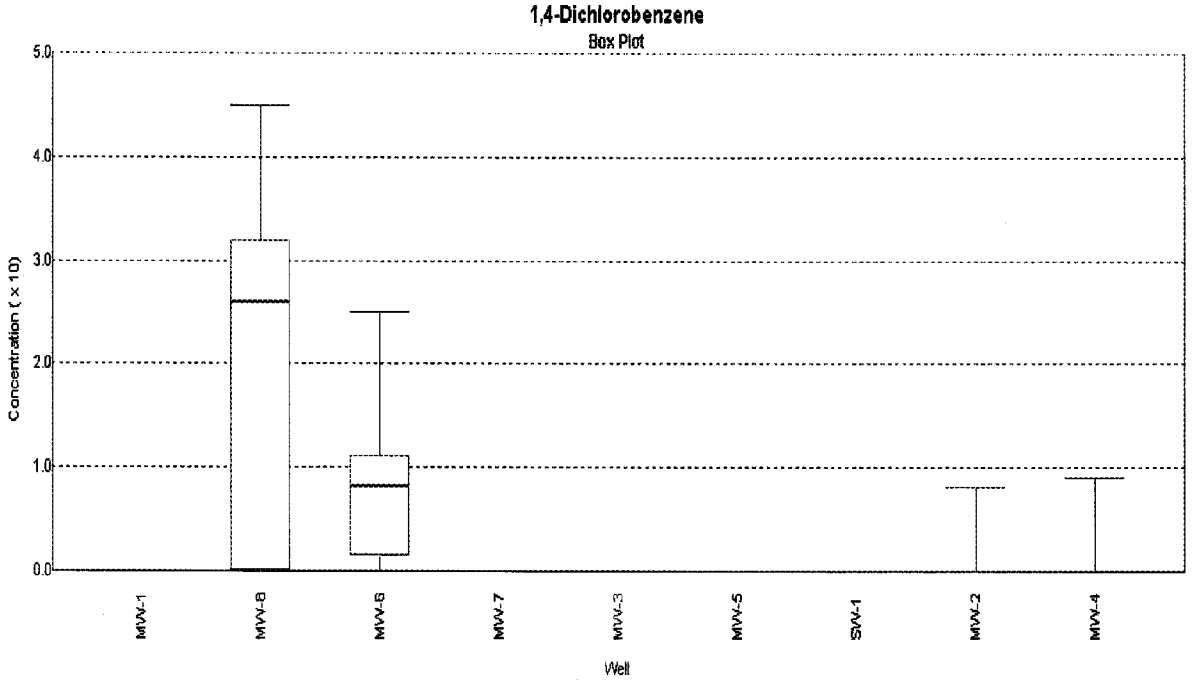


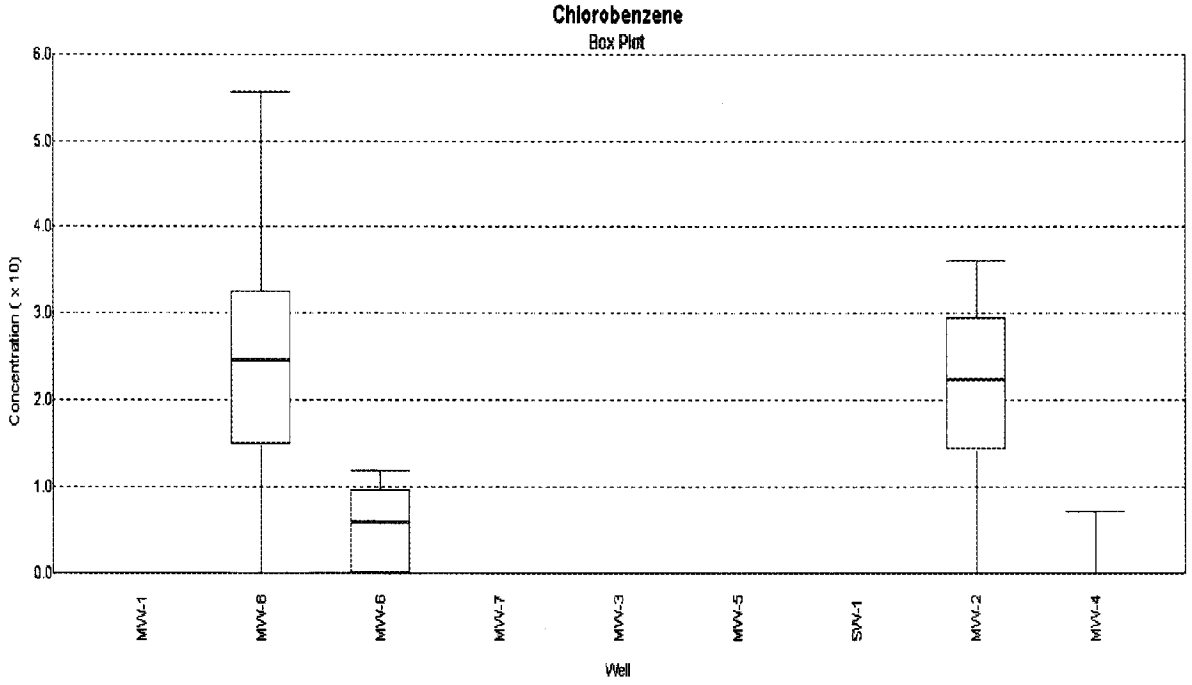

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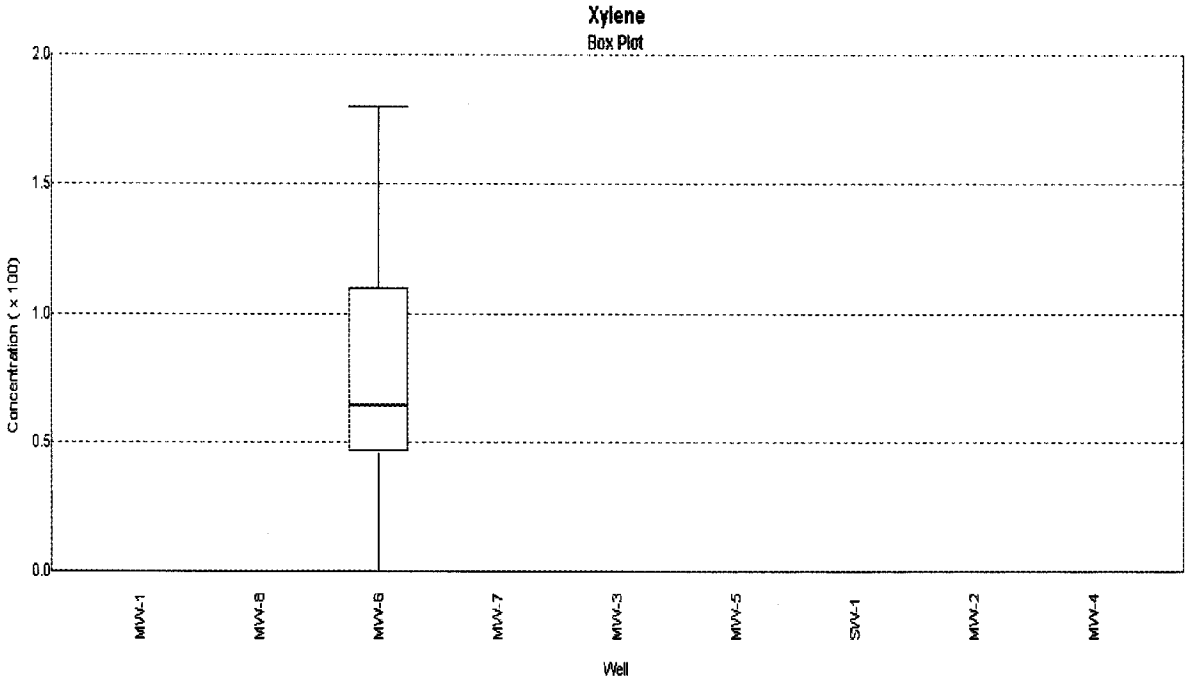
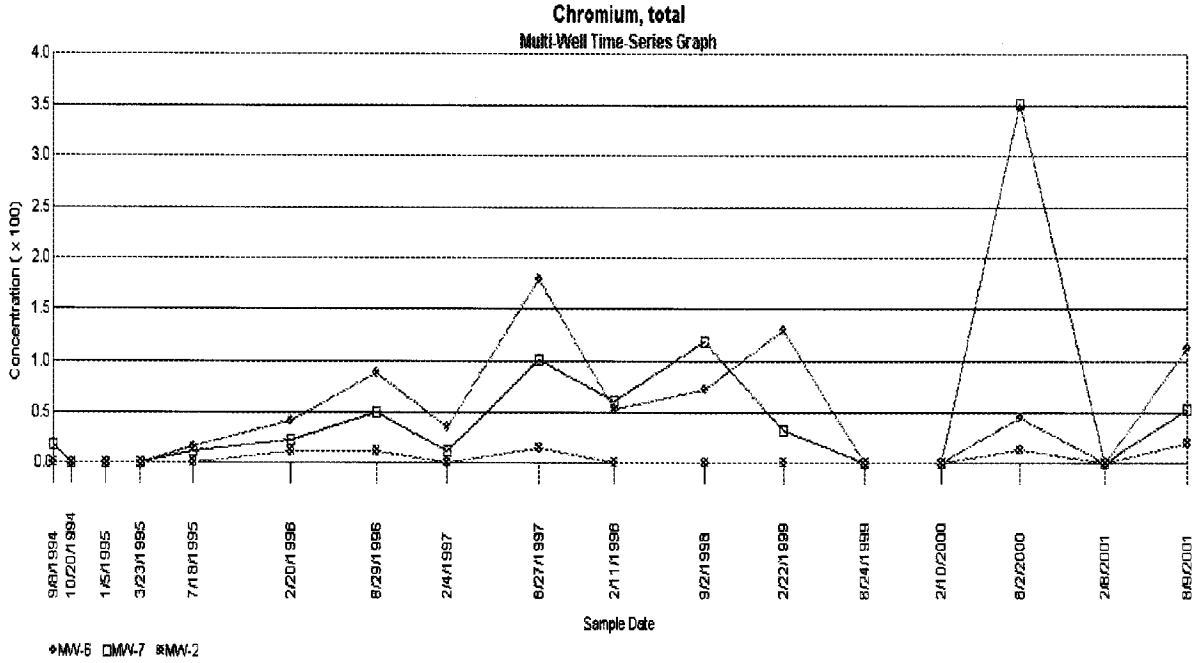
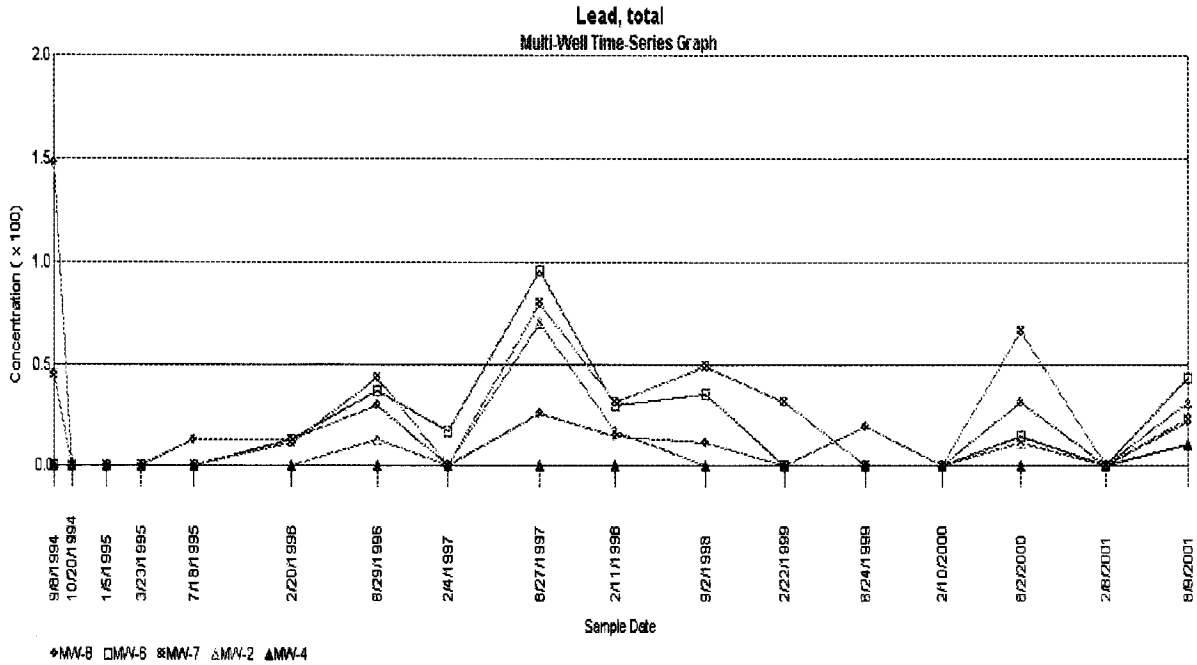
**Wayne County Closed Sanitary Landfill (Dudley)**



**Time Series Plots for Select Constituents**
**Wayne County Closed Sanitary Landfill (Dudley)**



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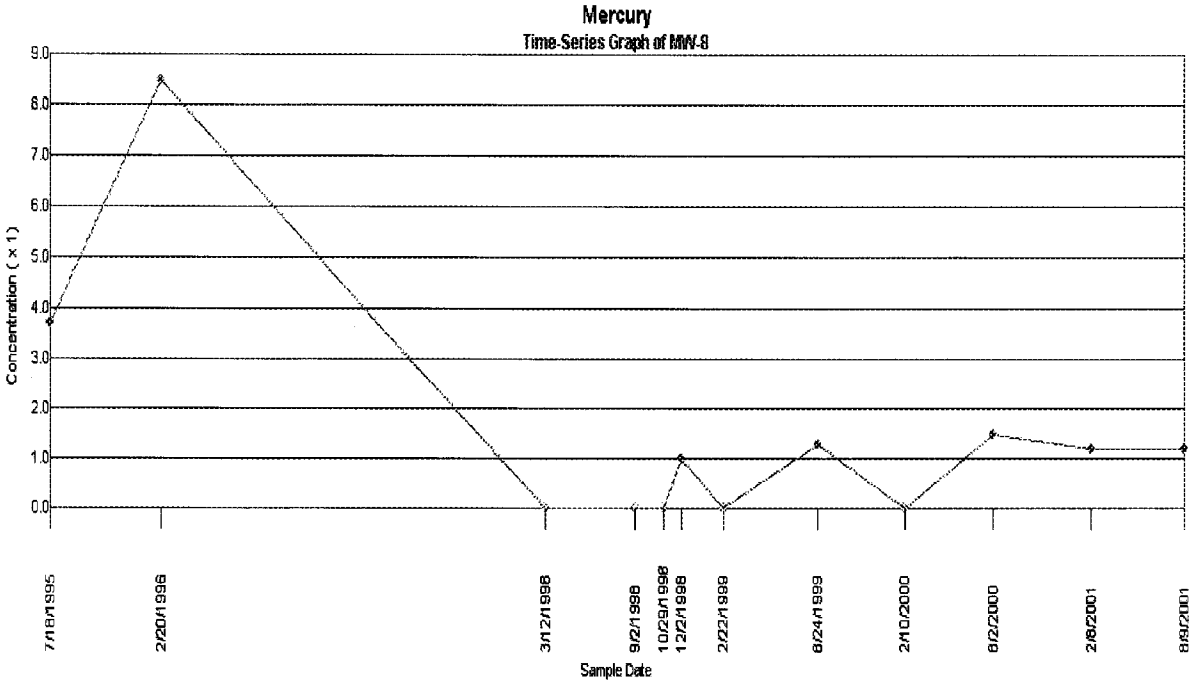


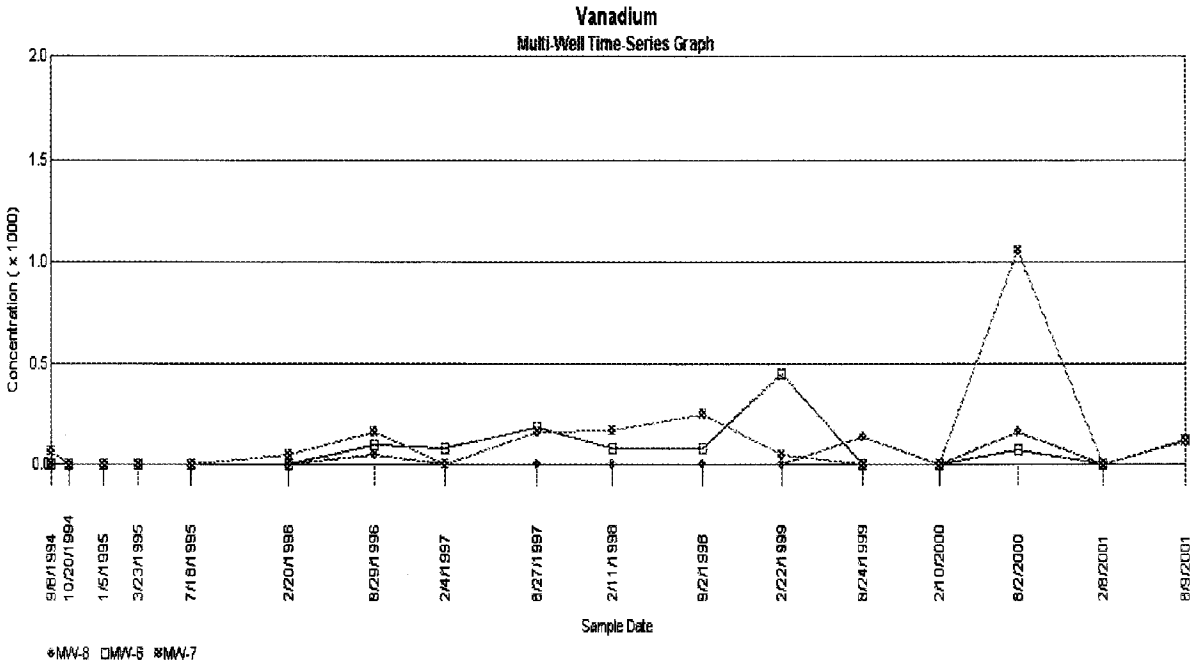

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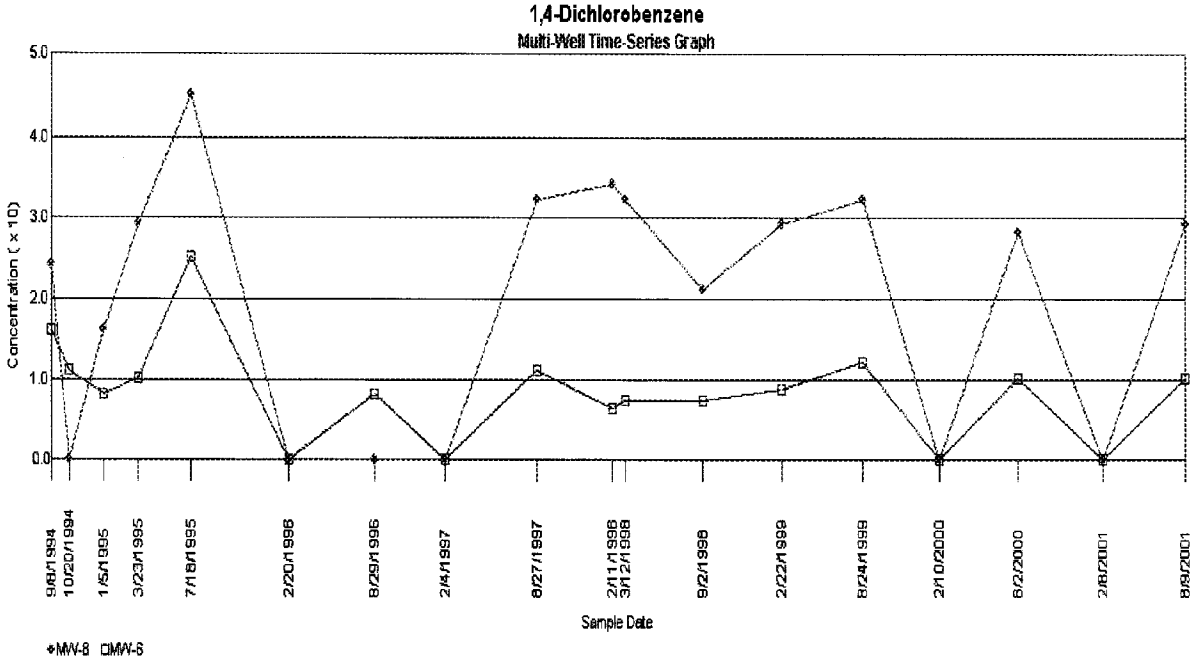


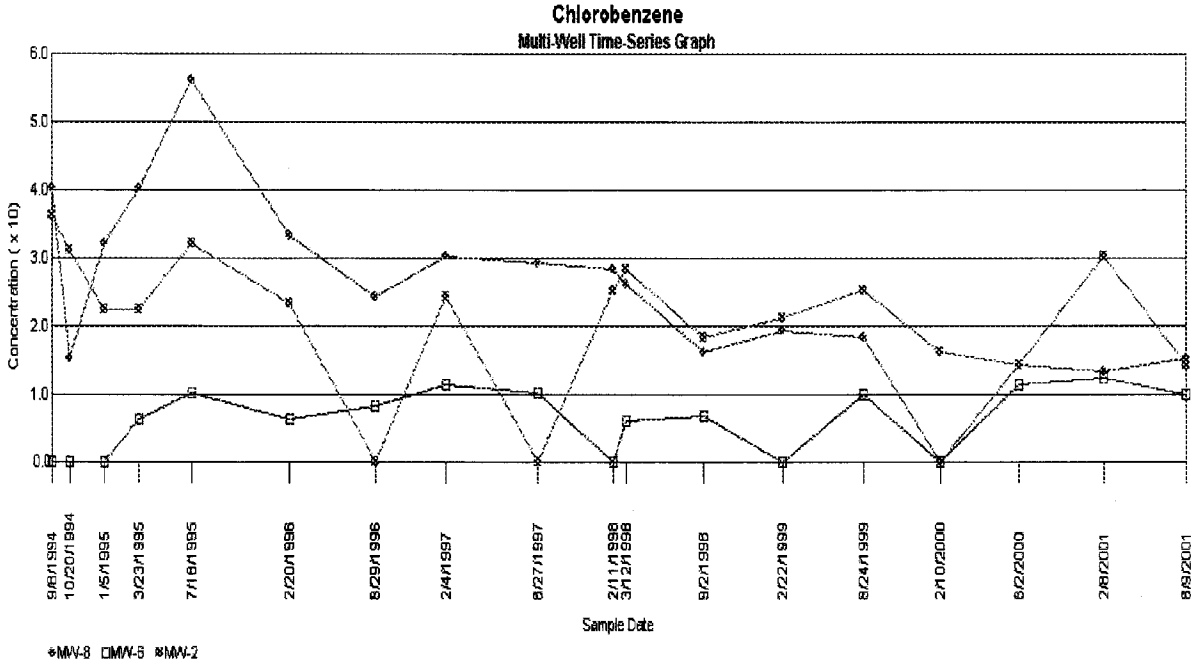

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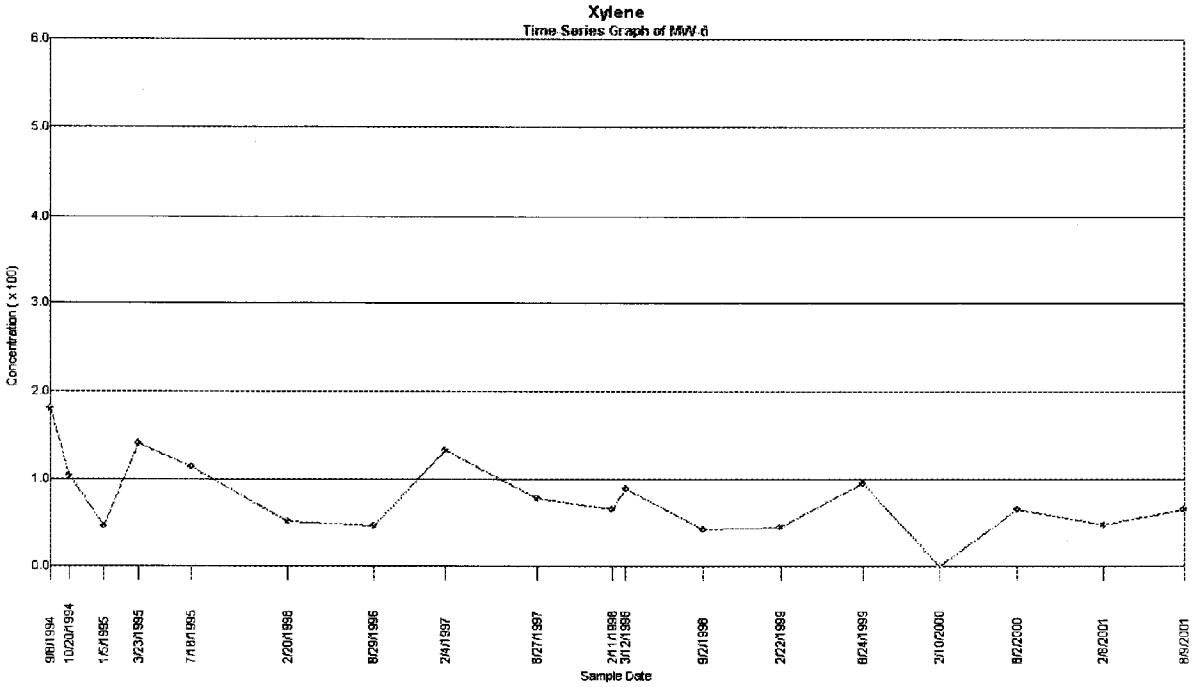
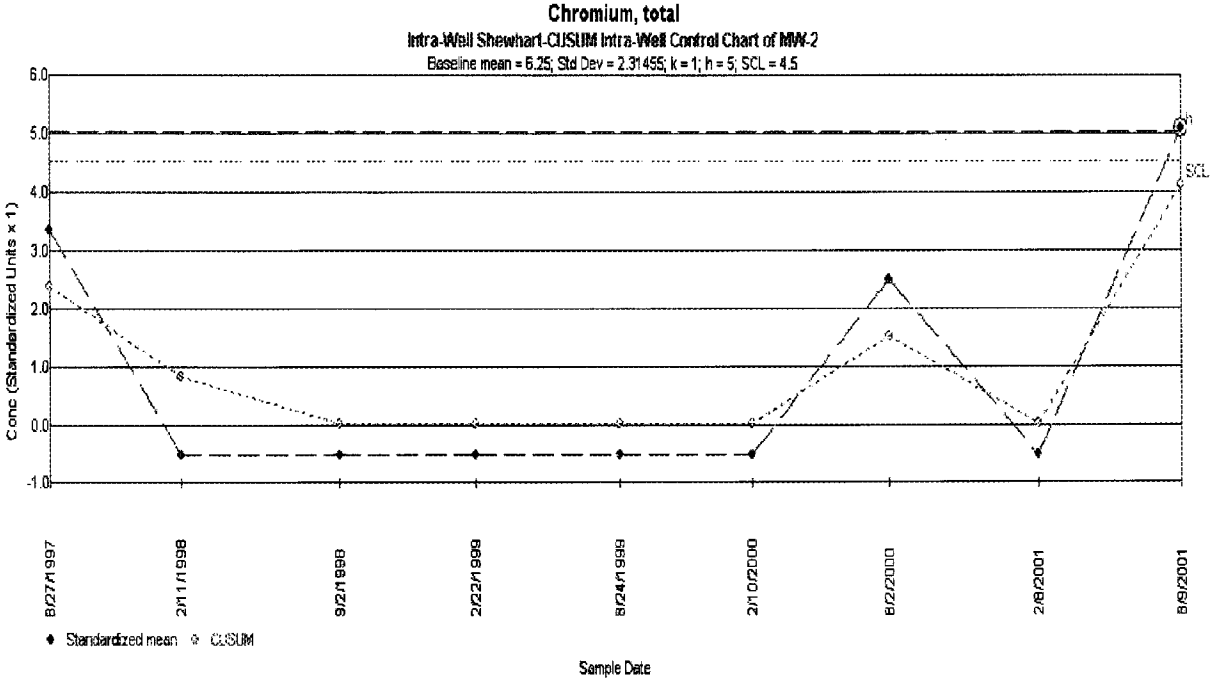
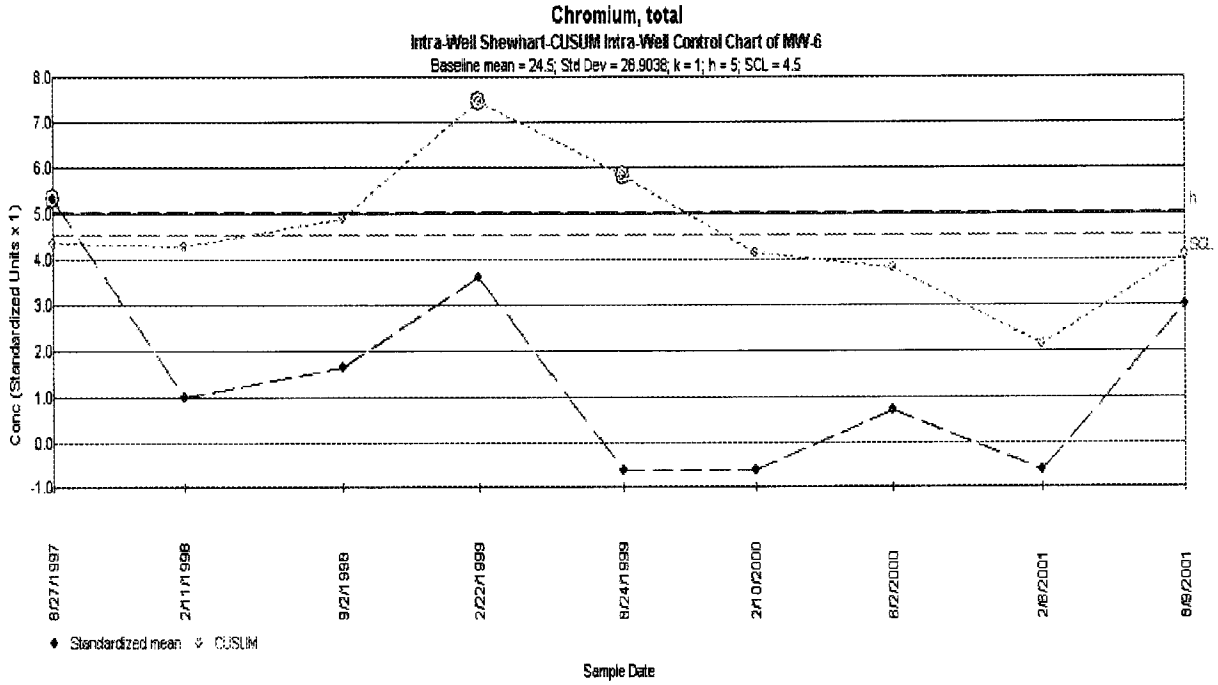


**Shewhart-CUSUM charts for selected constituents**
**Wayne County Closed Sanitary Landfill (Dudley)**



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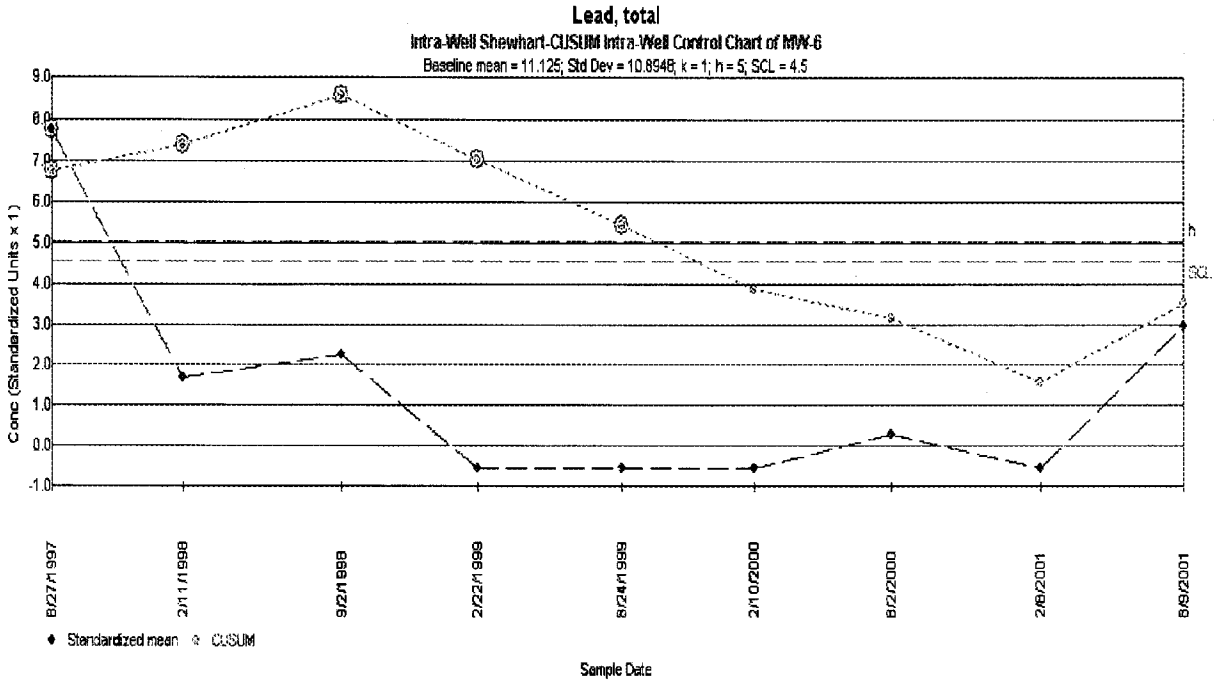


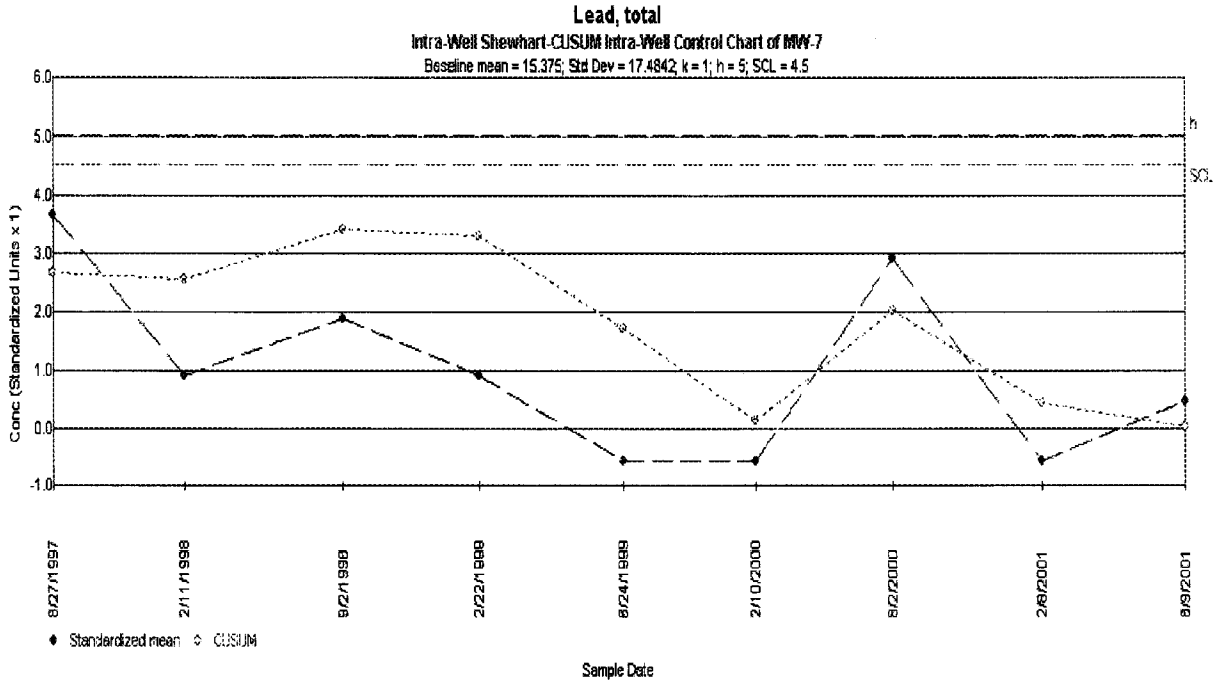

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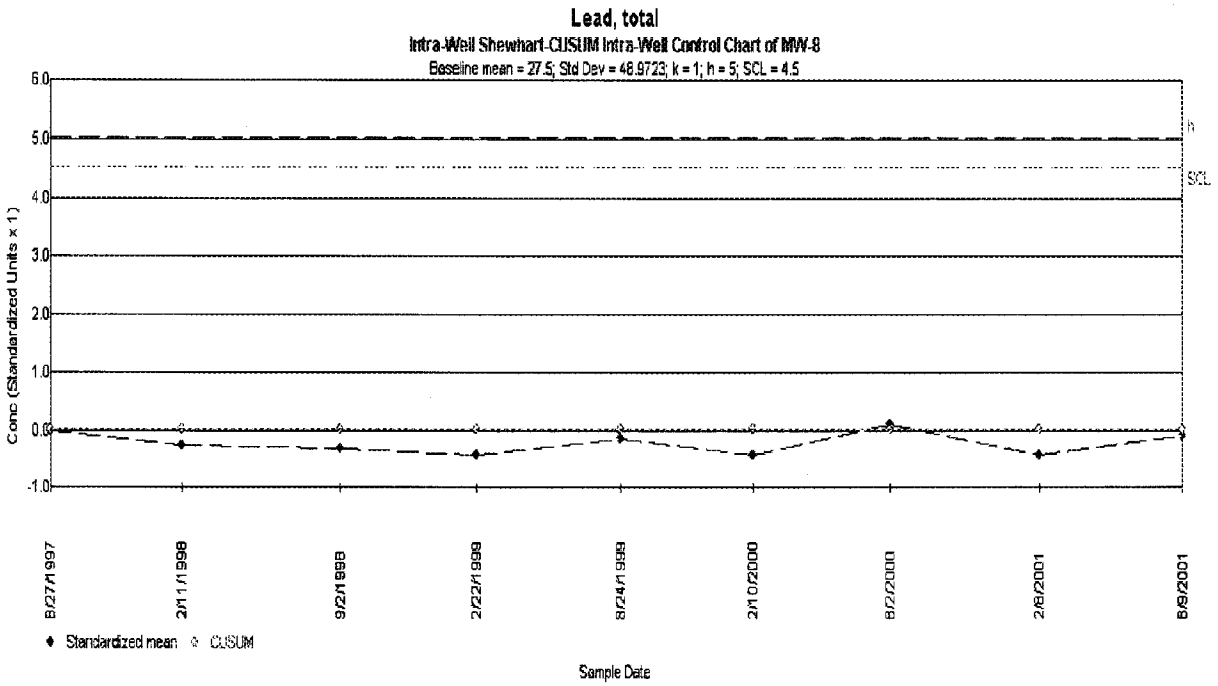


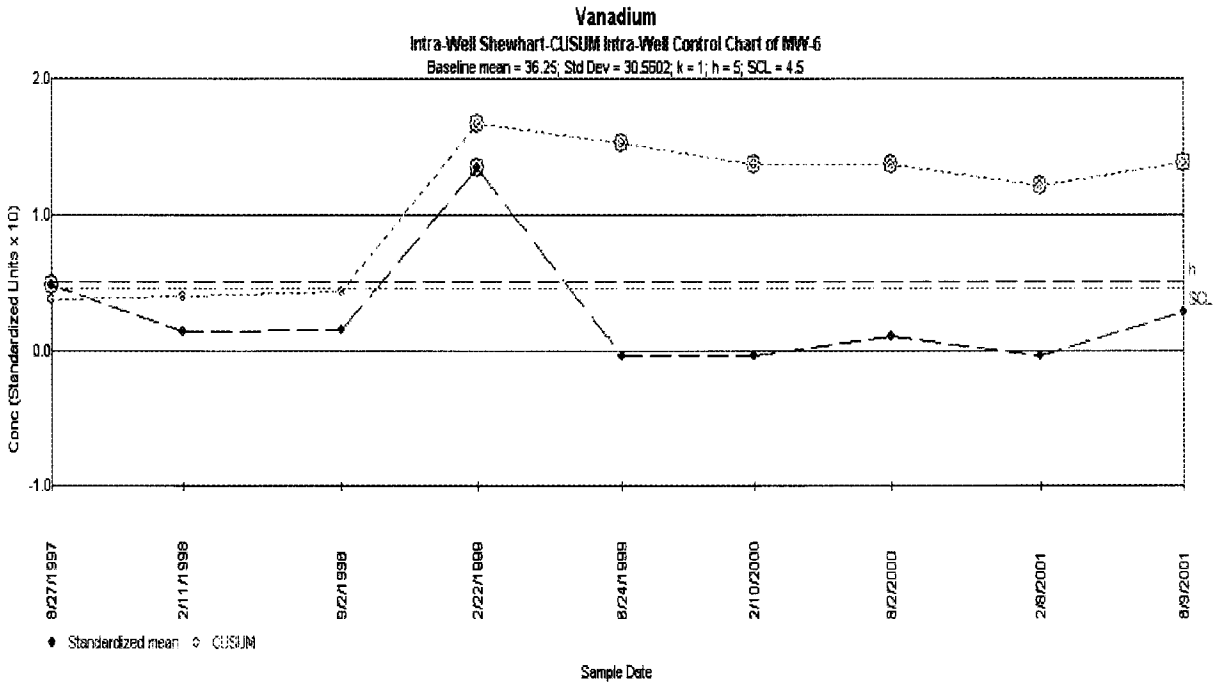

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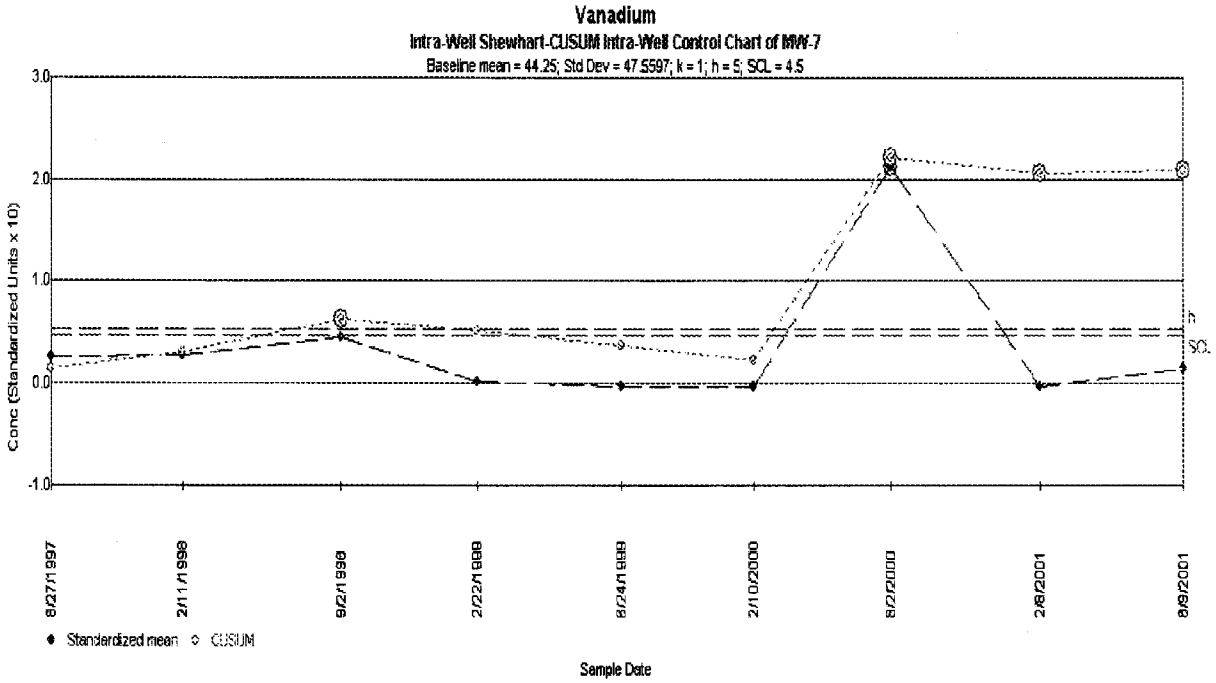
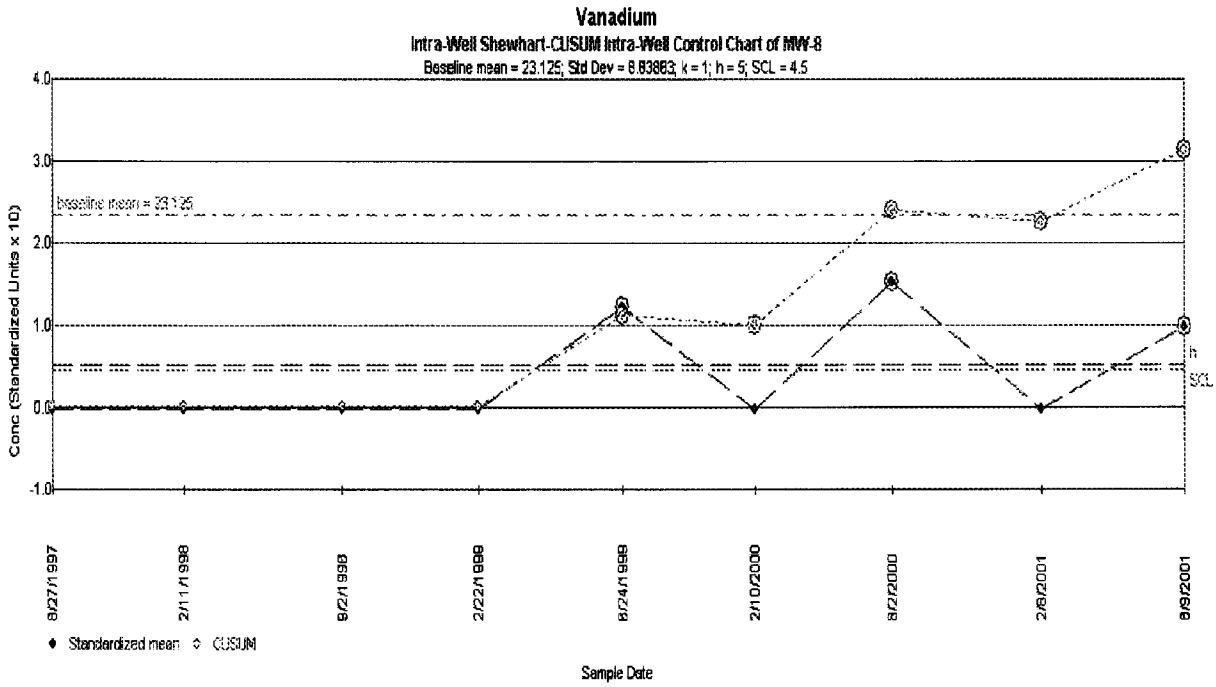
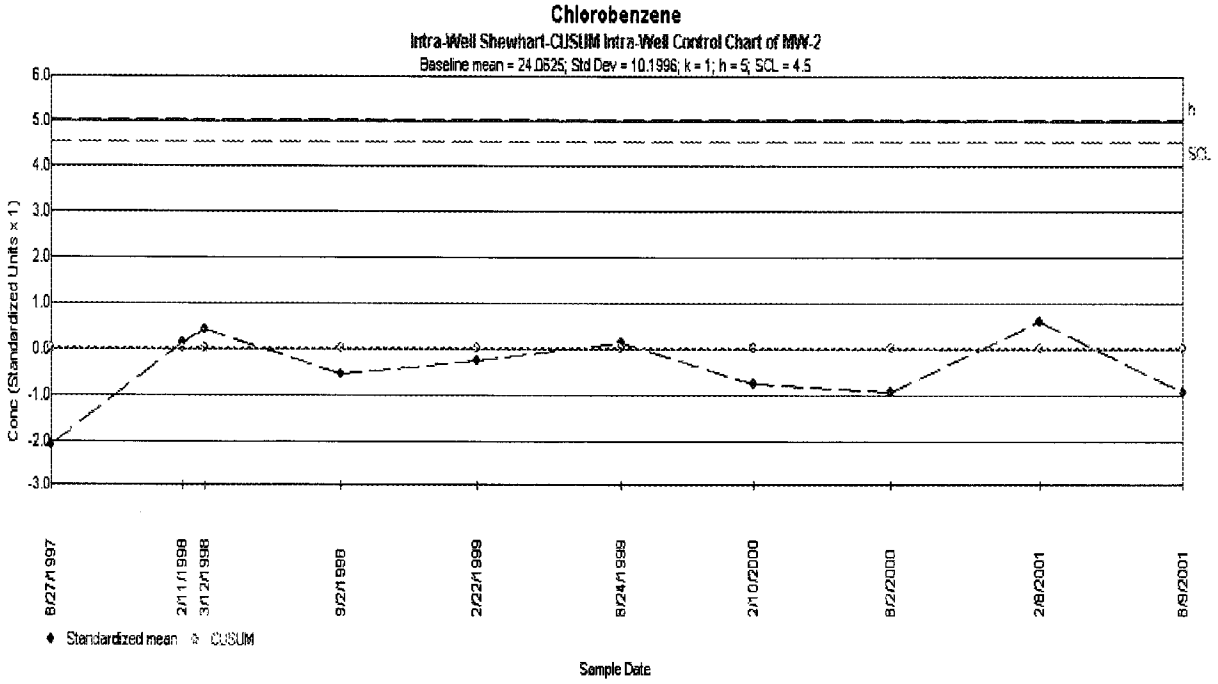
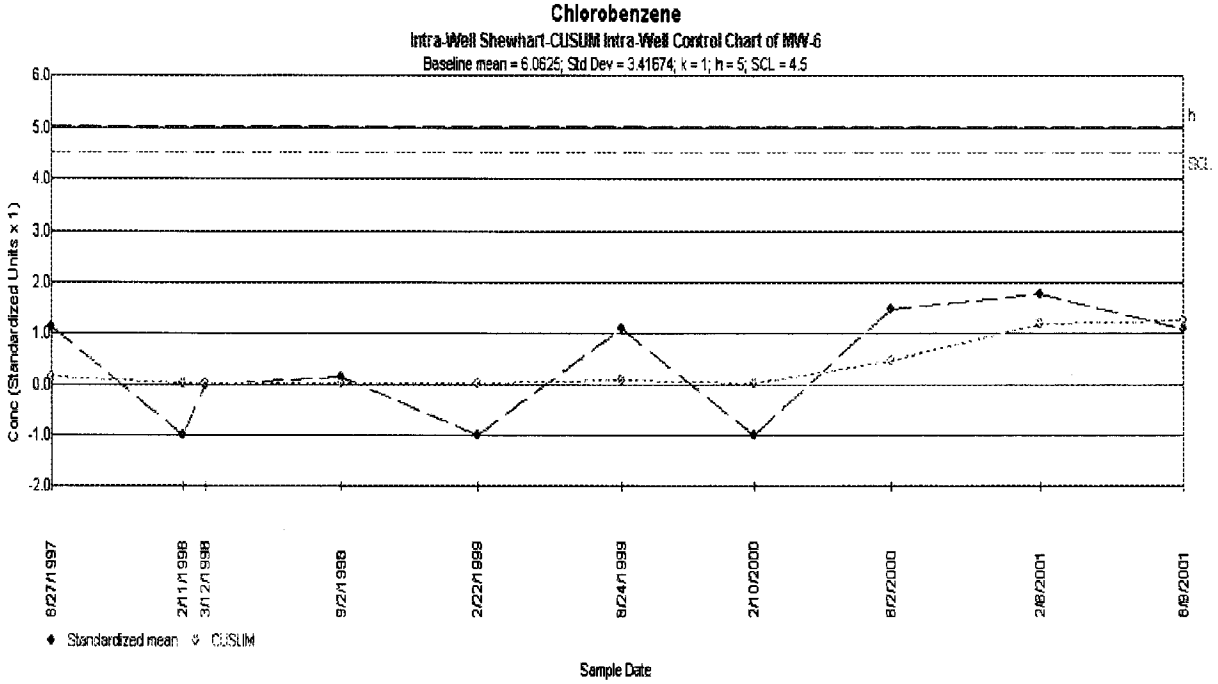
**Wayne County Closed Sanitary Landfill (Dudley)**



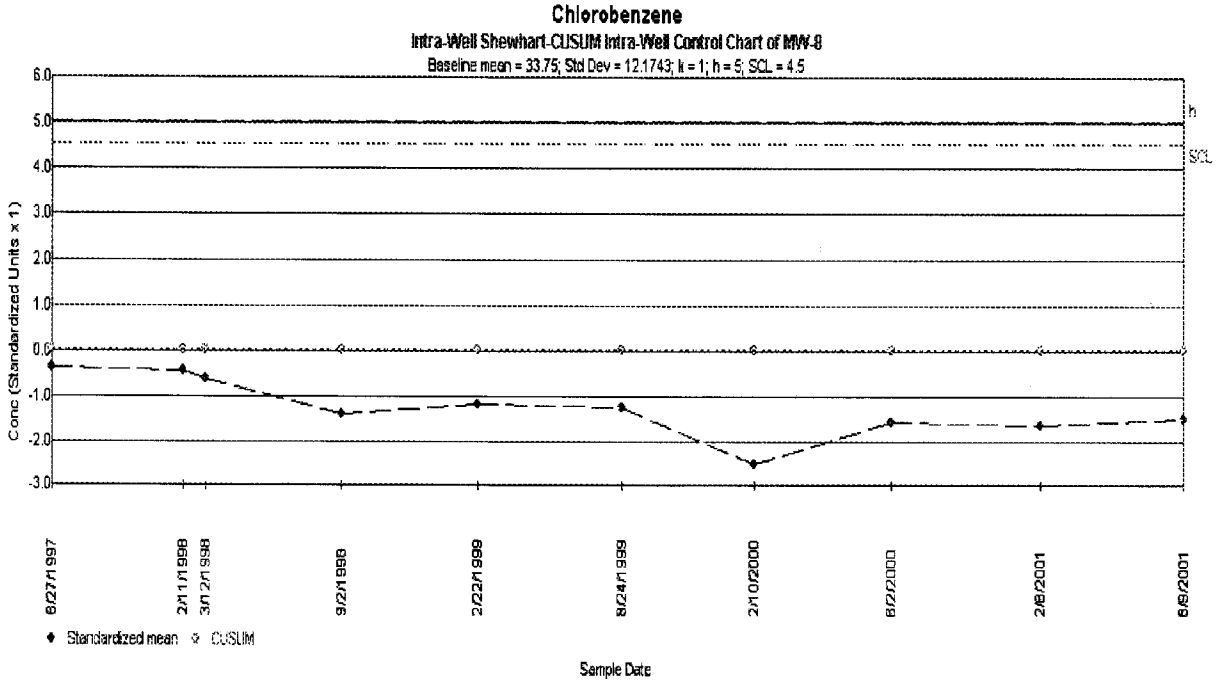



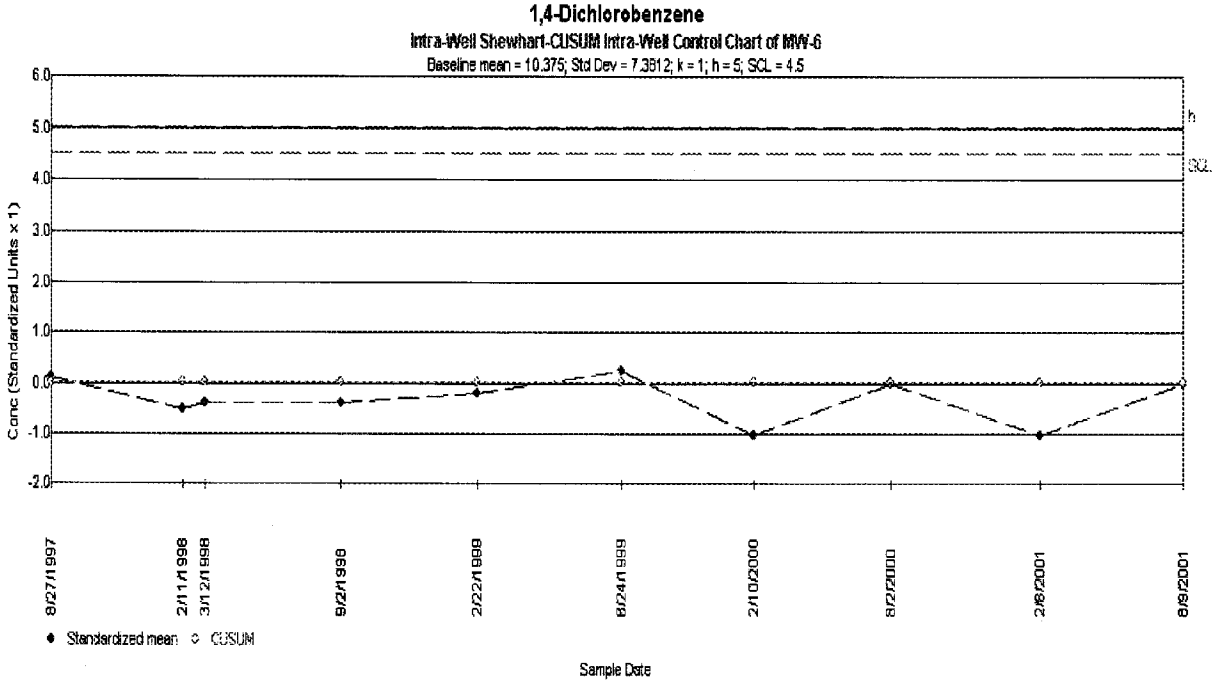
**Shewart-CUSUM charts for selected constituents**
**Wayne County Closed Sanitary Landfill (Dudley)**



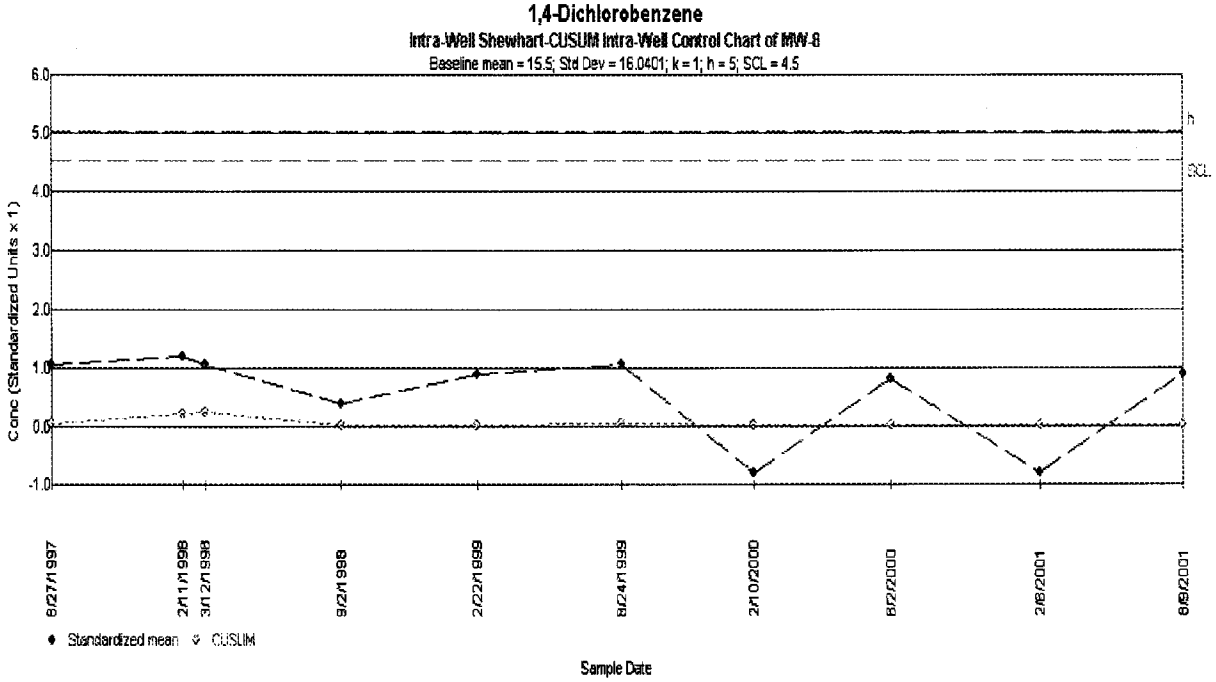



**Shewart-CUSUM charts for selected constituents**
**Wayne County Closed Sanitary Landfill (Dudley)**



**Shewart-CUSUM charts for selected constituents**
**Wayne County Closed Sanitary Landfill (Dudley)**



# Basic Statistics

## Basic Statistics

**Parameter: Chromium, total**
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

| | Total Observations |
|---|---|
| 147 | |
| Total Non-Detects | 99 |
| Pooled Mean | 22.9456 |
| Pooled Std Dev | 38.6138 |
| Background Mean | 10 |
| Background Std Dev | 0 |

### Background Wells

There is 1 background well

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 16 | 16 | 100 | 160 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 10 | 0 | 0 | 800 | 50 |

### Compliance Wells

There are 8 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 17 | 12 | 70.5882 | 184 |
| MW-3 | 17 | 13 | 76.4706 | 197 |
| MW-4 | 17 | 16 | 94.1176 | 171 |
| MW-5 | 17 | 10 | 58.8235 | 262 |
| MW-6 | 17 | 7 | 41.1765 | 829 |
| MW-7 | 17 | 6 | 35.2941 | 878 |
| MW-8 | 17 | 8 | 47.0588 | 559 |
| SW-1 | 12 | 11 | 91.6667 | 133 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 10.8235 | 2.12824 | 0.823529 | 12.5034 | 1134 | 66.7059 |
| MW-3 | 11.5882 | 3.79241 | 1.58824 | 12.5034 | 1106 | 65.0588 |
| MW-4 | 10.0588 | 0.242536 | 0.0588235 | 12.5034 | 906 | 53.2941 |
| MW-5 | 15.4118 | 11.4349 | 5.41176 | 12.5034 | 1312 | 77.1765 |
| MW-6 | 48.7647 | 50.4189 | 38.7647 | 12.5034 | 1692 | 99.5294 |
| MW-7 | 51.6471 | 83.6966 | 41.6471 | 12.5034 | 1700 | 100 |
| MW-8 | 32.8824 | 37.5165 | 22.8824 | 12.5034 | 1557 | 91.5882 |
| SW-1 | 11.0833 | 3.75278 | 1.08333 | 13.7084 | 671 | 55.9167 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 39864.3 |
| SS Total | 217690 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 50 |
| Background Rank Sum | 800 |
| Background Rank Mean | 50 |
| H Statistic | 27.9615 |
| H Adjusted for Ties | 40.258 |

## Basic Statistics

**Parameter: Lead, total**

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

| | Total Observations |
|---|---|
| 147 | |
| Total Non-Detects | 108 |
| Pooled Mean | 16.068 |
| Pooled Std Dev | 17.7137 |
| Background Mean | 10 |
| Background Std Dev | 0 |

### Background Wells

There is 1 background well

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 16 | 16 | 100 | 160 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 10 | 0 | 0 | 872 | 54.5 |

### Compliance Wells

There are 8 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 17 | 12 | 70.5882 | 260 |
| MW-3 | 17 | 16 | 94.1176 | 178 |
| MW-4 | 17 | 16 | 94.1176 | 170 |
| MW-5 | 17 | 12 | 70.5882 | 257 |
| MW-6 | 17 | 9 | 52.9412 | 370 |
| MW-7 | 17 | 8 | 47.0588 | 456 |
| MW-8 | 17 | 7 | 41.1765 | 391 |
| SW-1 | 12 | 12 | 100 | 120 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 15.2941 | 15.0115 | 5.29412 | 5.94943 | 1278 | 75.1765 |
| MW-3 | 10.4706 | 1.94029 | 0.470588 | 5.94943 | 996 | 58.5882 |
| MW-4 | 10 | 0 | 0 | 5.94943 | 981 | 57.7059 |
| MW-5 | 15.1176 | 15.6919 | 5.11765 | 5.94943 | 1269 | 74.6471 |
| MW-6 | 21.7647 | 21.9076 | 11.7647 | 5.94943 | 1535.5 | 90.3235 |
| MW-7 | 26.8235 | 22.1168 | 16.8235 | 5.94943 | 1650 | 97.0588 |
| MW-8 | 23 | 32.7395 | 13 | 5.94943 | 1642.5 | 96.6176 |
| SW-1 | 10 | 0 | 0 | 6.52276 | 654 | 54.5 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 5550.26 |
| SS Total | 45811.3 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 54.5 |
| Background Rank Sum | 872 |
| Background Rank Mean | 54.5 |
| H Statistic | 22.8871 |
| H Adjusted for Ties | 37.9273 |

## Basic Statistics

### Parameter: Mercury

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

| | Total Observations |
|---|---|
| 76 | |
| Total Non-Detects | 68 |
| Pooled Mean | 0.697368 |
| Pooled Std Dev | 0.994381 |
| Background Mean | 0.5 |
| Background Std Dev | 0 |

### Background Wells

There is 1 background well

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 6 | 6 | 100 | 3 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 0.5 | 0 | 0 | 207 | 34.5 |

### Compliance Wells

There are 7 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 11 | 11 | 100 | 5.5 |
| MW-3 | 7 | 7 | 100 | 3.5 |
| MW-4 | 11 | 10 | 90.9091 | 5.6 |
| MW-5 | 7 | 7 | 100 | 3.5 |
| MW-6 | 11 | 11 | 100 | 5.5 |
| MW-7 | 11 | 11 | 100 | 5.5 |
| MW-8 | 12 | 5 | 41.6667 | 20.9 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 0.5 | 0 | 0 | 0.47121 | 379.5 | 34.5 |
| MW-3 | 0.5 | 0 | 0 | 0.516546 | 241.5 | 34.5 |
| MW-4 | 0.509091 | 0.0301511 | 0.00909091 | 0.47121 | 414 | 37.6364 |
| MW-5 | 0.5 | 0 | 0 | 0.516546 | 241.5 | 34.5 |
| MW-6 | 0.5 | 0 | 0 | 0.47121 | 379.5 | 34.5 |
| MW-7 | 0.5 | 0 | 0 | 0.47121 | 379.5 | 34.5 |
| MW-8 | 1.74167 | 2.30827 | 1.24167 | 0.464229 | 683.5 | 56.9583 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 15.5412 |
| SS Total | 74.1595 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 34.5 |
| Background Rank Sum | 207 |
| Background Rank Mean | 34.5 |
| H Statistic | 10.1396 |
| H Adjusted for Ties | 35.7347 |

## Basic Statistics

### Parameter: Vanadium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

| | Total Observations |
|---|---|
| 147 | |
| Total Non-Detects | 116 |
| Pooled Mean | 61.6803 |
| Pooled Std Dev | 95.0816 |
| Background Mean | 40 |
| Background Std Dev | 0 |

### Background Wells

There is 1 background well

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 16 | 16 | 100 | 640 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 40 | 0 | 0 | 936 | 58.5 |

### Compliance Wells

There are 8 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 17 | 16 | 94.1176 | 693 |
| MW-3 | 17 | 16 | 94.1176 | 705 |
| MW-4 | 17 | 17 | 100 | 680 |
| MW-5 | 17 | 9 | 52.9412 | 1089 |
| MW-6 | 17 | 9 | 52.9412 | 1491 |
| MW-7 | 17 | 8 | 47.0588 | 2329 |
| MW-8 | 17 | 13 | 76.4706 | 960 |
| SW-1 | 12 | 12 | 100 | 480 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 40.7647 | 3.15296 | 0.764706 | 32.1523 | 1060 | 62.3529 |
| MW-3 | 41.4706 | 6.06339 | 1.47059 | 32.1523 | 1062 | 62.4706 |
| MW-4 | 40 | 0 | 0 | 32.1523 | 994.5 | 58.5 |
| MW-5 | 64.0588 | 57.9574 | 24.0588 | 32.1523 | 1550.5 | 91.2059 |
| MW-6 | 87.7059 | 99.1071 | 47.7059 | 32.1523 | 1603.5 | 94.3235 |
| MW-7 | 137 | 242.705 | 97 | 32.1523 | 1676 | 98.5882 |
| MW-8 | 56.4706 | 36.8529 | 16.4706 | 32.1523 | 1293.5 | 76.0882 |
| SW-1 | 40 | 0 | 0 | 35.2507 | 702 | 58.5 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 144046 |
| SS Total | 1.31991e+006 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 58.5 |
| Background Rank Sum | 936 |
| Background Rank Mean | 58.5 |
| H Statistic | 20.8404 |
| H Adjusted for Ties | 40.9737 |

## Basic Statistics

**Parameter: 1,4-Dichlorobenzene**

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

| | Total Observations |
|---|---|
| 156 | |
| Total Non-Detects | 127 |
| Pooled Mean | 7.43782 |
| Pooled Std Dev | 6.94899 |
| Background Mean | 5 |
| Background Std Dev | 0 |

### Background Wells

There is 1 background well

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 17 | 17 | 100 | 85 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 5 | 0 | 0 | 1088 | 64 |

### Compliance Wells

There are 8 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 18 | 16 | 88.8889 | 95 |
| MW-3 | 18 | 18 | 100 | 90 |
| MW-4 | 18 | 17 | 94.4444 | 94 |
| MW-5 | 18 | 18 | 100 | 90 |
| MW-6 | 18 | 4 | 22.2222 | 170.3 |
| MW-7 | 18 | 18 | 100 | 90 |
| MW-8 | 18 | 6 | 33.3333 | 381 |
| SW-1 | 13 | 13 | 100 | 65 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 5.27778 | 0.826442 | 0.277778 | 1.61373 | 1285 | 71.3889 |
| MW-3 | 5 | 0 | 0 | 1.61373 | 1152 | 64 |
| MW-4 | 5.22222 | 0.942809 | 0.222222 | 1.61373 | 1224 | 68 |
| MW-5 | 5 | 0 | 0 | 1.61373 | 1152 | 64 |
| MW-6 | 9.46111 | 4.8603 | 4.46111 | 1.61373 | 2174 | 120.778 |
| MW-7 | 5 | 0 | 0 | 1.61373 | 1152 | 64 |
| MW-8 | 21.1667 | 13.1025 | 16.1667 | 1.61373 | 2187 | 121.5 |
| SW-1 | 5 | 0 | 0 | 1.75801 | 832 | 64 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 4137.9 |
| SS Total | 7484.71 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 64 |
| Background Rank Sum | 1088 |
| Background Rank Mean | 64 |
| H Statistic | 42.1417 |
| H Adjusted for Ties | 91.5219 |

## Basic Statistics

### Parameter: Chlorobenzene

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

| | Total Observations |
|---|---|
| 156 | |
| Total Non-Detects | 110 |
| Pooled Mean | 9.5641 |
| Pooled Std Dev | 9.22895 |
| Background Mean | 5 |
| Background Std Dev | 0 |

### Background Wells

There is 1 background well

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 17 | 17 | 100 | 85 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 5 | 0 | 0 | 943.5 | 55.5 |

### Compliance Wells

There are 8 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 18 | 2 | 11.1111 | 391 |
| MW-3 | 18 | 18 | 100 | 90 |
| MW-4 | 18 | 17 | 94.4444 | 92.3 |
| MW-5 | 18 | 18 | 100 | 90 |
| MW-6 | 18 | 6 | 33.3333 | 135.7 |
| MW-7 | 18 | 18 | 100 | 90 |
| MW-8 | 18 | 1 | 5.55556 | 453 |
| SW-1 | 13 | 13 | 100 | 65 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 21.7222 | 8.601 | 16.7222 | 1.76007 | 2335 | 129.722 |
| MW-3 | 5 | 0 | 0 | 1.76007 | 999 | 55.5 |
| MW-4 | 5.12778 | 0.542115 | 0.127778 | 1.76007 | 1058.5 | 58.8056 |
| MW-5 | 5 | 0 | 0 | 1.76007 | 999 | 55.5 |
| MW-6 | 7.53889 | 2.56931 | 2.53889 | 1.76007 | 1739 | 96.6111 |
| MW-7 | 5 | 0 | 0 | 1.76007 | 999 | 55.5 |
| MW-8 | 25.1667 | 12.3824 | 20.1667 | 1.76007 | 2451.5 | 136.194 |
| SW-1 | 5 | 0 | 0 | 1.91743 | 721.5 | 55.5 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 9220.57 |
| SS Total | 13201.9 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 55.5 |
| Background Rank Sum | 943.5 |
| Background Rank Mean | 55.5 |
| H Statistic | 80.5803 |
| H Adjusted for Ties | 124.08 |

## Basic Statistics

**Parameter: Xylene**

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

| | Total Observations |
|---|---|
| 156 | |
| Total Non-Detects | 139 |
| Pooled Mean | 13.5064 |
| Pooled Std Dev | 27.5953 |
| Background Mean | 5 |
| Background Std Dev | 0 |

### Background Wells

There is 1 background well

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-1 | 17 | 17 | 100 | 85 |

| Well | Mean | Std Dev | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|
| MW-1 | 5 | 0 | 0 | 1190 | 70 |

### Compliance Wells

There are 8 compliance wells

| Well | Samples | Non-Detects | % ND | Total |
|---|---|---|---|---|
| MW-2 | 18 | 18 | 100 | 90 |
| MW-3 | 18 | 18 | 100 | 90 |
| MW-4 | 18 | 18 | 100 | 90 |
| MW-5 | 18 | 18 | 100 | 90 |
| MW-6 | 18 | 1 | 5.55556 | 1417 |
| MW-7 | 18 | 18 | 100 | 90 |
| MW-8 | 18 | 18 | 100 | 90 |
| SW-1 | 13 | 13 | 100 | 65 |

| Well | Mean | Std Dev | Dif From Bkg | Std Err | Rank Sum | Rank Mean |
|---|---|---|---|---|---|---|
| MW-2 | 5 | 0 | 0 | 4.95008 | 1260 | 70 |
| MW-3 | 5 | 0 | 0 | 4.95008 | 1260 | 70 |
| MW-4 | 5 | 0 | 0 | 4.95008 | 1260 | 70 |
| MW-5 | 5 | 0 | 0 | 4.95008 | 1260 | 70 |
| MW-6 | 78.7222 | 43.0401 | 73.7222 | 4.95008 | 2586 | 143.667 |
| MW-7 | 5 | 0 | 0 | 4.95008 | 1260 | 70 |
| MW-8 | 5 | 0 | 0 | 4.95008 | 1260 | 70 |
| SW-1 | 5 | 0 | 0 | 5.39266 | 910 | 70 |

### Analysis of Variance Statistics

| | |
|---|---|
| SS Wells | 86541.4 |
| SS Total | 118033 |

### Kruskal-Wallis Statistics

| | |
|---|---|
| Non-Detect Rank | 70 |
| Background Rank Sum | 1190 |
| Background Rank Mean | 70 |
| H Statistic | 42.3376 |
| H Adjusted for Ties | 144.695 |

# Interwell Analyses for Metals

# Poisson Tolerance Limit

**Parameter: Chromium, total**

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Poisson Count of 16 background Samples = 160

Degrees of Freedom = 322

**95% Confidence Values**

Chi-Squared Value (95% Confidence) = 364.847

Lambda (from Zack's formula) = 11.4015

Smallest Degrees of Freedom = 36

Upper Tolerance Limit (95%) = 17

**99% Confidence Values**

Chi-Squared Value (99% Confidence) = 383.959

Lambda (from Zack's formula) = 11.9987

Smallest Degrees of Freedom = 43

Upper Tolerance Limit (99%) = 20.5

| | Date | Result | Impacted 95% | Impacted 99% |
|---|---|---|---|---|
| MW-2 | 9/8/1994 | ND<10 | FALSE | FALSE |
| | 10/20/1994 | ND<10 | FALSE | FALSE |
| | 1/5/1995 | ND<10 | FALSE | FALSE |
| | 3/23/1995 | ND<10 | FALSE | FALSE |
| | 7/18/1995 | ND<10 | FALSE | FALSE |
| | 2/20/1996 | 10 | FALSE | FALSE |
| | 8/29/1996 | 10 | FALSE | FALSE |
| | 2/4/1997 | ND<10 | FALSE | FALSE |
| | 8/27/1997 | 14 | FALSE | FALSE |
| | 2/11/1998 | ND<10 | FALSE | FALSE |
| | 9/2/1998 | ND<10 | FALSE | FALSE |
| | 2/22/1999 | ND<10 | FALSE | FALSE |
| | 8/24/1999 | ND<10 | FALSE | FALSE |
| | 2/10/2000 | ND<10 | FALSE | FALSE |
| | 8/2/2000 | 12 | FALSE | FALSE |
| | 2/8/2001 | ND<10 | FALSE | FALSE |
| | 8/9/2001 | 18 | TRUE | FALSE |
| MW-6 | 9/8/1994 | ND<10 | FALSE | FALSE |
| | 10/20/1994 | ND<10 | FALSE | FALSE |
| | 1/5/1995 | ND<10 | FALSE | FALSE |
| | 3/23/1995 | ND<10 | FALSE | FALSE |
| | 7/18/1995 | 15 | FALSE | FALSE |
| | 2/20/1996 | 40 | TRUE | TRUE |
| | 8/29/1996 | 87 | TRUE | TRUE |
| | 2/4/1997 | 34 | TRUE | TRUE |
| | 8/27/1997 | 178 | TRUE | TRUE |
| | 2/11/1998 | 52 | TRUE | TRUE |
| | 9/2/1998 | 71 | TRUE | TRUE |
| | 2/22/1999 | 128 | TRUE | TRUE |
| | 8/24/1999 | ND<10 | FALSE | FALSE |
| | 2/10/2000 | ND<10 | FALSE | FALSE |
| | 8/2/2000 | 44 | TRUE | TRUE |
| | 2/8/2001 | ND<10 | FALSE | FALSE |
| | 8/9/2001 | 110 | TRUE | TRUE |
| MW-7 | 9/8/1994 | 17 | FALSE | FALSE |
| | 10/20/1994 | ND<10 | FALSE | FALSE |
| | 1/5/1995 | ND<10 | FALSE | FALSE |
| | 3/23/1995 | ND<10 | FALSE | FALSE |
| | 7/18/1995 | 10 | FALSE | FALSE |
| | 2/20/1996 | 22 | TRUE | TRUE |
| | 8/29/1996 | 49 | TRUE | TRUE |
| | 2/4/1997 | 10 | FALSE | FALSE |

| | | | |
|---|---|---|---|
| 8/27/1997 | 100 | TRUE | TRUE |
| 2/11/1998 | 60 | TRUE | TRUE |
| 9/2/1998 | 117 | TRUE | TRUE |
| 2/22/1999 | 31 | TRUE | TRUE |
| 8/24/1999 | ND<10 | FALSE | FALSE |
| 2/10/2000 | ND<10 | FALSE | FALSE |
| 8/2/2000 | 350 | TRUE | TRUE |
| 2/8/2001 | ND<10 | FALSE | FALSE |
| 8/9/2001 | 52 | TRUE | TRUE |

# Poisson Tolerance Limit

**Parameter: Lead, total**
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Poisson Count of 16 background Samples = 160
Degrees of Freedom = 322

**95% Confidence Values**
Chi-Squared Value (95% Confidence) = 364.847
Lambda (from Zack's formula) = 11.4015
Smallest Degrees of Freedom = 36
Upper Tolerance Limit (95%) = 17

**99% Confidence Values**
Chi-Squared Value (99% Confidence) = 383.959
Lambda (from Zack's formula) = 11.9987
Smallest Degrees of Freedom = 43
Upper Tolerance Limit (99%) = 20.5

| | Date | Result | Impacted 95% | Impacted 99% |
|---|---|---|---|---|
| MW-2 | 9/8/1994 | ND<10 | FALSE | FALSE |
| | 10/20/1994 | ND<10 | FALSE | FALSE |
| | 1/5/1995 | ND<10 | FALSE | FALSE |
| | 3/23/1995 | ND<10 | FALSE | FALSE |
| | 7/18/1995 | ND<10 | FALSE | FALSE |
| | 2/20/1996 | ND<10 | FALSE | FALSE |
| | 8/29/1996 | 12 | FALSE | FALSE |
| | 2/4/1997 | ND<10 | FALSE | FALSE |
| | 8/27/1997 | 70 | TRUE | TRUE |
| | 2/11/1998 | 16 | FALSE | FALSE |
| | 9/2/1998 | ND<10 | FALSE | FALSE |
| | 2/22/1999 | ND<10 | FALSE | FALSE |
| | 8/24/1999 | ND<10 | FALSE | FALSE |
| | 2/10/2000 | ND<10 | FALSE | FALSE |
| | 8/2/2000 | 11 | FALSE | FALSE |
| | 2/8/2001 | ND<10 | FALSE | FALSE |
| | 8/9/2001 | 31 | TRUE | TRUE |
| MW-6 | 9/8/1994 | ND<10 | FALSE | FALSE |
| | 10/20/1994 | ND<10 | FALSE | FALSE |
| | 1/5/1995 | ND<10 | FALSE | FALSE |
| | 3/23/1995 | ND<10 | FALSE | FALSE |
| | 7/18/1995 | ND<10 | FALSE | FALSE |
| | 2/20/1996 | 12 | FALSE | FALSE |
| | 8/29/1996 | 36 | TRUE | TRUE |
| | 2/4/1997 | 16 | FALSE | FALSE |
| | 8/27/1997 | 95 | TRUE | TRUE |
| | 2/11/1998 | 29 | TRUE | TRUE |
| | 9/2/1998 | 35 | TRUE | TRUE |
| | 2/22/1999 | ND<10 | FALSE | FALSE |
| | 8/24/1999 | ND<10 | FALSE | FALSE |
| | 2/10/2000 | ND<10 | FALSE | FALSE |
| | 8/2/2000 | 14 | FALSE | FALSE |
| | 2/8/2001 | ND<10 | FALSE | FALSE |
| | 8/9/2001 | 43 | TRUE | TRUE |
| MW-7 | 9/8/1994 | 44 | TRUE | TRUE |
| | 10/20/1994 | ND<10 | FALSE | FALSE |
| | 1/5/1995 | ND<10 | FALSE | FALSE |
| | 3/23/1995 | ND<10 | FALSE | FALSE |
| | 7/18/1995 | ND<10 | FALSE | FALSE |
| | 2/20/1996 | 11 | FALSE | FALSE |
| | 8/29/1996 | 43 | TRUE | TRUE |
| | 2/4/1997 | ND<10 | FALSE | FALSE |

| | | | | |
|---|---|---|---|---|
| | 8/27/1997 | 79 | TRUE | TRUE |
| | 2/11/1998 | 31 | TRUE | TRUE |
| | 9/2/1998 | 48 | TRUE | TRUE |
| | 2/22/1999 | 31 | TRUE | TRUE |
| | 8/24/1999 | ND<10 | FALSE | FALSE |
| | 2/10/2000 | ND<10 | FALSE | FALSE |
| | 8/2/2000 | 66 | TRUE | TRUE |
| | 2/8/2001 | ND<10 | FALSE | FALSE |
| | 8/9/2001 | 23 | TRUE | TRUE |
| **MW-4** | 9/8/1994 | ND<10 | FALSE | FALSE |
| | 10/20/1994 | ND<10 | FALSE | FALSE |
| | 1/5/1995 | ND<10 | FALSE | FALSE |
| | 3/23/1995 | ND<10 | FALSE | FALSE |
| | 7/18/1995 | ND<10 | FALSE | FALSE |
| | 2/20/1996 | ND<10 | FALSE | FALSE |
| | 8/29/1996 | ND<10 | FALSE | FALSE |
| | 2/4/1997 | ND<10 | FALSE | FALSE |
| | 8/27/1997 | ND<10 | FALSE | FALSE |
| | 2/11/1998 | ND<10 | FALSE | FALSE |
| | 9/2/1998 | ND<10 | FALSE | FALSE |
| | 2/22/1999 | ND<10 | FALSE | FALSE |
| | 8/24/1999 | ND<10 | FALSE | FALSE |
| | 2/10/2000 | ND<10 | FALSE | FALSE |
| | 8/2/2000 | ND<10 | FALSE | FALSE |
| | 2/8/2001 | ND<10 | FALSE | FALSE |
| | 8/9/2001 | 10 | FALSE | FALSE |
| **MW-8** | 9/8/1994 | 147 | TRUE | TRUE |
| | 10/20/1994 | ND<10 | FALSE | FALSE |
| | 1/5/1995 | ND<10 | FALSE | FALSE |
| | 3/23/1995 | ND<10 | FALSE | FALSE |
| | 7/18/1995 | 12 | FALSE | FALSE |
| | 2/20/1996 | 12 | FALSE | FALSE |
| | 8/29/1996 | 29 | TRUE | TRUE |
| | 2/4/1997 | ND<10 | FALSE | FALSE |
| | 8/27/1997 | 25 | TRUE | TRUE |
| | 2/11/1998 | 14 | FALSE | FALSE |
| | 9/2/1998 | 11 | FALSE | FALSE |
| | 2/22/1999 | ND<10 | FALSE | FALSE |
| | 8/24/1999 | 19 | TRUE | FALSE |
| | 2/10/2000 | ND<10 | FALSE | FALSE |
| | 8/2/2000 | 31 | TRUE | TRUE |
| | 2/8/2001 | ND<10 | FALSE | FALSE |
| | 8/9/2001 | 21 | TRUE | TRUE |

# Poisson Tolerance Limit

**Parameter: Vanadium**

Original Data (Not Transformed)
Non-Detects Replaced with 1/2 DL

Poisson Count of 16 background Samples = 320
Degrees of Freedom = 642

**95% Confidence Values**

Chi-Squared Value (95% Confidence) = 702.055
Lambda (from Zack's formula) = 21.9392
Smallest Degrees of Freedom = 61
Upper Tolerance Limit (95%) = 29.5

**99% Confidence Values**

Chi-Squared Value (99% Confidence) = 728.289
Lambda (from Zack's formula) = 22.759
Smallest Degrees of Freedom = 71
Upper Tolerance Limit (99%) = 34.5

| | Date | Result | Impacted 95% | Impacted 99% |
|---|---|---|---|---|
| MW-8 | 9/8/1994 | ND<20 | FALSE | FALSE |
| | 10/20/1994 | ND<20 | FALSE | FALSE |
| | 1/5/1995 | ND<20 | FALSE | FALSE |
| | 3/23/1995 | ND<20 | FALSE | FALSE |
| | 7/18/1995 | ND<20 | FALSE | FALSE |
| | 2/20/1996 | ND<20 | FALSE | FALSE |
| | 8/29/1996 | 45 | TRUE | TRUE |
| | 2/4/1997 | ND<20 | FALSE | FALSE |
| | 8/27/1997 | ND<20 | FALSE | FALSE |
| | 2/11/1998 | ND<20 | FALSE | FALSE |
| | 9/2/1998 | ND<20 | FALSE | FALSE |
| | 2/22/1999 | ND<20 | FALSE | FALSE |
| | 8/24/1999 | 130 | TRUE | TRUE |
| | 2/10/2000 | ND<20 | FALSE | FALSE |
| | 8/2/2000 | 156 | TRUE | TRUE |
| | 2/8/2001 | ND<20 | FALSE | FALSE |
| | 8/9/2001 | 109 | TRUE | TRUE |
| MW-6 | 9/8/1994 | ND<20 | FALSE | FALSE |
| | 10/20/1994 | ND<20 | FALSE | FALSE |
| | 1/5/1995 | ND<20 | FALSE | FALSE |
| | 3/23/1995 | ND<20 | FALSE | FALSE |
| | 7/18/1995 | ND<20 | FALSE | FALSE |
| | 2/20/1996 | ND<20 | FALSE | FALSE |
| | 8/29/1996 | 95 | TRUE | TRUE |
| | 2/4/1997 | 75 | TRUE | TRUE |
| | 8/27/1997 | 180 | TRUE | TRUE |
| | 2/11/1998 | 75 | TRUE | TRUE |
| | 9/2/1998 | 78 | TRUE | TRUE |
| | 2/22/1999 | 443 | TRUE | TRUE |
| | 8/24/1999 | ND<20 | FALSE | FALSE |
| | 2/10/2000 | ND<20 | FALSE | FALSE |
| | 8/2/2000 | 66 | TRUE | TRUE |
| | 2/8/2001 | ND<20 | FALSE | FALSE |
| | 8/9/2001 | 119 | TRUE | TRUE |
| MW-7 | 9/8/1994 | 57 | TRUE | TRUE |
| | 10/20/1994 | ND<20 | FALSE | FALSE |
| | 1/5/1995 | ND<20 | FALSE | FALSE |
| | 3/23/1995 | ND<20 | FALSE | FALSE |
| | 7/18/1995 | ND<20 | FALSE | FALSE |
| | 2/20/1996 | 40 | TRUE | TRUE |
| | 8/29/1996 | 157 | TRUE | TRUE |
| | 2/4/1997 | ND<20 | FALSE | FALSE |

| | | | |
|---|---|---|---|
| 8/27/1997 | 154 | TRUE | TRUE |
| 2/11/1998 | 162 | TRUE | TRUE |
| 9/2/1998 | 246 | TRUE | TRUE |
| 2/22/1999 | 42 | TRUE | TRUE |
| 8/24/1999 | ND<20 | FALSE | FALSE |
| 2/10/2000 | ND<20 | FALSE | FALSE |
| 8/2/2000 | 1047 | TRUE | TRUE |
| 2/8/2001 | ND<20 | FALSE | FALSE |
| 8/9/2001 | 104 | TRUE | TRUE |