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Groundwater Sampling Report and Statistical Analysis

Prepared for

Wayne County Closed Landfill, Dudley
Dudley, North Carolina

February, 2005

Received
AUG 2005
Solid Waste Section

MESCO Project Number: G05016.0

Completed on August 10, 2005

Municipal Services Garner, NC
Engineering Company, P.A. Boone, NC
Municipal Engineering Services Company, P.A.
Garner, Boone and Morehead City, North Carolina

OPERATION/CONSTRUCTION MANAGERS

Municipal Services

CIVIL/SANITARY ENGINEERS

Engineering Company, P.A.

August 8, 2005

Mr. Matt Gamble
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 Landfill, Dudley
MESCO Project No. G5016.0

Dear Mr. Gamble:

Municipal Engineering Services Company, P.A. (MESCO) completed the sampling report and statistical analyses for the Wayne County Closed Landfill, located in Dudley, NC. Environment 1 Inc. of Greenville, NC, sampled and analyzed the water samples obtained from the closed landfill on February 21, 2005. Compliance wells MW-2 and MW-8 were analyzed for the Appendix II list of constituents and the remaining monitoring locations (MW-1, MW-3, MW-4, MW-5, MW-6, MW-7) were tested for only the Appendix I metal and VOC parameters as part of the assessment monitoring program. The laboratory results and statistical analysis are included herein.

All detected constituents were compared with North Carolina Groundwater Standards for regulatory exceedance. The results are shown in the enclosed table titled "Exceedance Scan". The following table (Table 1) summarizes those constituents that exceed the Standard.

Table 1. Exceedance Summary

Monitoring Location	Chromium	Lead
MW-7	x	x

x = concentration greater than groundwater standard

Chromium and lead were detected in concentrations above the Standard within compliance well MW-7. The intermediate chlorinated hydrocarbons chlorobenzene and 1,4-dichlorobenzene were detected in low concentrations in MW-8. Chlorobenzene was also found well below the Standard within compliance well MW-2.

MESCO also completed the statistical analysis as required by the Solid Waste Section. The purpose of these analyses is to determine, in comparison to background levels, statistical significance of constituents detected during the February 2005 event.

PO Box 97, Garner, North Carolina 27529 (919) 772-5393
PO Box 828, Morehead City, NC 28557 (252) 726-9481 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

Statistical Analysis Methodology

Metals

MESCO conducted an interwell statistical analysis on all of the detected metals. Monitoring well MW-1 was defined as the background well, and an upper tolerance limit (UTL) with 95% coverage was computed for each detected constituent from the background data at a 95% level of confidence. 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 4 metals were tested for statistical significance. For cadmium and lead the Poisson tolerance limit was used on the original data with no ND substitution since the constituents had never been detected within the background well. For chromium and vanadium the non-parametric tolerance limit with ½ NDs was used on the original data as its %ND was not normally distributed or the Poisson count exceeded the required value.

VOCs

All historical 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. Baseline levels in this context are defined as the background level derived from the data in a given downgradient well. Intrawell analyses through Shewhart-CUSUM control charts require a minimum of eight independent historical sampling events and a detection rate greater than 25% (%ND≤75%). Due to the detection rate criteria cadmium within MW-6 and chromium within MW-4 could not be analyzed via Shewhart-CUSUM charts.

Results

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 statistically significant by interwell comparison analysis.

Table2. Interwell Analyses Summary

Well	Cadmium	Chromium	Lead	Vanadium
MW-3		x		x
MW-4		x		
MW-6	x			
MW-7		x	x	x
MW-8		x		x

x=level significantly higher than the background level

The numbers of metal detections continue to be consistent with historical results and all concentrations were found within the historically identified range. Water samples obtained from MW-7 contained concentrations of chromium and lead above the NCGW2L Standard. Levels of chromium, lead, and vanadium were found to have increased over background levels in MW-7 according to interwell analysis. Chromium was found to have increased in statistically significant concentrations according to both interwell and intrawell analysis within compliance wells MW-3 and MW-7.

Low levels of the chlorinated solvent 1,4-dichlorobenzene and it's intermediate breakdown product chlorobenzene continue to be detected within MW-8. Chlorobenzene also continues to be detected in low concentrations within MW-2. Chlorobenzene has consistently been detected within both MW-2 and MW-8 since groundwater monitoring was initiated in 1994 but current levels are within the historical range. After further analyses through both Mann-Kendall Trend Analysis and Sen's Slope Analysis the detected VOCs were found to not be exhibiting an upward trend. However due to the historical absence of VOCs detected within the background well both MW-2 and MW-8 are considered to be impacted according to the Poisson Prediction Interval Analysis.

Conclusion

The statistical analysis results conducted on metals indicate that levels of chromium have increased within MW-3 and MW-7. However, chromium is likely naturally inherent in the groundwater as indicated by elevated concentrations found within the background wells for both the closed and adjacent Subtitle D Landfills. Metal concentrations have historically exhibited large fluctuations and none of the constituents were detected at all time highs during this sampling event.

The only compliance wells found to contain VOCs are MW-2 and MW-8. The VOC concentrations are well below the Standard and are not exhibiting an increasing trend. MW-8 is located south of the landfill phase that was closed in June of 1991. According to current and historical potentiometric maps the surficial aquifer appears to be flowing in a northwest direction placing the well mostly upgradient of the waste boundary. A methane probe located adjacent to MW-8 has a history of Landfill gas (LFG) detection which is currently being controlled via an active GCCS system. LFG may attribute to the VOC detections in the groundwater in the upgradient direction. Another possible release mechanism leading to the VOC detections in the upgradient direction is a previous overland flow event in which stormwater transported the contaminants to the area just 20 feet from the waste limits. Regardless of the source, the direction of groundwater flow and low concentrations make it highly unlikely that the impacted water will reach any receptor off of the landfill property. MW-2,located west of the cohesive capped landfill cell, has also consistently contained concentrations of chlorobenzene that are not increasing and well below the MCL.

MESCO completed the groundwater report including a potentiometric map with groundwater flow rates and direction for the sampling event. The flow directions and gradients are consistent with historical observations, showing no changes that would result in a different interpretation of the groundwater system. The facility is scheduled to be sampled again in August 2005 and a report and statistical analysis will be forwarded 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 Specialist

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]	NCGW2L[3]	Exceedance
MW-1	Chromium, total	02/21/2005	0.013	mg/l	0.01	0.05	
MW-2	Lead, total	02/21/2005	0.011	mg/l	0.01	0.015	
MW-3	Chromium, total	02/21/2005	0.032	mg/l	0.01	0.05	
MW-3	Vanadium	02/21/2005	0.115	mg/l	0.04		
MW-4	Chromium, total	02/21/2005	0.016	mg/l	0.01	0.05	
MW-6	Cadmium, total	02/21/2005	0.004	mg/l	0.001	0.005	
MW-7	Vanadium	02/21/2005	0.606	mg/l	0.04		
MW-7	**Lead, total**	**02/21/2005**	**0.041**	**mg/l**	**0.01**	**0.015**	**0.026**
MW-7	**Chromium, total**	**02/21/2005**	**0.163**	**mg/l**	**0.01**	**0.05**	**0.113**
MW-8	Vanadium	02/21/2005	0.045	mg/l	0.04		
MW-8	Lead, total	02/21/2005	0.014	mg/l	0.01	0.015	
MW-8	Chromium, total	02/21/2005	0.037	mg/l	0.01	0.05	
MW-8	Chlorobenzene	02/21/2005	9.6	ug/l	5	50	
MW-8	1,4-Dichlorobenzene	02/21/2005	24.7	ug/l	5	75	
MW-2	Chlorobenzene	02/21/2005	8.4	ug/l	5	50	

[1] Table only contains detected constituents.
[2] PQL = Practical Quantitation Limit
[3] NCGW2L = North Carolina Ground Water 2L Standard

MW-7
Lead
Chromium

Hydrologic Properties at Monitoring Well Locations
Wayne County Closed Sanitary Landfill (Dudley)

Monitoring Well	Hydraulic Conductivity (cm/sec)	Effective Porosity (%)	Hydraulic Gradient	Flow Rate (ft/yr)	Flow Direction	Water Table Depth (ft)	Water Table Elev. (ft)
MW-1	5.40E-04	20.0	0.00624	17.42	N57W	15.47	147.79
MW-2	3.00E-04	20.0	0.00835	12.96	N61W	4.84	129.68
MW-3	6.40E-03	20.0	0.02211	732.07	N51W	0.50	134.31
MW-4	9.90E-04	20.0	0.00646	33.09	N57W	6.61	143.59
MW-5	3.10E-05	20.0	0.02024	3.25	N50W	3.24	121.54
MW-6	1.60E-04	20.0	0.00615	5.09	N68W	5.51	140.02
MW-7	7.30E-05	20.0	0.00745	2.81	N62W	7.55	136.04
MW-8	3.40E-04	20.0	0.00583	10.26	N61W	18.92	142.96

NOTE: Data for conductivities and effective porosity obtained from GAI Consultants' Water Sampling Report (January, 1995).
Hydrologic Gradient taken from the February 21, 2005 sampling event from water levels reported by Environment I.
Flow rate (Q) is defined by the equation:

where

$$Q = -\frac{K}{n_e} \cdot \frac{dh}{dl}$$

K = hydraulic conductivity
ne = effective porosity
dh = head difference
dl = horizontal distance

Statistical Analyses Summary

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

Background Well: MW-1

Cadmium, total

%ND	Normality	Method	ND Adj.	Upper Limit (a = 95%)	Unit
100	-	Poisson tolerance interval	ND	3.5	ug/l

Well	Result	Significance
MW-6	4	yes

Chromium, total

%ND	Normality	Method	ND Adj.	Upper Limit (a = 95%)	Unit
82.609	-	Non-Parametric tolerance interval	1/2 ND	13	ug/l

Well	Result	Significance
MW-3	32	yes
MW-4	16	yes
MW-7	163	yes
MW-8	37	yes

Lead, total

%ND	Normality	Method	ND Adj.	Upper Limit (a = 95%)	Unit
100	-	Poisson tolerance interval	ND	16.5	ug/l

Well	Result	Significance
MW-2	11	no
MW-7	41	yes
MW-8	14	no

Vanadium, total

%ND	Normality	Method	ND Adj.	Upper Limit (a = 95%)	Unit
100	-	Non-Parametric tolerance interval	1/2 ND	40	ug/l

Well	Result	Significance
MW-3	115	yes
MW-7	606	yes
MW-8	45	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	25	25	100.00
1,1,1-Trichloroethane	25	25	100.00
1,1,2,2-Tetrachloroethane	25	25	100.00
1,1,2-Trichloroethane	25	25	100.00
1,1-Dichloroethane	25	25	100.00
1,1-Dichloroethene	25	25	100.00
1,2,3-Trichloropropane	25	25	100.00
1,2-Dibromo-3-chloropropane	25	25	100.00
1,2-Dibromoethane	25	25	100.00
1,2-Dichlorobenzene	25	25	100.00
1,2-Dichloroethane	25	25	100.00
1,2-Dichloropropane	25	25	100.00
1,4-Dichlorobenzene	25	25	100.00
2-Butanone	25	25	100.00
2-Hexanone	25	25	100.00
4-Methyl-2-Pentanone	25	25	100.00
Acetone	25	25	100.00
Acrylonitrile	25	25	100.00
Benzene	25	25	100.00
Bromochloromethane	25	25	100.00
Bromodichloromethane	25	25	100.00
Bromoform	25	25	100.00
Bromomethane	25	25	100.00
Carbon disulfide	25	25	100.00
Carbon tetrachloride	25	25	100.00
Chlorobenzene	24	24	100.00
Chloroethane	25	25	100.00
Chloroform	25	25	100.00
Chloromethane	25	25	100.00
cis-1,2-Dichloroethene	25	25	100.00
cis-1,3-Dichloropropene	25	25	100.00
Chlorodibromomethane	25	25	100.00
Dibromomethane	25	25	100.00
Ethylbenzene	25	25	100.00
Iodomethane	25	25	100.00
Dichloromethane	25	25	100.00
Styrene	25	25	100.00
Tetrachloroethylene	25	25	100.00
Toluene	25	25	100.00
trans-1,2-Dichloroethene	25	25	100.00
trans-1,3-Dichloropropene	25	25	100.00
trans-1,4-Dichloro-2-butene	25	25	100.00
Trichloroethylene	25	25	100.00
Trichlorofluoromethane	25	25	100.00
Vinyl acetate	25	25	100.00
Vinyl chloride	25	25	100.00
Xylene	25	25	100.00
Total	**1174**	**1174**	**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-8
1,4-Dichlorobenzene		x
Chlorobenzene	x	x
Detection(s) per Scan	1.00	2.00

Total number of sampling events [n] =	24.979
Total number of detections in background wells [y] =	0
Number of comparisons (downgradient wells) [k] =	7
One-sided value of Student's t-statistic (95% confidence) [t] =	2.616
Expected number of detections in a single future sample [y*] =	**0.2739**

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

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

Well	Cadmium	Chromium	Lead	Vanadium
MW-3		yes		no
MW-4		n/a		
MW-6	n/a			
MW-7		yes	no	no
MW-8		no		no

EXPLANATION

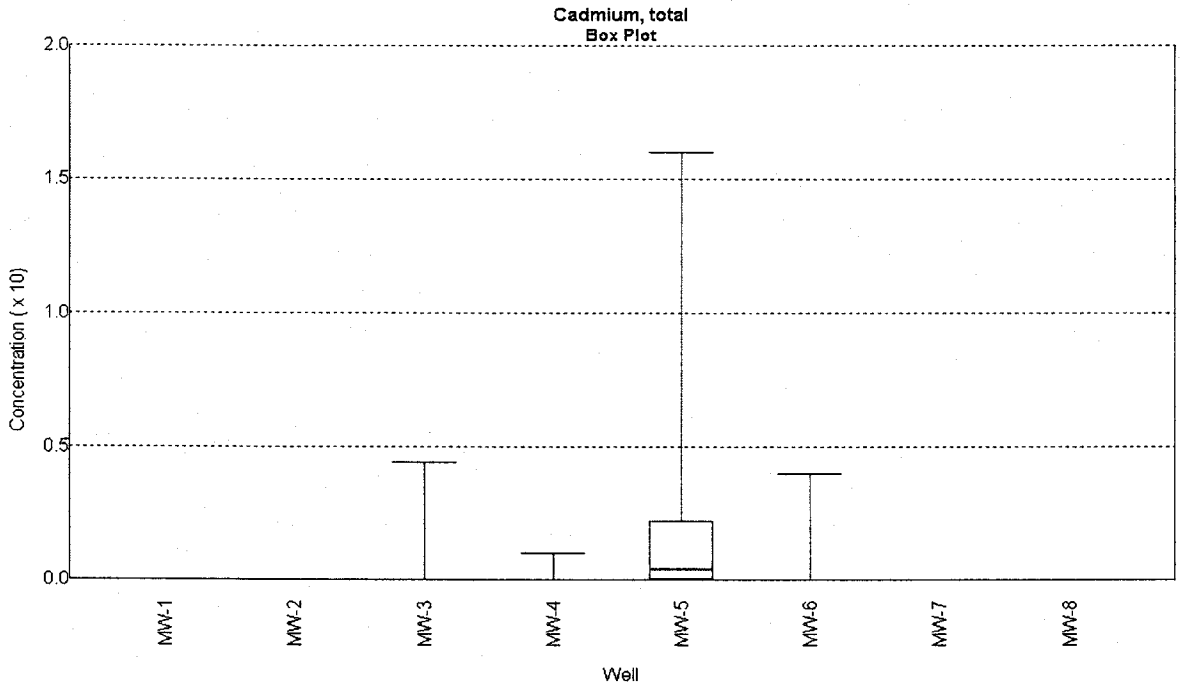
yes=detection statistically significant by intrawell analysis

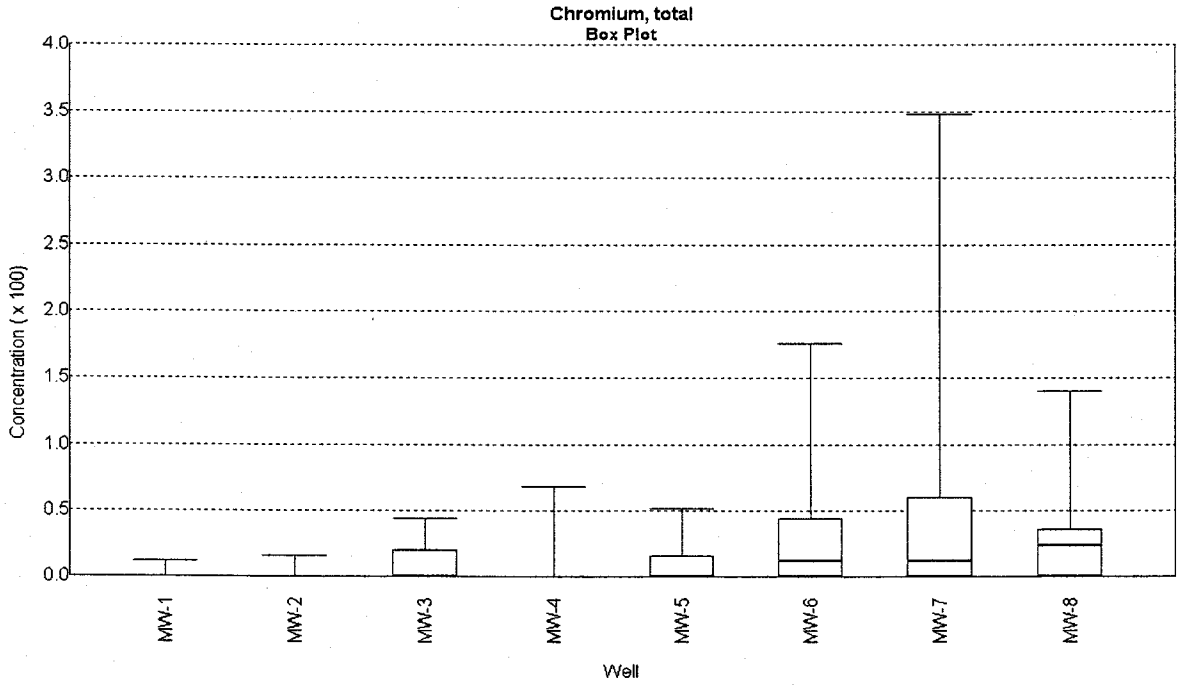
no=detection not statistically significant by intrawell analysis

n/a=not available, intrawell not possible via Shewhart CUSUM chart due to detection rate requirement

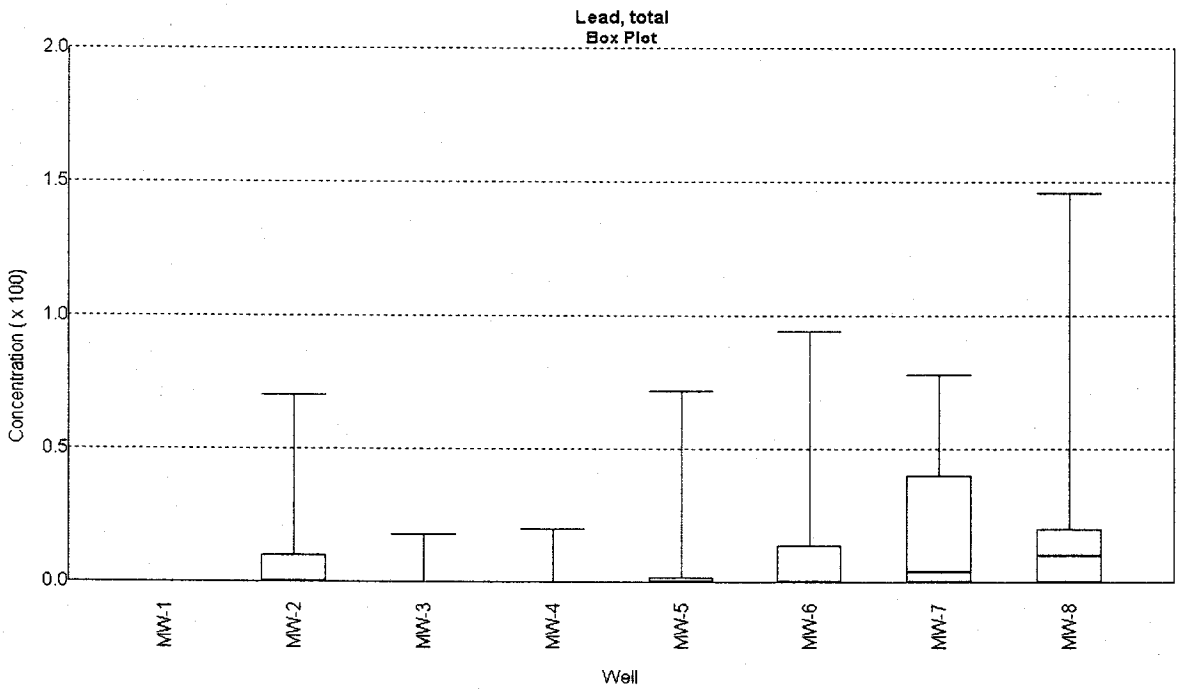
Chromium within MW-3 and MW-7 have increased according to Intrawell Analysis

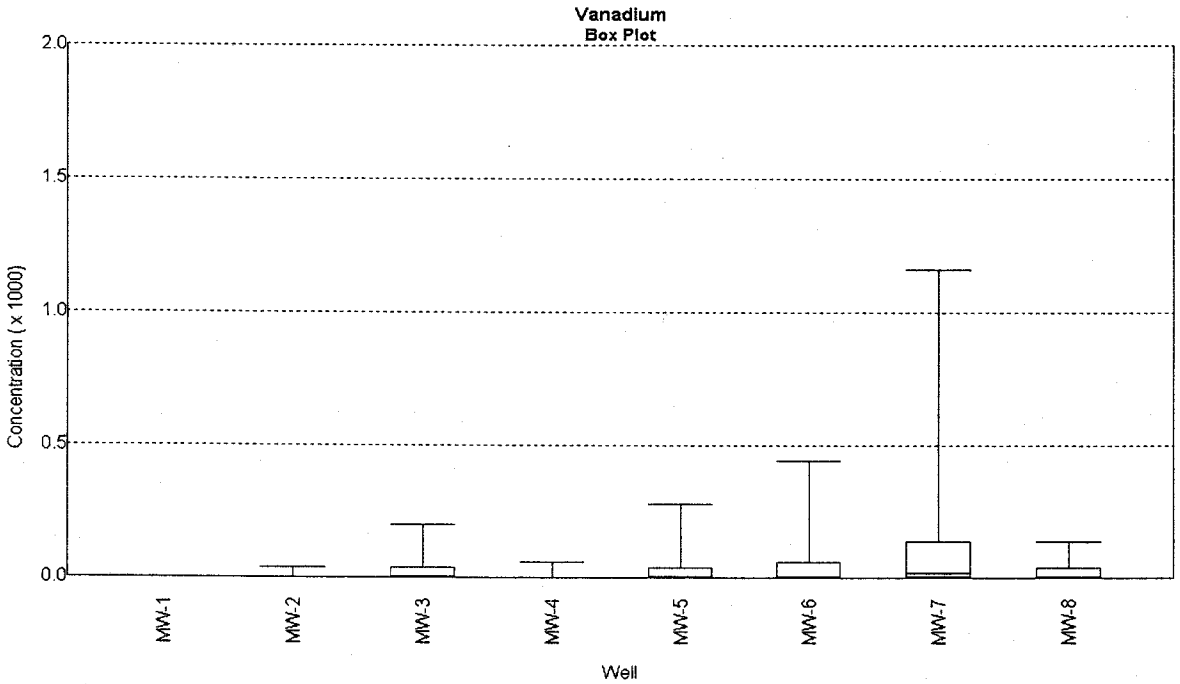
Box Plots for Select Constituents (Metals)
Wayne County Closed Sanitary Landfill (Dudley)



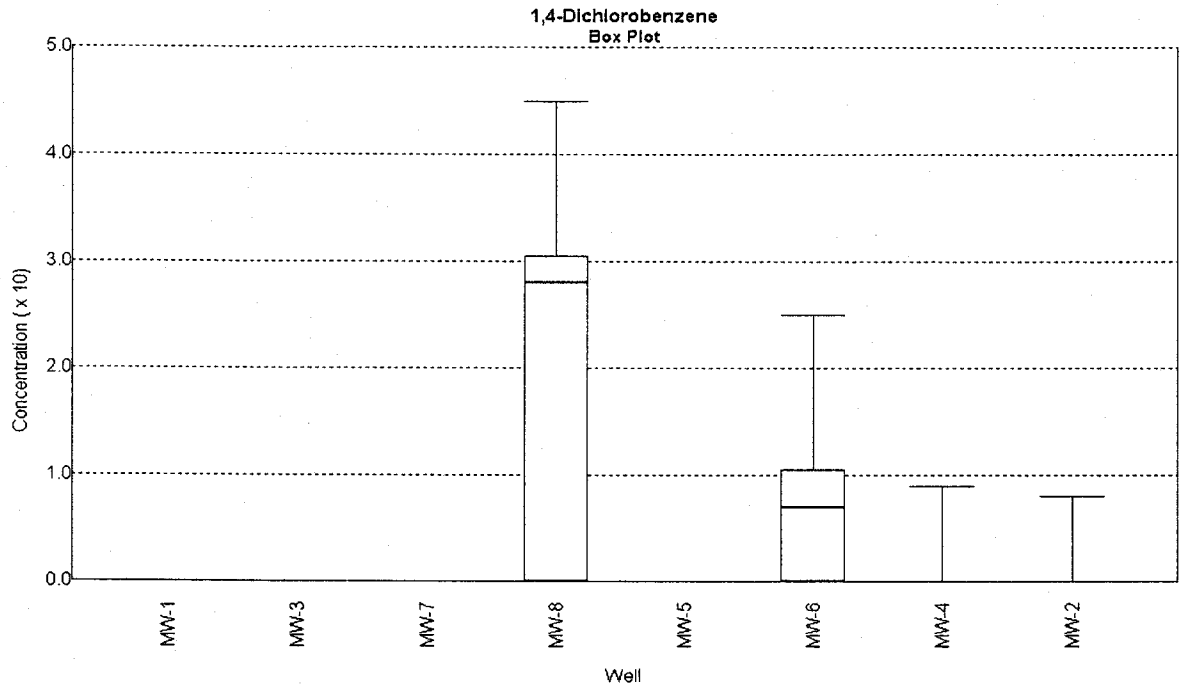


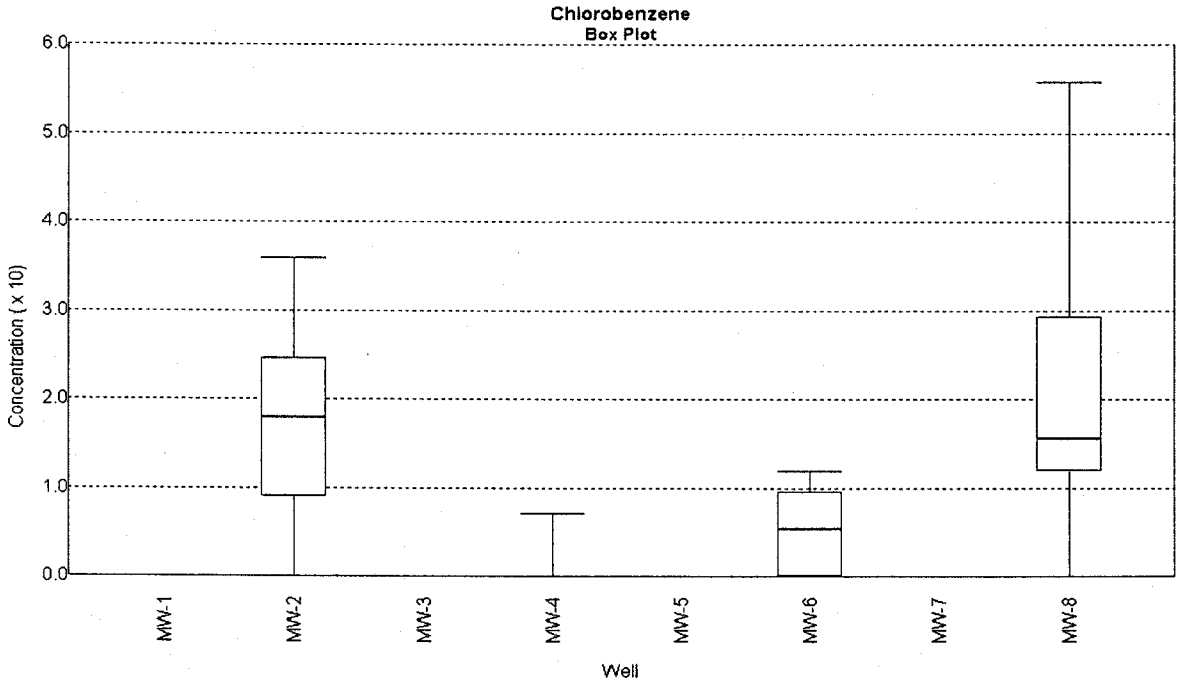
Box Plots for Select Constituents (Metals)
Wayne County Closed Sanitary Landfill (Dudley)



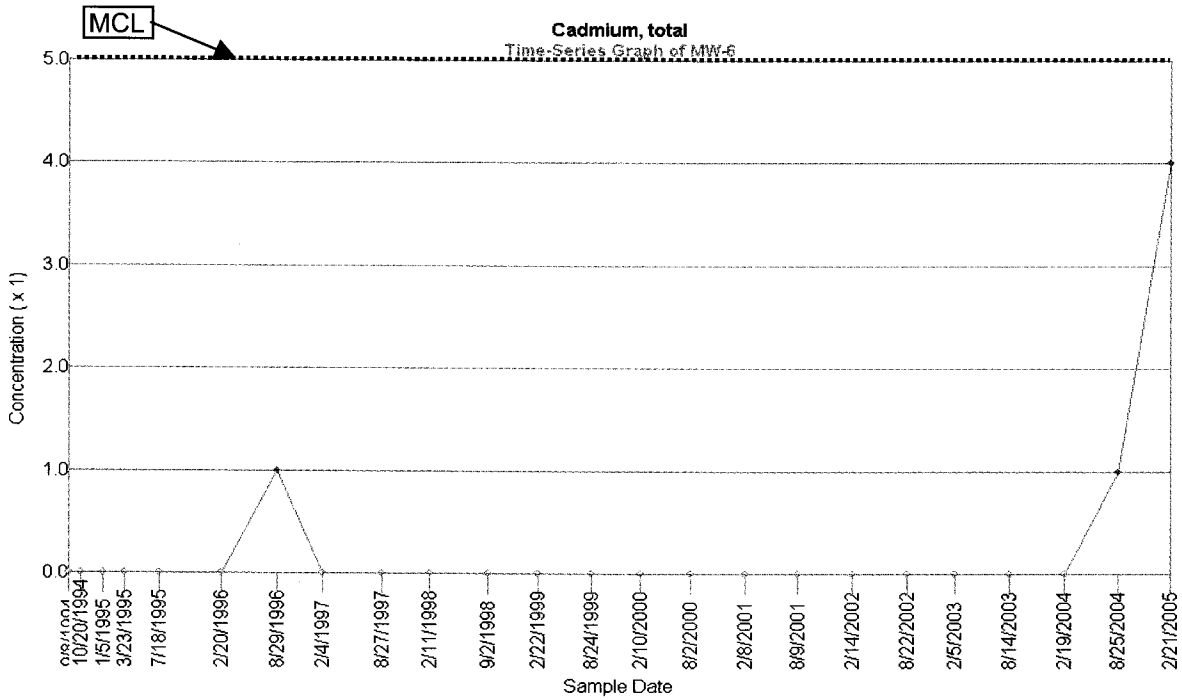


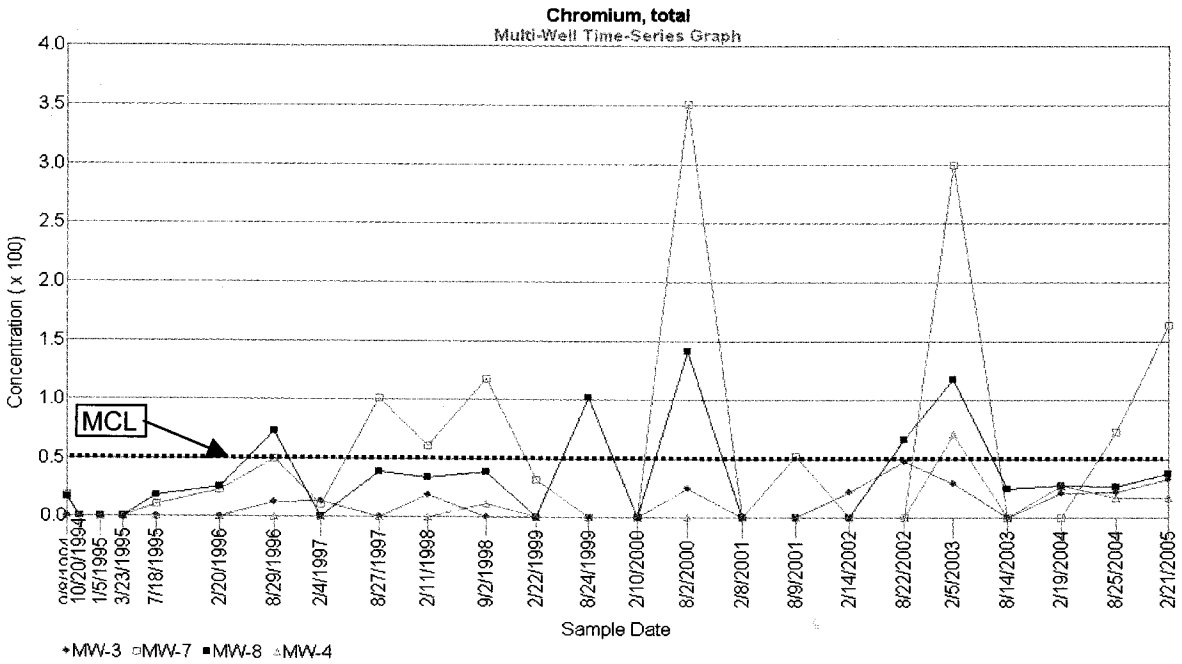
Box Plots for Select Constituents (VOCs)
Wayne County Closed Sanitary Landfill (Dudley)



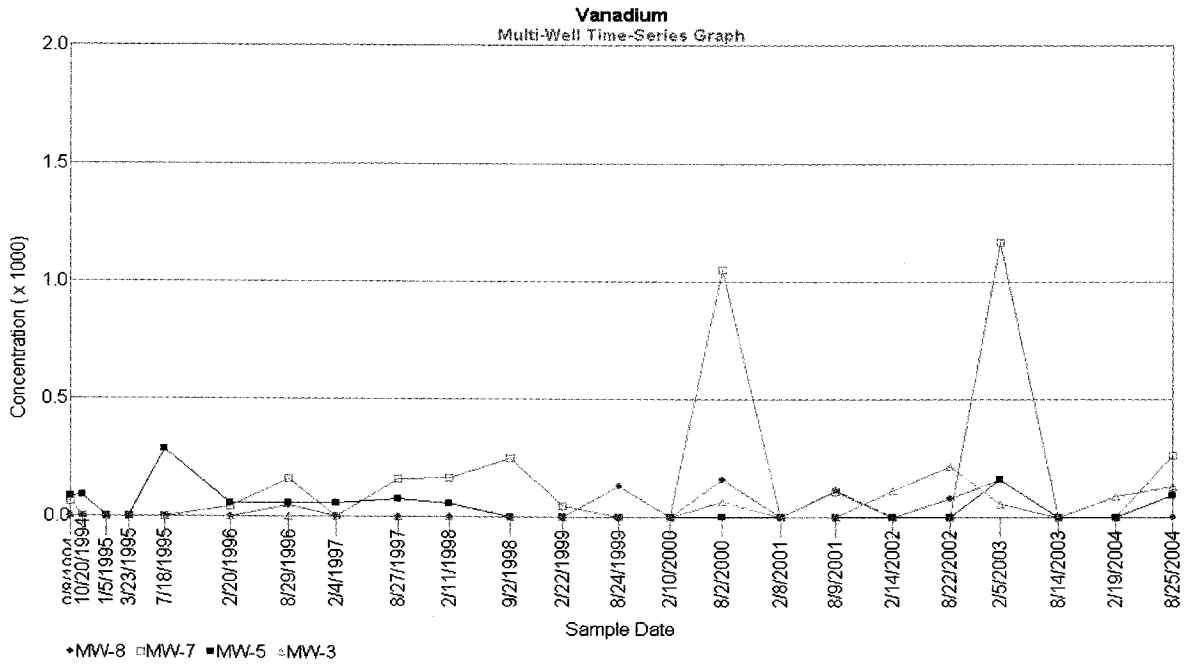


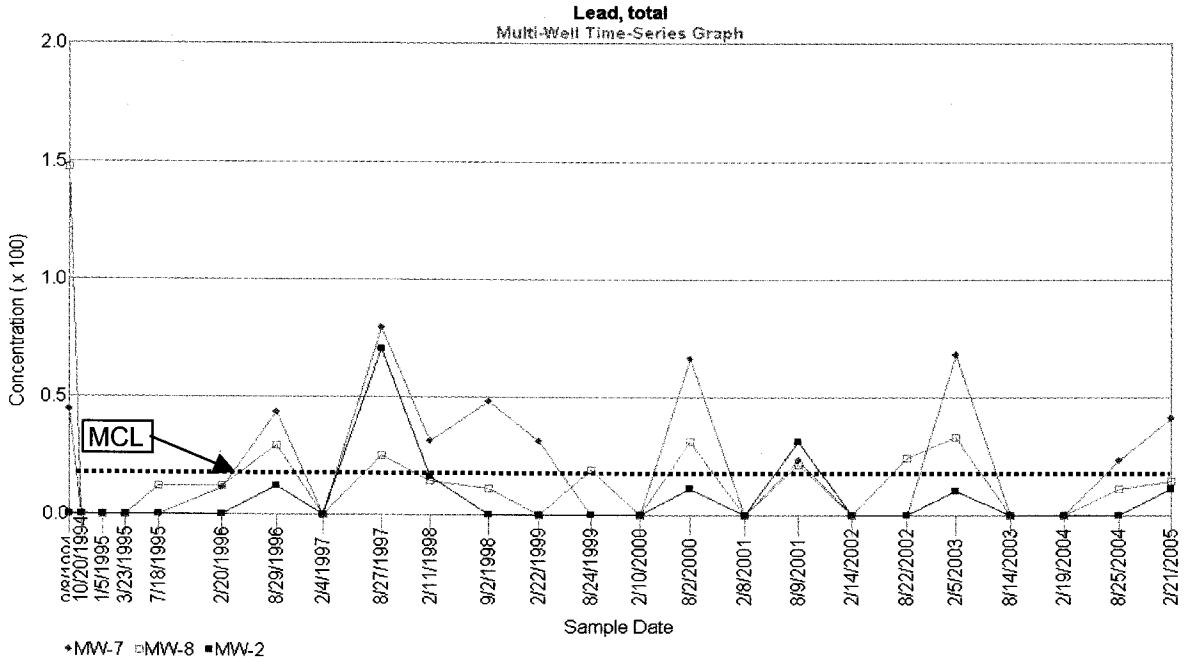
Time Series Plots for Select Constituents (Metals)
Wayne County Closed Sanitary Landfill (Dudley)



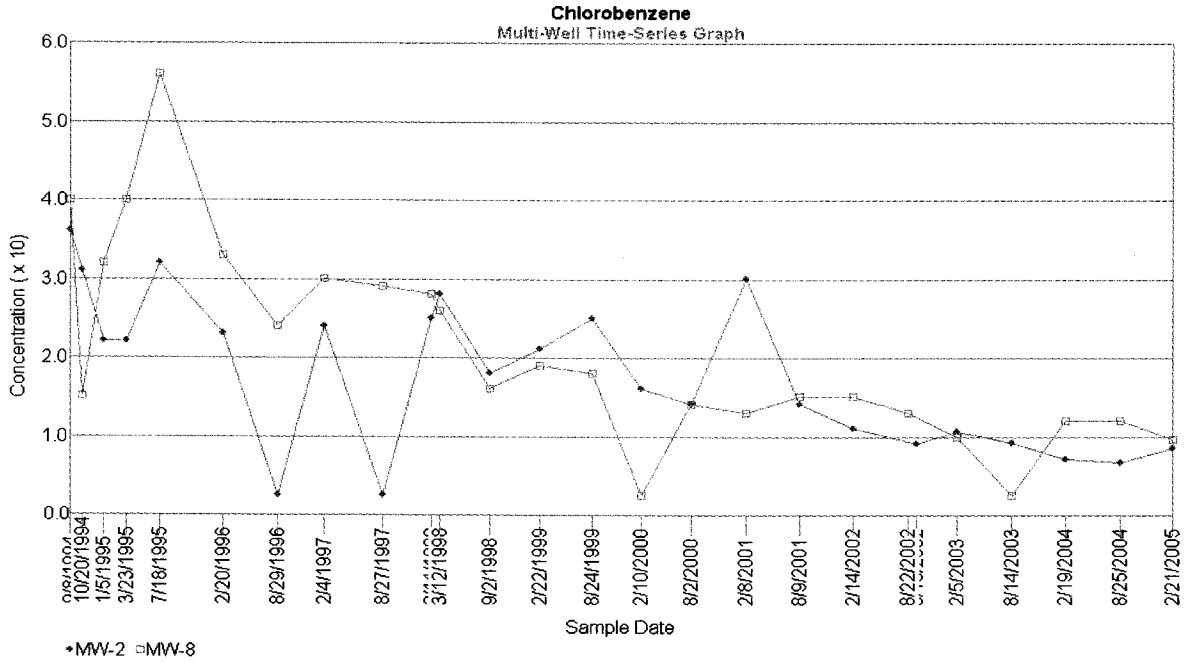


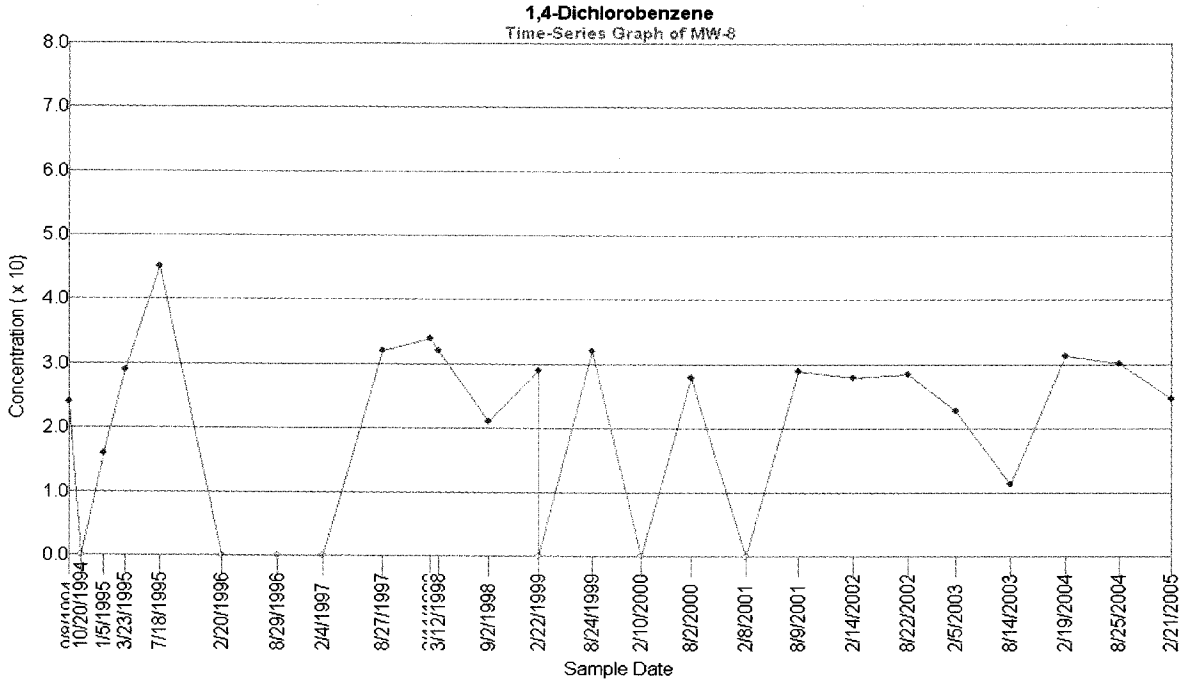
Time Series Plots for Select Constituents (Metals)
Wayne County Closed Sanitary Landfill (Dudley)



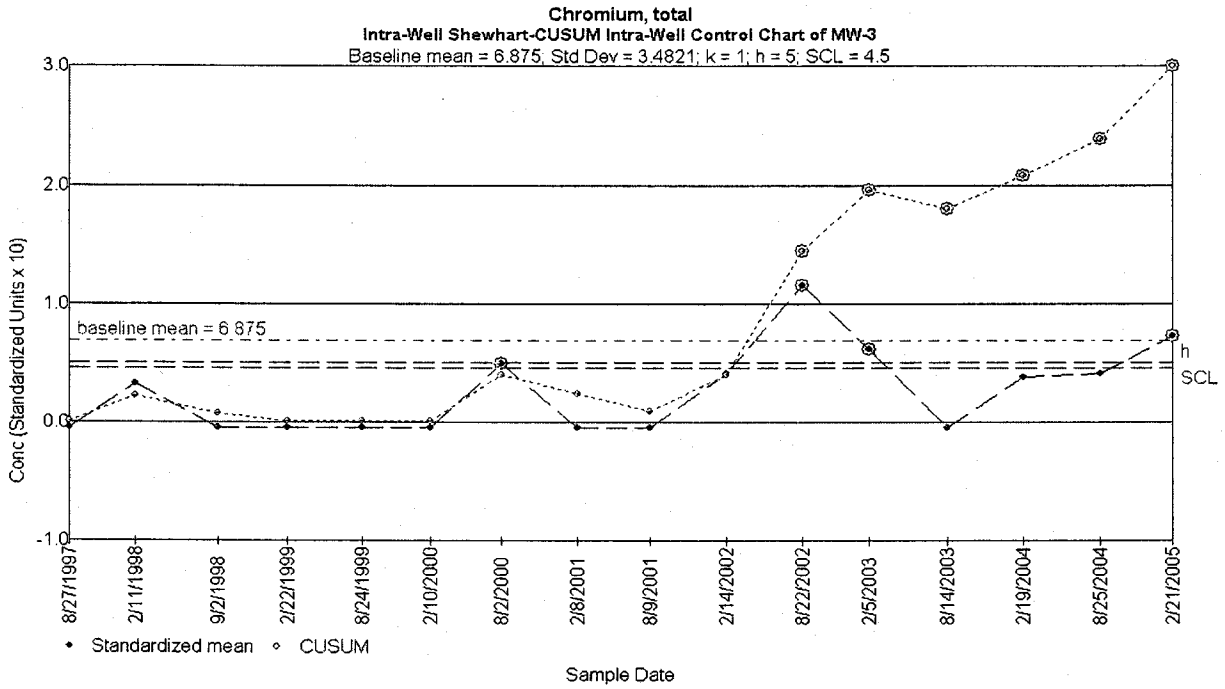


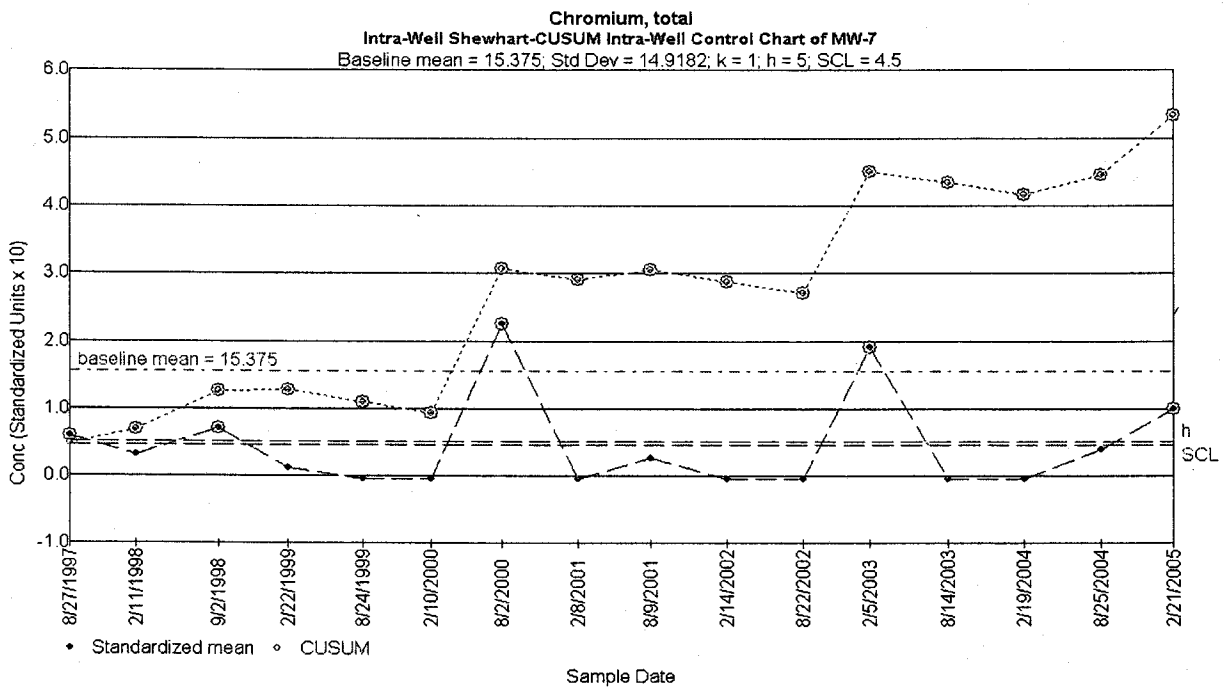
Time Series Plots for Select Constituents (VOCs)
Wayne County Closed Sanitary Landfill (Dudley)



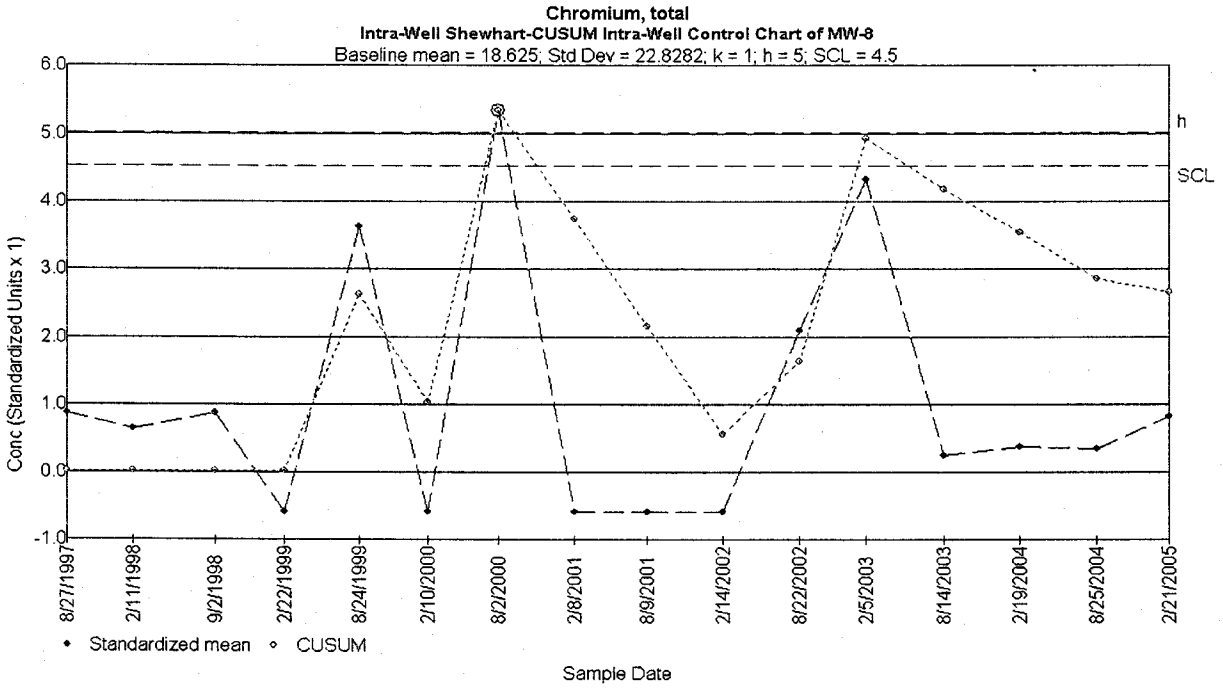


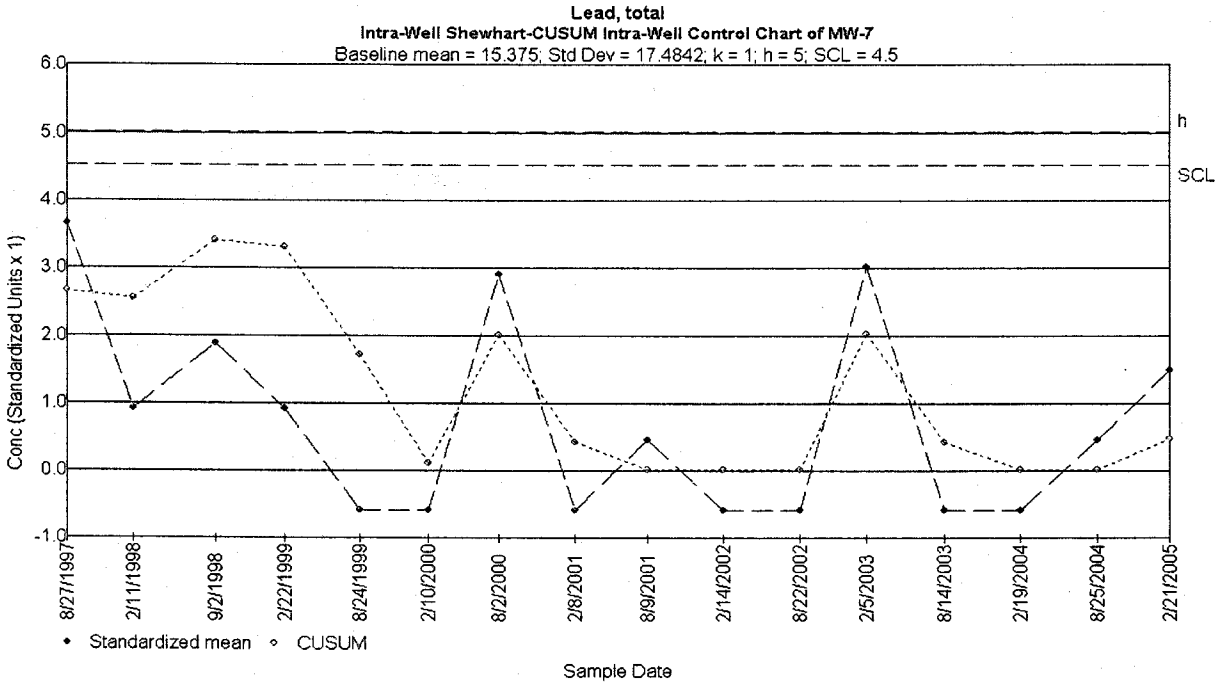
Shewhart-CUSUM charts for selected constituents
Wayne County Closed Sanitary Landfill (Dudley)





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





Shewhart-CUSUM charts for selected constituents
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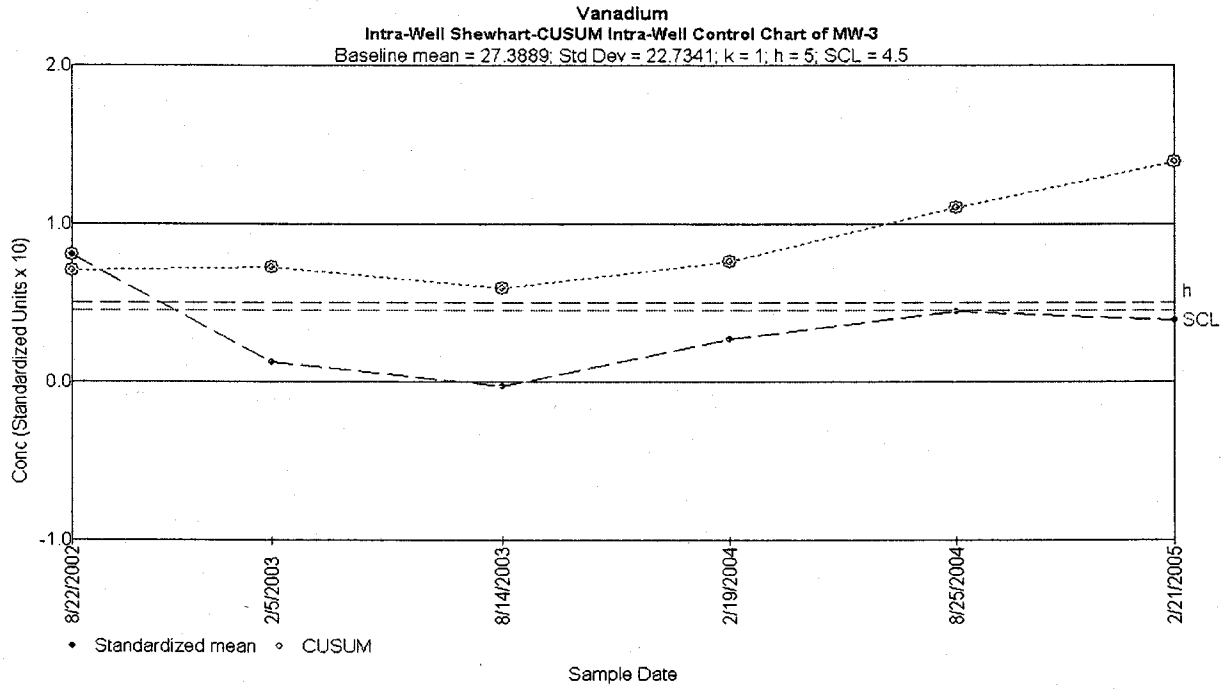
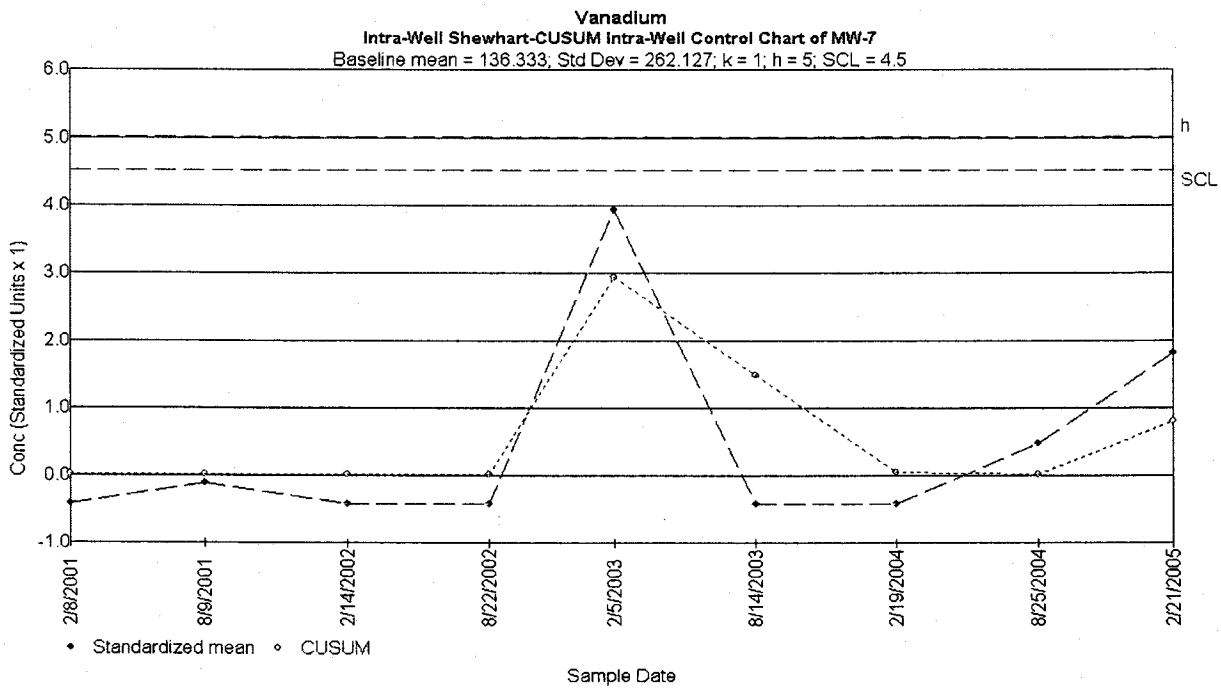
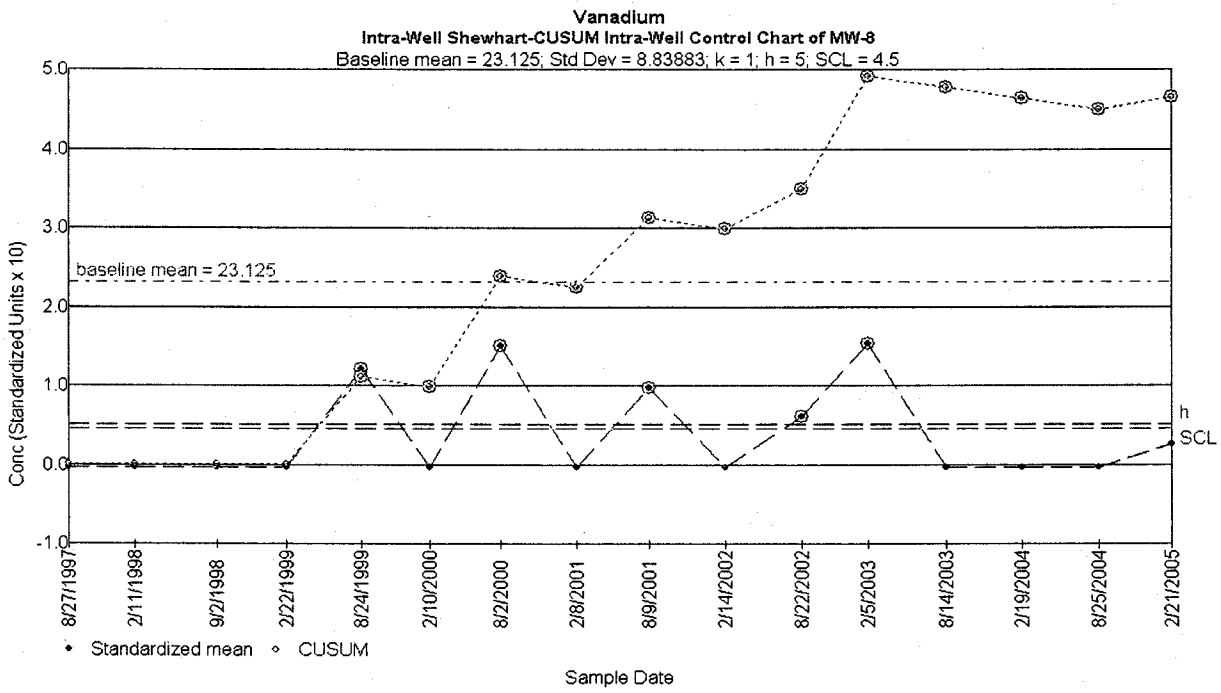




Shewhart-CUSUM charts for selected constituents
Wayne County Closed Sanitary Landfill (Dudley)



Basic Statistics

Basic Statistics

Parameter: Cadmium, total

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

	Total Observations
191	
Total Non-Detects	172
Pooled Mean	0.76911
Pooled Std Dev	1.34796
Background Mean	0.5
Background Std Dev	0

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	23	23	100	11.5

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	0.5	0	0	1989.5	86.5

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	24	24	100	12
MW-3	24	21	87.5	19
MW-4	24	23	95.8333	12.5
MW-5	24	12	50	51.4
MW-6	24	21	87.5	16.5
MW-7	24	24	100	12
MW-8	24	24	100	12

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	0.5	0	0	0.368265	2076	86.5
MW-3	0.791667	0.895844	0.291667	0.368265	2366.5	98.6042
MW-4	0.520833	0.102062	0.0208333	0.368265	2162.5	90.1042
MW-5	2.14167	3.36787	1.64167	0.368265	3230	134.583
MW-6	0.6875	0.719488	0.1875	0.368265	2359.5	98.3125
MW-7	0.5	0	0	0.368265	2076	86.5
MW-8	0.5	0	0	0.368265	2076	86.5

Analysis of Variance Statistics

SS Wells	53.7452
SS Total	345.228

Kruskal-Wallis Statistics

Non-Detect Rank	86.5
Background Rank Sum	1989.5
Background Rank Mean	86.5
H Statistic	14.8649
H Adjusted for Ties	55.1101

Basic Statistics

Parameter: Chromium, total

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

	Total Observations
191	
Total Non-Detects	115
Pooled Mean	22.2984
Pooled Std Dev	43.0045
Background Mean	6.34783
Background Std Dev	3.00921

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	23	19	82.6087	146

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	6.34783	3.00921	0	1609	69.9565

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	24	18	75	166
MW-3	24	14	58.3333	306
MW-4	24	19	79.1667	235
MW-5	24	15	62.5	302
MW-6	24	11	45.8333	881
MW-7	24	10	41.6667	1402
MW-8	24	9	37.5	821

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	6.91667	3.67029	0.568841	11.6549	1797	74.875
MW-3	12.75	11.3454	6.40217	11.6549	2277	94.875
MW-4	9.79167	13.8877	3.44384	11.6549	1827	76.125
MW-5	12.5833	13.184	6.23551	11.6549	2178	90.75
MW-6	36.7083	46.662	30.3605	11.6549	2791	116.292
MW-7	58.4167	92.3914	52.0688	11.6549	2891	120.458
MW-8	34.2083	38.2418	27.8605	11.6549	2966	123.583

Analysis of Variance Statistics

SS Wells	59433.9
SS Total	351384

Kruskal-Wallis Statistics

Non-Detect Rank	58
Background Rank Sum	1609
Background Rank Mean	69.9565
H Statistic	25.8449
H Adjusted for Ties	33.0607

Basic Statistics

Parameter: Lead, total

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

	Total Observations
191	
Total Non-Detects	140
Pooled Mean	11.8665
Pooled Std Dev	17.7035
Background Mean	4.8913
Background Std Dev	0.521286

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	23	23	100	112.5

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	4.8913	0.521286	0	1621.5	70.5

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	24	17	70.8333	246
MW-3	24	22	91.6667	139
MW-4	24	22	91.6667	141
MW-5	24	18	75	247
MW-6	24	16	66.6667	360
MW-7	24	12	50	568
MW-8	24	10	41.6667	453

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	10.25	13.9977	5.3587	4.90948	2300.5	95.8542
MW-3	5.79167	2.87386	0.900362	4.90948	1859	77.4583
MW-4	5.875	3.37912	0.983696	4.90948	1857	77.375
MW-5	10.2917	14.645	5.40036	4.90948	2234	93.0833
MW-6	15	20.6755	10.1087	4.90948	2494	103.917
MW-7	23.6667	23.7279	18.7754	4.90948	2965	123.542
MW-8	18.875	28.8358	13.9837	4.90948	3005	125.208

Analysis of Variance Statistics

SS Wells	7744.87
SS Total	59548.8

Kruskal-Wallis Statistics

Non-Detect Rank	70.5
Background Rank Sum	1621.5
Background Rank Mean	70.5
H Statistic	23.5344
H Adjusted for Ties	38.8227

Basic Statistics

Parameter: Vanadium

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

	Total Observations
191	
Total Non-Detects	145
Pooled Mean	55.7801
Pooled Std Dev	127.994
Background Mean	20
Background Std Dev	0

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	23	23	100	460

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	20	0	0	1679	73

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	24	23	95.8333	513
MW-3	24	17	70.8333	1109
MW-4	24	23	95.8333	528
MW-5	24	14	58.3333	1256
MW-6	24	16	66.6667	1451
MW-7	24	12	50	4278
MW-8	24	17	70.8333	1059

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	21.375	6.7361	1.375	35.1876	1833	76.375
MW-3	46.2083	49.3091	26.2083	35.1876	2422	100.917
MW-4	22	9.79796	2	35.1876	1838	76.5833
MW-5	52.3333	59.5605	32.3333	35.1876	2653	110.542
MW-6	60.4583	91.414	40.4583	35.1876	2527	105.292
MW-7	178.25	314.865	158.25	35.1876	2975	123.958
MW-8	44.125	45.673	24.125	35.1876	2409	100.375

Analysis of Variance Statistics

SS Wells	451483
SS Total	3.11265e+006

Kruskal-Wallis Statistics

Non-Detect Rank	73
Background Rank Sum	1679
Background Rank Mean	73
H Statistic	18.7844
H Adjusted for Ties	33.3956

Basic Statistics

Parameter: 1,4-Dichlorobenzene

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

	Total Observations
206	
Total Non-Detects	168
Pooled Mean	5.52961
Pooled Std Dev	7.6977
Background Mean	2.6
Background Std Dev	0.5

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	25	25	100	65

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	2.6	0.5	0	2112.5	84.5

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	26	24	92.3077	77.5
MW-3	26	26	100	67.5
MW-4	26	25	96.1538	74
MW-5	26	26	100	67.5
MW-6	26	9	34.6154	197.2
MW-7	26	26	100	67.5
MW-8	25	7	28	522.9

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	2.98077	1.42465	0.380769	1.39018	2375	91.3462
MW-3	2.59615	0.49029	-0.00384615	1.39018	2197	84.5
MW-4	2.84615	1.34736	0.246154	1.39018	2291.5	88.1346
MW-5	2.59615	0.49029	-0.00384615	1.39018	2197	84.5
MW-6	7.58462	5.18758	4.98462	1.39018	3811.5	146.596
MW-7	2.59615	0.49029	-0.00384615	1.39018	2197	84.5
MW-8	20.916	13.0448	18.316	1.40374	4139.5	165.58

Analysis of Variance Statistics

SS Wells	7270.23
SS Total	12147.2

Kruskal-Wallis Statistics

Non-Detect Rank	84.5
Background Rank Sum	2112.5
Background Rank Mean	84.5
H Statistic	53.9748
H Adjusted for Ties	117.952

Basic Statistics

Parameter: Chlorobenzene

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

	Total Observations
199	
Total Non-Detects	139
Pooled Mean	7.18492
Pooled Std Dev	9.21071
Background Mean	2.5
Background Std Dev	0

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	24	24	100	60

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	2.5	0	0	1680	70

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	25	2	8	447.7
MW-3	25	25	100	62.5
MW-4	25	24	96	67.3
MW-5	25	25	100	62.5
MW-6	25	12	48	143
MW-7	25	25	100	62.5
MW-8	25	2	8	524.3

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	17.908	9.69557	15.408	1.65937	4106	164.24
MW-3	2.5	0	0	1.65937	1750	70
MW-4	2.692	0.96	0.192	1.65937	1826	73.04
MW-5	2.5	0	0	1.65937	1750	70
MW-6	5.72	3.50939	3.22	1.65937	2804	112.16
MW-7	2.5	0	0	1.65937	1750	70
MW-8	20.972	12.692	18.472	1.65937	4234	169.36

Analysis of Variance Statistics

SS Wells	10357.9
SS Total	16797.8

Kruskal-Wallis Statistics

Non-Detect Rank	70
Background Rank Sum	1680
Background Rank Mean	70
H Statistic	100.826
H Adjusted for Ties	152.948

Interwell Analyses for Metals

Poisson Tolerance Limit

Parameter: Cadmium, total

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

Poisson Count of 23 background Samples = 23
Degrees of Freedom = 48

95% Confidence Values

Chi-Squared Value (95% Confidence) = 65.1708
Lambda (from Zack's formula) = 1.41676
Smallest Degrees of Freedom = 9
Upper Tolerance Limit (95%) = 3.5

99% Confidence Values

Chi-Squared Value (99% Confidence) = 73.6826
Lambda (from Zack's formula) = 1.60179
Smallest Degrees of Freedom = 12
Upper Tolerance Limit (99%) = 5

	Date	Result	Impacted 95%	Impacted 99%
MW-6	9/8/1994	ND<1	FALSE	FALSE
	10/20/1994	ND<1	FALSE	FALSE
	1/5/1995	ND<1	FALSE	FALSE
	3/23/1995	ND<1	FALSE	FALSE
	7/18/1995	ND<1	FALSE	FALSE
	2/20/1996	ND<1	FALSE	FALSE
	8/29/1996	1	FALSE	FALSE
	2/4/1997	ND<1	FALSE	FALSE
	8/27/1997	ND<1	FALSE	FALSE
	2/11/1998	ND<1	FALSE	FALSE
	9/2/1998	ND<1	FALSE	FALSE
	2/22/1999	ND<1	FALSE	FALSE
	8/24/1999	ND<1	FALSE	FALSE
	2/10/2000	ND<1	FALSE	FALSE
	8/2/2000	ND<1	FALSE	FALSE
	2/8/2001	ND<1	FALSE	FALSE
	8/9/2001	ND<1	FALSE	FALSE
	2/14/2002	ND<1	FALSE	FALSE
	8/22/2002	ND<1	FALSE	FALSE
	2/5/2003	ND<1	FALSE	FALSE
	8/14/2003	ND<1	FALSE	FALSE
	2/19/2004	ND<1	FALSE	FALSE
	8/25/2004	1	FALSE	FALSE
	2/21/2005	4	TRUE	FALSE

Non-Parametric Tolerance Interval

Parameter: Chromium, total

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

Total Percent Non-Detects = 59.6639%
Background Samples (n) = 23
Maximum Background Concentration = 13
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

Well	Sample	Result	Impacted
MW-3	9/8/1994	ND<5	FALSE
MW-3	10/20/1994	ND<5	FALSE
MW-3	1/5/1995	ND<5	FALSE
MW-3	3/23/1995	ND<5	FALSE
MW-3	7/18/1995	ND<5	FALSE
MW-3	2/20/1996	ND<5	FALSE
MW-3	8/29/1996	12	FALSE
MW-3	2/4/1997	13	FALSE
MW-3	8/27/1997	ND<5	FALSE
MW-3	2/11/1998	18	TRUE
MW-3	9/2/1998	ND<5	FALSE
MW-3	2/22/1999	ND<5	FALSE
MW-3	8/24/1999	ND<5	FALSE
MW-3	2/10/2000	ND<5	FALSE
MW-3	8/2/2000	24	TRUE
MW-3	2/8/2001	ND<5	FALSE
MW-3	8/9/2001	ND<5	FALSE
MW-3	2/14/2002	21	TRUE
MW-3	8/22/2002	47	TRUE
MW-3	2/5/2003	28	TRUE
MW-3	8/14/2003	ND<5	FALSE
MW-3	2/19/2004	20	TRUE
MW-3	8/25/2004	21	TRUE
MW-3	2/21/2005	32	TRUE
MW-4	9/8/1994	ND<5	FALSE
MW-4	10/20/1994	ND<5	FALSE
MW-4	1/5/1995	ND<5	FALSE
MW-4	3/23/1995	ND<5	FALSE
MW-4	7/18/1995	ND<5	FALSE
MW-4	2/20/1996	ND<5	FALSE
MW-4	8/29/1996	ND<5	FALSE
MW-4	2/4/1997	ND<5	FALSE
MW-4	8/27/1997	ND<5	FALSE
MW-4	2/11/1998	ND<5	FALSE
MW-4	9/2/1998	11	FALSE
MW-4	2/22/1999	ND<5	FALSE
MW-4	8/24/1999	ND<5	FALSE
MW-4	2/10/2000	ND<5	FALSE
MW-4	8/2/2000	ND<5	FALSE
MW-4	2/8/2001	ND<5	FALSE
MW-4	8/9/2001	ND<5	FALSE
MW-4	2/14/2002	ND<5	FALSE
MW-4	8/22/2002	ND<5	FALSE
MW-4	2/5/2003	70	TRUE
MW-4	8/14/2003	ND<5	FALSE
MW-4	2/19/2004	27	TRUE
MW-4	8/25/2004	16	TRUE
MW-4	2/21/2005	16	TRUE
MW-7	9/8/1994	17	TRUE

MW-7	10/20/1994	ND<5	FALSE
MW-7	1/5/1995	ND<5	FALSE
MW-7	3/23/1995	ND<5	FALSE
MW-7	7/18/1995	10	FALSE
MW-7	2/20/1996	22	TRUE
MW-7	8/29/1996	49	TRUE
MW-7	2/4/1997	10	FALSE
MW-7	8/27/1997	100	TRUE
MW-7	2/11/1998	60	TRUE
MW-7	9/2/1998	117	TRUE
MW-7	2/22/1999	31	TRUE
MW-7	8/24/1999	ND<5	FALSE
MW-7	2/10/2000	ND<5	FALSE
MW-7	8/2/2000	350	TRUE
MW-7	2/8/2001	ND<5	FALSE
MW-7	8/9/2001	52	TRUE
MW-7	2/14/2002	ND<5	FALSE
MW-7	8/22/2002	ND<5	FALSE
MW-7	2/5/2003	299	TRUE
MW-7	8/14/2003	ND<5	FALSE
MW-7	2/19/2004	ND<5	FALSE
MW-7	8/25/2004	72	TRUE
MW-7	2/21/2005	163	TRUE
MW-8	9/8/1994	15	TRUE
MW-8	10/20/1994	ND<5	FALSE
MW-8	1/5/1995	ND<5	FALSE
MW-8	3/23/1995	ND<5	FALSE
MW-8	7/18/1995	17	TRUE
MW-8	2/20/1996	25	TRUE
MW-8	8/29/1996	72	TRUE
MW-8	2/4/1997	ND<5	FALSE
MW-8	8/27/1997	38	TRUE
MW-8	2/11/1998	33	TRUE
MW-8	9/2/1998	38	TRUE
MW-8	2/22/1999	ND<5	FALSE
MW-8	8/24/1999	101	TRUE
MW-8	2/10/2000	ND<5	FALSE
MW-8	8/2/2000	140	TRUE
MW-8	2/8/2001	ND<5	FALSE
MW-8	8/9/2001	ND<5	FALSE
MW-8	2/14/2002	ND<5	FALSE
MW-8	8/22/2002	66	TRUE
MW-8	2/5/2003	117	TRUE
MW-8	8/14/2003	24	TRUE
MW-8	2/19/2004	27	TRUE
MW-8	8/25/2004	26	TRUE
MW-8	2/21/2005	37	TRUE

Poisson Tolerance Limit

Parameter: Lead, total

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

Poisson Count of 23 background Samples = 225
Degrees of Freedom = 452

95% Confidence Values

Chi-Squared Value (95% Confidence) = 502.566
Lambda (from Zack's formula) = 10.9253
Smallest Degrees of Freedom = 35
Upper Tolerance Limit (95%) = 16.5

99% Confidence Values

Chi-Squared Value (99% Confidence) = 524.872
Lambda (from Zack's formula) = 11.4103
Smallest Degrees of Freedom = 41
Upper Tolerance Limit (99%) = 19.5

	Date	Result	Impacted 95%	Impacted 99%
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
	2/14/2002	ND<10	FALSE	FALSE
	8/22/2002	ND<10	FALSE	FALSE
	2/5/2003	68	TRUE	TRUE
	8/14/2003	ND<10	FALSE	FALSE
	2/19/2004	ND<10	FALSE	FALSE
	8/25/2004	23	TRUE	TRUE
	2/21/2005	41	TRUE	TRUE
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
	2/14/2002	ND<10	FALSE	FALSE

	8/22/2002	24	TRUE	TRUE
	2/5/2003	33	TRUE	TRUE
	8/14/2003	ND<10	FALSE	FALSE
	2/19/2004	ND<10	FALSE	FALSE
	8/25/2004	11	FALSE	FALSE
	2/21/2005	14	FALSE	FALSE
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
	2/14/2002	ND<10	FALSE	FALSE
	8/22/2002	ND<10	FALSE	FALSE
	2/5/2003	10	FALSE	FALSE
	8/14/2003	ND<10	FALSE	FALSE
	2/19/2004	ND<10	FALSE	FALSE
	8/25/2004	ND<10	FALSE	FALSE
	2/21/2005	11	FALSE	FALSE

Non-Parametric Tolerance Interval

Parameter: Vanadium

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

Total Percent Non-Detects = 72.6316%
Background Samples (n) = 23
Maximum Background Concentration = 40
Minimum Coverage = 87.8%
Average Coverage = 95.8333%

Well	Sample	Result	Impacted
MW-7	9/8/1994	57	TRUE
MW-7	10/20/1994	ND<40	FALSE
MW-7	1/5/1995	ND<40	FALSE
MW-7	3/23/1995	ND<40	FALSE
MW-7	7/18/1995	ND<40	FALSE
MW-7	2/20/1996	40	FALSE
MW-7	8/29/1996	157	TRUE
MW-7	2/4/1997	ND<40	FALSE
MW-7	8/27/1997	154	TRUE
MW-7	2/11/1998	162	TRUE
MW-7	9/2/1998	246	TRUE
MW-7	2/22/1999	42	TRUE
MW-7	8/24/1999	ND<40	FALSE
MW-7	2/10/2000	ND<40	FALSE
MW-7	8/2/2000	1047	TRUE
MW-7	2/8/2001	ND<40	FALSE
MW-7	8/9/2001	104	TRUE
MW-7	2/14/2002	ND<40	FALSE
MW-7	8/22/2002	ND<40	FALSE
MW-7	2/5/2003	1164	TRUE
MW-7	8/14/2003	ND<40	FALSE
MW-7	2/19/2004	ND<40	FALSE
MW-7	8/25/2004	259	TRUE
MW-7	2/21/2005	606	TRUE
MW-8	9/8/1994	ND<40	FALSE
MW-8	10/20/1994	ND<40	FALSE
MW-8	1/5/1995	ND<40	FALSE
MW-8	3/23/1995	ND<40	FALSE
MW-8	7/18/1995	ND<40	FALSE
MW-8	2/20/1996	ND<40	FALSE
MW-8	8/29/1996	45	TRUE
MW-8	2/4/1997	ND<40	FALSE
MW-8	8/27/1997	ND<40	FALSE
MW-8	2/11/1998	ND<40	FALSE
MW-8	9/2/1998	ND<40	FALSE
MW-8	2/22/1999	ND<40	FALSE
MW-8	8/24/1999	130	TRUE
MW-8	2/10/2000	ND<40	FALSE
MW-8	8/2/2000	156	TRUE
MW-8	2/8/2001	ND<40	FALSE
MW-8	8/9/2001	109	TRUE
MW-8	2/14/2002	ND<40	FALSE
MW-8	8/22/2002	76	TRUE
MW-8	2/5/2003	158	TRUE
MW-8	8/14/2003	ND<40	FALSE
MW-8	2/19/2004	ND<40	FALSE
MW-8	8/25/2004	ND<40	FALSE
MW-8	2/21/2005	45	TRUE
MW-3	9/8/1994	ND<40	FALSE

MW-3	10/20/1994	ND<40	FALSE
MW-3	1/5/1995	ND<40	FALSE
MW-3	3/23/1995	ND<40	FALSE
MW-3	7/18/1995	ND<40	FALSE
MW-3	2/20/1996	ND<40	FALSE
MW-3	8/29/1996	ND<40	FALSE
MW-3	2/4/1997	ND<40	FALSE
MW-3	8/27/1997	ND<40	FALSE
MW-3	2/11/1998	ND<40	FALSE
MW-3	9/2/1998	ND<40	FALSE
MW-3	2/22/1999	ND<40	FALSE
MW-3	8/24/1999	ND<40	FALSE
MW-3	2/10/2000	ND<40	FALSE
MW-3	8/2/2000	65	TRUE
MW-3	2/8/2001	ND<40	FALSE
MW-3	8/9/2001	ND<40	FALSE
MW-3	2/14/2002	108	TRUE
MW-3	8/22/2002	210	TRUE
MW-3	2/5/2003	55	TRUE
MW-3	8/14/2003	ND<40	FALSE
MW-3	2/19/2004	88	TRUE
MW-3	8/25/2004	128	TRUE
MW-3	2/21/2005	115	TRUE

Basic Statistics

Parameter: Cadmium, total

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

	Total Observations
191	
Total Non-Detects	172
Pooled Mean	0.76911
Pooled Std Dev	1.34796
Background Mean	0.5
Background Std Dev	0

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	23	23	100	11.5

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	0.5	0	0	1989.5	86.5

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	24	24	100	12
MW-3	24	21	87.5	19
MW-4	24	23	95.8333	12.5
MW-5	24	12	50	51.4
MW-6	24	21	87.5	16.5
MW-7	24	24	100	12
MW-8	24	24	100	12

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	0.5	0	0	0.368265	2076	86.5
MW-3	0.791667	0.895844	0.291667	0.368265	2366.5	98.6042
MW-4	0.520833	0.102062	0.0208333	0.368265	2162.5	90.1042
MW-5	2.14167	3.36787	1.64167	0.368265	3230	134.583
MW-6	0.6875	0.719488	0.1875	0.368265	2359.5	98.3125
MW-7	0.5	0	0	0.368265	2076	86.5
MW-8	0.5	0	0	0.368265	2076	86.5

Analysis of Variance Statistics

SS Wells	53.7452
SS Total	345.228

Kruskal-Wallis Statistics

Non-Detect Rank	86.5
Background Rank Sum	1989.5
Background Rank Mean	86.5
H Statistic	14.8649
H Adjusted for Ties	55.1101

Basic Statistics

Parameter: Chromium, total

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

	Total Observations
191	
Total Non-Detects	115
Pooled Mean	22.2984
Pooled Std Dev	43.0045
Background Mean	6.34783
Background Std Dev	3.00921

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	23	19	82.6087	146

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	6.34783	3.00921	0	1609	69.9565

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	24	18	75	166
MW-3	24	14	58.3333	306
MW-4	24	19	79.1667	235
MW-5	24	15	62.5	302
MW-6	24	11	45.8333	881
MW-7	24	10	41.6667	1402
MW-8	24	9	37.5	821

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	6.91667	3.67029	0.568841	11.6549	1797	74.875
MW-3	12.75	11.3454	6.40217	11.6549	2277	94.875
MW-4	9.79167	13.8877	3.44384	11.6549	1827	76.125
MW-5	12.5833	13.184	6.23551	11.6549	2178	90.75
MW-6	36.7083	46.662	30.3605	11.6549	2791	116.292
MW-7	58.4167	92.3914	52.0688	11.6549	2891	120.458
MW-8	34.2083	38.2418	27.8605	11.6549	2966	123.583

Analysis of Variance Statistics

SS Wells	59433.9
SS Total	351384

Kruskal-Wallis Statistics

Non-Detect Rank	58
Background Rank Sum	1609
Background Rank Mean	69.9565
H Statistic	25.8449
H Adjusted for Ties	33.0607

Basic Statistics

Parameter: Lead, total

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

	Total Observations
191	
Total Non-Detects	140
Pooled Mean	11.8665
Pooled Std Dev	17.7035
Background Mean	4.8913
Background Std Dev	0.521286

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	23	23	100	112.5

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	4.8913	0.521286	0	1621.5	70.5

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	24	17	70.8333	246
MW-3	24	22	91.6667	139
MW-4	24	22	91.6667	141
MW-5	24	18	75	247
MW-6	24	16	66.6667	360
MW-7	24	12	50	568
MW-8	24	10	41.6667	453

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	10.25	13.9977	5.3587	4.90948	2300.5	95.8542
MW-3	5.79167	2.87386	0.900362	4.90948	1859	77.4583
MW-4	5.875	3.37912	0.983696	4.90948	1857	77.375
MW-5	10.2917	14.645	5.40036	4.90948	2234	93.0833
MW-6	15	20.6755	10.1087	4.90948	2494	103.917
MW-7	23.6667	23.7279	18.7754	4.90948	2965	123.542
MW-8	18.875	28.8358	13.9837	4.90948	3005	125.208

Analysis of Variance Statistics

SS Wells	7744.87
SS Total	59548.8

Kruskal-Wallis Statistics

Non-Detect Rank	70.5
Background Rank Sum	1621.5
Background Rank Mean	70.5
H Statistic	23.5344
H Adjusted for Ties	38.8227

Basic Statistics

Parameter: Vanadium

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

	Total Observations
191	
Total Non-Detects	145
Pooled Mean	55.7801
Pooled Std Dev	127.994
Background Mean	20
Background Std Dev	0

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	23	23	100	460

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	20	0	0	1679	73

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	24	23	95.8333	513
MW-3	24	17	70.8333	1109
MW-4	24	23	95.8333	528
MW-5	24	14	58.3333	1256
MW-6	24	16	66.6667	1451
MW-7	24	12	50	4278
MW-8	24	17	70.8333	1059

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	21.375	6.7361	1.375	35.1876	1833	76.375
MW-3	46.2083	49.3091	26.2083	35.1876	2422	100.917
MW-4	22	9.79796	2	35.1876	1838	76.5833
MW-5	52.3333	59.5605	32.3333	35.1876	2653	110.542
MW-6	60.4583	91.414	40.4583	35.1876	2527	105.292
MW-7	178.25	314.865	158.25	35.1876	2975	123.958
MW-8	44.125	45.673	24.125	35.1876	2409	100.375

Analysis of Variance Statistics

SS Wells	451483
SS Total	3.11265e+006

Kruskal-Wallis Statistics

Non-Detect Rank	73
Background Rank Sum	1679
Background Rank Mean	73
H Statistic	18.7844
H Adjusted for Ties	33.3956

Basic Statistics

Parameter: 1,4-Dichlorobenzene

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

	Total Observations
206	
Total Non-Detects	168
Pooled Mean	5.52961
Pooled Std Dev	7.6977
Background Mean	2.6
Background Std Dev	0.5

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	25	25	100	65

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	2.6	0.5	0	2112.5	84.5

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	26	24	92.3077	77.5
MW-3	26	26	100	67.5
MW-4	26	25	96.1538	74
MW-5	26	26	100	67.5
MW-6	26	9	34.6154	197.2
MW-7	26	26	100	67.5
MW-8	25	7	28	522.9

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	2.98077	1.42465	0.380769	1.39018	2375	91.3462
MW-3	2.59615	0.49029	-0.00384615	1.39018	2197	84.5
MW-4	2.84615	1.34736	0.246154	1.39018	2291.5	88.1346
MW-5	2.59615	0.49029	-0.00384615	1.39018	2197	84.5
MW-6	7.58462	5.18758	4.98462	1.39018	3811.5	146.596
MW-7	2.59615	0.49029	-0.00384615	1.39018	2197	84.5
MW-8	20.916	13.0448	18.316	1.40374	4139.5	165.58

Analysis of Variance Statistics

SS Wells	7270.23
SS Total	12147.2

Kruskal-Wallis Statistics

Non-Detect Rank	84.5
Background Rank Sum	2112.5
Background Rank Mean	84.5
H Statistic	53.9748
H Adjusted for Ties	117.952

Basic Statistics

Parameter: Chlorobenzene

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

	Total Observations
198	
Total Non-Detects	139
Pooled Mean	7.17273
Pooled Std Dev	9.23245
Background Mean	2.5
Background Std Dev	0

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	24	24	100	60

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	2.5	0	0	1680	70

Compliance Wells

There are 7 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-2	25	2	8	447.7
MW-3	25	25	100	62.5
MW-4	25	24	96	67.3
MW-5	25	25	100	62.5
MW-6	25	12	48	143
MW-7	25	25	100	62.5
MW-8	24	2	8.33333	514.7

Well	Mean	Std Dev	Dif From Bk	Std Err	Rank Sum	Rank Mean
MW-2	17.908	9.69557	15.408	1.64624	4088	163.52
MW-3	2.5	0	0	1.64624	1750	70
MW-4	2.692	0.96	0.192	1.64624	1826	73.04
MW-5	2.5	0	0	1.64624	1750	70
MW-6	5.72	3.50939	3.22	1.64624	2797	111.88
MW-7	2.5	0	0	1.64624	1750	70
MW-8	21.4458	12.7371	18.9458	1.66296	4060	169.167

Analysis of Variance Statistics

SS Wells	10486.8
SS Total	16791.9

Kruskal-Wallis Statistics

Non-Detect Rank	70
Background Rank Sum	1680
Background Rank Mean	70
H Statistic	99.4172
H Adjusted for Ties	152.007

Laboratory Results

Environment 1, Incorporated

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

Drinking Water ID: 37715
Wastewater ID: 10

ID#: 6043

WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY ,NC 28333

DATE COLLECTED: 02/21/05
DATE REPORTED : 04/01/05

REVIEWED BY:

PARAMETERS	Well #1	Well #2	Well #3	Well #4	Well #5	Analysis Date	Analyst	Method Code
PH (field measurement), Units	5.2	6.4	5.1	4.7	5.4	02/21/05	RJH	EPA150.1
Total Cyanide, mg/l		<0.050				02/23/05	SEJ	SM4500 CN-E
Antimony, mg/l	<0.030	<0.030	<0.030	<0.030	<0.030	02/28/05	CMF	EPA204.2
Arsenic, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010	02/24/05	CMF	EPA206.2
Barium, mg/l	<0.500	<0.500	<0.500	<0.500	<0.500	02/23/05	LFJ	EPA200.7
Beryllium, mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	02/23/05	LFJ	EPA200.7
Cadmium, mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	03/02/05	CMF	EPA213.2
Cobalt, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010	02/23/05	LFJ	EPA200.7
Copper, mg/l	<0.200	<0.200	<0.200	<0.200	<0.200	02/24/05	ADD	EPA220.1
Total Chromium, mg/l	0.013	<0.010	0.032	0.016	<0.010	02/23/05	LFJ	EPA200.7
Lead, mg/l	<0.010	0.011	<0.010	<0.010	<0.010	02/24/05	CMF	EPA239.2
Mercury, mg/l		<0.0005				02/22/05	ADD	EPA245.1
Nickel, mg/l	<0.050	<0.050	<0.050	<0.050	<0.050	02/23/05	LFJ	EPA200.7
Selenium, mg/l	<0.020	<0.020	<0.020	<0.020	<0.020	02/25/05	CMF	EPA270.2
Silver, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010	02/23/05	LFJ	EPA200.7
Thallium, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010	03/01/05	CMF	EPA279.2
Tin, mg/l		<0.100				03/07/05	LFJ	EPA200.7
Vanadium, mg/l	<0.040	<0.040	0.115	<0.040	<0.040	02/23/05	LFJ	EPA200.7
Zinc, mg/l	<0.050	<0.050	<0.050	<0.050	<0.050	02/28/05	ADD	EPA289.1
Sulfide, mg/l		<1				02/28/05	LFJ	SM4500-S2D
Conductivity (at 25c), uMhos	26	1209	37	55	71	02/21/05	RJH	SM2510B
Temperature, °C	18	13	17	15	17	02/21/05	RJH	SM2550B
Static Water Level, feet	15.47	4.84	0.50	6.61	3.24	02/21/05	RJH	
Well Depth, feet	26.61	16.65	19.46	19.85	18.84	02/21/05	RJH	

APR 6 2005

Environment 1, Incorporated

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

Drinking Water ID: 37715
Wastewater ID: 10

ID#: 6043

WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY ,NC 28333

DATE COLLECTED: 02/21/05
DATE REPORTED : 04/01/05

REVIEWED BY:

PARAMETERS	Well #6	Well #7	Well #8	Equipment Blank	Trip Blank	Analysis Date	Analyst	Method Code
PH (field measurement), Units	4.6	4.6	4.7			02/21/05	RJH	EPA150.1
Total Cyanide, mg/l			<0.050	<0.050		03/02/05	SEJ	SM4500 CN-E
Antimony, mg/l	<0.030	<0.030	<0.030	<0.030		02/28/05	CMF	EPA204.2
Arsenic, mg/l	<0.010	<0.010	<0.010	<0.010		02/24/05	CMF	EPA206.2
Barium, mg/l	<0.500	<0.500	<0.500	<0.500		02/23/05	LFJ	EPA200.7
Beryllium, mg/l	<0.002	<0.002	<0.002	<0.002		02/23/05	LFJ	EPA200.7
Cadmium, mg/l	0.004	<0.001	<0.001	<0.001		03/02/05	CMF	EPA213.2
Cobalt, mg/l	<0.010	<0.010	<0.010	<0.010		02/23/05	LFJ	EPA200.7
Copper, mg/l	<0.200	<0.200	<0.200	<0.200		02/24/05	ADD	EPA220.1
Total Chromium, mg/l	<0.010	0.163	0.037	<0.010		02/23/05	LFJ	EPA200.7
Lead, mg/l	<0.010	0.041	0.014	<0.010		02/24/05	CMF	EPA239.2
Mercury, mg/l			<0.0005			02/22/05	ADD	EPA245.1
				<0.0002		03/02/05	ADD	EPA245.1
Nickel, mg/l	<0.050	<0.050	<0.050	<0.050		02/23/05	LFJ	EPA200.7
Selenium, mg/l	<0.020	<0.020	<0.020	<0.020		02/25/05	CMF	EPA270.2
Silver, mg/l	<0.010	<0.010	<0.010	<0.010		02/23/05	LFJ	EPA200.7
Thallium, mg/l	<0.010	<0.010	<0.010	<0.010		03/01/05	CMF	EPA279.2
Tin, mg/l			<0.100			03/07/05	LFJ	EPA200.7
				<0.100		02/23/05	LFJ	EPA200.7
Vanadium, mg/l	<0.040	0.606	0.045	<0.040		02/23/05	LFJ	EPA200.7
Zinc, mg/l	<0.050	<0.050	<0.050	<0.050		02/28/05	ADD	EPA289.1
Sulfide, mg/l			<1	<1		02/28/05	LFJ	SM4500-S2D
Conductivity (at 25c), uMhos	346	147	122			02/21/05	RJH	SM2510B
Temperature, °C	12	13	17			02/21/05	RJH	SM2550B
Static Water Level, feet	5.51	7.55	18.92			02/21/05	RJH	
Well Depth, feet	17.21	19.89	30.01			02/21/05	RJH	

APR 5 2005

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: SSR
DATE COLLECTED: 02/21/05
DATE EXTRACTED: 02/22/05
DATE ANALYZED: 03/04/05
DATE REPORTED: 04/01/05

REVIEWED BY:

PESTICIDES AND PCB'S
EPA METHOD 8081A

PARAMETERS, ug/l	Well #2	Well #8	Equipment Blank
1. Aldrin	<0.05	<0.05	<0.05
2. Alpha-BHC	<0.05	<0.05	<0.05
3. Beta-BHC	<0.05	<0.05	<0.05
4. Delta-BHC	<0.05	<0.05	<0.05
5. Gamma-BHC (Lindane)	<0.05	<0.05	<0.05
6. Chlordane	<0.50	<0.50	<0.50
7. 4,4-DDD	<0.10	<0.10	<0.10
8. 4,4-DDE	<0.10	<0.10	<0.10
9. 4,4-DDT	<0.10	<0.10	<0.10
10. Dieldrin	<0.10	<0.10	<0.10
11. Endosulfan I	<0.10	<0.10	<0.10
12. Endosulfan II	<0.10	<0.10	<0.10
13. Endosulfan Sulfate	<0.10	<0.10	<0.10
14. Endrin	<0.10	<0.10	<0.10
15. Endrin Aldehyde	<0.10	<0.10	<0.10
16. Heptachlor	<0.05	<0.05	<0.05
17. Hepthchlor Epoxide	<0.10	<0.10	<0.10
18. Methoxychlor	<1.00	<1.00	<1.00
19. Pcb's (Aroclors)	<2.00	<2.00	<2.00
20. Toxaphene	<2.00	<2.00	<2.00

Surrogate recovery outside control limits for Wells 2 & 8

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: CHS
DATE COLLECTED: 02/21/05
DATE EXTRACTED: 02/24/05
DATE ANALYZED: 03/10/05
DATE REPORTED: 04/01/05

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8151A

PARAMETERS, ug/l	Well #2	Well #8	Equipment Blank
1. 2,4-D	<2.00	<2.00	<2.00
2. Dinoseb	<1.00	<1.00	<1.00
3. 2,4,5-TP	<2.00	<2.00	<2.00
4. 2,4,5-T	<2.00	<2.00	<2.00

Dinoseb QC recovery outside control limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: MAO
DATE COLLECTED: 02/21/05
DATE ANALYZED: 02/22/05
DATE REPORTED: 04/01/05

REVIEWED BY:

VOLATILE ORGANICS
EPA METHOD 8260B

PARAMETERS, ug/l	Well #1	Well #3	Well #4	Well #5	Well #6
1. Chloromethane	<10.00	<10.00	<10.00	<10.00	<10.00
2. Vinyl Chloride	<10.00	<10.00	<10.00	<10.00	<10.00
3. Bromomethane	<10.00	<10.00	<10.00	<10.00	<10.00
4. Chloroethane	<10.00	<10.00	<10.00	<10.00	<10.00
5. Trichlorofluoromethane	<5.00	<5.00	<5.00	<5.00	<5.00
6. 1,1-Dichloroethene	<5.00	<5.00	<5.00	<5.00	<5.00
7. Acetone	<100.00	<100.00	<100.00	<100.00	<100.00
8. Iodomethane	<10.00	<10.00	<10.00	<10.00	<10.00
9. Carbon Disulfide	<100.00	<100.00	<100.00	<100.00	<100.00
10. Methylene Chloride	<10.00	<10.00	<10.00	<10.00	<10.00
11. trans-1,2-Dichloroethene	<5.00	<5.00	<5.00	<5.00	<5.00
12. 1,1-Dichloroethane	<5.00	<5.00	<5.00	<5.00	<5.00
13. Vinyl Acetate	<50.00	<50.00	<50.00	<50.00	<50.00
14. Cis-1,2-Dichloroethene	<5.00	<5.00	<5.00	<5.00	<5.00
15. 2-Butanone	<100.00	<100.00	<100.00	<100.00	<100.00
16. Bromochloromethane	<5.00	<5.00	<5.00	<5.00	<5.00
17. Chloroform	<5.00	<5.00	<5.00	<5.00	<5.00
18. 1,1,1-Trichloroethane	<5.00	<5.00	<5.00	<5.00	<5.00
19. Carbon Tetrachloride	<10.00	<10.00	<10.00	<10.00	<10.00
20. Benzene	<5.00	<5.00	<5.00	<5.00	<5.00
21. 1,2-Dichloroethane	<5.00	<5.00	<5.00	<5.00	<5.00
22. Trichloroethene	<5.00	<5.00	<5.00	<5.00	<5.00
23. 1,2-Dichloropropane	<5.00	<5.00	<5.00	<5.00	<5.00
24. Bromodichloromethane	<5.00	<5.00	<5.00	<5.00	<5.00
25. Cis-1,3-Dichloropropene	<10.00	<10.00	<10.00	<10.00	<10.00
26. 4-Methyl-2-Pentanone	<100.00	<100.00	<100.00	<100.00	<100.00
27. Toluene	<5.00	<5.00	<5.00	<5.00	<5.00
28. trans-1,3-Dichloropropene	<10.00	<10.00	<10.00	<10.00	<10.00
29. 1,1,2-Trichloroethane	<5.00	<5.00	<5.00	<5.00	<5.00
30. Tetrachloroethene	<5.00	<5.00	<5.00	<5.00	<5.00
31. 2-Hexanone	<50.00	<50.00	<50.00	<50.00	<50.00
32. Dibromochloromethane	<5.00	<5.00	<5.00	<5.00	<5.00
33. 1,2-Dibromoethane	<5.00	<5.00	<5.00	<5.00	<5.00
34. Chlorobenzene	<5.00	<5.00	<5.00	<5.00	<5.00
35. 1,1,1,2-Tetrachloroethane	<5.00	<5.00	<5.00	<5.00	<5.00
36. Ethylbenzene	<5.00	<5.00	<5.00	<5.00	<5.00
37. Xylenes	<5.00	<5.00	<5.00	<5.00	<5.00
38. Dibromomethane	<10.00	<10.00	<10.00	<10.00	<10.00
39. Styrene	<10.00	<10.00	<10.00	<10.00	<10.00
40. Bromoform	<5.00	<5.00	<5.00	<5.00	<5.00
41. 1,1,2,2-Tetrachloroethane	<5.00	<5.00	<5.00	<5.00	<5.00
42. 1,2,3-Trichloropropane	<15.00	<15.00	<15.00	<15.00	<15.00
43. 1,4-Dichlorobenzene	<5.00	<5.00	<5.00	<5.00	<5.00
44. 1,2-Dichlorobenzene	<5.00	<5.00	<5.00	<5.00	<5.00
45. 1,2-Dibromo-3-Chloropropane	<25.00	<25.00	<25.00	<25.00	<25.00
46. Acrylonitrile	<200.00	<200.00	<200.00	<200.00	<200.00
47. trans-1,4-Dichloro-2-Butene	<100.00	<100.00	<100.00	<100.00	<100.00

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: MAO
DATE COLLECTED: 02/21/05
DATE ANALYZED: 02/22/05
DATE REPORTED: 04/01/05

REVIEWED BY:

VOLATILE ORGANICS
EPA METHOD 8260B

PARAMETERS, ug/l	Well #7
1. Chloromethane	<10.00
2. Vinyl Chloride	<10.00
3. Bromomethane	<10.00
4. Chloroethane	<10.00
5. Trichlorofluoromethane	<5.00
6. 1,1-Dichloroethene	<5.00
7. Acetone	<100.00
8. Iodomethane	<10.00
9. Carbon Disulfide	<100.00
10. Methylene Chloride	<10.00
11. trans-1,2-Dichloroethene	<5.00
12. 1,1-Dichloroethane	<5.00
13. Vinyl Acetate	<50.00
14. Cis-1,2-Dichloroethene	<5.00
15. 2-Butanone	<100.00
16. Bromochloromethane	<5.00
17. Chloroform	<5.00
18. 1,1,1-Trichloroethane	<5.00
19. Carbon Tetrachloride	<10.00
20. Benzene	<5.00
21. 1,2-Dichloroethane	<5.00
22. Trichloroethene	<5.00
23. 1,2-Dichloropropane	<5.00
24. Bromodichloromethane	<5.00
25. Cis-1,3-Dichloropropene	<10.00
26. 4-Methyl-2-Pentanone	<100.00
27. Toluene	<5.00
28. trans-1,3-Dichloropropene	<10.00
29. 1,1,2-Trichloroethane	<5.00
30. Tetrachloroethene	<5.00
31. 2-Hexanone	<50.00
32. Dibromochloromethane	<5.00
33. 1,2-Dibromoethane	<5.00
34. Chlorobenzene	<5.00
35. 1,1,1,2-Tetrachloroethane	<5.00
36. Ethylbenzene	<5.00
37. Xylenes	<5.00
38. Dibromomethane	<10.00
39. Styrene	<10.00
40. Bromoform	<5.00
41. 1,1,2,2-Tetrachloroethane	<5.00
42. 1,2,3-Trichloropropane	<15.00
43. 1,4-Dichlorobenzene	<5.00
44. 1,2-Dichlorobenzene	<5.00
45. 1,2-Dibromo-3-Chloropropane	<25.00
46. Acrylonitrile	<200.00
47. trans-1,4-Dichloro-2-Butene	<100.00

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: CHS
DATE COLLECTED: 02/21/05
DATE EXTRACTED: 02/22/05
DATE ANALYZED: 03/15/05
DATE REPORTED: 04/01/05

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270C

PARAMETERS, ug/l	Well #2	Well #8	Equipment Blank
1. Acenaphthene	<10.00	<10.00	<10.00
2. Acenaphthylene	<10.00	<10.00	<10.00
3. Anthracene	<10.00	<10.00	<10.00
4. Benzo[a]antrhacene	<10.00	<10.00	<10.00
5. Benzo[b]fluoranthene	<10.00	<10.00	<10.00
6. Benzo[k]fluoranthene	<10.00	<10.00	<10.00
7. Benzo[g,h,i]perylene	<10.00	<10.00	<10.00
8. Benzo[a]pyrene	<10.00	<10.00	<10.00
9. 4-Bromophenyl Phenyl Ether	<10.00	<10.00	<10.00
10. Butyl Benzyl Phthalate	<10.00	<10.00	<10.00
11. Bis-(2-Chloroethoxy) Methane	<10.00	<10.00	<10.00
12. Bis-(2-Chloroethyl) Ether	<10.00	<10.00	<10.00
13. Bis-(2-Chloroisopropyl) Ether	<10.00	<10.00	<10.00
14. 2-Chloronaphthalene	<10.00	<10.00	<10.00
15. 4-Chlorophenyl Phenyl Ether	<10.00	<10.00	<10.00
16. Crysene	<10.00	<10.00	<10.00
17. Dibenz[a,h]anthracene	<10.00	<10.00	<10.00
18. Di-N-Butyl Phthalate	<10.00	<10.00	<10.00
19. Dimethyl Phthalate	<10.00	<10.00	<10.00
20. Diethyl Phthalate	<10.00	<10.00	<10.00
21. 2,4-Dinitrotoluene	<10.00	<10.00	<10.00
22. 2,6-Dinitrotoluene	<10.00	<10.00	<10.00
23. Di-N-Octyl Phthalate	<10.00	<10.00	<10.00
24. Bis-(2-Ethylhexyl) Phthalate	<20.00	<20.00	<20.00
25. Fluoranthene	<10.00	<10.00	<10.00
26. Fluorene	<10.00	<10.00	<10.00
27. Hexachlorobenzene	<10.00	<10.00	<10.00
28. Hexachlorocyclopentadiene	<10.00	<10.00	<10.00
29. Indeno[1,2,3-Cd]pyrene	<10.00	<10.00	<10.00
30. Isophorone	<10.00	<10.00	<10.00
31. Nitrobenzene	<10.00	<10.00	<10.00
32. N-Nitrosodimethylamine	<10.00	<10.00	<10.00
33. N-Nitrosodiphenylamine	<10.00	<10.00	<10.00
34. N-Nitrosodi-N-Propylamine	<10.00	<10.00	<10.00
35. Phenanthrene	<10.00	<10.00	<10.00
36. Pyrene	<10.00	<10.00	<10.00
37. 4-Chloro-3-Methylphenol	<20.00	<20.00	<20.00
38. 2-Chlorophenol	<10.00	<10.00	<10.00
39. O-Cresol	<10.00	<10.00	<10.00
40. P-Cresol	<10.00	<10.00	<10.00
41. 2,4-Dichlorophenol	<10.00	<10.00	<10.00
42. 2,6-Dichlorophenol	<10.00	<10.00	<10.00
43. 2,4-Dimethylphenol	<10.00	<10.00	<10.00
44. 4,6-Dinitro-2-Methylphenol	<50.00	<50.00	<50.00
45. 2,4-Dinitrophenol	<50.00	<50.00	<50.00
46. Ethyl Methanesulfonate	<10.00	<10.00	<10.00
47. Methyl Methanesulfonate	<10.00	<10.00	<10.00
48. 2-Nitrophenol	<10.00	<10.00	<10.00

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: CHS
DATE COLLECTED: 02/21/05
DATE EXTRACTED: 02/22/05
DATE ANALYZED: 03/15/05
DATE REPORTED: 04/01/05

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270C

PARAMETERS, ug/l	Well #2	Well #8	Equipment Blank
49. 4-Nitrophenol	<50.00	<50.00	<50.00
50. Pentachlorophenol	<50.00	<50.00	<50.00
51. Phenol	<10.00	<10.00	<10.00
52. 2,3,4,6-Tetrachlorophenol	<10.00	<10.00	<10.00
53. 2,4,5-Trichlorophenol	<10.00	<10.00	<10.00
54. 2,4,6-Trichlorophenol	<10.00	<10.00	<10.00
55. Acetophenone	<10.00	<10.00	<10.00
56. 2-Acetylaminofluorene	<20.00	<20.00	<20.00
57. 4-Aminobiphenyl	<20.00	<20.00	<20.00
58. Benzyl Alcohol	<20.00	<20.00	<20.00
59. 4-Chloroaniline	<20.00	<20.00	<20.00
60. Chlorobenzilate	<10.00	<10.00	<10.00
61. Diallate	<10.00	<10.00	<10.00
62. Dibenzofuran	<10.00	<10.00	<10.00
63. 3,3-Dichlorobenzidine	<20.00	<20.00	<20.00
64. Dimethoate	<20.00	<20.00	<20.00
65. P-Dimethylaminoazobenzene	<10.00	<10.00	<10.00
66. 7,12-Dimethylbenz[a]anthracene	<10.00	<10.00	<10.00
67. 3,3-Dimethylbenzadine	<10.00	<10.00	<10.00
68. 1,3-Dinitrobenzene	<20.00	<20.00	<20.00
69. Diphenylamine	<10.00	<10.00	<10.00
70. Disulfoton	<10.00	<10.00	<10.00
71. Famphur	<20.00	<20.00	<20.00
72. Hexachloropropene	<10.00	<10.00	<10.00
73. Isosafrole	<10.00	<10.00	<10.00
74. Kepone	<20.00	<20.00	<20.00
75. Methapryilene	<100.00	<100.00	<100.00
76. 3-Methylchloroanthrene	<10.00	<10.00	<10.00
77. 2-Methylnaphthalene	<10.00	<10.00	<10.00
78. Methyl Parathion	<10.00	<10.00	<10.00
79. m-Cresol	<10.00	<10.00	<10.00
80. 1,4-Naphthoquinone	<10.00	<10.00	<10.00
81. 1-Naphthylamine	<10.00	<10.00	<10.00
82. 2-Naphthylamine	<10.00	<10.00	<10.00
83. 2-Nitroaniline	<50.00	<50.00	<50.00
84. 3-Nitroaniline	<50.00	<50.00	<50.00
85. 4-Nitroaniline	<20.00	<20.00	<20.00
86. 5-Nitro-O-Toluidine	<10.00	<10.00	<10.00
87. N-Nitrosodi-n-butylamine	<10.00	<10.00	<10.00
88. N-Nitrosodiethylamine	<20.00	<20.00	<20.00
89. N-Nitrosomethylethalamine	<10.00	<10.00	<10.00
90. N-Nitrosopiperidine	<20.00	<20.00	<20.00
91. N-Nitrosopyrrolidine	<40.00	<40.00	<40.00
92. Parathion	<10.00	<10.00	<10.00
93. Pentachlorobenzene	<10.00	<10.00	<10.00
94. Pentachloronitrobenzene	<50.00	<50.00	<50.00
95. Phenacetin	<20.00	<20.00	<20.00
96. 1,4 Benzenediamine	<10.00	<10.00	<10.00

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: CHS
DATE COLLECTED: 02/21/05
DATE EXTRACTED: 02/22/05
DATE ANALYZED: 03/15/05
DATE REPORTED: 04/01/05

REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270C

PARAMETERS, ug/l	Well #2	Well #8	Equipment Blank
97. Phorate	<10.00	<10.00	<10.00
98. Pronamide	<10.00	<10.00	<10.00
99. Safrole	<10.00	<10.00	<10.00
100. 1,2,4,5-Tetrachlorobenzene	<10.00	<10.00	<10.00
101. Thionazin	<20.00	<20.00	<20.00
102. O-Toluidine	<10.00	<10.00	<10.00
103. 1,3,5-Trinitrobenzene	<10.00	<10.00	<10.00
104. 0,0,0-Triethyl Phosphorothioate	<10.00	<10.00	<10.00
105. Hexachloroethane	<10.00	<10.00	<10.00
106. Isodrin	<100.00	<100.00	<100.00

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

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CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: CHS
DATE COLLECTED: 02/21/05
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REVIEWED BY:

SEMI-VOLATILE ORGANICS
EPA METHOD 8270C

PARAMETERS, ug/l	Well #2	Well #8	Equipment Blank
97. Phorate	<10.00	<10.00	<10.00
98. Pronamide	<10.00	<10.00	<10.00
99. Safrole	<10.00	<10.00	<10.00
100. 1,2,4,5-Tetrachlorobenzene	<10.00	<10.00	<10.00
101. Thionazin	<20.00	<20.00	<20.00
102. O-Toluidine	<10.00	<10.00	<10.00
103. 1,3,5-Trinitrobenzene	<10.00	<10.00	<10.00
104. 0,0,0-Triethyl Phosphorothioate	<10.00	<10.00	<10.00
105. Hexachloroethane	<10.00	<10.00	<10.00
106. Isodrin	<100.00	<100.00	<100.00

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

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CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: MAO
DATE COLLECTED: 02/21/05
DATE REPORTED: 04/01/05

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B

PARAMETERS, ug/l — Date Analyzed:	02/22/05 Well #2	02/23/05 Well #8	02/22/05 Equipment Blank	02/22/05 Trip Blank
1. Chloromethane	<10.00	<10.00	<10.00	<10.00
2. Vinyl Chloride	<10.00	<10.00	<10.00	<10.00
3. Bromomethane	<10.00	<10.00	<10.00	<10.00
4. Chloroethane	<10.00	<10.00	<10.00	<10.00
5. Trichlorofluoromethane	<5.00	<5.00	<5.00	<5.00
6. 1,1-Dichloroethene	<5.00	<5.00	<5.00	<5.00
7. Acetone	<100.00	<100.00	<100.00	<100.00
8. Iodomethane	<10.00	<10.00	<10.00	<10.00
9. Carbon Disulfide	<100.00	<100.00	<100.00	<100.00
10. Methylene Chloride	<10.00	<10.00	<10.00	<10.00
11. trans-1,2-Dichloroethene	<5.00	<5.00	<5.00	<5.00
12. 1,1-Dichloroethane	<5.00	<5.00	<5.00	<5.00
13. Vinyl Acetate	<50.00	<50.00	<50.00	<50.00
14. Cis-1,2-Dichloroethene	<5.00	<5.00	<5.00	<5.00
15. 2-Butanone	<100.00	<100.00	<100.00	<100.00
16. Bromochloromethane	<5.00	<5.00	<5.00	<5.00
17. Chloroform	<5.00	<5.00	<5.00	<5.00
18. 1,1,1-Trichloroethane	<5.00	<5.00	<5.00	<5.00
19. Carbon Tetrachloride	<10.00	<10.00	<10.00	<10.00
20. Benzene	<5.00	<5.00	<5.00	<5.00
21. 1,2-Dichloroethane	<5.00	<5.00	<5.00	<5.00
22. Trichloroethene	<5.00	<5.00	<5.00	<5.00
23. 1,2-Dichloropropane	<5.00	<5.00	<5.00	<5.00
24. Bromodichloromethane	<5.00	<5.00	<5.00	<5.00
25. Cis-1,3-Dichloropropene	<10.00	<10.00	<10.00	<10.00
26. 4-Methyl-2-Pentanone	<100.00	<100.00	<100.00	<100.00
27. Toluene	<5.00	<5.00	<5.00	<5.00
28. trans-1,3-Dichloropropene	<10.00	<10.00	<10.00	<10.00
29. 1,1,2-Trichloroethane	<5.00	<5.00	<5.00	<5.00
30. Tetrachloroethene	<5.00	<5.00	<5.00	<5.00
31. 2-Hexanone	<50.00	<50.00	<50.00	<50.00
32. Dibromochloromethane	<5.00	<5.00	<5.00	<5.00
33. 1,2-Dibromomethane	<5.00	<5.00	<5.00	<5.00
34. Chlorobenzene	8.40	9.60	<5.00	<5.00
35. 1,1,1,2-Tetrachloroethane	<5.00	<5.00	<5.00	<5.00
36. Ethylbenzene	<5.00	<5.00	<5.00	<5.00
37. Xylenes	<5.00	<5.00	<5.00	<5.00
38. Dibromomethane	<10.00	<10.00	<10.00	<10.00
39. Styrene	<10.00	<10.00	<10.00	<10.00
40. Bromoform	<5.00	<5.00	<5.00	<5.00
41. 1,1,2,2-Tetrachloroethane	<5.00	<5.00	<5.00	<5.00
42. 1,2,3-Trichloropropane	<15.00	<15.00	<15.00	<15.00
43. 1,4-Dichlorobenzene	<5.00	24.70	<5.00	<5.00
44. 1,2-Dichlorobenzene	<5.00	<5.00	<5.00	<5.00
45. 1,2-Dibromo-3-Chloropropane	<25.00	<25.00	<25.00	<25.00
46. Acrylonitrile	<200.00	<200.00	<200.00	<200.00
47. trans-1,4-Dichloro-2-Butene	<100.00	<100.00	<100.00	<100.00

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY, NC 28333

CLIENT ID: 6043

ANALYST: MAO
DATE COLLECTED: 02/21/05
DATE REPORTED: 04/01/05

REVIEWED BY:

LANDFILL APPENDIX II
EPA METHOD 8260B

Date Analyzed: / PARAMETERS, ug/l	02/22/05 Well #2	02/23/05 Well #8	02/22/05 Equipment Blank	02/22/05 Trip Blank
48. Acrolein	<100.00	<100.00	<100.00	<100.00
49. Allyl Chloride	<10.00	<10.00	<10.00	<10.00
50. Chloroprene	<20.00	<20.00	<20.00	<20.00
51. 1,3-Dichlorobenzene	<5.00	<5.00	<5.00	<5.00
52. Dichlorodifluoromethane	<5.00	<5.00	<5.00	<5.00
53. 1,3-Dichloropropane	<5.00	<5.00	<5.00	<5.00
54. 2,2-Dichloropropane	<15.00	<15.00	<15.00	<15.00
55. 1,1-Dichloropropene	<5.00	<5.00	<5.00	<5.00
56. Ethyl Methacrylate	<10.00	<10.00	<10.00	<10.00
57. Hexachlorobutadine	<10.00	<10.00	<10.00	<10.00
58. Isobutyl Alcohol	<100.00	<100.00	<100.00	<100.00
59. Methacrylonitrile	<100.00	<100.00	<100.00	<100.00
60. Methyl Methacrylate	<30.00	<30.00	<30.00	<30.00
61. Naphthalene	<10.00	<10.00	<10.00	<10.00
62. Propionitrile	<150.00	<150.00	<150.00	<150.00
63. 1,2,4-Trichlorobenzene	<10.00	<10.00	<10.00	<10.00
64. Acetonitrile	<100.00	<100.00	<100.00	<100.00

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858

Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT 6043 Week: 7

WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY NC 28333

(919) 689-2994

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	Cyanide	Metals	Sulfide	Conductivity	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1	EPA 8270C	8270C Dup. 1	EPA 8081A	8260B App. II	8260 App. II 1	8260 App. II 2	8260 App. II 3
CHLORINE NEUTRALIZED AT COLLECTION																					
pH CHECK (LAB)							12	12	12				12	12	12	12	12	12	12	12	12
CONTAINER TYPE, P/G						P	P	P	P	P	P		G	G	G	G	G	G	G	G	G
CHEMICAL PRESERVATION						A	D	B	F D	A	A		E	E	A	A	A	E	E	E	E
Well #1	02/21/05	1105		18	4	G		G		G	G	G	G	G							
Well #2	02/21/05	0915		13	12	G	G	G	G	G	G	G			G	G	G	G	G	G	G
Well #3	02/21/05	0955		17	4	G		G		G	G	G	G	G							
Well #4	02/21/05	1030		15	4	G		G		G	G	G	G	G							
Well #5	02/21/05	0935		17	4	G		G		G	G	G	G	G							
Well #6	02/21/05	1015		12	4	G		G		G	G	G	G	G							
Well #7	02/21/05	0845		13	4	G		G		G	G	G	G	G							
Well #8	02/21/05	1050		17	10	G	G	G	G	G	G	G			G	G	G	G	G		
Equipment Blank	02/21/05				9		G	G	G						G	G	G	G	G		
Trip Blank					2																

PARAMETERS

A - NONE D - NAOH
B - HNO_3 E - HCL
C - H_2SO_4 F - ZINC ACETATE
G - NA THIOSULFATE

CLASSIFICATION:
☐ WASTEWATER (NPDES)
☐ DRINKING WATER
☐ DWQ/GW
☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: (Y) N

SAMPLES COLLECTED BY: (Please Print) Wayne Fox

SAMPLES RECEIVED IN LAB AT 2.6 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bob Wayne	02/21/05 12:39	Nathan Nash	2-21-05 12:39
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

Instructions for completing this form are on the reverse side.

Sampler must place a "C" for composite sample or a "G" for grab sample in the blocks above for each parameter requested.

[redacted] 5 [redacted] 1 [redacted] 73 [redacted]

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Greenville, NC 27858

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CHAIN OF CUSTODY RECORD

CLIENT: 6043 **Week: 7**

WAYNE CO. LANDFILL (DUDLEY)
MR. LLOYD COOK
460B LANDFILL ROAD
DUDLEY NC 28333

(919) 689-2994

DISINFECTION
- [ ] CHLORINE
- [ ] UV
- [ ] NONE
- [ ] _____

CHLORINE NEUTRALIZED AT COLLECTION

pH CHECK (LAB): 12

CONTAINER TYPE, P/G: G

CHEMICAL PRESERVATION: A

PARAMETERS: A - NONE; B - HNO_3; C - H_2SO_4; D - NAOH; E - HCL; F - ZINC ACETATE; G - NA THIOSULFATE

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	8151A Landfill
Well #1					4	
Well #2 02	2105	0915		13	12	G
Well #3					4	
Well #4					4	
Well #5					4	
Well #6					4	
Well #7					4	
Well #8 02	2105	1050		17	10	G
Equipment Blank 02	2105				9	G
Trip Blank					2	

CLASSIFICATION:
- [ ] WASTEWATER (NPDES)
- [ ] DRINKING WATER
- [ ] DWQ/GW
- [x] SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: Y (circled) N

SAMPLES COLLECTED BY: (Please Print) H Lagore / Fox

SAMPLES RECEIVED IN LAB AT 2.6 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
Bob H Lagore	02-21-05 12:39	Martha Laden	2-21-05 12:39
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

Instructions for completing this form are on the reverse side.

Sampler must place a "C" for composite sample or a "G" for [redacted]b sa[redacted] the [redacted] abov[redacted] each [redacted]ter requested. [redacted] 73[redacted]