ENCLOSURE

HANFORD SITE SOLID WASTE LANDFILL ANNUAL MONITORING REPORT

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HANFORD SITE SOLID WASTE LANDFILL
ANNUAL MONITORING REPORT

October 2009 through September 2010

This report summarizes results of leachate, groundwater, and soil gas monitoring performed at the Hanford Site Solid Waste Landfill (SWL) during the period of October 2009 through September 2010. In March 1996, waste disposal activities at the SWL were discontinued. The SWL is currently in interim closure status.

CONTENTS

1.0 INTRODUCTION 1

2.0 LEACHATE MONITORING 3
2.1 LEACHATE GENERATION 3
2.2 LEACHATE RESULTS 3

3.0 GROUNDWATER MONITORING 7
3.1 BACKGROUND THRESHOLD VALUE EXCEEDANCES 9
3.2 GROUNDWATER QUALITY CRITERIA AND DRINKING WATER MAXIMUM CONTAMINANT LEVEL EXCEEDANCES 10
3.3 GROUNDWATER HYDROLOGY 12
3.4 CHLORINATED ORGANICS IN TARGET WELLS 12

4.0 SOIL GAS MONITORING 13

APPENDIX - GROUNDWATER TRENDS A-1

FIGURES

Figure 1. Hanford Site Map. 1
Figure 2. Location of Solid Waste Landfill Trenches and Basin Lysimeter. 2
Figure 3. Leachate Generation versus Precipitation (2009-2010). 4
Figure 4. Leachate Generation Rate 5
Figure 5. Solid Waste Landfill Basin Lysimeter Drainage. 5
Figure 6. Location of Groundwater Monitoring Wells. 8
Figure 7. Soil Gas Monitoring Stations. 14

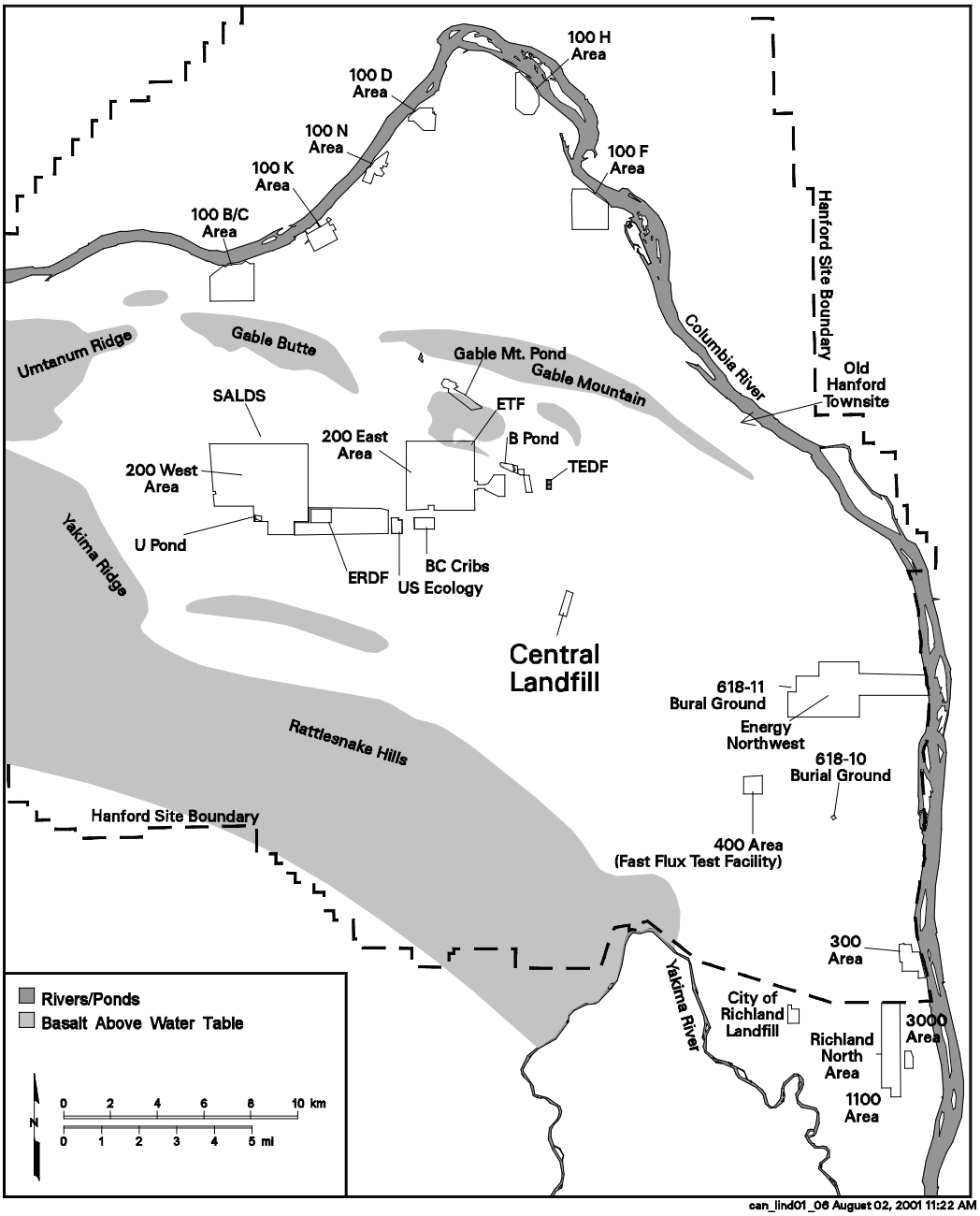
TABLES

Table 1. Leachate Generation Volumes. 4
Table 2. Leachate Monitoring Results - Key Constituents 6
Table 3. Groundwater Monitoring Constituents 7
Table 4. Background Threshold Value Exceedances. 9
Table 5. Groundwater Quality Criteria and Drinking Water Maximum Contaminant Levels Exceedances. 10
Table 6. Results of Groundwater Monitoring in Three Target Wells Compared with One Upgradient Well. 11
Table 7. Solid Waste Landfill Soil Gas Monitoring Results (October 2009 through September 2010) 15

1.0 **INTRODUCTION**

The Hanford Solid Waste Landfill (SWL) covers approximately 27 hectares (66 acres) and began operations in 1973. Figure 1 shows location of the SWL (Central Landfill) on the Hanford Site.

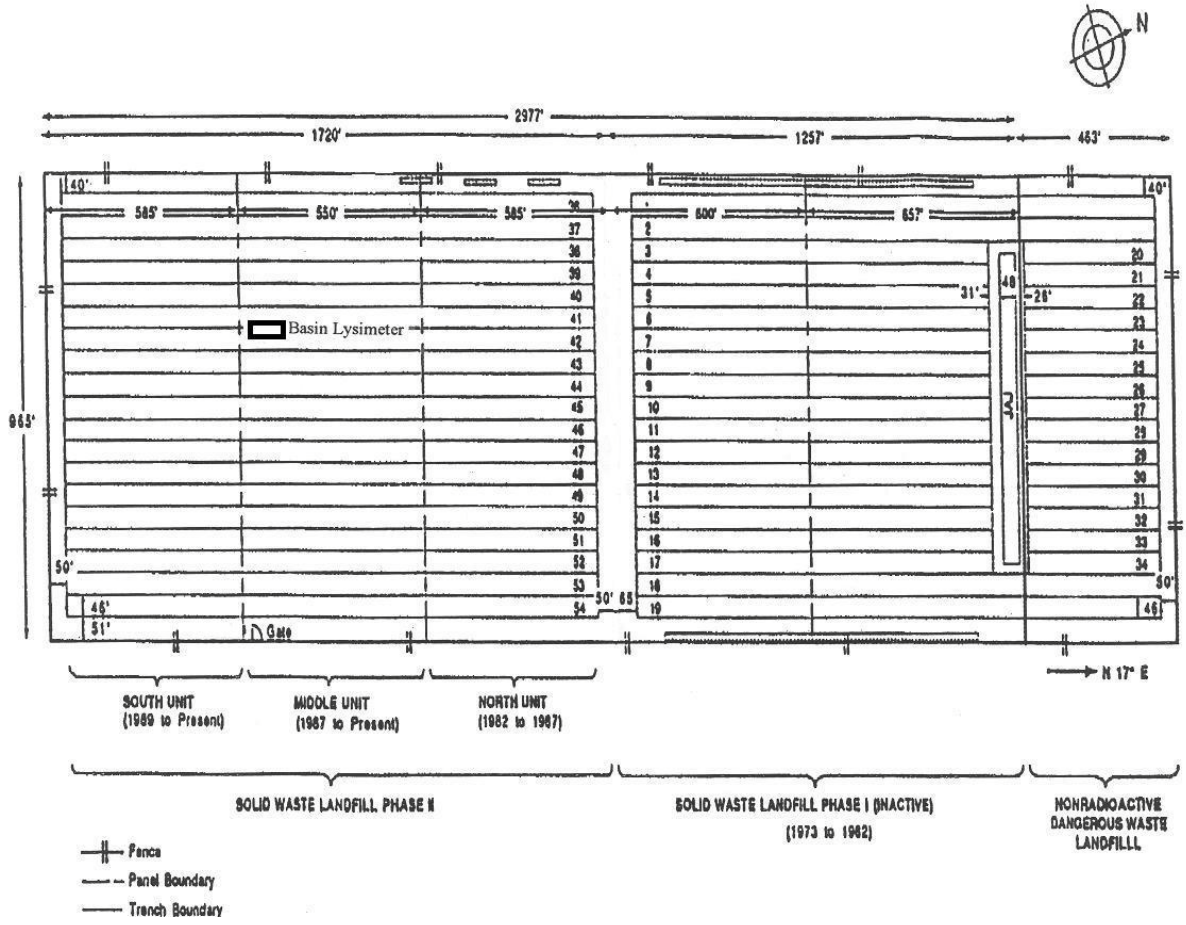
Figure 1. Hanford Site Map.



The SWL is divided into five units, each consisting of a series of parallel trenches (Figure 2). The two oldest units comprise Phase I. Phase II is comprised of three units: north, middle, and

south. The SWL stopped receiving waste in 1996, and an intermediate cover was placed over all disposal trenches. Current plans call for the placement of an engineered final cover to minimize infiltration and leachate generation.

Figure 2. Location of Solid Waste Landfill Trenches and Basin Lysimeter.



Monitoring systems at the landfill have been established and provide data for evaluating changes which could indicate increased risks to human health and the environment. Current monitoring activities include leachate, groundwater, and soil gas testing and tracking. The following sections provide information from monitoring activities performed from October 2009 through September 2010.

2.0 LEACHATE MONITORING

One of the double trenches in the landfill is provided with a liner that allows for collection of leachate in a basin lysimeter. Leachate is generated as precipitation percolates through the contents of the landfill. Figure 2 shows the location of the basin lysimeter in relation to other landfill trenches. The collected leachate is disposed through a permitted wastewater treatment system.

Leachate monitoring provides an indication of potential impurities that may be reaching the groundwater from unlined disposal cells. However, it is important to note that leachate is only collected under one of the double trenches in the Phase II area of the SWL trenches; therefore, results are not necessarily representative of total leachate generation throughout the landfill. Contaminants potentially leaching from trenches throughout the SWL represent a 23-year disposal period, dating back to 1973, before many of the regulations putting restrictions on land disposal were enacted. In contrast, the leachate being collected is from one of the newer disposal trenches. There are also varying amounts of vegetation growing over the intermediate cover, which has an effect on the volume of leachate generation. The older trenches have a thick vegetation cover, while some of the newer trenches remain essentially bare.

2.1 LEACHATE GENERATION

Leachate is removed from the underground lysimeter collection tank every 10 to 14 days. During the period of October 2009 through September 2010, a total of 750.1 gallons of leachate was collected, for a daily average during the year of 2.1 gallons. This is about a 61% decrease in leachate generation over the previous year, where the daily average was 3.4 gallons.

Table 1 and Figure 3 provide leachate volumes collected from the lysimeter as well as monthly precipitation for the reporting period (October 2009 through September 2010). A chart of generation rates over the past decade is provided in Figure 4. As data in Figure 5 indicates, about 30% of the precipitation drains through the vadose zone.

2.2 LEACHATE RESULTS

Table 2 shows results of indicator and site-specific parameters for the leachate. Only the indicator parameters for groundwater monitoring listed in Washington Administrative Code (WAC) 173-304-490, “Groundwater Monitoring Requirements,” are monitored on a quarterly basis. The analytical results were similar to previous years and did not identify any areas of concern.

As can be seen from Table 2, some of the parameters continue to be above WAC 173-200, “Water Quality Standards for Groundwaters of the State of Washington,” Groundwater Quality Criteria (GWQC) and/or Maximum Contaminant Levels (MCL) for public water supplies established in WAC 246-290, “Group A Public Water Supplies.” The fact that these contaminants are above compliance levels in the leachate does not necessarily mean that they will be present in the same concentrations in the groundwater. Annual groundwater monitoring results are reported in Section 3.0.

Table 1. Leachate Generation Volumes.

Month	Gallons	Average Rate	Precipitation (1/100th inch)
Oct-09	74.1	2.5	78
Nov-09	73.4	2.4	56
Dec-09	77.5	2.5	71
Jan-10	91.8	3	124
Feb-10	60.9	2.2	56
Mar-10	70.6	2.3	20
Apr-10	65.6	2.2	59
May-10	49.8	1.6	133
Jun-10	44	1.7	115
Jul-10	41.3	1.3	46
Aug-10	52.6	1.8	13
Sep-10	48.5	1.6	95

Figure 3. Leachate Generation versus Precipitation (2009-2010).

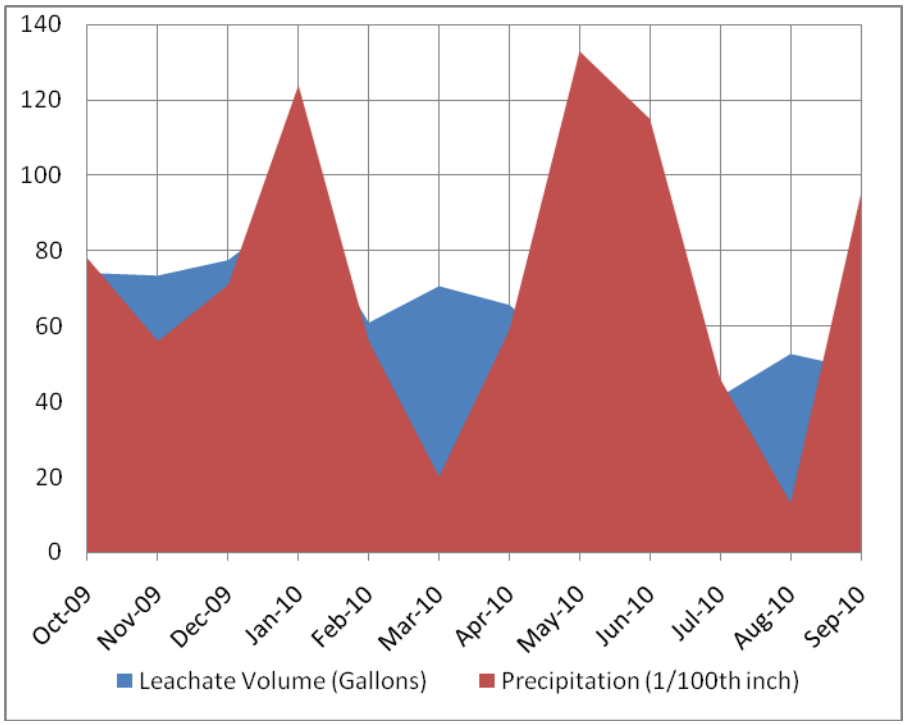


Figure 4. Leachate Generation Rate.

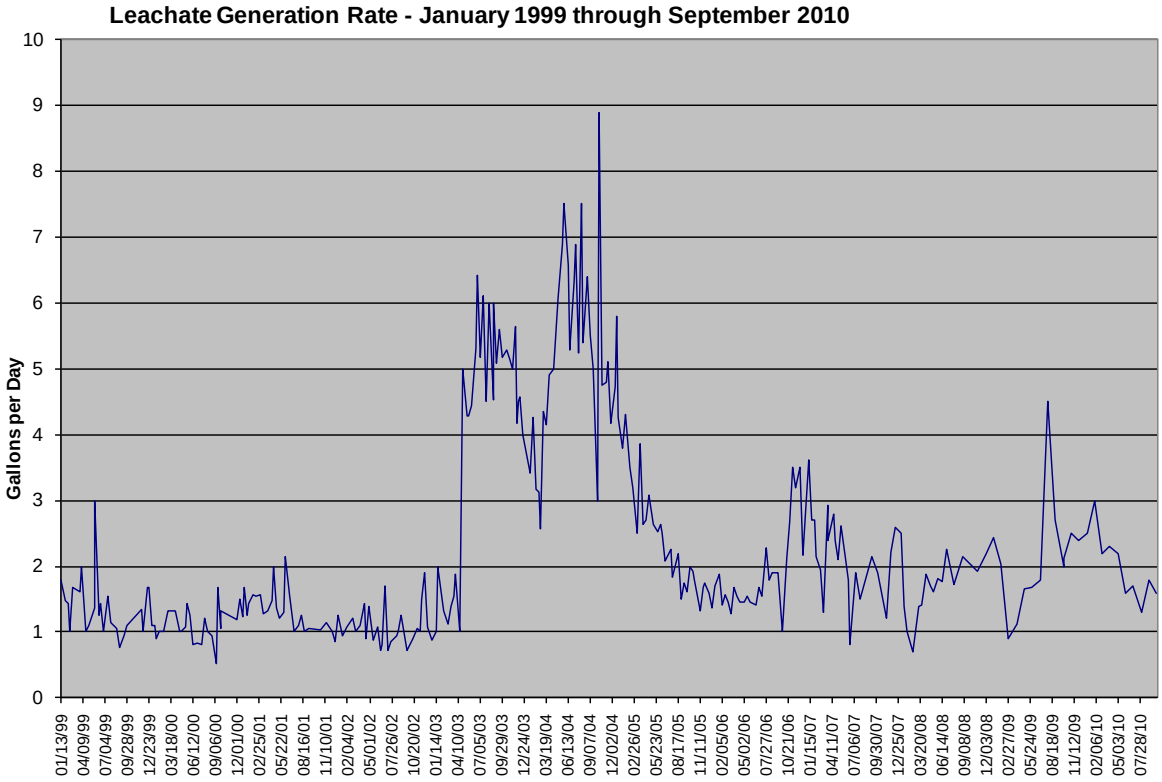


Figure 5. Solid Waste Landfill Basin Lysimeter Drainage.

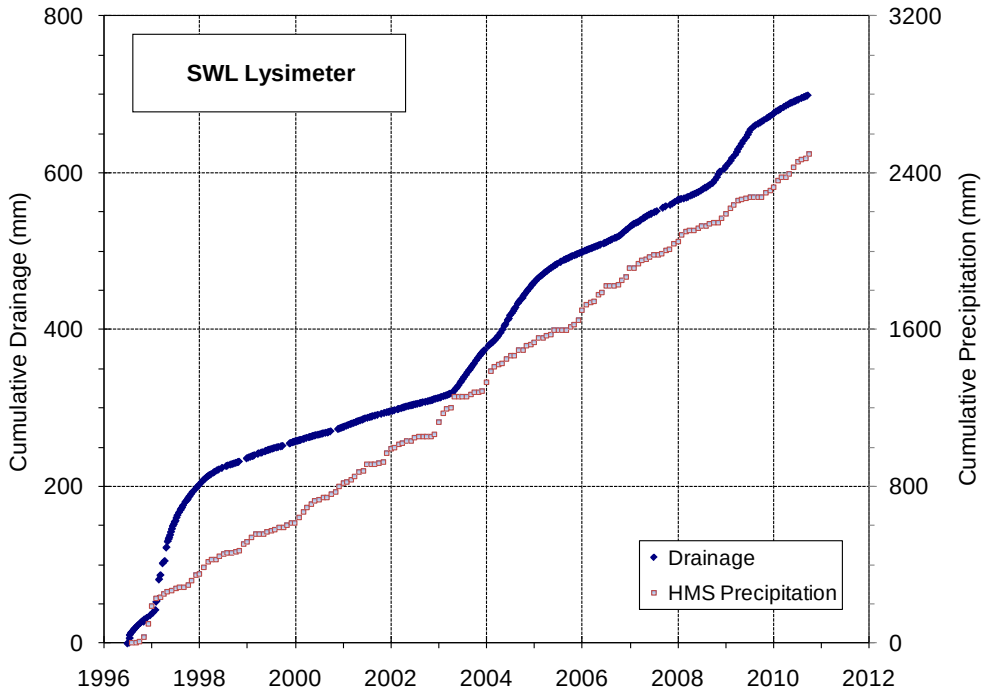


Table 2. Leachate Monitoring Results - Key Constituents.

Parameter[1]	Results by Quarter				GWQC[2]	MCL[3]
	4th 2009	1st 2010	2nd 2010	3rd 2010		
Indicator Parameters						
Conductivity (uS/cm)	NT	1910	1.90	2.28	NA	700 umhos/cm
pH	NT	7.09	6.62	6.56	6.5-8.5	NA
Ammonia as N (mg/L)	NT	0.407	0.445	0.592	NA	NA
Dissolved Iron (ug/L)	NT	7570	7930	9150	0.3 mg/L	0.3 mg/L
Dissolved Manganese (ug/L)	NT	1420	1320	1520	0.05 mg/L	0.05 mg/L
Dissolved Zinc (ug/L)	NT	1140	<6.0	5.00	5.0 mg/L	5.0 mg/L
Chemical Oxygen Demand (mg/L)	NT	159	183	182	NA	NA
Total Organic Carbon (mg/L)	NT	NT	58.2	64.6	NA	NA
Site-Specific Parameters						
Total Dissolved Solids (mg/L)	NT	NT	NT	NT	500 mg/L	500 mg/L[4]
Total Organic Halides (ug/L)	NT	597	NT	NT	NA	NA
Arsenic (ug/L)	NT	25.4	NT	NT	0.05 ug/L	0.010 mg/L
Barium (ug/L)	NT	44.6	NT	NT	1.0 mg/L	2.0 mg/L
Cadmium (ug/L)	NT	<4.0	NT	NT	0.01 mg/L	0.005 mg/L
Chloride (mg/L)	NT	184	183	193	250 mg/L	25.0 mg/L
Copper (ug/L)	NT	6.30	NT	NT	1.0 mg/L	NA
Fluoride (mg/L)	NT	<1.5	<1.5	<2.2	4 mg/L	4 mg/L
Nickel (ug/L)	NT	66.6	NT	NT	NA	0.1 mg/L
Selenium ug/L)	NT	<45	NT	NT	0.01 mg/L	0.05 mg/L
Sulfate (mg/L)	NT	15.9	14.1	15.0	250 mg/L	25 mg/L
1,1-Dichloroethane (ug/L)	NT	ND	NT	NT	1.0 ug/L	NA
1,1,1-Trichloroethane (ug/L)	NT	ND	NT	NT	0.20 mg/L	0.2 mg/L
1,4-Dioxane (ug/L)	NT	ND	NT	NT	7 ug/L	NA
1,4-Dichlorobenzene (ug/L)	NT	ND	NT	NT	4 ug/L	NA
Carbon Tetrachloride (ug/L)	NT	ND	NT	NT	0.3 ug/L	0.005 mg/L
Chloroform (ug/L)	NT	ND	NT	NT	7.0 ug/L	NA
Methylene Chloride (ug/L)	NT	ND	NT	NT	5 ug/L	NA
Tetrachloroethene (ug/L)	NT	ND	NT	NT	NA	NA
Trichloroethene (ug/L)	NT	ND	NT	NT	NA	NA

NT = Not Tested
NA = Not Applicable
[1] Units as provided in analytical results report.
[2] Groundwater Quality Criteria from WAC 173-200.
[3] Maximum Contaminant Levels from WAC 246-290.
[4] Required only when specific conductivity exceeds 700 uS/cm.

3.0 **GROUNDWATER MONITORING**

The existing SWL groundwater monitoring network consists of two upgradient wells on the west side of the SWL and eight downgradient wells along the east and south sides of the SWL. See Figure 6 for location of SWL groundwater monitoring wells. These wells are monitored quarterly, as required by WAC 173-304, "Minimum Functional Standards for Solid Waste Handling," as part of the overall Hanford Site groundwater monitoring project.
Well 699-25-34C has gone dry. Consequently, only nine wells are being monitored. At this time, there are no plans to deepen or replace well 699-25-34C because there are seven other downgradient wells remaining in the network. The results of groundwater sampling are evaluated each quarter and statistical procedures are applied to determine if there are any significant increases in any of the constituents sampled over established background threshold values and/or the GWQC or MCL.

A complete list of constituents sampled in the groundwater for the past year (October 2009 through September 2010) is provided in Table 3. Annual reporting values are shown in Table 4.

Table 3. Groundwater Monitoring Constituents.

1,1,1-Trichloroethane	Cadmium	M+P-Xylene	Temperature
1,1,2-Trichloroethane	Calcium	Magnesium	Tetrachloroethene
1,1-Dichloroethane	Carbon Disulfide	Manganese (dissolved)	Tetrahydrofuran
1,2-Dichloroethane	Carbon Tetrachloride	Methylene Chloride	Tolulene
1,4-Dichlorobenzene	Chemical Oxygen Demand	Nickel	Total Organic Carbon
1,4-Dioxane	Chloride	Nitrogen in Nitrate	
1-Butanol	Chloroform	Nitrogen as Nitrite	Total Xylenes
2-Butanone	Chromium	Nitrogen in Ammonia	Trans-1,2-Dichloroethylene
4-Methyl-2-Pentanone	Cis-1,2-Dichloroethylene	o-Xylene	Trichloroethene
Acetone	Cobalt	pH Measurement	Turbidity
Aluminum	Coliform Bacteria	Potassium	Vanadium
Antimony	Copper	Silver	Vinyl Chloride
Arsenic	Ethylbenzene	Sodium	Zinc (dissolved)
Barium	Ethyl Cyanide	Specific Conductivity	
Benzene	Fluoride	Strontium (elemental)	
Beryllium	Iron (dissolved)	Sulfate	

All groundwater wells at the SWL were sampled successfully for this reporting period, except Well 699-25-34C, which has gone dry.

Figure 6. Location of Groundwater Monitoring Wells.

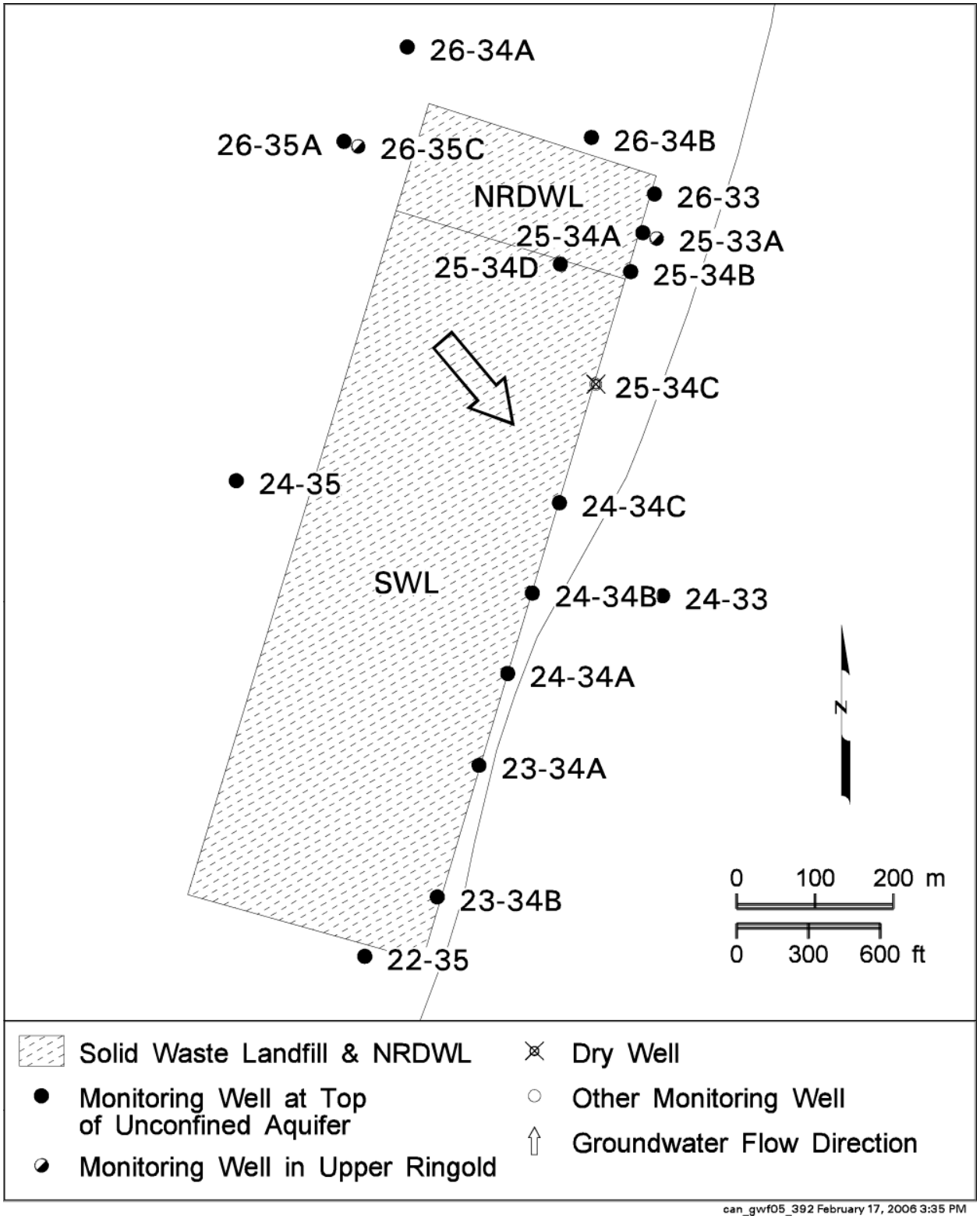


Table 4. Background Threshold Value Exceedances.

Parameter (BTV)	Maximum Previous Year	October 2009 through September 2010
Chemical Oxygen Demand (10,000 µg/L)	- Two downgradient - 18 ,000 µg/L	No exceedances
Chloride (7,820 µg/L)	No exceedances	No exceedances
Coliform bacteria (1 colony/100 ml)	- One upgradient - 62 colonies/100ml @ 699-24-35	- One down-gradient - Maximum: 3.1 colony/100ml @ 699-22-35
Field pH (6.68-7.84)	- Four down-gradient and one up-gradient with lowest value of 6.32 @ 699-23&24-34B	- One down-gradient and one up-gradient with lowest value of 6.63 @ 699-23-34A
Specific Conductance (583 µS/cm)	- All down-gradient and one upgradient - Maximum: 839 µS/cm @ 699-22-35	- All down-gradient and two upgradient - Maximum: 812 µS/cm @ 699-22-35
Sulfate (47,200 µg/L)	- Three downgradient - Maximum 54,100 µg/L	- One downgradient - Maximum 49,200 µg/L @ 669-23-34A
Temperature (20.7 degrees C)	- One down-gradient - Maximum: 24 degrees C @ 699-22-35	- Two down-gradient - Maximum: 22.6 degrees C @ 699-24-34B
Iron (160 µg/L)	No exceedances	No exceedances
Total organic carbon (842 ug/L)	No exceedances	No exceedances

3.1 BACKGROUND THRESHOLD VALUE EXCEEDANCES

Sample results for SWL groundwater monitoring wells are compared to background threshold values (BTV) for groundwater constituents specified in WAC 173-304-490(2)(d). The BTVs are calculated from monitoring results at the two background (upgradient) wells 699-24-35 and 699-26-35A.

During the previous reporting year, BTVs for chemical oxygen demand, field pH, specific conductance, total organic carbon, and sulfate were exceeded. During this reporting period, BTVs for these parameters again showed some exceedances.

Table 4 summarizes the exceedances for sampling associated with this annual reporting period (October 2009 through September 2010).

There were no volatile organic compounds that were positively detected in the network wells during the reporting period.

Elevated chemical oxygen demand, coliform bacteria, pH, specific conductance, and sulfate potentially indicate the disposal of sewage in the landfill. Continued detection of low levels of chlorinated hydrocarbons is consistent with wastes from the 1100 Area heavy equipment garage and bus shop. It is not known whether the tentatively detected volatile organic compounds are due to liquid waste other than the sewage.

In summary, the analytical results are typical of historical trends at the SWL and are consistent with the results at the two background wells.

3.2 GROUNDWATER QUALITY CRITERIA AND DRINKING WATER MAXIMUM CONTAMINANT LEVEL EXCEEDANCES

During the previous reporting period, WAC 173-200 GWQC exceedances were observed for arsenic, pH, and tetrachloroethene. Specific conductance exceeded the Washington Drinking Water MCL.

During this reporting period, the limits for these parameters again showed some exceedances (with the exception of pH). Table 5 provides a summary of the exceedances during the October 2009 through September 2010 period.

Table 5. Groundwater Quality Criteria and Drinking Water Maximum Contaminant Levels Exceedances.

Parameter (Limit)	Maximum Previous Year	October2009 – September 2010
Aresenic (0.05 µg/L)[1]	All network wells - Maximum: 3.46 µg/L @ 699-24-35A	All network wells - Maximum: 3.4 µg/L @ 699-26-35A
pH (6.5-8.5) [1]	- Six wells (5 downgradient and one upgradient) Maximum 6.32 @ 699-24-34B	- No exceedances
Specific conductance (700 µS/cm) [2]	Six down-gradient - Maximum: 839 µS/cm @ 699-22-35	All network wells - Maximum: 839 µS/cm @ 699-24-34C
Tetrachloro-ethene (0.8 µg/L) [1]	All network wells - Maximum: 4.5 µg/L @ 699-24-33	- All network wells - Maximum: 1.1 µg/L @ 699-24-34C
Antimony (6 ug/L) [3]	No exceedances	All network wells - Maximum: 4.5 µg/L

[1]Groundwater Quality Criteria from WAC 173-200-040
[2]Maximum Contaminant Levels from WAC 246-290-310
[3] Maximum Contaminant Levels from 40 CFR 141.62

Results remain consistent with the type of waste that was disposed to the landfill which included sewage and chlorinated hydrocarbons from the 1100 Area heavy equipment garage and bus shop. Aresenic continues to be detected at SWL wells, but the concentrations detected are typical of the Hanford Site background values. Field measurements of pH in downgradient wells continued to be lower than upgradient wells at the site.

Table 6. Results of Groundwater Monitoring in Three Target Wells Compared with One Upgradient Well.*

699-22-35				699-23-34A				699-24-34C				699-24-35 (upgradient)			
2009		2010		2009		2010		2009		2010		2009		2010	
4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd
1,1,1 Trichloroethane (GWQC of 200 ug/L)**															
1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u
1,1 Dichloroethane (GWQC of 1 ug/L)**															
1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u
Carbon Tetrachloride (GWQC of 0.3 ug/L)**															
1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u
Chloroform (GWQC of 7 ug/L)**															
1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u
Tetrachloroethene															
1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u
Trichloroethene															
1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u

*Units in ug/L.

**Groundwater Quality Criteria from WAC 173-200.

u = Non-detect or below the method detection level (MDL = 1.0 ug/L).

3.3 GROUNDWATER HYDROLOGY

The direction and flow of groundwater beneath the SWL is difficult to determine from water table maps because of the extremely low hydraulic gradients. However, groundwater is known to flow southeast between the 200 East Area and the SWL, because the average water-level elevation at the landfill is about 0.43 ft (0.13 m) less than the average elevation in the 200 East Area. The groundwater flow rate was estimated in the *Hanford Site Groundwater Monitoring for Fiscal Year 2006* (PNNL-16346) to be in the range of 0.066 to 0.427 ft (0.02 to 0.13 m) per day, based on measurements of the hydraulic gradient from water table maps and current understanding of the local hydraulic conductivity and effective porosity.

According to information provided by the Pacific Northwest National Laboratory (PNNL-16346), the elevation of the water table continued to decline but at a slower rate within the 200 East Area and vicinity. In the 200 East Area, the elevation of the water table declined an average of 0.23 ft (0.07 m) from March 2005 to April 2006. This is less than the previous annual decline (i.e., 0.055 ft [0.13 m] from March 2004 to March 2005), and is below the average rate of decline observed from June 1997 to March 2002 (i.e., 0.56 ft [0.17 m] per year). Beginning in the fall of 2002, the rate of water table elevation decline in the 200 East Area and vicinity slowed significantly with water levels actually increasing in some wells. The region affected by this smaller than normal decline extended from north of Gable Gap through the 200 East Area to the SWL. An investigation into the cause of the water table fluctuation was completed during Fiscal Year 2006 and documented in a PNNL report (PNNL-SA-49780, *The 2002-2003 Fluctuation of the Water-Table Elevation in the 200 East Area and Vicinity: Evaluation of Potential Causes*).

3.4 CHLORINATED ORGANICS IN TARGET WELLS

Based on past monitoring of the 10 wells in the SWL groundwater monitoring program, 6 primary contaminants have been identified in the groundwater below the SWL for inclusion in this report: (1) 1,1-Dichloroethane, (2) 1,1,1-Trichloroethane, (3) Chloroform, (4) Carbon Tetrachloride, (5) Tetrachloroethylene, and (6) Trichloroethylene. These chlorinated hydrocarbons are detected in both upgradient and downgradient wells, although concentrations for most constituents are slightly higher in the downgradient wells. The three wells which historically have shown the highest levels of contamination are included in this report. These three wells are referred to as the target wells and are all downgradient wells. Well 699-22-35 is located outside the south perimeter fence of the SWL; well 699-23-34A is located outside the east perimeter fence near the southeast corner; and well 699-24-34C is located outside the east perimeter fence near the mid-point of the landfill. Table 6 shows the results of analyses for the six primary contaminants in the three target downgradient wells, in addition to comparison data from one of the upgradient wells (699-24-35).

The historical trend for each of the six contaminants in the three target wells is downward. The levels for all of the chlorinated organic constituents shown in these figures are currently below WAC 173-304 GWQC, including tetrachloroethene which had shown elevated levels in the previous reporting year. Note: Tetrachloroethene data are showing non-detect at 1.0 µg/L; WAC 173-200 limit is 0.8 µg/L. Also of note is that tetrachloroethene levels are about the same in the upgradient well as in the downgradient wells.

Charts showing decreases in concentrations of these six organic chemical contaminants in the groundwater are provided in the Appendix, Figures A-1 through A-6. The contaminants have steadily decreased over the past 10 years as shown on the charts.

4.0 **SOIL GAS MONITORING**

The soil gas monitoring network consists of eight shallow monitoring stations located around the perimeter of the SWL. Each monitoring station consists of two dedicated soil-gas probes driven to depths of approximately 9 and 15 ft (2.7 and 4.6 m), respectively. The gas is monitored quarterly to determine concentrations of carbon dioxide and methane. The soil gas is also analyzed for several key volatile organic constituents; i.e., methylene chloride, 1,1-dichloroethane, chloroform, 1,1,1-trichloroethane, carbon tetrachloride, trichloroethylene, 1,1,2-trichloroethane, and tetrachloroethylene. See Figure 7 for location of soil gas monitoring stations. Note: Soil gas monitoring station DE-1 (shown in Figure 7) is no longer used due to fire damage.

In addition to the eight monitoring stations in the SWL soil gas monitoring network, soil gas monitoring station DW-2 (located along the border with the Non-Radioactive Dangerous Waste Landfill) is sampled routinely.

A summary of soil gas monitoring results is provided in Table 7. Results are consistent with results of previous monitoring. The concentrations for the volatile organic constituents were at or below the detection limits. Methane concentrations remain low or, for the most part, are not detected. Carbon dioxide concentrations continue to be consistent with data provided in previous reports.

Figure 7. Soil Gas Monitoring Stations.

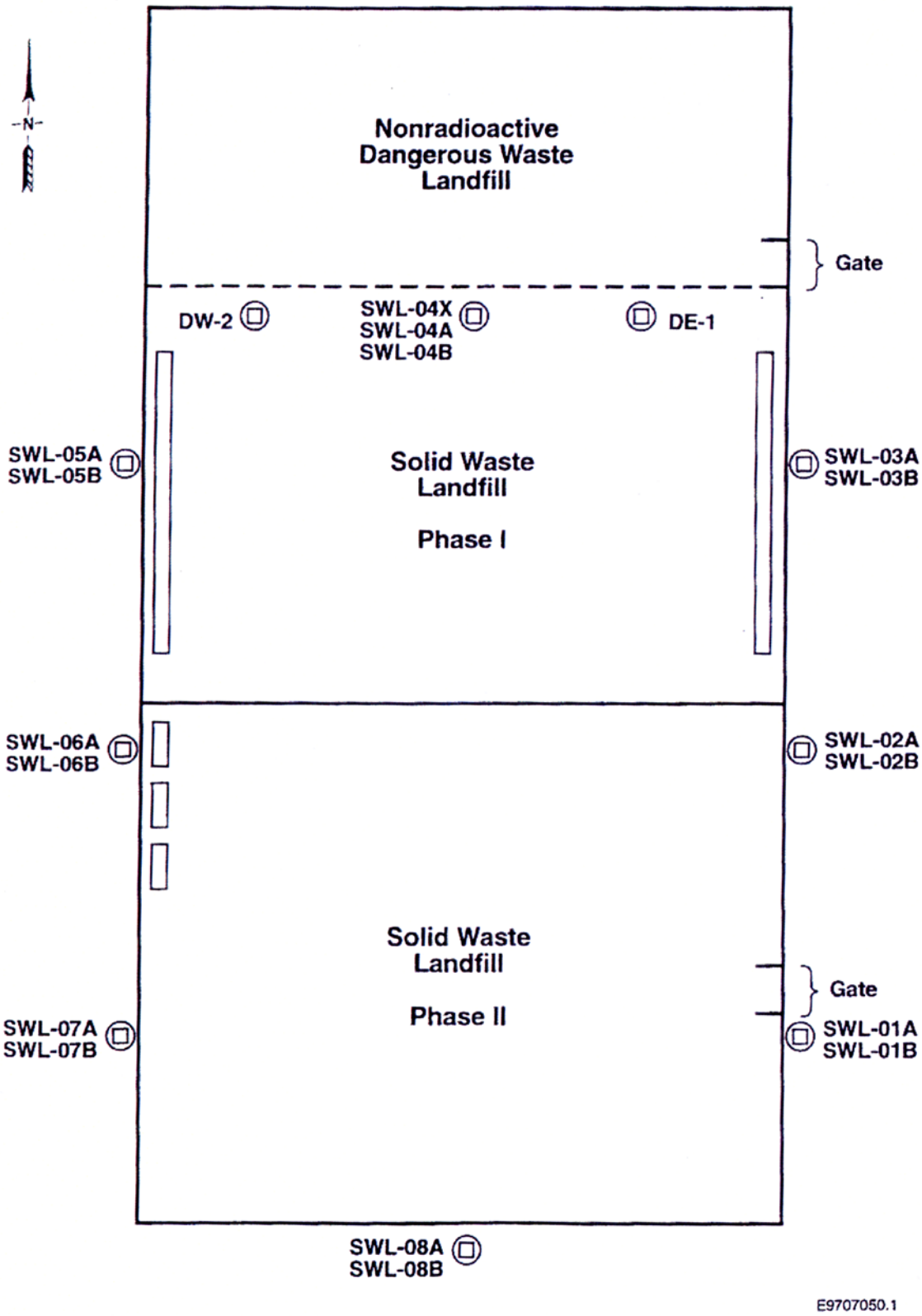


Table 7. Solid Waste Landfill Soil Gas Monitoring Results (October 2009 through September 2010). (2 sheets)

Constituent/ Sample Month	Wells																	
	01-A	**01-B**	**02-A**	**02-B**	**03-A**	**03-B**	**04-A**	**04-B**	**04-X**	**DW-2**	**05-A**	**05-B**	**06-A**	**06-B**	**07-A**	**07-B**	**08-A**	**08-B**
Methane (CH_4) (ppm)																		
Nov 2009	12	14	21	-	-	6	-	-	-		26	19	16	-	25	[2]	14	-
Jan 2010	6	-	-	-	-	9	-	-	16	-	-	17	13	13	17	[2]	14	-
Feb 2010	-	20	-	-	-	-	-	-	-	6	-	19	-	18	-	-	18	-
Apr 2010[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	[2]	-	-
Sept 2010	19	14	24	12	14	16	-	-	24	-	30	17	12	-	38	[2]	12	-
Carbon dioxide (CO_2) (ppm)																		
Nov 2009	447	2235	541	3184	-	1897	7085	9095	2900	4387	753	2281	994	2798	1145	[2]	2265	4990
Jan 2010	798	2453	1321	3323	-	2001	5992	6731	2430	3266	-	2656	1674	2851	2069	[2]	2780	5019
Feb 2010	1536	2864	1434	3527	-	2042	5884	6744	2537	3491	1307	2935	2398	3231	2055	-	2828	4978
Apr 2010[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	[2]	-	-
Sept 2009	2404	3292	2522	4292	715	2387	9019	10400	3961	5750	2803	3552	3300	4645	2752	[2]	3259	5652
Methylene chloride (DCM) (ppm)																		
Nov 2009	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	[2]	<0.44	<0.44
Jan 2010	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	[2]	<0.44	<0.44
Feb 2010	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	[2]	<0.44	<0.44
Apr 2010	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	[2]	<0.44	<0.44
Sept 2010	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	[2]	<0.44	<0.44
1,1-Dichloroethane (1,1-DCA) (ppm)																		
Nov 2009	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	[2]	<0.22	<0.22
Jan 2010	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	[2]	<0.22	<0.22
Feb 2010	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	[2]	<0.22	<0.22
Apr 2010	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	[2]	<0.22	<0.22
Sept 2010	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	[2]	<0.22	<0.22
Chloroform (TCM) (ppm)																		
Nov 2009	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Jan 2010	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Feb 2010	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Apr 2010	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Sept 2010	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07

Table 7. Solid Waste Landfill Soil Gas Monitoring Results (October 2009 through September 2010). (2 sheets)

Constituent/ Sample Month	Wells																	
	01-A	**01-B**	**02-A**	**02-B**	**03-A**	**03-B**	**04-A**	**04-B**	**04-X**	**DW-2**	**05-A**	**05-B**	**06-A**	**06-B**	**07-A**	**07-B**	**08-A**	**08-B**
1,1,1-Trichloroethane (1,1,1-TCA) (ppm)																		
Nov 2009	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	[2]	<0.15	<0.15
Jan 2010	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	[2]	<0.15	<0.15
Feb 2010	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	[2]	<0.15	<0.15
Apr 2010	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	[2]	<0.15	<0.15
Sept 2010	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	[2]	<0.15	<0.15
Carbon tetrachloride (CCl_4) (ppm)																		
Nov 2009	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	[2]	<0.09	<0.09
Jan 2010	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	[2]	<0.09	<0.09
Feb 2010	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	[2]	<0.09	<0.09
Apr 2010	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	[2]	<0.09	<0.09
Sept 2010	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	[2]	<0.09	<0.09
Trichloroethylene (TCE) (ppm)																		
Nov 2009	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[2]	<1.2	<1.2
Jan 2010	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[2]	<1.2	<1.2
Feb 2010	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[2]	<1.2	<1.2
Apr 2010	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[2]	<1.2	<1.2
Sept 2010	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[2]	<1.2	<1.2
1,1,2-Trichloroethane (1,1,2-TCA) (ppm)																		
Nov 2009	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Jan 2010	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Feb 2010	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Apr 2010	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Sept 2010	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07
Tetrachloroethylene (PCE) (ppm)																		
Nov 2009	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	[2]	<0.16	<0.16
Jan 2010	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	[2]	<0.16	<0.16
Feb 2010	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	[2]	<0.16	<0.16
Apr 2010	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	[2]	<0.16	<0.16
Sept 2010	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	[2]	<0.16	<0.16

[1] No gas available to check standards.

[2] Sample tube was filled with water and no sample was collected.

APPENDIX

GROUNDWATER TRENDS

Figure A-1. 1,1,1-Trichloroethane Trend – January 1, 2000 to September 30, 2010.

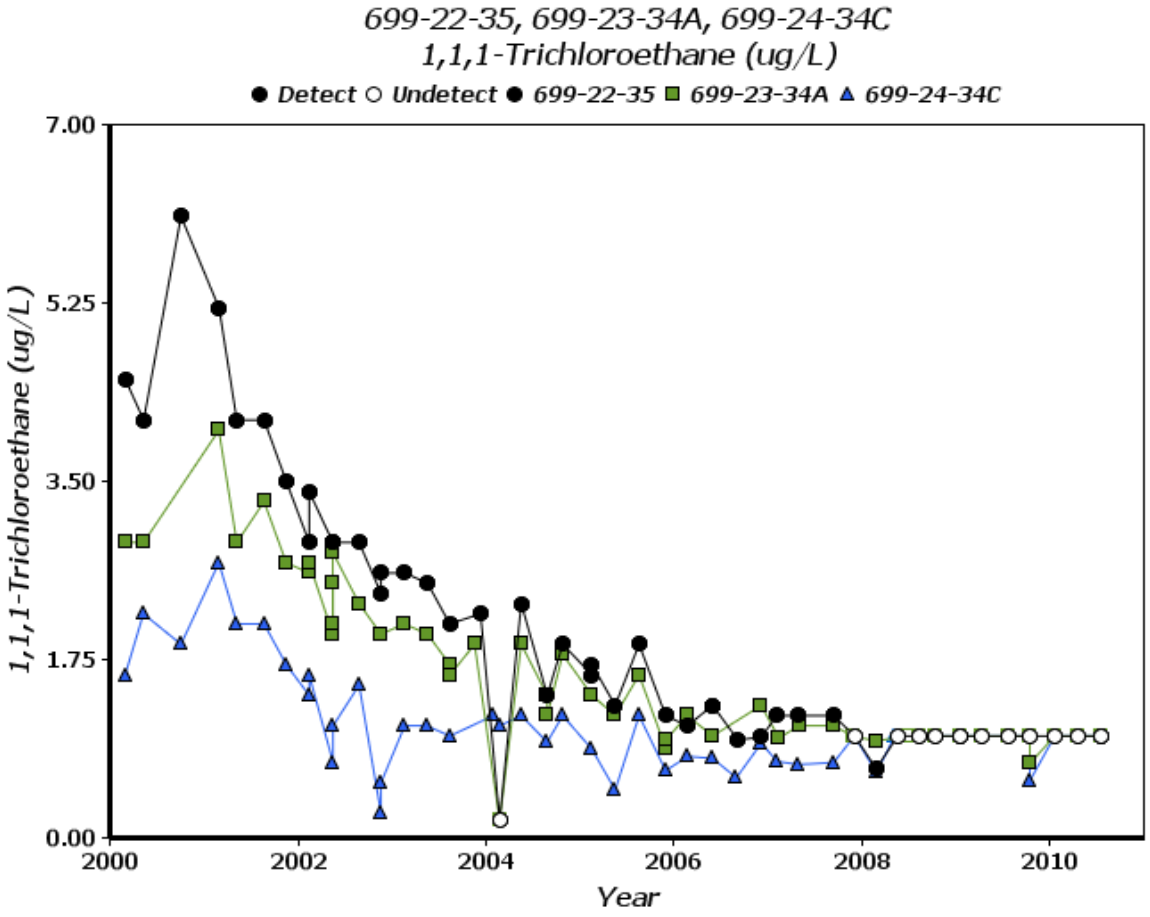


Figure A-2. 1,1-Dichloroethane Trend – January 1, 2000 to September 30, 2010.

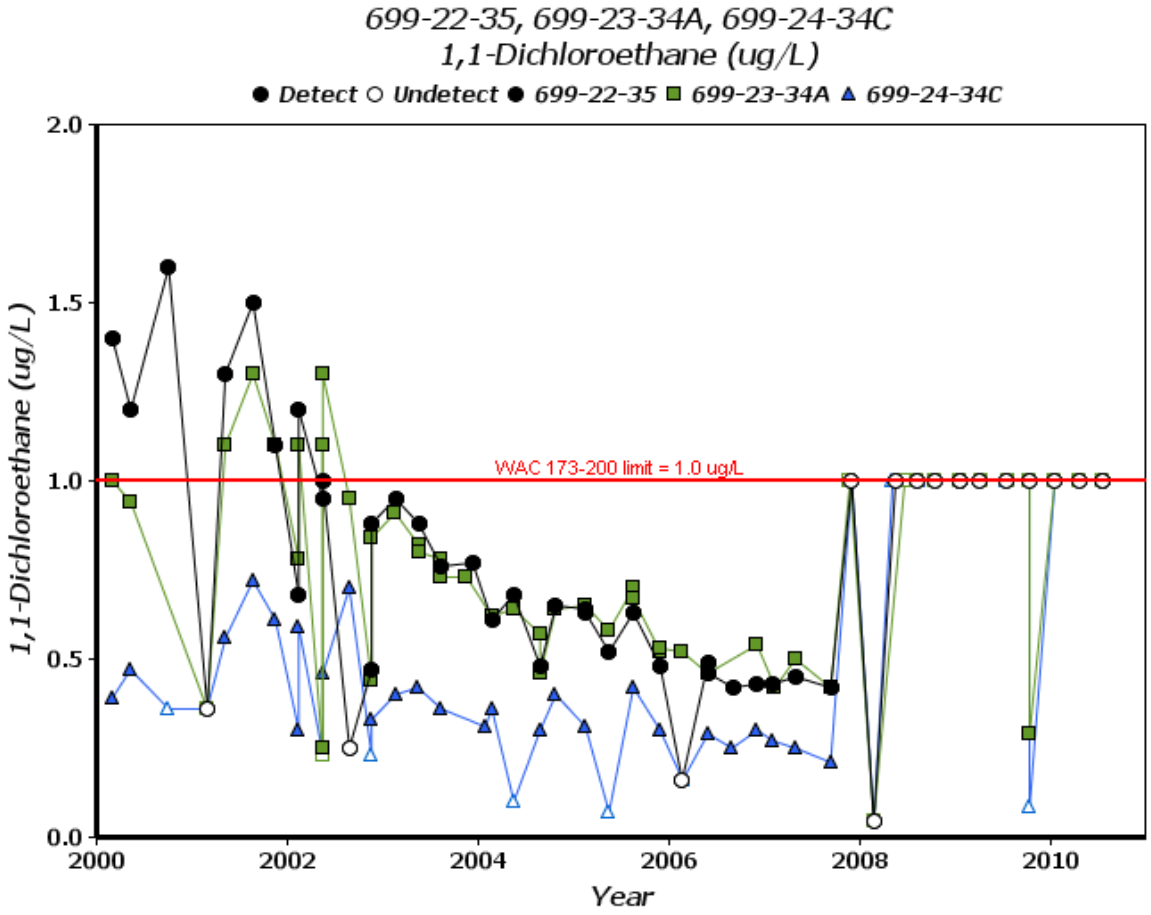


Figure A-3. Carbon Tetrachloride Trend – January 1, 2000 to September 30, 2010.

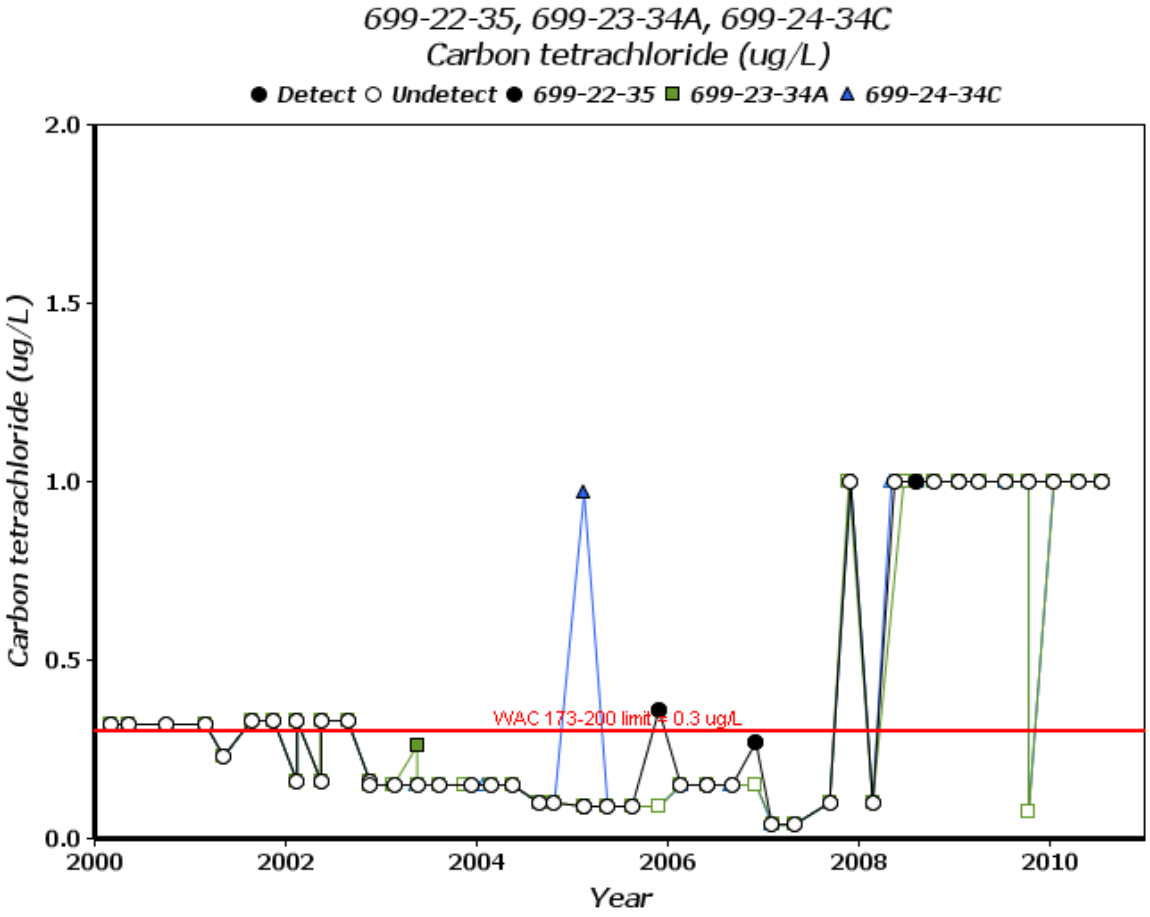


Figure A-4. Chloroform Trend – January 1, 2000 to September 30, 2010.

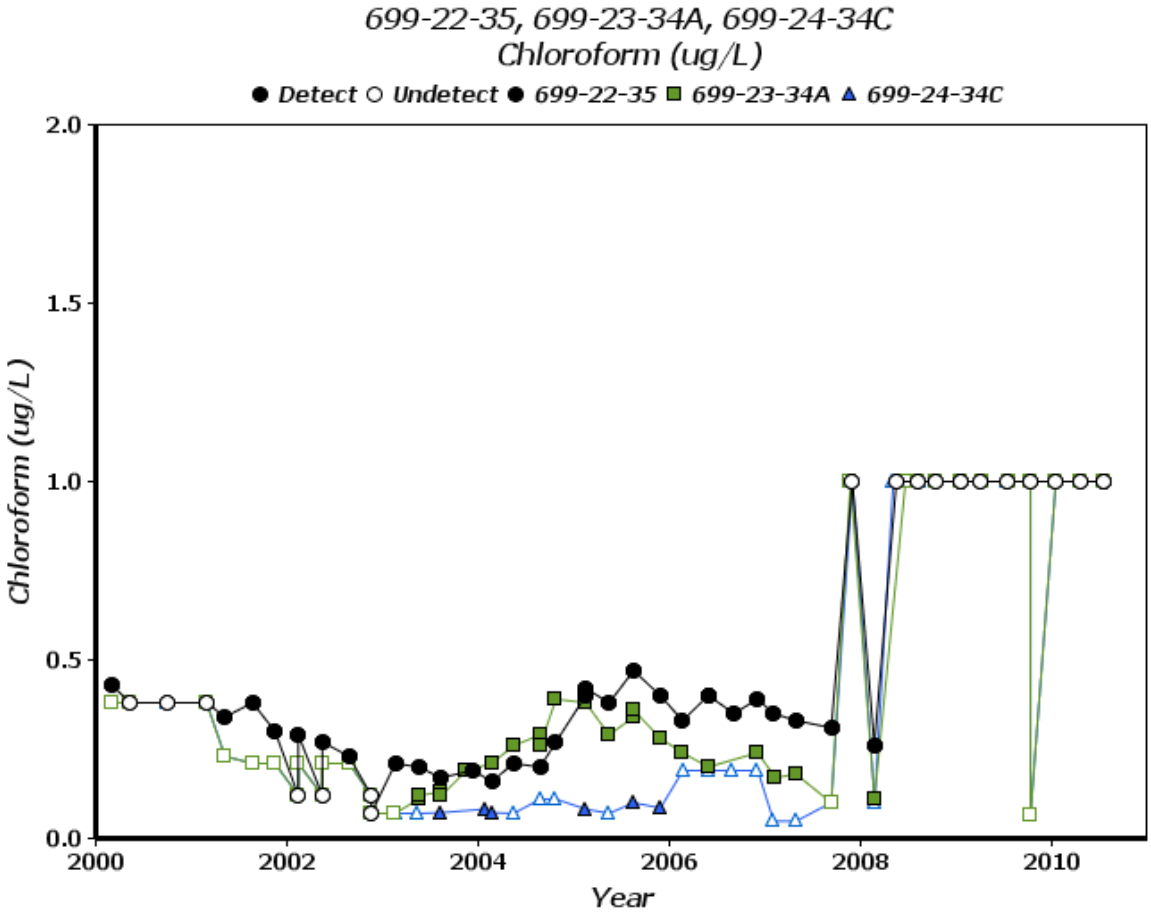


Figure A-5. Tetrachloroethene Trend – January 1, 2000 to September 30, 2010.

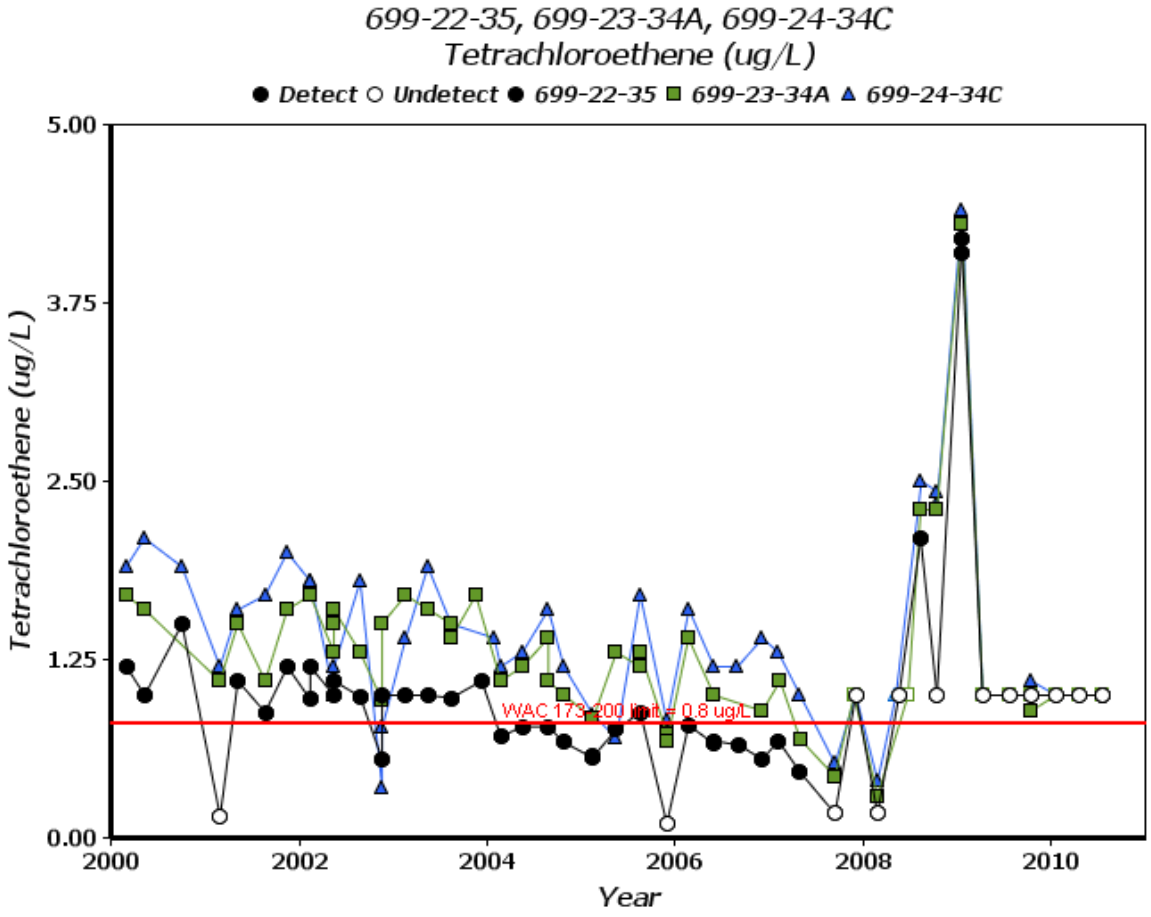
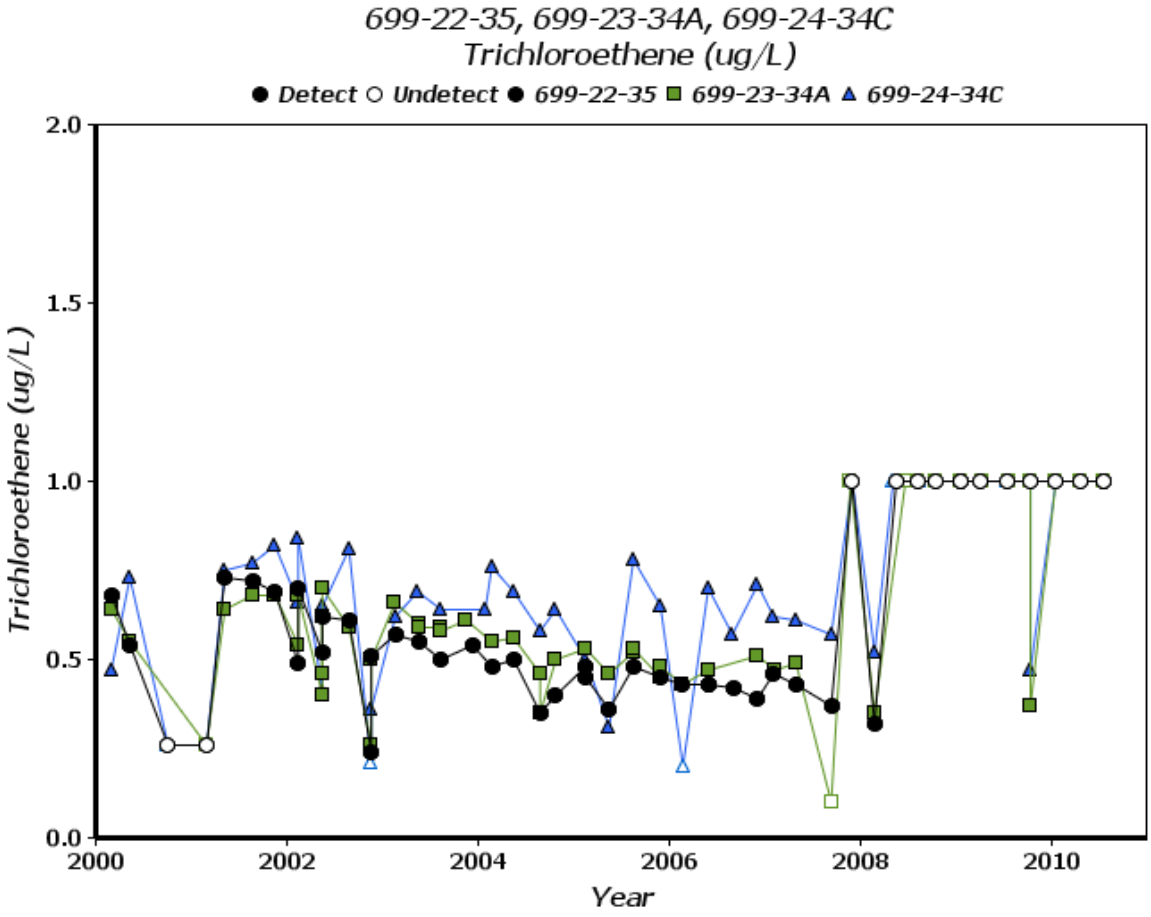



Figure A-6. Trichloroethene Trend – January 1, 2000 to September 30, 2010.