ENCLOSURE

HANFORD SITE SOLID WASTE LANDFILL ANNUAL MONITORING REPORT
October 2011 through September 2012

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HANFORD SITE SOLID WASTE LANDFILL ANNUAL MONITORING REPORT

October 2011 through September 2012

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 2011 through September 2012. In March 1996 waste disposal activities at the SWL were discontinued. The SWL is currently in interim closure status.

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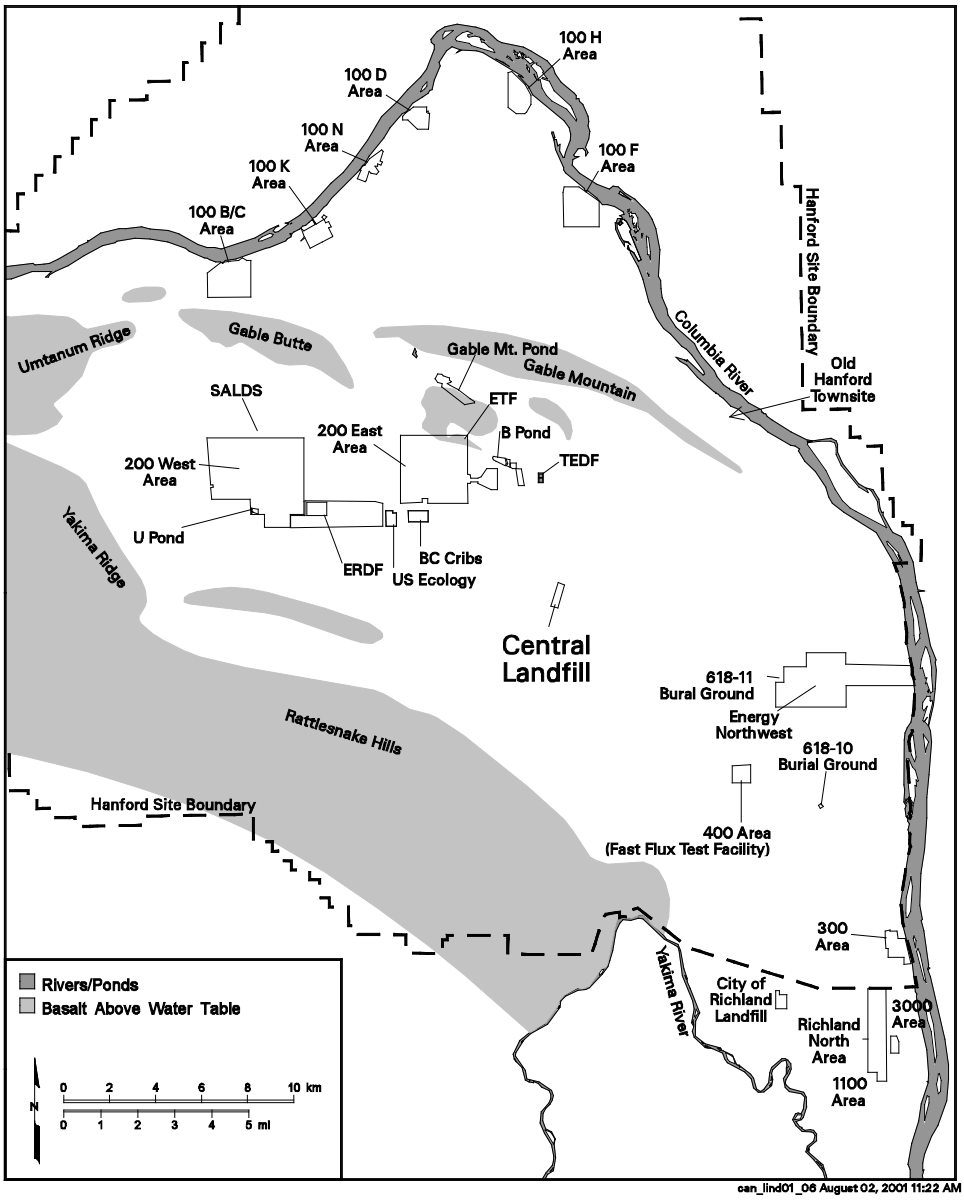
1.0 INTRODUCTION

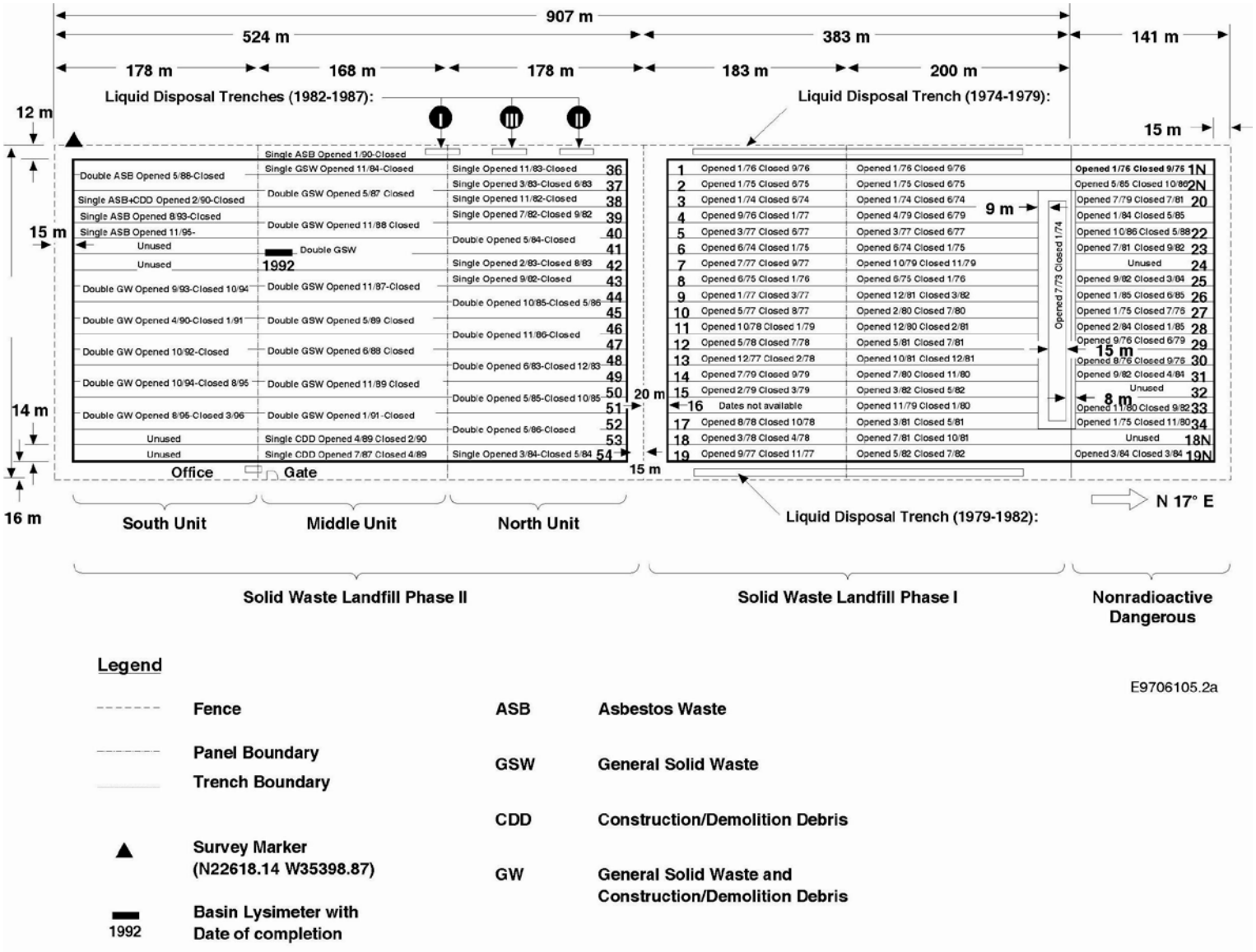
The Hanford Solid Waste Landfill (SWL) covers approximately 27 hectares (66 acres) and began operations in 1973. Figure 1 shows the location of the SWL (Central Landfill) on the Hanford Site.

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 2011 through September 2012.

2.0 LEACHATE MONITORING

One of the double trenches in the landfill is equipped with a liner, allowing 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 which may be reaching the groundwater from unlined disposal cells. 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 an underground lysimeter collection tank every 10 to 14 days. During the period of October 2011 through September 2012, a total of approximately 588 gallons of leachate was collected, for a daily average during the year of approximately 1.61 gallons. This is about a 25 percent decrease in leachate generation over the previous year, during which the daily average leachate generation was approximately 2.1 gallons.

Table 1 and Figure 3 provide leachate volumes collected from the lysimeter, as well as monthly precipitation for the reporting period (October 2011 through September 2012). In addition, a chart of generation rates over the past decade is provided in Figure 4. Data in Figure 5 shows the relationship between the precipitation received at the landfill and drainage.

2.2 LEACHATE ANALYTICAL RESULTS

Table 2 shows analytical 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.

Table 1. Leachate Generation Volumes.

Month	Gallons	Average Rate	Precipitation (1/100th inch)
Oct-11	89.5	2.8	77
Nov-11	80	2.6	12
Dec-11	28.5	0.9	1
Jan-12	40	1.3	1.09
Feb-12	23	0.8	67
Mar-12	15	0.48	64
Apr-12	66	2.2	61
May-12	38	1.2	22
Jun-12	14.5	0.48	1.51
Jul-12	37	1.19	15
Aug-12	76.5	2.46	0
Sep-12	80	2.6	3

Figure 3. Leachate Generation versus Precipitation (2011-2012).

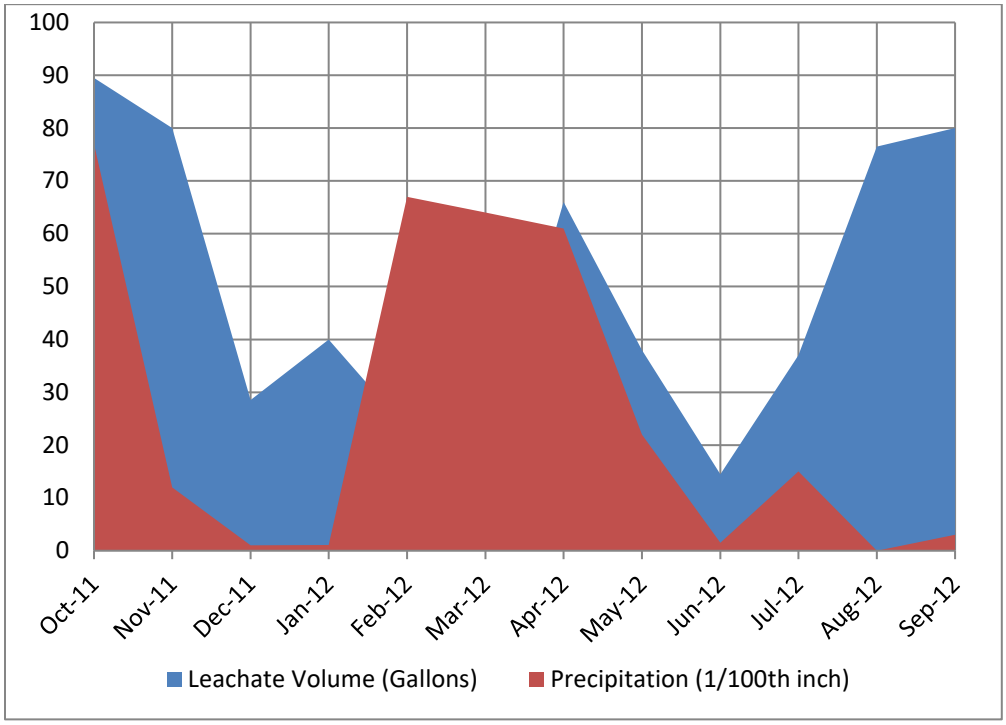


Figure 4. Leachate Generation Rate.

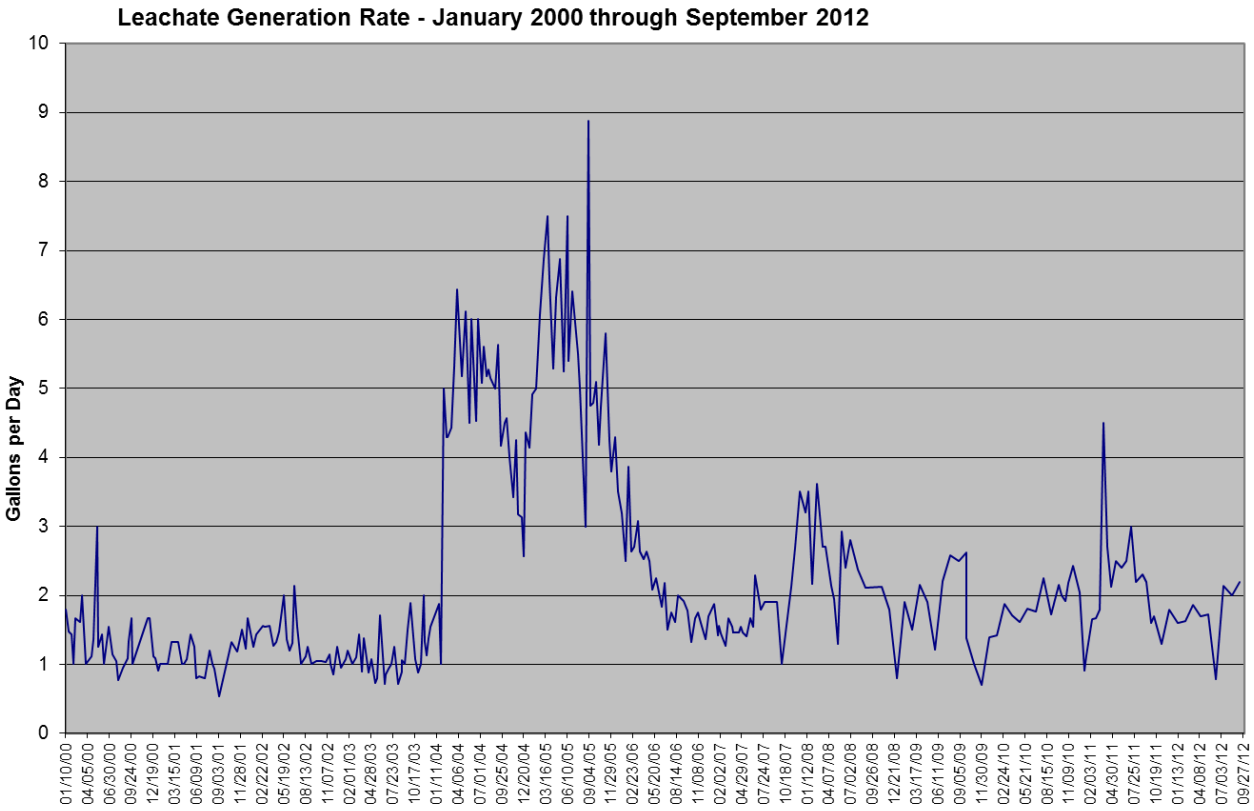


Figure 5. Solid Waste Landfill Basin Lysimeter Drainage.

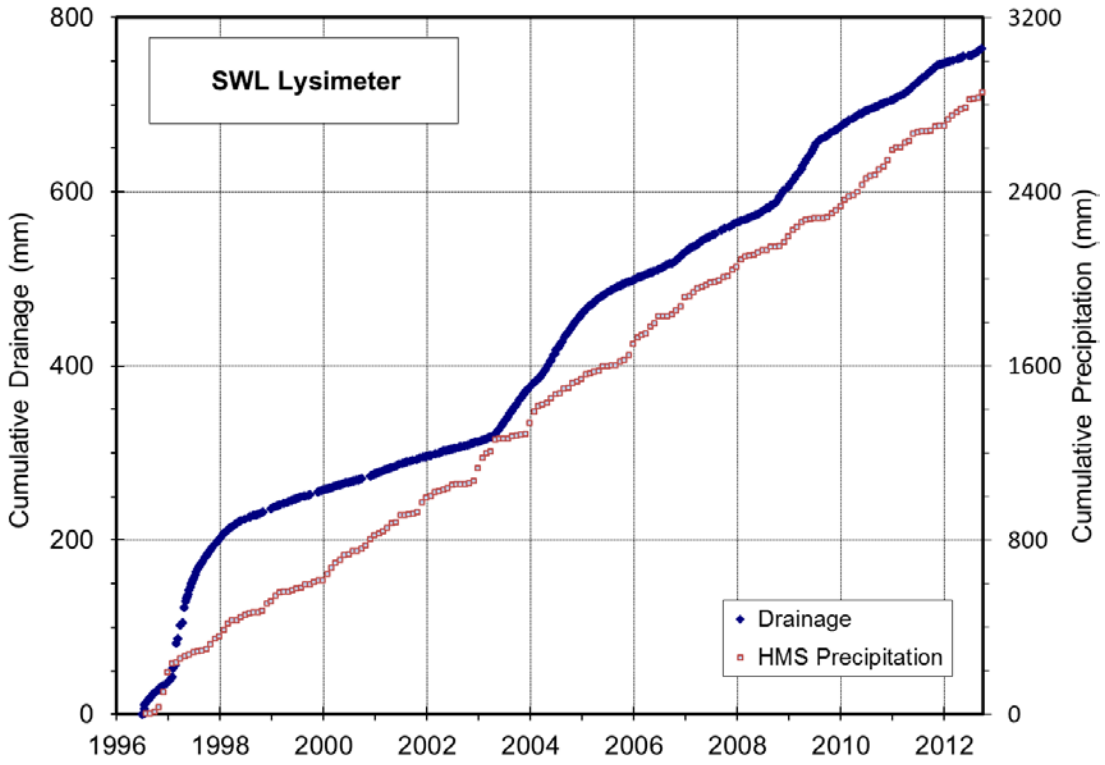


Table 2. Leachate Monitoring Results - Key Constituents.

Parameter[1]	Results by Quarter				GWQC[2]	MCL[3]
	4th 2011	1st 2012	2nd 2012	3rd 2012		
Indicator Parameters						
Conductivity (uS/cm)	1860	1750	2040	2110	NA	700 umhos/cm
pH	7.34	6.78	6.79	6.85	6.5-8.5	NA
Ammonia as N (mg/L)	0.543	0.377	0.392	0.444	NA	NA
Dissolved Iron (ug/L)	7230	8640	6000	8150	0.3 mg/L	0.3 mg/L
Dissolved Manganese (ug/L)	1370	1670	1340	1580	0.05 mg/L	0.05 mg/L
Dissolved Zinc (ug/L)	287	16.8	1.82	1.45	5.0 mg/L	5.0 mg/L
Chemical Oxygen Demand (mg/L)	165	179	175	179	NA	NA
Total Organic Carbon (mg/L)	48.5	55	43.6	52.2	NA	NA
Site-Specific Parameters						
Total Dissolved Solids (mg/L)	1400	1550	1410	1400	500 mg/L	500 mg/L[4]
Total Organic Halides (ug/L)	590	NT	NT	NT	NA	NA
Arsenic (ug/L)	<44	29.1	22.9	21.3.0	0.05 ug/L	0.010 mg/L
Barium (ug/L)	445	311	476	572	1.0 mg/L	2.0 mg/L
Cadmium (ug/L)	<4.0	<0.50	<0.050	<0.050	0.01 mg/L	0.005 mg/L
Chloride (mg/L)	185	179	177	187	250 mg/L	25.0 mg/L
Copper (ug/L)	<4.0	<1.0	0.420	<0.815	1.0 mg/L	NA
Fluoride (mg/L)	<1.2	<1.2	<0.23	<0.132	4 mg/L	4 mg/L
Nickel (ug/L)	66.2	88.9	60.9	62.3	NA	0.1 mg/L
Selenium ug/L)	<36	<10	<1.0	<1.0	0.01 mg/L	0.05 mg/L
Sulfate (mg/L)	50.2	52.8	57.6	55.3	250 mg/L	25 mg/L
1,1-Dichloroethane (ug/L)	<1.0	NT	NT	NT	1.0 ug/L	NA
1,1,1-Trichloroethane (ug/L)	<1.0	NT	NT	NT	0.20 mg/L	0.2 mg/L
1,4-Dioxane (ug/L)	<10	NT	NT	NT	7 ug/L	NA
1,4-Dichlorobenzene (ug/L)	9.8	NT	NT	NT	4 ug/L	NA
Carbon Tetrachloride (ug/L)	<1.0	NT	NT	NT	0.3 ug/L	0.005 mg/L
Chloroform (ug/L)	<1.0	NT	NT	NT	7.0 ug/L	NA
Methylene Chloride (ug/L)	<1.0	NT	NT	NT	5 ug/L	NA
Tetrachloroethene (ug/L)	1.5	NT	NT	NT	NA	NA
Trichloroethene (ug/L)	<1.0	NT	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.

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.

3.0 GROUNDWATER MONITORING

The existing SWL groundwater monitoring network consists of two upgradient wells on the west side of the SWL and seven downgradient wells along the east and south sides of the facility. See Figure 6 for the locations of the 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 is dry and Well 699-24-34C went dry in fiscal year (FY) 2011. Consequently, eight wells are being monitored instead of ten. At this time, there are no plans to deepen or replace Well 699-25-34C, as the seven serviceable downgradient wells are sufficient for monitoring purposes. 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 2011 through September 2012) is provided in Table 3. Analytical results are summarized 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	Toluene
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 and 699-24-34C, with no results for this period because they went dry.

Figure 6. Location of Groundwater Monitoring Wells.

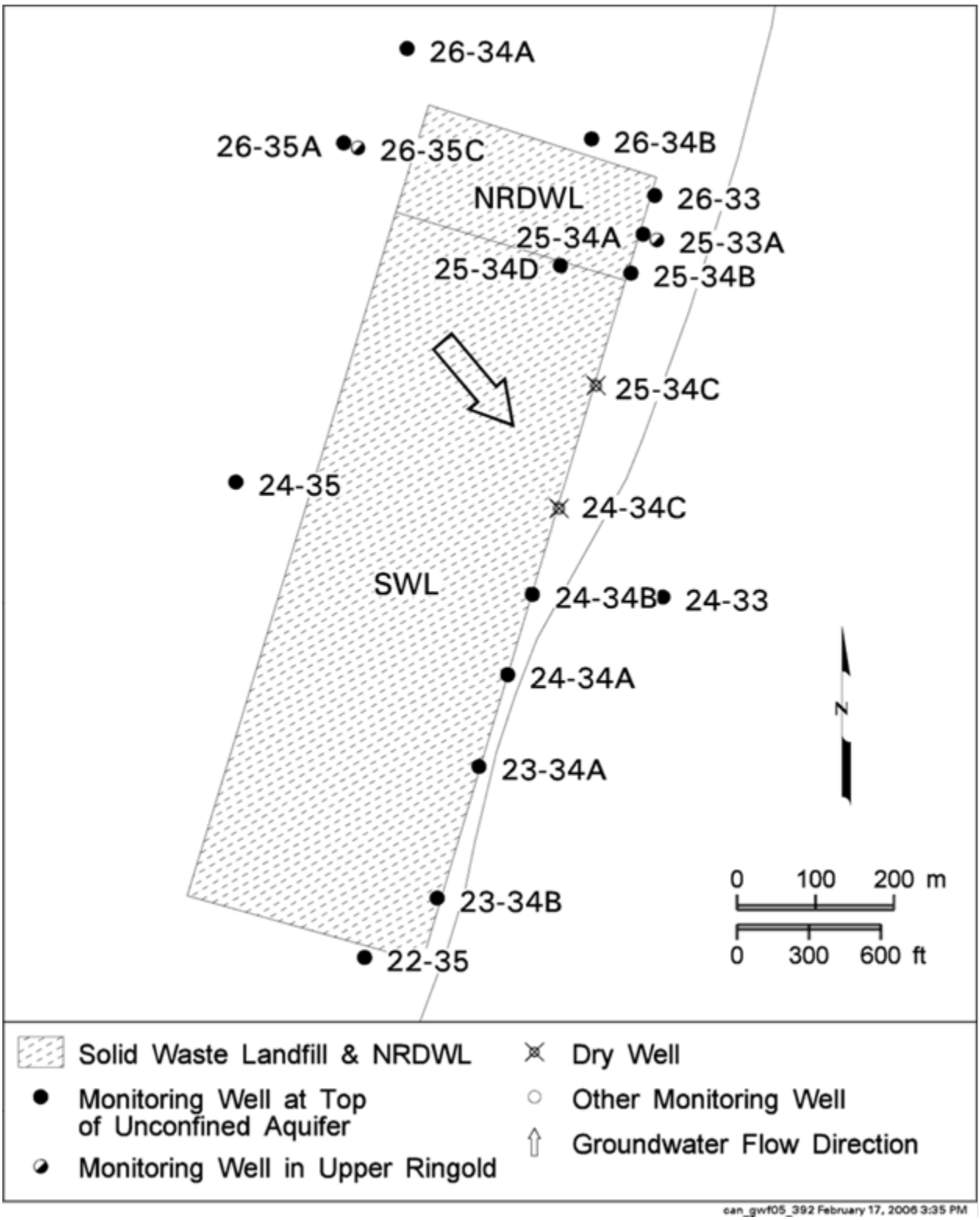


Table 4. Background Threshold Value (BTV) Exceedances.

Parameter (BTV)	Maximum Previous Year	October 2011 through September 2012
Chemical Oxygen Demand (10,000 µg/L)	No exceedances	No exceedances
Chloride (6578 µg/L)	No exceedances	All down-gradient wells and one up-gradient well with maximum value of 8300 ug/l @ 699-2534B
Coliform bacteria (1 colony/100 ml)	No exceedances	No exceedances
Field pH (6.78-7.4)	Four down-gradient exceedances with a maximum value of 1,990 @ 699-23-34A	Three down-gradient exceedances Lowest value = 6.52 @ 699-23-34A
Specific Conductance (541 µS/cm)	All down-gradient wells with a maximum value of 821µS/cm @ 699-22-35	All down-gradient wells with a maximum value of 824 µS/cm @ 699-22-35
Sulfate (42,580 µg/L)	All down-gradient wells with a maximum value of 47,500 @ 699-23-34A	All down-gradient wells with a maximum value of 50,700 ug/l @ 699-23-34A
Temperature (17.8 deg C)	Six down-gradient wells with a maximum value of 20.3 deg C @ 699-24-34B	Six down-gradient wells with a maximum value of 19.9 deg C @ 699-24-34B
Iron (116 µg/L)	Four down-gradient wells with a maximum value of 1,680 µg/L @ 699-24-34B	Six down-gradient wells with a maximum value of 3.320 µg/L @ 699-24-34B
Total organic carbon (842 ug/L)	Four down-gradient wells with a maximum value of 1,890 µg/L @ 699-22-35	Six down-gradient wells with a maximum value of 7,160 µg/L @ 699-24-33

3.1 BACKGROUND THRESHOLD VALUE EXCEEDANCES

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

During the previous reporting year, BTVs for coliform bacteria, field pH, specific conductance, sulfate, temperature, iron, and total organic carbon were exceeded in down-gradient wells. During this reporting period, BTVs for all parameters, except for chemical oxygen demand and coliform bacteria indicated some exceedances.

Table 4 summarizes these exceedances for sampling associated with this annual reporting period (October 2011 through September 2012).

No volatile organic compounds were positively detected in the network wells during the reporting period.

Elevated chemical pH, specific conductance, and sulfate potentially indicate the past disposal of sewage in the landfill. Continued detection of low levels of chlorinated hydrocarbons (tetrachloroethene [PCE]) is consistent with wastes previously disposed of at the landfill 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 historical results at the two up-gradient (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 reported for arsenic, specific conductance, and tetrachloroethene (PCE). In addition, reported specific conductance levels exceeded the Washington Drinking Water MCL.

During this reporting period, the limits for these parameters were again exceeded (with the exception of pH). Table 5 provides a summary of exceedances recorded from October 2011 through September 2012.

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

Parameter (Limit)	Maximum Previous Year	October 2011 through September 2012
Arsenic (0.05 µg/L)[1]	3.4 µg/L @ 699-26-35A	All network wells Maximum 5.93 µg/L @ 699-23-34A
pH (6.5-8.5)[1]	No exceedances	No exceedances
Specific conductance (700 µS/cm)[2]	5 down-gradient network wells Maximum 821 @ 699-22-35	4 down-gradient network wells Maximum 824 @ 699-22-35
Tetrachloroethene (PCE) (0.8 µg/L)[1]	All network wells Maximum 3.0 µg/L @ 699-24-34B	All network wells Maximum 1.7 µg/L @ 699-24-34B
Antimony (6 ug/L)[2]	No exceedances	No exceedances

[1]Groundwater Quality Criteria from WAC 173-200-040.
[2]Maximum Contaminant Levels from WAC 246-290-310.

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. Arsenic continues to be detected at SWL wells, but the concentrations detected are typical of Hanford Site background values. Field measurements of pH in down-gradient wells continue to be lower than up-gradient wells at the site.

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 FY 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 groundwater wells in the SWL groundwater monitoring program, six primary organic compounds have been identified in the groundwater below the SWL for inclusion in this report:

- 1,1-Dichloroethane
- 1,1,1-Trichloroethane
- Chloroform
- Carbon Tetrachloride
- Tetrachloroethene
- Trichloroethylene.

These chlorinated hydrocarbons are detected in both up-gradient and down-gradient wells, although concentrations for most constituents are slightly higher in the down-gradient wells. The three wells which historically have shown the highest levels of organic compounds are included in this report. These three wells are referred to as the target wells and are all down-gradient 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 (dry in FY 2011) is located outside the east perimeter fence near the mid-point of the landfill (see Figure 6). Table 6 shows the results of analyses for the six primary organic compounds in the three target down-gradient wells, in addition to comparison data from one of the up-gradient wells (699-24-35).

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

699-22-35				699-23-34A				699-24-34C				699-24-35 (upgradient)			
2011		2012		2011		2012		2011		2012		2011		2012	
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)**															
0.5 j	1.0u	1.5j	1.0u	0.38j	1.0u	1.0u	1.0u	1.0	1.0u	1.0u	1.0u	0.45j	1.5j	1.0u	1.0u
1,1 Dichloroethane (GWQC of 1 ug/L)**															
0.18j	1.0u	1.0u	1.0u	0.16j	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	0.11j	1.0u	1.0u	1.0u
Carbon Tetrachloride (GWQC of 0.3 ug/L)**															
0.12j	1.0u	1.0u	1.0u	0.12j	1.0u	2.1j	1.0u	1.0u	1.0u	1.0u	1.0u	0.12j	1.0u	1.0u	1.0u
Chloroform (GWQC of 7 ug/L)**															
0.1j	1.0u	1.0u	1.0u	0.1j	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u
Tetrachloroethene															
0.51j	1.0u	1.0u	1.0u	0.57j	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	0.61j	1.4j	1.0u	1.0u
Trichloroethene															
0.25j	1.0u	1.0u	1.0u	0.27j	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	1.0u	0.29j	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 limit (MDL = 1.0 ug/L).
j = Estimated value (actual value is between the MDL and the practical quantitation limits (PQLs).

The historical trend for each of the six organic compounds 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. (**NOTE:** tetrachloroethene data are showing non-detect at 1.0 µg/L; WAC 173-200 limit is 0.8µg/L. Also of note is that tetrachloroethene levels are about the same in the up-gradient well as in the down-gradient wells.)

Charts showing decreases in concentrations of these six organic chemical compounds in the groundwater are provided in the Appendix, Figures A-1 through A-6. As indicated on these charts, the concentrations of these organic compounds have steadily decreased over the past ten years.

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 tetrachloroethene. See Figure 7 for the locations of soil gas monitoring stations. (**NOTE:** Soil gas monitoring station DE-1 [shown in Figure 7] is no longer used due to fire damage. Also, soil gas monitoring was not completed as scheduled during the 1st quarter of FY 2011 due to major layoffs in the Groundwater Monitoring Programs.

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.

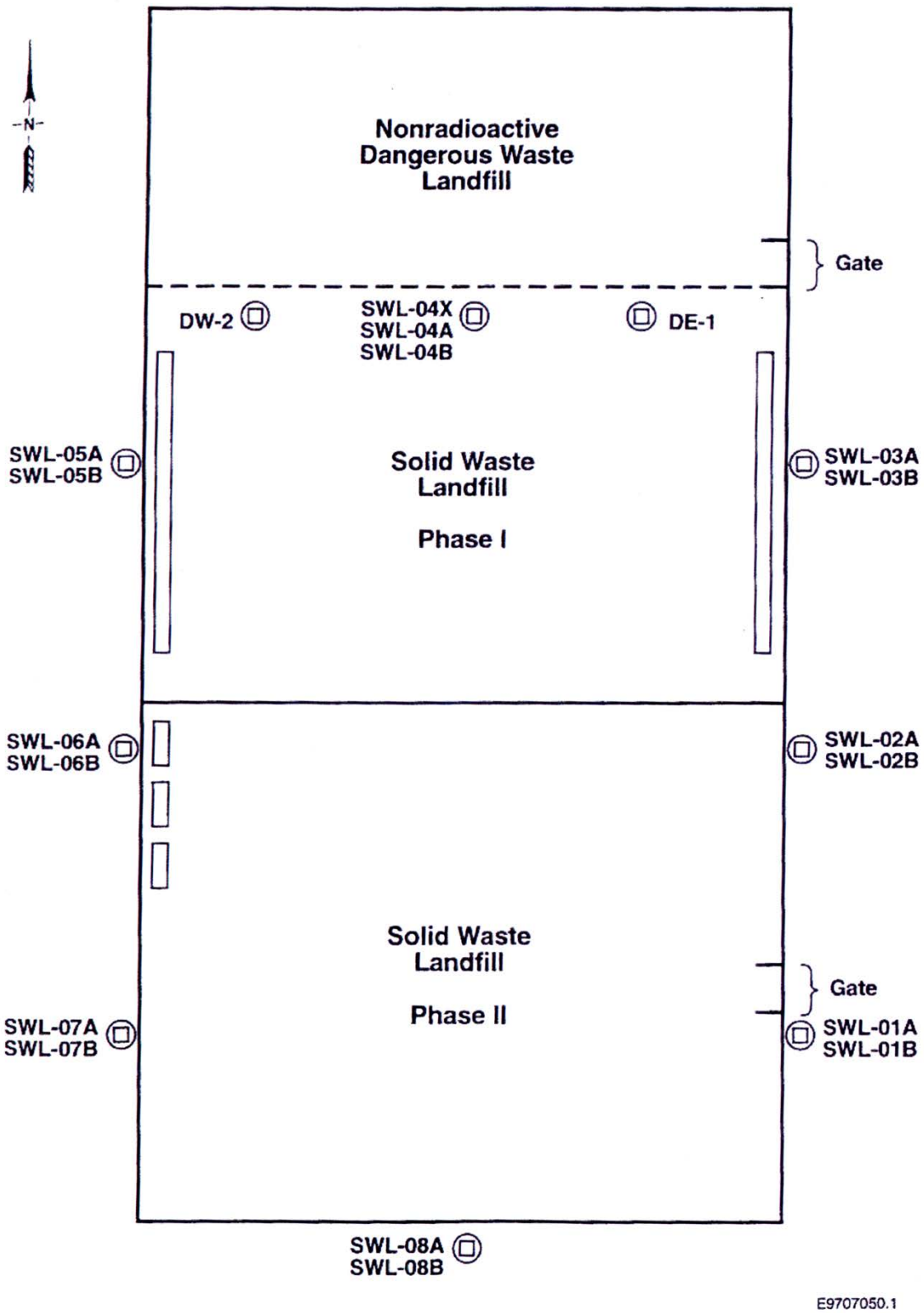


Table 7. Solid Waste Landfill Soil Gas Monitoring Results (March 2012 through September 2012). (2 Sheets)

Constituent/ Sample Month	Sample Station																	
	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)																		
Mar 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.9	16.9	<DL	<DL	<DL	<DL	0.7	<DL	<DL
Jun 2012	<DL	<DL	<DL	<DL	2.1	1.7	0.5	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	2.1	2.6
Aug 2012	<DL	<DL	<DL	2.5	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	1.8
Carbon dioxide (CO_2) (ppm)																		
Mar 2012	13	12	<DL	3	<DL	<DL	230	1441	3536	82	2	5	295	60	12	1	19	9
June 2012	<DL1	42	4	15	16	<DL	2213	5332	2830	2	85	30	172	106	28	2071	412	18
Aug 2012	210	23	11	19	12	18	4998	1616	7320	23	34	41	385	61	41	<DL	183	54
Methylene chloride (DCM) (ppm)																		
Mar 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Jun 2012	<DL	<DL	0.9	2.9	4	0.9	7.2	3.2	4.6	0.8	<DL	15.1	0.8	<DL	0.5	2.6	3.3	<DL
Aug 2012	<DL	1.9	2.6	0.5	0.6	1.8	3	4.4	8	1.4	1.2	1.5	1.7	2.7	1	<DL	0.7	2.4
1,1-Dichloroethane (1,1-DCA) (ppm)																		
Mar 2012	<DL	<DL	<DL	<DL	0.5	<DL	0.5	<DL	>DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Jun 2012	<DL	<DL	<DL	<DL	<DL	<DL	0.4	0.8	<DL	<DL	<DL	<DL	<DL	<DL	0.9	0.4	<DL	<DL
Aug2012	<DL	<DL	<DL	0.7	<DL	<DL	<DL	0.3	0.3	<DL	<DL	<DL	<DL	<DL	0.4	<DL	<DL	<DL
Chloroform (TCM) (ppm)																		
Mar 2012	<DL	<DL	<DL	<DL	<DL	<DL	11.2	1.8	6	<DL	0.4	<DL	0.4	<DL	<DL	<DL	<DL	<DL
Jun 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.2	0.1	<DL	042	<DL	0.4	<DL	<DL	<DL	<DL	<DL
Aug 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
1,1,1-Trichloroethane (1,1,1-TCA) (ppm)																		
Mar 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Jun 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.3	<DL	<DL	<DL	0.4	<DL	<DL	<DL	<DL
Aug 2012	<DL	<DL	<DL	0.2	<DL	<DL	0.3	0.2	0.3	<DL	<DL	0.2	<DL	<DL	0.2	<DL	<DL	<DL
Carbon tetrachloride (CCl_4) (ppm)																		
Mar 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Jun 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Aug 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL

Table 7. Solid Waste Landfill Soil Gas Monitoring Results (March 2012 through September 2012). (2 Sheets)

Constituent/ Sample Month	Sample Station																	
	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**
Trichloroethylene (TCE) (ppm)																		
Mar2012	<DL	<DL	4	<DL	<DL	<DL	<DL	4	9	8	<DL	11	<DL	<DL	34	40	<DL	<DL
Jun 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<3	<DL	12	<DL	<DL	<DL	<DL
Aug 2012	<DL	2	2	5	<DL	3	5	5	6	4	3	2	4	1	<DL	<DL	<DL	7
1,1,2-Trichloroethane (1,1,2-TCA) (ppm)																		
Mar 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Jun 2012	<DL	0.3	<DL	<DL	<DL	<DL	7.4	12.3	8.5	0.6	0.5	0.3	0.7	<DL	<DL	<DL	1.4	1.2
Aug 2012	1	0.3	<DL	<DL	<DL	1.5	9.3	6.4	16.2	0.4	1.2	<DL	1.6	<DL	<DL	0.2	1.8	1
Tetrachloroethene (PCE) (ppm)																		
Mar 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Jun 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL
Aug 2012	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL

NOTE: Monitoring was not completed during the 1st quarter due to major layoffs in the Groundwater Monitoring Programs.

APPENDIX

GROUNDWATER TRENDS

Figure A-1. 1,1,1-Trichloroethane Trend – January 1, 2000 to September 30, 2012.

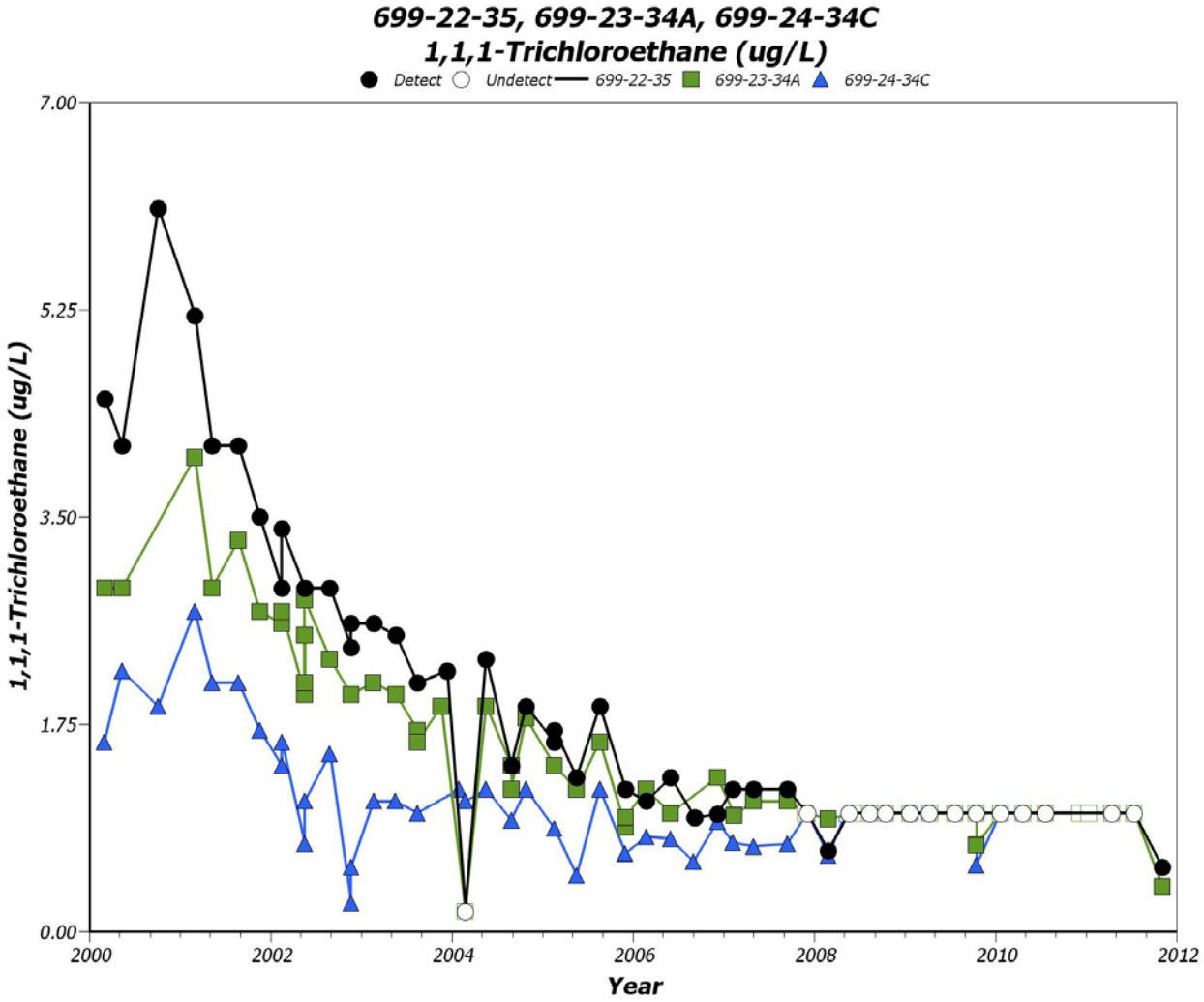


Figure A-2. 1,1-Dichloroethane Trend – January 1, 2000 to September 30, 2012.

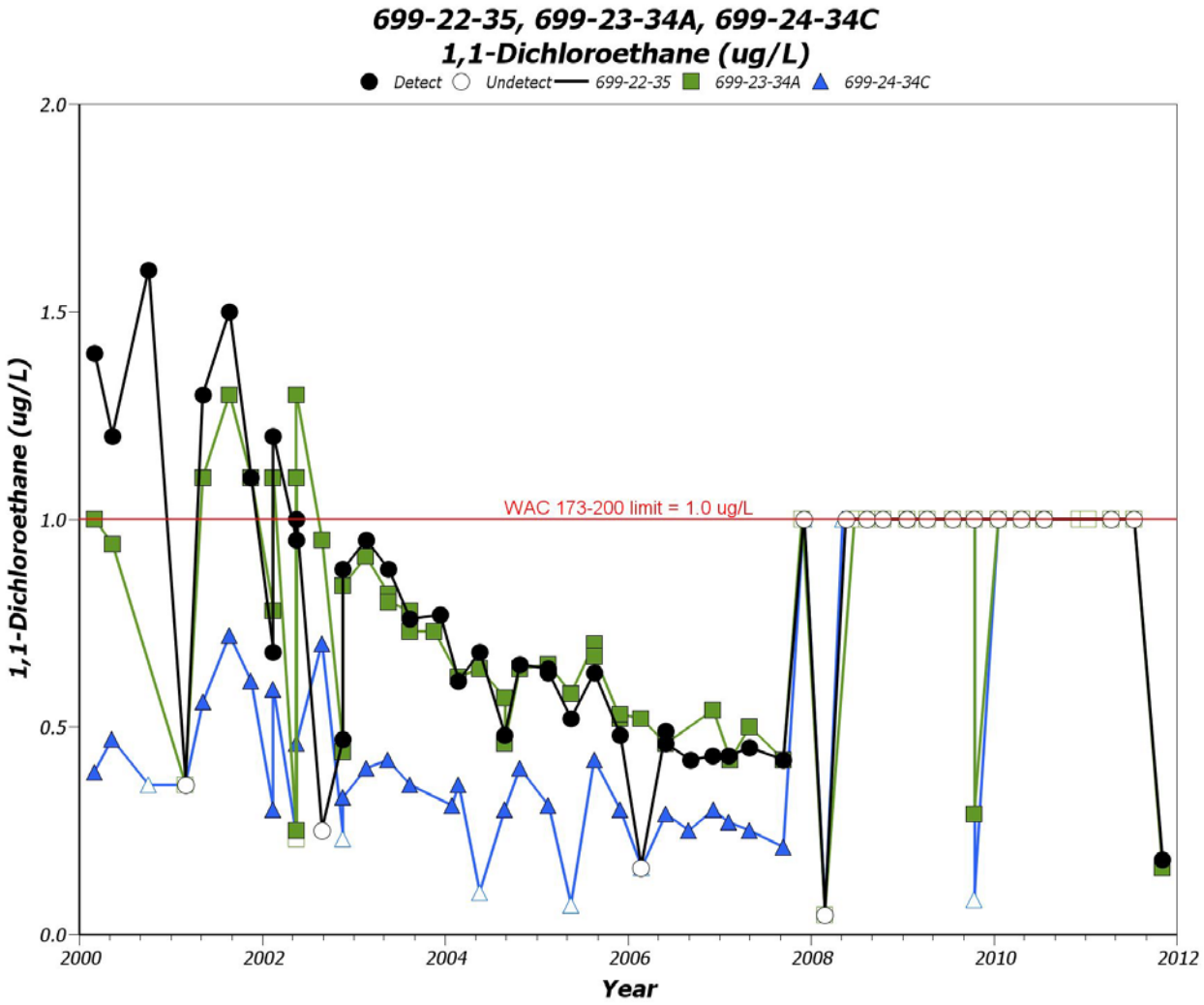


Figure A-3. Carbon Tetrachloride Trend – January 1, 2000 to September 30, 2012.

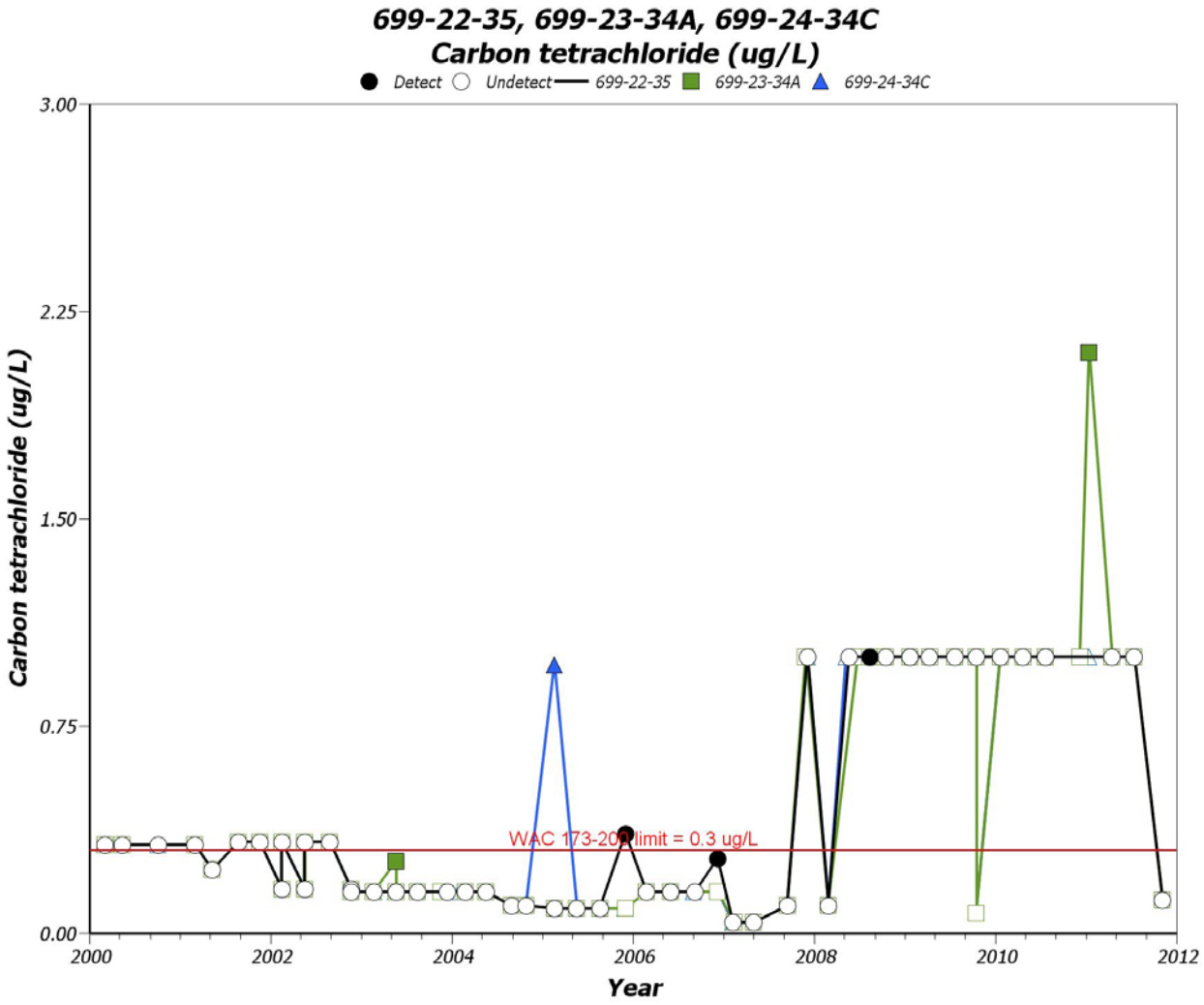


Figure A-4. Chloroform Trend – January 1, 2000 to September 30, 2012.

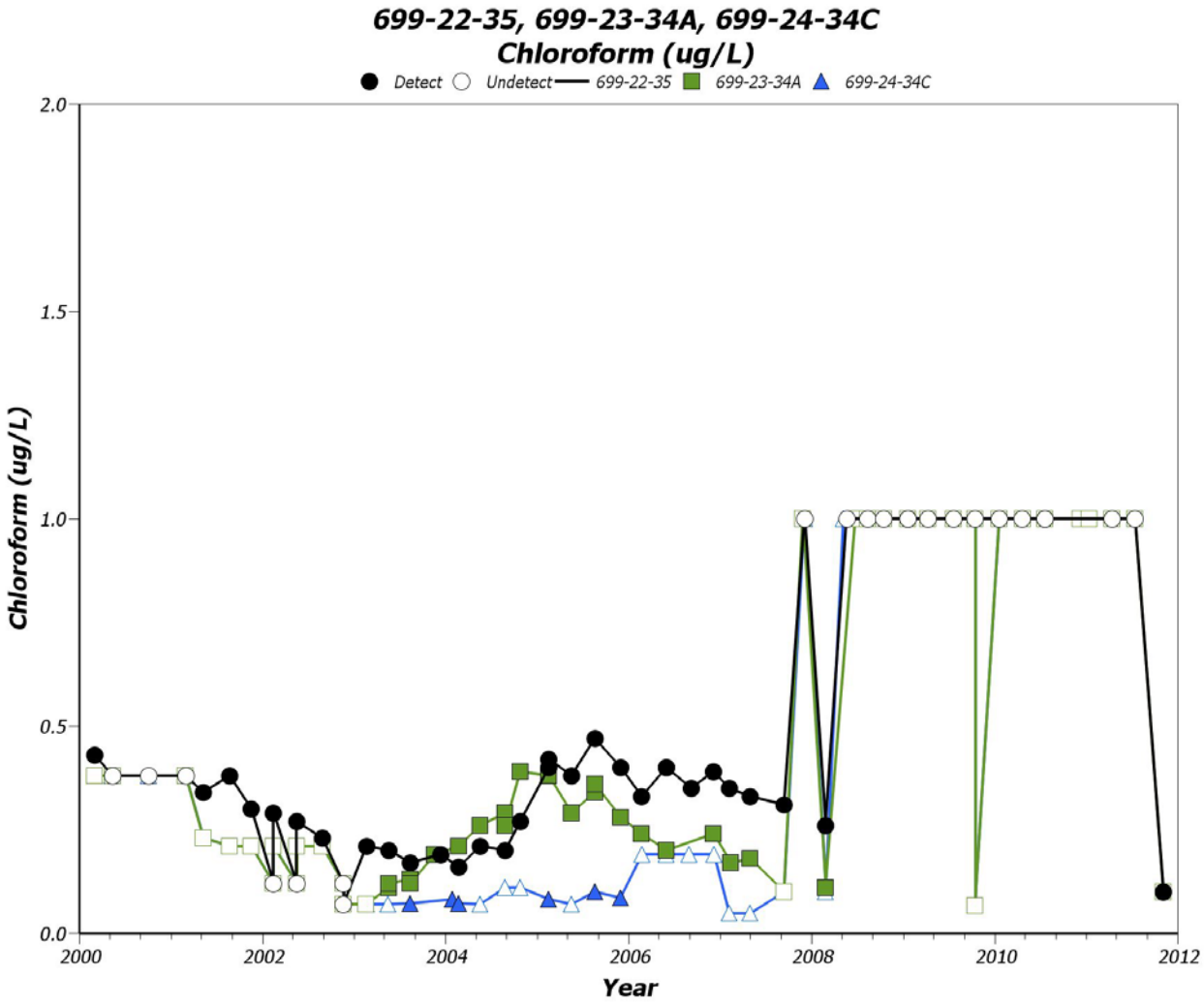


Figure A-5. Tetrachloroethene Trend – January 1, 2000 to September 30, 2012.

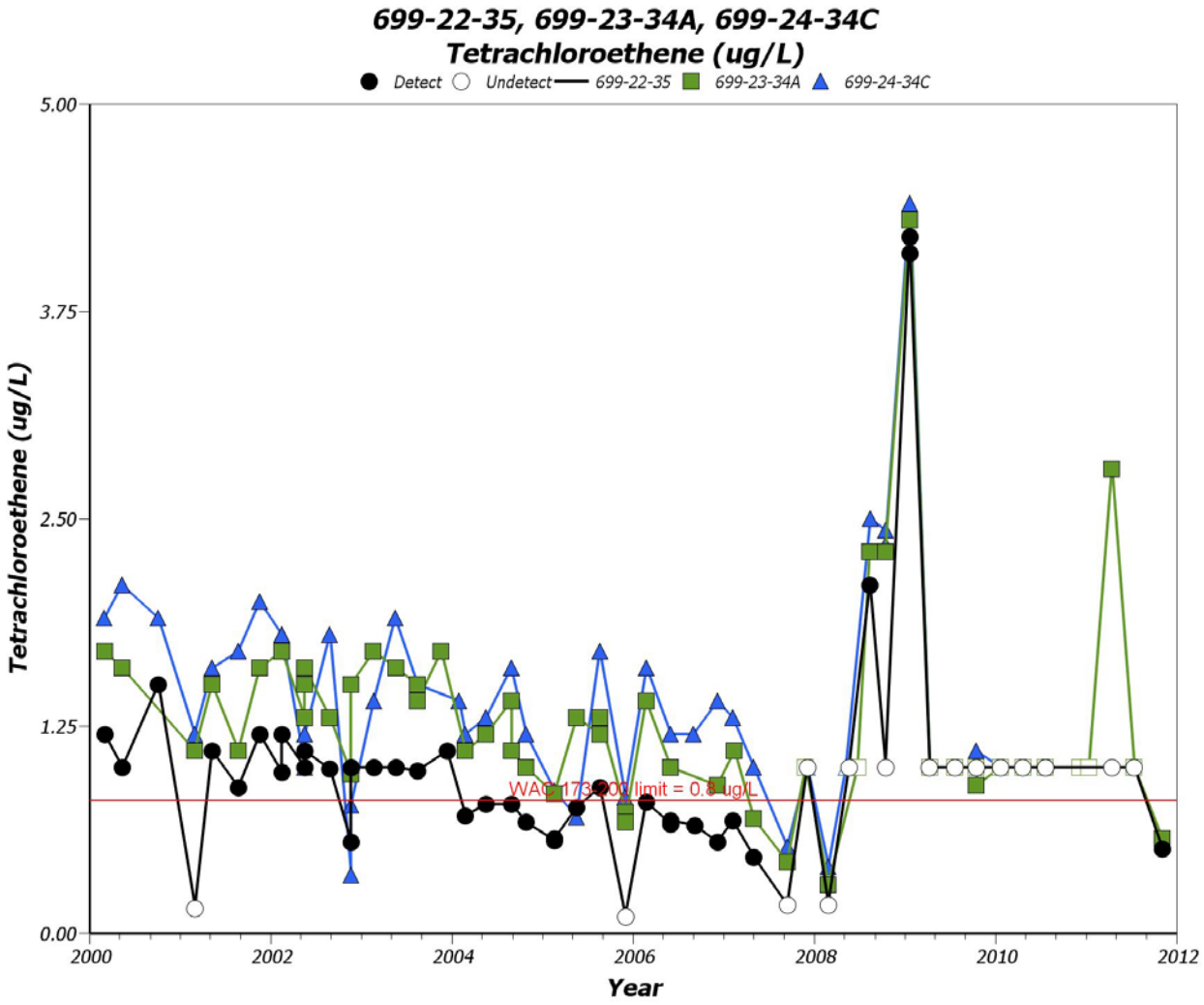
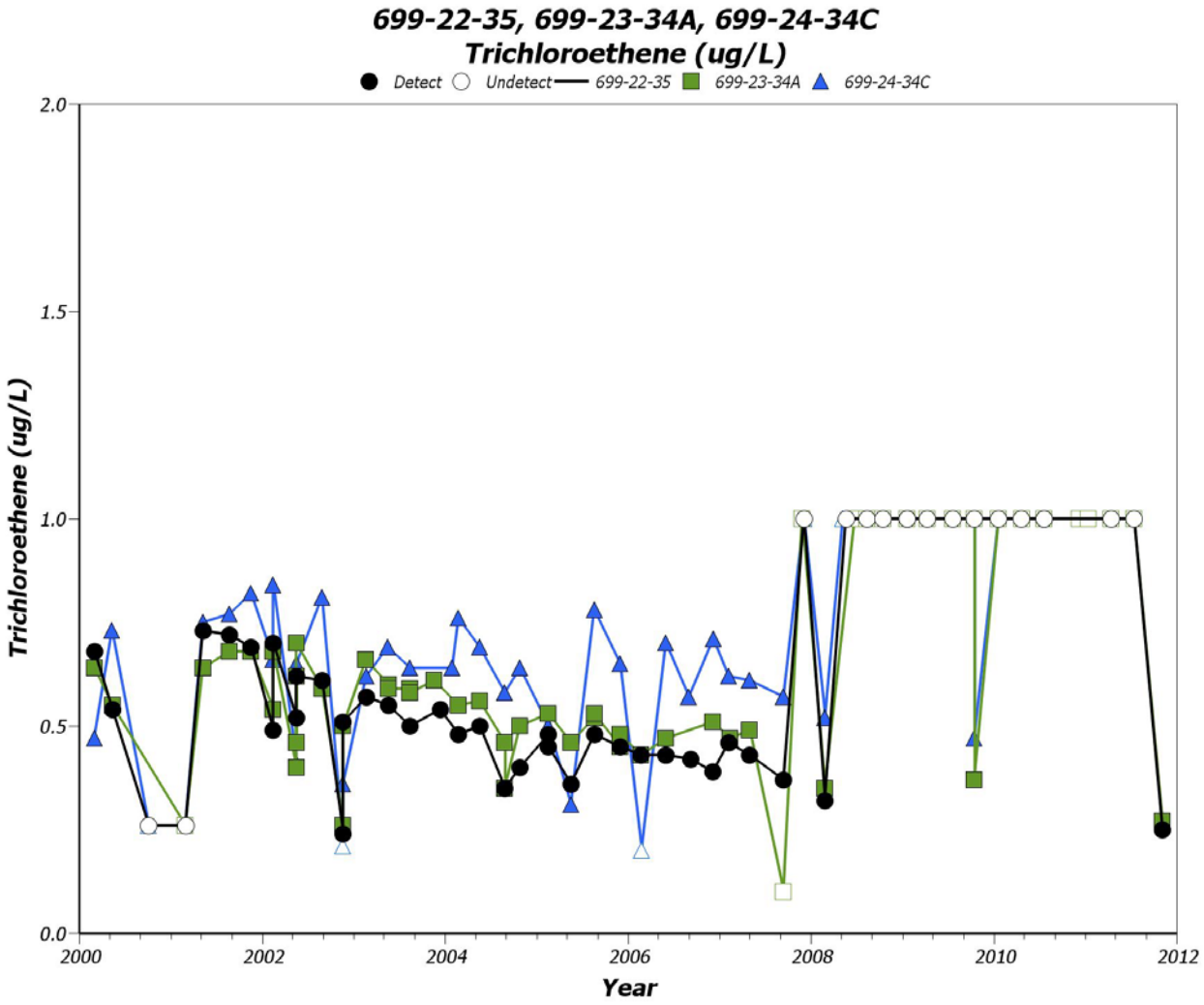



Figure A-6. Trichloroethene Trend – January 1, 2000 to September 30, 2012.