HANFORD SITE SOLID WASTE LANDFILL
ANNUAL MONITORING REPORT

July 2006 through June 2007

This report summarizes results of leachate, groundwater, and soil gas monitoring performed at the Hanford Site Solid Waste Landfill during the period of July 2006 through June 2007. The Hanford Site Solid Waste Landfill stopped receiving waste in March 1996 and is in interim closure status.

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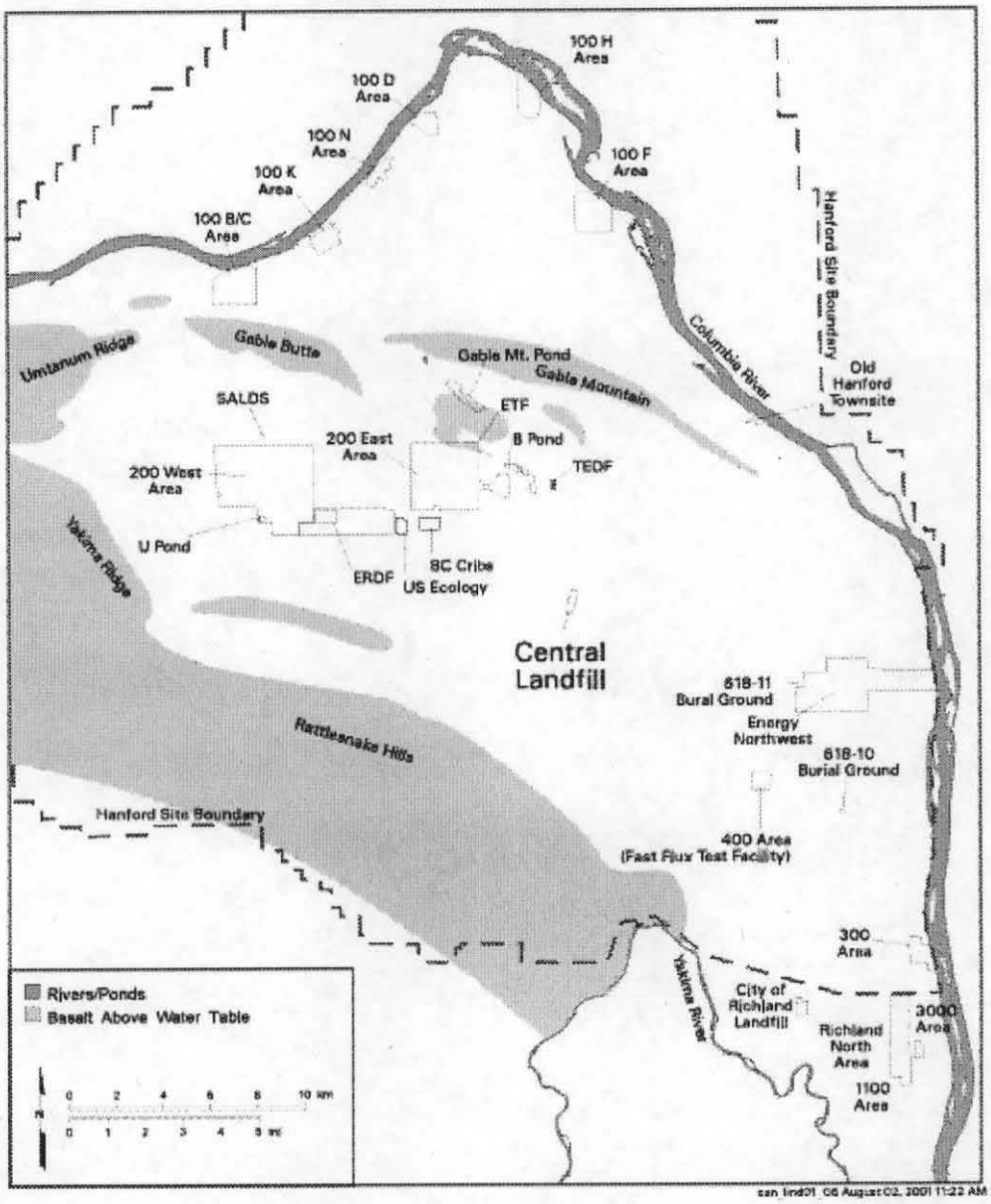
1.0 Introduction

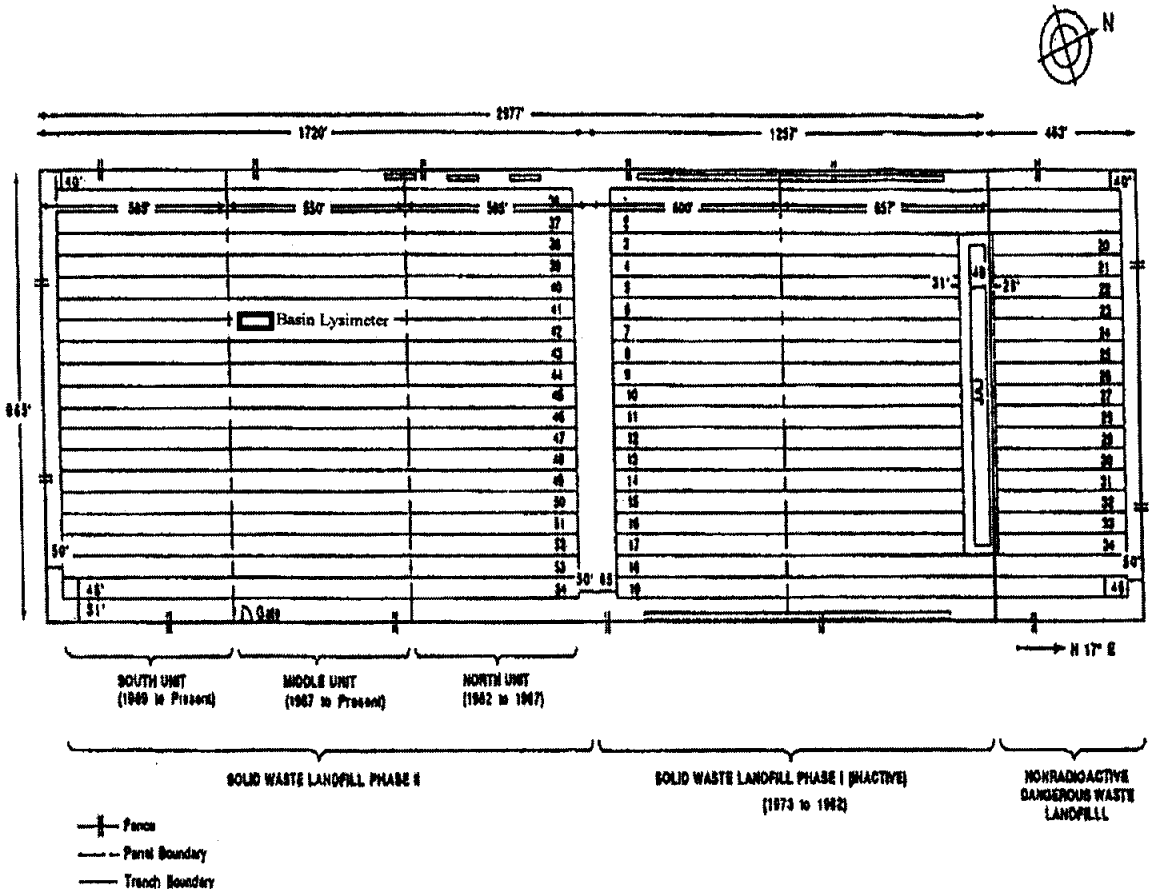
The Hanford Solid Waste Landfill (SWL) covers approximately 27 hectares (66 acres) and began operations in 1973. Figure 1 shows location of the SWL (Central Landfill) in relation to the Hanford Site.

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 that could indicate increased risks to human health and the environment. Current monitoring includes leachate, groundwater, and soil gas. The following sections provide information for monitoring performed from July 2006 through June 2007.

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 refuse. Figure 2 shows the location of the basin lysimeter in relation to other landfill trenches. The collected leachate is disposed through a permitted wastewater system.

Leachate monitoring provides an indication of what contaminants 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 and is 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 are still essentially bare.

2.1 Leachate Generation

Leachate is removed from the underground lysimeter collection tank every 10 to 14 days. During the period of July 2006 through June 2007, a total of 836 gallons of leachate was generated, for a daily average during the year of 2.3 gallons. This is about a 35% increase in leachate generation over the previous year, when the daily average was 1.7 gallons. This increase is mainly attributed to wetter than normal precipitation recorded at Hanford in October 2006 (0.76 inch, which is 155% of normal [i.e., 0.49 inch]) and December 2006 (1.75 inches, which is 158% of normal [i.e., 1.11 inches]).

The Hanford Meteorological Station recorded 2.65 inches of rain during the December 2006 through February 2007 period, which is 99% of normal (i.e., 2.66 inches). Total precipitation for 2007 (i.e., January through June 2007) is 2.65 inches, which is 75% of normal (i.e., 3.53 inches). Because the precipitation recorded at Hanford during the first half of 2007 is less than normal, a decrease in drainage through the lysimeter is expected to be seen in the second half of 2007 (i.e., July through December 2007).

Table 1 provides leachate volumes by month for the reporting period. A chart of generation rates over the past 9 years is provided in Figure 3. As data in Figure 4 indicate, about 30% of the precipitation drains through the vadose zone.

Table 1 – Leachate Generation Volumes

Month	Volume (gallons)	Average Rate (gallons/day)
July 2006	52	1.68
August 2006	48	1.55
September 2006	56	1.87
October 2006	71	2.29
November 2006	74	2.47
December 2006	96	3.10
January 2007	133	4.29
February 2007	46	1.64
March 2007	71	2.29
April 2007	75	2.50
May 2007	85	2.74
June 2007	29	0.97

Figure 3 – Leachate Generation Rate

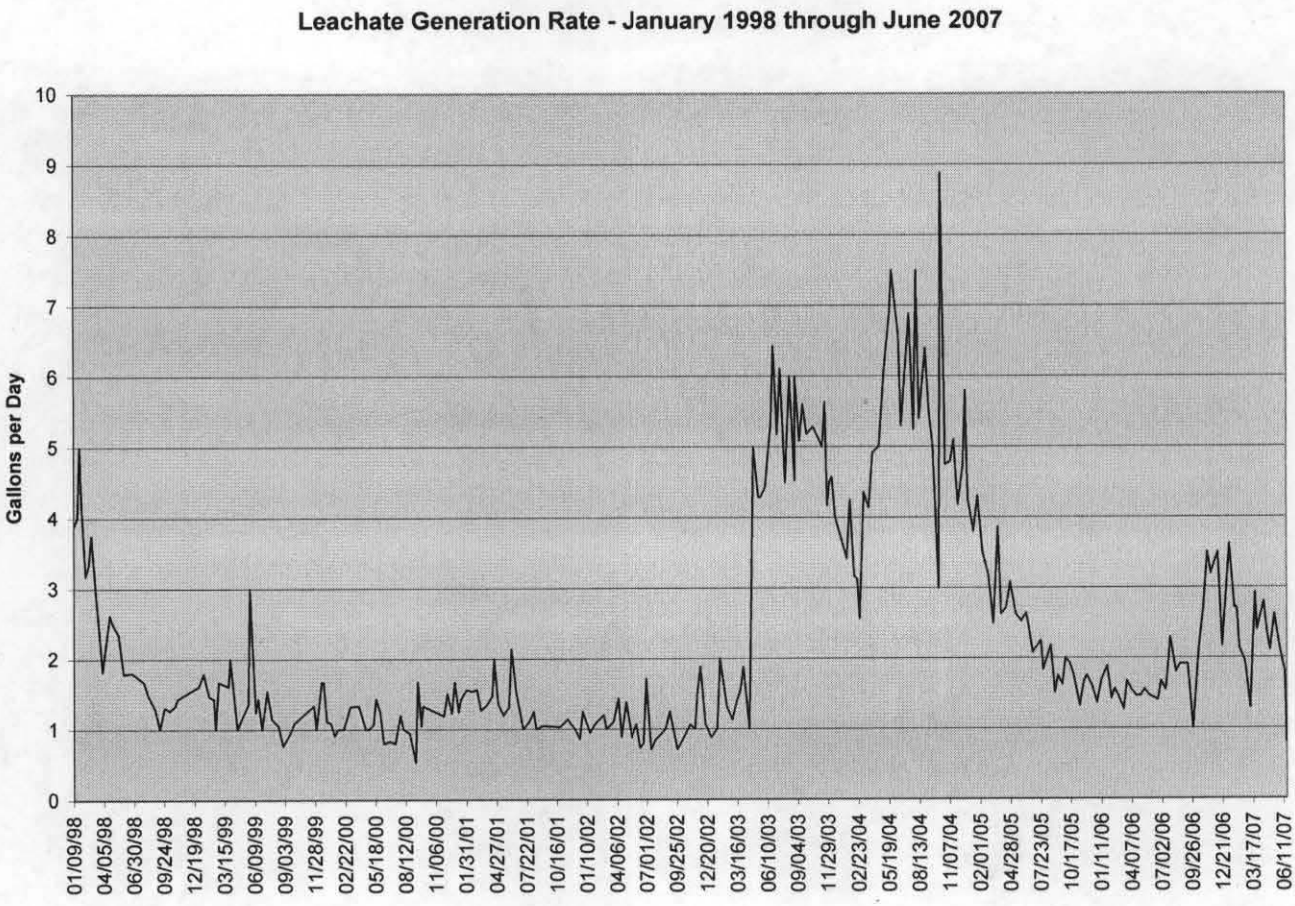
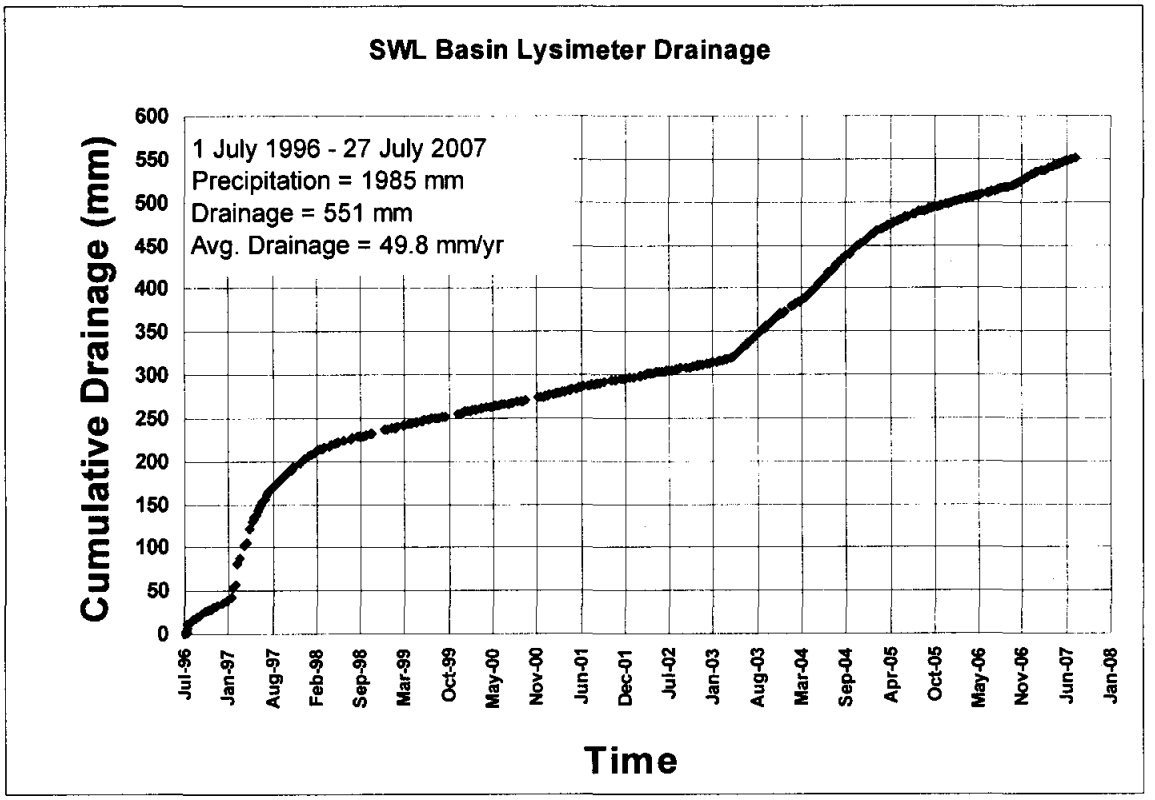


Figure 4 – Solid Waste Landfill Basin Lysimeter Drainage



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 WAC 173-304-490 are monitored on a quarterly basis. In addition, at least once per year, the leachate is tested for a complete range of metals and organics (i.e., site-specific parameters). During this reporting period, the site-specific parameters were analyzed twice; laboratory reports 20061153 (issued October 19, 2006) and WSCF20071028 (issued July 19, 2007) show testing results for the site-specific parameters. The values identified are similar to previous results 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 Groundwater Quality Criteria (GWQC) and/or Maximum Contaminant Levels (MCL) for public water supplies established in WAC 246-290. 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. Groundwater monitoring results are reported in Section 3.0.

Table 2 – Leachate Monitoring Results – Key Constituents

Parameter[1]	Results by Quarter				GWQC[2]	MCL[3]
	3rd 2006	4th 2006	1st 2007	2nd 2007		
Indicator Parameters						
Conductivity (uS/cm)	1,680	1,860	1,920	2,000	NA	700 umhos/cm
pH	7.35	6.74	6.89	7.32	6.5-8.5	NA
Ammonia as N (mg/L)	0.330	0.340	0.292	NT	NA	NA
Dissolved Iron (ug/L)	87.9	9,850	8,870	6,400	0.3 mg/L	0.3 mg/L
Dissolved Manganese (ug/L)	1,580	1,590	1,540	1,295[5]	0.05 mg/L	0.05 mg/L
Dissolved Zinc (ug/L)	187	40.5	109	155[6]	5.0 mg/L	5.0 mg/L
Chemical Oxygen Demand (mg/L)	222	220	208	204	NA	NA
Total Organic Carbon (mg/L)	701	100	76.5	275	NA	NA
Site-Specific Parameters						
Total Dissolved Solids (mg/L)	1,460	NT	NT	1,380	500 mg/L	500 mg/L[4]
Total Organic Halides (ug/L)	NT	NT	NT	846	NA	NA
Arsenic (ug/L)	29.3	NT	NT	20.1	0.05 ug/L	0.010 mg/L
Barium (ug/L)	519	NT	NT	452	1.0 mg/L	2.0 mg/L
Cadmium (ug/L)	<0.100	NT	NT	<0.100	0.01 mg/L	0.005 mg/L
Chloride (mg/L)	210	191	192	199	250 mg/L	25.0 mg/L
Copper (ug/L)	1.60	NT	NT	1.03	1.0 mg/L	NA
Fluoride (mg/L)	<0.145	<0.0315	<0.321	0.207	4 mg/L	4 mg/L
Nickel (ug/L)	110	NT	NT	92.9	NA	0.1 mg/L
Selenium ug/L)	2.58	NT	NT	2.15	0.01 mg/L	0.05 mg/L
Sulfate (mg/L)	5.66	7.67	6.32	7.77	250 mg/L	25 mg/L
1,1-Dichloroethane (ug/L)	<1.0	NT	NT	<1.0	1.0 ug/L	NA
1,1,1-Trichloroethane (ug/L)	<1.0	NT	NT	<1.0	0.20 mg/L	0.2 mg/L
1,4-Dioxane (ug/L)	<25.0	NT	NT	<20.0	7 ug/L	NA
1,4-Dichlorobenzene (ug/L)	6.5[7]	NT	NT	4.15[8]	4 ug/L	NA
Carbon Tetrachloride (ug/L)	<1.0	NT	NT	<1.0	0.3 ug/L	0.005 mg/L
Chloroform (ug/L)	<1.0	NT	NT	<1.0	7.0 ug/L	NA
Methylene Chloride (ug/L)	<1.0	NT	NT	1.25[9]	5 ug/L	NA
Tetrachloroethene (ug/L)	<1.0	NT	NT	<1.0	NA	NA
Trichloroethene (ug/L)	<1.0	NT	NT	<1.0	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.

[5] Averaged result from two samples; one sample result was 1,200 ug/L and one sample result was 1,390 ug/L.

[6] Averaged result from two samples: one sample result was 120 ug/L and one sample result was 190 ug/L.

[7] Averaged result from two samples: one sample result was <1.0 ug/L and one sample result was 12.0 ug/L.
[8] Averaged result from two samples: one sample result was <1.0 ug/L and one sample result was 7.30 ug/L.
[9] Averaged result from two samples: one sample result was <1.0 ug/L and one sample result was 1.50 ug/L.

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 5 for location of SWL groundwater monitoring wells. These wells are monitored quarterly 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 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 over the past four quarters is provided in Table 3 below.

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	Total Organic Halides
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	Gross alpha
Benzene	Fluoride	Strontium (elemental)	Gross beta
Beryllium	Iron (dissolved)	Sulfate	

During the July through September 2006 quarter, samples at the two upgradient wells (i.e., 699-24-35 and 699-26-35A) and downgradient well 699-23-34A were not taken because of safety concerns (high buildup of tumbleweeds which created a high fire hazard) and a lack of personnel available to meet all sampling needs across the Hanford Site. The remaining six groundwater wells at the SWL were sampled successfully.

Prioritization of Site groundwater monitoring due to resource constraints resulted in deferral of collection from the two upgradient wells and one downgradient well (i.e., 699-24-33) for the October through December 2006 quarter to January 2007. Sampling at the remaining six wells was completed successfully during the October through December 2006 quarter.

All groundwater wells at the SWL were sampled successfully during the third and fourth quarters (i.e., January through March 2007, and April through June 2007) for this reporting period.

3.1 Background Threshold Value Exceedances

Sample results for SWL groundwater monitoring wells are compared to background threshold values (BTV) for several parameters. 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, chloride, coliform bacteria, field pH, specific conductance, and sulfate were exceeded. During this reporting period, BTVs for these parameters again showed some exceedances.

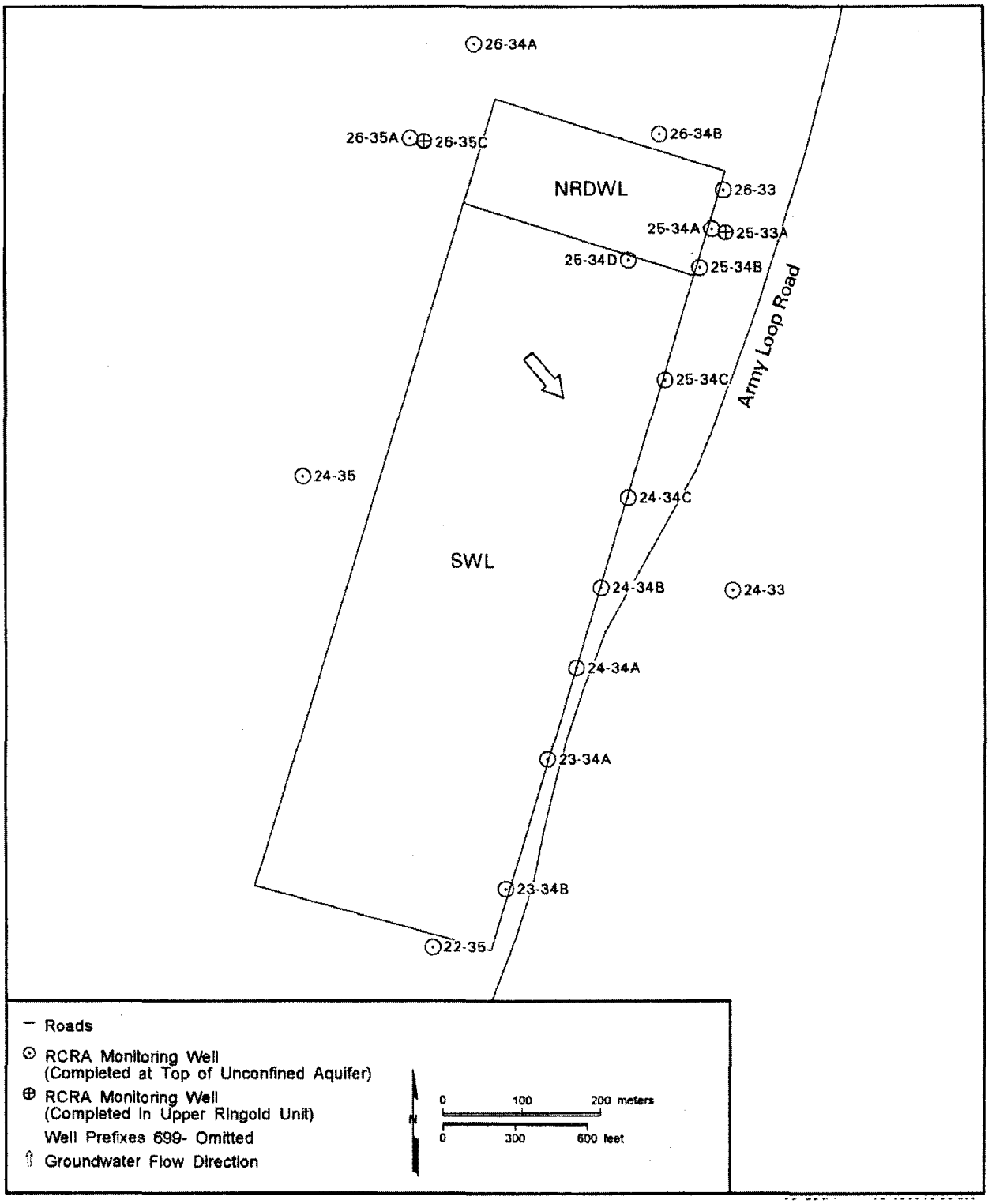
Table 4 summarizes the exceedances during the four quarters of sampling associated with this reporting period.

Table 4 – Background Threshold Value Exceedances

Parameter (BTV)	Maximum Previous Year	July-Sept 2006	Oct-Dec 2006	Jan-Mar 2007	Apr-June 2007
Chemical Oxygen Demand (10,000 µg/L)	127,000 µg/L @ 699-24-34C	- Four down-gradient - Maximum: 27,000 µg/L @ 699-24-33	- Five down-gradient - Maximum: 285,000 µg/L @ 699-22-35	- One upgradient - Maximum: 22,000 µg/L @ 699-26-35A	- Four wells - Maximum: 62,000 µg/L @ 699-26-35A
Chloride (7,820 µg/L)	8,400 µg/L @ 699-24-34A	- Five down-gradient - Maximum: 8,400 µg/L @ 699-22-35 and 699-24-34B	No exceedances	- Four down-gradient and two upgradient - Maximum: 9,700 µg/L @ 699-23-34B	No exceedances
Coliform bacteria (1 colony/100 ml)	16 colonies/ 100 ml @ 699-24-34C	- Two down-gradient - Maximum: 16 colonies/100 ml @ 699-24-34C	- One down-gradient - Maximum: 345 colonies/100 ml @ 699-23-34A	No exceedances	- One down-gradient and one upgradient - Maximum: 14.8 colonies/100 ml @ 699-24-33 and 699-26-35A
Field pH (6.68-7.84)	6.60 @ 699-23-34A (lowest value)	- One down-gradient 6.65 @ 699-23-34B	- One down-gradient 6.63 @ 699-23-34A	No exceedances	- One down-gradient 6.49 @ 699-23-34A
Specific Conductance (583 µS/cm)	826 µS/cm @ 699-22-35	- Six down-gradient and one upgradient - Maximum: 813 µS/cm @ 699-22-35	- Six down-gradient - Maximum: 829 µS/cm @ 699-22-35	- All down-gradient - Maximum: 826 µS/cm @ 699-22-35	- All down-gradient - Maximum: 809 µS/cm @ 699-22-35
Sulfate (47,200 µg/L)	61,900 µg/L @ 699-24-34B	- One down-gradient - Maximum: 66,900 µg/L @ 699-24-34B	No exceedances	No exceedances	No exceedances

The analytical results for this reporting period are typical of results shown in previous years and are consistent with the type of waste disposed in the landfill, including sewage and chlorinated hydrocarbons from the 1100 Area heavy equipment garage and bus shop. Chemical oxygen demand and coliform bacteria continued to show erratic results in response to the sewage disposed at the Site. Specific conductance remains steady to slightly decreasing at the SWL wells. Field measurements of pH in downgradient wells continued to be lower than wells upgradient of the landfill.

Figure 5 – Location of Groundwater Monitoring 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 filtered 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. Table 5 provides a summary of the exceedances during the four quarters of sampling included in this report.

Table 5 – GWQC and Drinking Water MCL Exceedances

Parameter (Limit)	Maximum Previous Year	July-Sept 2006	Oct-Dec 2006	Jan-Mar 2007	Apr-June 2007
Filtered arsenic (0.05 µg/L)[1]	3.8 µg/L @ 699-24-34B	No exceedances	- One down-gradient - Maximum: 2.5µg/L @ 699-23-34B	- One down-gradient and both upgradient - Maximum: 2.5 µg/L @ 699-24-35	No exceedances
pH (6.5-8.5)[1]	No exceedances	No exceedances	- One down-gradient - 6.63 @ 699-23-34A	No exceedances	- One down-gradient 6.49 @ 699-23-34A
Specific conductance (700 µS/cm)[2]	826 µS/cm @ 699-22-35	- Five down-gradient - Maximum: 813 µS/cm @ 699-22-35	- Three downgradient - Maximum: 829 µS/cm @ 699-22-35	- Five down-gradient - Maximum: 826 µS/cm @ 699-22-35	- Four downgradient - Maximum: 809 µS/cm @ 699-22-35
Tetrachloro-ethene (0.8 µg/L)[1]	1.8 µg/L @ 699-24-33	- Three down-gradient t - Maximum: 1.4 µg/L @ 699-24-33 and 699-24-34B	- Two down-gradient - Maximum: 0.89 µg/L @ 699-23-34A	- Five down-gradient and one upgradient - Maximum: 1.5 µg/L @ 699-24-33	- Four downgradient - Maximum: 1.2 µg/L @ 699-24-33

[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 downgradient wells continued to be lower than upgradient wells at the Site. Specific conductance remains steady to slightly decreasing at SWL wells. Volatile organic compounds (such as tetrachloroethene) continued to decrease slightly in concentration.

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 foot (0.13 meter) 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 foot (0.02 to 0.13 meter) 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 foot (0.07 meter) from March 2005 to April 2006. This is less than the previous annual decline (i.e., 0.055 foot [0.13 meter] 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 foot [0.17 meter] 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).

3.4 Chlorinated Organics in Target Wells

Based on past monitoring of the 10 wells in the SWL groundwater monitoring program, six 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 that 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. With the exception of tetrachloroethene; the levels for all of the chlorinated organic constituents shown in these figures are currently below WAC 173-300 GWQC. Tetrachloroethene levels, as indicated previously, are slightly above GWQC thresholds in some of the wells, with an apparent downward trend. 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. Other wells exhibit similar downward trends.

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)			
2006		2007		2006		2007		2006		2007		2006		2007	
3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd
1,1,1 Trichloroethane (GWQC of 200 ug/L)**															
0.96j	0.99j	1.2	1.2	***	1.3	0.98j	1.1	0.59j	0.93j	0.75j	0.72j	***	1.0	1.0	0.85j
1,1 Dichloroethane (GWQC of 1 ug/L)**															
0.42j	0.43j	0.43j	0.45j	***	0.54j	0.42j	0.5j	0.25j	0.3j	0.27j	0.25j	***	0.19j	0.21j	0.19j
Carbon Tetrachloride (GWQC of 0.3 ug/L)**															
0.15u	0.27j	0.039u	0.039u	***	0.15u	0.039u	0.039u	0.15u	0.15u	0.039u	0.039u	***	0.039u	0.039u	0.039u
Chloroform (GWQC of 7 ug/L)**															
0.35j	0.39j	0.35j	0.33j	***	0.24j	0.17j	0.18j	0.19u	0.19u	0.048u	0.048u	***	0.048u	0.048u	0.048u
Tetrachloroethene															
0.65j	0.55j	0.68j	0.46j	***	0.89j	1.1	0.69j	1.2	1.4	1.3	1.0	***	0.64j	0.94j	0.45j
Trichloroethene															
0.42j	0.39j	0.46j	0.43j	***	0.51j	0.47j	0.49j	0.57j	0.71j	0.62j	0.61j	***	0.42j	0.5j	0.35j

*Units in ug/L

**Groundwater Quality Criteria from WAC 173-200

***Not sampled; see Section 3.0.

j means the reported value is estimated because analyte was detected at a level less than the required detection level or the practical quantitation limit and greater than or equal to the method detection level.

u means non-detect or below the method detection level.

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 feet (2.7 and 4.6 meters), 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 6 for location of soil gas monitoring stations.

In addition to performing soil gas monitoring at the eight monitoring stations described in the Hanford Solid Waste Landfill Closure Plan (HNF-7173), two stations (DE-1 and DW-2), along the border of the Non-Radioactive Dangerous Waste Landfill, are sampled routinely. During the January through March 2007 quarter, samples were not collected at soil gas monitoring station DE-1 because tumbleweeds had accumulated over the sample port making it impossible for the port to be located and a sample to be collected. During the April through June 2007 quarter, the tumbleweeds over soil gas monitoring station DE-1 were burned as a fire prevention measure; DE-1 was damaged during this preventive measure and no sample was collected. For the two quarters where no samples were collected at DE-1, sample data from soil gas monitoring stations SWL-04 and SWL-03, which are located within the vicinity of the damaged sample station (i.e., DE-1), were reviewed to make sure sample results remained consistent with past sampling results (specifically results as reported in the 2005-2006 annual report). All data for methane, carbon dioxide, and the key volatile organic

constituents were consistent with data as reported in the 2005-2006 annual report for the SWL. At this time, there are no plans to replace/repair soil gas monitoring station DE-1 because the eight-station SWL monitoring network provides adequate coverage and sample results remain at or below detection limits.

A summary of soil gas monitoring results are 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. When pressure is rising, the carbon dioxide values are lower. Soil gas monitoring station SWL-04A continues to show high carbon dioxide values; this sample port usually has at least one tube with high carbon dioxide values.

Figure 6 – Soil Gas Monitoring Stations

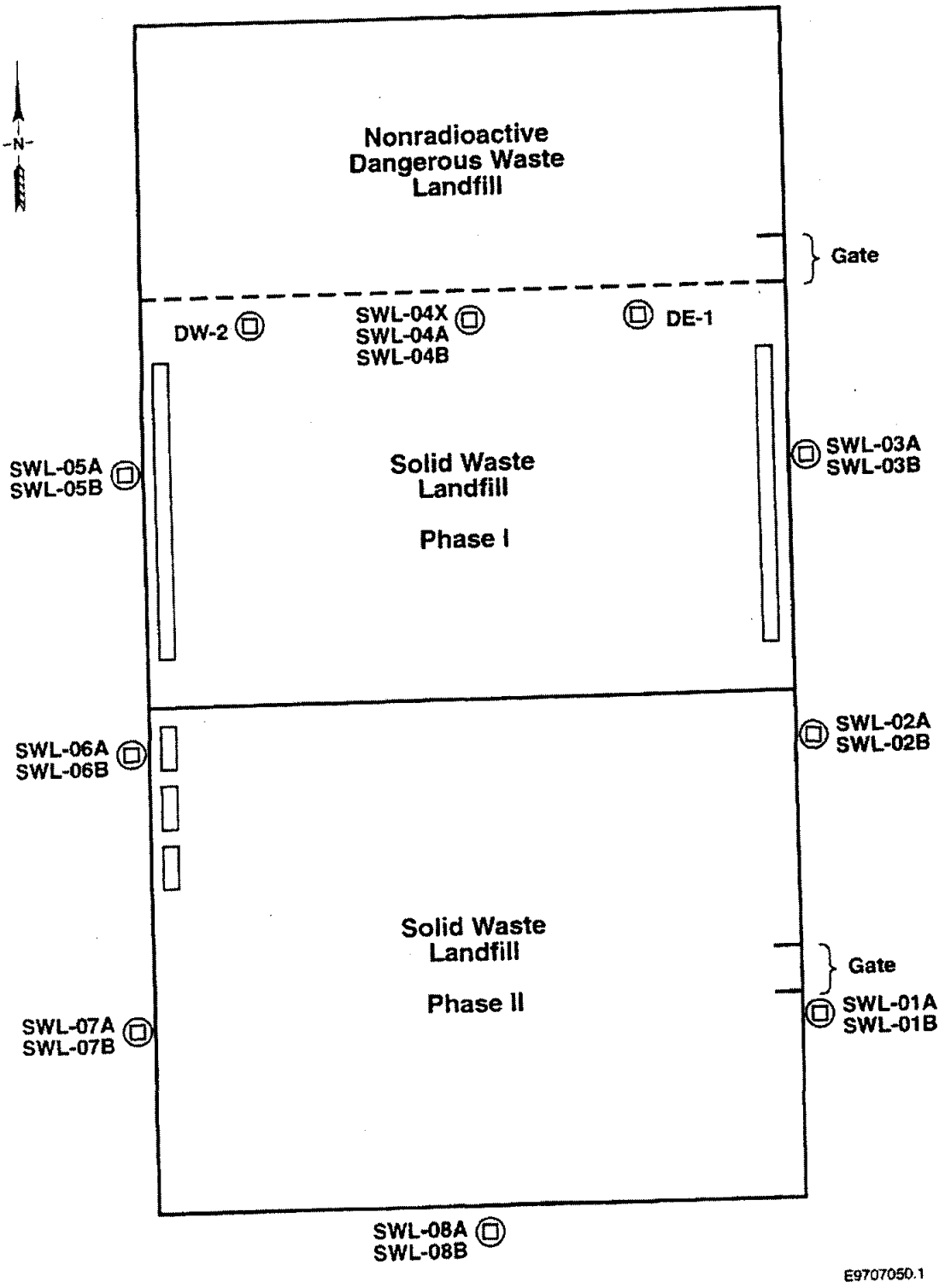


Table 7 – SWL Soil Gas Monitoring Results
(July 2006 through June 2007)

Constituents / Sample Month	Wells																	
	01-A	01-B	02-A	02-B	03-A	03-B	04-A	04-B	04-X	DE-1	DW-2	05-A	05-B	06-A	06-B	07-A	07-B	08-A	08-B
Methane (CH_4) (ppm)																			
Sept 2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dec 2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
March 2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[2]	0.0	0.0	0.0	0.0	0.0	0.0	[1]	0.0	0.0
May 2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[3]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carbon dioxide (CO_2) (ppm)																			
Sept 2006	0.0	0.0	0.0	0.0	4,259	6,740	0.0	11,310	0.0	9,380	0.0	0.0	2,522	0.0	0.0	0.0	1,080	0.0	824
Dec 2006	0.0	0.0	0.0	0.0	4,259	6,740	0.0	11,310	0.0	9,380	0.0	0.0	2,522	0.0	0.0	0.0	1,080	0.0	824
March 2007	4,675	5,892	5,985	7,683	0.0	4,098	7,344	7,126	3,770	[2]	3,950	4,241	1,035	5151	5,961	2,979	[1]	2,150	2,020
May 2007	458	475	32	298	545	124	13,971	120	755	[3]	93	240	473	717	813	797	1,129	861	996
Methylene chloride (DCM) (ppm)																			
Sept 2006	<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	<0.44	<0.44	<0.44	<0.44
Dec 2006	<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	<0.44	<0.44	<0.44	<0.44
March 2007	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	[2]	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	[1]	<0.44	<0.44
May 2007	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	[3]	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44
1,1-Dichloroethane (1,1-DCA) (ppm)																			
Sept 2006	<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	<0.22	<0.22	<0.22	<0.22
Dec 2006	<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	<0.22	<0.22	<0.22	<0.22
March 2007	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	[2]	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	[1]	<0.22	<0.22
May 2007	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	[3]	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22
Chloroform (TCM) (ppm)																			
Sept 2006	<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	<0.07	<0.07	<0.07	<0.07
Dec 2006	<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	<0.07	<0.07	<0.07	<0.07
March 2007	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[1]	<0.07	<0.07
May 2007	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[3]	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
1,1,1-Trichloroethane (1,1,1-TCA) (ppm)																			
Sept 2006	<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	<0.15	<0.15	<0.15	<0.15
Dec 2006	<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	<0.15	<0.15	<0.15	<0.15
March 2007	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	[2]	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	[1]	<0.15	<0.15
May 2007	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	[3]	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15

Carbon tetrachloride (CCl_4) (ppm)																			
Sept 2006	<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	<0.09	<0.09	<0.09	<0.09
Dec 2006	<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	<0.09	<0.09	<0.09	<0.09
March 2007	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	[2]	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	[1]	<0.09	<0.09
May 2007	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	[3]	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Trichloroethylene (TCE) (ppm)																			
Sept 2006	<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	<1.2	<1.2	<1.2	<1.2
Dec 2006	<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	<1.2	<1.2	<1.2	<1.2
March 2007	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[2]	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[1]	<1.2	<1.2
May 2007	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	[3]	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,1,2-Trichloroethane (1,1,2-TCA) (ppm)																			
Sept 2006	<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	<0.07	<0.07	<0.07	<0.07
Dec 2006	<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	<0.07	<0.07	<0.07	<0.07
March 2007	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[2]	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[1]	<0.07	<0.07
May 2007	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	[3]	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Tetrachloroethylene (PCE) (ppm)																			
Sept 2006	<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	<0.16	<0.16	<0.16	<0.16
Dec 2006	<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	<0.16	<0.16	<0.16	<0.16
March 2007	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	[2]	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	[1]	<0.16	<0.16
May 2007	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	[3]	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16

[1]Sample tube was filled with water and no sample was collected.
[2]Sample port was covered by 20 feet of tumbleweeds. No sample was collected.
[3]Sample port was damaged when tumbleweeds were burned. No sample was collected.

Appendix – Groundwater Trends

Figure A-1 – 1,1,1-Trichloroethane Trend

1,1,1-Trichloroethane Trend - May 1987 through May 2007

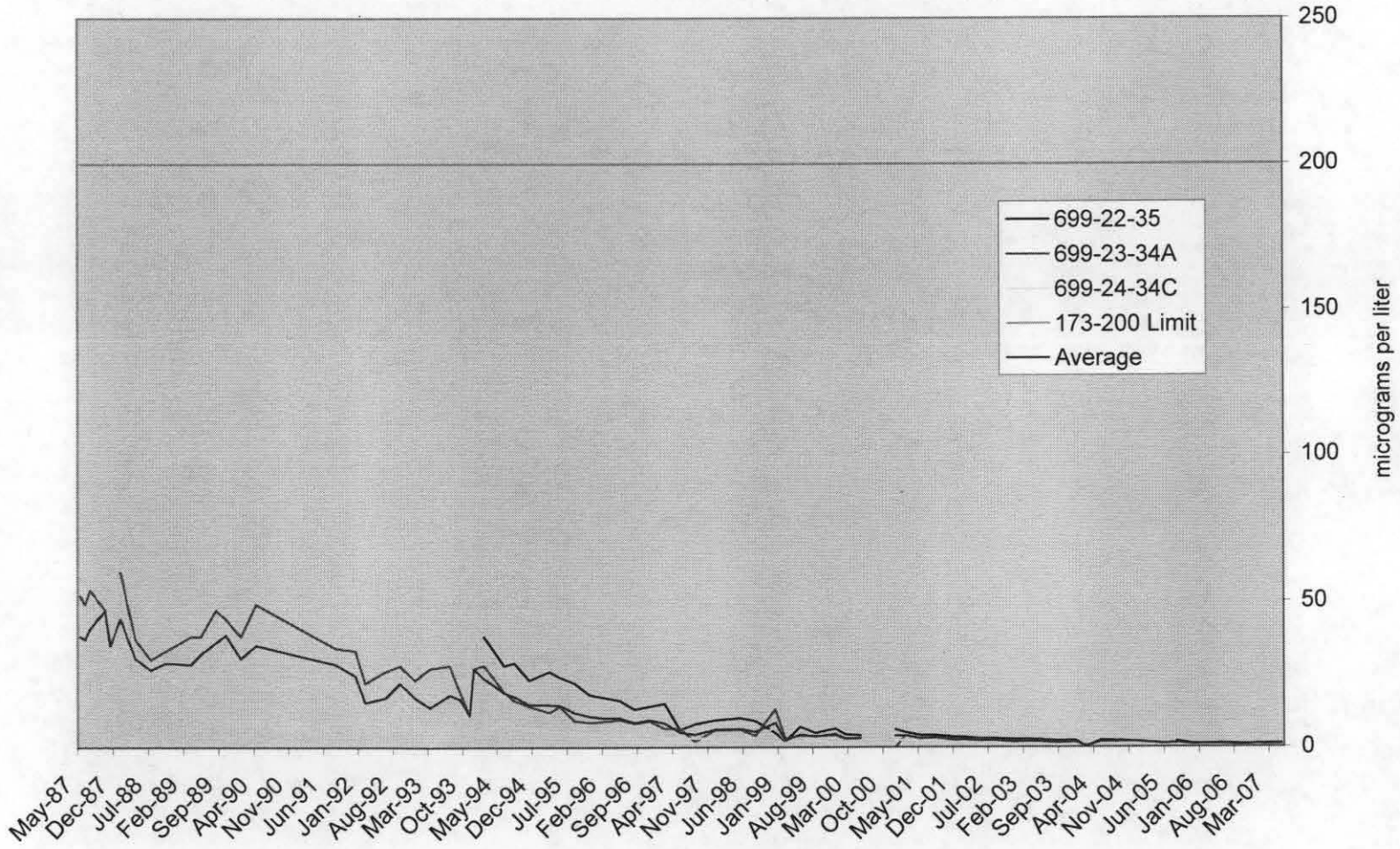


Figure A-2 – 1,1-Dichloroethane Trend

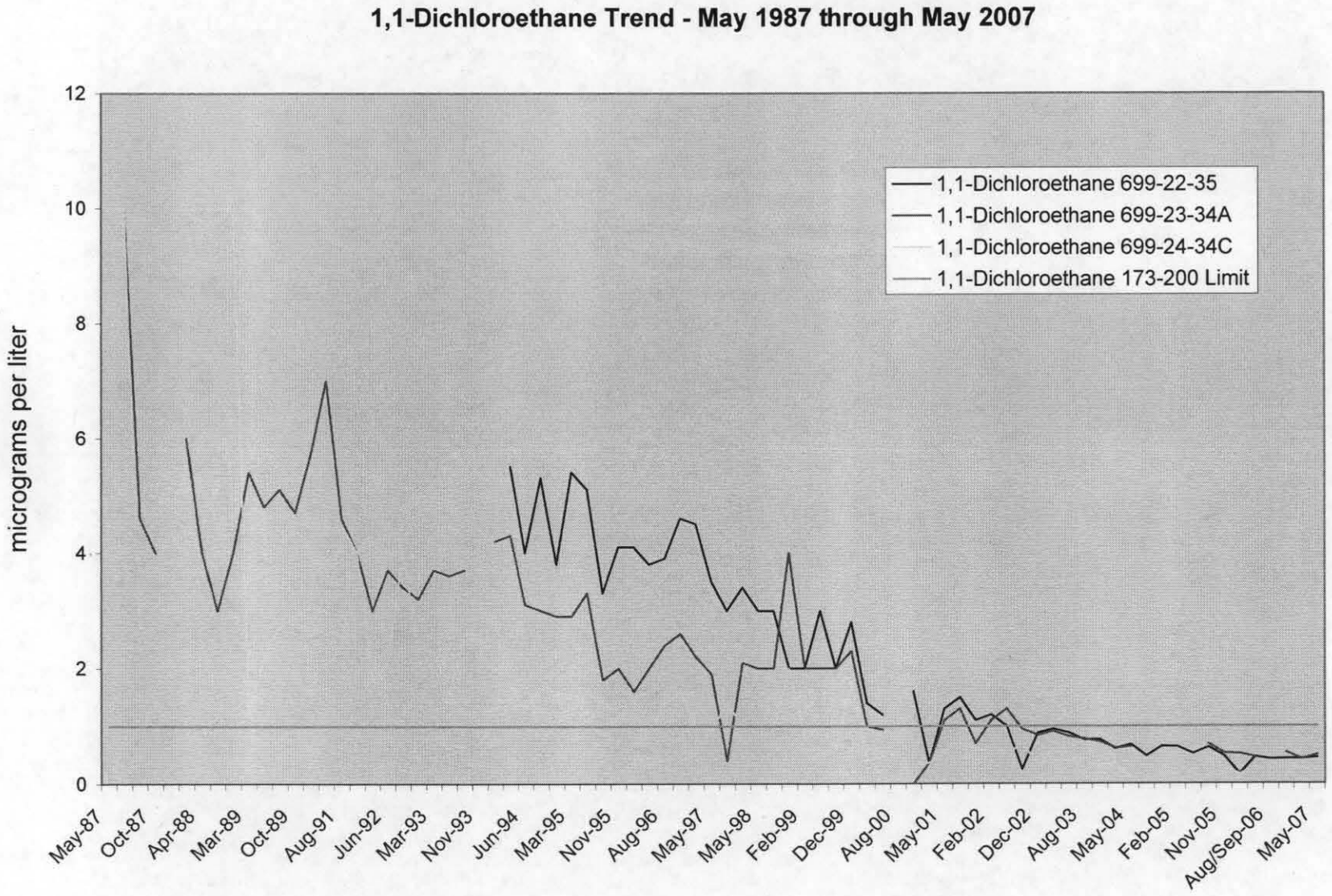


Figure A-3 – Carbon Tetrachloride Trend

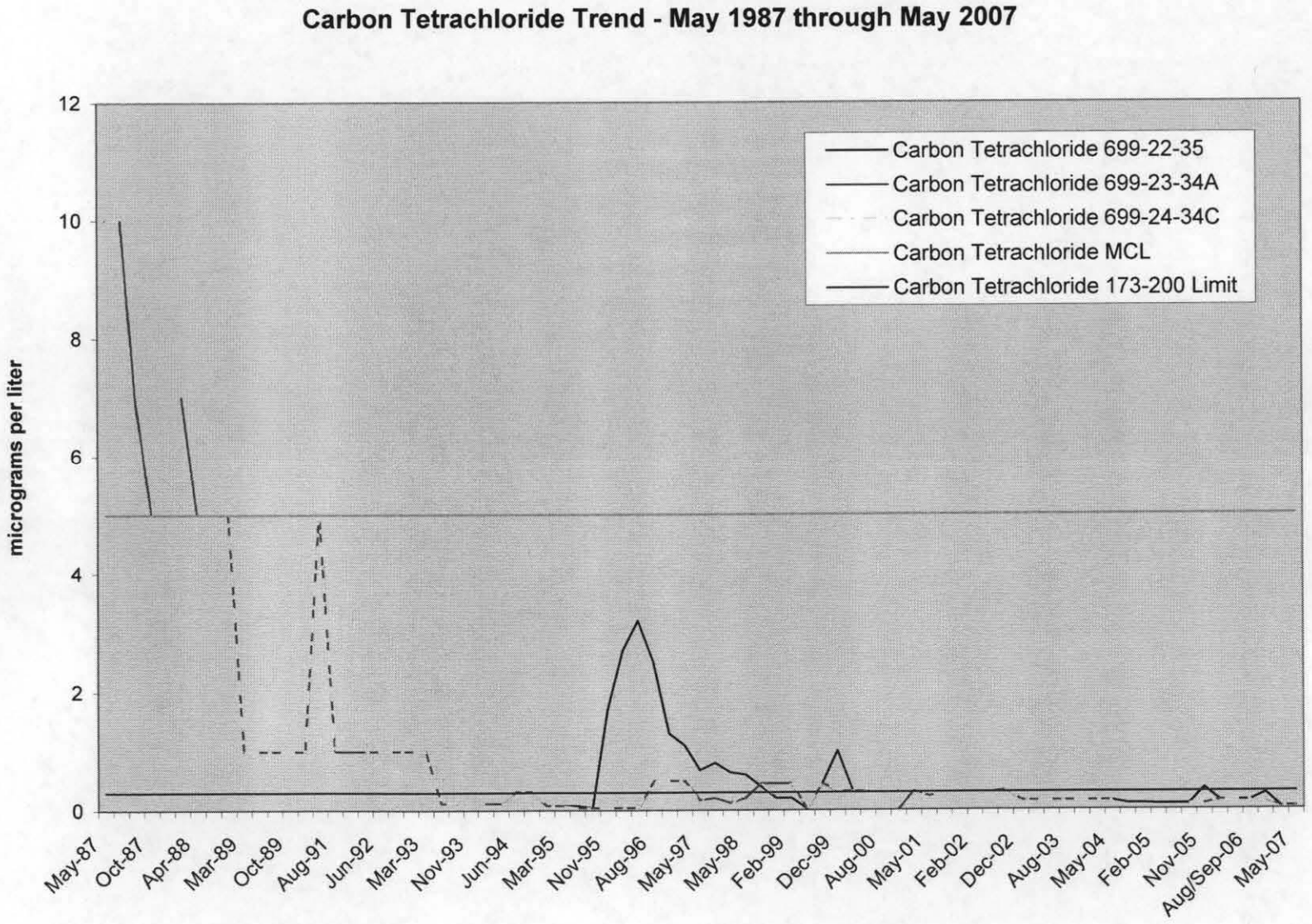


Figure A-4 – Chloroform Trend

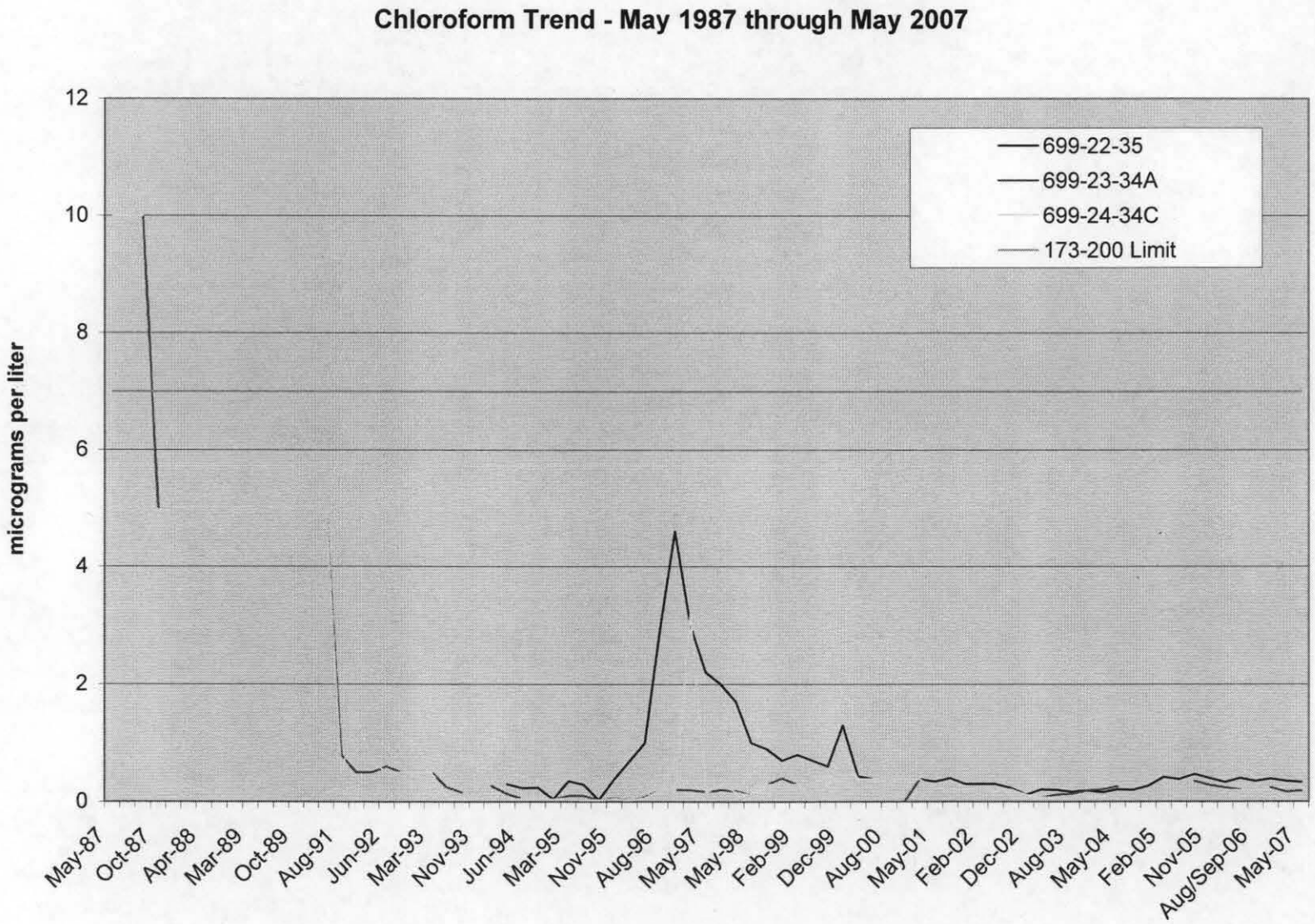


Figure A-5 – Tetrachloroethene Trend

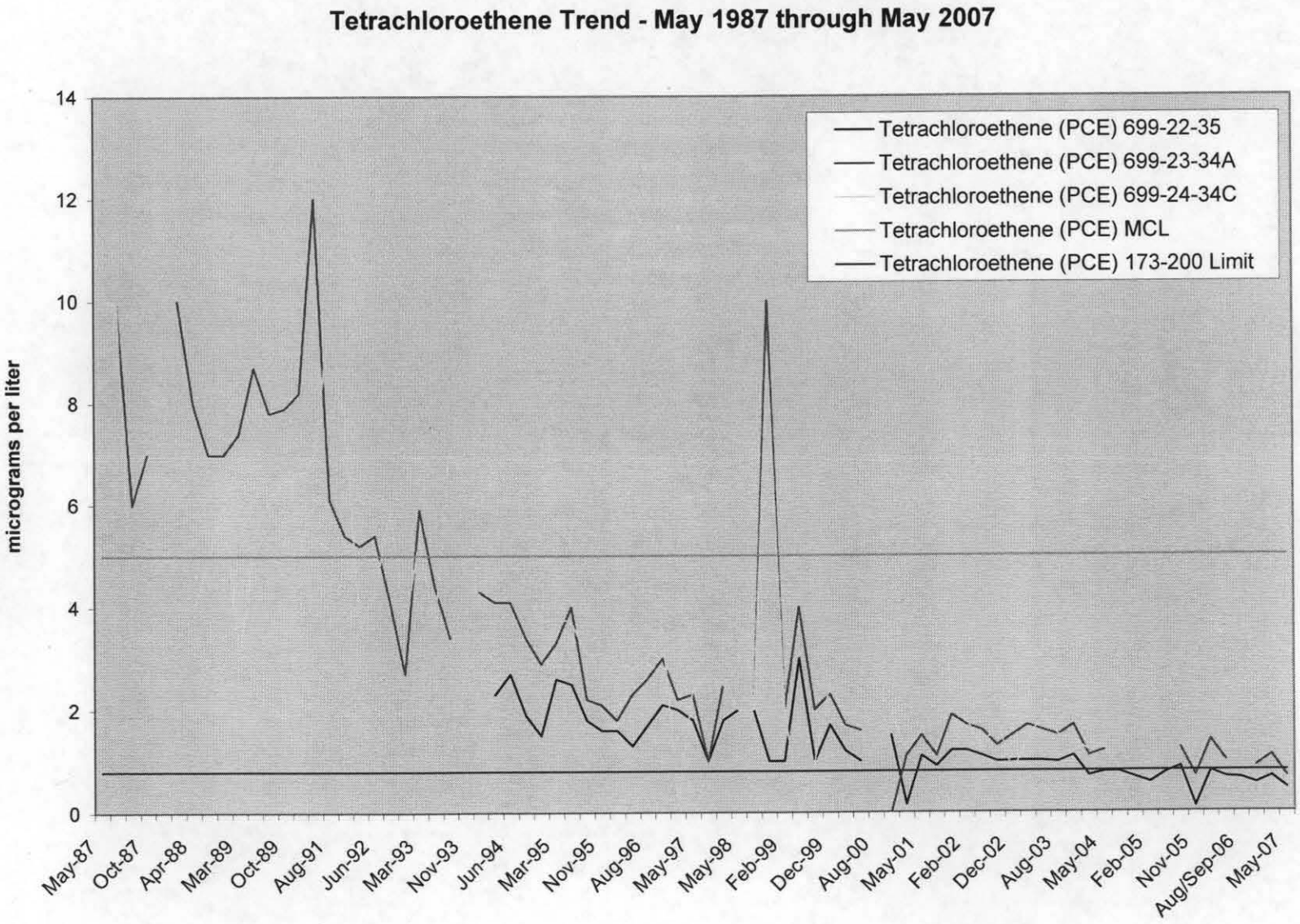
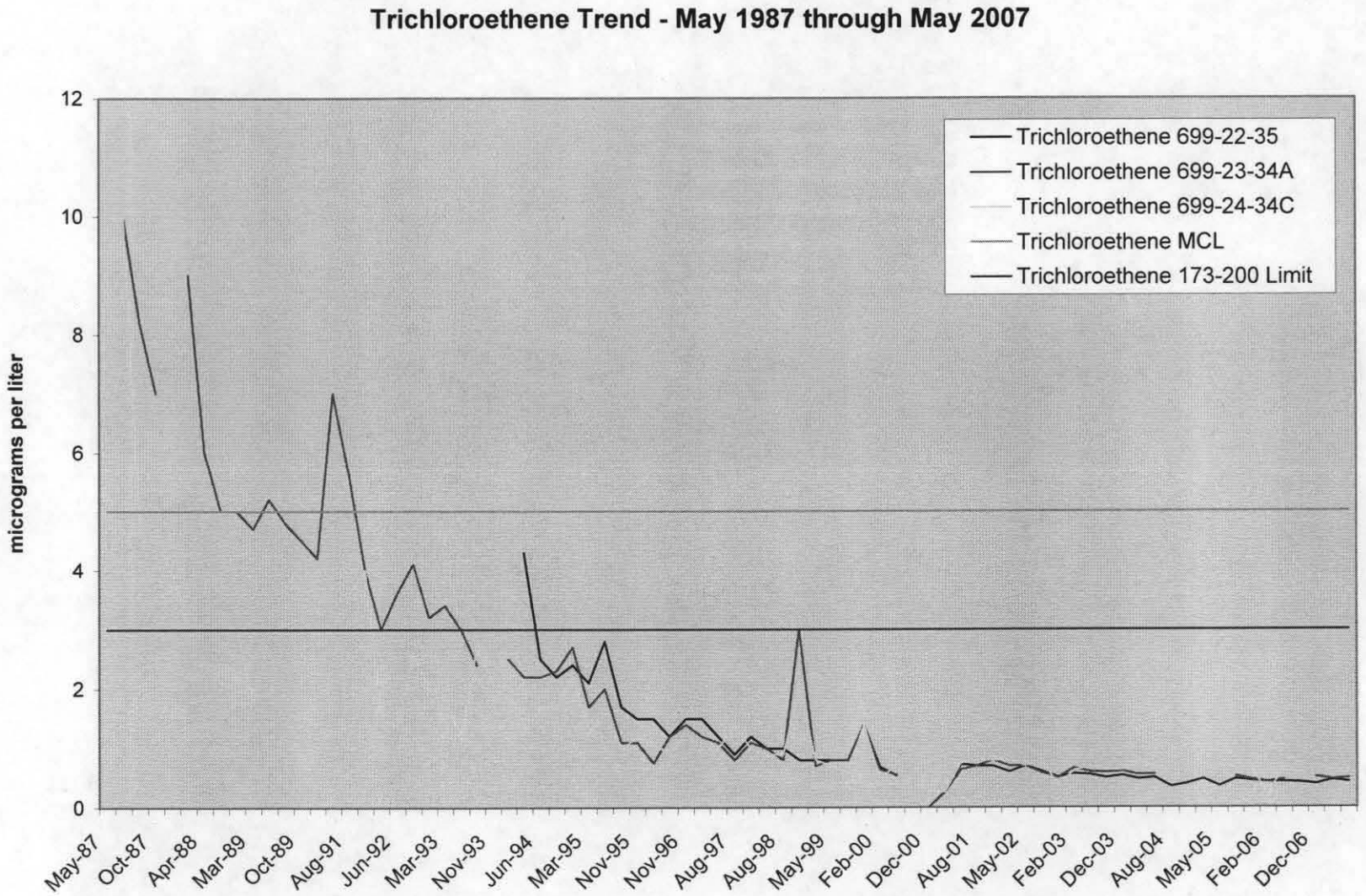


Figure A-6 – Trichloroethene Trend



FH-0702400

ENCLOSURE 2

Draft Transmittal Letter
to the Washington State Department of Ecology

Consisting of 3 pages,
including this cover page.

Mr. John Price
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

Dear Mr. Price:

HANFORD SITE SOLID WASTE LANDFILL ANNUAL MONITORING REPORT

The enclosed report contains information concerning monitoring at the Hanford Site Solid Waste Landfill. The landfill is in closure status and has not received waste since March 1996.

The report is a compilation of data from quarterly monitoring of leachate, groundwater, and soil gas at the landfill, covering a one-year period from July 2006 through June 2007. No significant contaminant increases were observed in the leachate, groundwater, or soil gas over the past reporting year.

As explained in Section 3.0 of the report, sampling for three of the nine active groundwater monitoring wells was not performed for the July through September 2006 quarter and was deferred until January 2007 for the October through December 2006 quarter.

Sampling for one of the ten soil gas monitoring stations was not completed during the last two quarters of the sampling period because of damage to the collection tubing. At this time, there are no plans to replace the damaged monitoring station because results remain at or below detection limits and a sufficient number of collection points are available in the monitoring network. Section 4.0 of the enclosed report provides additional details.

If you have questions about the information in this annual report, please contact Mr. F. M. Roddy at 372-0945.

Sincerely,

David A. Brockman
Manager

Enclosure:
Hanford Site Solid Waste Landfill Annual Monitoring Report

cc: w/o enclosure:
B. J. Dixon, FH
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