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MAR 21 2008

08-AMCP-0137

Ms. J. A. Hedges, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton
Richland, Washington 99354

Dear Ms. Hedges:

**BURIAL GROUND SAMPLING AND ANALYSIS RESULTS FOR OCTOBER -
DECEMBER 2007**

The purpose of this letter is to transmit the Burial Ground Sampling and Analysis Results for October - December 2007. Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) Milestone M-91-40, requirement 2, paragraph 3, requires quarterly reports of results from retrieval burial grounds sampling and analysis plan sampling activities. No sampling and analysis activities were conducted as part of the sampling and analysis plans for the 218-W-4B, 218-W-3A or 218-E 12B Burial Grounds during this quarter, so no analysis results for these burial grounds are provided. Sampling results are provided for the 218-W-4C Burial Ground.

Step II sampling, as defined in the 218-W-4C Burial Ground Sampling and Analysis Plan, DOE/RL-2003-48, was started in Retrieval Burial Ground 218-W-4C in October 2007. Soil vapor samples were collected from the vadose zone through direct push holes at Trenches T-04, T-20, T-24, and T-29. The vapor samples were analyzed for volatile organic compounds. The results of the analysis are provided in the attached report. Preliminary action levels are not applicable to these vapor samples because there are no vapor cleanup levels for volatile organic compounds. Step II sampling will be conducted at the remaining 218-W-4C Retrieval Trenches (T-01 and T-07) after the remaining containers have been removed.

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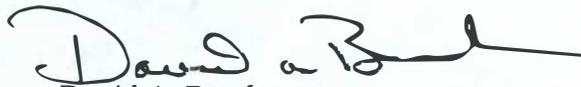
Ms. J. A. Hedges
08-AMCP-0137

-2-

MAR 21 2008

If you have any questions, please contact me, or your staff may contact Matt McCormick, Assistant Manager for the Central Plateau, on (509) 373-9971.

Sincerely,


David A. Brockman
Manager

AMCP:GLS

Attachment

cc w/attach:

G. Bohnee, NPT
L. Buck, Wanapum
C. E. Cameron, EPA
N. Ceto, EPA
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K. Niles, ODOE
J. F. Ollero, Ecology
D. G. Singleton, Ecology
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Administrative Record (M-91)
Environmental Portal

cc w/o attach:

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Burial Ground Sampling and Analysis Results for October – December 2007

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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Burial Ground Sampling and Analysis Results for October – December 2007

B. A. Williams
Fluor Hanford, Inc.

Date Published
March 2008

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Assistant Secretary for Environmental Management

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EXECUTIVE SUMMARY

Step II sampling, as defined in DOE/RL-2003-48, *218-W-4C Burial Ground Sampling and Analysis Plan*, was conducted during the October – December 2007 quarter for four of the six trenches in the 218-W-4C Burial Ground that once contained retrievably stored waste (RSW).¹ Soil vapor samples were collected from the vadose zone through direct push holes at trenches T-04, T-20, T-24, and T-29. The soil vapor samples were analyzed for volatile organic compounds (VOC) using field screening instruments. The highest concentrations of carbon tetrachloride were detected at the east end of trench T-29. Preliminary action levels are not applicable to these vapor samples. The determination of whether or not the vadose zone vapor results indicate any releases to the environment from the previously stored waste is currently under evaluation and will be reported in a future report. A preliminary review of Step II data did not reveal any “hot spot” concentrations or large accumulations of VOCs that suggest the need for additional push investigations around the asphalt pads at trenches T-04, T-20, T-24, and T-29. The Step II data acquired during this quarter are adequate to focus Step III sample and analysis requirements at these four trenches. Other than incidental and unavoidable vapor releases to the atmosphere associated with sampling at the direct push locations, no contaminant releases to the environment were documented as a result of this vapor sampling. Step II sampling at trenches T-01 and T-07 will be conducted when the remaining drums and containers of RSW have been removed, allowing access to the trench bottoms. Results for Step II sampling at trenches T-01 and T-07 will be included in a future quarterly report.

Step I of the sampling design in the sampling and analysis plan (SAP) for the 218-W-4C Burial Ground (DOE/RL-2003-48) was initiated during the October – December 2003 quarter and completed during the January – March 2004 quarter.

Step III of the sampling design in the SAP for the 218-W-4C Burial Ground (DOE/RL-2003-48) is planned following completion of the Step I and Step II sampling.

¹ Retrievably stored for purposes of the *Atomic Energy Act of 1954*.

Step I of the sampling design in DOE/RL-2004-70, *218-W-4B Burial Ground Sampling and Analysis Plan*, was initiated during the July – September 2006 quarter and was completed during the October – December 2006 quarter. No sampling or analyses were conducted at the 218-W-4B Burial Ground during the October – December 2007 quarter; therefore, no analytical results are available for this period.

Based on the sampling design in the SAP for the 218-W-4B Burial Ground (DOE/RL-2004-70), Step II sampling is planned following retrieval of the RSW.

Step I of the sampling design in DOE/RL-2004-71, *218-W-3A Burial Ground Sampling and Analysis Plan*, was initiated during the July – September 2005 quarter and was completed during the October – December 2005 quarter. No sampling or analyses were conducted at the 218-W-3A Burial Ground during the October – December 2007 quarter; therefore, no analytical results are available for this period.

Based on the sampling design in the SAP for the 218-W-3A Burial Ground (DOE/RL-2004-71), Step II sampling is planned following retrieval of the RSW.

Step I of the sampling design in DOE/RL-2004-32, *218-E-12B Burial Ground Sampling and Analysis Plan*, was completed during the April – June 2005 quarter. No sampling or analyses were conducted at the 218-E-12B Burial Ground during the October – December 2007 quarter; therefore, no analytical results are available for this period.

Based on the sampling design in the SAP for the 218-E-12B Burial Ground (DOE/RL-2004-32), Step II sampling is planned following retrieval of the RSW.

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1.0 INTRODUCTION

This quarterly letter report has been prepared in response to *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al., 1989) Interim Milestone M-91-40, Requirement 2, paragraph 3. The sampling and analysis activities summarized in this quarterly letter report were conducted in accordance with DOE/RL-2003-48, *218-W-4C Burial Ground Sampling and Analysis Plan*, issued by the Washington State Department of Ecology on September 12, 2003 as an attachment to Skinnerland 2003, "Issuance of the Final 218-W-4C Sampling and Analysis Plan (SAP) in Conjunction with Administrative Order No. 03NWPKW-5494 Issued on April 30, 2003, by the Washington State Department of Ecology (Ecology) and Modified by Stipulation Approved on July 8, 2003, by the Washington State Pollution Control Hearings Board on July 8, 2003." This quarterly letter report presents sampling and analysis results obtained during the period of October through December 2007 and the first week of January 2008.

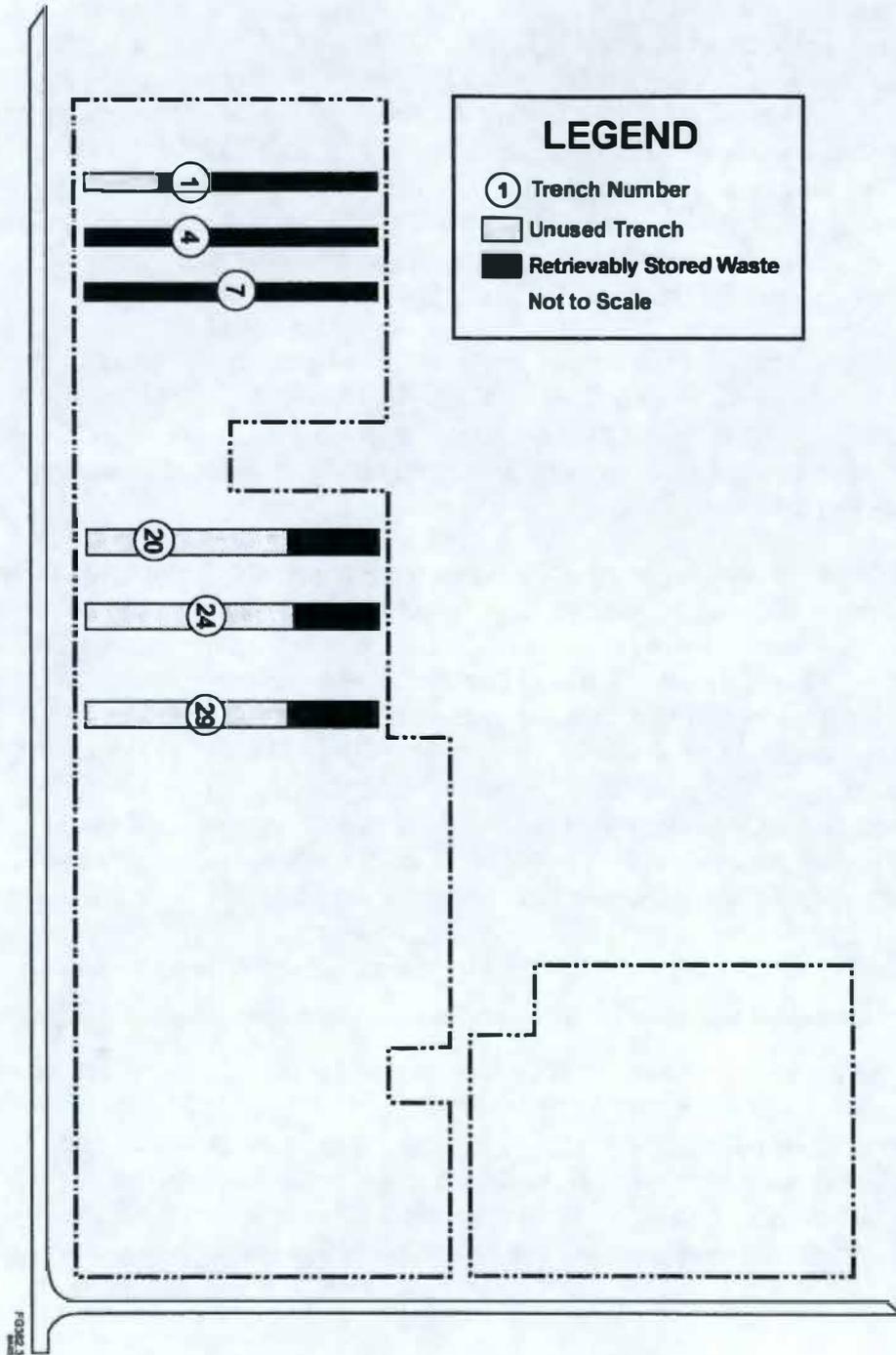
The 218-W-4C Burial Ground SAP was developed to determine whether contaminants have been released to the vadose zone from RSW in the 218-W-4C Burial Ground located in the 200 West Area of the Hanford Site. In the 218-W-4C Burial Ground, trenches T-01, T-04, T-07, T-20, T-24, and T-29 contained suspect TRU² retrievable waste (Figure 1). The waste typically was contained in 208-L (55-gal) drums or boxes.

The 218-W-4C Burial Ground sampling design consists of three steps. Step I consisted of vapor sampling through vent risers in the trenches prior to waste retrieval to provide an indication of potential release areas. Before waste retrieval began, 85 vent risers existed in trenches T-01, T-04, T-07, T-20, and T-29 in the 218-W-4C Burial Ground. Step I was completed in 2004 and results were included in the quarterly reports for October – December 2003 (FH-040144.1, "Transmittal of the Burial Ground Sampling and Analysis Results for October - December 2003, in Accordance with the *Hanford Federal Facility Agreement and Consent Order* Interim Milestone M-91-40) and January-March 2004 (FH-0402233.1, "Transmittal of the Burial Ground Sampling and Analysis Results for January – March, 2004, in Accordance with the *Hanford Federal Facility Agreement and Consent Order* Interim Milestone M-91-40). Results of the Step I vent riser sampling were used to help refine sampling locations for Step II sampling. The Step II sampling activities described in this report were conducted following removal of the RSW drums; the vent risers were removed with the RSW.

Step II and Step III were planned to be conducted following waste retrieval. Step II includes vapor sampling for potential VOC contamination along the edges of the asphalt pads at the bottom of the waste trenches resulting from potential leaking drums or condensate. The edges of the asphalt pads were identified for sampling in the SAP because any liquid organic contaminants (if present) released from the drums, or water condensate in the trench that absorbed vapor released from the drums, could have flowed along the asphalt pad and reached the soils at the edges. The presence of VOCs also could be an indication for other types of

² Transuranic (radioactive waste materials as defined in DOE G 435.1-1, *Implementation Guide for Use with DOE M 435.1-1*)

Figure 1. Locations of Retrievably Stored Waste Trenches at the 218-W-4C Burial Ground.



contaminants. The data collected in Step I and Step II will identify the need for additional potential characterization (Step III) of the substrate soils beneath the asphalt pads.

The Step II sampling in the 218-W-4C Burial Ground was initiated in October 2007. Sampling and analysis activities continued for the October – December 2007 quarter in trenches T-04, T-20, T-24, and T-29. Sampling and analysis activities at trench T-04, the last trench to be sampled, extended into the first week of January 2008. Analytical results from this latest quarterly sampling period represent a complete set of vapor sampling data for trenches T-04, T-20, T-24, and T-29. Trenches T-01 and T-07 were not sampled in this quarter because waste retrieval in those trenches had not been completed and the entire asphalt trench bottom was not accessible. The trenches will be sampled following removal of the remaining stored waste containers. Subsequent sampling activities will be included in a later quarterly report.

Other Step II activities identified in the SAP included the determination of biased sampling locations by (1) conducting organic and radiological field screening surveys on the asphalt pads and the soils along the edges of the pads; (2) conducting visual observations of the asphalt pad surface; (3) reviewing the Step I vent riser results; and (4) reviewing pertinent inspection records and/or occurrence reports regarding subsidence and/or flooding in the burial ground. These activities were completed during this quarter. Surface inspections of the excavated pads, including digital photographs of each pad, and organic and radiological field screening during the field work along the perimeter of the pads revealed no contaminated areas that would merit soil vapor sampling. Review of the records indicated no evidence of subsidence or flooding that would suggest the need for focused sampling. Vent riser results (Step I) were reviewed to determine the need for additional locations and/or deeper soil vapor sampling in accordance with the SAP.

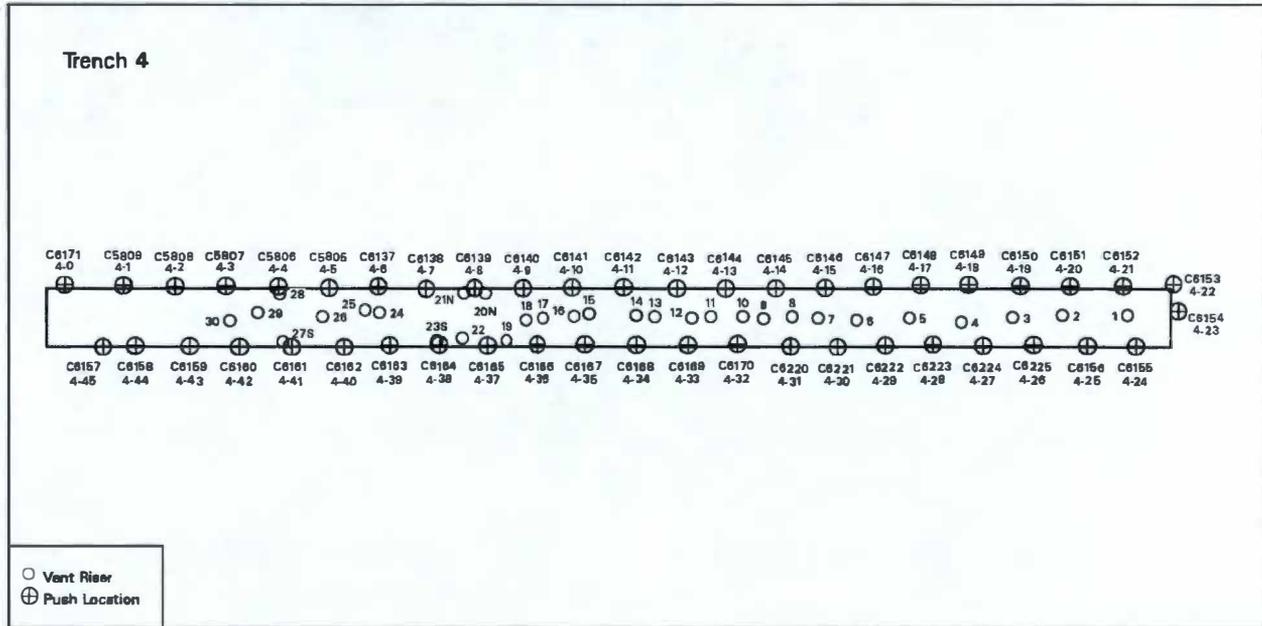
As specified in the 218-W-4C Burial Ground SAP, the Step III sampling to characterize the substrate soils will be conducted when the asphalt pad in an entire trench is accessible and sampling will not interfere with waste retrieval operations. The results of the Step I and Step II sampling will be used to plan the Step III sampling and analysis.

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2.0 SAMPLING METHODOLOGY

During Step II sampling in the October – December 2007 quarter, a total of 84 direct push holes were installed with a Geoprobe,³ as shown in Figures 2 to 5. A total of 243 vapor samples (including 29 quality control [QC] samples and six samples inadvertently collected in incorrect locations) were collected and analyzed in the field using the MIRAN SapphIRe Ambient Air Analyzer⁴ (MIRAN analyzer). The MIRAN analyzer is used to field screen for VOCs. Field screening for VOCs was the only analytical activity identified in the SAP for Step II. A summary of maximum concentrations by trench is provided in Table 1.

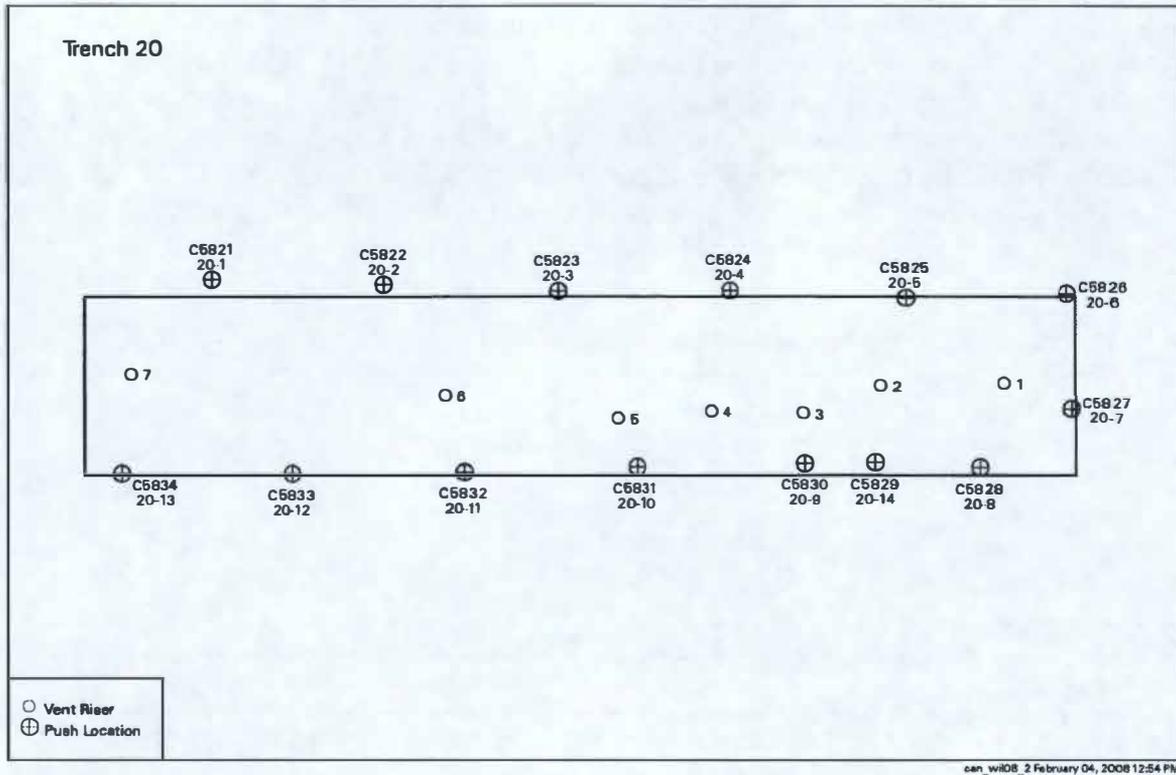
Figure 2. Direct Push Sampling Locations for the 218-W-4C Burial Ground, Trench T-04.



³ Geoprobe is a registered trademark of Jejr, Inc., Salina, Kansas.

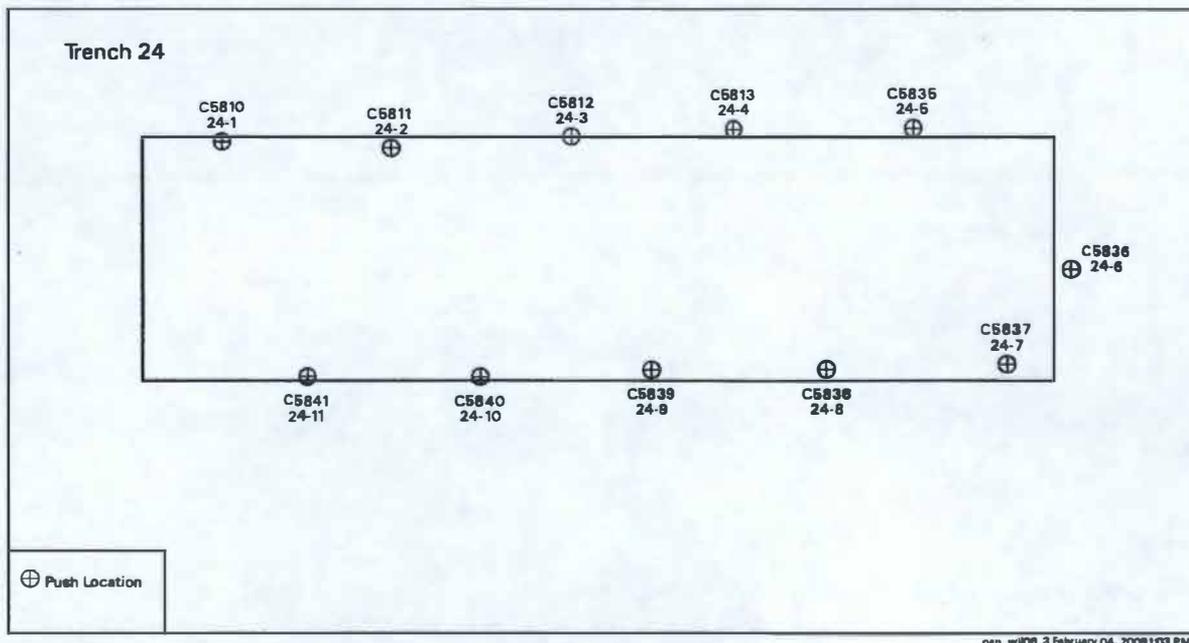
⁴ MIRAN and the SapphIRe Ambient Air Analyzer are registered trademarks of Thermo Electron Corporation, Franklin, Massachusetts.

Figure 3. Direct Push Sampling Locations for the 218-W-4C Burial Ground, Trench T-20.



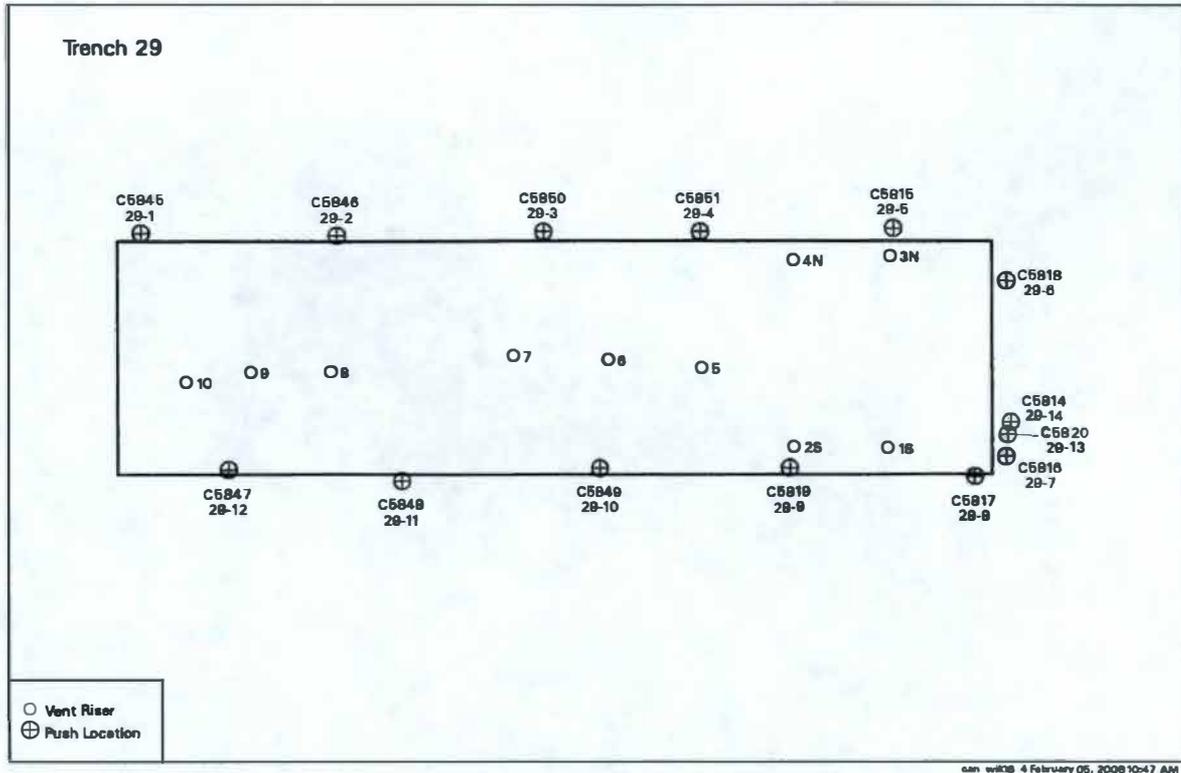
NOTE: This figure represents only the section of the trench that contained retrievably stored waste, shown on Figure 1.

Figure 4. Direct Push Sampling Locations for the 218-W-4C Burial Ground, Trench T-24.



NOTE: This figure represents only the section of the trench that contained retrievably stored waste, shown on Figure 1.

Figure 5. Direct Push Sampling Locations for the 218-W-4C Burial Ground, Trench T-29.



NOTE: This figure represents only the section of the trench that contained retrievably stored waste, shown on Figure 1.

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Table 1. Maximum Concentrations From Direct Push Vapor Sampling, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29.

Trench	Number of Direct Push Locations	Number of Vapor Samples Collected	Number of Quality Control Samples	Maximum Concentrations From Direct Push Vapor Sampling																
				Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Methane (ppmv)	Tetrachloroethylene (Perchloroethylene) (ppmv)	Benzyl Chloride (ppmv)	Trichlorofluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)
T-04	46	103	17	0.63	1510	18.46	43.06	--	--	--	--	--	--	--	--	--	--	--	--	--
T-20	14	41	4	2.52	2130	--	--	74.24	8.65	19.72	5.75	45.50	19.90	0.39	2.03	1.53	3.87	0.75	7.54	--
T-24	11	30	4	1.77	1888	--	--	185.54	57.59	51.11	--	--	28.87	9.40	--	3.54	--	11.27	--	--
T-29	13	34	4	3.21	3061	51.15	--	--	--	27.77	--	--	--	0.64	4.49	--	--	0.79	27.07	13.89
Total	84	208	29																	

NOTE: 6 samples were inadvertently collected at trench T-29 at incorrect locations. These samples were analyzed and are discussed in this report, however, they have not been counted in this table.

BOLD indicates maximum detected concentration for a constituent for the entire data set.

ppmv = parts per million by volume.

Direct push sampling was initiated on October 9, 2007 using a Geoprobe. Two hundred forty-three vapor samples were collected in 12-L Tedlar⁵ bags; samples were collected at prescribed depths from the trench bottom to a maximum depth of 10.5 m (34.5 ft). Sampling was completed on January 3, 2008. Soil vapor sampling was conducted along the edges of the asphalt pads using a systematic sampling design. The sampling locations were spaced at 7.6 m (25 ft) intervals along each side. As described in the SAP, a random number generator was used to determine the distance of the first sampling location from each corner. In addition, trenches T-04, T-20, and T-29 each included a biased sampling location near the vent riser that had the highest VOC concentrations, based on the Step I results. Because vent risers were not present in trench T-24, no Step I results were available to guide Step II sampling for this trench.

Sampling was scheduled only in those portions of the trenches where suspect TRU RSW previously was stored (Figure 1). As a result, all four sides of trench T-04 were sampled along the entire length of the trench. In trenches T-20, T-24, and T-29, sampling was conducted only on the north, east, and south sides at the eastern portion of each trench.

Prior to sampling, the sample locations were staked in the field and a ground-penetrating-radar survey was conducted to clear the locations for underground utilities and other obstacles. In general, the grid sample locations in each trench were staked and numbered sequentially, starting at the northwest corner of the former waste storage area within each trench. Temporary sample location numbers consisting of the trench number followed by the sequence location number (e.g., location 20-1 is the northwestern-most sample location in trench T-20) were assigned to each location. A permanent *Hanford Environmental Information System* well identification number was assigned to each location after completion of each direct push borehole (e.g., C5827).

The Geoprobe rod was positioned as close to the staked location as possible and driven to the prescribed maximum depth. Next a 15.2 m- (50-ft) -long piece of TYGON tubing was lowered to the bottom of the probe hold. The tubing was 0.3 cm (0.125-in) inside diameter and 0.6 cm (0.25-in) outside diameter with a metal filter on the lower end to prevent plugging. The tubing was marked at 0.3 m (1-ft) intervals so that depth to the bottom of the trench could be measured. Then the tubing was pulled back approximately 0.2 m (0.5 ft) to lift the filter off of the bottom of the hole. A 5.08 cm (2-in) diameter plastic disk was slid along the tubing to seal the Geoprobe casing and the tubing to reduce inflow of ambient air during purging and sampling.

The sample tubing was connected to a sampling pump, which pumped vapor for one to two minutes to purge the tubing. A vapor sample then was collected in a 12 L (3 gal) Tedlar bag for field-screening analysis. Typically, a second sample was collected at specific depths, either as a back-up sample in the event that the first sample could not be analyzed or as a duplicate sample. If a second sample was collected but not needed, it generally was analyzed. These data are reported for completeness in Table 2.

Following the maximum-depth sample collection, the sample tubing was removed from the hole and the Geoprobe rod was backpulled to the next (shallower) sample location. The lower portion of the borehole was backfilled with granular bentonite. The tubing was lowered again to collect

⁵ Tedlar is a registered trademark of E. I. du Pont de Nemours and Company, Wilmington, Delaware.

the next sample. The process of sampling, backpulling, and backfilling was repeated until the final (shallowest) vapor sample was collected. At all locations, samples were collected at 1.8 m and 3.7 m (6 and 12 ft) below the depth of the asphalt pad (exceptions shown in Table 2). In addition, the biased sampling locations were planned at 1.8 m (6 ft) intervals below the depth of the asphalt pad until reaching a depth of approximately 9.8 m (32 ft); the deepest sample was collected at 10.5 m (34.5 ft). Following the final vapor sample collection, the direct push hole was decommissioned in accordance with WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells."

The filled Tedlar bags were stored out of direct sunlight in a clean cooler for transport to the onsite laboratory for analysis. The samples were analyzed using the MIRAN analyzer, generally within 6 hours of the collection time. Sample information is summarized in Table 2.

The locations of the decommissioned direct push holes in the 218-W-4C Burial Ground trenches were surveyed on November 9, 2007 and January 4 and 16, 2008. Coordinates were recorded using NAVD88, North American Vertical Datum of 1988, and the Washington State plane (south zone) in NAD83, North American Datum of 1983, with the 1991 adjustment for horizontal coordinates. Figure 1 illustrates the area within each trench where the suspect retrievable TRU waste was stored. Figures 2 to 5 depict the direct-push hole locations within the trench boundaries.

Table 2. Direct Push Vapor Sampling Results, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29. (8 Pages)

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)				
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3					
TRENCH 4 SAMPLES																																
C6171	12.0	B1RWL6	12/27/2007	1040	1335	4-0	0.16	858	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6171	6.0	B1RWL7	12/27/2007	1055	1340	4-0	0.09 U	670 J	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5809	12.0	B1R8J8	11/27/2007	955	1650	4-1	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5809	6.0	B1R8K0	11/27/2007	1030	1355	4-1	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5809	6.0 (dup)	B1R8K1	11/27/2007	1037	1400	4-1	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5808	12.0	B1R8K2	11/27/2007	1320	1550	4-2	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5808	6.0	B1R8K4	11/27/2007	1345	1555	4-2	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5807	12.0	B1R8K5	11/27/2007	1425	1600	4-3	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5807	12.0 *	B1R8K6	11/27/2007	1435	1605	4-3	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5807	6.0	B1R8K7	11/27/2007	1500	1610	4-3	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5806	12.0	B1R8K9	12/03/2007	1313	--	4-4	No data collected during analysis due to equipment or operator error.																									
C5806	6.0	B1R8L0	12/03/2007	1334	1655	4-4	0.09 U	518	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C5806	6.0 (dup)	B1R8L1	12/03/2007	1241	--	4-4	No data collected during analysis due to equipment or operator error.																									
C5805	12.0	B1RMY5	12/03/2007	1428	--	4-5	No data collected during analysis due to equipment or operator error.																									
C5805	12.0 *	B1RMY4	12/03/2007	1420	1712	4-5	0.09 U	--	0.07 U	--	--	--	--	--	---	---	---	---	---	---	---	---	---	---	---	---	---	--				
C5805	6.0	B1RMY6	12/03/2007	1445	--	4-5	No data collected during analysis due to equipment or operator error.																									
C6137	12.0	B1RMY8	12/04/2007	850	1350	4-6	0.09 U	173	0.07 U	--	--	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
C6137	6.0	B1RMY9	12/04/2007	905	1355	4-6	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6137	6.0 (dup)	B1RNO0	12/04/2007	910	1401	4-6	0.09 U	--	0.07 U	--	--	--	--	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---				
C6138	12.0	B1RNO2	12/04/2007	945	1425	4-7	0.09 U	133	0.07 U	--	9.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6138	6.0	B1RNO3	12/04/2007	1000	1435	4-7	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6139	12.0	B1RNO4	12/04/2007	1255	1605	4-8	0.09 U	135	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6139	12.0 *	B1RNO5	12/04/2007	1300	1610	4-8	0.09 U	648	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6139	6.0	B1RNO6	12/04/2007	1315	1620	4-8	0.09 U	180	0.07 U	--	15.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6140	12.0	B1NRNO8	12/04/2007	1400	1635	4-9	0.16	184	0.07 U	--	18.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6140	6.0	B1NRNO9	12/04/2007	1415	1645	4-9	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6141	12.0	B1NRN13	12/05/2007	900	1409	4-10	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6141	6.0	B1NRN14	12/05/2007	910	1415	4-10	0.09 U	333	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
C6141	6.0 (dup)	B1NRN15	12/05/2007	915	1420	4-10	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				

Table 2. Direct Push Vapor Sampling Results, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29. (8 Pages)

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)			
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3				
C6142	12.0	B1NRN16	12/05/2007	945	1425	4-11	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6142	12.0*	B1NRN17	12/05/2007	950	1430	4-11	0.09 U	598	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6142	6.0	B1NRN18	12/05/2007	1005	1445	4-11	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6143	12.0	B1NRN20	12/05/2007	1315	1502	4-12	0.20	381	0.07 U	--	8.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6143	6.0	B1NRN21	12/05/2007	1325	1507	4-12	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6144	12.0	B1RN23	12/10/2007	1010	1355	4-13	0.2	879	0.07 U	--	--	0.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6144	6.0	B1RN24	12/10/2007	1028	1400	4-13	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6144	6.0 (dup)	B1RN25	12/10/2007	1033	1405	4-13	0.09 U	259	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6145	12.0	B1RN26	12/10/2007	1300	1410	4-14	0.09 U	536	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6145	12.0*	B1RN27	12/10/2007	1304	1415	4-14	0.09 U	361	0.07 U	--	--	0.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6145	6.0	B1RN28	12/10/2007	1318	1420	4-14	0.09 U	612	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6146	12.0	B1RN30	12/11/2007	905	1345	4-15	0.09 U	391	0.07 U	--	--	2.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6146	6.0	B1RN31	12/11/2007	924	1350	4-15	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6146	6.0 (dup)	B1RN32	12/11/2007	928	1355	4-15	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6147	12.0	B1RN33	12/11/2007	1012	1400	4-16	0.09 U	656	0.07 U	--	--	8.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	68			
C6147	6.0	B1RN34	12/11/2007	1025	1405	4-16	0.09 U	182	0.07 U	--	--	1.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6148	12.0	B1RN35	12/11/2007	1355	1455	4-17	0.09 U	1366	0.07 U	--	--	43.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6148	12.0*	B1RN36	12/11/2007	1401	1500	4-17	0.09 U	1105	0.07 U	--	--	39.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6148	6.0	B1RN37	12/11/2007	1420	1505	4-17	0.09 U	725	0.07 U	--	--	16.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6149	12.0	B1RN39	12/12/2007	948	1405	4-18	0.09 U	158	0.07 U	--	--	1.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6149	6.0	B1RN40	12/12/2007	1005	1410	4-18	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6149	6.0 (dup)	B1RN41	12/12/2007	1009	1415	4-18	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6150	12.0	B1RN42	12/12/2007	1044	1420	4-19	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6150	6.0	B1RT51	12/12/2007	1059	1425	4-19	0.09 U	198	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6151	12.0	B1RT52	12/12/2007	1329	1505	4-20	0.09 U	1479	0.07 U	--	--	18.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6151	12.0*	B1RT53	12/12/2007	1334	1510	4-20	0.09 U	1510	0.07 U	--	--	18.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6151	6.0	B1RT54	12/12/2007	1406	1515	4-20	0.09 U	284	0.07 U	--	--	2.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6152	12.0	B1RT55	12/13/2007	854	1310	4-21	0.09 U	547	0.07 U	--	--	25.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25			
C6152	6.0	B1RT56	12/13/2007	916	1315	4-21	0.09 U	239	0.07 U	--	--	6.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6152	6.0 (dup)	B1RT58	12/13/2007	921	1320	4-21	0.09 U	456	0.07 U	--	--	9.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6153	12.0	B1RT59	12/13/2007	1005	1325	4-22	0.09 U	495	0.07 U	--	--	8.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.5			

Table 2. Direct Push Vapor Sampling Results, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29. (8 Pages)

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)			
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3				
C6153	6.0	B1RT60	12/13/2007	1021	1330	4-22	0.09 U	270	0.07 U	--	--	1.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6154	12.0	B1RT62	12/13/2007	1314	1505	4-23	0.09 U	241	0.07 U	--	--	14.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23			
C6154	6.0	B1RT63	12/13/2007	1332	1510	4-23	0.09 U	160	0.07 U	--	--	11.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6155	12.0	B1RT64	12/13/2007	1413	1515	4-24	0.09 U	--	0.07 U	--	--	14.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23			
C6155	6.0	B1RT65	12/13/2007	1428	1520	4-24	0.09 U	--	0.07 U	--	--	9.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6156	12.0	B1RT67	12/17/2007	910	1315	4-25	0.09 U	683 J	0.07 U	--	--	8.62 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14			
C6156	6.0	B1RT68	12/17/2007	928	1320	4-25	0.09 U	326 J	0.07 U	--	--	1.70 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6156	6.0 (dup)	B1RT69	12/17/2007	933	1325	4-25	0.09 U	323 J	0.07 U	--	--	2.57 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6225	12.0	B1LWN6	01/03/2008	1135	1350	4-26	0.09 U	410	0.07 U	--	--	22.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26			
C6225	6.0	B1LWN7	01/03/2008	1150	1355	4-26	0.09 U	--	0.07 U	--	--	13.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17			
C6224	32.0	B1LWN0	01/03/2008	930	1320	4-27	0.63	404	0.07 U	--	--	37.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	60			
C6224	24.0	B1LWN1	01/03/2008	1013	1325	4-27	0.25	509	0.07 U	--	--	33.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53			
C6224	24.0 (dup)	B1LWN2	01/03/2008	1016	1330	4-27	0.19	562	0.07 U	--	--	34.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53			
C6224	18.0	B1LWN3	01/03/2008	1032	1335	4-27	0.09 U	510	0.07 U	--	--	26.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	31			
C6224	12.0	B1LWN4	01/03/2008	1048	1340	4-27	0.09 U	638	0.07 U	--	--	26.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	39			
C6224	6.0	B1LWN5	01/03/2008	1105	1345	4-27	0.09 U	339	0.07 U	--	--	21.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	38			
C6223	12.0	B1LWM7	01/02/2008	1405	1525	4-28	0.09 U	484	0.07 U	--	--	26.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	48			
C6223	6.0	B1LWM8	01/02/2008	1425	1530	4-28	0.09 U	103	0.07 U	--	--	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	70			
C6222	12.0	B1LWM5	01/02/2008	1325	1515	4-29	0.09 U	--	0.07 U	--	7.12	7.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10			
C6222	6.0	B1LWM6	01/02/2008	1335	1520	4-29	0.09 U	--	0.07 U	--	--	6.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8			
C6221	12.0	B1LWM2	01/02/2008	1015	1345	4-30	0.25	480	0.07 U	--	7.04	3.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3			
C6221	6.0	B1LWM3	01/02/2008	1020	1350	4-30	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30			
C6220	12.0	B1RWL9	01/02/2008	925	1330	4-31	0.09 U	164 J	0.07 U	--	13.8 J	1.27 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6220	6.0	B1LWM0	01/02/2008	940	1335	4-31	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6220	6.0 (dup)	B1LWM1	01/02/2008	945	1340	4-31	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6170	12.0	B1RWL3	12/27/2007	920	1320	4-32	0.09 U	238 J	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6170	6.0	B1RWL4	12/27/2007	934	1325	4-32	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6170	6.0 (dup)	B1RWL5	12/27/2007	940	1330	4-32	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6169	12.0	B1RWL0	12/20/2007	1406	1430	4-33	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6169	6.0	B1RWL1	12/20/2007	1420	1435	4-33	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6168	12.0	B1RT99	12/20/2007	1320	1415	4-34	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			

Table 2. Direct Push Vapor Sampling Results, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29. (8 Pages)

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)			
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3				
C6168	12.0*	B1RWK8	12/20/2007	1330	1420	4-34	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6168	6.0	B1RWK9	12/20/2007	1344	1425	4-34	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6167	12.0	B1RT97	12/20/2007	1039	1345	4-35	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6167	6.0	B1RT98	12/20/2007	1052	1350	4-35	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6166	12.0	B1RT95	12/20/2007	1000	1335	4-36	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6166	6.0	B1RT96	12/20/2007	1015	1340	4-36	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6165	12.0	B1RT85	12/20/2007	915	1320	4-37	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6165	6.0	B1RT93	12/20/2007	928	1325	4-37	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6165	6.0 (dup)	B1RT94	12/20/2007	933	1330	4-37	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6164	12.0	B1RT82	12/19/2007	1047	1250	4-38	0.09 U	635 J	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6164	6.0	B1RT83	12/19/2007	1101	1255	4-38	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6163	12.0	B1RT80	12/19/2007	1002	1240	4-39	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6163	6.0	B1RT81	12/19/2007	1017	1245	4-39	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6162	12.0	B1RT77	12/19/2007	922	1225	4-40	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6162	6.0	B1RT78	12/19/2007	935	1230	4-40	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6162	6.0 (dup)	B1RT79	12/19/2007	939	1235	4-40	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6161	12.0	B1RT74	12/18/2007	1440	1550	4-41	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6161	6.0	B1RT75	12/18/2007	1454	1555	4-41	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6160	12.0	B1RT92	12/18/2007	1352	1535	4-42	0.09 U	347 J	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6160	6.0	B1RT72	12/18/2007	1406	1540	4-42	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6160	6.0 (dup)	B1RT73	12/18/2007	1411	1545	4-42	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6159	12.0	B1RT89	12/17/2007	1423	1530	4-43	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6159	6.0	B1RT90	12/17/2007	1437	1535	4-43	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6158	12.0	B1RT87	12/17/2007	1326	1520	4-44	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6158	6.0	B1RT88	12/17/2007	1342	1525	4-44	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6157	12.0	B1RT70	12/17/2007	1015	1330	4-45	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6157	6.0	B1RT71	12/17/2007	1030	1335	4-45	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
TRENCH 20 SAMPLES																															
C5827	12.0	B1R7M3	10/31/2007	850	1425	20-7	0.33	710	0.07 U	--	--	--	--	--	3.95	--	--	--	--	--	--	--	2.61	--	--	--	--	--			
C5827	5.5	B1R7M4	10/31/2007	915	1430	20-7	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5828	12.0	B1R7M5	10/31/2007	958	1435	20-8	0.16	273	0.07 U	--	--	--	--	--	2.34	--	--	--	--	--	--	--	--	--	--	--	--	--			

Table 2. Direct Push Vapor Sampling Results, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29. (8 Pages)

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)			
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3				
C5828	12.0*	B1R7M6	10/31/2007	1005	1440	20-8	0.09 U	667	0.07 U	--	--	--	--	--	4.68	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5828	6.0	B1R7M7	10/31/2007	1045	1445	20-8	0.09 U	846	0.07 U	--	--	--	--	--	5.33	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5829	34.0	B1R7M8	10/31/2007	1325	1520	20-14	2.47	1117	0.07 U	--	--	--	--	12.43	6.52	--	--	--	--	--	--	0.78	--	--	--	--	--	--			
C5829	34.0*	B1R7M9	10/31/2007	1330	1525	20-14	2.52	1407	0.07 U	--	--	--	--	32.33	8.65	--	--	--	--	--	--	2.31	--	--	--	--	--	--			
C5829	30.0	B1R7N0	10/31/2007	1335	1530	20-14	2.15	1441	0.07 U	--	--	--	--	15.66	8.21	--	--	--	--	--	--	1.91	--	--	--	--	--	--			
C5829	24.0	B1R7N1	10/31/2007	1355	1535	20-14	0.83	876	0.07 U	--	--	--	--	20.71	3.85	--	--	--	--	--	--	3.07	--	--	--	--	--	--			
C5829	18.0	B1R7N2	10/31/2007	1415	1540	20-14	0.43	1244	0.07 U	--	--	--	--	32.05	5.38	--	--	--	--	--	--	3.87	--	--	--	--	--	--			
C5829	18.0 (dup)	B1R7N3	10/31/2007	1420	1545	20-14	0.49	1400	0.07 U	--	--	--	--	30.38	5.44	--	--	--	--	--	--	1.62	--	--	--	--	--	--			
C5829	12.0	B1R7N4	10/31/2007	1435	1550	20-14	0.42	1367	0.07 U	--	--	--	--	37.19	5.28	--	--	--	--	--	--	1.79	--	--	--	--	--	--			
C5829	6.0	B1R7N5	10/31/2007	1455	1555	20-14	0.46	1301	0.07 U	--	--	--	--	21.42	4.67	--	--	--	--	--	--	3.44	--	--	--	--	--	--			
C5830	12.0	B1R8C2	11/01/2007	915	1435	20-9	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5830	6.0	B1R8C3	11/01/2007	930	1440	20-9	0.09 U	683	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5831	12.0	B1R8C4	11/01/2007	1042	1445	20-10	0.09 U	1279	0.07 U	--	--	--	--	24.98	1.91	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5831	12.0*	B1R8C5	11/01/2007	1045	1450	20-10	0.09 U	1507	0.07 U	--	--	--	--	31.21	3.89	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5831	6.0	B1R8C6	11/01/2007	1105	1455	20-10	0.09 U	1312	0.07 U	--	--	--	--	21.38	2.40	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5832	12.0	B1R8C7	11/01/2007	1315	1500	20-11	0.45	1757	0.07 U	--	--	--	--	44.58	4.34	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5832	12.0*	B1R8C8	11/01/2007	1320	1525	20-11	0.56	2112	0.07 U	--	--	--	--	47.70	6.21	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5832	6.0	B1R7N7	11/01/2007	1355	1530	20-11	0.48	2080	0.07 U	--	--	--	--	39.35	6.06	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5832	6.0 (dup)	B1R7N8	11/01/2007	1400	1540	20-11	0.53	2167	0.07 U	--	--	--	--	46.40	6.46	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5833	12.0	B1R7N9	11/01/2007	1430	1535	20-12	0.49	2130	0.07 U	--	--	--	--	53.49	3.73	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5833	12.0*	B1R7P0	11/01/2007	1433	1545	20-12	0.56	2117	0.07 U	--	--	--	--	44.40	3.42	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5833	6.0	B1R7P1	11/01/2007	1445	1550	20-12	0.44	1862	0.07 U	--	--	--	--	50.18	2.62	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5834	12.0	B1R7P3	11/05/2007	910	1320	20-13	0.32	410	0.07 U	--	--	--	--	10.12	2.19	--	--	--	--	--	--	--	0.75	--	--	--	--	--			
C5834	6.0	B1R7P4	11/05/2007	927	1325	20-13	0.32	301	0.07 U	--	--	--	--	5.85	1.85	--	--	--	--	--	--	--	0.59	--	--	--	--	--			
C5821	12.0	B1R7K3	10/25/2007	1025	1500	20-1	0.34	1026	0.07 U	--	--	--	--	--	1.74	9.53	--	--	--	--	--	--	--	--	--	--	--	--			
C5821	6.0	B1R7K4	10/25/2007	1040	1505	20-1	0.28	747	0.07 U	--	--	--	--	--	1.47	10.91	--	--	--	--	--	--	--	--	--	--	--	--			
C5822	12.0	B1R7K5	10/25/2007	1335	1510	20-2	0.47	1330	0.07 U	--	--	--	--	46.28	0.63	19.72	--	--	--	--	--	--	--	--	--	--	--	--			
C5822	12.0*	B1R7K6	10/25/2007	1340	1515	20-2	No data collected during analysis due to equipment or operator error.																								
C5822	6.0	B1R7K7	10/25/2007	1400	1535	20-2	0.39	1467	0.07 U	--	--	--	--	47.72	--	--	--	24.98	14.94	--	--	--	--	--	--	--	--	--			
C5823	12.0	B1R7K8	10/25/2007	1430	1540	20-3	0.37	1660	0.07 U	--	--	--	--	71.54	1.14	--	--	--	18.60	--	--	--	--	--	--	--	--	--			
C5823	12.0*	B1R7K9	10/25/2007	1436	1545	20-3	0.53	1701	0.07 U	--	--	--	--	74.24	--	--	5.75	43.25	--	--	--	--	--	--	--	--	--	--			
C5823	6.0	B1R7L0	10/25/2007	1444	1550	20-3	0.09 U	1610	0.07 U	--	--	--	--	43.44	2.27	--	--	45.50	19.90	--	--	--	--	--	--	--	--	--			

Table 2. Direct Push Vapor Sampling Results, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29. (8 Pages)

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)			
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3				
C5823	6.0 (dup)	B1R7L1	10/25/2007	1455	1555	20-3	0.09 U	1676	0.07 U	--	--	--	--	42.58	1.94	--	--	32.13	19.13	--	--	--	--	--	--	--	--	--			
C5824	12.0	B1R7L3	10/30/2007	927	1405	20-4	0.09 U	747	0.07 U	--	--	--	--	--	0.86	--	--	--	5.19	0.39	--	--	0.88	--	--	0.88	--	--			
C5824	6.0	B1R7L4	10/30/2007	942	1410	20-4	0.09 U	607	0.07 U	--	--	--	--	4.36	0.41	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5825	12.0	B1R7L5	10/30/2007	1042	1415	20-5	0.09 U	427	0.07 U	--	--	--	--	3.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5825	12.0*	B1R7L6	10/30/2007	1046	1420	20-5	0.09 U	1182	0.07 U	--	--	--	--	6.46	0.67	--	--	--	--	1.09	--	--	--	--	7.54	--	--	--			
C5825	6.0	B1R7L7	10/30/2007	1105	1425	20-5	0.09 U	696	0.07 U	--	--	--	--	--	0.32	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5826	12.0	B1R7L8	10/30/2007	1338	1445	20-6	0.09 U	1740	0.07 U	--	--	--	--	28.81	--	--	--	--	--	--	1.10	--	--	--	--	--	--	--			
C5826	12.0*	B1R7L9	10/30/2007	1345	1450	20-6	0.09 U	1927	0.07 U	--	--	--	--	48.26	--	--	--	--	14.28	--	2.03	0.75	--	--	--	--	--	--			
C5826	6.0	B1R7M0	10/30/2007	1400	1455	20-6	0.09 U	1807	0.07 U	--	--	--	--	36.41	--	--	--	--	4.18	--	0.94	1.53	--	--	--	--	--	--			
C5826	6.0 (dup)	B1R7M1	10/30/2007	1407	1500	20-6	0.09 U	1857	0.07 U	--	--	--	--	39.54	--	--	--	--	--	1.30	2.04	--	--	--	--	--	--	--			
TRENCH 24 SAMPLES																															
C5835	12.0	B1R7P5	11/05/2007	1007	1330	24-5	0.09 U	1141	0.07 U	--	--	--	--	--	9.76	--	--	--	--	8.08	--	3.02	--	10.56	--	--	--	--	--		
C5835	12.0*	B1R7P6	11/05/2007	1010	1335	24-5	0.09 U	1056	0.07 U	--	--	--	--	--	8.46	--	--	--	--	8.38	--	1.73	--	10.79	--	--	--	--	--		
C5835	6.0	B1R8D3	11/05/2007	1025	1340	24-5	0.09 U	884	0.07 U	--	--	--	--	--	4.51	--	--	--	--	1.77	--	1.21	--	4.22	--	--	--	--	--		
C5836	12.0	B1R8D4	11/05/2007	1305	1500	24-6	0.09 U	1805	0.07 U	--	--	--	--	--	5.81	--	--	--	--	3.10	--	2.01	--	7.51	--	--	--	--	--		
C5836	12.0*	B1R8D5	11/05/2007	1314	1505	24-6	0.09 U	1847	0.07 U	--	--	--	--	55.48	8.08	--	--	--	--	--	--	3.54	--	3.06	--	--	--	--	--		
C5836	6.0	B1R8D6	11/05/2007	1328	1510	24-6	0.57	1632	0.07 U	--	--	--	--	--	8.16	--	--	--	16.56	--	--	--	--	4.89	--	--	--	--	--		
C5836	6.0 (dup)	B1R8D7	11/05/2007	1330	1515	20-6	0.59	1573	0.07 U	--	--	--	--	--	8.52	--	--	--	14.91	--	--	--	--	4.07	--	--	--	--	--		
C5837	12.5	B1R8D8	11/05/2007	1402	1520	24-7	0.09 U	1833	0.07 U	--	--	--	--	92.11	6.88	--	--	--	--	--	--	2.57	--	3.95	--	--	--	--	--		
C5837	12.5*	B1R8D9	11/05/2007	1405	1525	24-7	0.09 U	1888	0.07 U	--	--	--	--	100.47	7.07	--	--	--	--	--	--	2.74	--	3.87	--	--	--	--	--		
C5837	6.0	B1R8F0	11/05/2007	1420	1530	24-7	0.37	1536	0.07 U	--	--	--	--	13.28	5.91	--	--	--	--	--	--	--	--	2.66	--	--	--	--	--		
C5838	12.0	B1R8F2	11/06/2007	945	1445	24-8	0.09 U	1015	0.07 U	--	--	--	--	--	10.04	--	--	--	28.87	7.75	--	--	--	9.77	--	--	--	--	--		
C5838	6.0	B1R8F3	11/06/2007	1000	1450	24-8	0.09 U	326	0.07 U	--	--	--	--	--	3.12	--	--	--	13.45	3.07	--	--	--	4.13	--	--	--	--	--		
C5839	12.0	B1R8F4	11/06/2007	1030	1455	24-9	0.70	1494	0.07 U	--	--	--	--	--	20.26	51.11	--	--	--	--	--	--	--	8.22	--	--	--	--	--		
C5839	12.0*	B1R8F5	11/06/2007	1032	1500	24-9	0.62	1195	0.07 U	--	--	--	--	--	11.48	--	--	--	--	9.40	--	--	--	10.08	--	--	--	--	--		
C5839	6.0	B1R8F6	11/06/2007	1045	1505	24-9	0.09 U	730	0.07 U	--	--	--	--	--	6.98	--	--	--	--	--	--	--	--	8.96	--	--	--	--	--		
C5840	12.0	B1R8F7	11/06/2007	1325	1510	24-10	0.09 U	1882	0.07 U	--	--	--	--	--	18.91	--	--	--	1.01	--	--	--	--	--	--	--	--	--	--		
C5840	12.0*	B1R8F8	11/06/2007	1332	1515	24-10	0.09 U	1845	0.07 U	--	--	--	--	--	24.59	--	--	--	1.19	--	--	--	--	--	--	--	--	--	--		
C5840	6.0	B1R8F9	11/06/2007	1345	1520	24-10	0.09 U	1411	0.07 U	--	--	--	--	--	23.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
C5840	6.0 (dup)	B1R8H0	11/06/2007	1350	1525	24-10	0.09 U	1456	0.07 U	--	--	--	--	--	17.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
C5841	12.0	B1R8H1	11/06/2007	1415	1530	24-11	0.09 U	868	0.07 U	--	--	--	--	--	16.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--		

Table 2. Direct Push Vapor Sampling Results, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29. (8 Pages)

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)			
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3				
C5841	12.0*	B1R8H2	11/06/2007	1420	1535	24-11	0.09 U	897	0.07 U	--	--	--	--	--	13.54	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5841	6.0	B1R8H3	11/06/2007	1435	1540	24-11	0.09 U	1399	0.07 U	--	--	--	--	--	22.35	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5813	12.0	B1R8H5	11/20/2007	1025	1420	24-4	0.09 U	582	0.07 U	--	--	--	--	28.51	--	--	--	--	2.22	--	1.23	--	1.73	--	--	--	--	--			
C5813	6.0	B1R8H6	11/20/2007	1045	1425	24-4	0.09 U	615	0.07 U	--	--	--	--	31.63	3.27	--	--	--	--	--	1.06	--	1.29	--	--	--	--	--			
C5813	6.0 (dup)	B1R8H7	11/20/2007	1050	1430	24-4	0.09 U	762	0.07 U	--	--	--	--	--	4.37	--	--	--	--	--	--	--	4.40	--	--	--	--	--			
C5812	12.0	B1R8H8	11/20/2007	1315	1435	24-3	0.09 U	1749	0.07 U	--	--	--	--	--	48.52	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5812	12.0*	B1R8H9	11/20/2007	1320	1440	24-3	0.09 U	1754	0.07 U	--	--	--	--	--	39.25	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5812	6.0	B1R8J0	11/20/2007	1340	1445	24-3	0.09 U	1363	0.07 U	--	--	--	--	--	24.26	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5811	12.0	B1R8J1	11/26/2007	940	1405	24-2	0.09 U	1093	0.07 U	--	--	--	--	--	57.59	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5811	6.0	B1R8J3	11/26/2007	1022	1410	24-2	0.09 U	575	0.07 U	--	--	--	--	24.38	21.69	--	--	--	--	--	--	--	--	11.27	--	--	--	--			
C5811	6.0 (dup)	B1R8J4	11/26/2007	1040	1415	24-2	0.65	128	0.07 U	--	--	--	--	14.70	16.17	--	--	--	--	--	--	--	8.38	--	--	--	--	--			
C5810	12.0	B1R8J5	11/26/2007	1330	1455	24-1	0.53	621	0.07 U	--	--	--	--	145.69	39.90	--	--	--	--	--	--	--	2.76	--	--	--	--	--			
C5810	12.0*	B1R8J6	11/26/2007	1335	1500	24-1	0.56	599	0.07 U	--	--	--	--	179.69	41.57	--	--	--	--	--	--	--	1.48	--	--	--	--	--			
C5810	6.0	B1R8J7	11/26/2007	1400	1505	24-1	1.77	1063	0.07 U	--	--	--	--	185.54	50.85	--	--	--	--	--	--	--	--	--	--	--	--	--			
TRENCH 29 SAMPLES																															
C5845	12.0	B1P4N1	10/15/2007	1410	1722	29-1	0.09 U	90.00	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5845	6.0	B1P4N3	10/15/2007	1450	1731	29-1	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5846	12.0	B1P4N5	10/16/2007	1045	1620	29-2	0.35	885	0.07 U	--	--	--	--	--	27.77	--	--	--	--	1.90	--	--	--	--	7.65	--	--	--			
C5846	6.0	B1P4N4	10/16/2007	1115	1642	29-2	0.25	612	0.07 U	--	--	--	--	--	21.51	--	--	--	0.64	--	--	--	--	5.15	--	--	--	--			
C5847	12.0	B1P4N7	10/16/2007	1350	1654	29-12	0.38	730	0.07 U	--	--	--	--	--	21.64	--	--	--	--	1.24	--	--	--	5.95	--	--	--	--			
C5847	12.0*	B1P4N8	10/16/2007	1355	1702	29-12	0.44	765	0.07 U	--	--	--	--	--	22.54	--	--	--	--	1.44	--	--	--	5.54	--	--	--	--			
C5847	6.0	B1P4N9	10/16/2007	1425	1713	29-12	0.34	347	0.07 U	--	--	--	--	--	19.93	--	--	--	0.37	--	--	--	5.40	--	--	--	--	--			
C5848	12.0	B1P4P1	10/17/2007	930	1553	29-11	0.09 U	1350	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5848	6.0	B1P4P2	10/17/2007	951	1546	29-11	0.16	190	0.07 U	--	15.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5849	12.0	B1P4P5	10/22/2007	931	1440	29-10	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5849	6.0	B1P4P7	10/22/2007	1004	1447	29-10	0.09 U	1260 J	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5850	12.0	B1P4P8	10/22/2007	1049	1451	29-3	0.51	2563	0.07 U	--	--	--	--	--	26.70	--	--	--	--	--	--	--	--	--	--	2.61	--	--			
C5850	12.0*	B1P4P9	10/22/2007	1056	1457	29-3	0.55	3061	0.07 U	--	--	--	--	--	19.25	--	--	--	--	--	--	--	--	11.02	--	--	--	--			
C5850	6.0	B1P4R0	10/22/2007	1111	1502	29-3	0.24	2315	0.07 U	--	--	--	--	--	15.16	--	--	--	--	--	--	--	--	9.01	1.32	--	--	--			
C5850	6.0 (dup)	B1P4R1	10/22/2007	1116	1507	29-3	0.77	2662	0.07 U	--	--	--	--	--	14.07	--	--	--	--	--	--	--	22.97	1.80	--	--	--	--			
C5851	12.0	B1P4R3	10/22/2007	1355	1512	29-4	2.65	2965	0.07 U	--	--	--	--	--	19.17	--	--	--	--	--	--	--	27.07	1.79	--	--	--	--			

Table 2. Direct Push Vapor Sampling Results, 218-W-4C Burial Ground, Trenches T-04, T-20, T-24, and T-29. (8 Pages)

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)			
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3				
C5851	6.0	B1P4R4	10/22/2007	1412	1517	29-4	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5815	12.0	B1P4R5	10/23/2007	959	1335	29-5	0.41	613	0.07 U	--	--	--	--	--	--	5.65	--	--	--	--	--	--	--	--	--	13.82	2.02	--			
C5815	6.0	B1P4R6	10/23/2007	1015	1340	29-5	0.09 U	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5816	12.0	B1P4R7	10/23/2007	1052	1345	29-13	0.85 J	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5816	12.0*	B1P4R8	10/23/2007	1100	1350	29-13	0.86 J	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5816	6.0	B1P4R9	10/23/2007	1320	1510	29-13	0.68 J	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5817	12.0	B1P4T0	10/23/2007	1400	1505	29-8	0.57 J	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5817	6.0	B1P4T1	10/23/2007	1415	1520	29-8	0.62 J	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5817	6.0 (dup)	B1P4T2	10/23/2007	1412	1525	29-8	0.81 J	--	0.07 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5818	12.0	B1P4T4	10/24/2007	925	1425	29-6	0.46	1422	0.07 U	--	--	--	--	--	--	6.39	--	--	--	--	1.91	--	--	--	--	9.00	--	--			
C5818	6.0	B1P4T5	10/24/2007	945	1430	29-6	0.28	1278	0.07 U	--	--	--	--	--	--	3.06	--	--	--	--	2.27	--	--	--	--	5.64	--	--			
C5819	12.0	B1P4T6	10/24/2007	1025	1435	29-9	0.86	1508	0.07 U	--	--	--	--	--	--	2.64	--	--	--	--	3.39	--	--	--	--	--	6.55	--			
C5819	12.0*	B1P4T7	10/24/2007	1030	1440	29-9	0.79	1571	0.07 U	--	--	--	--	--	--	2.77	--	--	--	--	2.80	--	--	--	--	12.11	--	--			
C5819	6.0	B1P4T8	10/24/2007	1050	1445	29-9	0.57	1953	0.07 U	--	--	--	--	--	--	13.02	--	--	--	--	4.49	--	--	--	--	13.89	--	--			
C5820	34.5	B1P4T9	10/24/2007	1332	1615	29-7	3.21	1976	0.07 U	--	36.11	--	--	--	--	--	--	--	--	--	1.51	--	--	0.79	--	--	--	--			
C5820	32.5	B1P4V0	10/24/2007	1358	1545	29-7	2.83	1758	0.07 U	--	39.78	--	--	--	--	--	--	--	--	--	1.83	--	--	0.72	--	--	--	--			
C5820	26.5	B1R7J7	10/24/2007	1415	1550	29-7	No data collected during analysis due to equipment or operator error.																								
C5820	20.5	B1R7J8	10/24/2007	1430	1555	29-7	1.11	1605	0.07 U	--	51.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5820	14.5	B1R7J9	10/24/2007	1455	1600	29-7	0.92	1581	0.07 U	--	51.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5820	14.5 (dup)	B1R7K0	10/24/2007	1500	1605	29-7	0.86	1668	0.07 U	--	49.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C5820	8.5	B1R7K1	10/24/2007	1515	1610	29-7	0.82	1445	0.07 U	--	48.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			

-- = not detected.
 (dup) = duplicate.
 * = Indicates a sample collected as a backup in the event the main sample bag leaked. Backup samples were analyzed and reported for completeness in the data set.
 CAS = Chemical Abstracts Service, a division of the American Chemical Society.
 HEIS = Hanford Environmental Information System database.
 J = estimated.
 ppmv = parts per million by volume.
 U = undetected.

3.0 ANALYTICAL RESULTS

A summary of maximum VOC detections from trenches T-04, T-20, T-24, and T-29 in the 218-W-4C Burial Ground is provided in Table 1. Table 2 provides sample locations, sample numbers, sample depths, and results measured using the MIRAN analyzer for the Step II samples collected during the October – December 2007 quarter. The impacts of these Step II data from trenches T-04, T-20, T-24, and T-29 will be evaluated to determine activities needed for Step III and as part of the final remediation assessment for this waste site.

At the time that the SAP was prepared in 2003, the two available field screening instruments were configured to analyze for either two or eight VOCs. Since then, the MIRAN analyzer was obtained for field screening. The MIRAN analyzer identifies up to five compounds with the highest concentrations in the vapor sample from a library of more than 100 VOCs. As a result, the analysis of VOCs using field screening was not limited to the two to eight compounds identified in the SAP.

The MIRAN analyzer contains factory calibration data for 120 chemical compounds. The calibration data have been confirmed on site using calibration gases for the following eight VOCs: carbon tetrachloride, chloroform, methylene chloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, trichloroethylene, and tetrachloroethylene. Additionally, the MIRAN analyzer is checked quarterly for instrument response using a closed-loop injection system and 10 certified chemical compounds. Results of the instrument response checks indicate that all 10 of these compounds show good response (Table 3). Good correlation between the expected concentration and the instrument response indicates that the data generated from these analyses are reliable.

The following summarizes the data collected at each trench.

3.1 TRENCH T-04

Forty-six direct push boreholes were installed surrounding trench T-04 during Step II (Figures 1 and 2). A total of 95 intervals were sampled, with eight backup samples and 15 duplicate samples. Three regular samples and one duplicate did not have data collected during analysis because of either equipment or operator error. The deepest samples interval occurred at push 4-27 to a maximum depth of 9.8 m (32.0 ft) below the depth of the asphalt pad.

Carbon tetrachloride was detected seven times (from 0.16 ppmv to 0.63 ppmv) and was generally located around the asphalt pad at the eastern half of the trench. Results indicated that the VOC with the highest detection was tetrachloroethylene (PCE), detailed below. Carbon dioxide was detected 37 times and generally was located along the northern edge and the eastern half of the trench. Methane was detected seven times and generally found on the northern and southern edges of the asphalt pad near the central part of the trench (Table 2).

Maximum concentrations of PCE detected during the sampling in the October – December 2007 quarter were associated with this trench. The maximum concentration of PCE was 43.06 ppmv at location 4-17 (Tables 1 and 2 and Figure 2). The second highest concentration of PCE was

37.58 ppmv detected at location 4-27. Locations 4-17 and 4-27 are northwest and southeast, respectively, of the former location of vent riser T4-04 (Figure 2). PCE was detected 34 times out of 97 intervals and was generally located around the pad in the eastern half of the trench; this contaminant was not detected in the other three trenches (Table 2). Previously, vent riser sampling (Step I) showed the highest levels of VOCs were associated with the eastern end of this trench, particularly in samples from vent riser T4-04 (FH-040144.1). Based on the Step I laboratory analyses of samples from vent riser T4-04, the VOC with the highest concentration also was PCE (FH-0402233.1).

3.2 TRENCH T-20

Fourteen direct push boreholes surrounding the east end of trench T-20 were installed during Step II (Figures 1 and 3). A total of 32 intervals were sampled, with nine backup samples and four duplicate samples. One backup sample did not have data collected during analysis because of either equipment or operator error. The deepest sample interval occurred at push 20-14 to a maximum depth of 10.4 m (34.0 ft) below the depth of the asphalt pad.

Carbon tetrachloride was detected 23 times at low concentrations along most of the asphalt pad edge. Results indicated that the VOC with the highest detection was benzyl chloride (29 detections), with a maximum concentration of 74.24 ppmv at location 20-03 on the north side of the asphalt pad (Tables 1 and 2 and Figure 3). Benzyl chloride was detected at most of the locations. Toluene (three detections), chlorobenzene (one detection), nitrobenzene (three detections), methyl chloride (six detections), and methyl chloroform (one detection) were mainly identified along the northern asphalt pad edge. Nitrous oxide (three detections), 1,1,2-trichloroethane (three detections), and acetylene (two detections) were associated with the northeastern edge of the pad. 1,2-Dichloroethylene was detected nine times, mainly at the deep push location 20-14. Phosgene was detected two times at location 20-13 at the south-western corner of the area where waste was formerly stored. Carbon dioxide (38 detections) and trichlorofluoromethane (31 detections) were detected at most of the locations around the pad. Maximum concentrations of chlorobenzene, nitrobenzene, and 1,2-dichloroethylene detected during the sampling in the October – December 2007 quarter were associated with this trench.

The highest concentration of carbon tetrachloride was 2.52 ppmv (collected at 10.4 m (34 ft) below the depth of the asphalt pad) at deep push location 20-14 on the southeastern edge of the pad, near the location of former vent riser T20-03. Samples above these depths at this location ranged from 0.42 to 0.83 ppmv. Carbon tetrachloride was identified in the easternmost part of the trench during the Phase I vent riser sampling and in the laboratory analysis of the vapor sample from vent riser T20-03. The results for trichlorofluoromethane detected during Step II coincides with elevated concentrations of dichlorofluoromethane and trichlorofluoromethane in Step I samples from vent riser T20-03.

Table 3. Quarterly Calibration Results for the MIRAN SapphIRe Ambient Air Analyzer, First Quarter 2008.

Calibration Element	Calibration Constituents									
	CCl ₄	TCE	PCE	1,1,2-TCA	TCM	1,1-DCA	1,1,1-TCA	DCM	CO ₂	Methane
Calibration Standard	49.7 ppmv	6 ppmv	5 ppmv	5.01 ppmv	4.94 ppmv	1 ppmv	3 ppmv	4 ppmv	105 ppmv	51 ppmv
Calibration Value	56.7 ppmv	7 ppmv	5.55 ppmv	4.67 ppmv	5.51 ppmv	1 ppmv	2.8 ppmv	3.6 ppmv	105 ppmv	51 ppmv
%Recovery	114 %	117 %	111 %	93 %	112 %	100 %	93%	90%	100%	100%

1,1,1-TCA = 1,1,1-trichloroethane.

1,1,2-TCA = 1,1,2-trichloroethane.

1,1-DCA = 1,1-dichloroethane.

CCl₄ = carbon tetrachloride.CO₂ = carbon dioxide.

DCM = dichloromethane, also known as methylene chloride.

PCE = perchloroethylene, also known as tetrachloroethylene.

ppmv = parts per million by volume.

TCE = trichloroethylene.

TCM = trichloromethane, or chloroform.

3.3 TRENCH T-24

Eleven direct push boreholes surrounding the east end of trench T-24 were installed during Step II (Figures 1 and 4). A total of 22 intervals were sampled, with eight backup samples and four duplicate samples. All samples had data collected during analysis. The deepest sample interval occurred at push 24-7 to a maximum depth of 3.8 m (12.5 ft) below the depth of the asphalt pad.

Carbon tetrachloride was detected seven times. The only detection of carbon tetrachloride above 1 ppmv occurred at location 24-1 (1.77 ppmv). Results indicated that the VOC with the highest concentration in the soil vapor at this trench was benzyl chloride (nine detections), with a maximum concentration of 185.54 ppmv at location 24-1 at the northwestern corner of the area where waste formerly was stored (Tables 1 and 2 and Figure 4). Carbon dioxide (30 detections), trichlorofluoromethane (29 detections), toluene (one detection), methyl chloride (five detections), methyl chloroform (eight detections), 1,1,2-trichloroethane (nine detections), and phosgene (16 detections) also were detected around the asphalt pad at this trench. The maximum concentration of phosgene and trichlorofluoromethane occurred at location 24-2. The remainder of the contamination was detected along the edges of the easternmost portion of the asphalt pad. Maximum concentrations of benzyl chloride, trichlorofluoromethane, toluene, methyl chloride, and phosgene detected during the sampling in the October – December 2007 quarter were associated with this trench.

Trench T-24 did not have vent risers, so no comparison can be drawn between Step I and Step II.

3.4 TRENCH 29

Thirteen direct push boreholes surrounding the east end of trench T-29 were installed during Step II (Figures 1 and 5). A total of 30 intervals were sampled, with four backup samples and three duplicate samples. One regular sample did not have data collected during analysis because of either equipment or operator error. The deepest sample interval occurred at push 29-7 to a maximum depth of 10.5 m (34.5 ft) below the depth of the asphalt pad. Three direct push locations inadvertently were sampled at the west end of trench T-29 that was not used to store RSW (Figure 1).

Carbon tetrachloride was detected at sampling locations around the asphalt pad as detailed below. Results indicated that the VOC with the highest concentration in the soil vapor at this trench was methane (six detections), with a maximum concentration of 51.15 ppmv at location 29-7 at the southeastern corner of the trench (Tables 1 and 2 and Figure 5). Carbon tetrachloride (26 detections), carbon dioxide (24 detections), toluene (15 detections), methyl chloroform (two detections), nitrous oxide (10 detections), phosgene (two detections), acetylene (12 detections), and 1,1-dichloroethane (six detections) also were detected around the asphalt pad at trench T-29 (Table 2). Maximum concentrations of carbon dioxide, toluene, methyl chloroform, and acetylene were found on the northern edge of the pad. Maximum concentrations of nitrous oxide and 1,1-dichloroethane were found at location 29-9 at the southeastern corner of the asphalt pad. Most of these constituents were found consistently around the pad perimeter. Maximum concentrations for carbon tetrachloride, carbon dioxide, methane, nitrous oxide, acetylene, and

1,1-dichloroethane detected during the sampling in the October – December 2007 quarter were associated with this trench.

Carbon tetrachloride was detected 26 times at sampling locations around the asphalt pad where waste formerly was stored. The maximum concentration of 3.21 ppmv was detected at location 29-7 at a depth of 10.5 m (34.5 ft). A detection of 2.65 ppmv was also identified at a depth of 3.7 m (12 ft) at location 29-4, northwest of the former location of vent riser T29-04-N. Carbon tetrachloride also was detected in the laboratory analyses of the vent riser samples from vent risers T29-01-S and T29-04-N (FH-0202233.1). The only two detections of phosgene (with a maximum detection of 0.79 ppmv) also were at location 29-7. The maximum concentration of methane was found near the former location of vent riser T29-01-S. Laboratory analysis of the vent riser sample from T29-01-S also showed the presence of chloromethane and methanol.

In addition to the 13 direct push boreholes at trench T-29, direct push location 29-14 was installed to collect a vapor sample for laboratory analysis of phosgene for health and safety purposes. Preliminary data from the vapor samples from location 29-7 in trench T-29 indicated potential for the presence of phosgene. The laboratory analytical data were not available during the October – December 2007 quarter. These data will be reported in a future quarterly report, along with any resulting assessment of the impacts of the data. This assessment will be incorporated as appropriate into the planning for Step III activities.

Three sample locations at the western, unused end of the trench were inadvertently sampled. Six vapor samples and a duplicate sample were collected from these locations (Table 4). While contamination would not be expected because no waste was stored in this area, carbon tetrachloride (2 detections), carbon dioxide (3 detections), methane (two detections), sulfur dioxide (two detections), and epichlorohydrin (one detection) were detected in these vapor samples. This could indicate that vapors from other sources are dispersing through the vadose zone.

Table 4. Vapor Sample Results from Inadvertently Collected Direct Push Samples from the Western End of Trench T-29 in the 218-W-4C Burial Ground.

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Methane (ppmv)	Sulfur Dioxide (ppmv)	Epichlorohydrin (ppmv)
							CAS #	CAS #	CAS #	CAS #	CAS #	CAS #
							56-23-5	124-38-9	67-66-3	74-82-8	7446-0905	106-89-8
C5842	12.0	B1P4M2	10/09/2007	1500	1700	T-29 west end	0.09 U	--	0.07 U	--	--	--
C5842	6.0	B1P4M4	10/10/2007	1120	1230	T-29 west end	0.09 U	--	0.07 U	---	--	--
C5843	12.0	B1P4M5	10/10/2007	1412	1610	T-29 west end	0.40	1945.00	0.07 U	21.70	6.00	2.42
C5843	6.0	B1P4M6	10/10/2007	1455	1617	T-29 west end	0.09 U	--	0.07 U	--	--	--
C5844	12.0	B1P4M7	10/11/2007	853	1435	T-29 west end	0.09 U	1286.00	0.07 U	--	--	--
C5844	6.0	B1P4M9	10/11/2007	940	1444	T-29 west end	0.18	1670.00	0.07 U	18.11	5.57	--
C5844	6.0 (dup)	B1P4N0	10/11/2007	948	1449	T-29 west end	0.24	1504.00	0.07 U	26.36	7.59	--

NOTE: These three direct push locations were inadvertently placed in the wrong location at trench T-29. Only the eastern portion of trench T-29 received waste, so sampling was to be conducted only around the eastern end of the trench. These direct pushes were located at the western end of the trench, around a portion of the trench that was never used. The samples were analyzed and the data are reported for completeness.

-- = detected.

(dup) = duplicate.

CAS = Chemical Abstracts Service, a division of the American Chemical Society.

HEIS = Hanford Environmental Information System database.

ppmv = parts per million by volume.

4.0 QUALITY CONTROL

For the vapor samples, field QC consisted of duplicate samples and equipment blank samples. An initial assessment of data quality for the samples collected during the October – December 2007 quarter was conducted. Additional data quality evaluation will be conducted on this data set and on the data to be collected from trenches T-01 and T-07. The initial assessment is summarized in this report; additional evaluations will be included in future reports.

The SAP required that a minimum of 5% of the total collected vapor samples be duplicated. This equates to at least one duplicate sample for every 20 samples or at least one duplicate sample per day. At least one duplicate was analyzed for every 20 samples, as required by the quality assurance project plan in the SAP. Samples collected on October 15 to 17 did not have corresponding duplicates. The duplicate samples were collected to evaluate the performance of the analytical method by comparing two vapor samples from the same depth; the samples were collected in 12-L Tedlar bags.

Duplicate samples were analyzed using the MIRAN analyzer. For duplicate samples with detections of at least one VOC in both samples, the relative percent difference (RPD) was calculated for each pair of VOC results according to the following formula:

$$RPD = \frac{(C_1 - C_2) \times 100}{(C_1 + C_2) / 2}$$

where:

C_1 = the larger of the two observed values

C_2 = the smaller of the two observed values.

The following summarizes the initial assessment of the RPDs for each set of duplicate samples. The RPD was calculated only for VOC pairs in which both the sample and the duplicate result were unqualified (i.e., no data flags). The assessment is presented by trench to provide location information for duplicate sample data.

4.1 TRENCH T-04

Fifteen duplicates were collected at trench T-04. One set of duplicate samples had estimated data, so an RPD was not calculated; two duplicate sample sets had detections of at least one VOC in both samples (the original and the duplicate) so that RPDs could be calculated. A total of five RPDs were calculated, ranging from 3 to 62 percent. The required precision of +/- 25 percent applies only to VOC detections that are greater than five times the method detection limit (DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Documents*, Section 7.5.1.3). Based on this requirement, one of the RPDs was associated with detections of tetrachloroethylene at concentrations greater than the detection limit of 0.16 ppmv. The RPD for this contaminant exceeded the precision target of 25 percent. The precision requirement was exceeded for carbon tetrachloride in one set of duplicates; however, the detected concentrations did not exceed five times the method detection limit. The precision requirement was also

exceeded for one duplicate sample set for carbon dioxide. No method detection limit has been established for this constituent; therefore, no comparison to the five times rule was possible.

4.2 TRENCH T-20

Four duplicate sample sets were collected at trench T-20 and all four duplicate sample sets had detections of at least one VOC in both samples so that RPDs could be calculated. A total of 18 RPDs were calculated, ranging from 2 to 82 percent. Four of the 18 RPDs exceeded the required precision of 25 percent. The precision requirement was exceeded for nitrobenzene, nitrous oxide, 1,1,2-trichloroethane, and 1,2-dichloroethylene. The RPD for the 1,1,2-trichloroethane was associated with concentrations that exceeded five times the method detection limit. No method detection limits have been established for the remaining constituents; therefore, no comparison to the five times rule was possible.

4.3 TRENCH T-24

Four duplicate sample sets were collected at trench T-24 and all four sets of duplicates had detections of at least one VOC in both samples so that RPDs could be calculated. A total of 14 RPDs were calculated, ranging from 3 to 127 percent. Six of the 14 RPDs exceeded the required precision of 25 percent. The precision requirement was exceeded for carbon dioxide, benzyl chloride, trichlorofluoromethane, and phosgene. None of these constituents have developed method detection limits for comparison.

4.4 TRENCH T-29

Four duplicate sample sets were collected at trench T-29; including one duplicate set from the western edge of the trench where samples were inadvertently taken (Tables 2 and 4). Three of the four duplicate sets had detections of at least one VOC in both samples so that RPDs could be calculated. A total of 12 RPDs were calculated, ranging from 3 to 105 percent. Six of the 12 RPDs exceeded the required precision of 25 percent. The precision requirement was exceeded for carbon tetrachloride, methane, acetylene, 1,1-dichloroethane, and sulfur dioxide (sulfur dioxide was only detected in the inadvertent samples from the western edge of the trench). The carbon tetrachloride RPDs were associated with detections that were less than five times the method detection limit. One RPD for 1,1-dichloroethane was associated with detections that exceeded five times the method detection limit. No method detection limits have been established for the remaining constituents; therefore, no comparison to the five times rule was possible.

Three equipment blanks were collected during this quarter by purging a Tedlar sampling bag three times with ambient air, drawing an ambient air sample, and then analyzing the ambient air sample on the MIRAN analyzer. No VOCs were detected in the equipment blanks (Table 5). The purpose of collecting equipment blanks is to verify the adequacy of sampling equipment decontamination procedures, so equipment blanks were only needed for Tedlar bags that were re-used. During Step II, the Tedlar bags were routinely re-used; however, the SAP requirement of one equipment blank for every 20 samples was not achieved because of missed sample collection in the field. Tedlar bags were decontaminated by purging with three full volumes of ambient air

Table 5. Results for Equipment Blanks.

Well	Depth below Trench Floor (ft)	HEIS #	Sample Date	Sample Collection Time	Analysis Time	Trench Location	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)	Trichloroethene (ppmv)	Methane (ppmv)	Tetrachloroethylene (ppmv)	Sulfur Dioxide (ppmv)	Benzyl Chloride (ppmv)	Trichloro-fluoromethane (ppmv)	Toluene (ppmv)	Chlorobenzene (ppmv)	Nitrobenzene (ppmv)	Methyl Chloride (ppmv)	Methyl Chloroform (ppmv)	Nitrous Oxide (ppmv)	1,1,2-Trichloroethane (ppmv)	1,2-Dichloroethylene (ppmv)	Phosgene (ppmv)	Epichlorohydrin	Acetylene (ppmv)	1,1-Dichloroethane (ppmv)	VOC detected by IH (ppmv)			
							CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#	CAS#		CAS#	CAS#	CAS#
							56-23-5	124-38-9	67-66-3	79-01-6	74-82-8	127-18-4	7446-0905	100-44-7	75-69-4	108-88-3	108-90-7	98-95-3	74-87-3	71-55-6	10024-97-2	79-00-5	156-59-2	75-44-5	106-89-8	74-86-2	75-34-3				
C5848	Equipment Blank	B1P4P4	10/17/2007	1007	--	29-11	No data collected during analysis due to equipment or operator error.																								
C6139	Equipment Blank	B1RN11	12/04/2007	1255	1615	4-8	00.9 U	--	00.7 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
C6140	Equipment Blank	B1NRN10	12/04/2007	1355	1640	4-9	00.9 U	--	00.7 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			

-- = not detected.
 CAS = Chemical Abstract Service, a division of the American Chemical Society.
 HEIS = Hanford Environmental Information System database.
 IH = Industrial Hygiene.
 ppmv = parts per million by volume.
 U = undetected.

prior to sample collection. Because the equipment blanks that were collected showed no detections, the impact of having less than 1 in 20 equipment blanks should not have a significant detrimental impact on the data set.

An instrument response check for carbon tetrachloride was run daily before analyzing samples and at the end of analysis for most days. The pairs of standard and measured VOC concentrations were used to evaluate the accuracy of the carbon tetrachloride analyses conducted using the MIRAN analyzer. The percent recovery (%R) was calculated according to the following formula:

$$\%R = 100x(C_m / C_s)$$

where

C_m = the measured concentration of carbon tetrachloride

C_s = is the standard.

Fifty-four instrument response checks were conducted during this quarter's sampling. The maximum %R was 858 percent and the minimum was 1 percent. Thirty-four of the 54 pairs (63 percent) of standard and measured carbon tetrachloride concentrations were within the SAP requirement of ± 25 percent. The other 20 pairs were affected by equipment difficulties in the field associated with injection syringes used to draw air into the analyzer. New syringes were obtained and used starting December 10, 2007. All instrument response checks beyond this date were within required limits. Results of the instrument response checks are provided in Table 6. Additional evaluation of the impact of the problem with the injection syringes will be conducted during the analysis of Step I and Step II data to determine the strategy for Step III requirements. Because the QC data collected after fixing the problem were of required quality, the data collected prior to identification and correction of the problem are not likely to have significant quality issues that would preclude their use. The additional evaluation will be reported in a future quarterly report.

Table 6. Results for Carbon Tetrachloride Calibration Checks. (3 Pages)

Analysis Date	Analysis Time	Carbon Tetrachloride Concentration Standard (ppmv) ^a	Carbon Tetrachloride Concentration Analyzed (ppmv) ^a	Percent Recovery (%) ^b	Within QC range (+/- 25%)
10/09/2007	1640	25.7	13.82	54	No
10/10/2007	1217	22.37	11.39	51	No
10/10/2007	1657	22.37	15.69	70	No
10/11/2007	1520	0.97	8.32	858	No
10/15/2007	1646	0.97	0.67	69	No
10/15/2007	1656	0.97	0.76	78	Yes
10/16/2007	1552	4.5	3.37	75	Yes
10/16/2007	1734	4.5	3 J	67	No
10/17/2007	1140	4.5	3.45	77	Yes
10/22/2007	1423	4.5	3.61	80	Yes
10/22/2007	1600	4.5	2.81	62	No

Table 6. Results for Carbon Tetrachloride Calibration Checks. (3 Pages)

Analysis Date	Analysis Time	Carbon Tetrachloride Concentration Standard (ppmv) ^a	Carbon Tetrachloride Concentration Analyzed (ppmv) ^a	Percent Recovery (%) ^b	Within QC range (+/- 25%)
10/23/2007	1030	56.7	49.7	88	Yes
10/24/2007	1409	4.5	4.6	102	Yes
10/25/2007	1448	4.5	0.15	3	No
10/25/2007	1635	4.5	0.09 U	1	No
10/30/2007	1337	4.5	0.24	5	No
10/30/2007	1545	4.5	1.49	33	No
10/31/2007	1403	4.5	0.61	14	No
10/31/2007	1640	4.5	1.33	30	No
11/1/2007	1419	4.5	0.66	15	No
11/01/2007	1631	4.5	0.53	12	No
11/05/2007	1345	4.5	2.83	63	No
11/05/2007	1359	4.5	4.55	101	Yes
11/06/2007	1530	4.5	4.9	109	Yes
11/20/2007	1510	18.1	15.1	83	Yes
11/20/2007	1525	18.1	15.4	85	Yes
11/26/2007	1315	9.1	4.5	49	No
11/26/2007	1520	18.1	11	61	No
11/27/2007	1300	9.1	5.4	59	No
11/27/2007	1645	9.1	7.8	86	Yes
12/03/2007	NR	11.3	9	80	Yes
12/04/2007	1720	11.3	10.3	91	Yes
12/05/2007	1325	11.3	9	80	Yes
12/05/2007	1350	11.3	11	97	Yes
12/10/2007	1310	11.3	8.1	72	No
12/10/2007	1500	11.3	11	97	Yes
12/11/2007	1250	11.3	11.5	102	Yes
12/11/2007	1300	11.3	12.9	114	Yes
12/12/2007	1315	11.3	11.9	105	Yes
12/12/2007	1320	11.3	11.1	98	Yes
12/13/2007	1235	11.3	13.2	116	Yes
12/13/2007	1545	11.3	11.9	105	Yes
12/17/2007	1235	11.3	12.1	107	Yes
12/17/2007	1600	11.3	11.8	104	Yes
12/18/2007	1455	11.3	12.4	110	Yes
12/19/2007	1150	11.3	12	106	Yes
12/19/2007	1320	11.3	9	80	Yes

Table 6. Results for Carbon Tetrachloride Calibration Checks. (3 Pages)

Analysis Date	Analysis Time	Carbon Tetrachloride Concentration Standard (ppmv) ^a	Carbon Tetrachloride Concentration Analyzed (ppmv) ^a	Percent Recovery (%) ^b	Within QC range (+/- 25%)
12/20/2007	1240	5.7	5.6	98	Yes
12/20/2007	1500	5.7	5.8	102	Yes
12/27/2007	1244	5.7	6.4	112	Yes
01/02/2008	1240	5.7	5.6	98	Yes
01/02/2008	1555	5.7	6.8	119	Yes
01/03/2008	1245	5.7	4.9	86	Yes
01/03/2008	1430	5.7	6	105	Yes

^a data reported as received from the analysts.

^b values rounded to nearest whole number.

NR = not recorded.

ppmv = parts per million by volume.

U = undetected.

QC = quality control.

At least one blank sample of ambient air was analyzed each day of sampling using the MIRAN analyzer. A total of 61 blanks were run during this quarter's sampling activities. Carbon tetrachloride was detected in one blank sample at a concentration of 0.2 ppmv and carbon dioxide was detected in six blank samples. Because carbon dioxide is found in ambient air, filtering it is difficult. Ambient air blank results are presented in Table 7.

Table 7. Results for Ambient Air Blanks. (3 Pages)

Sample Type	Sample Date	Analysis Time	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)
Blank	10/09/2007	1630	0.09 U	1400 J	0.07 U
Blank	10/10/2007	1210	0.09 U	--	0.07 U
Blank	10/10/2007	1642	0.09 U	--	0.07 U
Blank	10/11/2007	1428	0.09 U	842	0.07 U
Blank	10/11/2007	1532	0.2	--	0.07 U
Blank	10/15/2007	1550	0.09 U	--	0.07 U
Blank	10/15/2007	1747	0.09 U	181	0.07 U
Blank	10/16/2007	1544	0.09 U	--	0.07 U
Blank	10/16/2007	1741	0.09 U	--	0.07 U
Blank	10/17/2007	1127	0.09 U	228	0.07 U
Blank	10/17/2007	1616	0.09 U	133	0.07 U
Blank	10/22/2007	1409	0.09 U	--	0.07 U
Blank	10/22/2007	1545	0.09 U	209	0.07 U
Blank	10/23/2007	1321	0.09 U	--	0.07 U
Blank	10/23/2007	1546	0.09 U	--	0.07 U
Blank	10/24/2007	1355	0.09 U	--	0.07 U

Table 7. Results for Ambient Air Blanks. (3 Pages)

Sample Type	Sample Date	Analysis Time	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)
Blank	10/24/2007	1646	0.09 U	--	0.07 U
Blank	10/25/2007	1433	0.09 U	--	0.07 U
Blank	10/25/2007	1622	0.09 U	--	0.07 U
Blank	10/30/2007	1322	0.09 U	--	0.07 U
Blank	10/30/2007	1530	0.09 U	--	0.07 U
Blank	10/31/2007	1347	0.09 U	--	0.07 U
Blank	10/31/2007	1623	0.09 U	--	0.07 U
Blank	11/01/2007	1345	0.09 U	--	0.07 U
Blank	11/01/2007	1617	0.09 U	--	0.07 U
Blank	11/05/2007	1330	0.09 U	--	0.07 U
Blank	11/05/2007	1657	0.09 U	--	0.07 U
Blank	11/06/2007	1543	0.09 U	--	0.07 U
Blank	11/06/2007	1712	0.09 U	--	0.07 U
Blank	11/20/2007	1400	0.09 U	--	0.07 U
Blank	11/20/2007	1500	0.09 U	--	0.07 U
Blank	11/26/2007	1345	0.09 U	--	0.07 U
Blank	11/27/2007	1334	0.09 U	--	0.07 U
Blank	11/27/2007	1625	0.09 U	--	0.07 U
Blank	12/03/2007	1710	0.09 U	--	0.07 U
Blank	12/03/2007	1853	0.09 U	--	0.07 U
Blank	12/04/2007	1330	0.09 U	--	0.07 U
Blank	12/04/2007	1655	0.09 U	--	0.07 U
Blank	12/04/2007	1709	0.09 U	--	0.07 U
Blank	12/05/2007	1534	0.09 U	--	0.07 U
Blank	12/10/2007	1441	0.09 U	--	0.07 U
Blank	12/11/2007	1331	0.09 U	--	0.07 U
Blank	12/11/2007	1528	0.09 U	--	0.07 U
Blank	12/12/2007	1356	0.09 U	--	0.07 U
Blank	12/12/2007	1534	0.09 U	--	0.07 U
Blank	12/13/2007	1259	0.09 U	--	0.07 U
Blank	12/13/2007	1541	0.09 U	--	0.07 U
Blank	12/17/2007	1303	0.09 U	--	0.07 U
Blank	12/17/2007	1552	0.09 U	--	0.07 U
Blank	12/18/2007	1526	0.09 U	--	0.07 U
Blank	12/18/2007	1615	0.09 U	--	0.07 U
Blank	12/19/2007	1215	0.09 U	--	0.07 U
Blank	12/19/2007	1314	0.09 U	--	0.07 U

Table 7. Results for Ambient Air Blanks. (3 Pages)

Sample Type	Sample Date	Analysis Time	Carbon Tetrachloride (ppmv)	Carbon Dioxide (ppmv)	Chloroform (ppmv)
Blank	12/20/2007	1305	0.09 U	--	0.07 U
Blank	12/20/2007	1450	0.09 U	--	0.07 U
Blank	12/27/2007	1310	0.09 U	--	0.07 U
Blank	12/27/2007	1358	0.09 U	--	0.07 U
Blank	01/02/2008	1318	0.09 U	--	0.07 U
Blank	01/02/2008	1551	0.09 U	--	0.07 U
Blank	01/03/2008	1312	0.09 U	--	0.07 U
Blank	01/03/2008	1417	0.09 U	--	0.07 U

J = estimated.

U = undetected.

ppmv = parts per million by volume.

All samples were collected and analyzed on the same day. The SAP requires that samples be analyzed within 6 hours of collection. All analyses met this holding time requirement with the exception of samples B1R8J8 (located in 4-1) and B1P4P1 (located in 29-11), which were analyzed 6 hours, 55 minutes and 6 hours, 23 minutes respectively following collection (Table 2). Exceeding the required holding time by less than an hour is not likely to affect the results for these samples.

In accordance with the SAP, formal data validation was not performed on these field screening analytical results. For field-screening data, the data are to be reviewed to determine if they are usable, based on review of the sampling methodology and analyses of duplicates, blanks, and standards. While this process was started for the data collected during the October – December 2007 quarter, the data review was not completed because data collection continued into January 2008. The completed data review results will be reported in a future quarterly report.

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5.0 HEALTH AND SAFETY MONITORING AND RADIOLOGICAL FIELD SCREENING

Health and safety monitoring was conducted by industrial hygienists during the Step II sampling activities at the 218-W-4C Burial Ground. For each direct push, the industrial hygienists would screen for carbon tetrachloride using an organic vapor monitor for combustible gases. The radiological control technician then surveyed for radiological contamination. Monitoring was conducted at each direct push location prior to vapor sample collection. During the sampling activities, the industrial hygienists performed continuous monitoring in the breathing zone. Controls put in place to prevent exposure included restricted access to limit personnel and entry only to personnel designated to perform the work.

After each vapor sample was collected, the radiological control technician wiped the tubing and filter with a cloth as it was retrieved to monitor for potential radiological contamination. No radiological contamination was detected through the field screening of the direct push holes in the 218-W-4C Burial Ground.

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6.0 COMPARISON TO REGULATORY REQUIREMENTS

As noted in CP-16886, *Data Quality Objectives Summary Report for the 218-W-4C Burial Ground Contaminant Release Investigation*, preliminary action levels are not applicable to VOC vapor samples.

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7.0 DOCUMENTED CONTAMINANT RELEASES TO THE ENVIRONMENT

The determination of whether or not the Step II vadose zone vapor results (reported in this October – December 2007 quarterly report) indicate any releases to the environment from the stored waste is under evaluation and will be included in a future report. Other than incidental and unavoidable vapor releases into the atmosphere associated with sampling at the direct push locations, no contaminant releases to the environment were documented as a result of this quarter's Step II vapor sampling field activities.

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8.0 PLANNED AND/OR SCHEDULED ADDITIONAL WORK

The field work associated with the Step II sampling at the 218-W-4C Burial Ground was completed at trenches T-04, T-20, T-24, and T-29 during this quarter (October – December 2007; note that two sampling days in January were included). A preliminary review of these data did not reveal any “hot spot” concentrations or large accumulations of VOCs that require additional push investigations at these trenches during Step II. The conclusion is that the acquired data are adequate to focus Step III sample and analysis requirements. Step II sampling activities at trenches T-01 and T-07 are planned for fiscal year 2009. These results will be evaluated and reported in a future quarterly report.

Based on the SAP for the 218-W-4C Burial Ground, Step III sampling is to be planned and implemented (if needed) after completion of the following:

- Step I sampling
- retrieval of the suspect TRU waste
- Step II sampling.

The Step III characterization will be scheduled for trenches T-04, T-20, T-24, and T-29 following a more thorough evaluation of the Step I and Step II results. Step II and Step III activities will be completed in trenches T-01 and T-07 following removal of trench waste containers.

Characterization activities planned at other burial grounds in addition to the 218-W-4C Burial Ground are summarized below.

Based on the sampling design in the 218-W-4B Burial Ground SAP (DOE/RL-2004-70), Step II sampling is planned following completion of Step I sampling and retrieval of the RSW. The Step II characterization will be scheduled when the RSW portions of the trenches have become accessible and sampling will not interfere with waste-retrieval operations.

Based on the sampling design in the 218-W-3A Burial Ground SAP (DOE/RL-2004-71), Step II sampling is planned following completion of Step I sampling and retrieval of the RSW. The Step II characterization will be scheduled when the RSW portions of the trenches have become accessible and sampling will not interfere with waste-retrieval operations.

Based on the sampling design in the 218-E-12B Burial Ground SAP (DOE/RL-2004-32), Step II sampling is planned following completion of Step I sampling and retrieval of the RSW. The Step II characterization will be scheduled when the RSW portions of the trenches have become accessible and sampling will not interfere with waste-retrieval operations.

9.0 REFERENCES

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WAC 173-160, "Minimum standards for construction and maintenance of wells," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

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