0066652

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

05-AMCP-0414

SEP 20 2005

Mr. Michael A. Wilson, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

RECEIVED
OCT 04 2005
EDMC

Dear Mr. Wilson:

TRANSMITTAL OF THE BURIAL GROUND SAMPLING AND ANALYSIS (SAP) RESULTS FOR APRIL-JUNE 2005

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 SAP sampling activities. No sampling and analysis activities were conducted as part of the SAP for the 218-W-4C Burial Ground during the April through June 2005 quarter so no analysis results for this burial ground are provided.

The SAP for burial ground 218-E-12B was approved in January 2005. Sampling in accordance with that plan was started on May 5, 2005. Results of sampling conducted in 218-E-12B in the April through June 2005 period are attached. Passive soil vapor samples were collected in trenches T-17 and T-27 and analyzed for volatile organic compounds. Preliminary action levels are not applicable to these vapor samples because there are no vapor cleanup levels for volatile organic compounds. No contaminant releases to the environment were documented as a result of the passive soil vapor sampling.

If you have any questions, please contact me, or you may contact Mark French, of my staff, on (509) 373-9863.

Sincerely,

Matthew S. McCormick, Assistant Manager
for the Central Plateau

AMCP:GLS

Attachment

cc: See page 2

SEP 20 2005

cc w/attach:
G. Bohnee, NPT
N. Ceto, EPA
L. D. Crass, FHI
L. J. Cusack, Ecology
S. Harris, CTUIR
R. Jim, YN
T. M. Martin, HAB
M. Mills, Ecology
E. J. Murphy-Fitch, FHI
K. Niles, ODOE
R. Piippo, FHI
V. J. Rohay, FHI
L. Seelatsee, Wanapum
D. G. Singleton, Ecology
R. Skinnarland, Ecology
J. B. Price, Ecology
R.T. Wilde, FHI
D. A. Isom, Admin Record (M-91), H6-08
Environmental Portal

BURIAL GROUND SAMPLING AND ANALYSIS RESULTS FOR APRIL – JUNE 2005

SUMMARY

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. Passive soil vapor samples were collected in Trenches T-17 and T-27 and analyzed for volatile organic compounds using a gas chromatograph/mass spectrometer instrument. The results indicate a potential hot spot at trace levels in Trench T-27. Preliminary action levels are not applicable to these vapor samples. No contaminant releases to the environment were documented as a result of the passive soil vapor sampling.

Based on the sampling design in the sampling and analysis plan for the 218-E-12B Burial Ground (DOE/RL-2004-32), Step II sampling is planned following retrieval of the retrievably stored waste (RSW)[1].

Step I of the sampling design in DOE/RL-2003-48, *218-W-4C Burial Ground Sampling and Analysis Plan*, was initiated during the October – December 2003 quarter and completed during the January – March 2004 quarter. No sampling and analysis activities were conducted as part of the sampling and analysis plan for the 218-W-4C Burial Ground during the April – June 2005 quarter. Therefore, there are no analysis results for the 218-W-4C Burial Ground to be provided for this period.

Based on the sampling design in the sampling and analysis plan for the 218-W-4C Burial Ground (DOE/RL-2003-48), Step II sampling is planned following retrieval of the RSW.

1.0 INTRODUCTION

This quarterly letter report has been prepared in accordance with the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology, et al., 1989) Interim Milestone M-91-40, Requirement 2, paragraph 3. This letter report covers the quarter from April through June 2005.

The sampling and analysis activities summarized in this quarterly letter report were conducted in accordance with DOE/RL-2004-32, *218-E-12B Burial Ground Sampling and Analysis Plan* (SAP), approved by the State of Washington Department of Ecology on January 20, 2005 (Bond 2005, "Approval of the 218-E-12B Sampling and Analysis Plan, DOE-RL-2004-32, Rev. 0").

The 218-E-12B Burial Ground SAP was developed to determine whether contaminants have been released to the vadose zone from RSW in the 218-E-12B Burial Ground in the 200 East Area of the Hanford Site. In the 218-E-12B Burial Ground, Trenches T-17 and T-27 contain

---

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

suspect TRU[2] RSW (Figure 1). The waste typically is contained in 208-liter (L) (55-gallon [gal]) drums.

The 218-E-12B sampling design consists of three steps. Step I includes passive soil vapor sampling in the soils overlying the RSW before waste retrieval. This sampling is being conducted in lieu of vent riser sampling, because this burial ground does not contain vent risers. Step II and Step III will be conducted following waste retrieval. Step II includes sampling the trench floor and adjacent soils. Step III involves assessing the data collected in Step I and Step II, leading to potential characterization of the substrate soils beneath the trench floor.

The Step I sampling in the 218-E-12B Burial Ground was completed during the April – June 2005 quarter. As specified in the 218-E-12B Burial Ground SAP, the Step II and Step III sampling to characterize the substrate soils will be conducted when the trench floor in an entire trench has become accessible and sampling will not interfere with waste retrieval operations. The results of the Step I sampling will be used to focus the Step II sampling.

Step I of the sampling design in the 218-W-4C Burial Ground SAP (DOE/RL-2003-48) was initiated during the October – December 2003 quarter and completed during the January – March 2004 quarter. No sampling and analysis activities were conducted as part of the 218-W-4C Burial Ground SAP during the April – June 2005 quarter. Therefore, there are no analysis results for the 218-W-4C Burial Ground to be provided for this period.

2.0 SAMPLING METHODOLOGY

Passive soil vapor sampling was initiated on May 5, 2005. The passive soil vapor samples were collected on hydrophobic absorbent cartridges contained in glass vials. Fifty-two sampling vials, including four duplicate samples, were emplaced in the soil overlying the RSW in Trenches T-17 and T-27 (Figure 2). (Note: In the 218-E-12B Burial Ground SAP, Figure 3-1 indicated that the southern portion of Trench T-17 containing RSW was 640 feet (ft) long. The correct length is 288 ft, as shown in Figure 2 in this report.) In accordance with the SAP, the sampling locations were 4.9 meters (m) (16 ft) apart. A random number generator was used to establish the initial sampling location from the corner in each portion of the trenches containing RSW. The vials and absorbent cartridges were retrieved from the soil on May 12, 2005. Two trip blanks also were collected. The vials containing the absorbent cartridges then were shipped to the passive soil vapor vendor's laboratory for analysis of volatile organic compounds using gas chromatography/mass spectrometry instrumentation. The data were received from the vendor on June 27, 2005.

---

[2] Transuranic (waste materials contaminated with greater than 100 nCi/g of transuranic materials having half-lives longer than 20 years).

The passive soil vapor vendor was Beacon Environmental Services, Inc., Bel Air, Maryland (Beacon). Beacon's passive soil vapor sampling technology is the EMFLUX® Passive Soil-Gas Sampling System (EMFLUX®). The passive soil vapor sampling vials were deployed and retrieved following Beacon's protocols for the EMFLUX® system.

Each EMFLUX® sampling vial is approximately 6.4 cm (2.5 in.) long, 1.5 cm (0.6 in.) in diameter, and contains two absorbent cartridges. The vials provided by Beacon initially were sealed with a solid white plastic cap (shipping cap). At each sampling location, the sampler created a hole approximately 10.2 centimeters (cm) (4 inches [in.]) deep. The sampler then removed the shipping cap from the vial and replaced it with a black plastic cap with a hole covered by screen meshing (sampling cap). The vial was placed in the hole with the sampling cap end facing down. The vial was covered with soil. A wire attached to the vial extended above the soil surface for use during retrieval of the vial. When the sampling vial was retrieved, the sampler replaced the sampling cap with the shipping cap.

Thirty-eight sampling vials (including two duplicates) were deployed in the southern portion of Trench T-17, five vials (including one duplicate) were deployed in the northern portion of Trench T-17, and nine vials (including one duplicate) were deployed in Trench T-27. All of the vials were deployed on the same day. A sample location number was established and recorded for each sampling location. The sampling locations were numbered sequentially from south to north, beginning at the southern end of Trench T-17. A unique *Hanford Environmental Information System* (HEIS) database number was assigned to each sampling vial during retrieval (Table 1).

Before deployment of the vials, Hanford Site coordinates were generated for each sampling location, based on the results of the random number generator and the Hanford Site coordinates for the locations of RSW in the trenches. The sampling locations were marked with small flags on April 19, 2005, using a Global Positioning System with sub-meter accuracy to identify the sampling locations at these coordinates. The Hanford Site coordinates later were converted to coordinates 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. The survey data will allow the sampling locations to be established following waste retrieval.

3.0 ANALYTICAL RESULTS

One hydrophobic absorbent cartridge was analyzed from each sampling vial. Analysis began on May 19, 2005, seven days after the vials were retrieved from the burial ground, and was completed on May 20, 2005. Each absorbent cartridge was thermally desorbed and then analyzed using gas chromatography/mass spectrometry equipment in accordance with the U.S. Environmental Protection Agency Method 8260B (SW-846, *Test Methods for Evaluating Solid*

® EMFLUX is a registered trademark of Beacon Environmental Services, Inc., Bel Air, Maryland.

Waste: Physical/Chemical Methods, Third Edition). Each cartridge was analyzed for the list of volatile organic compounds in Table 2.

The analytical results are provided in nanograms (ng) per cartridge. The practical quantitation levels represent values above which Beacon believes that quantitative laboratory results can be achieved within specified limits of precision and with a high degree of confidence. The practical quantitation levels for all analytes is 25 ng. All of the results are in the HEIS database.

Only two compounds were detected above the practical quantitation level (Table 3). 1,2,4-trimethylbenzene was detected at four locations at values ranging from 26 to 30 ng. The four locations are widely separated and do not appear to represent a hot spot (Figure 3). Tetrachloroethene was detected at three locations at values ranging from 26 to 34 ng. All three locations are adjacent to each other and are located at the northern end of the portion of Trench T-27 that contains RSW and may represent a hot spot. All of the detections are considered to be at trace levels.

4.0 QUALITY CONTROL

Field quality control consisted of field duplicate samples and trip blank samples. One duplicate sample was analyzed for every 20 samples, as required. One duplicate sample was analyzed in Trench T-27, one in the northern portion of Trench T-17, and two in the southern portion of Trench T-17 (Figure 3). The duplicate samples were collected to evaluate variability of the sample collection and analytical methodology by comparing two analyses of sample collection media exposed to equivalent conditions. Of the four sample-duplicate pairs, two pairs had no detectable volatile organic compounds (VOC) in either the sample or the duplicate. In one pair, 1,2,4-trimethylbenzene was detected in the duplicate but not in the sample. In one pair, tetrachloroethene was detected in the duplicate but not in the sample.

For sample-duplicate pairs with detections of at least one VOC in the sample and duplicate, the relative percent difference (RPD) can be calculated to evaluate whether the data meet the required precision of 25 percent. However, because no sample-duplicate pair in this study had detections of at least one VOC in both the sample and the duplicate, the RPD was not calculated.

For the purpose of evaluating the two sample-duplicate pairs with detections of one VOC in only the duplicate, the non-detect results are considered to be equivalent to the practical quantitation level value of 25 ng. A detected value that is within an order of magnitude of 25 ng is considered acceptable. In this study, the detected value of tetrachloroethene in duplicate B1CH67 was 34 ng, which is within an order of magnitude of the value of 25 ng assigned to sample B1CH66. The detected value of 1,2,4-trimethylbenzene in duplicate B1CH55 was 25 ng, which is within an order of magnitude of the value of 25 ng assigned to sample B1CH54.

The purpose of collecting trip blanks was to check for possible contamination originating from container preparation methods, shipment, handling, storage, or site conditions. No compounds above the practical quantitation level were identified on either of the two trip blanks.

5.0 RADIOLOGICAL FIELD SCREENING

A radiological control technician surveyed the sampling locations for potential radioactive contamination before the sampling vials were placed, to minimize the potential for the sampling vials to be contaminated. The technician also surveyed the instrument used to create the 10.2 cm (4 in.) deep hole during sampling vial placement for the same reason. The radiological control technician surveyed the sampling vials during retrieval. No radioactive contamination was detected on the sampling vials.

6.0 COMPARISON TO REGULATORY REQUIREMENTS

As noted in WMP-20379, *Data Quality Objectives Summary Report for the 218-E-12B Burial Ground Contaminant Release Investigation*, preliminary action levels are not applicable to VOC vapor samples.

7.0 DOCUMENTED CONTAMINANT RELEASES TO THE ENVIRONMENT

No contaminant releases to the environment were documented as a result of the passive soil vapor sampling. The passive soil vapor samples were collected in the soils overlying the RSW in engineered trenches. The Step II and Step III characterization of the trench floor and vadose zone is designed to evaluate whether contaminants within the engineered trench were released to the environment.

8.0 PLANNED AND/OR SCHEDULED ADDITIONAL WORK

The Step I sampling at the 218-E-12B Burial Ground was completed during this quarter (April - June 2005).

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 trench floor in an entire trench has become accessible and sampling will not interfere with waste retrieval operations.

Based on the sampling design in the 218-W-4C Burial Ground SAP (DOE/RL-2003-48), 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 asphalt pad in an entire trench has become accessible and sampling will not interfere with waste retrieval operations.

9.0 REFERENCES

Atomic Energy Act of 1954, 42 USC 2011, et seq.

Bond, R., 2005, "Approval of the 218-E-12B Sampling and Analysis Plan, DOE-RL-2004-32, Rev. 0", (letter to G. Sinton, U. S. Department of Energy, Richland Operations Office), Washington State Department of Ecology, Richland, Washington, January 20, 2005.

DOE/RL-2003-48, 2003, *218-W-4C Burial Ground Sampling and Analysis Plan*, Rev. 0, U.S. Department of Energy, Richland, Operations Office, Richland, Washington.

DOE/RL-2004-32, 2005, *218-E-12B Burial Ground Sampling and Analysis Plan*, Rev. 0, U.S. Department of Energy, Richland, Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington, as amended.

Hanford Environmental Information System, Hanford Site database.

NAD83, 1991, *North American Datum of 1983*, National Geodetic Survey, Federal Geodetic Control Committee, Silver Spring, Maryland.

NAVD88, 1988, *North American Vertical Datum of 1988*, National Geodetic Survey, Federal Geodetic Control Committee, Silver Spring, Maryland.

SW-846, 1999, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, Third Edition*, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., as updated.

WMP-20379, 2005, *Data Quality Objectives Summary Report for the 218-E-12B Burial Ground Contaminant Release Investigation*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

Figure 1. Locations of Retrievably Stored Waste Trenches at the 218-E-12B Burial Ground.

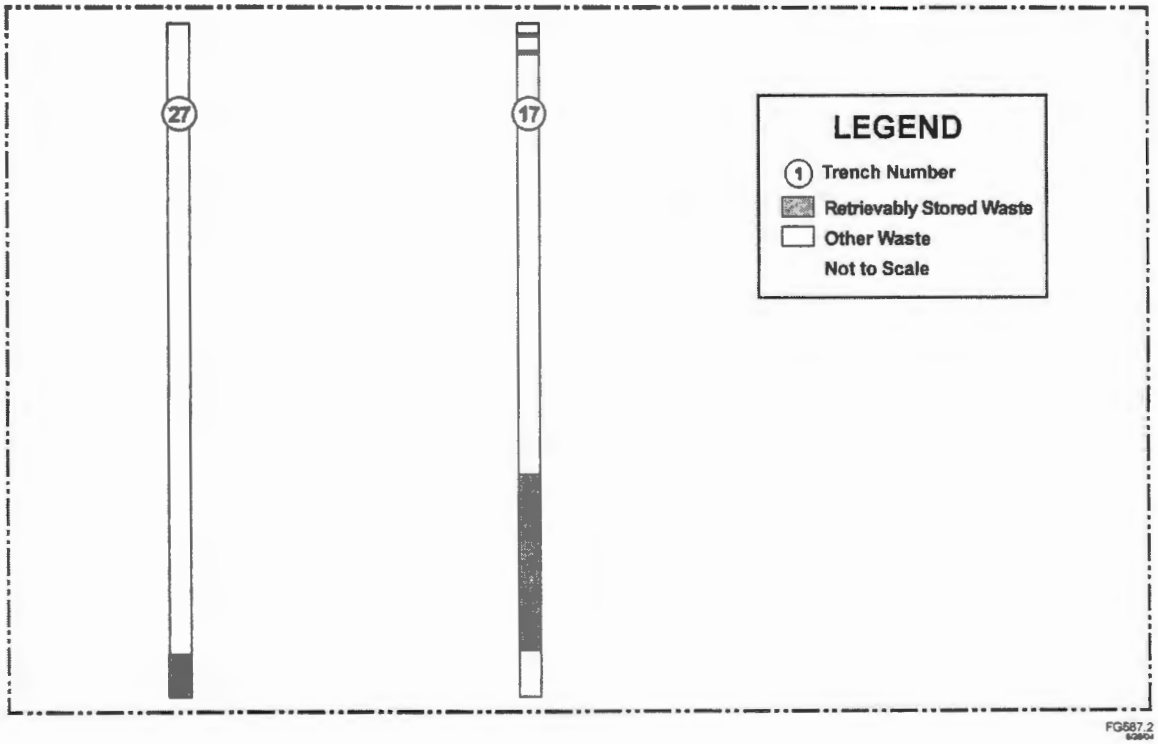


Figure 2. Sampling Grid for Passive Soil-Vapor Sampling at the 218-E-12B Burial Ground.

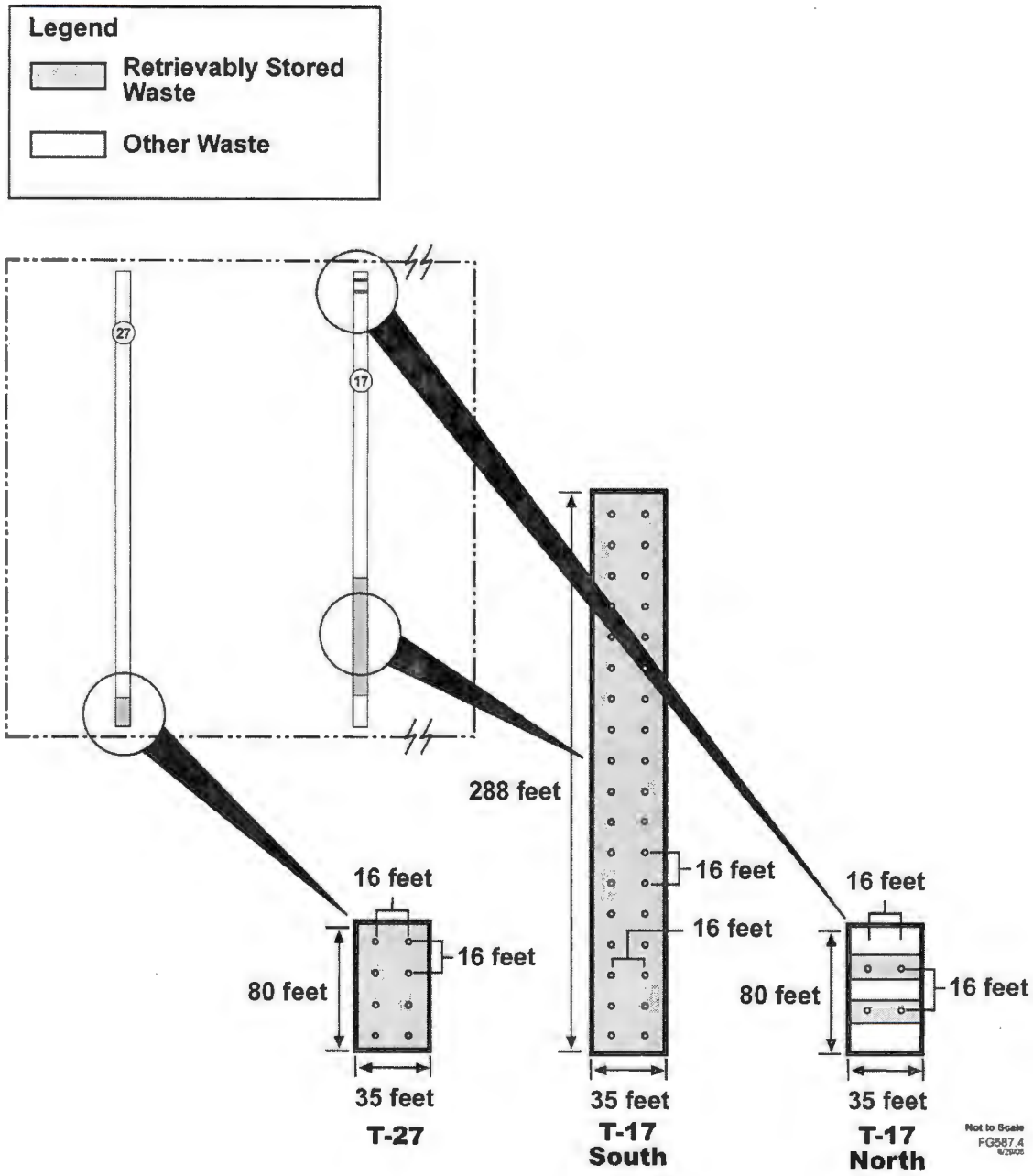
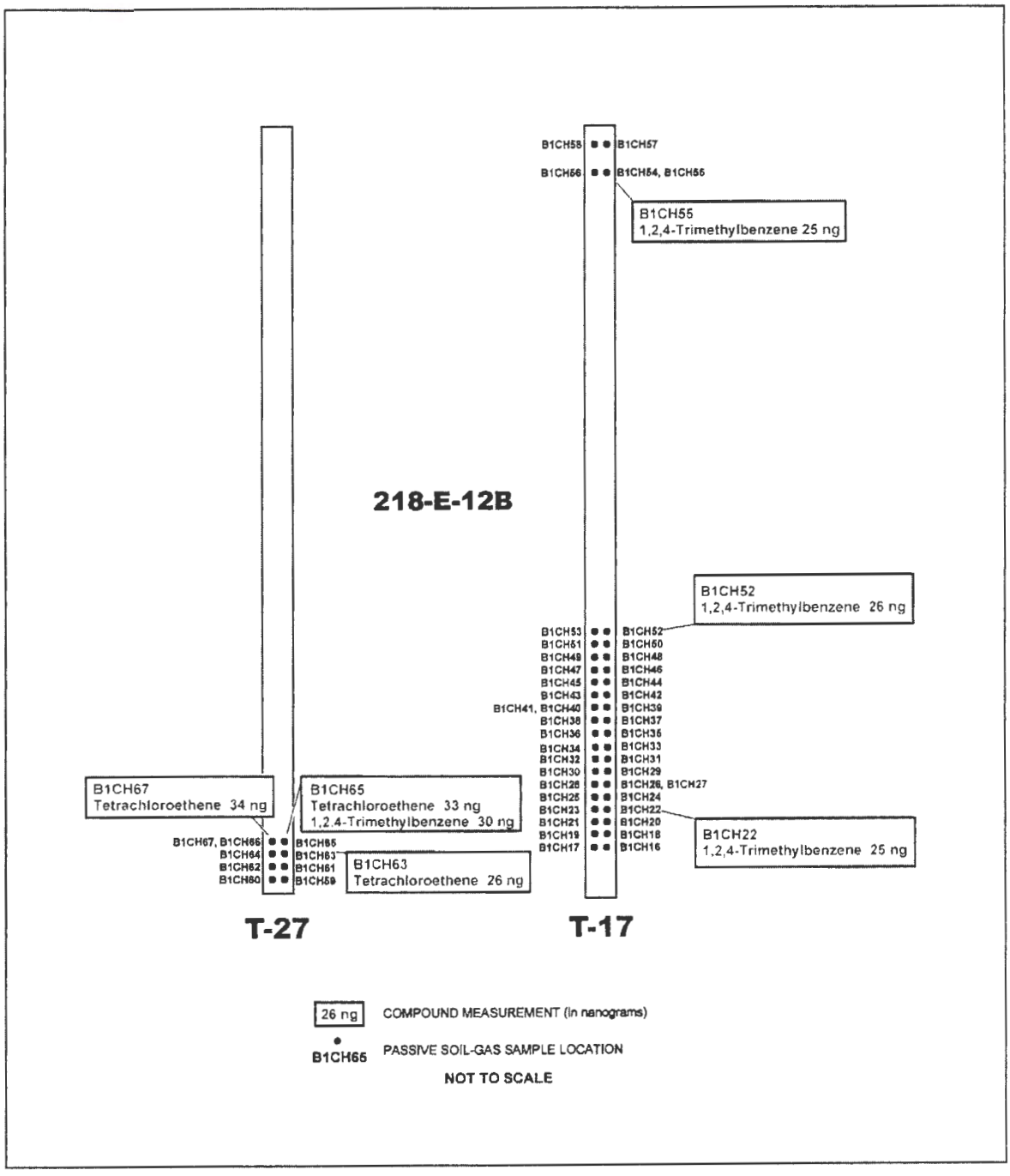


Figure 3. Location of Passive Soil Gas Samples and Compound Detections in Trenches T-17 and T-27 at the 218-E-12B Burial Ground.



BURIAL GROUND SAMPLING AND ANALYSIS RESULTS FOR APRIL – JUNE 2005

Table 1. Field Measurements for Passive Soil Vapor Samples Collected in the 218-E-12B Burial Ground Trenches. (2 Pages)

Sample Point	HEIS Sample Number	Sample Placement		Sample Retrieval	
		Date	Time	Date	Time
Trench T-17, South					
1	B1CH16	05/05/05	10:23	05/12/05	10:16
2	B1CH17	05/05/05	10:25	05/12/05	10:14
3	B1CH18	05/05/05	10:29	05/12/05	10:18
4	B1CH19	05/05/05	10:27	05/12/05	10:19
5	B1CH20	05/05/05	10:32	05/12/05	10:23
6	B1CH21	05/05/05	10:35	05/12/05	10:21
7	B1CH22	05/05/05	10:40	05/12/05	10:25
8	B1CH23	05/05/05	10:37	05/12/05	10:26
9	B1CH24	05/05/05	10:43	05/12/05	10:30
10	B1CH25	05/05/05	10:46	05/12/05	10:28
11	B1CH26	05/05/05	10:56	05/12/05	10:31
11 Duplicate	B1CH27	05/05/05	10:56	05/12/05	10:32
12	B1CH28	05/05/05	10:52	05/12/05	10:34
13	B1CH29	05/05/05	10:59	05/12/05	10:38
14	B1CH30	05/05/05	11:02	05/12/05	10:37
15	B1CH31	05/05/05	11:08	05/12/05	10:40
16	B1CH32	05/05/05	11:05	05/12/05	10:42
17	B1CH33	05/05/05	11:11	05/12/05	10:45
18	B1CH34	05/05/05	11:14	05/12/05	10:43
19	B1CH35	05/05/05	11:20	05/12/05	10:46
20	B1CH36	05/05/05	11:16	05/12/05	10:48
21	B1CH37	05/05/05	11:23	05/12/05	10:51
22	B1CH38	05/05/05	11:26	05/12/05	10:50
23	B1CH39	05/05/05	11:34	05/12/05	10:54
24	B1CH40	05/05/05	11:30	05/12/05	10:55
24 Duplicate	B1CH41	05/05/05	11:31	05/12/05	10:57
25	B1CH42	05/05/05	11:43	05/12/05	11:01
26	B1CH43	05/05/05	11:47	05/12/05	10:59
27	B1CH44	05/05/05	11:52	05/12/05	11:02
28	B1CH45	05/05/05	11:50	05/12/05	11:05
29	B1CH46	05/05/05	11:54	05/12/05	11:08
30	B1CH47	05/05/05	11:57	05/12/05	11:06

Table 1. Field Measurements for Passive Soil Vapor Samples Collected in the 218-E-12B Burial Ground Trenches. (2 Pages)

Sample Point	HEIS Sample Number	Sample Placement		Sample Retrieval	
		Date	Time	Date	Time
31	B1CH48	05/05/05	12:02	05/12/05	11:10
32	B1CH49	05/05/05	12:00	05/12/05	11:12
33	B1CH50	05/05/05	12:05	05/12/05	11:15
34	B1CH51	05/05/05	12:07	05/12/05	11:13
35	B1CH52	05/05/05	12:15	05/12/05	11:17
36	B1CH53	05/05/05	12:13	05/12/05	11:19
Trench T-17, North					
37	B1CH54	05/05/05	12:24	05/12/05	11:26
37 Duplicate	B1CH55	05/05/05	12:25	05/12/05	11:27
38	B1CH56	05/05/05	12:26	05/12/05	11:24
39	B1CH57	05/05/05	12:30	05/12/05	11:30
40	B1CH58	05/05/05	12:29	05/12/05	11:31
Trench T-27					
41	B1CH59	05/05/05	09:47	05/12/05	09:55
42	B1CH60	05/05/05	10:14	05/12/05	09:57
43	B1CH61	05/05/05	09:51	05/12/05	10:01
44	B1CH62	05/05/05	10:10	05/12/05	09:59
45	B1CH63	05/05/05	09:54	05/12/05	10:02
46	B1CH64	05/05/05	10:07	05/12/05	10:04
47	B1CH65	05/05/05	10:00	05/12/05	10:09
48	B1CH66	05/05/05	10:04	05/12/05	10:06
48 Duplicate	B1CH67	05/05/05	10:04	05/12/05	10:08

HEIS = *Hanford Environmental Information System* database.

Table 2. List of Volatile Organic Compounds Analyzed in Passive Soil Vapor Samples

Compound	Chemical Abstracts Service #
1,1-Dichloroethane	75-34-3
1,2-Dichloroethane	107-06-2
1,4-Dichlorobenzene	106-46-7
Benzene	71-43-2
Carbon tetrachloride	56-23-5
Chlorobenzene	108-90-7
Chloroform	67-66-3
cis-1,2-Dichloroethene	156-59-2
Ethylbenzene	100-41-4
Toluene	108-88-3
Tetrachloroethene	127-18-4
trans-1,2-Dichloroethene	156-60-5
Trichloroethene	79-01-6
p & m-Xylene	108-38-3
1,1-Dichloroethene	75-35-4
1,1,2-Trichlorotrifluoroethane	76-13-1
Methyl-t-butyl ether	1634-04-4
2,2-Dichloropropane	594-20-7
1,1,1-Trichloroethane	71-55-6
1,1-Dichloropropene	563-58-6
1,2-Dichloropropane	78-87-5
cis-1,3-Dichloropropene	10061-01-5
trans-1,3-Dichloropropene	10061-02-6
1,1,2-Trichloroethane	79-00-5
1,3-Dichloropropane	142-28-9
1,2-Dibromoethane (EDB)	106-93-4
1,1,1,2-Tetrachloroethane	630-20-6
Bromoform	75-25-2
1,1,2,2-Tetrachloroethane	79-34-5
o-Xylene	95-47-6
1,2,3-Trichloropropane	96-18-4
Isopropylbenzene	98-82-8
1,3,5-Trimethylbenzene	108-67-8
1,2,4-Trimethylbenzene	95-63-6
1,3-Dichlorobenzene	541-73-1
1,2-Dichlorobenzene	95-50-1
n-Butylbenzene	104-51-8
1,2,4-Trichlorobenzene	120-82-1
Naphthalene	91-20-3
1,2,3-Trichlorobenzene	87-61-6

Table 3. Compound Detections for Passive Soil Vapor Samples.

HEIS Sample Number	Compound	
	1,2,4-Trimethylbenzene (ng)	Tetrachloroethene (ng)
B1CH22	25	--
B1CH52	26	--
B1CH55	25	--
B1CH65	30	33
B1CH63	--	26
B1CH67	--	34

HEIS = *Hanford Environmental Information System* database.
ng = nanograms.