

Appendix H

V-Tanks Characterization Sampling Data

APPENDIX H

V-TANKS CHARACTERIZATION SAMPLING DATA

This appendix presents the historical sampling results for the V-Tank contents, ancillary lines and equipment, contaminated soil, and the Test Area North (TAN)-1704 valve box.

H-1. TANK CONTENTS

The V-Tank contents were sampled under two investigations: the 1993 Track 2 investigation and the 1996 remedial investigation/feasibility study (RI/FS). The 1993 Track 2 investigation sampled Tanks V-1, V-2, and V-3, but did not sample Tank V-9. Sample results for the Track 2 investigation were reported in the *Preliminary Scoping Track 2 Summary Report for the Test Area North Operable Unit 1-05: Radioactive Contamination Sites* (Idaho National Engineering and Environmental Laboratory [INEEL] 1994) and are summarized in the following tables:

- Table H-1, 1993 summary table for V-Tanks sludge sampling
- Table H-2, 1993 summary table for V-Tanks liquid sampling.

The 1996 RI/FS collected discrete liquid and sludge samples from Tanks V-1, V-2, V-3, and V-9. To further separate the phases, gravimetric filtration was conducted on samples obtained from Tanks V-1, V-2, and V-3. To prevent the release of volatile constituents, volatile organic compound (VOC) sample aliquots from these tanks were not filtered. The VOC analyses for Tanks V-1, V-2, and V-3 were conducted on watery sludge only and are reported as the sludge phase. The sample results from the 1996 RI/FS were reported in the *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory* (Department of Energy Idaho Operations Office [DOE-ID] 1997) and are summarized in the tables and figures that follow.

H-1.1 Tanks V-1, V-2, and V-3

Figures H-1 through H-3 illustrate the 1996 sample locations within Tanks V-1, V-2, and V-3. Sampling results are summarized in the following tables:

Tank Sludge

- Tables H-3 through H-5, Radionuclide results
- Tables H-6 through H-8, VOC results
- Tables H-9 through H-11, Semivolatile organic compound (SVOC) results
- Tables H-12 through H-14, Polychlorinated biphenyl (PCB) results
- Tables H-15 through H-17, Inorganic results
- Tables H-18 through H-20, Miscellaneous analyses.

Tank Liquid

- Tables H-21 through H-23, Radionuclide results
- Table H-22, SVOC results
- Table H-23, PCB results
- Table H-24, Miscellaneous analyses.

H-1.2 Tank V-9

Figure H-4 illustrates the 1996 Tank V-9 sample locations. Sampling results are summarized in the following tables:

Tank Sludge and Liquid

- Table H-25, Radionuclide results
- Table H-26, VOC results
- Table H-27, SVOC results
- Table H-28, PCB results
- Table H-29, Inorganic results
- Table H-30 and H-31, Miscellaneous analyses.

H-2. SAND FILTER SAMPLING

In 1997, the sand filter was sampled to characterize the filter contents (DOE-ID 2000). The sampling results are summarized in Tables H-32 and H-33.

H-3. SOIL SAMPLING

Soil sampling was conducted in four separate events: 1983, 1988, 1993 Track 2, and 1998. In 1983, sampling for gamma emitters was conducted as part of a decontamination and decommissioning project (INEEL 1994). Sampling locations for the 1983 event are shown in Figure H-5 and are summarized in the following tables:

- Table H-34, Surface soil radionuclide counts
- Table H-35, Gamma emitter radionuclides results.

In 1988, the Department of Energy collected surface and subsurface soils from three boreholes as part of an environmental survey (INEEL 1994). Samples were analyzed for VOCs, SVOCs, metals, and beta/gamma activity. No VOCs or SVOCs were detected. The sample locations are shown in Figure H-6, and results are summarized in Table H-36, Beta/gamma activity and total metals results.

The 1993 Track 2 investigation sampled three boreholes in the vicinity of the V-Tanks. The location of the boreholes is shown in Figure H-7, and results are summarized in the following tables:

- Table H-37, Summary of analytes detected and results
- Table H-38, VOC results
- Table H-39, SVOC results
- Table H-40, PCB results
- Table H-41, Inorganic results.

In 1998, samples were collected to determine the preliminary waste classification of future excavated soil (DOE-ID 1998). Figure H-8 depicts the sample locations. Results of the sampling effort are summarized in Table H-42.

H-4. TAN-1704 VALVE PIT

The TAN-1704 valve pit is not considered a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) component. Results for the 2000 sampling event are presented in *Characterization and Decision Analysis Report for TAN-616 Liquid Waste Treatment Facility* (INEEL 2001) and are summarized in the following tables:

- Table H-43, TAN-1704 valve pit liquid
- Table H-44, TAN-1704 valve pit liquid duplicate sample.

H-5. REFERENCES

DOE-ID, 1992, *Track 1 Sites: Guidance for Assessing Low Probability Sites at the INEL*, Department of Energy Idaho Operations Office, DOE/ID-10340, Rev. 1, July 1992.

DOE-ID, 1994, *Track 2 Sites: Guidance for Assessing Low Probability Hazard Sites at the INEL*, Department of Energy Idaho Operations Office, DOE/ID-10389, Rev. 6, January 1994.

DOE-ID, 1997, *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North, Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory*, Department of Energy Idaho Operations Office, DOE/ID-10557, Rev. 0, November 1997.

DOE-ID, 1998, *Field Sampling Plan for Test Area North TSF-09, TSF-18, and TSF-26 Area Soils*, Department of Energy Idaho Operations Office, DOE/ID-10635, Rev. 0, June 1998.

DOE-ID, 2000, *Field Sampling Plan for the V-Tanks, TSF-09 and TSF-18, at Waste Area Group 1, Operable Unit 1-10 Remedial Action*, Department of Energy Idaho Operations Office, DOE/ID-10794, Rev. 0, November 2000.

INEEL, 1994, *Preliminary Scoping Track 2 Summary Report for the Test Area North Operable Unit 1-05: Radioactive Contamination Sites*, Idaho National Engineering Laboratory, INEL-94/0135, Rev. 0, October 1994.

INEEL, 2001, *Characterization and Decision Analysis Report for TAN-616 Liquid Waste Treatment Facility*, Idaho National Engineering and Environmental Laboratory, INEEL/EXT-01-00029, Rev. 0, May 2001.

Tank Contents

Table H-1. 1993 summary table for V-Tank sludge sampling.

Isotope parameter	V1			V2			V3		
	T1600101VK	T1600102VK	T1600301VK	T1600302VK	T1600501VK	T1600502VK			
Gamma-emitting isotopic analysis (pCi/g)									
Cobalt-60	6.59 ± 0.37 E+4	5.46 ± 0.26 E+4	6.65 ± 0.36 E+4	3.73 ± 0.20 E+4	6.16 ± 0.33 E+3	6.54 ± 0.32 E+3			
Cesium-134	ND	ND	ND	ND	ND	ND			
Cesium-137	5.46 ± 0.18 E+6	3.3 ± 0.09 E+6	5.86 ± 0.18 E+6	4.51 ± 0.12 E+6	1.28 ± 0.05 E+7	1.32 ± 0.08 E+7			
Europium-152	ND	ND	ND	ND	ND	ND			
Europium-154	ND	ND	ND	ND	ND	ND			
Alpha-emitting isotopic analysis (pCi/g)									
Plutonium-238	9.3 ± 0.6 E+1	9.95 ± 0.55 E+1	7.41 ± 0.33 E+1	1.01 ± 0.04 E+2	3.46 ± 0.13 E+2	3.84 ± 0.07 E+2			
Plutonium-239/240	9.0 ± 0.6 E+1	5.95 ± 0.42 E+1	6.59 ± 0.32 E+1	7.68 ± 0.31 E+1	2.63 ± 0.11 E+2	3.05 ± 0.06 E+2			
Thorium-228	0.00	-2.3 E+2	0.00	0.00	3.8 ± 5.5 E-1	0.00			
Thorium-230	0.00	-5.7 E-1	-3.1 E-1	0.00	-2.5 E-1	0.00			
Thorium-232	0.00	-2.8 E-1	0.00	0.00	-1.3 E-1	0.00			
Americium-241	1.62 ± 0.07 E+2	2.17 ± 0.14 E+2	5.51 ± 0.29 E+1	8.11 ± 0.32 E+1	2.02 ± 0.05 E+2	1.97 ± 0.05 E+2			
Uranium-234	4.06 E-2	3.93 E-2	4.10 E-2	4.71 E-2	5.10 E-2	6.91 E-2			
Uranium-235	1.30 E-3	1.32 E-3	1.35 E-3	1.52 E-3	1.77 E-3	2.23 E-3			
Uranium-236	3.79 E-4	3.92 E-4	3.95 E-4	4.96 E-4	4.73 E-4	5.45 E-4			
Uranium-238	6.75 E-5	6.92 E-5	1.02 E-4	1.22 E-4	1.36 E-4	1.71 E-4			
Beta-emitting isotopic analysis (pCi/g)									
Gross beta	1.01 ± 0.01 E+7	9.54 ± 0.10 E+6	8.70 ± 0.10 E+6	9.32 ± 0.10 E+6	1.70 ± 0.02 E+7	1.34 ± 0.01 E+7			
Total Strontium	2.29 ± 0.06 E+6	1.74 ± 0.05 E+6	8.92 ± 0.50 E+5	1.12 ± 0.04 E+6	2.49 ± 0.05 E+6	2.55 ± 0.04 E+6			

Table H-1. (continued).

Isotope parameter	V1	V2	V3			
	T1600101VK	T1600102VK	T1600301VK	T1600302VK	T1600501VK	T1600502VK
Metallic inorganic Contract Laboratory Program (CLP) analysis (mg/kg)						
Barium	600 R	513 R	1,100 R	1,160 R	1,590 R	1,459 R
Cadmium	71.7	68.8	253	247	102 J	102 J
Chromium	3,770	3,680 R	4,870 R	4,570 R	3,570 R	3,540 R
Lead	3,190	3,230	1,180	1,330	1,860 WJ	1,890
Mercury	890	732	256	288	1,040	1,020
Silver	1,000 J	900 J	1,120 J	1,120 J	1,280 J	1,310 J
Volatile organic CLP analysis (µg/kg)						
Acetone	2,200 R	ND	ND	ND	ND	ND
Trichloroethene	23,000 J	ND	ND	ND	ND	ND
Tetrachloroethene	1,000,000 EJ	1,800,000	440,000 J	541,000 J	430,000	480,000
Metallic inorganic TCLP analysis^a (µg/L)						
Barium	2,320 NJ	2,180 NJ	1,100 NJ	1,150 NJ	1,820 NJ	1,400
Cadmium	303 DJ	331 DJ	1,160 DJ	1,210 DJ	190 DJ	134 DJ
Chromium	286 NJ	301 NJ	696 NJ	760 NJ	601 NJ	380 NJ
Lead	81.7 NJ	40.1 NJ	51.6 NJ	46.5 NJ	42.6 NJ	40.1 NUJ
Mercury	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Silver	18 DJ	17.5 DJ	16.1 DJ	21.7 DJ	15.4 DJ	16.0 DJ
Volatile organic TCLP analysis^b (µg/kg)						
Trichloroethene	3,705 J	710 J	2,587 J			
Tetrachloroethene	18,717 J	2,387 J	8,658 J			

Table H-1. (continued).

Isotope parameter	V1	V2	V3			
	T1600101VK	T1600102VK	T1600301VK	T1600302VK	T1600501VK	T1600502VK
a. The complete set of metallic inorganic results is provided in Appendix F, Section 9 from the Track 2 Summary Report (INEL-94/0135). Only the primary contaminants of concern (COCs) are provided here.						
b. The complete set of volatile organic results is provided in Appendix F, Section 9 from the Track 2 Summary Report (INEL-94/0135). Only the positive detection results are provided here.						

ND = Non detect.
J = The analyte was analyzed for and was positively identified, but could not be quantified.
UJ = The analyte was analyzed for and was not above the level of the associated value.
N = Analysis indicates that an analyte is present, and there are strong indications the identity is correct.
M = Duplicate injection precision not met.
R = Rejected.
EJ = The reported value is estimated because of the presence of interference.
D = Compounds identified are at a secondary dilution factor.

Table H-2. 1993 summary table for V-Tank liquid sampling.

Isotope parameter	V1			V2			V3		
	T1600101VK	T1600102VK	T1600301VK	T1600302VK	T1600501VK	T1600502VK			
Gamma-emitting isotopic analysis (pCi/L)									
Cobalt-60	1.01 ± 0.04 E+5	7.70 ± 0.35 E+4	9.5 ± 1.0 E+3	1.05 ± 0.10 E+4	5.41 ± 0.39 E+3	5.70 ± 0.46 E+3			
Cesium-134	1.69 ± 0.19 E+4	1.10 ± 0.17 E+4	ND	ND	1.22 ± 0.20 E+3	1.41 ± 0.43 E+3			
Cesium-137	1.25 ± 0.04 E+7	9.92 ± 0.30 E+6	2.02 ± 0.06 E+7	2.02 ± 0.06 E+7	1.15 ± 0.04 E+6	1.16 ± 0.04 E+6			
Europium-152	8.38 ± 0.89 E+4	7.8 ± 1.1 E+4	ND	ND	ND	ND			
Europium-154	9.38 ± 0.98 E+4	6.73 ± 0.62 E+4	ND	ND	ND	ND			
Alpha-emitting isotopic analysis (pCi/L)									
Plutonium-238	7.01 ± 0.22 E+3	6.70 ± 0.22 E+3	4.7 ± 1.8 E+1	3.32 ± 0.69 E+1	2.95 ± 0.46 E+1	1.46 ± 0.60 E+1			
Plutonium-239/240	3.22 ± 0.18 E+3	3.03 ± 0.18 E+3	0.00	0.00	0.00	0.00			
Thorium-228	5.3 ± 1.6 E+0	2.7 ± 2.5 E+0	0.00	0.00	0.00	0.00			
Thorium-230	-4.8 E-1	-9.0 E-1	-1.6 E+0	-4.8 E-1	-4.8 E-1	-4.8 E-1			
Thorium-232	-4.8 E-1	-4.5 E-1	0.00	-4.8 E-1	-4.8 E-1	-4.8 E-1			
Americium-241	8.68 ± 0.57 E+3	8.73 ± 0.31 E+3	1.57 ± 0.29 E+1	1.46 ± 0.24 E+1	1.23 ± 0.23 E+1	2.41 ± 0.60 E+1			
Uranium-234	5.35 E+0	3.54 E+0	2.28 E+0	1.52 E+0	1.14 E+0	1.9 E-7			
Uranium-235	7.59 E-2	8.63 E-2	3.86 E-2	3.91 E-2	3.59 E-2	3.48 E-2			
Uranium-236	7.13 E-2	7.35 E-2	5.91 E-2	6.31 E-2	3.58 E-2	7.68 E-2			
Uranium-238	2.87 E-2	3.38 E-2	1.41 E-2	1.40 E-2	4.50 E-2	4.43 E-3			
Beta-emitting isotopic analysis (pCi/L)									
Gross beta	1.16 ± 0.02 E+7	1.17 ± 0.02 E+7	2.52 ± 0.02 E+7	2.34 ± 0.02 E+7	9.78 ± 0.12 E+6	7.73 ± 0.12 E+6			
Tritium	1.18 ± 0.17 E+7	1.63 ± 0.45 E+7	6.70 ± 0.05 E+7	6.70 ± 0.05 E+7	3.06 ± 0.23 E+7	3.44 ± 0.83 E+7			
Total Strontium	1.84 ± 0.11 E+6	2.16 ± 0.12 E+6	1.52 ± 0.12 E+6	1.45 ± 0.12 E+6	2.69 ± 0.09 E+6	2.70 ± 0.09 E+6			

Table H-2. (continued).

Isotope parameter	V1	V2	V3			
	T1600101VK	T1600102VK	T1600301VK	T1600302VK	T1600501VK	T1600502VK
Metallic inorganic CLP analysis^a (µg/L)						
Barium	250 UJ	253 UJ	163 BUJ	163 BUJ	191 BUJ	189 BUJ
Cadmium	49.9	42.6 J	4.4 U	4.4 J	4.4 JU	4.4 U
Chromium	398	323 J	39.2 U	39.2 J	10.6 U	10.8 J
Lead	842 J	716 W	3.7 MU	3.6 UN	32.7 W	68.2 W
Mercury	367	369	1.0 U	1.0 U	1.0 U	1.0 U
Silver	58.9	43 J	2.4 J	2.4 U	2.4 U	2.4 U
Volatile organic CLP analysis^b (µg/L)						
Methylene Chloride	11 U	10 UJ	10 UJ	10 UJ	10 U	10 U
Vinyl Chloride	10 UJ	10 UJ	20 J	20 J	11 J	11 J
1,1-Dichloroethene	10 UJ	10 UJ	36 J	36 J	19	19
1,1-Dichloroethane	58 J	58 J	370 EJ	370 EJ	200	200
Trichloroethene	160 J	160 J	300 EJ	300 EJ	200	200
Tetrachloroethene	140 J	140 J	10 UJ	10 UJ	10 U	10 U

- a. The complete set of metallic inorganic results is provided in Appendix F, Section 9 from the Track 2 Summary Report (INEL-94/0135). Only the primary contaminants of concern (COCs) are provided here.
- b. The complete set of volatile organic results is provided in Appendix F, Section 9 from the Track 2 Summary Report (INEL-94/0135). Only the positive detection results are provided here.

ND = Non detect.

U = The analyte was analyzed for and is definitely not present.

J = The analyte was analyzed for and was positively identified, but could not be quantified.

UJ = The analyte was analyzed for and was not above the level of the associated value.

W = Postdigestion spike for AA Furnace analysis is out of control.

B = Analyte found in associated blank.

N = Analysis indicates that an analyte is present, and there are strong indications the identity is correct.

M = Duplicate injection precision not met.

EJ = The reported value is estimated because of the presence of interference.

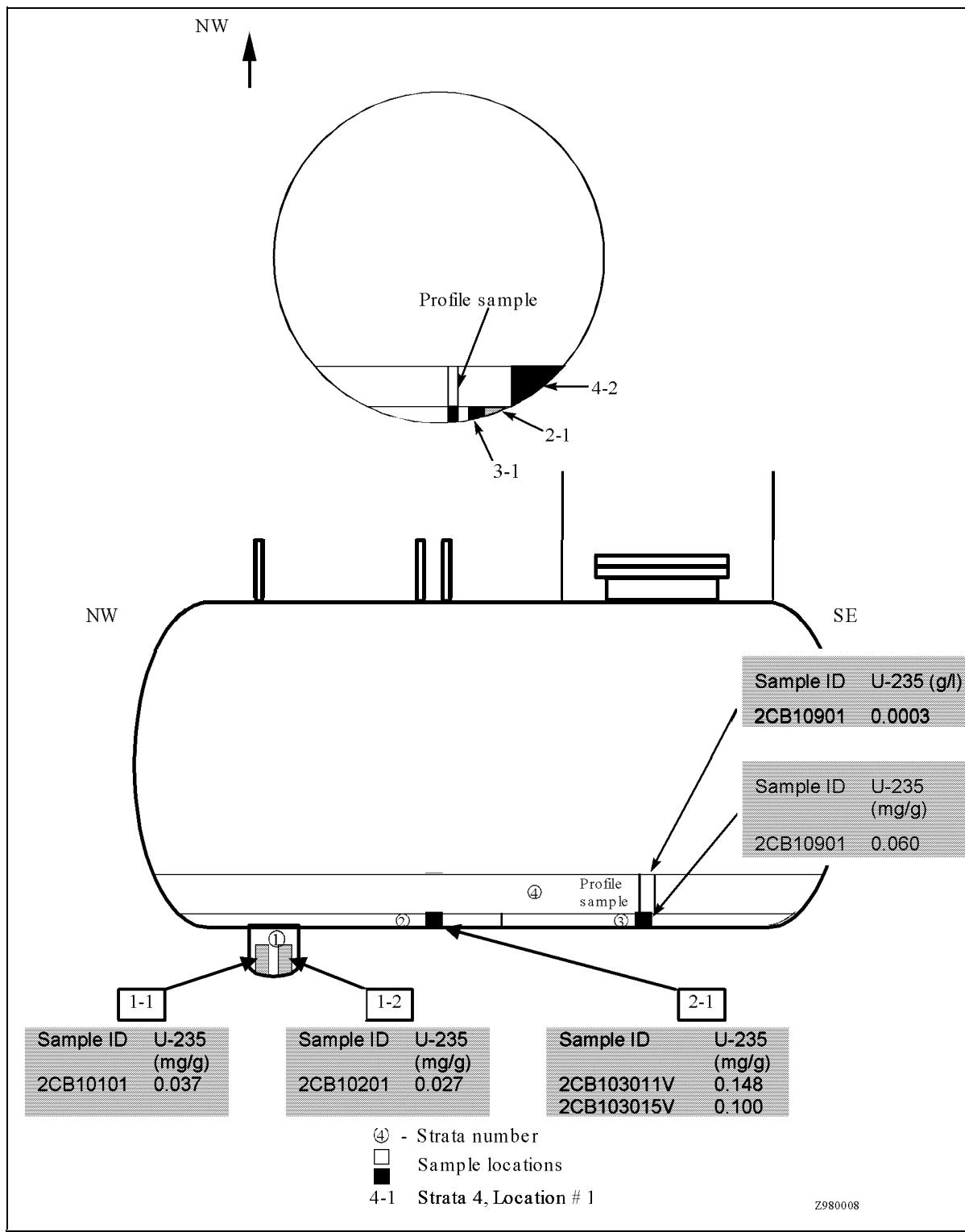


Figure H-1. 1996 Tank V-1 strata, sample locations and U-235 results.

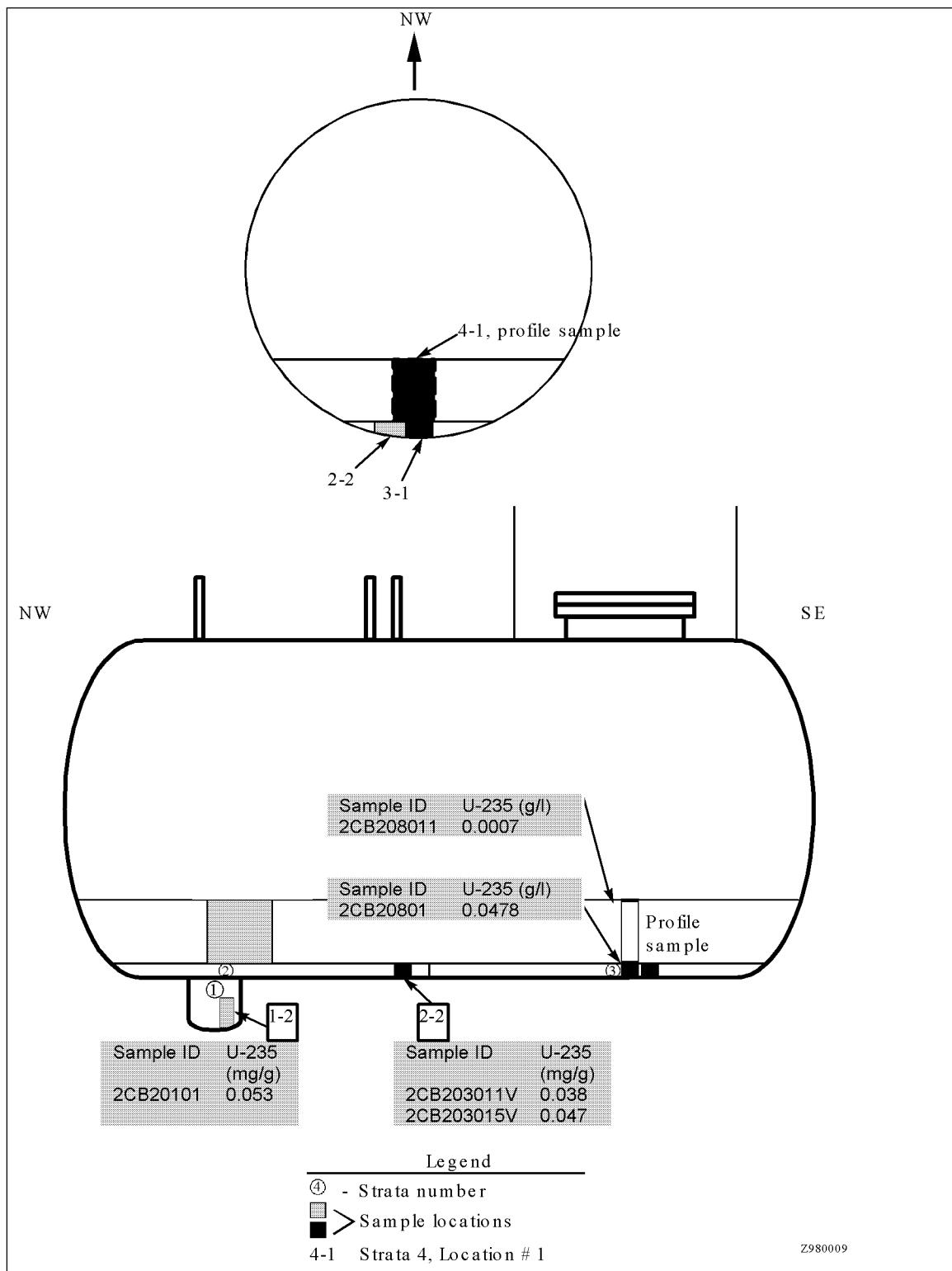


Figure H-2. 1996 Tank V-2 strata, sample locations and U-235 results.

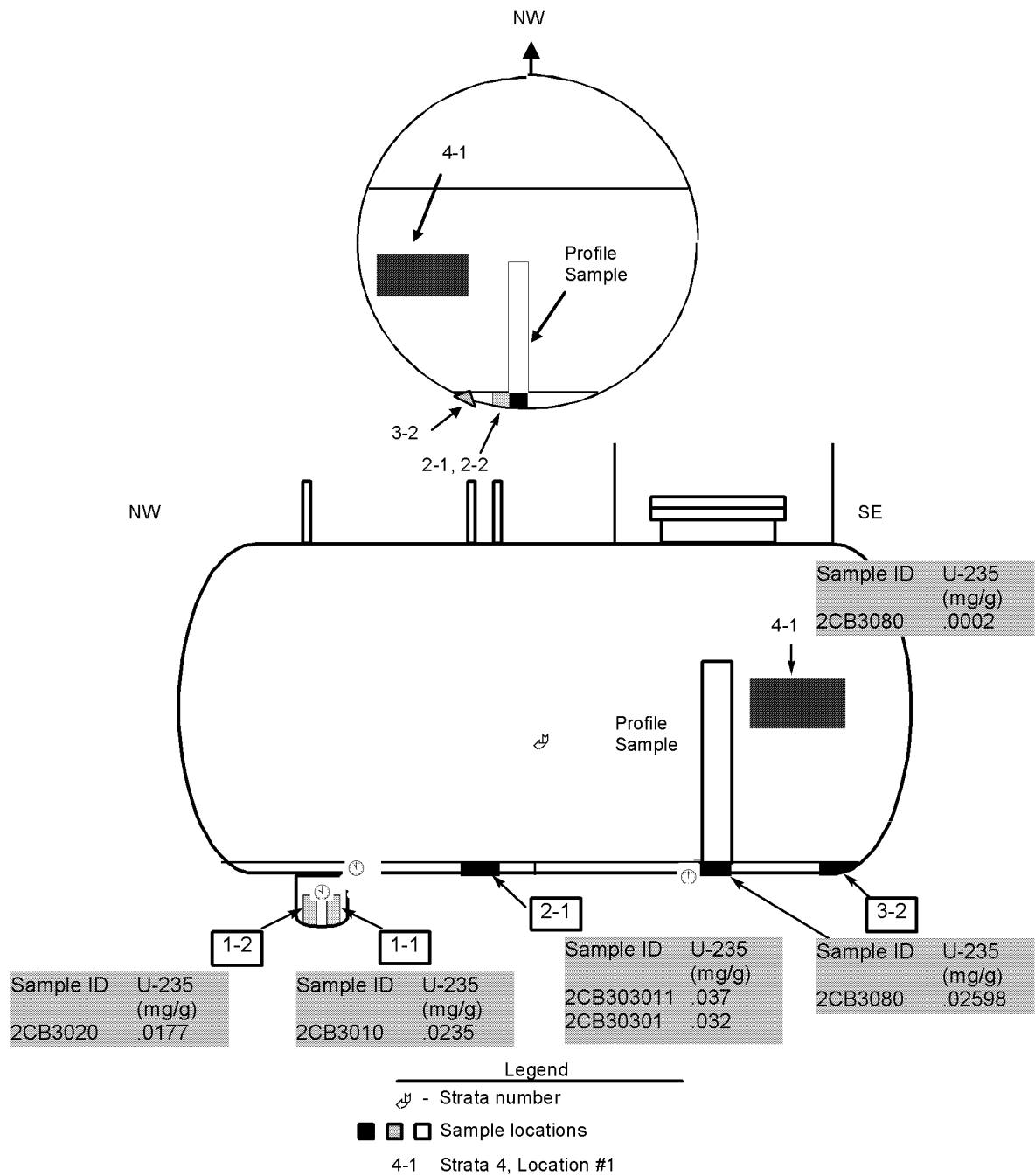


Figure H-3. 1996 Tank V-3 strata, sample locations and U-235 results.

Table H-3. 1996 radiological sampling and analysis results for the solid phase in Tank V-1.

Analyte	Activity (pCi/g) by Sample ID ^a				
	2CB101011V (1-1) ^b	2CB102011V (1-2) ^b	2CB103011V (2-1) ^b	2CB103015V (2-1) ^b	2CB109015V (profile) ^b
U-233/234	2,510 ± 94.9	1,760 ± 61	10,400 ± 554	7,270 ± 267	4,330 ± 155
U-235	78.3 ± 3.33	58.3 ± 2.28	316 ± 17.8	214 ± 8.21	130 ± 4.92
U-238	114 ± 3.93	65.4 ± 2.29	106 ± 4.74	80.6 ± 2.84	67.4 ± 2.35
Pu-238	26,100 ± 667	26,200 ± 672	23,700 ± 606	8,590 ± 223	10,700 ± 275
Pu-239/240	10,800 ± 278	11,200 ± 291	11,400 ± 293	4,600 ± 122	5,450 ± 143
Am-241	28,100 ± 743	32,800 ± 864	25,200 ± 658	9,240 ± 235	11,700 ± 326
Cm-242	U (110) ^c	U (112)	U (98)	15.2 ± 2.23	U (39.1)
Cm-243/244	8,400 ± 252	9,630 ± 287	7,260 ± 213	2,790 ± 75.1	3,470 ± 119
Np-237	U (29.9)	U (27.9)	U (21.3)	U (39.4)	U (14.7)
Sr-90	4,890,000 ± 6,610	4,040,000 ± 6,380	14,300,000 ± 11,500	6,750,000 ± 6,700	8,560,000 ± 9,450
Ag-108m	U (1,880)	U (631)	U (1,320)	U (1,010)	U (691)
Ag-110m	U (3,470)	U (1,050)	U (1,950)	U (1,920)	U (1,340)
Am-241 ^d	27,600 ± 2,820	35,600 ± 1,880	11,800 ± 4,660	6,780 ± 1,400	10,300 ± 1,220
Ce-144	U (18,400)	U (6,820)	U (21,800)	U (10,300)	U (7,190)
Co-58	U (3,700)	U (1,220)	U (4,370)	U (1,200)	U (825)
Co-60	446,000 ± 21,300	151,000 ± 7,640	368,000 ± 17,600	184,000 ± 8,790	67,000 ± 3,210
Cs-134	2,910 ± 552	2,160 ± 212	1,490 ± 644	502 ± 148	726 ± 120
Cs-137	7,260,000 ± 332,000	5,910,000 ± 272,000	15,800,000 ± 732,000	9,960,000 ± 455,000	5,100,000 ± 233,000
Eu-152	45,400 ± 5,700	52,900 ± 3,030	37,300 ± 2,300	15,200 ± 1,600	25,600 ± 1,610
Eu-154	64,300 ± 3,150	71,200 ± 3,630	53,400 ± 2,510	20,300 ± 1,000	28,200 ± 1,330
Eu-155	U (6,780)	2,700 ± 768	U (6,110)	U (3,770)	U (2,630)
Mn-54	U (1,380)	U (437)	U (1,510)	U (441)	U (282)
Nb-95	U (3,950)	U (1,300)	U (17,500)	U (1,280)	U (895)
Ra-226	U (849)	U (332)	U (1,120)	U (381)	U (336)
Ru-103	U (24,700)	U (10,200)	U (34,000)	U (13,800)	U (10,600)
Ru-106	U (22,900)	U (7,470)	U (24,200)	U (12,400)	U (8,580)
Sb-125	U (8,290)	U (3,430)	U (10,900)	U (4,680)	U (3,210)
U-235 ^c	U (3,020)	U (1,190)	U (4,000)	U (1,630)	U (1,120)
Zn-65	U (3,640)	U (1,130)	U (3,520)	U (1,160)	U (730)
Zr-95	U (7,010)	U (2,330)	U (8,740)	U (2,310)	U (1,590)
I-129	U (142)	U (43.6)	U (65.2)	U (48)	U (41.4)
Ni-63	1,980,000 ± 142,000	670,000 ± 48,200	3,310,000 ± 238,000	1,720,000 ± 124,000	725,000 ± 52,200

a. Analysis performed on solid portion of samples following gravity filtration; data validation level "C."

b. Sample location.

c. U - not detected (detection limit given in parentheses).

d. Analysis by gamma spectroscopy.

Table H-4. 1996 radiological sampling and analysis results for the solid phase in Tank V-2.

Analyte	Activity (pCi/g) by Sample ID ^a			
	2CB201011V (1-2) ^b	2CB203011V (2-2) ^b	2CB203015V (2-2) ^b	2CB208015V (profile) ^b
U-233/234	3,790 ± 142	2,660 ± 95.7	3,150 ± 115	3,350 ± 114
U-235	113 ± 4.65	81 ± 3.18	100 ± 3.99	102 ± 3.69
U-238	131 ± 4.46	51.3 ± 1.85	97 ± 3.32	74.8 ± 2.49
Pu-238	5,690 ± 149	4,440 ± 117	13,900 ± 356	7,540 ± 195
Pu-239/240	8,260 ± 215	7,500 ± 194	6,150 ± 160	4,730 ± 124
Am-241	3,520 ± 92.5	2,680 ± 70.3	2,500 ± 66.4	1,230 ± 35.6
Cm-242	3.22 ± 0.934	1.99 ± 0.631	9.46 ± 1.48	3.64 ± 1.01
Cm-243/244	161 ± 7.69	126 ± 5.90	117 ± 5.88	244 ± 10.3
Np-237	U (33.5) ^c	U (9.19)	U (37.9)	U (23.8)
Sr-90	16,500,000 ± 11,400	11,500,000 ± 8,630	10,700,000 ± 8,090	16,100,000 ± 11,300
Ag-108m	U (2,080)	753 ± 166	U (451)	U (759)
Ag-110m	U (3,910)	U (794)	U (760)	U (1,360)
Am-241 ^d	U (8,370)	3,300 ± 410	3,460 ± 410	U (3,300)
Ce-144	U (20,700)	U (4,960)	U (4,890)	U (7,470)
Co-58	U (3,730)	U (900)	U (889)	U (697)
Co-60	705,000 ± 33,600	156,000 ± 7,900	138,000 ± 6,960	75,800 ± 3,630
Cs-134	U (1,270)	316 ± 121	U (317)	U (290)
Cs-137	14,100,000 ± 645,000	6,330,000 ± 291,000	5,660,000 ± 261,000	4,870,000 ± 222,000
Eu-152	48,600 ± 3,260	2,950 ± 824	3,030 ± 825	9,930 ± 1,100
Eu-154	33,400 ± 1,850	24,400 ± 1,270	20,200 ± 1,060	146,000 ± 739
Eu-155	U (7,610)	2,580 ± 570	2,870 ± 566	U (2,930)
Mn-54	U (1,360)	U (335)	U (332)	U (299)
Nb-95	U (3,890)	U (972)	U (954)	U (728)
Ra-226	U (8,930)	U (241)	U (257)	U (373)
Ru-103	U (27,400)	U (6,960)	U (6,760)	U (6,980)
Ru-106	U (25,400)	U (5,440)	U (5,360)	U (8,860)
Sb-125	U (9,360)	U (2,450)	U (2,420)	U (3,440)
U-235 ^c	U (3,280)	U (853)	U (842)	U (1,230)
Zn-65	U (3,630)	U (775)	U (778)	U (751)
Zr-95	U (6,920)	U (1,770)	U (1,720)	U (1,280)
I-129	U (68.4)	U (115)	U (34.6)	U (57.7)
Ni-63	1,750,000 ± 126,000	557,000 ± 40,100	804,000 ± 57,900	569,000 ± 40,900

a. Analysis performed on solid portion of samples following gravity filtration; data validation level "C."

b. Sample location.

c. U - not detected (detection limit given in parentheses).

d. Analysis by gamma spectroscopy.

Table H-5. 1996 radiological sampling and analysis results for the solid phase in Tank V-3.

Analyte	Activity (pCi/g) by Sample ID ^a				
	2CB301011V (1-1) ^b	2CB302011V (1-2) ^b	2CB303011V (2-1) ^b	2CB303016V (2-1) ^b	2CB308015V (profile) ^b
U-233/234	1,380 ± 48.3	1,110 ± 37.1	2,430 ± 85.9	2,180 ± 74.7	4,060 ± 146
U-235	50.3 ± 2.00	38 ± 1.44	79.2 ± 3.09	68.9 ± 2.55	128 ± 4.91
U-238	64.8 ± 2.23	50.5 ± 1.72	79.2 ± 2.72	61.1 ± 2.06	85 ± 2.93
Pu-238	15,300 ± 393	14,600 ± 375	11,800 ± 303	14,200 ± 363	10,800 ± 278
Pu-239/240	10,000 ± 257	7,440 ± 193	5,370 ± 140	6,840 ± 177	4,810 ± 126
Am-241	11,500 ± 318	7,660 ± 194	4,840 ± 124	6,180 ± 185	5,620 ± 176
Cm-242	U (83.6) ^c	19.9 ± 2.11	13.2 ± 1.79	U (75.4)	U (47.8)
Cm-243/244	3,690 ± 121	2,070 ± 55.3	1,140 ± 32.6	1,590 ± 66	1,570 ± 68.8
Np-237	U (23.8)	U (25.9)	U (20.0)	U (20.9)	ND ^e (57.5)
Sr-90	6,210,000 ± 6,120	10,200,000 ± 5,870	23,200,000 ± 10,900	44,500,000 ± 20,800	24,000,000 ± 13,400
Ag-108m	U (413)	U (1,010)	U (1,360)	U (1,190)	U (777)
Ag-110m	U (711)	U (1,910)	U (2,610)	U (2,240)	U (1,030)
Am-241 ^d	13,000 ± 734	9,460 ± 1,710	U (6,140)	6,530 ± 2,100	U (9,540)
Ce-144	ND (4,550)	U (10,300)	U (14,500)	U (12,500)	U (25,600)
Co-58	ND (824)	U (1,760)	U (1,620)	U (1,860)	U (2,350)
Co-60	184,000 ± 9,270	321,000 ± 15,300	128,000 ± 6140	223,000 ± 10,700	80,500 ± 3,850
Cs-134	2,640 ± 167	2,370 ± 274	U (581)	897 ± 253	1,090 ± 320
Cs-137	6,810,000 ± 314,000	7,450,000 ± 341,000	8,050,000 ± 368,000	6,630,000 ± 303,000	9,050,000 ± 420,000
Eu-152	28,400 ± 1,680	29,300 ± 2,890	8,470 ± 1,780	12,800 ± 2,270	12,500 ± 812
Eu-154	37,900 ± 1,930	33,800 ± 1,640	26,300 ± 1,320	30,600 ± 1,540	28,500 ± 1,370
Eu-155	2,320 ± 516	U (3,860)	U (5,420)	U (4,720)	U (5,190)
Mn-54	U (294)	U (635)	U (572)	U (678)	U (815)
Nb-95	U (883)	U (1,870)	U (1,770)	U (1,960)	U (9,480)
Ra-226	U (220)	U (450)	U (523)	U (5,120)	U (8,260)
Ru-103	U (6,900)	U (13,700)	U (19,300)	U (16,300)	U (25,300)
Ru-106	U (4,940)	U (12,400)	U (16,800)	U (14,500)	U (17,900)
Sb-125	U (2,260)	U (4,560)	U (6,300)	U (5,390)	U (8,300)
U-235 ^d	U (780)	U (1,670)	U (2,230)	U (1,930)	U (4,200)
Zn-65	U (731)	U (1,690)	U (1,460)	U (1,760)	U (1,790)
Zr-95	U (1,570)	U (3,290)	U (3,140)	U (3,560)	U (6,850)
I-129	U (78.2)	U (48.3)	U (69.1)	U (108)	U (48)
Ni-63	1,770,000 ± 128,000	1,480,000 ± 106,000	969,000 ± 69,800	111,000 ± 80,200	441,000 ± 31,800

a. Analysis performed on solid portion of samples following gravity filtration; data validation level "C."

b. Sample locations.

c. U – not detected (detection limit given in parentheses).

d. Analysis by gamma spectroscopy.

e. ND – nondetect.

Table H-6. 1996 volatile organic compound sampling and analysis results for the sediment phase in Tank V-1.

Analyte	Sample Results by Sample ID (ug/L)		
	1996 Results ^a		
	2CB10101 (1-1) ^b	2CB10201 (1-2) ^b	2CB10301 (2-1) ^b
chloromethane	UD (10,000) ^c	UD (10,000)	UD (10,000)
bromomethane	UD (10,000)	UD (10,000)	UD (10,000)
vinyl chloride	UD (10,000)	UD (10,000)	UD (10,000)
chloroethane	UD (10,000)	UD (10,000)	UD (10,000)
methylene chloride	UD (10,000)	2,700 JBD ^d	UD (10,000)
acetone	UD (10,000)	UD (10,000)	UD (10,000)
carbon disulfide	UD (10,000)	UD (10,000)	UD (10,000)
1,1-dichloroethene	UD (10,000)	UD (10,000)	UD (10,000)
1,1-dichloroethane	UD (10,000)	UD (10,000)	UD (10,000)
trans-1,2-dichloroethene	UD (10,000)	UD (10,000)	UD (10,000)
chloroform	UD (10,000)	UD (10,000)	UD (10,000)
1,2-dichloroethane	UD (10,000)	UD (10,000)	UD (10,000)
2-butanone	UD (10,000)	UD (10,000)	UD (10,000)
1,1,1-trichloroethane	UD (10,000)	UD (10,000)	UD (10,000)
carbon tetrachloride	UD (10,000)	UD (10,000)	UD (10,000)
bromodichloromethane	UD (10,000)	UD (10,000)	UD (10,000)
1,2-dichloropropane	UD (10,000)	UD (10,000)	UD (10,000)
cis-1,3-dichloropropene	UD (10,000)	UD (10,000)	UD (10,000)
trichlorethene	UD (10,000)	UD (10,000)	UD (10,000)
dibromochloromethane	UD (10,000)	UD (10,000)	UD (10,000)
1,1,2-trichloroethane	UD (10,000)	UD (10,000)	UD (10,000)
benzene	UD (10,000)	UD (10,000)	UD (10,000)
trans-1,3-dichloropropene	UD (10,000)	UD (10,000)	UD (10,000)
bromoform	UD (10,000)	UD (10,000)	UD (10,000)
4,methyl-2-pentanone	UD (10,000)	UD (10,000)	UD (10,000)
2-hexanone	UD (10,000)	UD (10,000)	UD (10,000)
tetrachloroethene	UD (10,000)	UD (10,000)	6,000 JD
1,1,2,2-tetrachlorethane	UD (10,000)	UD (10,000)	UD (10,000)
toluene	UD (10,000)	UD (10,000)	UD (10,000)
chlorobenzene	UD (10,000)	UD (10,000)	UD (10,000)

Table H-6. (continued).

Analyte	Sample Results by Sample ID (ug/L)		
	1996 Results ^a		
	2CB10101 (1-1) ^b	2CB10201 (1-2) ^b	2CB10301 (2-1) ^b
ethylbenzene	UD (10,000)	UD (10,000)	UD (10,000)
styrene	UD (10,000)	UD (10,000)	UD (10,000)
cis-1,2-dichloroethene	UD (10,000)	UD (10,000)	UD (10,000)
xylene (ortho)	UD (10,000)	UD (10,000)	UD (10,000)
xylene (total meta and para)	UD (10,000)	UD (10,000)	UD (10,000)

a. VOC analysis performed on well-mixed samples containing both liquids and solids; data validation level "C."
 b. Sample location.
 c. U - not detected (detection limit given in parentheses), D - dilution factor of 1,000.
 d. J - estimated value, B - blank contamination.

Table H-7. 1996 volatile organic compound sampling and analysis results for sediment phase in Tank V-2.

Analyte	Sample Results by Sample ID (ug/L)	
	1996 Results ^a	
	2CB20101 (1-2)	2CB20301 (2-2)
chloromethane	UD (10,000) ^b	UD (10,000)
bromomethane	UD (10,000)	UD (10,000)
vinyl chloride	UD (10,000)	UD (10,000)
chloroethane	UD (10,000)	UD (10,000)
methylene chloride	UD (10,000)	UD (10,000)
acetone	UD (10,000)	UD (10,000)
carbon disulfide	UD (10,000)	UD (10,000)
1,1-dichloroethene	UD (10,000)	UD (10,000)
1,1-dichloroethane	UD (10,000)	UD (10,000)
trans-1,2-dichloroethene	UD (10,000)	UD (10,000)
chloroform	UD (10,000)	UD (10,000)
1,2-dichloroethane	UD (10,000)	UD (10,000)
2-butanone	UD (10,000)	UD (10,000)
1,1,1-trichloroethane	UD (10,000)	UD (10,000)
carbon tetrachloride	UD (10,000)	UD (10,000)
bromodichloromethane	UD (10,000)	UD (10,000)
1,2-dichloropropane	UD (10,000)	UD (10,000)
cis-1,3-dichloropropene	UD (10,000)	UD (10,000)
trichlorethene	UD (10,000)	5,900 JD ^c
dibromochloromethane	UD (10,000)	UD (10,000)
1,1,2-trichloroethane	UD (10,000)	UD (10,000)
benzene	UD (10,000)	UD (10,000)
trans-1,3-dichloropropene	UD (10,000)	UD (10,000)
bromoform	UD (10,000)	UD (10,000)
4,methyl-2-pentanone	UD (10,000)	UD (10,000)
2-hexanone	UD (10,000)	UD (10,000)
tetrachloroethene	UD (10,000)	UD (10,000)
1,1,2,2-tetrachlorethane	UD (10,000)	UD (10,000)
toluene	UD (10,000)	UD (10,000)

Table H-7. (continued).

Analyte	Sample Results by Sample ID (ug/L)	
	1996 Results ^a	
	2CB20101 (1-2)	2CB20301 (2-2)
chlorobenzene	UD (10,000)	UD (10,000)
ethylbenzene	UD (10,000)	UD (10,000)
styrene	UD (10,000)	UD (10,000)
cis-1,2-dichloroethene	UD (10,000)	UD (10,000)
xylene (ortho)	UD (10,000)	UD (10,000)
xylene (total meta and para)	UD (10,000)	UD (10,000)

a. VOC analysis performed on well-mixed samples containing both liquids and solids; data validation level "C."
 b. U - not detected (detection limit given in parentheses), D - dilution factor of 1,000.
 c. J - estimated value.

Table H-8. 1996 volatile organic compound sampling and analysis results for the sediment phase in Tank V-3.

Analyte	Sample Results by Sample ID (ug/L)			
	1996 Results ^a			
	2CB30101 (1-1)	2CB30201 (1-2)	2CB30301 (2-1)	2CB303016V (2-1)
chloromethane	UD (10,000) ^b	UD (10,000)	UD (10,000)	UD (10,000)
bromomethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
vinyl chloride	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
chloroethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
methylene chloride	UD (10,000)	2,700 JBD ^b	2,000 JBD	2,100 JBD
acetone	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
carbon disulfide	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
1,1-dichloroethene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
1,1-dichloroethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
trans-1,2-dichloroethene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
chloroform	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
1,2-dichloroethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
2-butanone	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
1,1,1-trichloroethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
carbon tetrachloride	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
bromodichloromethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
1,2-dichloropropane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
cis-1,3-dichloropropene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
trichlorethene	4,100 JD	36,000 D	10,000 D	8,600 JD
dibromochloromethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
1,1,2-trichloroethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
benzene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
trans-1,3-dichloropropene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
bromoform	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
4,methyl-2-pentanone	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
2-hexanone	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
tetrachloroethene	UD (10,000)	2,000 JD	UD (10,000)	UD (10,000)
1,1,2,2-tetrachlorethane	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)

Table H-8. (continued).

Analyte	Sample Results by Sample ID (ug/L)			
	1996 Results ^a			
	2CB30101 (1-1)	2CB30201 (1-2)	2CB30301 (2-1)	2CB303016V (2-1)
toluene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
chlorobenzene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
ethylbenzene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
styrene	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
cis-1,2-dichloroethene	UD (10,000)	4,700 JD	5,500 JD	2,600 JD
xylene (ortho)	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)
xylene (total meta and para)	UD (10,000)	UD (10,000)	UD (10,000)	UD (10,000)

a. VOC analysis performed on well-mixed samples containing both liquids and solids; data validation level "C."

b. U - not detected (detection limit given in parentheses), D - dilution factor of 1,000, J-estimated value, B-blank contamination.

Table H-9. 1996 semivolatile organic compound sampling and analysis results for the solid phase in Tank V-1.

Analyte	Concentration by Sample ID (ug/kg) ^a				
	2CB101011V (1-1) ^b	2CB102011V (1-2) ^b	2CB103011V (2-1) ^b	2CB105012V (3-1) ^b	2CB105022V (3-1) ^b
1,2,4-trichlorobenzene	U (270,000) ^c	U (240,000)	U (76,000)	U (260,000)	U (160,000)
1,2-dichlorobenzene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
1,3-dichlorobenzene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
1,4-dichlorobenzene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2,4,5-trichlorophenol	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
2,4,6-trichlorophenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2,4-dichlorophenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2,4-dimethylphenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2,4-dinitrophenol	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
2,4-dinitrotoluene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2,6-dinitrotoluene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2-chloronaphthalene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2-chlorophenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2-methylnaphthalene	U (270,000)	U (240,000)	7,600 J ^d	21,000 J	26,000 J
2-methylphenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
2-nitroaniline	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
2-nitrophenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
3,3'-dichlorobenzidine	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
3-nitroaniline	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
4,6-dinitro-2-methyphenol	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
4-bromophenyl-phenylether	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
4-chloro-3-methylphenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
4-chloroaniline	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
4-chlorophenyl-phenylether	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
4-methylphenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
4-nitroaniline	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
4-nitrophenol	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
acenaphthene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
acenaphthylene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
anthracene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
benzo(a)anthracene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
benzo(a)pyrene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
benzo(b)fluoranthene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
benzo(g,h,i)perylene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)

Table H-9. (continued).

Analyte	Concentration by Sample ID (ug/kg) ^a				
	2CB101011V (1-1) ^b	2CB102011V (1-2) ^b	2CB103011V (2-1) ^b	2CB105012V (3-1) ^b	2CB105022V (3-1) ^b
benzo(k)fluoranthene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
benzoic acid	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
Benzyl alcohol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
butylbenzylphthalate	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
carbozole	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
chrysene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
di-n-butylphthalate	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
di-n-octylphthalate	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
Dibenz(a,h)anthracene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
dibenzofuran	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
diethylphthalate	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
dimethylphthalate	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
fluoranthene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
fluorene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
hexachlorobenzene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
hexachlorobutadiene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
hexachlorocyclopentadiene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
hexachloroethane	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
indeno(1,2,3-cd)pyrene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
isophorone	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
N-nitroso-di-n-propylamine	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
N-nitrosodiphenylamine	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
naphthalene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
nitrobenzene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
pentachlorophenol	U (1,400,000)	U (1,200,000)	U (380,000)	U (1,300,000)	U (820,000)
phenanthrene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
phenol	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
pyrene	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
pyridine	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
Bis(2-chloroethoxy)methane	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
bis(2-chloroethyl)ether	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
bis(2-chloroisopropyl)ether	U (270,000)	U (240,000)	U (76,000)	U (260,000)	U (160,000)
bis(2-ethylhexyl)phthalate	U (7,300,000) E ^e	U (5,300,000) E ^f	U (1,100,000) E ^g	U (4,200,000) E ^h	U (3,100,000) E ⁱ

a. Analysis performed on solid portion of samples following gravity filtration; method validation level "C."

b. Sample location.

c. U - not detected (detection limit in parentheses).

d. J - estimated value.

Table H-9. (continued).

Analyte	Concentration by Sample ID (ug/kg) ^a				
	2CB101011V (1-1) ^b	2CB102011V (1-2) ^b	2CB103011V (2-1) ^b	2CB105012V (3-1) ^b	2CB105022V (3-1) ^b
e.	E - concentration exceeds calibration range of gas chromatography/mass spectrometry (GC/MS) instrument; result from reanalysis at a dilution factor of 10 is 17,000,000 ug/kg.				
f.	Result for reanalysis at a dilution factor of 10 is 14,000,000 ug/kg.				
g.					
h.					
i.					

Table H-10. 1996 semivolatile organic compound sampling and analysis results for the solid phase in Tank V-2.

Analyte	Concentration by Sample ID (ug/kg) ^a			
	2CB201011V (1-2) ^b	2CB203011V (2-2) ^b	2CB204012V (3-1) ^b	2CB204022V (3-1) ^b
1,2,4-trichlorobenzene	U (180,000) ^c	U (170,000)	U (190,000)	U (230,000)
1,2-dichlorobenzene	U (180,000)	30,000 J ^d	24,000 J	22,000 J
1,3-dichlorobenzene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
1,4-dichlorobenzene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2,4,5-trichlorophenol	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
2,4,6-trichlorophenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2,4-dichlorophenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2,4-dimethylphenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2,4-dinitrophenol	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
2,4-dinitrotoluene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2,6-dinitrotoluene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2-chloronaphthalene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2-chlorophenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2-methylnaphthalene	12,000 J	38,000 J	57,000 J	38,000 J
2-methylphenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
2-nitroaniline	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
2-nitrophenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
3,3'-dichlorobenzidine	U (180,000)	U (170,000)	U (190,000)	U (230,000)
3-nitroaniline	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
4,6-dinitro-2-methyphenol	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
4-bromophenyl-phenylether	U (180,000)	U (170,000)	U (190,000)	U (230,000)
4-chloro-3-methylphenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
4-chloroaniline	U (180,000)	U (170,000)	U (190,000)	U (230,000)
4-chlorophenyl-phenylether	U (180,000)	U (170,000)	U (190,000)	U (230,000)
4-methylphenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
4-nitroaniline	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
4-nitrophenol	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
acenaphthene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
acenaphthylene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
anthracene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
benzo(a)anthracene	U (180,000)	U (170,000)	U (190,000)	U (230,000)

Table H-10. (continued).

Analyte	Concentration by Sample ID (ug/kg) ^a			
	2CB201011V (1-2) ^b	2CB203011V (2-2) ^b	2CB204012V (3-1) ^b	2CB204022V (3-1) ^b
benzo(a)pyrene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
benzo(b)fluoranthene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
benzo(g,h,I)perylene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
benzo(k)fluoranthene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
benzoic acid	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
Benzyl alcohol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
butylbenzylphthalate	U (180,000)	U (170,000)	U (190,000)	U (230,000)
carbozole	U (180,000)	U (170,000)	U (190,000)	U (230,000)
chrysene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
di-n-butylphthalate	U (180,000)	U (170,000)	U (190,000)	U (230,000)
di-n-octylphthalate	U (180,000)	U (170,000)	U (190,000)	U (230,000)
Dibenz(a,h)anthracene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
dibenzofuran	U (180,000)	U (170,000)	U (190,000)	U (230,000)
diethylphthalate	U (180,000)	U (170,000)	U (190,000)	U (230,000)
dimethylphthalate	U (180,000)	U (170,000)	U (190,000)	U (230,000)
fluoranthene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
fluorene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
hexachlorobenzene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
hexachlorobutadiene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
Hexachlorocyclopentadiene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
hexachloroethane	U (180,000)	U (170,000)	U (190,000)	U (230,000)
Indeno(1,2,3-cd)pyrene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
isophorone	U (180,000)	U (170,000)	U (190,000)	U (230,000)
N-nitroso-di-n-propylamine	U (180,000)	U (170,000)	U (190,000)	U (230,000)
N-nitrosodiphenylamine	U (180,000)	U (170,000)	U (190,000)	U (230,000)
naphthalene	U (180,000)	U (170,000)	14,000 J	U (230,000)
nitrobenzene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
pentachlorophenol	U (920,000)	U (870,000)	U (940,000)	U (1,100,000)
phenanthrene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
Phenol	U (180,000)	U (170,000)	U (190,000)	U (230,000)
Pyrene	U (180,000)	U (170,000)	U (190,000)	U (230,000)
pyridine	U (180,000)	U (170,000)	U (190,000)	U (230,000)

Table H-10. (continued).

Analyte	Concentration by Sample ID (ug/kg) ^a			
	2CB201011V (1-2) ^b	2CB203011V (2-2) ^b	2CB204012V (3-1) ^b	2CB204022V (3-1) ^b
bis(2-chloroethoxy)methane	U (180,000)	U (170,000)	U (190,000)	U (230,000)
bis(2-chloroethyl)ether	U (180,000)	U (170,000)	U (190,000)	U (230,000)
bis(2-chloroisopropyl)ether	U (180,000)	U (170,000)	U (190,000)	U (230,000)
bis(2-ethylhexyl)phthalate	U (4,100,000) E ^e	U (2,500,000) E ^f	1,500,000	1,500,000

a. Analysis performed on solid portion of samples following gravity filtration; data validation level “C.”
 b. Sample location.
 c. U - not detected (detection limit in parentheses).
 d. J - estimated value.
 e. E - concentration exceeds calibration range of GC/MS instrument; result from reanalysis at a dilution factor of 10 is 7,000,000 ug/kg.
 f. Result for reanalysis at a dilution factor of 10 is 11,000,000 ug/kg.

Table H-11. 1996 semivolatile organic compound sampling and analysis results for the solid phase in Tank V-3.

Analyte	Concentration by Sample ID (ug/kg) ^a			
	2CB301011V (1-1) ^b	2CB302011V (1-2) ^b	2CB303011V (2-1) ^b	2CB303016V (2-1) ^b
1,2,4-trichlorobenzene	U (170,000) ^c	U (100,000)	U (270,000)	U (180,000)
1,2-dichlorobenzene	16,000 J ^d	11,000 J	50,000 J	26,000 J
1,3-dichlorobenzene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
1,4-dichlorobenzene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2,4,5-trichlorophenol	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
2,4,6-trichlorophenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2,4-dichlorophenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2,4-dimethylphenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2,4-dinitrophenol	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
2,4-dinitrotoluene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2,6-dinitrotoluene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2-chloronaphthalene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2-chlorophenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2-methylnaphthalene	16,000 J	9,900 J	32,000 J	15,000 J
2-methylphenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
2-nitroaniline	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
2-nitrophenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
3,3'-dichlorobenzidine	U (170,000)	U (100,000)	U (270,000)	U (180,000)
3-nitroaniline	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
4,6-dinitro-2-methyphenol	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
4-bromophenyl-phenylether	U (170,000)	U (100,000)	U (270,000)	U (180,000)
4-chloro-3-methylphenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
4-chloroaniline	U (170,000)	U (100,000)	U (270,000)	U (180,000)
4-chlorophenyl-phenylether	U (170,000)	U (100,000)	U (270,000)	U (180,000)
4-methylphenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
4-nitroaniline	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
4-nitrophenol	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
acenaphthene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
acenaphthylene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
anthracene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
benzo(a)anthracene	U (170,000)	U (100,000)	U (270,000)	U (180,000)

Table H-11. (continued).

Analyte	Concentration by Sample ID (ug/kg) ^a			
	2CB301011V (1-1) ^b	2CB302011V (1-2) ^b	2CB303011V (2-1) ^b	2CB303016V (2-1) ^b
benzo(a)pyrene	U (170,000) ^c	U (100,000)	U (270,000)	U (180,000)
benzo(b)fluoranthene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
benzo(g,h,I)perylene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
benzo(k)fluoranthene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
benzoic acid	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
benzyl alcohol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
butylbenzylphthalate	U (170,000)	U (100,000)	U (270,000)	U (180,000)
carbozole	U (170,000)	U (100,000)	U (270,000)	U (180,000)
chrysene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
di-n-butylphthalate	U (170,000)	U (100,000)	U (270,000)	U (180,000)
di-n-octylphthalate	U (170,000)	U (100,000)	U (270,000)	U (180,000)
dibenz(a,h)anthracene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
dibenzofuran	U (170,000)	U (100,000)	U (270,000)	U (180,000)
diethylphthalate	U (170,000)	U (100,000)	U (270,000)	U (180,000)
dimethylphthalate	U (170,000)	U (100,000)	U (270,000)	U (180,000)
fluoranthene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
fluorene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
hexachlorobenzene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
hexachlorobutadiene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
hexachlorocyclopentadiene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
hexachloroethane	U (170,000)	U (100,000)	U (270,000)	U (180,000)
indeno(1,2,3-cd)pyrene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
isophorone	U (170,000)	U (100,000)	U (270,000)	U (180,000)
N-nitroso-di-n-propylamine	U (170,000)	U (100,000)	U (270,000)	U (180,000)
N-nitrosodiphenylamine	U (170,000)	U (100,000)	U (270,000)	U (180,000)
naphthalene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
nitrobenzene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
pentachlorophenol	U (870,000)	U (500,000)	U (1,300,000)	U (890,000)
phenanthrene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
phenol	U (170,000)	U (100,000)	U (270,000)	U (180,000)
pyrene	U (170,000)	U (100,000)	U (270,000)	U (180,000)
pyridine	U (170,000)	U (100,000)	U (270,000)	U (180,000)
bis(2-chloroethoxy)methane	U (170,000)	U (100,000)	U (270,000)	U (180,000)

Table H-11. (continued).

Analyte	Concentration by Sample ID (ug/kg) ^a			
	2CB301011V (1-1) ^b	2CB302011V (1-2) ^b	2CB303011V (2-1) ^b	2CB303016V (2-1) ^b
bis(2-chloroethyl)ether	U (170,000)	U (100,000)	U (270,000)	U (180,000)
bis(2-chloroisopropyl)ether	U (170,000)	U (100,000)	U (270,000)	U (180,000)
bis(2-ethylhexyl)phthalate	U (3,800,000) E ^c	U (1,400,000) E ^f	U (2,900,000) E ^g	U (2,100,000) E ^h

a. Analysis performed on solid portion of samples following gravity filtration; validation level "C."
 b. Sample locations.
 c. U - not detected (detection limit in parentheses).
 d. J - estimated value.
 e. E - concentration exceeds calibration range of GC/MS instrument; result from reanalysis at a dilution factor of 10 is 9,600,000 ug/kg.
 f. Result for reanalysis at a dilution factor of 10 is 12,000,000 ug/kg.
 g. Result for reanalysis at a dilution factor of 10 is 12,000,000 ug/kg.
 h. Result for reanalysis at a dilution factor of 10 is 8,400,000 ug/kg.

Table H-12. 1996 polychlorinated biphenyl (PCB) sampling and analysis results for the solid phase in Tank V-1.

Analyte	Concentration by Sample ID (ug/kg) ^a				
	2CB101011V (1-1) ^{b,c}	2CB102011V (1-2) ^{b,d}	2CB103011V (2-1) ^{b,d}	2CB105012V (3-1) ^{b,d}	2CB105022V (3-1) ^{b,c}
Aroclor-1016	U (55,000) ^e	U (27,000)	U (13,000)	U (25,000)	U (34,000)
Aroclor-1221	U (110,000)	U (54,000)	U (25,000)	U (50,000)	U (68,000)
Aroclor-1232	U (55,000)	U (27,000)	U (13,000)	U (25,000)	U (34,000)
Aroclor-1242	U (55,000)	U (27,000)	U (13,000)	U (25,000)	U (34,000)
Aroclor-1248	U (55,000)	U (27,000)	U (13,000)	U (25,000)	U (34,000)
Aroclor-1254	U (55,000)	U (27,000)	U (13,000)	U (25,000)	U (34,000)
Aroclor-1260	660,000	510,000	150,000	340,000	310,000

- a. Analysis performed on solid portion of samples following phase separation; data validation level "C."
- b. Sample location.
- c. Dilution factor of 20.
- d. Dilution factor of 10.
- e. U - not detected (detection limit given in parentheses).

Table H-13. 1996 polychlorinated biphenyl (PCB) sampling and analysis results for the solid phase in Tank V-2.

Analyte	Concentration by Sample ID (ug/kg) ^a			
	2CB201011V (1-2) ^{b,c}	2CB203011V (2-2) ^{b,c}	2CB204012V (3-1) ^{b,c}	2CB204022V (3-1) ^{b,c}
Aroclor-1016	U (19,000) ^d	U (20,000)	U (13,000)	U (19,000)
Aroclor-1221	U (37,000)	U (39,000)	U (26,000)	U (38,000)
Aroclor-1232	U (19,000)	U (20,000)	U (13,000)	U (19,000)
Aroclor-1242	U (19,000)	U (20,000)	U (13,000)	U (19,000)
Aroclor-1248	U (19,000)	U (20,000)	U (13,000)	U (19,000)
Aroclor-1254	U (19,000)	U (20,000)	U (13,000)	U (19,000)
Aroclor-1260	200,000	250,000	160,000	260,000

a. Analysis performed on solid portion of samples following gravity filtration; data validation level “C.”
 b. Sample location.
 c. Dilution factor of 10.
 d. U - not detected (detection limit given in parentheses).

Table H-14. 1996 polychlorinated biphenyl (PCB) sampling and analysis results for the solid phase in Tank V-3.

Analyte	Concentration by Sample ID (ug/kg) ^a			
	2CB301011V (1-1) ^{b,c}	2CB302011V (1-2) ^{b,c}	2CB303011V (2-1) ^{b,d}	2CB303016V (2-1) ^{b,d}
Aroclor-1016	U (35,000) ^e	U (44,000)	U (21,000)	U (19,000)
Aroclor-1221	U (69,000)	U (88,000)	U (41,000)	U (37,000)
Aroclor-1232	U (35,000)	U (44,000)	U (21,000)	U (19,000)
Aroclor-1242	U (35,000)	U (44,000)	U (21,000)	U (19,000)
Aroclor-1248	U (35,000)	U (44,000)	U (21,000)	U (19,000)
Aroclor-1254	U (35,000)	U (44,000)	U (21,000)	U (19,000)
Aroclor-1260	370,000	400,000	210,000	260,000

- a. Analysis performed on solid portion of samples following gravity filtration; data validation level "C."
- b. Sample location.
- c. Dilution factor of 20.
- d. Dilution factor of 10.
- e. U - not detected (detection limit given in parentheses).

Table H-15. 1996 inorganic sampling and analysis results for the solid phase in Tank V-1.

Analyte	Concentration by Sample ID (mg/kg)		
	2CB101011V (1-1)	2CB102011V (1-2)	1996 Results ^a 2CB103011V (2-1)
Aluminum	4,050 D ^b	4,200	10,300 D
Antimony	17.3	30	30.6 B ^b
Arsenic	13.5	18.8	13.1 B
Barium	139	131	385
Beryllium	16.3	18.6	91.2
Boron	93.7	127	341
Cadmium	66.2	70.5	170
Calcium	23,000 D	23,120 D	6,320
Chromium	786	845	1,740
Cobalt	8.85	10.3	10.8
Copper	345	357	1,210
Iron	24,400	23,400	35,600
Lead	1,090	1,130	1,640
Magnesium	3,060	3,240	16,100 D
Manganese	3,220	2,910 D	10,500 D
Mercury	1,590 YE ^b	830 Y	688 Y
Nickel	346	352	534
Potassium	1,050	1,140	7,000
Selenium	U (2.25) ^c	U (2.98)	U (2.72)
Silica	303	678	371
Silver	87.4	0.36	446
Sodium	1,010	1,280	5,610
Thallium	U (19)	U (25.1)	U (22.9)
Tin	69.9 B	95.4 B	112
Vanadium	6.35 B	8.68 B	9.11 B
Zinc	24,700 D	27,000 D	15,400 D

a. Analysis performed on solid portion of samples following gravity filtration; data validation level "C."

b. D - dilution factor of 10, J - estimated value, B - reported value is greater than or equal to the instrument detection limit but less than the contract required detection limit, Y - laboratory defined flag, E - reported value is estimated due to the presence of interference.

c. U - not detected (detection limit given in parentheses).

Table H-16. 1996 inorganic sampling and analysis results for the solid phase in Tank V-2.

Analyte	Concentration by Sample ID (mg/kg)	
	1996 Results ^a	
	2CB201011V (1-2)	2CB203011V (2-2)
Aluminum	6,130 D ^b	4,080 D
Antimony	25.9 B ^b	20 B
Arsenic	18.5 B	11.1 B
Barium	187	138
Beryllium	22	13.8
Boron	31.2 B	19.5 B
Cadmium	108	86.7
Calcium	38,600 D	29,500 D
Chromium	1,680	1,030
Cobalt	7.41 B	6.42 B
Copper	734	837
Iron	22,400	17,200
Lead	1,550	1,050
Magnesium	7,000	7,030 D
Manganese	25,400	27,100 D
Mercury	612 Y ^b	381 Y
Nickel	385	264
Potassium	2,670	1,770
Selenium	7.80 B	2.74 B
Silica	364	522
Silver	118	315
Sodium	1,740	1,270
Thallium	U (23.6) ^c	U (18.8)
Tin	46.7 B	35.7 B
Vanadium	U (0.96)	U (0.76)
Zinc	2,130	1,450

a. Analysis performed on solid portion of samples following gravity filtration; data validation level "A."

b. D - dilution factor of 10, J - estimated value, B - reported value is greater than or equal to the instrument detection limit but less than the contract required detection limit, R - data rejected during data validation and unusable, Y - laboratory defined flag, N - spiked sample recovery was not within control limits.

c. U - not detected (detection limit given in parentheses).

Table H-17. 1996 inorganic sampling and analysis results for the solid phase in Tank V-3.

Analyte	Concentration by Sample ID (mg/kg)			
	1996 Results ^a			
	2CB301011V (1-1)	2CB302011V (1-2)	2CB303011V (2-1)	2CB303016V (2-1)
Aluminum	4,670 D ^b	5,220 D	3,820 D	5,470 D
Antimony	11 B ^b	15 B	11.5 B	17.9 B
Arsenic	19	12.2 B	7.68 B	10.8 B
Barium	148	158	184	175
Beryllium	15.1	17.9	23.4	29.7
Boron	28.4 B	32.8 B	38.5	42.8 B
Cadmium	71.8	80.3	61.3	81.4
Calcium	22,100	36,800 D	29,900 D	36,500 D
Chromium	641	947	619	807
Cobalt	7.40 B	8.22	4.58 B	9.41
Copper	289	287	206	211
Iron	17,700	18,900	12,200	17,200
Lead	1,370	1,210	696	930
Magnesium	3,650	6,680 D	6,640	8,480
Manganese	8,710 D	10,200	6,800	7,210
Mercury	1,390 YE ^b	820 Y	345 Y	429 Y
Nickel	198	418	334	425
Potassium	811	822	1,080	1350
Selenium	U (2.09) ^c	U (2.38)	U (2.20)	U (2.69)
Silica	544	287	337	518
Silver	42.8	48.7	198	113
Sodium	453	1,070	2,010	2,440
Thallium	U (17.6)	U (20.1)	U (19.0)	U (2.27)
Tin	60.3 B	55.1 B	36.1 B	42.7 B
Vanadium	10.8	6.43 B	2.06 B	5.78
Zinc	9,730	5,880	2,560	3,440 D

a. Analysis performed on solid portion of samples following gravity filtration; data validation level "C."

b. D - dilution factor of 10, J - estimated value, B - reported value is greater than or equal to the instrument detection limit but less than the contract required detection limit, R - result rejected during validation and unusable, Y - laboratory defined flag, E - reported value is estimated due to the presence of interference.

c. U - not detected (detection limit given in parentheses).

Table H-18. 1996 miscellaneous sampling and analysis results for the solid phase in Tank V-1.

Analyte	Concentration by Sample ID ^{a,c}				
	2CB101011V (1-1) ^b	2CB102011V (1-2) ^b	2CB103011V (2-1) ^b	2CB105012V (3-1) ^b	2CB105022V (3-1) ^b
Bromide	3.96	U (10) ^d	7.25	2.92	2.65
Chloride	153 B ^e	9.6 B	760	123	100
Fluoride	U (5)	U (5)	U (5)	U (5)	U (5)
Nitrate	U (2)	U (2)	U (2)	U (2)	U (2)
Nitrite	U (4)	U (4)	U (4)	U (4)	U (4)
Phosphate	2.38	U (3)	U (3)	17.1 B	25.4
Sulfate	619 B	2540	571	258 B	85.4
Total Carbon	78,900	85,800	92,900	84,300	79,100
Total Halides	745	361	474	561	473
density (solid)	1	0.694	0.846	0.849	0.928
density (total)	1.01	1.02	1.02	NA ^f	NA
pH	7.14	7.81	8.06 (8.14) ^g	NA	NA

- a. Anion, total carbon, and total halide concentrations are in units of mg/kg, density is in units of g/mL, and pH is unitless.
- b. Sample location.
- c. Analysis performed on solid portion of samples following gravity filtration; data validation level “C.”
- d. U - not detected (detection limit given in parentheses).
- e. B - reported value is greater than or equal to the instrument detection limit but less than the contract required detection limit.
- f. NA - not analyzed.
- g. Result from analysis of laboratory duplicate.

Table H-19. 1996 miscellaneous sampling and analysis results for the solid phase in Tank V-2.

Analyte	Concentration by Sample ID ^{a,b}			
	2CB201011V (1-2) ^{c,d}	2CB203011V (2-2) ^e	2CB204012V (3-1) ^e	2CB204022V (3-1) ^e
Bromide	1.22	U (10) ^e	U (10)	U (10)
Chloride	136	73.2	47.5	43.9
Fluoride	U (5)	U (5)	U (5)	U (5)
Nitrate	U (2)	U (2)	U (2)	U (2)
Nitrite	U (4)	U (4)	U (4)	U (4)
Phosphate	21.1	15	17.6 B ^f	10.9
Sulfate	5.56 B	106	186	20.2 B
Total Carbon	184,000	79,800	200,000	107,000
Total Halides	394	455	1240	1000
density (solid)	0.904	0.803	0.764	0.887
density (total)	1.03	1.01	1.02	NA ^g
pH	7.61	7.91	NA	NA

a. Anion, total carbon and total halide concentrations are in units of mg/kg, density is in units of g/mL, and pH is unitless.

b. Analysis performed on solid portion of samples following gravity filtration; data validation level “C.”

c. Sample location.

d. Anion results for sample ID 2CB201011V reported in mg/L.

e. U - not detected (detection limit given in parentheses).

f. B - reported value is greater than or equal to the instrument detection limit but less than the contract required detection limit.

g. NA - not analyzed.

Table H-20. 1996 miscellaneous sampling and analysis results for the solid phase in Tank V-3.

Analyte	Concentration by Sample ID ^{a,b}				
	2CB301011V (1-1) ^c	2CB302011V (1-2) ^c	2CB303011V (2-1) ^c	2CB303016V (2-1) ^c	2CB306017V (3-2) ^c
Bromide	U (10) ^d	U (10)	U (10)	U (10)	NA ^e
Chloride	64.3	60.1	54.8	55.6	NA
Fluoride	U (5)	U (5)	U (5)	U (5)	NA
Nitrate	U (2)	U (2)	U (2)	U (2)	NA
Nitrite	U (4)	U (4)	U (4)	U (4)	NA
Phosphate	U (3)	U (3)	U (3)	U (3)	NA
Sulfate	332	112 B ^f	25.9 B	33.5 B	NA
Total Carbon	937,000	110,000	113,000	NA	144,000
Total Halides	806	564	723	NA	1,320
density (solid)	0.695	0.879	1.02	NA	1.02
density (total)	1.01	1.02	1.02	NA	1.02
pH	7.41	7.08	7.86	NA	NA

a. Anion, total carbon, and total halide concentrations are in units of mg/kg, density is in units of g/mL, and pH is unitless.

b. Analysis performed on solid portion of samples following gravity filtration; data validation level “C.”

c. Sample location.

c. U - not detected (detection limit given in parentheses).

d. NA - not analyzed.

e. B - reported value is greater than or equal to the instrument detection limit but less than the contract required detection limit.

Table H-21. 1996 radiological sampling and analysis results for the liquids in Tanks V-1, V-2, and V-3.

Analyte	Activity (pCi/L) by Sample ID ^a			
	2CB109015V (V-1) ^b	2CB208015V (V-2) ^b	2CB308015V (V-3) ^b	2CB307018V (V-3) ^b
U-233/234	18,900 \pm 643	38,600 \pm 1,300	13,300 \pm 443	NA ^c
U-235	566 \pm 21.8	1,600 \pm 56.2	401 \pm 15.2	NA
U-238	210 \pm 8.91	499 \pm 17.6	135 \pm 5.97	NA
Pu-238	224 \pm 10.5	475 \pm 17.3	38.3 \pm 3.35	NA
Pu-239/240	105 \pm 6.64	283 \pm 12	19.7 \pm 2.36	NA
Am-241	197 \pm 9.21	58.9 \pm 4.88	31.8 \pm 3.16	NA
Cm-242	U (8.61) ^d	U (4.96)	U (6.18)	NA
Cm-243/244	64.2 \pm 4.72	16.2 \pm 2.48	U (6.28)	NA
Np-237	U (26.7)	U (27.6)	U (36.4)	NA
Sr-90	2,030,000 \pm 9,010	4,900,000 \pm 17,400	12,300,000 \pm 21,900	NA
Ag-108m	U (776)	U (3,960)	U (890)	U (343)
Ag-110m	U (1,270)	U (7,120)	U (1,450)	U (906)
Am-241 ^e	U (1,350)	U (15,900)	U (1,780)	U (1,830)
Ce-144	ND (7,530)	U (37,800)	U (9,100)	U (3,000)
Co-58	ND (2,160)	U (1,600)	U (2,060)	U (284)
Co-60	15,500 \pm 848	13,000 \pm 799	14,800 \pm 829	4,480 \pm 252
Cs-134	U (734)	U (764)	U (726)	449 \pm 52.7
Cs-137	2,900,000 \pm 134,000	13,500,000 \pm 617,000	4,230,000 \pm 195,000	1,560,000 \pm 102,000
Eu-152	U (4,860)	U (4,760)	U (4,630)	U (693)
Eu-154	U (1,660)	U (1,820)	U (1,530)	U (213)
Eu-155	U (2,420)	U (14,400)	U (3,020)	U (1,170)
Mn-54	U (755)	U (716)	U (748)	U (106)
Nb-95	U (2,400)	U (1,960)	U (2,220)	U (319)
Ra-226	U (1,260)	U (4,100)	U (1,220)	U (332)
Ru-103	U (12,900)	U (36,000)	U (13,600)	U (5,640)
Ru-106	U (9,430)	U (46,200)	U (10,500)	U (4,080)
Sb-125	U (3,870)	U (18,400)	U (4,600)	U (1,900)
U-235 ^d	U (1,340)	U (6,450)	U (1,660)	U (533)
Zn-65	U (1,730)	U (1,700)	U (1,640)	U (237)
Zr-95	U (4,300)	U (3,210)	U (4,000)	ND (549) ^f
I-129	U (252)	U (169)	U (218)	U (108)
H-3	30,400,000 \pm 3,160,000	102,000,000 \pm 10,700,000	6,090,000 \pm 633,000	NA
Ni-63	288,000 \pm 20,700	448,000 \pm 32,300	205,000 \pm 14,800	NA

Table H-21. (continued).

Analyte	Activity (pCi/L) by Sample ID ^a			
	2CB109015V (V-1) ^b	2CB208015V (V-2) ^b	2CB308015V (V-3) ^b	2CB307018V (V-3) ^b
a.	Analysis performed on liquid portion of samples following gravity filtration; data validation level "C."			
b.	Tank identification.			
c.	Not analyzed.			
d.	U - not detected (detection limit given in parentheses).			
e.	Analysis by gamma spectroscopy.			
f.	ND – nondetect.			

Table H-22. 1996 semivolatile organic compound sampling and analysis results for the liquid phase in Tanks V-1, V-2, and V-3.

Analyte	Concentration by Sample ID (ug/L) ^a				
	2CB101014V (V-1) ^b	2CB108014V (V-1) ^b	2CB201014V (V-2) ^b	2CB206014V (V-2) ^b	2CB307018V (V-3) ^b
1,2,4-trichlorobenzene	U (1,000) ^c	U (1,000)	U (1,000)	U (1,000)	U (1,000)
1,2-dichlorobenzene	U (1,000)	U (1,000)	U (1,000)	57 J ^d	U (1,000)
1,3-dichlorobenzene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
1,4-dichlorobenzene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2,4,5-trichlorophenol	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
2,4,6-trichlorophenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2,4-dichlorophenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2,4-dimethylphenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2,4-dinitrophenol	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
2,4-dinitrotoluene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2-chloronaphthalene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2-chlorophenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2-methylnaphthalene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2-methylphenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
2-nitroaniline	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
2-nitrophenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
3,3'-dichlorobenzidine	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
3-nitroaniline	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
4,6-dinitro-2-methyphenol	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
4-bromophenyl-phenylether	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
4-chloro-3-methylphenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
4-chloroaniline	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
4-chlorophenyl-phenylether	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
4-methylphenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
4-nitroaniline	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
4-nitrophenol	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
acenaphthene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
acenaphthylene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
anthracene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
benzo(a)anthracene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
benzo(a)pyrene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)

Table H-22. (continued).

Analyte	Concentration by Sample ID (ug/L) ^a				
	2CB101014V (V-1) ^b	2CB108014V (V-1) ^b	2CB201014V (V-2) ^b	2CB206014V (V-2) ^b	2CB307018V (V-3) ^b
benzo(b)fluoranthene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
benzo(g,h,I)perylene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
benzo(k)fluoranthene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
benzoic acid	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
benzyl alcohol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
butylbenzylphthalate	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
carbozole	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
chrysene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
di-n-butylphthalate	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
di-n-octylphthalate	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
dibenz(a,h)anthracene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
dibenzofuran	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
diethylphthalate	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
dimethylphthalate	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
fluoranthene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
fluorene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
hexachlorobenzene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
hexachlorobutadiene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
hexachlorocyclopentadiene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
hexachloroethane	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
indeno(1,2,3-cd)pyrene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
isophorone	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
N-nitroso-di-n-propylamine	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
N-nitrosodiphenylamine	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
naphthalene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
nitrobenzene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
pentachlorophenol	U (5,000)	U (5,000)	U (5,000)	U (5,000)	U (5,000)
phenanthrene	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
phenol	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
pyrene	U (1,000)	U (1,000)	U (1,000)	52 J ^d	63 J
pyridine	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
bis(2-chloroethoxy)methane	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
bis(2-chloroethyl)ether	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)

Table H-22. (continued).

Analyte	Concentration by Sample ID (ug/L) ^a				
	2CB101014V (V-1) ^b	2CB108014V (V-1) ^b	2CB201014V (V-2) ^b	2CB206014V (V-2) ^b	2CB307018V (V-3) ^b
bis(2-chloroisopropyl)ether	U (1,000)	U (1,000)	U (1,000)	U (1,000)	U (1,000)
bis(2-ethylhexyl)phthalate	83 J	73 J	86 J	200 J	100 J

a. Analysis performed on liquid portion of samples following gravity filtration; data validation level "C."

b. Tank identification.

c. U - not detected (detection limit in parentheses).

d. J - estimated value.

Table H-23. 1996 polychlorinated biphenyl (PCB) sampling and analysis results for the liquid phase in Tanks V-1, V-2, and V-3.

Analyte	Concentration by Sample ID (ug/L) ^a				
	2CB101014V (V-1) ^b	2CB108014V (V-1) ^b	2CB201014V (V-2) ^b	2CB206014V (V-2) ^b	2CB307018V (V-3) ^b
Aroclor-1016	U (100) ^c	U (100)	U (100)	U (100)	U (100)
Aroclor-1221	U (200)	U (200)	U (200)	U (200)	U (200)
Aroclor-1232	U (100)	U (100)	U (100)	U (100)	U (100)
Aroclor-1242	U (100)	U (100)	U (100)	U (100)	U (100)
Aroclor-1248	U (100)	U (100)	U (100)	U (100)	U (100)
Aroclor-1254	U (100)	U (100)	U (100)	U (100)	U (100)
Aroclor-1260	U (100)	U (100)	U (100)	U (100)	U (100)

a. Analysis performed on liquid portion of samples following gravity filtration; data validation level “C.”

b. Tank identification.

c. U - not detected (detection limit given in parentheses).

Table H-24. 1996 miscellaneous sampling and analysis results for liquid phase in Tanks V-1, V-2, and V-3.

Analyte	Concentration by Sample ID ^a				
	2CB101014V (V-1) ^b	2CB108014V (V-1) ^b	2CB201014V (V-2) ^b	2CB206014V (V-2) ^b	2CB307018V (V-3) ^b
Bromide	5.67	5.11	1.22	1.22	1.8
Chloride	240	232	136	102	76.2
Fluoride	U (5) ^c	U (5)	U (5)	U (5)	U (5)
Nitrate	U (2)	U (2)	U (2)	U (2)	0.172
Nitrite	U (4)	U (4)	U (4)	U (4)	U (4)
Phosphate	1.2	1.78 B ^e	21.1	23.3	2.51
Sulfate	12.8 ^d	48.4 B	5.56	18	15.7
Total Organic Carbon	65.9	54.9	NA ^e	105	35
Total Halides	183	151	NA	74.2	65.2
Oil and Grease	4.17	4.29	NA	U (1)	U (1) ^f
Hardness	NA	NA	NA	NA	175 mg/L
Total Suspended Solids	8	65.3	NA	26.7	2.0 ^f

a. Anion, oil and grease, total organic carbon, total halide, and total suspended solids concentrations are in units of mg/L; validation level "C."

b. Tank identification.

c. U - not detected (detection limit given in parentheses).

d. B - reported value is greater than or equal to the instrument detection limit but less than the contract required detection limit.

e. NA - not analyzed.

f. Analysis performed on total sample prior to gravity filtration; remaining analyses performed on liquid portion of sample after separation.

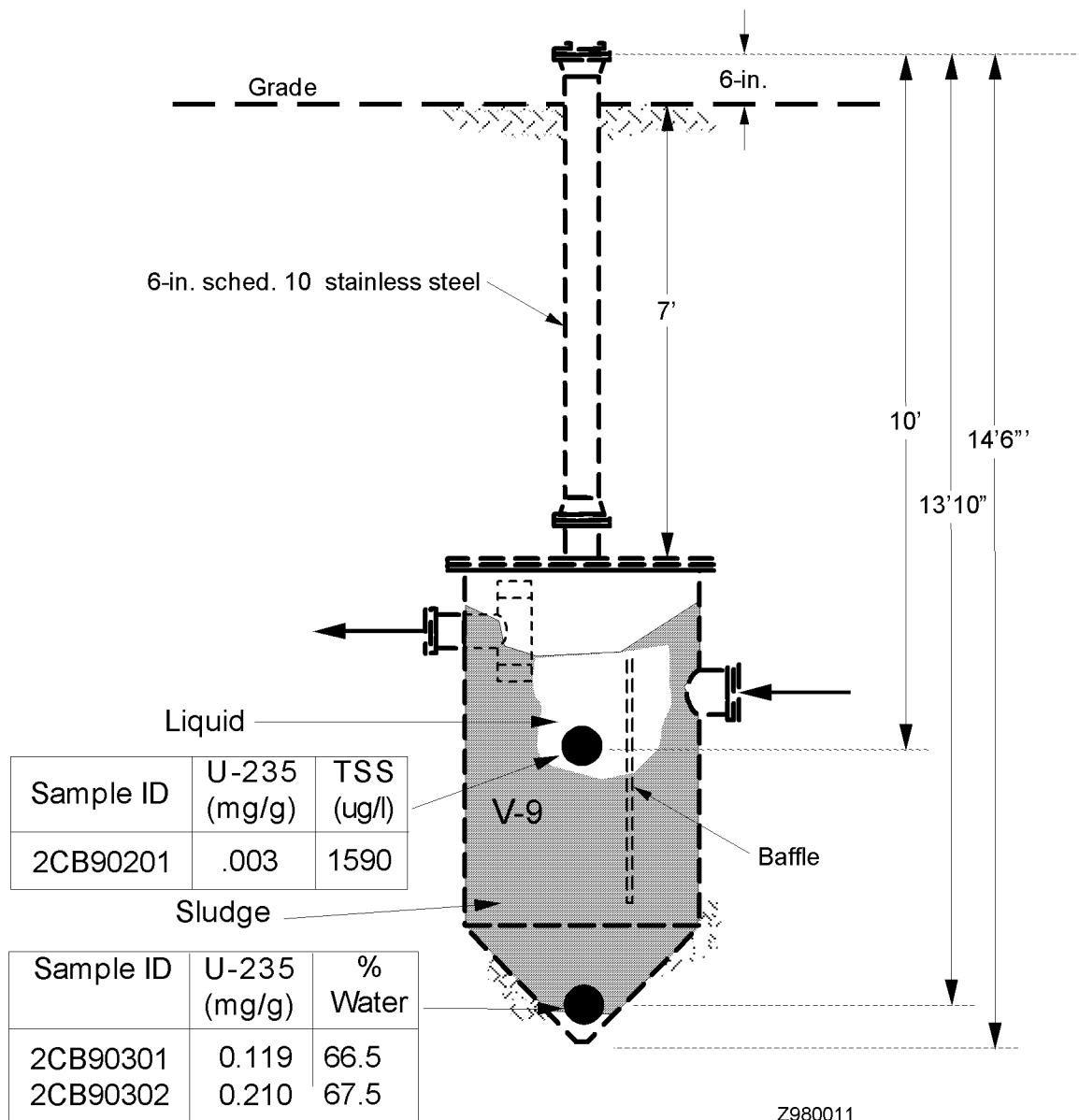


Figure H-4. Tank V-9 1996 sampling locations.

Table H-25. 1996 radiological sampling and analysis results for Tank V-9.

Analyte	Activity (pCi/L or pCi/g) by Sample ID (matrix in parenthesis)		
	2CB90201 (liquid)	2CB90310 (sludge)	2CB90302 (sludge)
U-233 ^a	12,400	U (944) ^b	3,420 B ^c
U-234 ^a	211,000	7,080	13,100
U-235 ^a	6,900 E ^d	255 N ^e	450 N
U-236 ^a	3,260	60 B	127
U-238 ^a	972 E	78.2	82.5
Pu-238	170,000 \pm 12,900	11,500 \pm 610	28,600 \pm 1,370
Pu-239/240	45,300 \pm 3,690	7,380 \pm 423	7,180 \pm 422
Am-241	40,200 \pm 2,500	4,300 \pm 287	5,700 \pm 357
H-3	353,000,000 \pm 180,000	NA ^f	NA
Cm-244	5,210 \pm 390	453 \pm 49.3	704 \pm 66.2
Np-237	200 \pm 36	27.2 \pm 5.71	33.3 \pm 6.12
Total Sr	250,000,000 \pm 25,000,000	5,740,000 \pm 260,000	7,070,000 \pm 300,000
Co-60	1,180 \pm 59.4	1,160,000 \pm 54,000	726,000 \pm 33,000
Cs-137	420,000 \pm 16,200	4,810,000 \pm 220,000	6,370,000 \pm 320,000
Eu-152	566 \pm 37	U	U
Eu-154	272 \pm 22.8	22,200 \pm 2,000	U

a. U isotope analysis by inductively coupled plasma mass spectroscopy.

b. U - not detected (detection limit given in parentheses).

c. B - blank contamination.

d. E - estimated value due to interference.

e. N - spiked sample recovery not within control limits.

f. NA - not analyzed.

Table H-26. 1996 volatile organic compound sampling and analysis results for Tank V-9.

Analyte	Sample Results by Sample ID (ug/L or ug/kg)		
	2CB90201 (liquid)	2CB90301 (sludge)	2CB90302 (sludge)
chloromethane	U (3,700) ^a	59,000 DJ ^b	80,000 DJ
bromomethane	U (7,800)	120,000 DJ	140,000 DJ
vinyl chloride	U (13,000)	U (120,000) D	U (120,000) D
chloroethane	U (17,000)	U (250,000) D	U (250,000) D
methylene chloride	59,000 J	U (250,000) D	U (250,000) D
acetone	U (110,000)	U (1,400,000) D	U (1,400,000) D
carbon disulfide	U (13,000)	U (120,000) D	U (120,000) D
1,1-dichloroethene	U (11,000)	U (120,000) D	U (120,000) D
1,1-dichloroethane	U (3,800)	U (50,000) D	U (50,000) D
cis-1,2-dichloroethene	U (9,500)	U (110,000) D	U (110,000) D
chloroform	U (10,000)	U (120,000) D	U (120,000) D
1,2-dichloroethane	U (25,000)	U (380,000) D	U (380,000) D
2-butanone	U (56,000)	U (750,000) D	U (750,000) D
1,1,1-trichloroethane	58,000 J	1,800,000 D	2,600,000 D
carbon tetrachloride	U (11,000)	U (120,000) D	U (120,000) D
bromodichloromethane	U (12,000)	U (120,000) D	U (120,000) D
1,2-dichloropropane	U (18,000)	U (250,000) D	U (250,000) D
cis-1,3-dichloropropene	U (14,000)	U (120,000) D	U (120,000) D
trichlorethene	410,000	14,000,000 D	22,000,000 D
dibromochloromethane	U (15,000)	U (120,000) D	U (120,000) D
1,1,2-trichloroethane	U (10,000)	U (120,000) D	U (120,000) D
benzene	U (17,000)	U (250,000) D	U (250,000) D
trans-1,2-dichloroethene	U (7,500)	U (88,000) D	U (88,000) D
trans-1,3-dichloropropene	U (19,000)	U (250,000) D	U (250,000) D
bromoform	U (43,000)	U (500,000) D	U (500,000) D
4,methyl-2-pentanone	U (14,000)	U (120,000) D	U (120,000) D
2-hexanone	U (38,000)	U (500,000) D	U (500,000) D
tetrachloroethene	U (17,000)	460,000 DJ	600,000
1,1,2,2-tetrachloroethane	U (11,000)	U (120,000) D	U (120,000) D
toluene	U (15,000)	U (250,000) D	U (250,000) D

Table H-26. (continued).

Analyte	Sample Results by Sample ID (ug/L or ug/kg)		
	2CB90201 (liquid)	2CB90301 (sludge)	2CB90302 (sludge)
chlorobenzene	U (10,000)	U (120,000) D	U (120,000) D
ethylbenzene	U (11,000)	U (120,000) D	U (120,000) D
styrene	U (17,000)	U (250,000) D	U (250,000) D
xylene (ortho)	U (14,000)	U (120,000) D	U (120,000) D
xylene (total meta and para)	U (19,000)	U (250,000) D	U (250,000) D

a. U - not detected (detection limit given in parentheses).
b. D - dilution factor of 10,000, J - estimated value.

Table H-27. 1996 semivolatile organic compound sampling and analysis results for Tank V-9.

Analyte	Concentration by Sample ID (ug/L or ug/kg)		
	2CB90201 (liquid)	2CB90301 (sludge)	2CB90302 (sludge)
1,2,4-trichlorobenzene	U (7) ^a	32,000 J ^b	26,000 J
1,2-dichlorobenzene	210 E ^c	350,000	280,000
1,3-dichlorobenzene	U (6)	16,000 J	13,000 J
1,4-dichlorobenzene	49	90,000 J	73,000 J
2,4,5-trichlorophenol	U (17)	U (770,000)	U (670,000)
2,4,6-trichlorophenol	U (10)	U (150,000)	U (130,000)
2,4-dichlorophenol	U (8)	U (150,000)	U (130,000)
2,4-dimethylphenol	79	270,000	260,000
2,4-dinitrophenol	U (27)	U (770,000)	U (670,000)
2,4-dinitrotoluene	U (10)	U (150,000)	U (130,000)
2,6-dinitrotoluene	U (8)	U (150,000)	U (130,000)
2-chloronaphthalene	U (10)	U (150,000)	U (130,000)
2-chlorophenol	U (6)	U (150,000)	U (130,000)
2-methylnaphthalene	U (14)	110,000 J	100,000 J
2-methylphenol	830 E	490,000	500,000
2-nitroaniline	U (6)	U (770,000)	U (670,000)
2-nitrophenol	U (7)	U (150,000)	U (130,000)
3,3'-dichlorobenzidine	U (66)	U (150,000)	U (130,000)
3-nitroaniline	U (17)	U (770,000)	U (670,000)
4,6-dinitro-2-methyphenol	190 E	U (770,000)	U (670,000)
4-bromophenyl-phenylether	U (7)	U (150,000)	U (130,000)
4-chloro-3-methylphenol	U (8)	U (150,000)	U (130,000)
4-chloroaniline	U (27)	U (150,000)	U (130,000)
4-chlorophenyl-phenylether	U (7)	U (150,000)	U (130,000)
4-methylphenol	830 E	260,000	260,000
4-nitroaniline	U (4)	U (770,000)	U (670,000)
4-nitrophenol	37	U (770,000)	U (670,000)
acenaphthene	U (6)	U (150,000)	U (130,000)
acenaphthylene	U (7)	U (150,000)	U (130,000)
anthracene	U (5)	U (150,000)	U (130,000)
benzo(a)anthracene	U (8)	U (150,000)	U (130,000)

Table H-27. (continued).

Analyte	Concentration by Sample ID (ug/L or ug/kg)		
	2CB90201 (liquid)	2CB90301 (sludge)	2CB90302 (sludge)
benzo(a)pyrene	U (1)	U (150,000)	U (130,000)
benzo(b)fluoranthene	U (7)	U (150,000)	U (130,000)
benzo(g,h,I)perylene	U (3)	U (150,000)	U (130,000)
benzo(k)fluoranthene	U (6)	U (150,000)	U (130,000)
benzoic acid	NA ^d	U (770,000)	U (670,000)
benzyl alcohol	NA	U (150,000)	U (130,000)
butylbenzylphthalate	U (8)	U (150,000)	U (130,000)
carbozole	U (10)	U (150,000)	U (130,000)
chrysene	U (8)	U (150,000)	U (130,000)
di-n-butylphthalate	U (3)	15,000 J	13,000 J
di-n-octylphthalate	6 J	U (150,000)	U (130,000)
dibenz(a,h)anthracene	U (5)	U (150,000)	U (130,000)
dibenzofuran	U (4)	U (150,000)	U (130,000)
diethylphthalate	U (8)	U (150,000)	U (130,000)
dimethylphthalate	U (7)	U (150,000)	U (130,000)
fluoranthene	U (8)	U (150,000)	U (130,000)
fluorene	U (5)	U (150,000)	U (130,000)
hexachlorobenzene	U (7)	U (150,000)	U (130,000)
hexachlorobutadiene	U (10)	U (150,000)	U (130,000)
hexachlorocyclopentadiene	U (13)	U (150,000)	U (130,000)
hexachloroethane	U (8)	U (150,000)	U (130,000)
indeno(1,2,3-cd)pyrene	U (36)	U (150,000)	U (130,000)
isophorone	U (7)	U (150,000)	U (130,000)
N-nitroso-di-n-propylamine	U (13)	U (150,000)	U (130,000)
N-nitrosodimethylamine	U (11)	NA	NA
N-nitrosodiphenylamine	U (10)	U (150,000)	U (130,000)
naphthalene	U (8)	44,000 J	38,000 J
nitrobenzene	U (9)	U (150,000)	U (130,000)
pentachlorophenol	U (13)	U (770,000)	U (670,000)
phenanthrene	U (6)	21,000 J	19,000 J
phenol	100 E	68,000 J	71,000 J
pyrene	U (12)	U (150,000)	U (130,000)

Table H-27. (continued).

Analyte	Concentration by Sample ID (ug/L or ug/kg)		
	2CB90201 (liquid)	2CB90301 (sludge)	2CB90302 (sludge)
tributylphosphate	190 E	NA	NA
pyridine	U (10)	U (150,000)	U (130,000)
bis(2-chloroethoxy)methane	U (8)	U (150,000)	U (130,000)
bis(2-chloroethyl)ether	U (7)	U (150,000)	U (130,000)
bis(2-chloroisopropyl)ether	U (6)	U (150,000)	U (1,300,000)
bis(2-ethylhexyl)phthalate	38	1,100,000	950,000

a. U - not detected (detection limit in parentheses).
 b. J - estimated value.
 c. E - concentration exceeded the calibration range of the gas chromatograph/mass spectroscopy instrument.
 d. NA - not applicable.

Table H-28. 1996 Polychlorinated biphenyl (PCB) sampling and analysis results for Tank V-9.

Analyte	Concentration by Sample ID (ug/L or ug/kg)		
	2CB90201 (liquid)	2CB90301 (sludge)	2CB90302 (sludge)
Aroclor-1016	U (5.4) ^a	U (30,000)	U (24,000)
Aroclor-1221	U (5.4)	U (60,000)	U (47,000)
Aroclor-1232	U (5.4)	U (30,000)	U (24,000)
Aroclor-1242	U (5.4)	U (30,000)	U (24,000)
Aroclor-1248	U (5.4)	U (30,000)	U (24,000)
Aroclor-1254	U (90)	U (30,000)	U (24,000)
Aroclor-1260	36 J ^b	310,000 P ^c	260,000 P

a. U - not detected (detection limit given in parentheses).

b. J - estimated concentration.

c. P - >25% difference in detected concentrations between two gas chromatograph (GC) columns; lower value reported.

Table H-29. 1996 inorganic sampling and analysis results for Tank V-9.

Analyte	Concentration by Sample ID (ug/L or mg/kg)		
	2CB90201 (liquid)	2CB90301 (sludge)	2CB90302 (sludge)
Aluminum	U (236) P ^a	2,160 P	2,290 P
Antimony	U (162) P	6.4 BNP ^b	22.2 BNP
Arsenic	U (232) P	U (3.7) P	U (3.8) P
Barium	1,020 P	232 P	515 P
Beryllium	65 P	24.6 P	25.7 P
Boron	37,600 P	42.6 P	47.3 P
Cadmium	1,900 P	22.5 P	30.9 P
Calcium	90,600 P	5,660 P	5,270 P
Chromium	1,460 P	975 P	1,100 P
Cobalt	116 BP	4.2 P	5.8 P
Copper	2,980 P	328 P	431 P
Iron	17,900 P	9,710 P	9,560 P
Lead	942 P	540 NP	592 NP
Magnesium	208,000 P	1,380 P	1,670 P
Manganese	23,500 P	825 P	815 P
Mercury	563 CV ^c	2,050 CV	2,110 CV
Nickel	13,800 P	354 P	435 P
Potassium	8,340,000 A ^d	10,300 EA ^e	6,870 EA
Selenium	U (256) P	U (4.1) NP	U (4.2) NP
Silicon	25,000 NEP	248 NP	292 NP
Silver	U (31.5) P	657 *P	646 *P
Sodium	3,150,000 A	1,950 EA	1,280 EA
Thallium	U (370) P	U (5.9) P	7.8 BP
Tin	U (116) P	29.6 P	33.4 P
Vanadium	U (22) P	5.4 P	6.8 P
Zinc	18,200 P	1,790 P	1,710 P

a. U - not detected (detection limit given in parentheses); P - analysis by inductively coupled plasma atomic emission spectroscopy.

b. B - reported value is greater than or equal to the instrument detection limit but less than the contract required detection limit, N - spiked sample recovery not within control limits.

c. CV - analysis by cold vapor atomic absorption spectroscopy.

d. A - analysis by flame atomic absorption spectroscopy.

e. E - estimated value due to interference.

* - duplicate analysis not within control limits.

Table H-30. 1996 miscellaneous sampling and analysis results for Tank V-9.

Analyte	Concentration by Sample ID		
	2CB90201 (liquid) ^a	2CB90301 (sludge) ^b	2CB90302 (sludge) ^b
Bromide	59.2	12.3	12.3
Chloride	10,900	483	503
Fluoride	1.44 B ^c	7.41	5.75
Nitrate	63.2	34.5	36.7
Nitrite	U (111) ^d	7.11	U (0.05)
Phosphate	2.42 B	1.09 B	0.8 B
Sulfate	290	45.3	44.5
Total Organic Carbon	3,060	10,022.7	12,924.7
Total Halides	9,380	NP ^e	NP
density (solid)	NA ^e	NP	NP
Total Suspended Solids	1,590	NA	NA
pH	7.89	7.7	7.44
% water	NA	66.5	67.5

a. Anion, total organic carbon, total suspended solids, and total halide concentrations are in units of ug/L for the liquids.

b. Anions are in units of mg/L and total organic carbon is in units of mg/kg for the sludges.

c. B – blank contamination.

d. U - not detected (detection limit given in parentheses).

e. NP - analysis not performed. NA - not applicable.

Table H-31. 1996 particle size analysis for Tank V-9 sludge.

	2CB90301 (%)	2CB90302 (%)
Particle density	1.28 g/cc	1.32 g/cc
Particle size fraction	39.7	41
30 mesh	65.8	70.0
50 mesh	8.4	7.9
70 mesh	1.7	1.8
100 mesh	3.4	3.5
200 mesh	4.4	5.0
400 mesh	3.5	3.1
>400 mesh	12.7	8.7

Sand Filter
Sample Results

Table H-32. 1997 sand filter sample results.

Compound Name	Sample Unit	Q-Flag (uncertainties)
TV9001017A – RAD		
pCi/g		
ALPHA	16,500	201
Ag-106M	58.2	12.1
Ag-110M	5,210	335
Am-241	10.7	.715
BETA	373,000	695
Ce-144	-65.6	54.9
Cm-242	0	.598
Cm-244	0	.704
Co-58	2	15.2
Co-60	36,200	1,860
Cs-134	-3.19	11.4
Cs-137	109,000	6,980
Eu-152	631	105
Eu-154	113	22.1
Eu-155	-30.5	25.1
Mn-54	-5.04	10.8
Nb-95	29	12.5
Np-237	0	823
Pu-238	42.1	1.3
Pu-239	45.2	1.38
Ru-106	98	101
Sb-125	-19.2	36.2
Sr-90	103,000	504
Te-99	1,290	46.5
Th-228	0	4.44
Th-230	0	8.43
Th-232	0	2.43
U-234	21,900	737
U-235	661	26.5
U-238	90.7	6.03
Zn-65	236	28

Table H-32. (continued).

Compound Name	Sample Unit	Q-Flag (uncertainties)
TV9001017A – SEMIS-8270		
$\mu\text{g}/\text{kg}$		
1,2,4 Trichlorobenzene	55,000	U
1,2 Dichlorobenzene	55,000	U
1,3 Dichlorobenzene	55,000	U
1,4 Dichlorobenzene	55,000	U
2,4,5 Trichlorophenol	270,000	U
2,4,6 Trichlorophenol	55,000	U
2,4 Dichlorophenol	55,000	U
2,4 Dimethylphenol	64,000	
2,4 Dinitrophenol	270,000	U
2,4 Dnitroluene	55,000	U
2,6 Dinitroluene	55,000	U
2 Chloronaphthalene	55,000	U
2 Chlorophenol	55,000	U
2 Methylnaphthalene	55,000	U
2 Methylphenol	54,000	J
2 Nitroaniline	270,000	U
2 Nitrophenol	55,000	U
3,3 Dichlorobenzidine	55,000	U
3 Nitroaniline	270,000	U
4,6 Dintro 2 methylphenol	270,000	U
4 Bromophenyl phenylether	55,000	U
4 Chloro 3 methylphenol	55,000	U
4 Chloroaniline	55,000	U
4 Chlorophenyl phenylether	55,000	U
4 Methylphenol	53,000	U
4 Nitroaniline	270,000	U
4 Nitrophenol	270,000	U
Acenaphthithene	55,000	U

Table H-32. (continued).

Compound Name	Sample Unit	Q-Flag (uncertainties)
TV9001017A – SEMIS-8270 (continued)		
$\mu\text{g/kg}$		
Anthracene	55,000	U
Benzo(a)anthracene	55,000	U
Benzo(a)pyrene	55,000	U
Benzo(b)fluoranthene	55,000	U
Benzo(g,h,f)perylene	55,000	U
Benzo(k)fluoranthene	55,000	U
Benzoic acid	13,000	J
Benzyl alcohol	55,000	U
Bulylbenzylphthaiate	55,000	U
Carbazote	55,000	U
Chrysene	55,000	U
Di-n-bulyiphlhaiate	55,000	U
Di-n-octylphthaiate	55,000	U
Dibenz(a,h)anthracene	55,000	U
Diethylphthaiate	55,000	U
Dimethylphthaiage	55,000	U
Fluoranthene	55,000	U
Fluorene	55,000	U
Hexachlorabenzene	55,000	U
Hexachlorocyclopentadlene	55,000	U
Hexachloroethane	55,000	U
Indeno(1,2,3-cd)cyrrens	55,000	U
Isophorone	55,000	U
N-Nitroso-dl-n-propylamine	55,000	U
N-Nitrosodlphenylamine	55,000	U
Naphthalene	55,000	U
Nitrobenzene	55,000	U
Pentachlorophenol	270,000	U

Table H-32. (continued).

Compound Name	Sample Unit	Q-Flag (uncertainties)
TV9001017A – SEMIS-8270 (continued)		
$\mu\text{g}/\text{kg}$		
Phenanthrene	55,000	U
Phenol	14,000	J
Pyrene	55,000	U
Pyridine	55,000	U
bfs(2-Chloroethoxy)methane	55,000	U
Bfs(2-Chloroethyl)ether	55,000	U
Bfs(2-Chlorolsopropyl)ether	55,000	U
Bfs(2-Ethylberyl)phihaisis	110,000	
TV9001017A – SEMIS – TCLP		
$\mu\text{g}/\text{L}$		
1,4 Dichlorobenzene	100	U
2,4,5 Trichlorophenol	500	U
2,4,5 Trichlorophenol	100	U
2,4 Dinitrotoluene	100	U
2 Methylphenol	100	U
4 Methylphenol	100	U
Hexachlorobenzene	100	U
Hexachlorobutadlene	100	U
Hexachloroethane	100	U
Nitrobenzene	100	U
Peniachlorophenol	500	U
Pyridine	100	U
TV9001017A – VOCS- TCLP		
$\mu\text{g}/\text{L}$		
1,1 Dichloroethene	5	U
1.2 Dichloroethane	5	U
1.4 Dichlorobenzene	5	U

Table H-32. (continued).

Compound Name	Sample Unit	Q-Flag (uncertainties)
TV9001017A – VOCS- TCLP (continued)		
$\mu\text{g/L}$		
2 Butanone	10	U
Benzene	5	U
Carbon Tetrachloride	5	U
Chlorophenzeno	5	U
Chloroform	5	U
Tetrachloroethene	1	J
Trichloroethene	5	U
Vinyl Chloride	5	U
TV900101TV – VOCS-8260		
$\mu\text{g/kg}$		
1.1.1 Trichloroethane	14	U
1.1.2.2 Tetrachloroethane	14	U
1.1.2 Trichloroethane	14	U
1.1 Dichloroethane	14	U
1.2 Dichloroethane	14	U
1.2 Dichloropropane	14	U
2 Butanone	14	U
2 Hexanone	14	U
4 Methyl-2 Penilanone	14	U
Acetone	14	U
Benzene	14	U
Bromodichloromethane	14	U
Bromoform	14	U
Bromomethane	14	U
Carbon Disulfide	14	U
Carbon Tetrachloride	14	U

Table H-32. (continued).

Compound Name	Sample Unit	Q-Flag (uncertainties)
TV900101TV – VOCS-8260 (continued)		
$\mu\text{g/kg}$		
Chlorobenzene	14	U
Chloroethane	14	U
Chloroform	14	U
Chloromethane	14	U
Dibromochloromethane	14	U
Ethylbenzene	14	U
Methylene Chloride	14	U
Styrene	14	U
Tetrachloroethane	2	J
Toluene	14	U
Trichloroethene	14	U
Vinyl Chloride	14	U
Xylene (ortho)	14	U
Xylene (total meta/para)	14	U
Cl _s 1,2 Dichloroethene	14	U
Cl _s 1, 3 Dichloropropene	14	U
Trans1,2 Dichloroethane	14	U
Trans1,3 Dichloropropene	14	U

U - Not detected, detection limit presented.

J - Estimated value.

Table H-33. 1997 sand filter data.

Compound Name	Sample Unit	Q-Flag (uncertainties)
TV9001017A – INORG		
mg/kg		
Arsenic	25	P
Barium	310	P
Cadmium	121	P
Chromium	1,985	P
Lead	1,349	P
Mercury	1,930	DMCV
Selenium	5.36	P
Silver	247	P
TV9001017A – INORG – TCLP		
μg/L		
Arsenic	19.4	UP
Barium	138.5	P
Cadmium	385.3	P
Chromium	17.7	P
Lead	219.6	P
Mercury	7.33	CV
Selenium	40.2	UP
Silver	4.5	UP
TV9001017A – HERBS – TCLP		
μg/L		
2,4,5 TP (Silver)	2	U
2,4-D	20	U
TV9001017A – PESTS – TCLP		
μg/L		
Chlordane (technical)	10	U
Endrin	1	U
Heptachlor	.5	U
Heptachlor epoxide	.5	U
Methoxychlor	5	U
Toxaphene	50	U
Gamma-BHC (lindane)	.5	U

Table H-33. (continued).

Compound Name	Sample Unit	Q-Flag (uncertainties)
TV9001017A – PCBS		
$\mu\text{g/kg}$		
Aroclor-1016	27	U
Aroclor-1221	55	U
Aroclor-1232	27	U
Aroclor-1242	27	U
Aroclor-1248	27	U
Aroclor-1254	27	U
Aroclor-1260	93,000	E
TV9001017ADL – PCBS		
$\mu\text{g/kg}$		
Aroclor-1016	14,000	U
Aroclor-1221	27,000	U
Aroclor-1232	14,000	U
Aroclor-1242	14,000	U
Aroclor-1248	14,000	U
Aroclor-1254	14,000	U
Aroclor-1260	290,000	

U – Not detected, detection limit presented.
P – Analysis by inductively coupled plasma atomic emission spectroscopy.
CV - Analysis by cold vapor atomic absorption spectroscopy.
E – Concentration exceeds calibration range.
D – The sample required dilution for analysis due to high levels of mercury.
M - An aliquot for the inductively coupled plasma (ICP) digestate was analyzed for mercury due to the elevated concentration.

Soil Samples Results

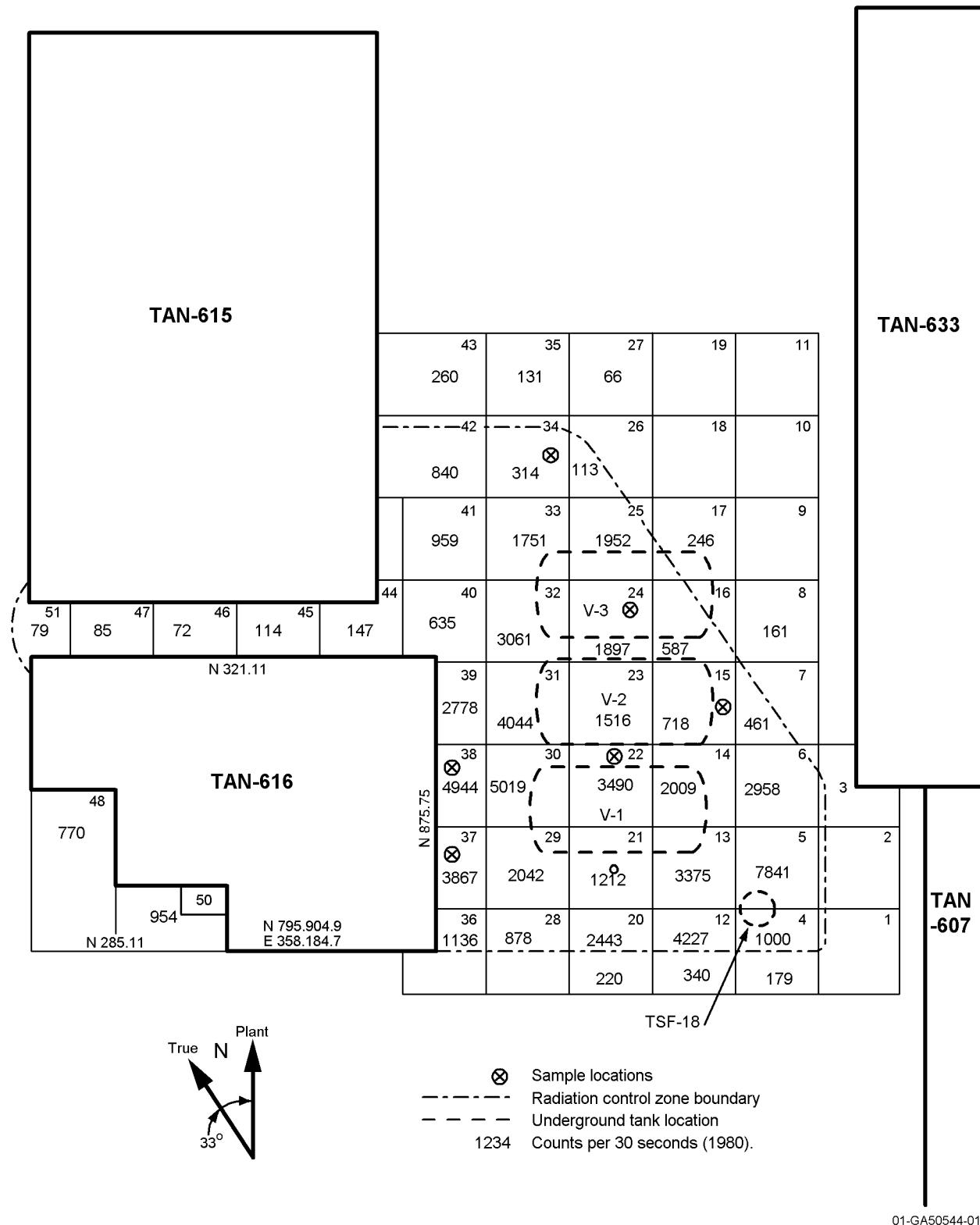


Figure H-5. 1983 grid network for surface radiation survey and sample locations of V-Tanks.

Table H-34. 1983 digital surface survey data, averaged over each square (counts/30 s).

Square Number	Inside Ribbon	Outside Ribbon	Square Number	Inside Ribbon	Outside Ribbon
1	Not staked	—	27	—	66 ± 6
2	Not staked	—	28	878 ± 21	—
3	Not staked	—	29	2,042 ± 32	—
4	1,000 ± 22	179 ± 9	30	5,019 ± 50	—
5	7,841 ± 63	—	31	4,044 ± 45	—
6	2,958 ± 38	—	32	3,061 ± 39	—
7	461 ± 15	333 ± 13	33	1,751 ± 30	—
8	—	161 ± 9	34	314 ± 13	—
9	Not staked	—	35	—	131 ± 8
10	Not staked	—	36	1,136 ± 24	—
11	Not staked	—	37	3,967 ± 45	—
12	4,227 ± 46	340 ± 13	38	3,944 ± 50	—
13	3,375 ± 41	—	39	2,778 ± 37	—
14	2,009 ± 32	—	40	635 ± 18	—
15	718 ± 19	—	41	959 ± 22	—
16	587 ± 17	231 ± 11	42	840 ± 20	—
17	—	246 ± 11	43	—	260 ± 11
18	Not staked	—	44	147 ± 9	—
19	Not staked	—	45	114 ± 8	—
20	2,443 ± 35	220 ± 10	46	72 ± 6	—
21	1,212 ± 25	—	47	85 ± 7	—
22	3,490 ± 42	—	48	770 ± 20	—
23	1,516 ± 27	—	49	Not staked	—
24	1,897 ± 31	—	50	945 ± 22	—
25	1,952 ± 31	—	51	79 ± 6	—
26	113 ± 8	—			

Note: Error is one standard deviation of the average value of the two measurements for each square.

Note: Data are presented in counts/30 seconds. Readings should be doubled to convert to counts/minute.

— Inferred to mean nondetect.

Table H-35. 1983 trench soil sampling results in V-Tank area – gamma-emitter activity (pCi/g).

Square	Depth (in.)	Cesium -137	Cobalt-60	Potassium-40	Cesium-134	Europium-154
15	Surface	79 ± 1	38 ± 1	9 ± 1	—	1.3 ± 0
	6	307 ± 3	376 ± 3	14 ± 2	—	—
	12	112 ± 2	64 ± 1	13 ± 2	—	—
	18	15 ± 1	0.8 ± 0.2	14 ± 2	—	—
	24	7 ± 1	0.5 ± 0.1	16 ± 2	—	—
	30	10 ± 1	0.6 ± 0.2	12 ± 2	—	—
	36	15 ± 1	14 ± 1	18 ± 3	—	—
22	Surface	1,074 ± 4	25 ± 3	9 ± 2	—	—
	6	2.0 ± 0.2	6.2 ± 0.5	10 ± 2	—	—
	12	16 ± 1	10 ± 1	14 ± 2	—	—
	18	2.9 ± 0.2	0.4 ± 0.1	10 ± 2	—	—
	24	2.9 ± 0.2	0.32 ± 0.08	10 ± 2	—	—
	To be revised	212 ± 2	460 ± 3	11 ± 2	—	—
24	A36	1.7 ± 0.2	1.2 ± 0.2	4 ± 1	—	—
	Surface	175 ± 2	32 ± 2	11 ± 2	0.9 ± 0.2	—
	6	40 ± 1	1.4 ± 0.2	6 ± 1	—	—
	12	54,120 ± 60	176 ± 7	17 ± 3	8 ± 4	—
	18	28 ± 1	0.5 ± 0.1	10 ± 2	—	—
	24	2.5 ± 0.2	0.22 ± 0.07	4.7 ± 0.9	—	—
	30	3.3 ± 0.3	0.8 ± 0.2	11 ± 2	—	—
34	36	2.8 ± 0.4	0.7 ± 0.2	14 ± 2	—	—
	Surface	106 ± 2	6.2 ± 0.5	8 ± 1	0.4 ± 0.2	—
	6	50 ± 1	16.2 ± 0.7	10 ± 2	—	—
	12	38 ± 1	1.2 ± 0.2	11 ± 2	—	—
	18	2.5 ± 0.2	—	9 ± 1	—	—
	24	0.2 ± 0.1	—	12 ± 2	—	—
	30	0.5 ± 0.1	—	14 ± 2	—	—
37	36	1.7 ± 0.2	20 ± 1	10 ± 2	—	—
	Surface	179 ± 2	52 ± 1	5 ± 1	—	—
	6	515 ± 3	30 ± 1	10 ± 2	—	—
	12	0.24 ± 0.06	1.1 ± 0.2	9 ± 1	—	—
	18	45,800 ± 100	500 ± 10	—	16 ± 6	—
	24	16 ± 1	18 ± 1	14 ± 2	—	—
	30	420 ± 3	17 ± 1	9 ± 1	—	—
	36	20 ± 1	15 ± 1	10 ± 2	—	—

Table H-35. (continued).

Square	Depth (in.)	Cesium -137	Cobalt-60	Potassium-40	Cesium-134	Europium-154
38	Surface	1,242 ± 5	610 ± 4	6 ± 2	2 ± 1	7 ± 1
	6	49 ± 1	2.9 ± 0.3	10 ± 2	—	—
	12	48 ± 1	4.6 ± 0.3	7 ± 1	—	—
	18	0.2 ± 0.1	0.2 ± 0.1	12 ± 2	—	—
	24	0.20 ± 0.5	—	8 ± 1	—	—
	30	—	—	5 ± 1	—	—
	36	3.0 ± 0.2	1.2 ± 0.2	4 ± 1	—	—

— Inferred to mean nondetect

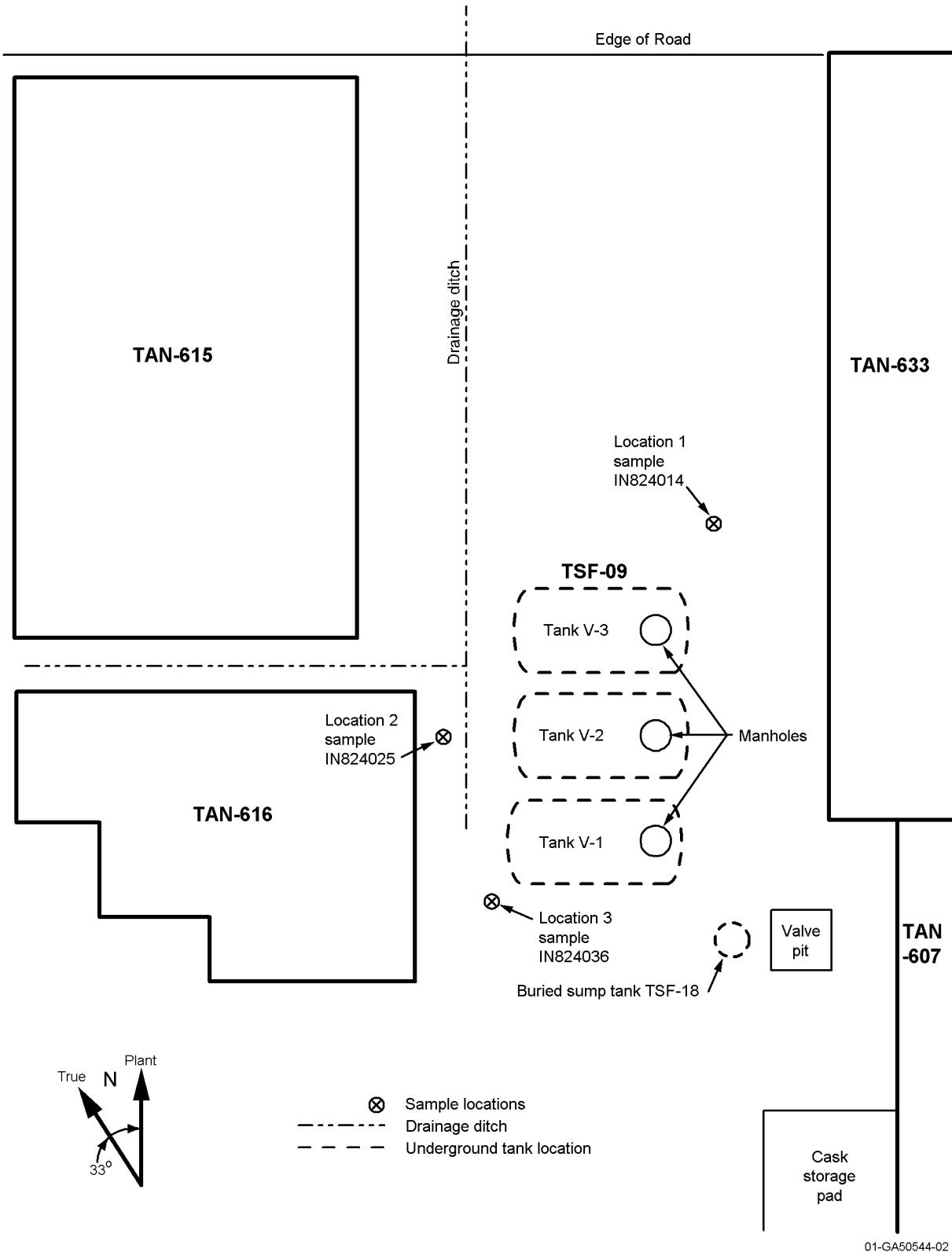


Figure H-6. TSF-09/18 1988 DOE Environmental Survey sample locations.

Table H-36. TSF-09/18 1988 DOE Environmental Survey sample analytical data from 0.3 to 0.3 m (1 to 2 ft) (data exceeding the risk-based and/or background values are underlined^a).

Field Measurements	Location 1 IN824014	Location 2 IN824025	Location 3 IN824036	90 th Percentile of Elements at TAN	Risk-Based Concentrations
Beta/Gamma Analytes	0.5 mR/hr	2 mR/hr	0.2 mR/hr	N/A	N/A
Aluminum	10,100 mg/kg	16,300 mg/kg	13,400 mg/kg	20,800 mg/kg	N/A
Arsenic	<u>8.6 mg/kg</u>	<u>8.6 mg/kg</u>	<u>9.9 mg/kg</u>	38.4 mg/kg	80 mg/kg (0.4 mg/kg)
Barium	127 mg/kg	186 mg/kg	168 mg/kg	254 mg/kg	20,000 mg/kg
Beryllium	<u>1.7 mg/kg</u>	<u>1.8 mg/kg</u>	<u>1.7 mg/kg</u>	1.5 mg/kg	1,000 mg/kg (0.1 mg/kg)
Cadmium	1 mg/kg	1.1 mg/kg	1.1 mg/kg	4.6 mg/kg	100 mg/kg
Calcium	<u>148,000 mg/kg</u>	92,300 mg/kg	105,000 mg/kg	121,000 mg/kg	N/A
Chromium	22 mg/kg	32 mg/kg	25 mg/kg	38.9 mg/kg	N/A
Cobalt	4.9 mg/kg	7 mg/kg	6.3 mg/kg	13.3 mg/kg	N/A
Copper	14 mg/kg	22 mg/kg	20 mg/kg	27.4 mg/kg	10,000 mg/kg
Iron	12,700 mg/kg	19,100 mg/kg	16,500 mg/kg	27,000 mg/kg	N/A
Lead	8.1 mg/kg	14 mg/kg	13 mg/kg	55.6 mg/kg	N/A
Magnesium	11,600 mg/kg	12,900 mg/kg	12,300 mg/kg	14,300 mg/kg	N/A
Manganese	250 mg/kg	410 mg/kg	409 mg/kg	490 mg/kg	30,000 mg/kg
Mercury	<u>0.12 mg/kg</u>	<u>0.08 mg/kg</u>	<u>0.08 mg/kg</u>	0.06 mg/kg	N/A
Nickel	22 mg/kg	30 mg/kg	28 mg/kg	42.5 mg/kg	5,000 mg/kg
Potassium	2,500 mg/kg	3,800 mg/kg	3,000 mg/kg	5,480 mg/kg	N/A
Silver	0.96 mg/kg	1.1 mg/kg	1.1 mg/kg	3.5 mg/kg	1,000 mg/kg
Sodium	<u>660 mg/kg</u>	<u>613 mg/kg</u>	472 mg/kg	522 mg/kg	N/A
Vanadium	33 mg/kg	48 mg/kg	39 mg/kg	53.7 mg/kg	2,000 mg/kg
Zinc	67 mg/kg	101 mg/kg	98 mg/kg	182 mg/kg	80,000 mg/kg

a. (INEEL 1994).

N/A = No concentration data are available.

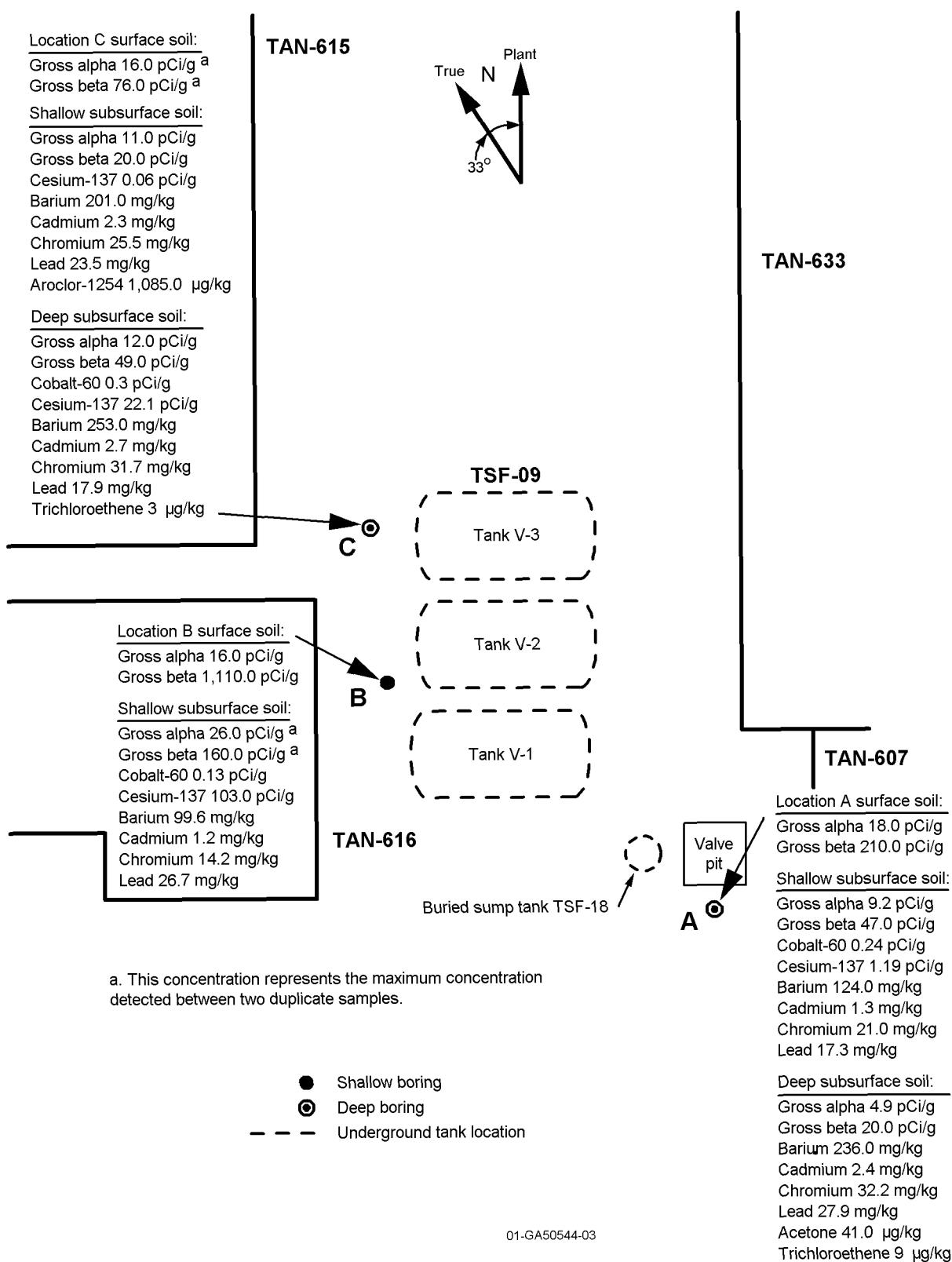


Figure H-7. 1993 Phase II Track 2 environmental sample analytical results from TSF-09/18.

Table H-37. 1993 Track 2 investigation, summary of analytes detected and results.

Sample Number	Sample Location	Sample Depth	Sample Constituent	Sample Activity	Background Concentration
T0920001AB	A	0 to 0.15m (0 to 0.5 ft)	Gross alpha Gross beta	18 ± 3.0 pCi/g 210.0 ± 5.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0910101AB	A	0 to 0.8 m (0 to 2.5 ft)	Gross alpha Gross beta	9.2 ± 3.5 pCi/g 47.0 ± 3.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0910101R4			Cobalt-60	0.24 ± 0.03 pCi/g	N/A
T0910101R4			Cesium-137	1.2 ± 0.1 pCi/g	1.24 pCi/g ^a
T0905201AB	A	6.1 to 6.7 m (20 to 22 ft)	Gross alpha Gross beta	4.9 ± 2.7 pCi/g U 20.0 ± 2.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0905201R4			Gamma	None detected	N/A
T0920101AB	B	0 to 0.15 m (0 to 0.5 ft)	Gross alpha Gross beta	16.0 ± 4.0 pCi/g $1,110.0 \pm 10.0$ pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0905501AB ^c	B	1.8 to 2.2 m (6 to 7 ft)	Gross alpha Gross beta	26.0 ± 5.0 pCi/g 110.0 ± 5.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0905602AB ^c	B	1.8 to 2.2 m (6 to 7 ft)	Gross alpha Gross beta	21.0 ± 5.0 pCi/g 160.0 ± 5.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0905602R4			Cobalt-60	0.13 ± 0.02 pCi/g	N/A
T0905602R4			Cesium-137	103.0 ± 7.4 pCi/g	1.24 pCi/g ^b
T0905602R4			Alpha spec.	0.8 ± 0.2 pCi/g	0.86 to 1.79 pCi/g
T0905602R4			Alpha spec.	0.3 ± 0.2 pCi/g	1.3 pCi/g
T0905602R4			Alpha spec.	0.7 ± 0.1 pCi/g	0.94 to 1.69 pCi/g
T0905602R4			Alpha spec.	0.01 ± 0.05 pCi/g	N/A
T0905602R4			Alpha spec.	0.7 ± 0.1 pCi/g	0.86 to 1.79 pCi/g
T0905602R4			Alpha spec.	0 ± 0.02 pCi/g	0.0005 to 0.0046 pCi/g
T0905602R4			Alpha spec.	0 ± 0.02 pCi/g	0.018 to 0.049 pCi/g
T0905602R4			Alpha spec.	0.01 ± 0.01 pCi/g	N/A
T0905602R4			Alpha spec.	0.03 ± 0.02 pCi/g	N/A
T0905602R4			Alpha spec.	0.03 ± 0.02 pCi/g	0.002 to 0.19 pCi/g
T0905602R4			Alpha spec.	0.25 ± 0.03 pCi/g	N/A
T0920201AB ^c	C	0 to 0.15 m (0 to 0.5 ft)	Gross alpha Gross beta	16.0 ± 4.0 pCi/g 76.0 ± 3.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a

Table H-37. (continued).

Sample Number	Sample Location	Sample Depth	Sample Constituent	Sample Activity	Background Concentration
T0920202AB ^c	C	0 to 0.15 m (0 to 0.5 ft)	Gross alpha Gross beta	13.0 ± 3.0 pCi/g 66.0 ± 13.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0905601AB	C	0 to 0.8 m (0 to 2.5 ft)	Gross alpha Gross beta	11.0 ± 5.0 pCi/g 20.0 ± 2.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0905601AB	C	0 to 0.8 m (0 to 2.5 ft)	Cesium-137	0.06 ± 0.02 pCi/g	1.24 pCi/g ^b
T0905702R4	C	5.5 to 6.1 m (18 to 20 ft)	Gross alpha Gross beta	12.0 ± 4.0 pCi/g 49.0 ± 3.0 pCi/g	19.8 pCi/g ^a 31.7 pCi/g ^a
T0905701AB	C	5.5 to 6.1 m (18 to 20 ft)	Cobalt-60	0.3 ± 0.0 pCi/g	N/A
T0910201R4	A	0.8 to 1.4 m (2.5 to 4.5 ft)	Cesium-137	22.1 ± 1.6 pCi/g	1.24 pCi/g ^b
T0910101	A	6.1 to 6.7 m (20 to 22 ft)	Barium Cadmium Chromium Lead	124.0 mg/kg 1.3 mg/kg 21.0 mg/kg 17.3 mg/kg S	254.0 mg/kg ^d 4.6 mg/kg ^d 38.9 mg/kg ^d 55.6 mg/kg ^d
T0905101	B	1.8 to 2.2 m (6 to 7 ft)	Barium Cadmium Chromium Lead	236.0 mg/kg 2.4 mg/kg 32.2 mg/kg 27.9 mg/kg S	254.0 mg/kg ^d 4.6 mg/kg ^d 38.9 mg/kg ^d 55.6 mg/kg ^d
T0905601	C	0 to 0.8 m (0 to 2.5 ft)	Barium Cadmium Chromium Lead	99.6 mg/kg 1.2 mg/kg 14.2 mg/kg 26.7 mg/kg S	254.0 mg/kg ^d 4.6 mg/kg ^d 38.9 mg/kg ^d 55.6 mg/kg ^d
T0905602	C	5.5 to 6.1 m (18 to 20 ft)	Barium Cadmium Chromium Lead	201.0 mg/kg 2.3 mg/kg 25.5 mg/kg 23.5 mg/kg S	254.0 mg/kg ^d 4.6 mg/kg ^d 38.9 mg/kg ^d 55.6 mg/kg ^d
T0905702	C	5.5 to 6.1 m (18 to 20 ft)	Barium Cadmium Chromium Lead	253.0 mg/kg 2.7 mg/kg 31.7 mg/kg 17.9 mg/kg S	254.0 mg/kg ^d 4.6 mg/kg ^d 38.9 mg/kg ^d 55.6 mg/kg ^d
T0910101	A	0.8 to 1.2 m (2.5 to 4 ft)	Acetone	7 µg/kg J	N/A

Table H-37. (continued).

Sample Number	Sample Location	Sample Depth	Sample Constituent	Sample Activity	Background Concentration
T0910101	A	6.1 to 7.4 m	Acetone	41 $\mu\text{g}/\text{kg}$	N/A
		(20 to 24 ft)	Trichloroethane	9 $\mu\text{g}/\text{kg}$	N/A
T0910201	C	6.1 to 6.7 m	Trichloroethane	3 $\mu\text{g}/\text{kg}$	N/A
		(20 to 22 ft)			
T0905702	C	0 to 0.8 m (0 to 2.5 ft)	Aroclor-1254	1,085 $\mu\text{g}/\text{kg}$	N/A

a. (Anderson 1993).

b. Mean of range for cesium-137 (0.4 to 2.08 pCi/g) taken from DOE-ID (1994), p. E-11.

c. Field duplicate samples.

d. 90th percentile value taken from DOE-ID (1992). J = Indicates an estimated value.

U = The constituent of interest was analyzed for, but was not detected above the minimum detectable activity of the instrumentation. There may or may not be a result provided in the data package. If no result is provided, a "zero" result should not be entered in its place, as the zero may mistakenly be included in statistical calculations performed from the sample results.

S = The value was determined by the method of standard addition (MSA).

N/A = No background concentration data.

Table H-38. Target compound list VOC analytical results for the 1993 TSF-09/18 boring subsurface soil samples.

Analytical parameter	Location A			Location B			Location C		
	Sample number T0910101VL (2.5 to 4 ft)	Sample number T0910101VM (22 to 24 ft)	Sample number T0905601VL ^a (7 to 8 ft)	Sample number T0905602VL ^a (7 to 8 ft)	Sample number T0910202VL (2.5 to 4.5 ft)	Sample number T0910201VL (20 to 22 ft)			
chloromethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
bromomethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
vinyl chloride	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
chloroethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
methylene chloride	11 µg/kg U	27 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
acetone	7 µg/kg J	41 µg/kg	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	15 µg/kg U	12 µg/kg U	12 µg/kg U
carbon disulfide	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
1,1-dichloroethene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
1,1-dichloroethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
1,2-dichloroethene (total)	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
chloroform	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
1,2-dichloroethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
2-butanone	11 µg/kg R	12 µg/kg R	12 µg/kg R	11 µg/kg R	12 µg/kg R	11 µg/kg R	12 µg/kg R	12 µg/kg R	12 µg/kg R
1,1,1-trichloroethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
carbon tetrachloride	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
bromodichloromethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
1,2-dichloropropane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
cis-1,3-dichloropropene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
trichlorethene	11 µg/kg U	9 µg/kg J	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	3 µg/kg J	12 µg/kg U
dibromochloromethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U
1,1,2-trichloroethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U	12 µg/kg U

Table H-38. (continued).

Analytical parameter	Location A			Location B			Location C	
	Sample number T0910101VL (2.5 to 4 ft)	Sample number T0910101VM (22 to 24 ft)	Sample number T0905601VL ^a (7 to 8 ft)	Sample number T0905602VL ^a (7 to 8 ft)	Sample number T0910202VL (2.5 to 4.5 ft)	Sample number T0910201VL (20 to 22 ft)		
benzene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
trans-1,3-dichloropropene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
bromoform	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
4-methyl-2-pentanone	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
2-hexanone	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
tetrachloroethene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
1,1,2,2-tetrachloroethane	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
toluene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
chlorobenzene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
ethylbenzene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
styrene	11 µg/kg U	12 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U
xylenes (total)	11 µg/kg U	12 µg/kg U	11 µg/kg U	12 µg/kg U	11 µg/kg U	11 µg/kg U	12 µg/kg U	12 µg/kg U

a. Field duplicate sample.

U = Indicates the compound was analyzed for, but not detected.

R = The data are unusable (may or may not be present). Resampling and reanalysis is necessary for verification.

J = Indicates an estimated value.

Table H-39. Target compound list SVOCs analytical results for the 1993 Phase II TSF-09/18 boring subsurface soil.

Analytical parameter	Location A			Location B			Location C		
	Sample number T0910101EL 0.8 to 1.2 m (2.5 to 4 ft)	Sample number T0905201EL 6.7 to 7.4 m (22 to 24 ft)	Sample number T0905601EL 1.5 to 1.9 m (5 to 6 ft)	Sample number T0905602EL 1.5 to 1.9 m (5 to 6 ft)	Sample number T0905702EL 0.8 to 1.4 m (2.5 to 4.5 ft)	Sample number T0905701EL 6.1 to 6.7 m (20 to 22 ft)	Sample number T0905701EL 6.1 to 6.7 m (20 to 22 ft)	Sample number T0905701EL 6.1 to 6.7 m (20 to 22 ft)	Sample number T0905701EL 6.1 to 6.7 m (20 to 22 ft)
phenol	360 µg/kg U ^a	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
bis(2-chloroethyl)ether	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
2-chlorophenol	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
1,3-dichlorobenzene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
1,4-dichlorobenzene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
1,2-dichlorobenzene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
2-methylphenol	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
2,2'-oxybis(1-chloropropane)	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
4-methylphenol	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
n-nitroso-di-n-propylamine	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
hexachloroethane	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
nitrobenzene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
isophorone	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
2-nitrophenol	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
2,4-dimethylphenol	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
bis(2-chloroethoxy)methane	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
2,4-dichlorophenol	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U
1,2,4-trichlorobenzene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U	390 µg/kg U

Table H-39. (continued).

Analytical parameter	Location A			Location B			Location C		
	Sample number T0905201EL 0.8 to 1.2 m (2.5 to 4 ft)	Sample number T0905601EL 6.7 to 7.4 m (22 to 24 ft)	Sample number T0905602EL 1.5 to 1.9 m (5 to 6 ft)	Sample number T0905601EL 1.5 to 1.9 m (5 to 6 ft)	Sample number T0905702EL 0.8 to 1.4 m (2.5 to 4.5 ft)	Sample number T0905701EL 6.1 to 6.7 m (20 to 22 ft)			
naphthalene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
4-chloroaniline	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
hexachlorobutadiene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
4-chloro-3-methylphenol	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
2 methylnaphthalene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
hexachlorocyclopentadiene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
2,4,6-trichlorophenol	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
2,4,5-trichlorophenol	900 µg/kg U	1,000 µg/kg U	980 µg/kg U	930 µg/kg U	1,000 µg/kg U	980 µg/kg U			
2-chloronaphthalene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
2-nitroaniline	900 µg/kg U	1,000 µg/kg U	980 µg/kg U	930 µg/kg U	1,000 µg/kg U	980 µg/kg U			
dimethylphthalate	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
acenaphthylene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
2,6-dinitrotoluene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
3-nitroaniline	900 µg/kg U	1,000 µg/kg U	980 µg/kg U	930 µg/kg U	1,000 µg/kg U	980 µg/kg U			
acenaphthene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
2,4-dinitrophenol	900 µg/kg U	1,000 µg/kg U	980 µg/kg U	930 µg/kg U	1,000 µg/kg U	980 µg/kg U			
4-nitrophenol	900 µg/kg U	1,000 µg/kg U	980 µg/kg U	930 µg/kg U	1,000 µg/kg U	980 µg/kg U			
dibenzofuran	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
2,4-dinitrotoluene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
diethylphthalate	420 µg/kg U	490 µg/kg U	390 µg/kg U	370 µg/kg U	500 µg/kg U	480 µg/kg U			
4-chlorophenyl-phenylether	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
fluorene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			

Table H-39. (continued).

Analytical parameter	Location A			Location B			Location C		
	Sample number T0910101EL 0.8 to 1.2 m (2.5 to 4 ft)	Sample number T0905201EL 6.7 to 7.4 m (22 to 24 ft)	Sample number T0905601EL 1.5 to 1.9 m (5 to 6 ft)	Sample number T0905602EL 1.5 to 1.9 m (5 to 6 ft)	Sample number T0905702EL 0.8 to 1.4 m (2.5 to 4.5 ft)	Sample number T0905701EL 6.1 to 6.7 m (20 to 22 ft)			
4-nitroaniline	900 µg/kg U	1,000 µg/kg U	980 µg/kg U	930 µg/kg U	1,000 µg/kg U	980 µg/kg U			
4,6-dinitro-2-methylphenol	900 µg/kg U	1,000 µg/kg U	980 µg/kg U	930 µg/kg U	1,000 µg/kg U	980 µg/kg U			
n-nitrosodiphenylamine (1)	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
4-bromophenyl-phenylether	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
hexachlorobenzene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
pentachlorophenol	900 µg/kg U	1,000 µg/kg U	980 µg/kg U	930 µg/kg U	1,000 µg/kg U	980 µg/kg U			
phenanthrene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
anthracene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
carbazole	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
di-n-butylphthalate	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
fluoranthene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
pyrene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
butylbenzylphthalate	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
3,3'-dichlorobenzidine	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
benzo(a)anthracene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
chrysene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
bis(2-ethylhexyl)phthalate	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
di-n-octylphthalate	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
benzo(k)fluoranthene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
benzo(a)perylene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
indeno(1,2,3-cd)pyrene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			

Table H-39. (continued).

Analytical parameter	Location A			Location B			Location C		
	Sample number T0910101EL	Sample number T0905201EL	Sample number T0905601EL	Sample number T0905602EL	Sample number T0905702EL	Sample number T0905701EL			
0.8 to 1.2 m (2.5 to 4 ft)	6.7 to 7.4 m (22 to 24 ft)	1.5 to 1.9 m (5 to 6 ft)	1.5 to 1.9 m (5 to 6 ft)	1.5 to 1.9 m (5 to 6 ft)	0.8 to 1.4 m (2.5 to 4.5 ft)	6.1 to 6.7 m (20 to 22 ft)			
dibenz(a,h)anthracene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
benzo(g,h,i)perylene	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			
tributylphosphate ^b	360 µg/kg U	400 µg/kg U	390 µg/kg U	370 µg/kg U	410 µg/kg U	390 µg/kg U			

a. U – indicates the compound was analyzed for, but not detected.

b. Field duplicate sample.

Table H-40. PCB analytical results for the 1993 Phase II TSF-09/18 boring subsurface soil samples.

Analytical parameter	Location A		Location B		Location C	
	Sample number T0910101PC (2.5 to 4 ft)	Sample number T0905201PC (20 to 22 ft)	Sample number T0905601PC ^a (5 to 6 ft)	Sample number T0905602PC ^a (5 to 6 ft)	Sample number T0905702PC (0 to 2.5 ft)	Sample number T0910201PC (18 to 20 ft)
Aroclor-1016	87 µg/kg U	97 µg/kg U	95 µg/kg U	89 µg/kg U	490 µg/kg UD	94 µg/kg U
Aroclor-1221	87 µg/kg U	97 µg/kg U	95 µg/kg U	89 µg/kg U	490 µg/kg UD	94 µg/kg U
Aroclor-1232	87 µg/kg U	97 µg/kg U	95 µg/kg U	89 µg/kg U	490 µg/kg UD	94 µg/kg U
Aroclor-1242	87 µg/kg U	97 µg/kg U	95 µg/kg U	89 µg/kg U	490 µg/kg UD	94 µg/kg U
Aroclor-1248	87 µg/kg U	97 µg/kg U	95 µg/kg U	89 µg/kg U	490 µg/kg UD	94 µg/kg U
Aroclor-1254	170 µg/kg U	190 µg/kg U	190 µg/kg U	180 µg/kg U	1,085 µg/kg D	190 µg/kg U
Aroclor-1260	170 µg/kg U	190 µg/kg U	190 µg/kg U	180 µg/kg U	980 µg/kg UD	190 µg/kg U

a. Field duplicate samples.

U = Indicates the compound was analyzed for, but not detected.

D = Identifies all compounds identified in an analysis at a secondary dilution factor.

Table H-41. 1993 Phase II inorganic analytical results for the TSF-09/18 boring subsurface soil samples.

Sample number	Sample location	Sample depth	Analytes				
			Barium	Cadmium	Chromium	Lead	Mercury
T091010LM	A	2.5 to 4 ft	124.0 mg/kg	1.3 mg/kg	21.0 mg/kg	17.3 mg/kg S	0.05 mg/kg U
T090510LM	A	20 to 22 ft	236.0 mg/kg	2.4 mg/kg	32.2 mg/kg	27.9 mg/kg S	0.06 mg/kg U
T0905610LM	B	6 to 7 ft	99.6 mg/kg	1.2 mg/kg	14.2 mg/kg	26.7 mg/kg S	0.15 mg/kg U
T0905602LM	C	0 to 2.5 ft	201.0 mg/kg	2.3 mg/kg	25.5 mg/kg	23.5 mg/kg S	0.09 mg/kg BU
T0905702LM	C	18 to 20 ft	253.0 mg/kg	2.7 mg/kg	31.7 mg/kg	17.9 mg/kg S	0.06 mg/kg U
							0.24 mg/kg U

S = Value was determined by the MSA.

U = Indicates the analyte was analyzed for, but not detected.

B = Value is less than the contract-required detection limit (CRDL), but greater than the IDL.

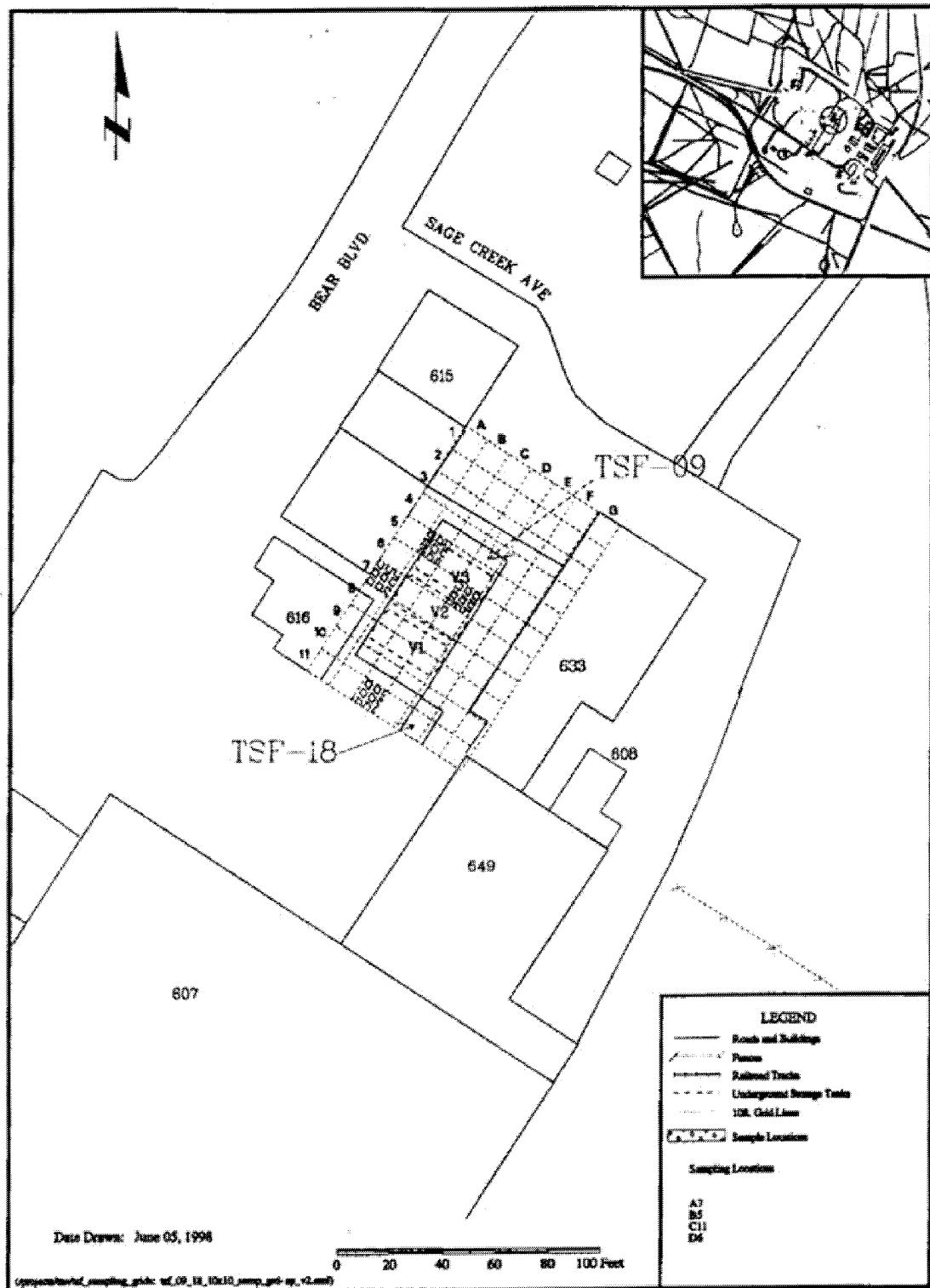


Figure H-8. TSF-09 and TSF-18 1998 soil sampling grid.

Table H-42. 1998 soil sampling results, soil surrounding V-Tanks.

Sample ID	Dilution Factors TCLP VOCs/ VOCs/PCBs/ Metals	Sample Date	Grid (ft)	Northing (ft)	Easting (ft)	Min	Max	Interval (ft)		Date Analyzed CLP VOCs	Date Analyzed CLP PCBs	Date Analyzed RCRA Metals	TCLP Vinyl Chloride ug/L flag	TCLP 1,1- Dichloro- ethene ug/L flag	TCLP 1,2- Chloro- form ug/L flag	TCLP 1,2- Dichloro- ethane ug/L flag
								TCLP VOCs	TCLP PCBs				TCLP 1,1- Dichloro- ethene ug/L flag	TCLP 1,2- Chloro- form ug/L flag	TCLP 1,2- Dichloro- ethane ug/L flag	
IWG00101	NA/1/1/NA	6/29/1998	QC	NA	NA	NA	NA	Not Analyzed	7/10/1998	8/15/1998	Not Analyzed					
IWG00201	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	0	2.5	7/17/1998	8/15/1998	7/17/1998	100U	50U	50U	200U		
IWG00301	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	0	2.5	7/18/1998	7/13/1998	7/17/1998	100U	50U	50U	200U		
IWG00401	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	0	2.5	7/17/1998	7/9/1998	8/15/1998	7/17/1998	100U	50U	50U	200U	
IWG00501	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	0	2.5	7/18/1998	7/11/1998	8/15/1998	7/17/1998	100U	50U	50U	97J	
IWG00502	NA/1/1/Unknown	6/30/1998	D4	795935.79	358237.07	0	2.5	Not Analyzed	7/12/1998	9/3/1998	7/17/1998					
IWG00601	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	5	7.5	7/20/1998	7/10/1998	8/15/1998	7/17/1998	100U	50U	50U	200U	
IWG00701	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	5	7.5	7/18/1998	7/11/1998	8/15/1998	7/17/1998	100U	50U	50U	200U	
IWG00801	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	5	7.5	7/17/1998	7/9/1998	8/15/1998	7/17/1998	100U	50U	50U	200U	
IWG00901	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	5	7.5	7/18/1998	7/12/1998	9/3/1998	7/17/1998	100U	50U	50U	200U	
IWG01001	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	7.5	10	7/20/1998	7/10/1998	8/15/1998	7/17/1998	100U	50U	50U	200U	
IWG01101	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	7.5	10	7/18/1998	7/11/1998	8/15/1998	7/17/1998	100U	50U	50U	75J	
IWG01201	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	7.5	10	7/17/1998	7/10/1998	8/15/1998	7/17/1998	100U	50U	50U	200U	
IWG01301	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	7.5	10	7/20/1998	7/12/1998	9/3/1998	7/17/1998	100U	50U	50U	94J	
IWG01401	NANANA/	6/30/1998	D6	795935.79	358237.07	10	12.5	Samples Taken for Physical Properties Only								
IWG01501	NANANA/	6/30/1998	D6	795935.79	358237.07	15	17.5	Samples Taken for Physical Properties Only								
IWG01601	NANANA/	6/30/1998	D6	795935.79	358237.07	17.5	20	Samples Taken for Physical Properties Only								

Table H-42. (continued).

Sample ID	Dilution Factors TCLP VOC _s / VOC _s /PCBs/ Metals	Sample Date	Grid	Northing (ft)	Easting (ft)	Min	Max	Date Analyzed TCLP VOCs	Date Analyzed CLP VOCs	Date Analyzed PCBs	Date Analyzed RCRA Metals	TCLP Carbon	TCLP Trichloro- ethene	TCLP Benzene	TCLP Tetrachloro- o-ethene	TCLP Chloro- benzene	
												Interval (ft)	ug/L flag	ug/L flag	ug/L flag	ug/L flag	
IWG00101	N/A/1/NA	6/29/1998	QC	NA	NA	NA	NA	Not Analyzed	7/10/1998	8/15/1998	Not Analyzed						
IWG00201	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	0	2.5	7/17/1998	7/10/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG00301	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	0	2.5	7/18/1998	7/13/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG00401	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	0	2.5	7/17/1998	7/9/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG00501	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	0	2.5	7/18/1998	7/11/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG00502	N/A/1/Unknown	6/30/1998	D4	795935.79	358237.07	0	2.5	Not Analyzed	7/12/1998	9/3/1998	7/17/1998	7/17/1998					
IWG00601	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	5	7.5	7/20/1998	7/10/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG00701	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	5	7.5	7/18/1998	7/11/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG00801	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	5	7.5	7/17/1998	7/9/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG00901	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	5	7.5	7/18/1998	7/12/1998	9/3/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG01001	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	7.5	10	7/20/1998	7/10/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG01101	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	7.5	10	7/18/1998	7/11/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG01201	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	7.5	10	7/17/1998	7/10/1998	8/15/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG01301	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	7.5	10	7/20/1998	7/12/1998	9/3/1998	7/17/1998	50U	50U	50U	50U	50U	
IWG01401	N/A/N/A/	6/30/1998	D6	795935.79	358237.07	10	12.5										
IWG01501	N/A/N/A/	6/30/1998	D6	795935.79	358237.07	15	17.5										
IWG01601	N/A/N/A/	6/30/1998	D6	795935.79	358237.07	17.5	20										

Table H-42. (continued).

Table H-42. (continued).

Table H-42. (continued).

Sample ID	Dilution Factors		Grid	Northing (ft)	Easting (ft)	Min Max	Date Analyzed	Date Analyzed	Date Analyzed	Interval (ft)		Date Analyzed	ug/kg flag					
	TCLP PCBs/Metals	OCs/VOCs/Sample Date								TCLP VOCs	CLP VOCs							
1WG00101	NA/1/1/NA	6/29/1998	QC	NA	NA	NA	Not Analyzed	7/10/1998	8/15/1998	1 ug/LU	1 ug/LU	1 ug/LU	1 ug/LU	1 ug/LU	1 ug/LU	1 ug/LU	1 ug/LU	
1WG00201	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	0 2.5	7/17/1998	7/10/1998	8/15/1998	7/17/1998	33U	44	33U	33U	33U	33U	33U	33U
1WG00301	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	0 2.5	7/18/1998	7/13/1998	8/15/1998	7/17/1998	33U	33U	33U	33U	33U	33U	33U	33U
1WG00401	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	0 2.5	7/17/1998	7/9/1998	8/15/1998	7/17/1998	33U	33U	53J	33U	33U	33U	33U	33U
1WG00501	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	0 2.5	7/18/1998	7/11/1998	8/15/1998	7/17/1998	33U	33U	33U	33U	33U	33U	33U	33U
1WG00502	NA/1/1/Unknown	6/30/1998	D4	795935.79	358237.07	0 2.5	Not Analyzed	7/12/1998	9/3/1998	7/17/1998	7/17/1998	33UJ	33UJ	33UJ	33UJ	33UJ	33UJ	33UJ
1WG00601	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	5 7.5	7/20/1998	7/10/1998	8/15/1998	7/17/1998	33U	33U	33U	33U	33U	33U	33U	33U
1WG00701	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	5 7.5	7/18/1998	7/11/1998	8/15/1998	7/17/1998	33U	33U	33U	33U	33U	33U	33U	33U
1WG00801	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	5 7.5	7/17/1998	7/9/1998	8/15/1998	7/17/1998	33U	33U	33U	33U	33U	33U	33U	33U
1WG00901	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	5 7.5	7/18/1998	7/12/1998	9/3/1998	7/17/1998	33UJ	33UJ	33UJ	33UJ	33UJ	33UJ	33UJ	33UJ
1WG01001	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	7.5 10	7/20/1998	7/10/1998	8/15/1998	7/17/1998	33U	33U	33U	33U	33U	33U	33U	33U
1WG01101	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	7.5 10	7/18/1998	7/11/1998	8/15/1998	7/17/1998	33U	33U	33U	33U	33U	33U	33U	33U
1WG01201	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	7.5 10	7/17/1998	7/10/1998	8/15/1998	7/17/1998	33U	33U	33U	33U	33U	33U	33U	33U
1WG01301	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	7.5 10	7/20/1998	7/12/1998	9/3/1998	7/17/1998	33UJ	33UJ	33UJ	33UJ	33UJ	33UJ	33U	33U
1WG01401	NA/NA/NA/	6/30/1998	D6	795935.79	358237.07	10 12.5	Samples Taken for Physical Properties Only											
1WG01501	NA/NA/NA/	6/30/1998	D6	795935.79	358237.07	15 17.5	Samples Taken for Physical Properties Only											
1WG01601	NA/NA/NA/	6/30/1998	D6	795935.79	358237.07	17.5 20	Samples Taken for Physical Properties Only											

Table H-42. (continued).

Sample ID	Dilution Factors TCLP VOCs/ VOCs/PCBs/ Metals	Sample Date	Grid	Northing (ft)	Easting (ft)	Min Max TCLP VOCs	Date Analyzed TCLP VOCs	Date Analyzed PCBs	Date Analyzed RCRA Metals	Interval (ft)			SW-846			
										30/10 Arsenic	30/10 Barium	30/10 Cadmium	30/10 Chromium	30/10 Lead		
1WG00101	NA/1/1/NA	6/29/1998	QC	NA	NA	NA	NA	Not Analyzed	7/10/1998	8/15/1998	Not Analyzed					
1WG00201	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	0	2.5	7/17/1998	7/10/1998	8/15/1998	7/17/1998	20.8U	1339	7.4B	4U	47.9U
1WG00301	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	0	2.5	7/18/1998	7/13/1998	8/15/1998	7/17/1998	20.8U	1519	6B	4U	47.9U
1WG00401	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	0	2.5	7/17/1998	7/9/1998	8/15/1998	7/17/1998	20.8U	1390	5.3B	4U	47.9U
1WG00501	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	0	2.5	7/18/1998	7/11/1998	8/15/1998	7/17/1998	20.8U	923	5.2B	4U	47.9U
1WG00502	NA/1/1/Unknown	6/30/1998	D4	795935.79	358237.07	0	2.5	Not Analyzed	7/12/1998	9/3/1998	7/17/1998	20.8U	1273	5.1B	4U	47.9U
1WG00601	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	5	7.5	7/20/1998	7/10/1998	8/15/1998	7/17/1998	20.8U	1623	4.3U	4U	47.9U
1WG00701	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	5	7.5	7/18/1998	7/11/1998	8/15/1998	7/17/1998	20.8U	1948	5.8B	4U	47.9U
1WG00801	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	5	7.5	7/17/1998	7/9/1998	8/15/1998	7/17/1998	20.8U	2335	12.6B	4U	47.9U
1WG00901	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	5	7.5	7/18/1998	7/12/1998	9/3/1998	7/17/1998	20.8U	1371	5.9B	4U	47.9U
1WG01001	10/1/1/Unknown	6/29/1998	A7	795943.80	358206.45	7.5	10	7/20/1998	7/10/1998	8/15/1998	7/17/1998	20.8U	1516	6.1B	4U	47.9U
1WG01101	10/1/1/Unknown	6/30/1998	B5	795955.13	358225.75	7.5	10	7/18/1998	7/11/1998	8/15/1998	7/17/1998	20.8U	2150	6.3B	4U	47.9U
1WG01201	10/1/1/Unknown	6/29/1998	C10	795899.37	358201.46	7.5	10	7/17/1998	7/10/1998	8/15/1998	7/17/1998	20.8U	2369	11.8B	4.3B	47.9U
1WG01301	10/1/1/Unknown	6/30/1998	D6	795935.79	358237.07	7.5	10	7/20/1998	7/12/1998	9/3/1998	7/17/1998	20.8U	1786	7B	4U	47.9U
1WG01401	NA/N/NA/	6/30/1998	D6	795935.79	358237.07	10	12.5	Samples Taken for Physical Properties Only								
1WG01501	NA/N/NA/	6/30/1998	D6	795935.79	358237.07	15	17.5	Samples Taken for Physical Properties Only								
1WG01601	NA/N/NA/	6/30/1998	D6	795935.79	358237.07	17.5	20	Samples Taken for Physical Properties Only								

Table H-47 (continued)

Sample ID	Dilution Factors TCLP VOCs/ VOCs/PCBs/ Metals	Sample Date	Grid	Northing (ft)	Easting (ft)	Interval (ft)	Date Analyzed				RCRA Metals	ug/L flag	ug/L flag	
							Min	Max	TCLP VOCs	CLP VOCs				
1WG00101	NA/1/1/NA	6/29/1998	QC	NA	NA	NA	Not Analyzed	7/10/1998	8/15/1998	8/15/1998	Not Analyzed			
1WG0 201	10 1/1/Unknown	6/25/1998	A7	'95923.80	3582(6.45	0	2.5	7/17/1998	8/15/1998	7/17/1998	0.14UJ	.2B	25.4UJ	
1WG00301	10 1/1/Unknown	6/30/1998	B5	'95915.13	3582(5.75	0	2.5	7/18/1998	7/13/1998	8/15/1998	0.14J	12.5B	25.4UJ	
1WG0 401	10 1/1/Unknown	6/25/1998	C10	'95895.37	3582(1.46	0	2.5	7/17/1998	7/9/1998	8/15/1998	0.14UJ	16.1B	25.4UJ	
1WG005K 1	10 1/1/Unknown	6/30/1998	D6	'95535.79	358237.07	0	2.5	7/18/1998	7/11/1998	8/15/1998	0.14UJ	9.9B	25.4UJ	
1WG00502	NA/1/1/Unknown	6/30/1998	D4	'95535.79	358237.07	0	2.5	Not Analyzed	7/12/1998	9/3/1998	7/17/1998	0.14UJ	8.5B	25.4UJ
1WG0 601	10 1/1/Unknown	6/25/1998	A7	'95943.80	3582(6.45	5	7.5	7/22/1998	7/10/1998	8/15/1998	0.14UJ	7.1B	25.4UJ	
1WG0 701	10 1/1/Unknown	6/30/1998	B5	'95915.13	3582(5.75	5	7.5	7/18/1998	7/11/1998	8/15/1998	0.14UJ	.8B	25.4UJ	
1WG008K 1	10 1/1/Unknown	6/25/1998	C10	'95895.37	3582(1.46	5	7.5	7/17/1998	7/9/1998	8/15/1998	0.14UJ	29.2B	25.4UJ	
1WG0 901	10 1/1/Unknown	6/30/1998	D6	'95535.79	358237.07	5	7.5	7/18/1998	7/12/1998	9/3/1998	0.18J	10.1B	25.4UJ	
1WG01001	10 1/1/Unknown	6/25/1998	A7	'95923.80	3582(6.45	7.5	10	7/20/1998	7/10/1998	8/15/1998	0.16J	16.9B	25.4UJ	
1WG01101	10 1/1/Unknown	6/30/1998	B5	'95915.13	3582(5.75	7.5	10	7/18/1998	7/11/1998	8/15/1998	0.14UJ	14.5B	25.4UJ	
1WG01201	10 1/1/Unknown	6/25/1998	C10	'95895.37	3582(1.46	7.5	10	7/17/1998	7/10/1998	8/15/1998	0.2J	25.2B	25.4UJ	
1WG01301	10 1/1/Unknown	6/30/1998	D6	'95535.79	358237.07	7.5	10	7/21/1998	7/12/1998	9/3/1998	0.34J	15.2B	25.4UJ	
1WG01401	NA/NA/NA/	6/30/1998	D6	'95535.79	358237.07	10	12.5	Sample Taken for Physical Properties Only						
1WG01501	NA/NA/NA/	6/30/1998	D6	'95935.79	358237.07	15	17.5	Samples Taken for Physical Properties Only						
1WG01601	NA/NA/NA/	6/30/1998	D6	'95535.79	358237.07	17.5	20	Sample Taken for Physical Properties Only						

TAN 1704
Valve Box Liquid

Table H-43. 2000 valve box liquid sample results.

Sample Number: TAN37201

Sample Location: TAN-1704 valve box

Matrix: Aqueous (liquid)

Analysis Type	Analyte	Result	Concentration Code/ Data Qualifier Code
TCLP Inorganic	Arsenic	170 ($\mu\text{g/L}$)	U
	Barium	37	B/U
	Cadmium	152	B
	Chromium	80	U
	Lead	380	U
	Selenium	220	U
	Silver	70	UJ
	Mercury	0.600	U
Radionuclide	Gross Alpha	8.50E+01 \pm 3.62E+01 (pCi/L)	J
	Sr-90	4.48E+05 \pm 1.38E+03	—
	Gross Beta	9.08E+05 \pm 3.62E+03	—
	Mn-54	1.75E+01 \pm 2.25E+01	U
	Co-58	-1.16E+01 \pm 2.47E+01	U
	Co-60	1.15E+02 \pm 1.37E+01	—
	Zn-65	8.97E+01 \pm 4.39E+01	J
	Nb-95	3.66E+01 \pm 2.63E+01	U
	Zr-95	-4.91E+01 \pm 4.47E+01	U
	Ru-103	-4.09E+02 \pm 1.54E+02	U
	Ru-106	-2.27E+03 \pm 7.74E+02	U
	Ag-108m	-1.71E+01 \pm 2.45E+01	U
	Ag-110m	3.36E+01 \pm 6.65E+01	U
	Sb-125	1.24E+02 \pm 4.04E+02	U
	Cs-134	1.08E+02 \pm 7.44E+01	U
	Cs-137	2.00E+05 \pm 3.04E+03	—
	Ce-144	1.50E+03 \pm 6.65E+02	—
	Eu-152	-1.10E+02 \pm 1.11E+02	U
	Eu-154	1.39E+02 \pm 6.67E+01	J
	Eu-155	-1.66E+02 \pm 2.97E+02	U

Table H-43. (continued).

Analysis Type	Analyte	Result	Concentration Code/ Data Qualifier Code
	Ra-226	8.26E+01±2.65E+02	U
	U-235	-2.72E+02±6.48E+02	U
	Am-241	4.27E+02±5.46E+02	U
Volatile Organics Compounds	Chloromethane	10 ($\mu\text{g/L}$)	U
	Vinyl chloride	10	U
	Bromomethane	10	U
	Chloroethane	10	U
	1,1-dichloroethene	10	U
	Carbon disulfide	10	U
	Methylene chloride	10	U
	Acetone	10	R
	Trans-1,2- dichloroethene	10	U
	1,1-dichloroethane	10	U
	Cis-1,2-dichloroethene	10	U
	Chloroform	10	U
	Carbon tetrachloride	10	U
	1,1,1-trichloroethane	10	U
	2-butanone	10	U
	Benzene	10	U
	1,2-dichloroethane	10	U
	Trichloroethene	7	J
	1,2-dichloropropane	10	U
	Bromodichloromethane	10	U
	Cis-1,3- dichloropropene	10	U
	Toluene	10	U
	Tetrachloroethene	10	U
	4-methyl-2-pentanone	10	U
	Trans-1,3- dichloropropene	10	U
	2-hexanone	10	U
	1,1,2-trichloroethane	10	U

Table H-43. (continued).

Analysis Type	Analyte	Result	Concentration Code/ Data Qualifier Code
	Dibromochloromethane	10	U
	Chlorobenzene	10	U
	Ethylbenzene	10	U
	M,p-xylenes	10	U
	Styrene	10	U
	Bromoform	10	U
	1,1,2,2-tetrachloroethane	10	U
Volatile Organics (TCLP)	Vinyl chloride	100 ($\mu\text{g/L}$)	UJ
	1,1-dichloroethene	100	UJ
	Chloroform	100	UJ
	Carbon tetrachloride	100	UJ
	2-butanone	100	UJ
	Benzene	100	UJ
	1,2-dichloroethane	100	UJ
	Trichloroethene	100	UJ
	Tetrachloroethene	100	UJ
	Chlorobenzene	100	UJ
	1,4-dichlorobenzene	100	UJ
Semivolatile Organics	Pyridine	100 ($\mu\text{g/L}$)	U
	1,4-dichlorobenzene	100	U
	2-methylphenol	100	U
	Hexachloroethane	100	U
	Nitrobenzene	100	U
	Hexachlorobutadiene	100	U
	2,4,6-Trichlorophenol	100	U
	2,4,5-trichlorophenol	100	U
	2,4-dinitrotoluene	100	U
	Hexachlorobenzene	100	U
	Pentachlorophenol	500	U
	3&4-methylphenol	100	U

Table H-43. (continued).

Analysis Type	Analyte	Result	Concentration Code/ Data Qualifier Code
Semivolatile Organics (PCBs)	Aroclor-1016	100	U
	Aroclor-1221	200	U
	Aroclor-1232	100	U
	Aroclor-1242	100	U
	Aroclor-1248	100	U
	Aroclor-1254	100	U
	Aroclor-1260	100	U

VOC analysis:

R – Reject nondetected results for acetone, R, due to a continuing calibration relative response factor (RRF) less than 0.05.

U – Not detected, detection limit presented.

B – Blank contamination.

J – Indicates an estimated value.

– Accept data, but qualify positive results below the reporting limit as estimated, J, due to uncertainty near the detection limit.

Table H-44. Valve box liquid results duplicate sample.

Sample Number: TAN37202

Sample Location: TAN-1704 valve box

Matrix: Aqueous (liquid)

Analysis Type	Analyte	Result	Concentration Code/ Data Qualifier Code
TCLP Inorganic	Arsenic	170 ($\mu\text{g/L}$)	U
	Barium	35	B/U
	Cadmium	20	U
	Chromium	80	U
	Lead	380	U
	Selenium	220	U
	Silver	70	UJ
	Mercury	0.600	U
Radionuclide	Gross alpha	4.42E+01 \pm 3.06E+01	U
	Sr-90	4.08E+05 \pm 1.24E+03	
	Gross beta	8.59E+05 \pm 1.81E+03	
	Mn-54	-1.58E+01 \pm 1.30E+01	U
	Co-58	-4.81E+01 \pm 1.57E+01	U
	Co-60	1.07E+02 \pm 1.01E+01	
	Zn-65	2.17E+01 \pm 3.04E+01	U
	Nb-95	2.38E+00 \pm 1.66E+01	U
	Zr-95	3.42E+01 \pm 2.54E+01	U
	Ru-103	-5.52E+01 \pm 8.51E+01	U
	Ru-106	3.13E+02 \pm 4.45E+02	U
	Ag-108m	1.70E+01 \pm 1.33E+01	U
	Ag-110m	2.08E+01 \pm 4.41E+01	U
	Sb-125	-2.77E+00 \pm 2.43E+02	U
	Cs-134	6.64E+01 \pm 6.64E+01	U
	Cs-137	1.97E+05 \pm 2.52E+03	
	Ce-144	-1.38E+02 \pm 2.73E+02	U
	Eu-152	5.59E+00 \pm 7.21E+01	U
	Eu-154	-3.14E+01 \pm 4.40E+01	U
	Eu-155	1.46E+01 \pm 1.05E+02	U

Table H-44. (continued).

Analysis Type	Analyte	Result	Concentration Code/ Data Qualifier Code
	Ra-226	-1.03E+02±1.35E+02	U
	U-235	5.74E+01±2.68E+02	U
	Am-241	-1.50E+02±1.61E+02	U
Volatile Organics Compounds	Chloromethane	10 ($\mu\text{g/L}$)	U
	Vinyl chloride	10	U
	Bromomethane	10	U
	Chloroethane	10	U
	1,1-dichloroethene	10	U
	Carbon disulfide	10	U
	Methylene chloride	10	U
	Acetone	10	R
	Trans-1,2- dichloroethene	10	U
	1,1-dichloroethane	10	U
	Cis-1,2-dichloroethene	10	U
	Chloroform	10	U
	Carbon tetrachloride	10	U
	1,1,1-trichloroethane	10	U
	2-butanone	10	U
	Benzene	10	U
	1,2-dichloroethane	10	U
	Trichloroethene	6.9	J
	1,2-dichloropropane	10	U
	Bromodichloromethane	10	U
	Cis-1,3- dichloropropene	10	U
	Toluene	10	U
	Tetrachloroethene	10	U
	4-methyl-2-pentanone	10	U
	Trans-1,3- dichloropropene	10	U
	2-hexanone	9.1	J
	1,1,2-trichloroethane	10	U

Table H-44. (continued).

Analysis Type	Analyte	Result	Concentration Code/ Data Qualifier Code
	Dibromochloromethane	10	U
	Chlorobenzene	10	U
	Ethylbenzene	10	U
	M,p-xylenes	10	U
	Styrene	10	U
	Bromoform	10	U
	1,1,2,2-tetrachloroethane	10	U
Volatile Organics (TCLP)	Vinyl chloride	100 ($\mu\text{g/L}$)	UJ
	1,1-dichloroethene	100	UJ
	Chloroform	100	UJ
	Carbon tetrachloride	100	UJ
	2-butanone	100	UJ
	Benzene	100	UJ
	1,2-dichloroethane	100	UJ
	Trichloroethene	100	UJ
	Tetrachloroethene	100	UJ
	Chlorobenzene	100	UJ
	1,4-dichlorobenzene	100	UJ
Semivolatile Organics	Pyridine	100 ($\mu\text{g/L}$)	U
	1,4-dichlorobenzene	100	U
	2-methylphenol	100	U
	Hexachloroethane	100	U
	Nitrobenzene	100	U
	Hexachlorobutadiene	100	U
	2,4,6-Trichlorophenol	100	U
	2,4,5-trichlorophenol	100	U
	2,4-dinitrotoluene	100	U
	Hexachlorobenzene	100	U
	Pentachlorophenol	500	U
	3&4-methylphenol	100	U

Table H-44. (continued).

Analysis Type	Analyte	Result	Concentration Code/ Data Qualifier Code
Semivolatile Organics (PCBs)	Aroclor-1016	100	U
	Aroclor-1221	200	U
	Aroclor-1232	100	U
	Aroclor-1242	100	U
	Aroclor-1248	100	U
	Aroclor-1254	100	U
	Aroclor-1260	100	U

VOC analysis:

U – Not detected, detection limit presented.

R – Reject nondetected results for acetone, R, due to a continuing calibration relative response factor (RRF) less than 0.05.

J – Accept data, but qualify positive results below the reporting limit as estimated, J, due to uncertainty near the detection limit.

Appendix I

V-3 Overflow Prevention Plan

Engineering Design File

V-3 Liquid Level Contingency Design

Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho



Form 412.14
10/05/99
Rev. 02

431.02
09/19/2000
Rev. 08

ENGINEERING DESIGN FILE

Functional File No. _____
EDF No. EDF-ER-2647

1. Project File No.: N/A
2. Project/Task: V-Tank RD/RA
3. Subtask: N/A

4. Title: V-3 Liquid Level Contingency Design				
5. Summary: The liquid level in Tank V-3 at Test Area North has increased since 1996. This design file documents the contingency plan in the event the liquid level in V-3 exceeds a statistically based trigger value. Transferring liquid from V-3 to V-1 will mitigate the threat of V-3 exceeding its 10,000-gallon capacity and releasing contamination to the environment.				
6. Distribution (complete package): Distribution (summary package only):				
7. Review (R) and Approval (A) Signatures: (Minimum reviews and approvals are listed. Additional reviews/approvals may be added.)				
	R/A	Typed Name/Organization	Signature	Date
Performer	R	Jacob Harris, Environmental Engineer		
Reviewer	R	Janet Rodriguez, OU 1-10 Lead Engineer		
Requestor	A	Al Jantz, OU 1-10 Program Manager		
Approver	A	Jerry Shea, WAG 1 Project Engineer		

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Attachment 1—Figure 1—Tank V-3 Liquid Level Contingency Design

Attachment 2—Statistical Model for V-3 Level Prediction

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V-3 Liquid Level Contingency Design

1. INTRODUCTION

Tanks V-1, V-2, and V-3 are 10,000-gal stainless steel tanks that have been used to store radioactive liquid wastes generated at Test Area North since the early 1950s. In 1968, a large quantity of oil was discovered in Tank V-2, and it was taken out of service. The oil was removed from Tank V-2 in 1981, and the liquid in the three tanks (V-1, V-2, and V-3) was removed in 1982. The tanks have not been used since the 1980s, although liquids (i.e., rainwater, snowmelt) may have accidentally discharged to Tank V-3 during the 1980s (DOE-ID 1997).

The tanks are 10 ft in diameter and 18 ft long. Buried approximately 10 ft below grade, the tanks have 20-in. manholes that are accessible through 6-ft diameter culverts installed in 1981. In 2000, when rising liquid levels were measured in Tank V-3, a gasket was installed in the manhole to prevent the suspected infiltration of snowmelt and rainwater through the manhole.

2. PROBLEM IDENTIFICATION

Liquid level data of Tank V-3 have been collected since April 29, 1996 (see Attachment 3). The reported 18-ft length includes rounded ends. To calculate the volume from liquid height, a right cylinder lying horizontally, 17.1 ft long and 10 ft in diameter is the geometric shape that was used. This shape has a calculated volume of 10,047 gal. According to liquid level data taken March 29, 2001, Tank V-3 contains an estimated 8,082 gal.

A regression line was fit to the data and a 0.87 correlation coefficient was found thus indicating a good linear fit. The slope of the regression line indicates the tank gains approximately 425 gallons each year (see Figure 3-1).

There are two problems to be solved. First, statistically determine a liquid level value that triggers action. Second, design the actions to be implemented after the trigger value is reached.

3. PROBLEM SOLUTION – LIQUID LEVEL VALUE

To predict tank volume into the future, a regression line and a 99% upper predicted limit (UPL) was applied to the existing data. The forecasted 99% UPL reaches the 10,000-gal capacity of the tank February 9, 2004. Thus, based on existing data, it is 99% certain the tank will not reach its capacity before February 9, 2004 (see Figure 3-2).

The following approach is used to determine what volume level should trigger a transfer of liquid from V-3. The trigger value assumes one year of time to allow for inflow while the action is implemented. The current data indicates the 99% UPL will reach the 10,000-gal level on February 9, 2004, and, thus, one year of time to implement indicates February 9, 2003, is the best prediction of when action must be implemented. Using the predicted value from the linear regression, the best estimate of tank volume on that date will be 8,973 gal (see Attachment 2).

The prediction of tank volume is dependant on the linear regression model of the data. As data are collected in the future, the slope of the linear regression model may change. The change of slope will change the date of reaching the 10,000-gal 99% UPL and thus the trigger value one year prior. Each data point collected should be put into this statistical model to obtain the best real time analysis. After data are input into the model, a graph such as Figure 3-2 should be used to determine the “new” 10,000-gal 99% UPL prediction date. The trigger value will be the predicted value from the linear regression one year prior to the 10,000-gal 99% UPL prediction date.

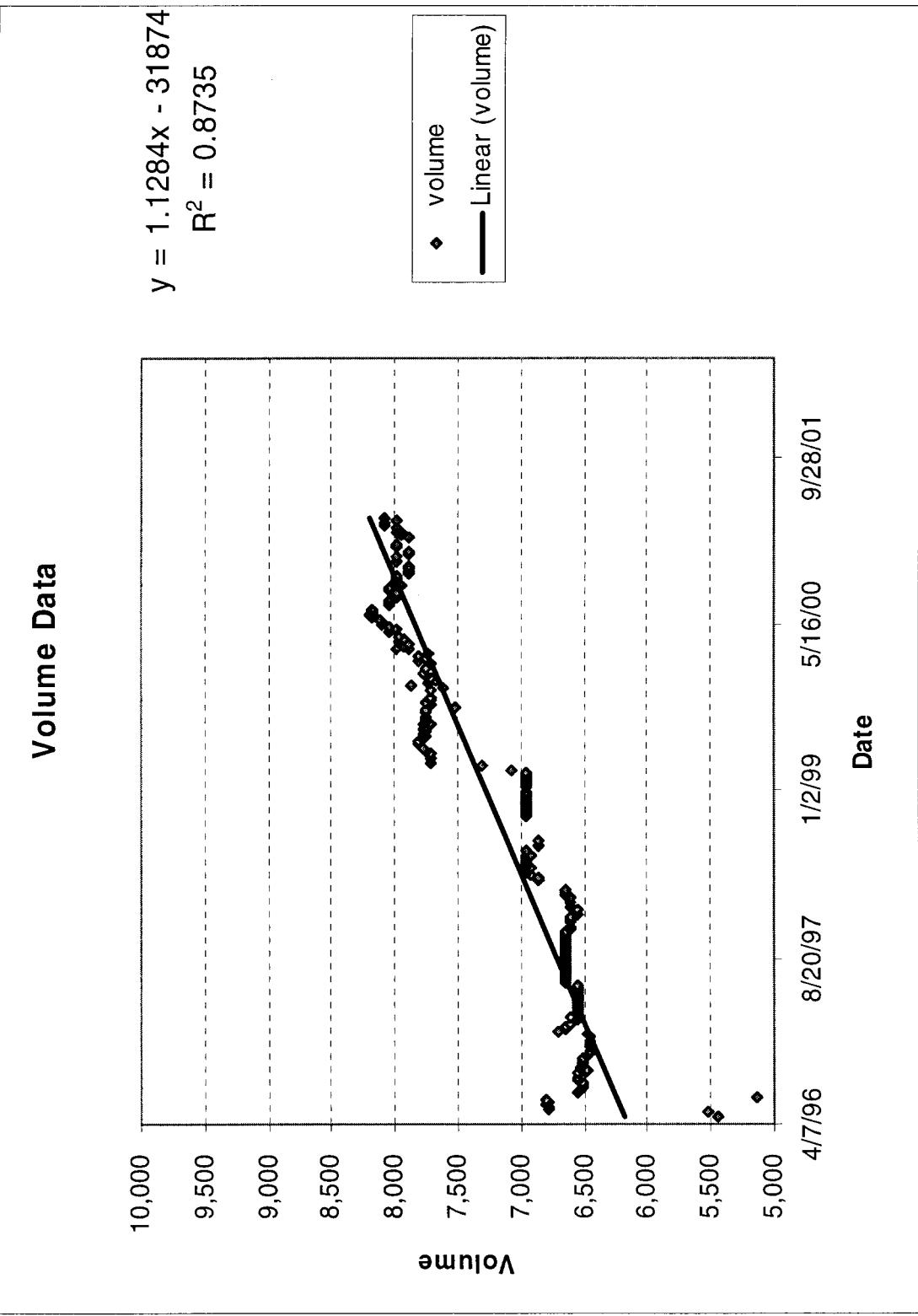


Figure 3-1. Volume data from Tank V-3.

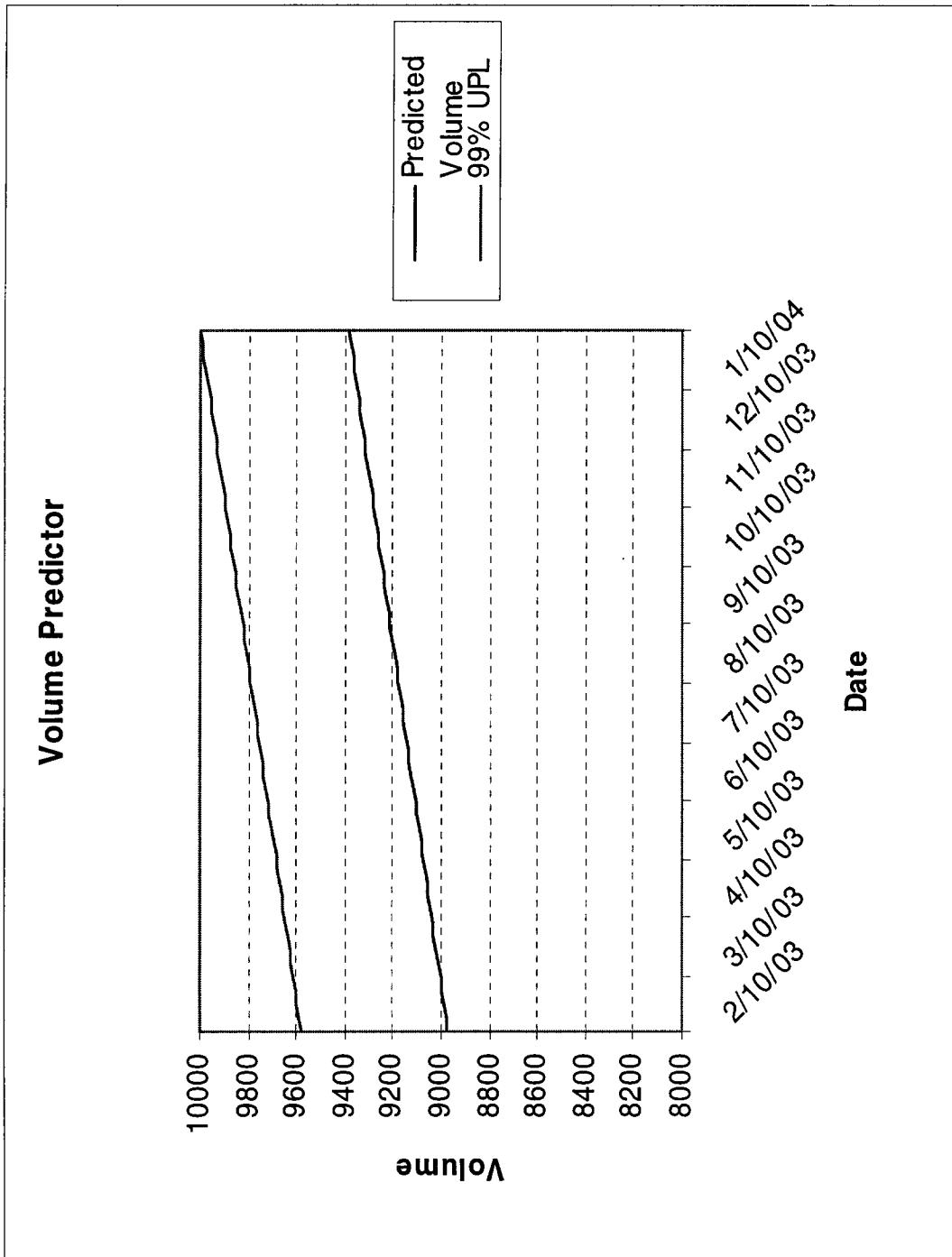


Figure 3-2. Volume predictor with 99% UPL.

4. PROBLEM SOLUTION – ACTIONS TO IMPLEMENT

If the trigger value has been reached and a decision has been made to take corrective action, liquid should be transferred out of V-3. Transferring liquid from V-3 will mitigate the threat of V-3 exceeding its 10,000-gal capacity and releasing contamination to the environment.

Liquid should be pumped from V-3 to a final volume of approximately 7,500 gal, which corresponds to 84 in. of liquid. Based on the current linear regression, 7,500 gal would allow more than 5 years of the 425-gal per year increase. Five years would allow adequate time for the remedial action to permanently address the V-Tank site.

Tank V-1 is the recommended location to store the liquid from V-3. The 1,430-gal level measured in V-1 has been very consistent, it contains the lowest volume of the three tanks. Using a tank instead of waste containers avoids the issue of waste storage location and procurement of waste containers. Tank V-1 will contain a final volume of 2,900 gal when V-3 is pumped from 8,973 gal to 7,500 gal.

4.1 Equipment

The following section describes the equipment necessary to implement this corrective action should it be required. Each item is listed in Table 4-1, and key items are discussed below.

Table 4-1. Equipment required for liquid transfer.

Equipment	Quantity	Model/Type
Flange funnel ^a	2	Fabricated at Central Facilities Area (CFA)
Peristaltic pump ^a	1	Watson-Marlow 704S/R, 8.8 gpm max
Generator ^a	1	240 Volt, 60 Hz, 2.1 Amps cr greater
Peristaltic pump tubing ^a	1	Watson-Marlow Marprene #92, 1-in. bore, 60-ft length
Flange gaskets	2	27.5-in. diameter, 6-bolt pattern, RTV Neoprene 1/4 in. from Paramount Supply, Idaho Falls
Cam and groove coupling, Type A-adapter, NPT female	2	1-in. inside diameter
Hose clamp, smooth band worm drive	2	6-in. length
Cam and groove coupling, Type C-coupler, hose shank	2	1-in. inside diameter
Cam and groove cap	2	1-in. inside diameter
Plastic sheeting	1	3- by 3-ft piece
Sleeving for power cord	1	60-ft length
240-volt power cord	1	As required

a. Description and function are given in the following subsections.

4.1.1 Flange Funnel

The flange funnel will draw liquid from the top of the tank to prevent liquid disturbance near the sludge heel. The sludge heel on bottom of Tank V-3 is easily suspended, and mixing solid materials between tanks should be minimized. The length of the flange funnel inlet pipe is fabricated to leave 7,500 gal remaining in the tank. The drain hole in the middle of the flange funnel is designed to return any drips from the cam and groove connection to the tank (see Attachment 1, Figure 1 for flange funnel details).

4.1.2 Peristaltic Pump

The peristaltic pump is specified because it will not contact any liquid waste and will not require internal decontamination. The Watson-Marlow 704S/R pump will take less than 7 hours of pumping time to pump to 7,500 gal (see Attachment 4 for pump details).

4.1.3 Generator

A generator may be required to run the pump if another source of power is not available or practical. The power requirement for the pump is used to determine the power output requirements for the generator. The pump requires 240 volt, 60 Hz, and 2.1 amps. Any generator that meets these requirements can be used (see Attachment 4 for pump details).

4.1.4 Peristaltic Pump Tubing

The specified Watson-Marlow peristaltic pump tubing is designed to be used with the Watson-Marlow peristaltic pump. The Marprene tubing has a wide range of chemical, temperature, and pressure compatibility. The tubing will be continuous from V-3 to V-1 and will not require secondary containment per 40 Code of Federal Regulations 264.193(f).

4.1.5 Miscellaneous Equipment

The miscellaneous equipment required for this action is all commercially available. The American Society for Testing and Materials (ASTM) or MIL specifications are included on the design drawing (see Attachment 1, Figure 1 for miscellaneous equipment details).

4.2 Work Procedure

The steps listed should be used as a starting point for the work control process and to gain an understanding of how the equipment relates to the work steps. The detailed steps to complete this work are as follows:

1. Have funnel flange fabricated and quality inspected at the Central Facilities Area (CFA) (see Attachment 1, Figure 1).
2. Install cam and groove coupling, type C-coupler, hose shank at both ends of the tubing (see Attachment 1, Figure 1).
3. Remove the wooden lid from the V-1 manhole.
4. Unbolt and remove the existing flange cover and gasket.
5. Set the new gasket in place.

6. Set the flange funnel in place, align holes, and bolt securely.
7. Connect the tubing to the cam and groove coupling, type A-adapter on the flange funnel.
8. Remove the wooden lid from the V-3 manhole.
9. Lower the pump down the manhole and place it on top of the 3- by 3-ft plastic sheeting next to the 20-in. flange.
10. Unbolt and remove the existing flange cover and gasket.
11. Set the new gasket in place.
12. Set the flange funnel in place, align holes, and bolt securely.
13. Connect the tubing to the cam and groove coupling, type A-adapter, on the flange funnel.
14. Place the tubing in the peristaltic pump per the manufacturer's instructions.
15. Verify flange funnels and cam and groove connections are securely in place.
16. Verify the tubing is correctly installed in the peristaltic pump.
17. Turn the pump on and set to the maximum flow rate.
18. Inspect the tubing and cam and groove couplings for leaks.
19. Inspect liquid flow into V-1 at 10-minute intervals until the flow stops.

Note: The pump and the tubing will not be damaged if allowed to run dry.
20. Turn pump off and remove the tubing from the pump.

Note: Do not disconnect the tubing from the flange funnel.
21. Remove the pump from the V-3 manhole.
22. Wait 2 minutes to allow the tubing to drain into the tanks.
23. Disconnect the cam and groove coupling from the flange funnel in V-1, and connect the cam and groove cap to prevent drips.
24. Using the existing bolts and washers, bolt the existing gasket and flange cover over the flange funnel in V-1.

Note: The gasket and flange cover will fit over the flange funnel.
25. Lift the tubing 6 ft above ground for 2 minutes to drain any liquid from the tubing into V-3.
26. Disconnect the cam and groove coupling from the flange funnel in V-3, and connect the cam and groove cap to prevent drips.

27. Using the existing bolts and washers, bolt the existing gasket and flange cover over the flange funnel in V-1.

Note: The gasket and flange cover will fit over the flange funnel.

28. Replace the wooden lid from V-1 and V-3.
29. Place the tubing, personal protective equipment, plastic sheeting, and sleeving from the power cord into the waste container designated by Waste Generator Services.

4.3 Waste Management

The waste generated during this activity will be less than one 55-gal drum. All contamination will be F-001 listed, Rad waste. The concentration of polychlorinated biphenyls in the liquid of V-3 is <50 ppm according to the analytical data, see Table 4-2, and the waste will not be Toxic Substances Control Act-regulated.

The contaminated items that require disposal at this time are as follows:

- 60-ft tubing with cam and groove caps
- Personal protective equipment
- 3- by 3-ft plastic sheeting
- 60-ft sleeving for power cord.

The pump does not contact any liquid waste and the plastic sheeting prevents contact with the soil. The flange funnel and connecting hardware will not be removed and are not a waste until disposed during the final remedial action of the V-Tanks.

Table 4-2. 1996 polychlorinated biphenyl sampling and analysis results for the liquid phase in Tanks V-1, V-2, and V-3.

Analyte	Concentration by Sample ID (Tank ID in parentheses) (ug/L) ^a				
	2CB101014V (V-1)	2CB108014V (V-1)	2CB201014V (V-2)	2CB206014V (V-2)	2CB307018V (V-3)
Aroclor-1016	U (100) ^b	U (100)	U (100)	U (100)	U (100)
Aroclor-1221	U (200)	U (200)	U (200)	U (200)	U (200)
Aroclor-1232	U (100)	U (100)	U (100)	U (100)	U (100)
Aroclor-1242	U (100)	U (100)	U (100)	U (100)	U (100)
Aroclor-1248	U (100)	U (100)	U (100)	U (100)	U (100)
Aroclor-1254	U (100)	U (100)	U (100)	U (100)	U (100)
<u>Aroclor-1260</u>	U (100)	U (100)	U (100)	U (100)	U (100)

a. Analysis performed on liquid portion of samples following gravity filtration; data validation level "C."

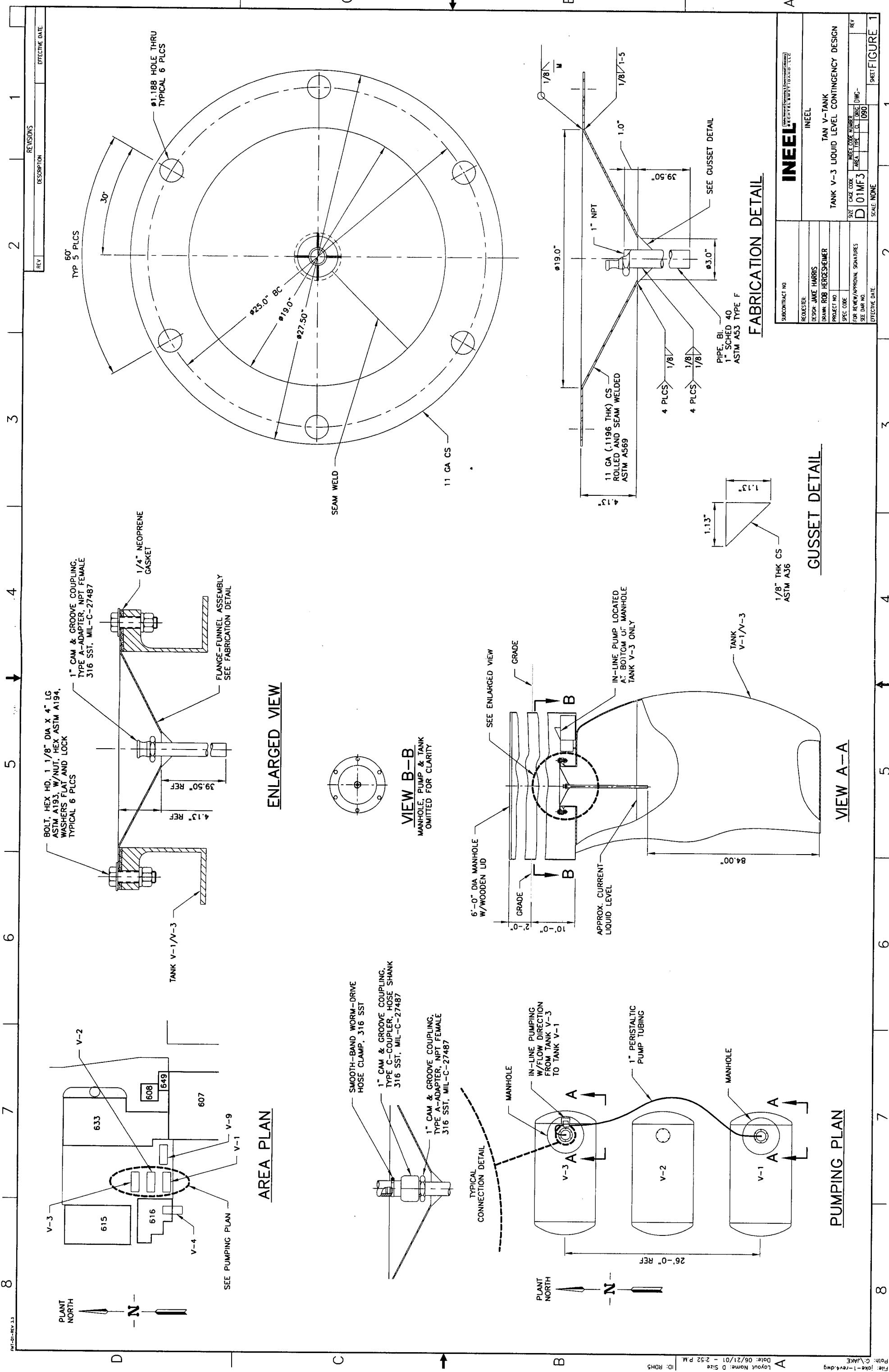
b. U - not detected, detection limit given in parentheses.

5. REFERENCE

DOE-ID, 1997, *Comprehensive Remedial Investigation/Feasibility Study (RI/FS) for the Test Area North (TAN) Operable Unit (OU) 1-10 at the Idaho National Engineering and Environmental Laboratory*, U.S. Department of Energy Idaho Operations Office, DOE/ID-10557, November.

Attachment 1

Figure 1 - Tank V-3 Liquid Level Contingency Design



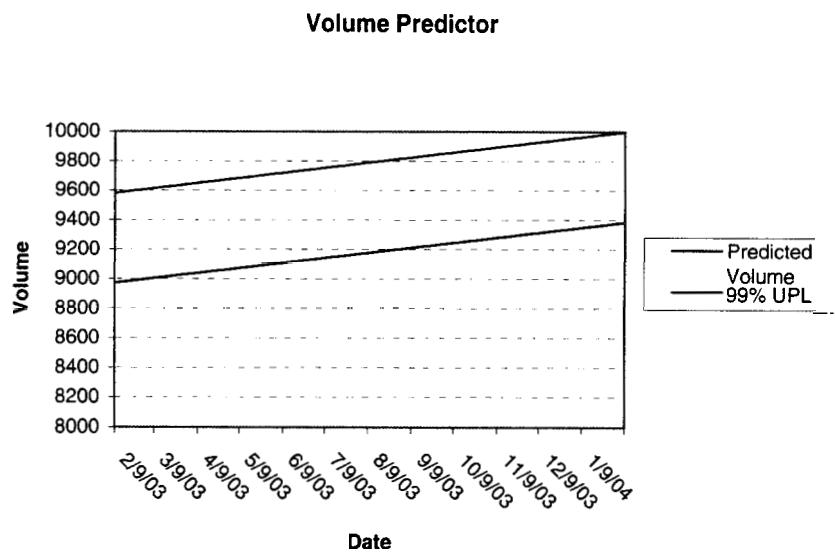
Attachment 2

Statistical Model for V-3 Level Prediction

One Year Prior to 10,000 Gallon 99% UPL
(establishes trigger value)

Starting Date: 2/9/03

Date	Predicted Vol	99% UPL	Date	Predicted Vol	99% UPL
2/9/03	8972	9581	8/17/03	9186	9798
2/16/03	8980	9589	8/24/03	9193	9806
2/23/03	8988	9597	8/31/03	9201	9814
3/2/03	8996	9605	9/7/03	9209	9822
3/9/03	9004	9613	9/14/03	9217	9830
3/16/03	9012	9621	9/21/03	9225	9838
3/23/03	9020	9629	9/28/03	9233	9846
3/30/03	9028	9637	10/5/03	9241	9854
4/6/03	9035	9645	10/12/03	9249	9862
4/13/03	9043	9653	10/19/03	9257	9870
4/20/03	9051	9661	10/26/03	9265	9878
4/27/03	9059	9669	11/2/03	9272	9886
5/4/03	9067	9677	11/9/03	9280	9894
5/11/03	9075	9685	11/16/03	9288	9902
5/18/03	9083	9694	11/23/03	9296	9910
5/25/03	9091	9702	11/30/03	9304	9918
6/1/03	9099	9710	12/7/03	9312	9926
6/8/03	9107	9718	12/14/03	9320	9934
6/15/03	9114	9726	12/21/03	9328	9942
6/22/03	9122	9734	12/28/03	9336	9950
6/29/03	9130	9742	1/4/04	9344	9958
7/6/03	9138	9750	1/11/04	9351	9966
7/13/03	9146	9758	1/18/04	9359	9974
7/20/03	9154	9766	1/25/04	9367	9982
7/27/03	9162	9774	2/1/04	9375	9990
8/3/03	9170	9782	2/8/04	9383	9998
8/10/03	9178	9790	2/15/04	9391	10006



Attachment 3
Spreadsheet – V-3 Volume Data

V-3 Volume Data

Tank Length*	17.1 ft
Tank Radius	5 ft
Tank Capacity**	10,000 gal

*Geometric shape for calculating volume is a right cylinder laying horizontally.

**Calculated capacity is 10,046 gallons.

Observation	Date	Measurement		Volume (gallons)
		Level (Inches)	Level (Feet)	
1	4/29/96	64	5.33	5449
2	5/15/96	64.75	5.40	5529
3	5/22/96	76.75	6.40	6785
4	5/30/96	76.75	6.40	6785
5	6/5/96	77	6.42	6811
6	6/12/96	76.75	6.40	6785
7	6/19/96	77	6.42	6811
8	6/27/96	61	5.08	5130
9	7/10/96	74.5	6.21	6554
10	7/17/96	74.25	6.19	6528
11	7/25/96	74	6.17	6502
12	7/31/96	74	6.17	6502
13	8/7/96	74	6.17	6502
14	8/13/96	74.5	6.21	6554
15	8/22/96	74.5	6.21	6554
16	8/28/96	74	6.17	6502
17	8/28/96	74	6.17	6502
18	9/4/96	74.5	6.21	6554
19	9/11/96	74	6.17	6502
20	9/18/96	73.75	6.15	6476
21	9/25/96	74.25	6.19	6528
22	10/2/96	74	6.17	6502
23	10/8/96	74	6.17	6502
24	10/16/96	74	6.17	6502
25	10/23/96	74	6.17	6502
26	10/30/96	73.75	6.15	6476
27	11/7/96	73.5	6.13	6450
28	11/13/96	73.5	6.13	6450
29	11/27/96	73.5	6.13	6450
30	12/4/96	73.5	6.13	6450
31	12/11/96	73.5	6.13	6450
32	12/24/96	73.5	6.13	6450
33	1/2/97	73.75	6.15	6476
34	1/8/97	76	6.33	6708
35	1/15/97	75.5	6.29	6657
36	1/22/97	75.5	6.29	6657
37	1/29/97	75	6.25	6605
38	2/13/97	74.5	6.21	6554
39	2/19/97	75	6.25	6605
40	2/26/97	74.5	6.21	6554
41	3/5/97	74.5	6.21	6554

V-3 Volume Data

Observation	Measurement Date	Level (Inches)	Level (Feet)	Volume (gallons)
42	3/12/97	74.5	6.21	6554
43	3/19/97	74.5	6.21	6554
44	3/27/97	74.5	6.21	6554
45	4/3/97	74.5	6.21	6554
46	4/10/97	74.5	6.21	6554
47	4/16/97	74.5	6.21	6554
48	4/23/97	74.5	6.21	6554
49	4/30/97	74.5	6.21	6554
50	5/8/97	74.5	6.21	6554
51	5/14/97	74.5	6.21	6554
52	5/21/97	74.5	6.21	6554
53	5/28/97	74.5	6.21	6554
54	6/4/97	75.5	6.29	6657
55	6/11/97	75.5	6.29	6657
56	6/18/97	75.5	6.29	6657
57	6/26/97	75.5	6.29	6657
58	7/2/97	75.5	6.29	6657
59	7/9/97	75.5	6.29	6657
60	7/17/97	75.5	6.29	6657
61	7/28/97	75.5	6.29	6657
62	7/30/97	75.5	6.29	6657
63	8/6/97	75.5	6.29	6657
64	8/13/97	75.5	6.29	6657
65	8/21/97	75.5	6.29	6657
66	8/28/97	75.5	6.29	6657
67	9/4/97	75.5	6.29	6657
68	9/10/97	75.5	6.29	6657
69	9/18/97	75.5	6.29	6657
70	9/25/97	75.5	6.29	6657
71	10/1/97	75.5	6.29	6657
72	10/7/97	75.5	6.29	6657
73	10/16/97	75.5	6.29	6657
74	10/22/97	75.5	6.29	6657
75	10/30/97	75.5	6.29	6657
76	11/5/97	75.5	6.29	6657
77	11/12/97	75	6.25	6605
78	11/19/97	75	6.25	6605
79	12/3/97	75	6.25	6605
80	12/10/97	75	6.25	6605
81	12/18/97	75	6.25	6605
82	12/24/97	74.5	6.21	6554
83	1/12/98	74.5	6.21	6554
84	1/15/98	75	6.25	6605
85	1/20/98	75	6.25	6605
86	1/28/98	75	6.25	6605
87	2/4/98	75	6.25	6605
88	2/16/98	75	6.25	6605
89	2/23/98	75.5	6.29	6657

V-3 Volume Data

Observation	Measurement Date	Level (Inches)	Level (Feet)	Volume (gallons)
90	3/4/98	75.5	6.29	6657
91	3/12/98	75.5	6.29	6657
92	4/6/98	77.5	6.46	6862
93	4/7/98	77.5	6.46	6862
94	4/15/98	77.5	6.46	6862
95	4/21/98	78	6.50	6913
96	4/29/98	78.5	6.54	6964
97	5/5/98	78.5	6.54	6964
98	5/13/98	78	6.50	6913
99	5/19/98	78.5	6.54	6964
100	5/26/98	78.5	6.54	6964
101	6/3/98	78.5	6.54	6964
102	6/10/98	78.5	6.54	6964
103	6/16/98	78.5	6.54	6964
104	6/22/98	78	6.50	6913
105	7/2/98	78.5	6.54	6964
106	7/22/98	77.5	6.46	6862
107	7/30/98	77.5	6.46	6862
108	8/5/98	77.5	6.46	6862
109	10/15/98	78.5	6.54	6964
110	10/20/98	78.5	6.54	6964
111	10/29/98	78.5	6.54	6964
112	11/4/98	78.5	6.54	6964
113	11/10/98	78.5	6.54	6964
114	11/18/98	78.5	6.54	6964
115	11/25/98	78.5	6.54	6964
116	12/1/98	78.5	6.54	6964
117	12/8/98	78.5	6.54	6964
118	12/16/99	78.5	6.54	6964
119	12/23/98	78.5	6.54	6964
120	1/7/99	78.5	6.54	6964
121	1/14/99	78.5	6.54	6964
122	1/25/99	78.5	6.54	6964
123	2/4/99	78.5	6.54	6964
124	2/11/99	78.5	6.54	6964
125	2/16/99	78.5	6.54	6964
126	2/25/99	78.5	6.54	6964
127	3/4/99	79.5	6.63	7065
128	3/17/99	82	6.83	7315
129	3/24/99	86	7.17	7705
130	4/7/99	86	7.17	7705
131	4/19/99	86	7.17	7705
132	4/20/99	86	7.17	7705
133	4/27/99	86.5	7.21	7753
134	5/6/99	86.75	7.23	7777
135	5/20/99	87	7.25	7801
136	5/26/99	87	7.25	7801
137	6/3/99	86.75	7.23	7777

V-3 Volume Data

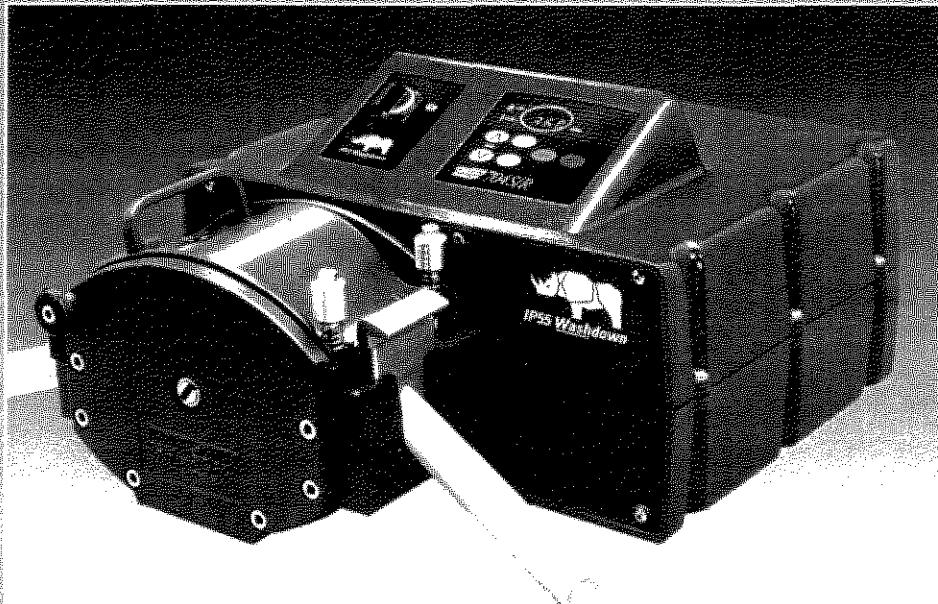
Observation	Measurement Date	Level (Inches)	Level (Feet)	Volume (gallons)
138	6/9/99	86.5	7.21	7753
139	6/17/99	86.75	7.23	7777
140	6/24/99	86.5	7.21	7753
141	7/1/99	86.75	7.23	7777
142	7/8/99	86.5	7.21	7753
143	7/15/99	86	7.17	7705
144	7/21/99	86.75	7.23	7777
145	7/28/99	86.5	7.21	7753
146	8/4/99	86.5	7.21	7753
147	8/11/99	86.5	7.21	7753
148	8/25/99	86.5	7.21	7753
149	8/31/99	86.5	7.21	7753
150	9/4/99	84	7.00	7512
151	9/13/99	86	7.17	7705
152	9/21/99	86.5	7.21	7753
153	9/30/99	86	7.17	7705
154	10/4/99	86	7.17	7705
155	10/26/99	86	7.17	7705
156	11/3/99	85	7.08	7609
157	11/10/99	87.75	7.31	7872
158	11/17/99	86.25	7.19	7729
159	11/24/99	86	7.17	7705
160	11/29/99	85.75	7.15	7681
161	12/6/99	86	7.17	7705
162	12/13/99	86.5	7.21	7753
163	12/21/99	86.75	7.23	7777
164	1/4/00	86.5	7.21	7753
165	1/17/00	86	7.17	7705
166	1/24/00	87	7.25	7801
167	2/2/00	86.5	7.21	7753
168	2/8/00	87	7.25	7801
169	2/15/00	86.25	7.19	7729
170	2/28/00	88	7.33	7896
171	3/2/00	89	7.42	7990
172	3/7/00	88.25	7.35	7919
173	3/16/00	88	7.33	7896
174	3/22/00	88.75	7.40	7966
175	3/29/00	88.25	7.35	7919
176	4/3/00	88.75	7.40	7966
177	4/19/00	89.5	7.46	8036
178	4/29/00	89	7.42	7990
179	5/4/00	89.5	7.46	8036
180	5/11/00	90.25	7.52	8105
181	5/17/00	90.25	7.52	8105
182	5/24/00	90.5	7.54	8128
183	6/1/00	91	7.58	8174
184	6/8/00	91.25	7.60	8197
185	6/15/00	91	7.58	8174

V-3 Volume Data

Observation	Measurement Date	Level (Inches)	Level (Feet)	Volume (gallons)
186	6/27/00	91	7.58	8174
187	7/13/00	89.5	7.46	8036
188	7/20/00	89.5	7.46	8036
189	7/25/00	89.5	7.46	8036
190	8/3/00	89	7.42	7990
191	8/10/00	89	7.42	7990
192	8/16/00	89	7.42	7990
193	8/23/00	89.5	7.46	8036
194	8/31/00	89.5	7.46	8036
195	9/6/00	88.5	7.38	7943
196	9/12/00	89.25	7.44	8013
197	9/20/00	89	7.42	7990
198	9/27/00	89	7.42	7990
199	10/4/00	89	7.42	7990
200	10/13/00	88	7.33	7896
201	10/19/00	88	7.33	7896
202	10/26/00	88	7.33	7896
203	11/1/00	88	7.33	7896
204	11/7/00	88	7.33	7896
205	11/16/00	89	7.42	7990
206	11/22/00	89	7.42	7990
207	11/30/00	89	7.42	7990
208	12/5/00	89	7.42	7990
209	12/14/00	88	7.33	7896
210	1/20/01	88	7.33	7896
211	1/2/01	89	7.42	7990
212	1/12/01	89	7.42	7990
213	1/30/01	88	7.33	7896
214	2/6/01	88.5	7.38	7943
215	2/13/01	88.5	7.38	7943
216	2/13/01	89	7.42	7990
217	2/28/01	89	7.42	7990
218	3/8/01	90	7.50	8082
219	3/14/01	90	7.50	8082
220	3/22/01	89	7.42	7990
221	3/29/01	90	7.50	8082

Attachment 4

**Watson-Marlow 704 S/R Pump Engineering and Technical
Data**



704S/R

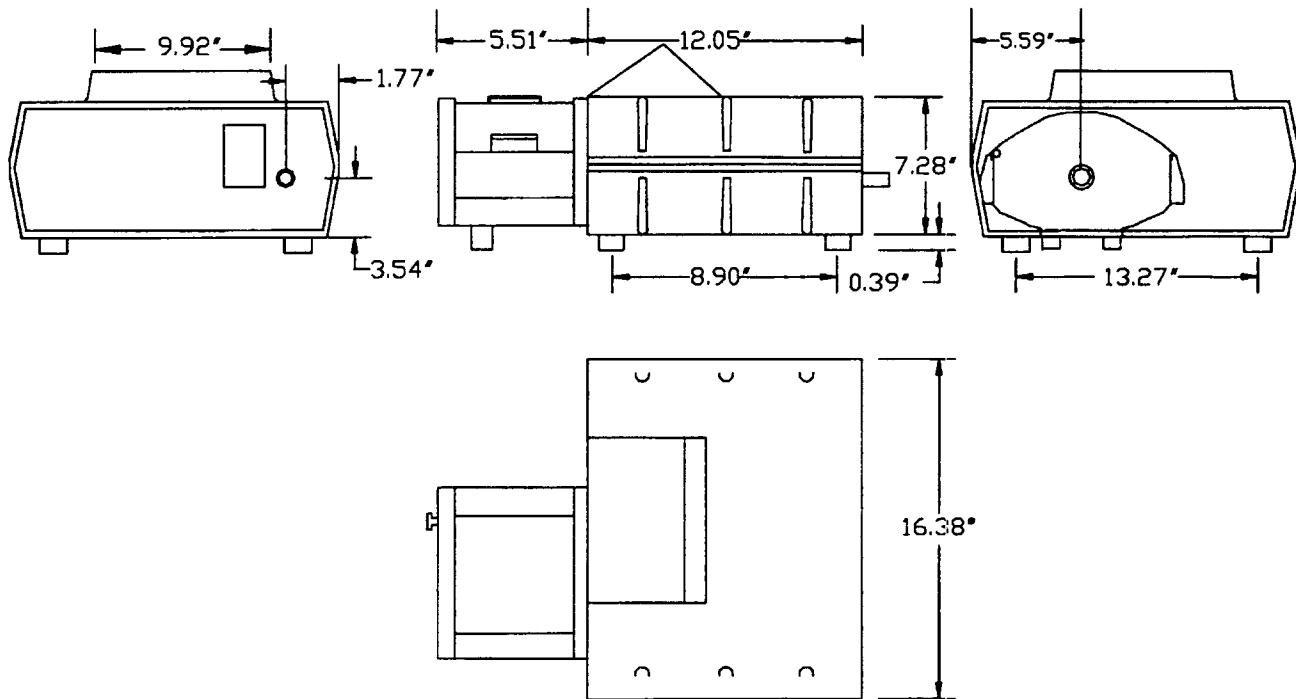
Technical Information and Features

- Flow rates from 0.03 - 8.8 GPM (8.4 to 2000 L/hr)
- PWM, microprocessor controlled closed loop speed regulation
- Manual control of stop/start, speed, direction, and priming via membrane keypad
- LED display of pumphead speed
- "Auto Restart", and "Keypad Lock" functions
- IP55 washdown enclosure
- Fitted with 701R driven roller pumphead
- Accepts tube sizes #190, 88, 189, 191, 92 (3/8"-1" bore and 3/16" wall)
- Equipped with magnet safety interlock switch to disable pump drive while pumphead is open

Flow rate ranges (ml/min)

Tube number	#190	#88	#189	#191	#92
Tube bore	9.6mm	12.7mm	15.9mm	19.0mm	25.4mm
	3/8"	1/2"	5/8"	3/4"	1"
Speed Range: 7.2-360rpm					
Liter/hr	8.4 - 420	15.6 - 780	22 - 1080	30 - 1500	40 - 2000
US gpm	0.03 - 1.9	0.07 - 3.4	0.10 - 4.8	0.13 - 6.6	0.18 - 8.8

Engineering and Technical Data



704S/R

Specifications

Shipping Weight: 77lbs
Maximum Power Consumption: 505VA
Supply: 100-120/220-240V 50/60Hz
Maximum Rotor Speeds: 360rpm
Enclosure: IP55
Operational Temperature Range: 0C to 40C
Control Range: 50:1
Noise: <78dBA at 1 meter
Standards: In Conformity with CE
Machinery Directive 89/392/EEC, EN60204-1
Low Voltage Directive 73/23/EEC, EN61010-1
EMC Directive 89/336/EEC, EN50081-1/EN50082-1
Product Code: 070.8201.000

Materials of Construction

Track: Epoxy coated aluminum
Rotor: Aluminum, Nylatron rollers
Drive: Epoxy coated pressure cast aluminum
Hardware: 316 Stainless Steel

Watson-Marlow Pumps

Bredel

Watson-Marlow, Inc.

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<http://www.bredel.com>