SOIL REMEDIATION
IMPLEMENTATION DESIGN REPORT

Prepared for

BLACK & DECKER (U.S.) INC.
Hampstead, Maryland

March 1997

Prepared by

ROY F. WESTON, INC.
West Chester, Pennsylvania

W.O. No. 02501-004-001-0310

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

LIST OF APPENDICES

LIST OF FIGURES

LIST OF FIGURES
(Continued)

LIST OF TABLES

SECTION 1
INTRODUCTION

1.1 OVERVIEW

A *Soil Remediation Plan* was prepared in August 1995 (WESTON, 1995) to meet the requirements of the Administrative Consent Order between the State of Maryland Department of the Environment (MDE) and Black & Decker (U.S.) Inc. This plan identified soil vapor extraction (SVE) and bioventing as the recommended remedial technologies for treatment of subsurface soil at the Black and Decker (U.S.) Inc. Hampstead, Maryland facility (the "site"). As prescribed by the plan, a pilot study was conducted to verify the effectiveness of SVE and bioventing at the site. This *Soil Remediation Implementation Design Report* presents the findings of the SVE and bioventing pilot study, and provides a conceptual design for full-scale implementation of the soil remediation.

1.2 OBJECTIVES

The objective of this *Soil Remediation Implementation Design Report* is to present and evaluate data obtained during the SVE and bioventing pilot study conducted at the site in accordance with the *Soil Remediation Plan* (WESTON, 1995). In addition, the data evaluation has been used as the basis for a conceptual design of a full-scale soil remediation system. With the concurrence of MDE, the full-scale system will be permitted, installed, and operated in accordance with the schedule provided in Subsection 5.7.

SECTION 2
SVE PILOT-SCALE SYSTEM INSTALLATION

The pilot-scale SVE system was installed between 30 October and 20 November 1996 following plans described in the Soil Remediation Plan (WESTON, 1995). Procedures used for system installation are described below:

Figure 2-1 shows the layout of the SVE system components, including extraction vents, subsurface pressure monitoring probes, trailer-mounted blower, vapor treatment system, and above-ground piping. As shown on Figure 2-1, the pilot study was conducted in two areas: the Tank Farm 2 area and the area beneath the northeast corner of the main building.

2.1 TANK FARM 2 VENT CONSTRUCTION

One extraction vent, designated as SVE-1, was located near the center of the Tank Farm 2 area as shown on Figure 2-1. This vent was installed inside a 12-inch diameter borehole which was constructed using hollow-stem auger drilling techniques. Subsurface soil samples were collected as discussed in Subsection 2.4. Borehole logs were also completed during vent construction and are included in Appendix A. The screened interval for SVE-1 extends from 16 to 25 feet (ft) below ground surface (bgs). This interval was selected based on previous investigations which defined the extent of vertical contamination in this area as discussed in the *Soil Remediation Plan* (WESTON, 1995). Construction details for SVE-1 are illustrated in Figure 2-2.

2.2 NORTHEAST CORNER OF BUILDING VENT CONSTRUCTION

Two pairs of nested extraction vents, SVE-2 and SVE-3, were installed beneath the concrete floor inside the northeast corner of the main building as shown in Figure 2-1. Each pair of nested vents was installed inside a 12-inch diameter borehole which was constructed using hollow-stem auger drilling techniques. Subsurface soil samples were collected as discussed in Subsection 2.4. Borehole logs were also completed during vent construction and are included in Appendix A. Boreholes were advanced to a depth of approximately 36 ft bgs, which corresponded to the first

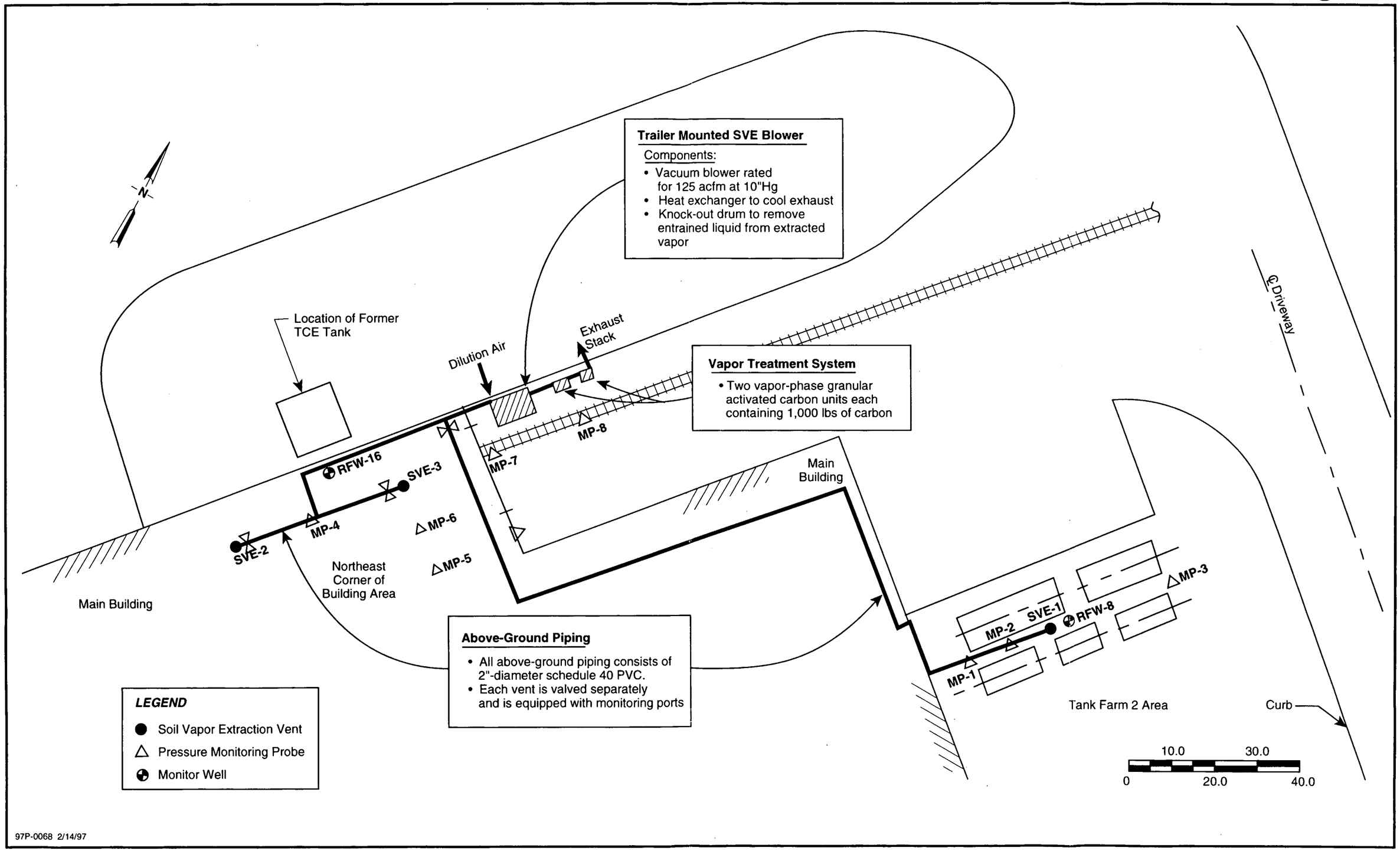


FIGURE 2-1 PILOT-SCALE SOIL VAPOR EXTRACTION SYSTEM LAYOUT

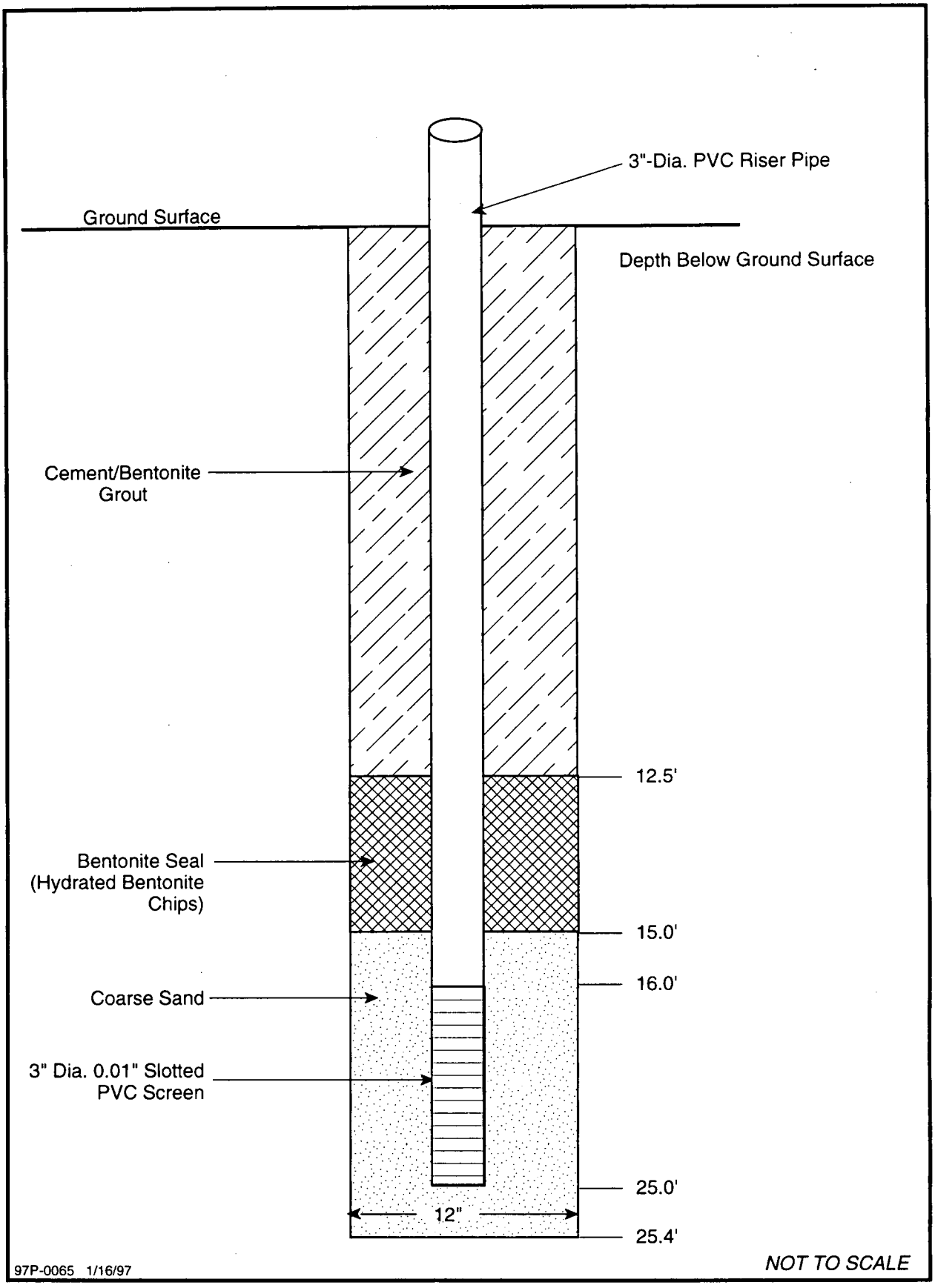


FIGURE 2-2 CONSTRUCTION DETAILS OF EXTRACTION VENT AT TANK FARM 2

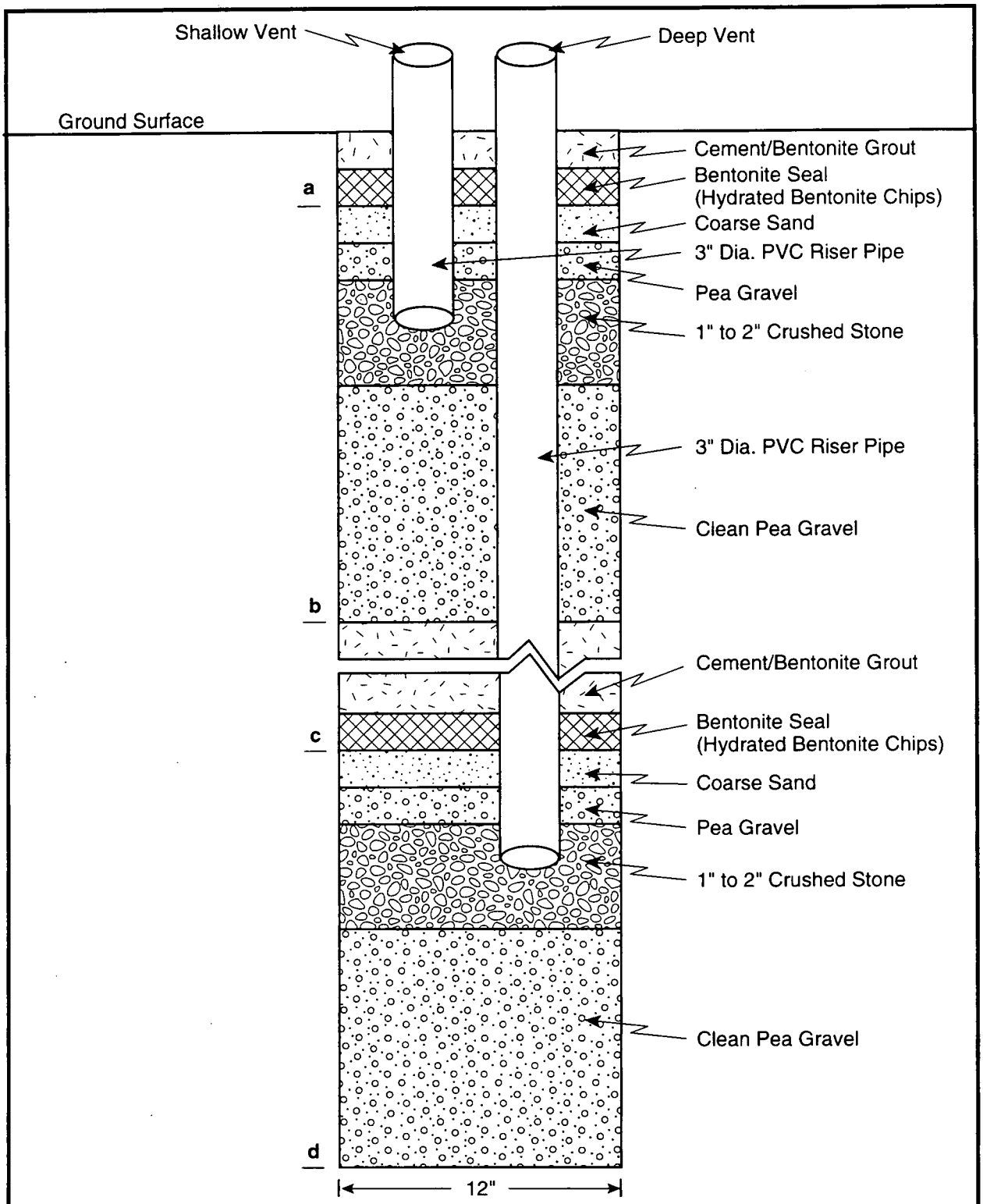
occurrence of groundwater. Termination of the boreholes at this depth, consistent with Subsection 4.2 of the *Soil Remediation Plan* (WESTON, 1995), was necessary to maximize the effective treatment zone while minimizing the collection of groundwater into the SVE system. One shallow and one deep vent (i.e., a nested vent pair) was installed in each borehole. Extraction vents were designated as SVE-2(S), SVE-2(D), SVE-3(S) and SVE-3(D) where the suffixes (S) and (D) denote shallow and deep vents, respectively. Construction details for the nested vents are illustrated on Figure 2-3.

2.3 SUBSURFACE PRESSURE MONITORING PROBE CONSTRUCTION

As shown in Figure 2-1, a total of eight pairs of nested subsurface monitoring probes were installed. Three of the probes, MP-1, MP-2, and MP-3 were constructed outside of the building in the Tank Farm 2 area. The remaining probes, MP-4, MP-5, MP-6, MP-7, and MP-8 were constructed in the vicinity of the northeast corner of the building. MP-7 and MP-8 were constructed outside the building beneath the ballast of the former railroad spur and MP-4, MP-5, and MP-6 were constructed inside the building through the concrete floor. Nested monitoring probes were installed inside 10-inch diameter boreholes which were constructed using hollow-stem auger drilling techniques. Subsurface soil samples were collected as discussed in Subsection 2.4. Borehole logs were also completed during probe construction and are included in Appendix A. The suffixes (S) and (D) were used to denote monitoring probes as shallow or deep, respectively. Construction details for the pressure monitoring probes are illustrated in Figure 2-4. All monitoring probes were equipped with quick-disconnect fittings. This allowed for vacuum gauges to be easily connected to the probes without a loss of negative pressure within the probe.

2.4 SUBSURFACE SOIL SAMPLING

Soil samples were collected from the soil encountered in each extraction vent and monitoring probe borehole using split spoon samplers. Each borehole was logged for physical characteristics (see boring logs in Appendix A) and the subsurface soil samples were field-screened for volatile organic compounds (VOCs) using a direct reading photo-ionization detector (PID). A summary

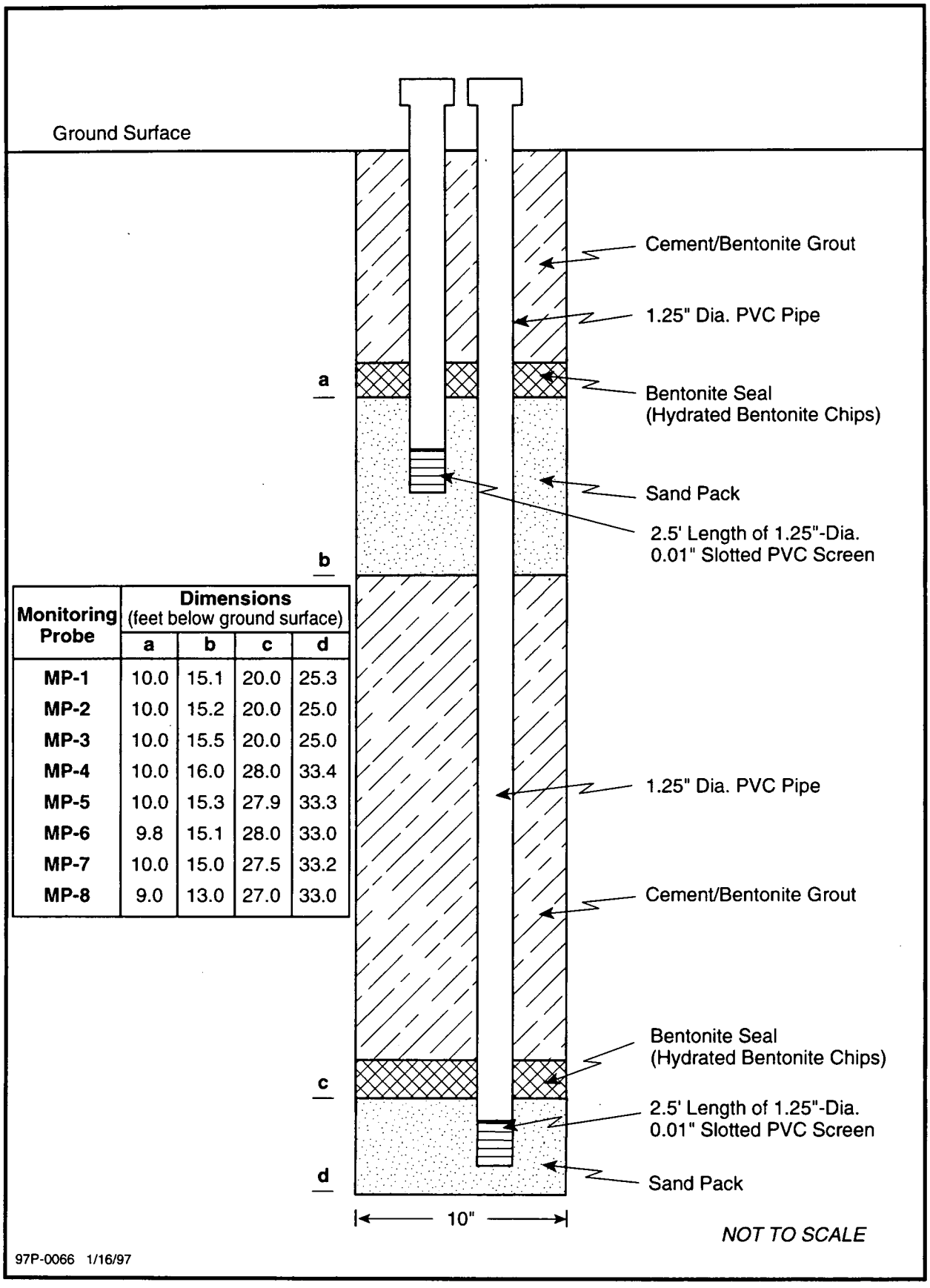


Extraction Vent	Dimensions (feet below ground surface)			
	a	b	c	d
SVE-2	4.5	19.5	24.5	36.3
SVE-3	4.5	19.2	24.5	36.4

97P-0067 1/15/97

NOT TO SCALE

FIGURE 2-3 CONSTRUCTION DETAILS OF NESTED EXTRACTION VENTS AT NORTHEAST CORNER OF BUILDING



Monitoring Probe	Dimensions (feet below ground surface)			
	a	b	c	d
MP-1	10.0	15.1	20.0	25.3
MP-2	10.0	15.2	20.0	25.0
MP-3	10.0	15.5	20.0	25.0
MP-4	10.0	16.0	28.0	33.4
MP-5	10.0	15.3	27.9	33.3
MP-6	9.8	15.1	28.0	33.0
MP-7	10.0	15.0	27.5	33.2
MP-8	9.0	13.0	27.0	33.0

FIGURE 2-4 CONSTRUCTION DETAILS OF NESTED PRESSURE MONITORING PROBES

of subsurface soil samples collected for laboratory analysis is presented in Table 2-1. A summary of laboratory data for subsurface soil samples is presented in Table 2-2. Laboratory data packages are included in Appendix B of this report.

2.4.1 Tank Farm 2

Subsurface soil samples were collected from three depth intervals from the SVE-1 borehole and were analyzed for VOCs and Total Petroleum Hydrocarbons (TPH). Samples for laboratory analysis were selected from soil borings within target depth ranges (i.e., 0 to 7 ft bgs, 7 to 15 ft bgs, 15 to 25 ft bgs) at depths which appeared to contain the highest VOC concentrations based on field screening and visual observation. Additional samples also were collected to determine nutrient availability, geophysical characteristics, microbial plate counts, and iron content of subsurface soil at SVE-1 (see Table 2-1).

Single subsurface soil samples were also collected from monitoring probe boreholes MP-1 and MP-2 and were analyzed for VOCs and TPH. Samples were collected from depth intervals which appeared to contain the highest VOC concentrations based on field screening and visual observation.

2.4.2 Northeast Corner of Building

Subsurface soil samples were collected from three depth intervals from both the SVE-2 and SVE-3 boreholes and were analyzed for VOCs and TPH. Samples for laboratory analysis were selected from soil borings within target depth ranges (i.e., 0 to 10 ft bgs, 10 to 20 ft bgs, 20 to 35 ft bgs) at depths which appeared to contain the highest VOC concentrations based on field screening and visual observation.

Single subsurface soil samples were also collected from monitoring probe boreholes MP-4, MP-5, MP-6, and MP-7 and were analyzed for VOCs and TPH. Samples were collected from depth intervals which appeared to contain the highest VOC concentrations based on field screening and visual observation.

Table 2-1
Summary of Subsurface Soil Samples
Black & Decker
Hampstead, Maryland

Vent/Probe ID	Sample ID	Sample Depth (ft bgs)	Analyses										
			VOC	TPH	Total Plate Count	Total Iron	Percent Moisture	TKN	pH	Alkalinity	Total Phos.	Hyd. Cond.*	Porosity*
Tank Farm 2													
SVE-1	SVE-1-005	2-5	X	X	X								
	SVE-1-009	7-9*										X	X
	SVE-1-011	9.0-10.8				X	X	X	X	X	X		
	SVE-1-013	11.0-12.3	X	X	X								
	SVE-1-015	13.0-15.0*										X	X
	SVE-1-017	15-16.8	X	X									
	SVE-1-019	17.0-18.8			X	X	X	X	X	X	X		
MP-1	MP-1-011	9.0-10.6	X	X									
MP-2	MP-2-011	9.0-10.5	X	X									
MP-3	NS	--											
Northeast Corner													
SVE-2	SVE-2-005	3.5-4.8	X	X									
	SVE-2-021	18.5-20.5	X	X									
	SVE-2-035	33.5-34.8	X	X									
SVE-3	SVE-3-011	8.5-10.4	X	X									
	SVE-3-020	18.5-20.0	X	X									
	SVE-3-036	34.0-35.3	X	X									
MP-4	MP-4-030	28.5-30.0	X	X									
MP-5	NS	--											
MP-6	MP-6-005	3.5-5.0	X	X									
MP-7	MP-7-031	29.0-30.3	X	X									
MP-8	NS	--											

Notes: ft bgs - feet below ground surface
VOC - Volatile organic compounds
TPH - Total petroleum hydrocarbons
TKN - Total Kjedahl nitrogen
Phos. - Phosphate
Hyd. Cond. - Hydraulic conductivity
NS - Not Sampled
* - Used Shelby Tubes

Table 2-2
Analytical Data Summary for Subsuface Soil
Black & Decker
Hampstead, Maryland

Analyte	Units	Sample ID/Depth (ft bgs)					
		SVE-1-005 2.0 to 5.0	SVE-1-009 7.0 to 9.0	SVE-1-011 9.0 to 10.8	SVE-1-013 11.0 to 12.3	SVE-1-019 17.0 to 18.8	SVE-1-017 15.0 to 16.8
Volatile Organic Compounds							
Methylene Chloride	ug/kg	**11 B**	NA	NA	**11 B**	NA	**14 B**
Acetone	ug/kg	**10 BJ**	NA	NA	**10 BJ**	NA	**8 BJ**
1,1-Dichloroethene	ug/kg	6 U	NA	NA	6 U	NA	6 U
1,2-Dichloroethene (total)	ug/kg	6 U	NA	NA	6 U	NA	6 U
Chloroform	ug/kg	6 U	NA	NA	6 U	NA	6 U
2-Butanone	ug/kg	12 U	NA	NA	12 U	NA	12 U
1,1,1-Trichloroethane	ug/kg	6 U	NA	NA	6 U	NA	6 U
Tricloroethene	ug/kg	**10**	NA	NA	**10**	NA	6 U
1,1,2-Trichloroethane	ug/kg	6 U	NA	NA	6 U	NA	6 U
Benzene	ug/kg	6 U	NA	NA	6 U	NA	6 U
2-Hexanone	ug/kg	12 U	NA	NA	12 U	NA	12 U
Tetrachloroethene	ug/kg	**130**	NA	NA	**190**	NA	6 U
Toluene	ug/kg	**8**	NA	NA	6 U	NA	**1 J**
Xylenes (total)	ug/kg	**3** J	NA	NA	6 U	NA	**1 J**
TPH/Inorganic Analyses							
% Solids	%	81.8	NA	83.5	79.9	84.6	84.8
Petroleum Hydrocarbons	mg/kg	**1320**	NA	NA	**118**	NA	**18.2**
Alkalinity	mg/kg	NA	NA	**150**	NA	**145**	NA
Total Kjedahl Nitrogen	mg/kg	NA	NA	**121**	NA	**115**	NA
pH	pH units	NA	NA	**7.4**	NA	**7.3**	NA
Phosphate as P - Total	mg/kg	NA	NA	**850**	NA	**884**	NA
Iron	mg/kg	NA	NA	**44200**	NA	**29900**	NA
Microbial Analyses							
Total plate count	(2)	**1100000**	NA	NA	**<12000**	**<12000**	NA
Geophysical Analyses							
Hydraulic conductivity	cm/sec	NA	**1.00E-06**	NA	NA	NA	NA
Intrinsic pemeability	darcys	NA	**1.04E-03**	NA	NA	NA	NA
Porosity	%	NA	**34.9 to 46.3** (3)	NA	NA	NA	NA

Notes: For Volatile Organic Compound (VOC) analyses, only those compounds detected are shown. Boldface type indicates chemical result above the detection limit.

(1) Sample collected using a 30-inch long shelby tube.

(2) Results expressed as a colony forming unit (cfu) per gram on a dry weight basis.

(3) Initial value prior to saturation and consolidation.

ft bgs = feet below ground surface
U = Not Detected
J = Detected below quantification limit
B = Detected in laboratory blank
NA = Not analyzed

Table 2-2 (continued)
Analytical Data Summary for Subsuface Soil
Black & Decker
Hampstead, Maryland

Analyte	Units	Sample ID/Depth (ft bgs)					
		MP-1-011 9.0 to10.6	MP-2-011 9.0 to 10.5	MP-2-011(DL) 9.0 to 10.5	SVE-2-005 3.5 to 4.8	SVE-2-021 18.5 to 20.5	SVE-2-035 33.5 to 34.8
Volatile Organic Compounds							
Methylene Chloride	ug/kg	**11 B**	**17 B**	**1900 B**	**9 B**	**9 B**	**6 B**
Acetone	ug/kg	**7 JB**	**35 B**	**4700 B**	**13 B**	12 U	12 U
1,1-Dichloroethene	ug/kg	6 U	**82**	NA	6 U	6 U	6 U
1,2-Dichloroethene (total)	ug/kg	6 U	**350**	**390 J**	6 U	6 U	6 U
Chloroform	ug/kg	6 U	**17**	NA	6 U	6 U	6 U
2-Butanone	ug/kg	11 U	**10 J**	NA	12 U	12 U	12 U
1,1,1-Trichloroethane	ug/kg	6 U	**E**	**3900**	6 U	6 U	6 U
Tricloroethene	ug/kg	6 U	**E**	**11000**	**4 J**	6 U	6 U
1,1,2-Trichloroethane	ug/kg	6 U	**20**	NA	6 U	6 U	6 U
Benzene	ug/kg	6 U	**7**	NA	6 U	6 U	6 U
2-Hexanone	ug/kg	11 U	**26**	NA	12 U	12 U	12 U
Tetrachloroethene	ug/kg	6 U	**E**	**33000**	6 U	6 U	6 U
Toluene	ug/kg	6 U	**10**	NA	6 U	6 U	6 U
Xylenes (total)	ug/kg	6 U	**6 U**	NA	6 U	6 U	6 U
TPH/Inorganic Analyses							
% Solids	%	90.8	81.7	NA	86.2	80.9	85.4
Petroleum Hydrocarbons	mg/kg	**11.1**	**80600**	NA	**13.2**	**13.1**	**8.8**
Alkalinity	mg/kg	NA	NA	NA	NA	NA	NA
Total Kjedahl Nitrogen	mg/kg	NA	NA	NA	NA	NA	NA
pH	pH units	NA	NA	NA	NA	NA	NA
Phosphate as P - Total	mg/kg	NA	NA	NA	NA	NA	NA
Iron	mg/kg	NA	NA	NA	NA	NA	NA
Microbial Analyses							
Total plate count	(2)	NA	NA	NA	NA	NA	NA
Geophysical Analyses							
Hydraulic conductivity	cm/sec	NA	NA	NA	NA	NA	NA
Intrinsic pemeability	darcys	NA	NA	NA	NA	NA	NA
Porosity	%	NA	NA	NA	NA	NA	NA

Notes: For Volatile Organic Compound (VOC) analyses, only those compounds detected are shown. Boldface type indicates chemical result above the detection limit.

(1) Sample collected using a 30-inch long shelby tube.

(2) Results expressed as a colony forming unit (cfu) per gram on a dry weight basis.

(3) Initial value prior to saturation and consolidation.

ft bgs = feet below ground surface
U = Not Detected
J = Detected below quantification limit
B = Detected in laboratory blank
NA = Not analyzed

Table 2-2 (continued)
Analytical Data Summary for Subsuface Soil
Black & Decker
Hampstead, Maryland

Analyte	Units	Sample ID/Depth (ft bgs)					
		SVE-3-011 8.5 to 10.4	SVE-3-020 18.5 to 20.0	SVE-3-036 34.0 to 35.3	MP-4-30 28.5 to 30.0	MP-6-005 3.5 to 5.0	MP-7-031 29.0 to 30.3
Volatile Organic Compounds							
Methylene Chloride	ug/kg	**8 B**	**11 B**	**9 B**	**9 B**	**8 B**	**11 B**
Acetone	ug/kg	**10 BJ**	**11 BJ**	**7 BJ**	12 U	11 U	**8 BJ**
1,1-Dichloroethene	ug/kg	6 U	6 U	6 U	6 U	6 U	6 U
1,2-Dichloroethene (total)	ug/kg	6 U	6 U	6 U	6 U	6 U	6 U
Chloroform	ug/kg	6 U	6 U	6 U	6 U	6 U	6 U
2-Butanone	ug/kg	12 U	13 U	12 U	12 U	11 U	12 U
1,1,1-Trichloroethane	ug/kg	6 U	6 U	6 U	6 U	6 U	6 U
Tricloroethene	ug/kg	6 U	**18**	6 U	**10**	6 U	6 U
1,1,2-Trichloroethane	ug/kg	6 U	6 U	6 U	**22**	6 U	6 U
Benzene	ug/kg	6 U	6 U	6 U	6 U	6 U	6 U
2-Hexanone	ug/kg	12 U	13 U	12 U	12 U	11 U	12 U
Tetrachloroethene	ug/kg	6 U	6 U	6 U	6 U	6 U	6 U
Toluene	ug/kg	6 U	6 U	6 U	6 U	6 U	6 U
Xylenes (total)	ug/kg	6 U	6 U	6 U	6 U	6 U	6 U
TPH/Inorganic Analyses							
% Solids	%	84.4	77.2	86.3	81.9	82.6	84.8
Petroleum Hydrocarbons	mg/kg	**8.5**	**13.2**	**9.6**	**19.9**	4 U	NA
Alkalinity	mg/kg	NA	NA	NA	NA	NA	NA
Total Kjedahl Nitrogen	mg/kg	NA	NA	NA	NA	NA	NA
pH	pH units	NA	NA	NA	NA	NA	NA
Phosphate as P - Total	mg/kg	NA	NA	NA	NA	NA	NA
Iron	mg/kg	NA	NA	NA	NA	NA	NA
Microbial Analyses							
Total plate count	(2)	NA	NA	NA	NA	NA	NA
Geophysical Analyses							
Hydraulic conductivity	cm/sec	NA	NA	NA	NA	NA	NA
Intrinsic pemeability	darcys	NA	NA	NA	NA	NA	NA
Porosity	%	NA	NA	NA	NA	NA	NA

Notes: For Volatile Organic Compound (VOC) analyses, only those compounds detected are shown. Boldface type indicates chemical result above the detection limit.

(1) Sample collected using a 30-inch long shelby tube.

(2) Results expressed as a colony forming unit (cfu) per gram on a dry weight basis.

(3) Initial value prior to saturation and consolidation.

ft bgs = feet below ground surface

U = Not Detected

J = Detected below quantification limit

B = Detected in laboratory blank

NA = Not analyzed

2.5 ABOVE-GROUND COMPONENTS

The layout and specifications for the above-ground components of the pilot-scale SVE system are shown on Figure 2-1. These components are briefly discussed in the following subsections.

2.5.1 Above-Ground Piping

Upon installation of the extraction vents and monitoring probes, the extraction vents were piped to a common manifold using 2-inch diameter Schedule 40 polyvinyl chloride (PVC) piping. Each extraction vent was equipped with a ball-valve to allow testing of individual vents or any combination of vents during test runs. These valves also made it possible to adjust the vacuum applied to individual vents during runs involving the simultaneous operation of multiple vents. The manifold was equipped with a dilution air valve just upstream of the blower intake. This valve allowed the system operating pressure to be adjusted and also prevented overload of the positive displacement blower.

2.5.2 Trailer-Mounted SVE Blower System

The trailer mounted SVE blower system included the following major components:

- Positive displacement vacuum blower rated for 125 actual cubic feet per minute (acfm) at a vacuum of 10 inches of mercury.
- Knock-out drum to remove entrained liquid from the extracted vapor.
- Air to air heat exchanger to cool blower exhaust prior to the vapor treatment system.

2.5.3 Vapor Treatment System

Extracted soil vapor was treated prior to emission using two, 1000-lb. granular activated carbon (GAC) bins connected in series.

SECTION 3
SVE PILOT STUDY EVALUATION

3.1 TEST RUN OVERVIEW

A total of 12 individual test runs were conducted at various operating pressures (vacuums) and vent configurations. Test Run Nos. 1 through 3 were conducted in the Tank Farm 2 area while Run Nos. 4 through 12 were conducted in the northeast corner of the building area. Test Run No. 12 was designed to determine the optimal operating conditions so that the SVE system could be adjusted for efficient VOC removal during sustained operations. Once these operating conditions were determined during Run No. 12, sustained operations were initiated using the final adjustments made at the end of Run No. 12 without interruption of SVE operation.

Physical parameters including static pressure, air flow, temperature, relative humidity, and relative VOC concentrations (collected using a direct reading flame ionization detector [FID]) were collected from several locations including:

- Extraction vent(s).
- Manifold upstream from blower.
- Dilution air pipe. (FID measurement not required at this location)
- Blower exhaust.

In addition, FID readings were periodically collected from the discharge port on both the primary and secondary carbon units. These ports were denoted as GAC1-OUT and GAC2-OUT, respectively. One air sample was collected at the end of each test run using 6-liter Summa canisters. These samples were collected from blower exhaust and were analyzed for VOCs by EPA Method TO-14

The test runs are summarized on Table 3-1. A summary of laboratory data for air samples is included on Table 3-2. VOC mass removal rates and total VOCs removed are summarized on Table 3-3 for each of the twelve test runs. Laboratory data packages are included in Appendix B. The SVE pilot study raw data are included in Tables 1 through 12 of Appendix C.

Table 3-1
Summary of Test Runs
Black & Decker
Hampstead, Maryland

Test Run	Configuration	Operating Pressure (inches of water)	Key Measurements	Air Samples Collected	Purpose
1	SVE-1 open	-40	Q, P, SP, OVA	AS01-OUT	To determine AP, ROI, MR, and Q at low vacuum.
2	SVE-1 open	-80	Q, P, SP, OVA	AS02-OUT	To determine AP, ROI, MR, and Q at moderate vacuum.
3	SVE-1 open	-135	Q, P, SP, OVA	AS03-OUT	To determine AP, ROI, MR, and Q at high vacuum.
4	SVE-3(S) open	-40	Q, P, ROI, OVA	AS04-OUT	To determine ROI, MR, and Q at low vacuum.
5	SVE-3(D) open	-40	Q, P, ROI, OVA	AS05-OUT	To determine ROI, MR, and Q at low vacuum.
6	SVE-3(S) open	-80	Q, P, SP, OVA	AS06-OUT	To determine AP, ROI, MR, and Q at moderate vacuum.
7	SVE-3(D) open	-80	Q, P, SP, OVA	AS07-OUT	To determine AP, ROI, MR, and Q at moderate vacuum.
8	SVE-2(S) open	-140	Q, P, SP, OVA	AS08-OUT	To determine AP, ROI, MR, and Q at high vacuum.
9	SVE-2(D) open	-140	Q, P, SP, OVA	AS09-OUT	To determine AP, ROI, MR, and Q at high vacuum.
10	SVE-3(S) open	-140	Q, P, SP, OVA	AS10-OUT	To determine AP, ROI, MR, and Q at high vacuum.
11	SVE-3(D) open	-140	Q, P, SP, OVA	AS11-OUT	To determine AP, ROI, MR, and Q at high vacuum.
12	SVE-3(D), SVE-3(S) SVE-2(D), SVE-2(S) open.	-40, -80, -125, -110	Q, P, SP, OVA	AS12-OUT	To determine optimal operating conditions.
SO	SVE-3(D), SVE-3(S) SVE-2(D), SVE-2(S) open.	-110	Q, P, SP, OVA	ASS01-OUT, ASS02-OUT, ASS03-OUT, ASS04-OUT	To determine steady-state mass removal rate and cumulative mass removal rate.

Notes: Q = Air Flowrate
P = Operating Pressure
SP = Subsurface Pressure
OVA = Organic Vapor Analyzer
AP = Air Permeability
ROI = Radius of Influence
MR = Mass Removal Rate
SO = Sustained Operations

Table 3-2
Summary of VOC Results for Air Samples
Black & Decker
Hampstead, Maryland

Sample ID	Date/Time Collected	Run No.	TCE (mg/scm)	PCE (mg/scm)	TCA (mg/scm)
Tank Farm 2					
AS01-OUT	3-Dec-96 16:15	1	0.71	7.6	ND
AS02-OUT	3-Dec-96 20:00	2	2	17	1.2
AS03-OUT	4-Dec-96 11:35	3	3.9	30	2.2
Northeast Corner					
AS04-OUT	4-Dec-96 15:16	4	87	1.2	ND
AS05-OUT	5-Dec-96 11:25	5	25	ND	ND
AS06-OUT	5-Dec-96 15:30	6	260	ND	ND
AS07-OUT	5-Dec-96 18:40	7	60	ND	ND
AS08-OUT	6-Dec-96 10:40	8	130	ND	ND
AS09-OUT	6-Dec-96 16:15	9	170	ND	ND
AS10-OUT	9-Dec-96 13:10	10	310	ND	ND
AS11-OUT	9-Dec-96 18:35	11	150	ND	ND
AS12-OUT	10-Dec-96 13:40	12	420	ND	ND
ASS01-OUT	10-Dec-96 17:05	SO	330	ND	ND
ASS02-OUT	11-Dec-96 13:40	SO	240	ND	ND
ASS03-OUT	12-Dec-96 14:20	SO	160	ND	ND
ASS04-OUT	13-Dec-96 9:30	SO	150	ND	ND

Notes: TCE - Trichloroethene
PCE - Tetrachloroethene
TCA - 1,1,1-Trichloroethane
mg/scm - milligrams per standard cubic meter
SO - Sustained operations
ND - Not detected