

**SOIL VAPOR EXTRACTION / AIR SPARGE  
PILOT TEST REPORT**

**ROUTE 119 AMOCO  
FACILITY ID. #26 - 18711  
STATE ROUTE 119  
DUNBAR TOWNSHIP, FAYETTE CO.  
DUNBAR, PENNSYLVANIA**

**PREPARED BY**

**CHAMBERS ENVIRONMENTAL GROUP, INC.  
PLEASANT GAP, PENNSYLVANIA**

**SUBMITTED TO**

**MR. RON HALL  
925 MORBELL AVENUE  
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**JUNE 30, 1998**

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June 30, 1998

Mr. Ed Gurski  
PA Dept. Of Environmental Protection  
Environmental Cleanup Program  
400 Waterfront Drive  
Pittsburgh, Pennsylvania 15222

**RE: Soil Vapor Extraction/Air Sparge Test Report  
Route 119 Amoco, Facility ID# 26-18711  
Dunbar Township, Fayette Co., PA**

Dear Mr Gurski:

Chambers Environmental Group, Inc. (CEG) has prepared the above titled report documenting the results of the Soil Vapor Extraction / Air Sparge (SVE/AS) pilot test completed at the Route 119 Amoco property.

The scope of work performed by CEG included the following activities: 1) installation of three (3) SVE wells and two (2) AS wells; 2) installation of vapor monitoring probes; 3) an SVE/AS pilot test; 4) SVE/AS test data reduction and report preparation. The results of these activities is presented below.

**SVE/AS Well Installation**

CEG subcontracted Advanced Drilling, Inc., Washington, New Jersey to install three (3) soil vapor extraction wells and two (2) air sparge wells on the Route 119 Amoco property. The wells were installed on June 1 and 2, 1998 using an air rotary drill rig. The SVE wells were installed to a depth of approximately thirty-five (35 ) feet just above the depth of the apparent water table aquifer. The SVE wells are identified as SVE-1, SVE-2, and SVE-3 and the AS wells are identified as AS-1 and AS-2. A copy of the drillers well logs are provided in the Appendix B. The location of the SVE/AS wells is presented in Appendix A, Figure 1.

One (1) split spoon soil sample (a total of five samples) was collected for laboratory analysis from each SVE and AS well at a depth interval of 5-6 feet. The samples were laboratory analyzed by Chem Spec Analytical Laboratories, Inc. laboratory using US EPA Methods 8260B/5035 for volatile organics. The laboratory results of the five (5) samples is presented in Appendix C and summarized Table 1.

The SVE wells were designed to extract petroleum vapors from the shallow impacted area (3'-6') and to capture volatilized petroleum constituents generated from the air sparge wells at a depth above thirty-five (35) feet. The SVE wells were constructed using two-inch diameter schedule 40 well screen and casing. The screened interval extends from depths of 3-35 feet and the solid casing riser extends from 0.5-3 feet below surface grade. The well annulus around the well screen was filled with #2 sand from depths of 2-35 feet and a bentonite seal was placed from a depth of 0.5-2 feet below surface grade. The well top was secured with an expandable locking plug and housed within an eight-inch diameter steel flush mount well box.

The AS wells were designed to inject compressed air below the observed water table aquifer in order to volatilize dissolved petroleum constituents within the water table aquifer. The AS wells were constructed using two-inch diameter schedule 40 well screen and casing. The screened interval extends from depths of 37-40 feet and the solid casing riser extends from 0.5-37 feet below surface grade. The well annulus around the well screen was filled with #2 sand from depths of 36-40 feet, a bentonite seal was placed from a depth of 32-36 feet, and the remaining annulus was filled with a bentonite grout mixture from a depth of 3-32 feet below surface grade. The well top was secured with an expandable locking plug and housed within an eight-inch diameter steel flush mount well box.

#### **Vapor Monitoring Probe Installation**

A total of six (6) vapor monitoring probe (VMP's) locations with one (1) probe per location were installed following the SVE/AS well installations. The VMP's were installed using a truck mounted Geoprobe drill rig. The Geoprobe advances a hollow sampler (similar to a split spoon) using direct pneumatic pressure to the hollow sampler. The VMP's were constructed using a one (1) foot length of 3/4-inch diameter slotted well screen. Tubing was connected to the VMP and run to the surface. The tubing was labeled as to the depth of the VMP interval and housed within a 5-inch diameter flush mount steel roadbox. One (1) VMP was installed in the subsurface of each VMP location at depth intervals of 3-4 feet. The annulus around the VMP was filled with graded #2 sand from depths of 2.5-4 feet. A bentonite seal was placed above the sand from a depth of 0.5-2.5 feet to isolate the VMP from the surface.

**Table 1**  
**Soil Quality Analytical Results**

Analyte/ Sample ID	PADEP USS/AL (mg/kg)	SVE-1, 5'-6'	SVE-2, 5'-6'	SVE-3, 5'-6'	AS-1, 5'-6'	AS-2, 5'-6'
MTBE	2	0.232	<0.200	0.003	<0.200	<0.200
Benzene	0.5	<b>0.553</b>	0.227	0.008	0.444	0.244
Toluene	100	0.160	1.27	0.007	0.258	2.25
Ethylbenzene	70	0.135	1.04	0.009	0.371	1.22
m,p-Xylene	1,000 (total)	0.157	4.52	0.005	0.695	5.88
o-Xylene	1,000 (total)	0.030	2.03	<0.002	0.369	3.27
Isopropylbenzene	18	0.011	0.317	0.003	<0.200	0.243
Naphthalene	5	0.025	2.05	0.002	0.578	2.83

Note: All concentrations reported in mg/kg (ppm).  
 PADEP USS/AL= Unsaturated Soil Standard/Action Level.  
**Bold** = PADEP USS/AL exceeded.

As summarized in Table 1, the SVE and AS wells were installed in areas exhibiting significant BTEX in soil concentrations. The fact that the SVE and AS wells exist in petroleum impacted areas of the property should provide relevant data as to the effectiveness of SVE and AS technology to remove adsorbed, dissolved, and vapor-phase petroleum constituents from the subsurface. One (1) soil sample (SVE-1, 5'-6') exceeded the benzene PADEP Unsaturated Soil Standards / Action Level for residential sites.

### **Multi-Well SVE Pilot Test**

CEG conducted soil vapor extraction and air sparge pilot tests on the SVE/AS wells on June 4 and 5, 1998. Prior to starting the test, background (no vacuum applied) readings were collected from the monitoring locations. No significant background readings (pressure or vacuum) were observed prior to commencement of the tests. A two-horsepower regenerative vacuum blower was manifolded to the extraction well using flexible hose. The test commenced and vacuum readings were obtained from the monitoring locations. Applied vacuum, air velocity, and temperature readings were collected from the SVE blower. The extracted vapor was manifolded through a 200 lb. granular activated carbon canister to remove volatile organic vapors from the effluent air stream.

The first SVE test was performed on SVE-1 using the VMP's and nearby monitoring wells to collect vacuum/pressure readings. The test was conducted at varying vacuum rates from low to the maximum (46-58 inches water) vacuum. The SVE only test on SVE-1 was conducted for

the maximum (46-58 inches water) vacuum. The SVE only test on SVE-1 was conducted for 180 minutes after which the test was terminated. The SVE-1 test observed vacuum data is tabulated in Table 5 and the applied vacuum, air flow rate, photoionization detector (PID) and temperature readings are presented in Table 2 below.

**Table 2**  
**SVE-1 Test Data**

Elapsed Time	Applied Vacuum (inches water)	Flowrate (CFM)	Temperature (F)	Influent PID Readings	Comments
2	53	60.6	117.8	700	Dilution open half
30	46	65.4	144.5	705	Dilution open half
45	46	61.9	146.3	713	Dilution open half
60	50	47.3	146.1	805	Dilution open half
75	49	56.0	150.3	790	Dilution open half
90	48	55.8	148.2	781	Dilution open half
105	50	57.6	152.1	772	Dilution open half
120	52	47.1	152.1	773	Dilution closed full
135	58	22.0	175.6	787	Dilution closed full
150	58	22.9	176.8	782	Dilution closed full
180	57	22.7	175.0	782	Dilution closed full

As indicated in Table 2, the applied vacuum readings resulted in a moderate air flow rate indicating that the soils are well suited to vapor extraction. The PID readings steadily increased following the start of the pilot test until approximately 60 minutes after which they remained relatively steady.

The second SVE test was performed on SVE-2 using the VMP's and nearby monitoring wells to collect vacuum/pressure readings. The test was conducted at varying vacuum rates from medium to the maximum (44-60 inches water) vacuum. The SVE only test on SVE-2 was conducted for 180 minutes after which the test was terminated. The SVE-2 test observed vacuum data is tabulated in Table 5 and the applied vacuum, air flow rate, photoionization detector (PID) and temperature readings are presented in Table 3 below.

**Table 3**  
**SVE-2 Test Data**

Elapsed Time	Applied Vacuum (inches water)	Flowrate (CFM)	Temperature (F)	Influent PID Readings	Comments
5	36	95.5	132.0	821	Dilution open half
10	36	94.8	127.7	855	Dilution open half
30	36	90.3	125.4	946	Dilution open half
60	36	91.1	125.0	1,003	Dilution open half
90	35	90.2	125.4	992	Dilution open half
120	58 (max.)	24.0	162.3	>2,000	Dilution closed full
150	58 (max.)	23.8	164.5	>2,000	Dilution closed full
180	58 (max.)	23.8	168.1	>2,000	Dilution closed full

As indicated in Table 3, the SVE-2 test applied vacuum ranged from 35-58 inches water during the test which resulted in a low to moderate flow rate (23.8-24.0 cfm) when the air dilution valve was closed and 90.2 to 95.5 cfm when the dilution valve was partially open. This indicates that the subsurface soils around SVE-2 are relatively "tight" and may provided adequate vacuum vapor extraction. The PID readings were maximized following closure of the dilution valve to readings >2,000 units.

The third SVE test was performed on SVE-3 using the VMP's and nearby monitoring wells to collect vacuum/pressure readings. The test was conducted at varying vacuum rates from low to the maximum (35->60 inches water) vacuum.

The SVE only test on SVE-3 was conducted for 180 minutes after which the air sparge test was terminated. The SVE-3 test observed vacuum data is tabulated in Table 7 and the applied vacuum, air flow rate, photoionization detector (PID) and temperature readings are presented in Table 4 below.

**Table 4**  
**SVE-3 Test Data**

Elapsed Time	Applied Vacuum (inches water)	Flowrate (CFM)	Temperature (F)	Influent PID Readings	Comments
3	35	95.7	113.1	895	Dilution open half
30	35	86.1	119.2	715	Dilution open half
60	37	96.8	119.9	787	Dilution open half
90	36	89.2	118.8	770	Dilution open half
95	>60 (max.)	11.6	117.3	1,643	Dilution closed full
120	>60 (max.)	8.94	120.1	1,970	Dilution closed full
150	>60 (max.)	6.32	179.4	>2,000	Dilution closed full
180	>60 (max.)	7.41	176.4	>2,000	Dilution closed full

As indicated in Table 4, the SVE-3 test applied vacuum ranged from 35 - >60 inches water during the test which resulted in a low flow rate (6.32- 11.6 cfm) when the air dilution valve was closed and 86.1 to 96.8 cfm when the dilution valve was partially open. This indicates that the subsurface soils around SVE-3 are relatively "tight" and may not yield large quantities of air through the formation due to few voids in the subsurface. The PID readings were maximized following closure of the dilution valve to readings >2,000 units.

The induced vacuum readings for the monitoring points for each of the three (3) SVE tests is presented in Tables 5, 6, and 7 below:

Table 5  
SVE Test on SVE-1 Vacuum Readings (inches water vacuum)

Elapsed Time	Applied Vacuum	Location	VMP-1 4'	VMP-2 4'	VMP-3 4'	VMP-4 4'	VMP-5 4'	VMP-6 4'	SVE-2	SVE-3	MW-1	MW-2	RW-1	RW-2
	(Inches water vacuum)	Radial Distance (ft)												
15-20	53		29	16.5	21.5	67	86.5	87	42.5	78	37	31	15	88
			-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.00	+0.05	0.00	+0.05
30-35	46		-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.80	+0.01	0.00	+0.10
50-55	48		-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.80	+0.01	0.00	+0.08
60-65	50		-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.80	+0.01	0.00	+0.06
75-80	49		-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.80	+0.02	0.00	+0.03
90-95	48		-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.80	+0.02	0.00	+0.03
105-110	50		-0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.80	+0.02	0.00	+0.03
120-125	52		-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.50	+0.01	0.00	+0.04
135-140	58 (max.)		-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.50	0.00	0.00	+0.01
150-155	58 (max.)		-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.50	+0.01	0.00	+0.04
180-185	57 (max.)		-0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.30	+0.01	0.00	+0.04

As indicated in Table 5, the SVE-1 pilot test (no air sparging) indicated significant vacuum influence in VMP's and monitoring wells from distances ranging from 37 (MW-1) to 29 feet (VMP-1) from the extraction well. The vacuum readings ranged from -0.10 inches water (VMP-1, 4') to -1.80 inches water (MW-1) during the SVE-1 pilot test.



**Table 6**  
**SVE Test on SVE-2 Vacuum Readings (inches water vacuum)**

Elapsed Time	Applied Vacuum	Location	VMP-1 4'	VMP-2 4'	VMP-3 4'	VMP-4 4'	VMP-5 4'	VMP-6 4'	SVE-1	SVE-3	MW-1	MW-3	RW-1	RW-2
	(Inches water vacuum)	Radial Distance (ft)												
5	36		51	57.5	20.5	25	49.5	62	42.5	48.5	66	59	42.5	47
10	36		0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.10	0.00	0.00	+0.05
30	36		0.00	0.00	0.00	0.00	-0.70	0.00	0.00	0.00	-0.20	0.00	0.00	+0.05
60	36		0.00	0.00	0.00	0.00	-0.80	0.00	0.00	0.00	-0.02	0.00	0.00	+0.04
90	35		0.00	0.00	0.00	0.00	-0.85	0.00	0.00	0.00	0.00	0.00	0.00	+0.08
120	58 (max.)		0.00	0.00	0.00	0.00	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	58 (max.)		0.00	0.00	0.00	0.00	-1.30	0.00	0.00	0.00	0.00	0.00	0.00	+0.01
180	58 (max.)		0.00	0.00	0.00	0.00	-1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00

As indicated in Table 6, the SVE-2 pilot test (no air sparging) indicated significant vacuum influence in VMP's and monitoring wells from distances ranging from 49.5 (VMP-5, 4') to 66 feet (MW-1) from the extraction well. The vacuum readings ranged from -1.50 inches water (VMP-5, 4') to -0.20 inches water (MW-1) during the SVE-2 pilot test.

**Table 7**  
**SVE Test on SVE-3 Vacuum Readings (inches water vacuum)**

Elapsed Time	Applied Vacuum	Location	VMP-1 4'	VMP-2 4'	VMP-3 4'	VMP-4 4'	VMP-5 4'	VMP-6 4'	SVE-1	SVE-2	MW-1	MW-3	RW-1	RW-2
	(Inches water vacuum)	Radial Distance (ft)												
5	36		66.5	87.5	61	39	18	16	78	48.5	81	54.5	69.5	46
10	36		0.00	0.00	0.00	0.00	-8.00	0.00	0.00	-0.02	0.00	0.00	0.00	0.00
30	36		0.00	0.00	0.00	-0.04	-12.0	0.00	0.00	-0.02	0.00	0.00	0.00	0.00
60	36		0.00	0.00	0.00	-0.20	-12.0	0.00	0.00	-0.02	0.00	0.00	0.00	0.00
90	35		0.00	0.00	0.00	-0.15	-0.85	0.00	0.00	-0.03	0.00	0.00	0.00	-0.01
120	58 (max.)		0.00	0.00	0.00	-0.90	-19.0	0.00	0.00	-0.05	0.00	0.00	0.00	-0.07
150	58 (max.)		0.00	0.00	0.00	-0.50	-19.0	0.00	0.00	-0.04	0.00	0.00	0.00	-0.15
180	58 (max.)		0.00	0.00	0.00	-0.55	-19.0	0.00	0.00	-0.05	0.00	0.00	0.00	-0.06

As indicated in Table 7, the SVE-3 pilot test (no air sparging) indicated significant vacuum influence in VMP's and monitoring wells from distances ranging from 18 (VMP-5, 4') to 48.5 feet (SVE-2) from the extraction well. The vacuum readings ranged from -19.0 inches water (VMP-5, 4') to -0.05 inches water (SVE-2) during the SVE-3 pilot test.

### Multi-Well SVE/AS Pilot Test

Following completion of the SVE only pilot test on SVE-3, the combined air sparge and SVE commenced on SVE-3/AS-2 and on SVE-2/AS-1 on June 5, 1998. The Multi-Well SVE/AS Pilot test consists of injecting air into a specially designed and constructed well with the screened interval below the water table and extracting vapors from a separate well some distance from the injection (air sparge well). A one-horsepower regenerative compressor blower was manifolded to AS-2 as the air sparge source and a two-horsepower regenerative vacuum blower was manifolded to SVE-3 as the extraction source. The test commenced and vacuum readings were obtained as in previously described tests. The air sparge system pressure and air flow into the well was measured as well as depth to water readings and dissolved oxygen readings. The purpose of the depth to water readings is to gather data as to potential mounding of the water table induced by adding compressed air below the water table which can be used to determine an effective radius of influence of air sparging. The dissolved oxygen readings were collected to gather data as increased dissolved oxygen within the water table aquifer induced by the air sparging and to determine a potential radius of influence of the air sparge system. The data from the two (2) tests on SVE-3/AS-2 and on SVE-2/AS-1 are presented in Tables 8 through 11 below:

Table 8  
SVE-3/AS-2 Test Data

Elapsed Time	Applied Vacuum (inches water)	Flowrate (CFM)	Temperature (F)	Influent PID Readings	Comments
4	>60	13.1	86.0	1,737	Dilution closed full
30	>60	12.0	170.0	1,917	Dilution closed full
60	>60	15.5	173.7	1,973	Dilution closed full
90	>60	17.2	181.2	>2,000	Dilution closed full
135	>60	20.1	183.1	>2,000	Dilution closed full

As indicated in Table 8, the SVE-3 test applied vacuum was >60 inches water during the test which resulted in a low flow rate (12.0- 20.1 cfm) when the air dilution valve was closed. This indicates that the subsurface soils around SVE-3 are relatively "tight" and may not yield large quantities of air through the formation due to few voids in the subsurface. The PID readings were maximized following closure of the dilution valve to readings >2,000 units.

As indicated in Table 9 below, the SVE-3/AS-2 pilot test (air sparging) indicated significant vacuum influence in VMP's and monitoring wells from distances ranging from 18 (VMP-5, 4') to 48.5 feet (SVE-2) from the extraction well. The vacuum readings ranged from -22.0 inches water (VMP-5, 4') to -0.08 inches water (RW-2) during the SVE-3 pilot test. The air sparge compressor was introducing the approx. 4-5 cfm of air into the formation at a pressure of 50 inches of water.

Table 9  
SVE & AS Test on SVE-3/AS-2  
Vacuum Readings (inches water vacuum)

Elapsed Time	Applied Vacuum	Location	VMP-1 4'	VMP-2 4'	VMP-3 4'	VMP-4 4'	VMP-5 4'	VMP-6 4'	SVE-1	SVE-2	MW-1	MW-3	RW-1	RW-2
	(Inches water vacuum)	Radial Distance (ft)												
5	>60		66.5	87.5	61	39	18	16	78	48.5	81	54.5	69.5	46
30	>60		0.00	0.00	0.00	-10.0	-22.0	0.00	0.00	-0.05	0.00	0.00	0.00	0.00
60	>60		0.00	0.00	0.00	-11.0	-21.5	0.00	0.00	-0.10	0.00	0.00	0.00	-0.08
90	>60		0.00	0.00	0.00	-10.5	-20.0	0.00	0.00	-0.12	0.00	0.00	0.00	-0.08
135	>60		0.00	0.00	0.00	-11.0	-20.5	0.00	0.00	-0.10	0.00	0.00	0.00	-0.08
			0.00	0.00	0.00	-10.0	-20.0	0.00	0.00	-0.18	0.00	0.00	0.00	0.00

Table 10  
SVE & AS Test on SVE-2/AS-1  
Vacuum Readings (inches water vacuum)

Elapsed Time	Applied Vacuum	Location	VMP-1 4'	VMP-2 4'	VMP-3 4'	VMP-4 4'	VMP-5 4'	VMP-6 4'	SVE-1	SVE-3	MW-1	MW-3	RW-1	RW-2
	(Inches water vacuum)	Radial Distance (ft)												
5	>60		51	57.5	20.5	25	49.5	62	42.5	48.5	66	59	42.5	47
35	58		0.00	0.00	0.00	-0.20	-0.85	0.00	0.00	-0.06	0.00	0.00	0.00	0.00
65	58		0.00	0.00	0.00	0.00	-0.80	0.00	0.00	-0.08	0.00	0.00	0.00	0.00
95	58		0.00	0.00	0.00	0.00	-0.70	0.00	0.00	-0.06	0.00	0.00	0.00	0.00
120	57		0.00	0.00	0.00	0.00	-0.55	0.00	0.00	-0.05	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	-0.70	0.00	0.00	-0.06	0.00	0.00	0.00	0.00

**Table 11**  
**SVE-2/AS-1 Test Data**

Elapsed Time	Applied Vacuum (inches water)	Flowrate (CFM)	Temperature (F)	Influent PID Readings	Comments
5	60	25.5	104.0	1,820	Dilution closed
35	58	22.7	107.2	>2,000	Dilution closed
65	58	30.0	138.6	>2,000	Dilution closed
95	58	30.1	124.6	>2,000	Dilution closed
120	57	26.4	122.4	>2,000	Dilution closed

As indicated in Table 11, the SVE-2 test applied vacuum was 57->60 inches water during the test which resulted in a low flow rate (22.7- 30.1 cfm) when the air dilution valve was closed. This indicates that the subsurface soils around SVE-2 are relatively "tight" and may not yield large quantities of air through the formation due to few voids in the subsurface. The PID readings were maximized following closure of the dilution valve to readings >2,000 units. The SVE-2/AS-1 test when compared to the SVE-2 only test on June 5, 1998 did not indicate loss in vacuum flowrate or quantitative change in PID readings.

As indicated in Table 10 above, the SVE-2/AS-1 pilot test (air sparging) indicated significant vacuum influence in VMP's and monitoring wells from distances ranging from 49.5 (VMP-5, 4') to 48.5 feet (SVE-3) from the extraction well. The vacuum readings ranged from -0.85 inches water (VMP-5, 4') to -0.08 inches water (SVE-3) during the SVE-2/AS-1 pilot test. The air sparge compressor was introducing the approx. 19.2-20.5 cfm of air into the formation at a pressure of 52-58 inches of water.

Depth to water readings were obtained from wells RW-2, SVE-1, MW-2, and MW-1 during the test. Depth to water readings decreased (water elevation increased) 0.26 feet in well RW-2 and slightly in SVE-1. This indicates that some water table mounding may have occurred in RW-2 at distance of 47 feet from the air sparge well.

#### **Multi-Well SVE/AS Pilot Test Air Quality Analysis**

Air quality samples were collected during the SVE and AS pilot tests to document petroleum hydrocarbon removal and to demonstrate the effect of air sparge technology. Air samples were collected during the SVE (no air sparging) portion of the tests on SVE-1, SVE-2, and SVE-3 and during the Air Sparge (air sparging) portion of the tests. The samples were collected by

extracting a known volume of air through a carbon absorption tube using an industrial hygiene-type air sample pump. The adsorber tubes were prepared, provided, and analyzed by Chem Spec analytical Laboratories, Inc., Harrisburg, Pennsylvania. The samples were analyzed for BTEX constituents using US EPA Method TO3. The laboratory report is presented in the Appendix D and analytical results of the ten (10) air samples is summarized in Table 12 below:

**Table 12**  
**Multi-Well SVE/AS Tests**  
**Air Quality Analytical Results**

Sample/Analyte	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	C1-C4 PHC	C4-C10 PHC
SVE-1 INFLUENT	10.6	8.48	6.64	7.60	5.50	415	565
SVE-1 EFFLUENT	<0.001	0.012	0.003	0.007	0.003	<1	<1
SVE-2 INFLUENT	20.3	60.2	0.85	20.4	22.9	7.14	14.3
SVE-2 EFFLUENT	0.42	0.423	0.061	0.140	0.047	47	18
SVE-3 INFLUENT	14.8	80.6	6.34	70.0	22.1	5,590	20,500
SVE-3 EFFLUENT	11.3	16.5	3.22	9.52	4.77	77	4,610
SVE-3B INFLUENT	2.06	5.90	0.667	1.44	0.336	907	351
SVE-3/AS-2 INFLUENT	20.8	9.17	20.5	19.9	22.9	5,590	15,600
SVE-2/AS-1 INFLUENT	14.5	30.4	13.9	18.5	16.0	5,340	9,260
SVE-2/AS-1 EFFLUENT	0.320	1.36	0.036	0.144	0.040	104	24

Note: All concentrations reported in parts per billion - volume (ppb-v).

As indicated in Table 12, BTEX constituents were detected in all ten (10) air samples. The air samples collected during the Air Sparge portion of the test (samples identified as SVE-2/AS-1 and SVE-3/AS-2) indicated increased concentrations of BTEX and petroleum hydrocarbon constituents when compared to the air samples collected during the SVE only portion of the tests (samples identified as SVE-2 and SVE-3). This fact may indicate that increased volatilization of dissolved BTEX constituents is occurring when the air sparge system is in operation.

In summary, the Multi-Well SVE/AS pilot tests indicated that SVE technology is effective in removing petroleum hydrocarbons from the subsurface. The tests also indicated that air sparge technology is moderately effective in volatilizing dissolved-phase petroleum hydrocarbons from the water table aquifer. However, the data collected in these tests did not conclusively indicate that the air sparge wells were adding additional oxygen to the subsurface and that mounding of groundwater may be occurring.

### AS Pilot Test

An Air Sparge only test was conducted on AS-2 on June 19, 1998 to gather data additional data as to potential radius of influence of air sparge well AS-2. Static depth to water and dissolved oxygen readings were collected from locations near AS-2 that may indicate a rapid response. The data is presented in Table 13 below:

Table 13  
Air Sparge Test on AS-2

Location/Distance to Air Sparge Well	Elapsed Time	Depth to Water (ft)	Dissolved Oxygen (mg/L)	Vac./Press. (-/+)
SVE-2	0	14.30	1.5	0.0
38'	15	14.15	3.5	0.0
	55	14.17	4.9	0.0
	85	14.17	3.4	0.0
SVE-3	0	17.69	0.8	0.0
22'	15	17.55	1.8	0.0
	55	17.50	1.5	0.0
	85	17.50	1.6	0.0
RW-2	0	30.51	6.1	0.0
20'	15	30.30	6.4	0.0
	55	30.18	5.8	0.0
	85	30.11	3.3	0.0
MW-3	0	22.30	1.4	0.0
29'	15	22.01	1.8	0.0
	55	21.93	3.3	0.0
	85	21.76	2.2	0.0

As indicated in Table 13, following the start of the air sparge test on AS-2 depth to water values decreased (elevation increased) in all four (4) of the monitoring locations with time as the test

progressed. This may indicate a mounding effect of groundwater due to the addition of compressed air into the water table. Additionally, dissolved oxygen readings increased in three (3) of four (4) monitoring locations potentially indicating an increased level of oxygen in the water table aquifer due to the air sparge introduction of compressed air. The volume of injected into the well ranged from 5.2-5.5 cubic feet/minute at a pressure ranging from 48-60 inches water. Based on the above data, AS-2 may have a radius of effective influence ranging from 20-38 feet.

An Air Sparge only test was conducted on AS-1 on June 19, 1998 to gather data as to potential radius of influence of air sparge well AS-1. Static depth to water and dissolved oxygen readings were collected from locations near AS-1 that may indicate a rapid response. The data is presented in Table 14 below:

Table 14  
Air Sparge Test on AS-1

Location/Distance to Air Sparge Well	Elapsed Time	Depth to Water (ft)	Dissolved Oxygen (mg/L)	Vac./Press. (-/+)
SVE-1	0	28.27	2.8	0.0
18'	35	28.22	2.8	0.0
	75	28.15	3.1	0.0
	105	28.06	3.0	0.0
SVE-2	0	14.17	3.4	0.0
37'	35	14.18	3.6	0.0
	75	14.20	3.8	0.0
	105	14.18	3.9	0.0
RW-1	0	38.18	5.9	0.0
24'	35	38.06	6.3	0.0
	75	37.91	6.4	0.0
	105	38.12	6.4	0.0
MW-1	0	17.24	1.8	0.0
50'	35	17.23	1.9	0.0
	75	17.21	1.9	0.0
	105	17.18	1.9	0.0
MW-2	0	37.65	2.2	0.0
42'	35	37.59	2.8	0.0
	75	37.56	3.2	0.0
	105	37.56	3.3	0.0



As indicated in Table 14, following the start of the air sparge test on AS-1 depth to water values decreased (elevation increased) in all four (4) of five (5) the monitoring locations with time as the test progressed. This may indicate a mounding effect of groundwater due to the addition of compressed air into the water table. Additionally, dissolved oxygen readings increased in all five (5) monitoring locations potentially indicating an increased level of oxygen in the water table aquifer due to the air sparge introduction of compressed air. The volume of injected into the well ranged from 5.2-5.7 cubic feet/minute at a pressure ranging from 50-52 inches water. Based on the above data, AS-1 may have a radius of effective influence ranging from 18-50 feet.

An additional test was planned to potentially utilize two (2) or more existing monitoring wells (MW-1 and MW-3) as SVE and/or AS wells. Utilization of these wells may not necessitate installing additional SVE and /or AS wells thus reducing costs and disruption of business at the Route 119 Amoco property. These wells are known to be installed in areas where high levels of dissolved-phase petroleum constituents in groundwater.

The Shallow Well observed radius of influence for SVE-1, SVE-2, and SVE-3 is depicted in Appendix A, Figure 2. The radius of influence of each SVE well is not symmetrical due to variability in the subsurface materials.

#### **Single-Well SVE/AS Pilot Test**

Following completion of the Multi-Well SVE/AS pilot test on SVE-1, SVE-2, SVE-3, AS-1 and AS-2, the data was reviewed and evaluated to determine whether this technology would be effective in remediating this property. An additional test was performed to potentially utilize existing monitoring wells as SVE/AS wells. The Single-Well SVE/AS tests commenced on MW-1 and MW-3 on June 18 and 19, 1998. The Single-Well SVE/AS Pilot test consists of injecting air into a two-inch drop tube open at the bottom into an existing four-inch diameter monitoring well. The bottom of the drop tube is placed approximately 3-5 below the static water level in the well. The injected air bubbles the water within the monitoring well potentially stripping dissolved volatile organics from water after which the vapor-phase volatiles in the unsaturated zone and the stripped volatiles are then captured via conventional vacuum extraction from the same well. This process is accomplished with a specially designed well-head apparatus. A one-horsepower regenerative compressor blower was manifolded to the test well as the air sparge source and a two-horsepower regenerative vacuum blower was manifolded to the test well as the extraction source. The test commenced and vacuum readings were obtained as in previously described tests. The air sparge system pressure and air flow into the well was measured as well as depth to water readings and dissolved oxygen readings. The purpose of the depth to water readings is to gather data as to potential mounding of the water table induced by adding compressed air below the water table which can be used to determine an effective radius of

influence of air sparging. The dissolved oxygen readings were collected to gather data as increased dissolved oxygen within the water table aquifer induced by the air sparging and to determine a potential radius of influence of the air sparge system. The vacuum blower data for MW-3 was also recorded as previously described and is summarized in Table 15 below:

**Table 15**  
**MW-3 SVE Test Data**

Elapsed Time	Applied Vacuum (inches water)	Flowrate (CFM)	Temperature (F)	Influent PID Readings	Comments
1	38	75.6	142.3	530	Dilution closed full
33	39	82.8	141.6	663	Dilution closed full
85	40	84.6	144.4	702	Dilution closed full
240	40	83.5	144.7	721	Dilution closed full

As indicated in Table 15, the MW-3 test applied vacuum ranged from 38-40 inches water during the test which resulted in a low flow rate ranging from 75.6-84.6 cfm when the air dilution valve was closed. This indicates that the subsurface soils around MW-3 are conducive to SVE and may yield moderate quantities of air through the formation. The PID readings were increased with time during the test which is likely due to increased volatilization through air stripping of dissolved-phase petroleum constituents from the groundwater. The PID units ranged from 530-721 units.

**Table 16**  
**MW-3 AS Test Data**

Elapsed Time	Air Flow Rate (cfm)	Temp.	Pressure (in. water)
150	5.0	99.7	44
205	4.5	109.4	42
240	4.4	107.5	42

As indicated in Table 15 and 16, the MW-3 AS pilot test (air sparging) indicated a significant vacuum influence in monitoring wells MW-2 and SVE-1 which range in distance from 130 and 103 feet, respectively from the extraction well and the vacuum readings ranged from -0.05 to -0.65 inches water, respectively. Vacuum influence was not detected in any of the remaining wells and the VMPs. The air sparge compressor was introducing the approx. 4-5 cfm of air into the formation at a pressure of 42-44 inches of water. Dissolved oxygen readings increased in SVE-1 slightly during the test. The remaining wells exhibited varying dissolved oxygen readings above and below static conditions, therefore no conclusions could be made as to dissolved oxygen content. Slight mounding of groundwater may have occurred in RW-2, however, others wells

much further from the test well experienced decreases in depth to water readings, therefore no conclusions could be made as to groundwater mounding. The observed groundwater elevation increases may be attributed to natural changes in groundwater elevation due to recharge / discharge.

The lack of vacuum influence in surrounding wells can be explained by the fact that while air sparging in the test well is occurring, the groundwater elevation is increased to a level above the screened interval in the well, thus preventing a vacuum from being induced on the subsurface. However, a vacuum was observed in MW-2 and SVE-1 during the test which may be due to preferential pathways (fractures) in the bedrock acting as a conduit to these locations.

**Table 17**  
**SVE & AS Test on MW-3**  
**Vacuum Readings (inches water vacuum)**

Well/Location	Elapsed Time	Depth to Water (ft)	Dissolved Oxygen (mg/l)	Vacuum/Pressure (-/+)	PID Readings
MW-1	0	--	--	--	--
	45	17.19	--	0.0	--
	90	--	--	-1.0	--
MW-2	0	37.48	3.8	-0.04	33.9
	45	37.12	2.2	-0.05	--
	90	37.19	2.1	-0.05	--
RW-1	0	38.16	6.8	0.0	0.6
	45	38.12	5.6	0.0	--
	90	38.13	5.9	0.0	--
RW-2	0	30.16	7.1	0.0	230
	45	30.27	5.5	0.0	--
	90	30.12	6.2	0.0	--
AS-1	0	19.20	3.5	0.0	918
	45	17.22	2.9	0.0	--
	90	19.31	3.0	0.0	--
AS-2	0	35.92	3.9	0.0	84.8
	45	36.57	5.5	0.0	--
	90	36.51	3.2	0.0	--
SVE-1	0	29.99	2.5	0.0	272
	45	29.31	2.8	0.0	--
	90	29.73	3.0	-0.65	--
SVE-2	0	14.24	1.6	0.0	57.6
	45	14.22	1.6	0.0	--
	90	14.15	1.6	0.0	--
SVE-3	0	17.16	SPH	0.0	1,000
	45	17.18	SPH	0.0	--
	90	17.32	SPH	0.0	--

An additional test was performed on MW-1 in the same manner as MW-3. The vacuum blower data for MW-1 was also recorded as previously described and is summarized in Table 16 below:

**Table 18**  
**MW-1 SVE Test Data**

Elapsed Time	Applied Vacuum (inches water)	Flowrate (CFM)	Temperature (F)	Influent PID Readings	Comments
5	33	82.0	128.3	204	Dilution closed full
52	40	80.4	146.3	180	Dilution closed full
60 (air sparge)	40	81.1	146.4	193	Dilution closed full
120	40	81.1	146.4	157	Dilution closed full
170	40	82.0	148.2	135	Dilution closed full

As indicated in Table 18, the MW-1 test applied vacuum ranged from 33-40 inches water during the test which resulted in a low flow rate ranging from 80.4-82.0 cfm when the air dilution valve was closed. This indicates that the subsurface soils around MW-1 are conducive to SVE and may yield large quantities of air through the formation due to the close proximity of the pea gravel fill around the USTs. The PID readings were increased with time following start of in-well air sparging which is likely due to increased volatilization through air stripping of dissolved-phase petroleum constituents from the groundwater. The PID units ranged from 135-204 units.

**Table 19**  
**MW-1 AS Test Data**

Elapsed Time	Air Flow Rate (cfm)	Temp.	Pressure (in. water)
60	4.8	114.7	50
125	4.8	114.2	42
165	5.5	119.1	35

**Table 20**  
**SVE & AS Test on MW-1**  
**Vacuum Readings (inches water vacuum)**

Well/Location	Elapsed Time	Depth to Water (ft)	Dissolved Oxygen (mg/l)	Vacuum/Pressure (-/+)	PID Readings
MW-2	0	37.21	2.3	-0.05	30.0
	10	37.25	2.4	-0.06	40.0
	165	37.51	3.4	-0.05	32.6
MW-3	0	22.18	1.0	0.00	420
	10	22.35	1.0	0.00	490
	165	22.35	1.2	0.00	474
RW-1	0	37.92	7.0	0.0	0.8
	10	38.02	6.8	0.0	0.0
	165	38.14	6.1	0.0	0.0
RW-2	0	29.83	8.0	-0.02	210
	10	30.21	7.3	0.0	292
	165	29.79	6.6	0.0	250
AS-1	0	15.97	3.5	0.0	3.5
	10	19.37	5.0	0.0	3.8
	165	19.31	3.0	0.0	0.2
AS-2	0	35.56	4.0	0.0	500
	10	36.78	3.7	0.0	575
	165	36.11	3.7	0.0	557
SVE-1	0	30.37	1.3	-0.03	30.5
	10	29.80	1.9	0.0	37.3
	165	29.78	3.4	0.0	401
SVE-2	0	14.22	0.9	0.0	2.5
	10	14.18	1.1	0.0	3.1
	165	14.19	1.4	0.0	119.9
SVE-3	0	17.37	SPH	0.0	257
	10	17.10	SPH	0.0	401
	165	17.10	SPH	0.0	340

As indicated in Table 19 and 20, the MW-1 AS pilot test (air sparging) did not indicate a significant vacuum influence in any of the monitoring wells. Vacuum influence was not detected in any of the remaining wells and the VMPs. The air sparge compressor was introducing the approx. 4.8-5.5 cfm of air into the formation at a pressure of 35-50 inches of water. Dissolved oxygen readings increased in SVE-1 and MW-2 slightly during the test. The remaining wells exhibited varying dissolved oxygen readings above and below static conditions, therefore no conclusions could be made as to their dissolved oxygen content. Slight mounding of groundwater may have occurred in SVE-1.

The lack of vacuum influence in surrounding wells can be explained by the fact that while air sparging in the test well is occurring, the groundwater elevation is increased to a level above the screened interval in the well, thus preventing a vacuum from being induced on the subsurface.

#### Single-Well SVE/AS Pilot Test Air Quality Analysis

Air quality samples were collected on June 18, 1998 during the MW-1 and MW-3 pilot tests to document petroleum hydrocarbon removal and to demonstrate the effect of air sparge technology within these wells. Air samples were collected during the SVE (no air sparging) portion of the tests on MW-1 and MW-3 and during the Air Sparge (air sparging) portion of the tests. The samples were collected by extracting a known volume of air through a carbon absorption tube using an industrial hygiene-type air sample pump. The adsorber tubes were prepared, provided, and analyzed by Chem Spec analytical Laboratories, Inc., Harrisburg, Pennsylvania. The samples were analyzed for BTEX constituents using US EPA Method TO3. The laboratory report is presented in the Appendix D and analytical results of the four (4) air samples is summarized in Table 21 below:

**Table 21**  
**Single-Well SVE/AS Tests (MW-1 & MW-3)**  
**Air Quality Analytical Results**

Sample/Analyte	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	C1-C4 PHC	C4-C10 PHC
MW-1	1.29	5.29	1.65	2.50	1.65	361	790
MW-1B	0.675	5.92	0.948	2.07	1.00	217	457
MW-3	2.47	3.97	2.60	3.61	3.19	416	1,830
MW-3B	3.08	10.5	2.73	5.28	3.85	1,560	2,120

Note: All concentrations reported in parts per billion - volume (ppb-v).

As indicated in Table 21, BTEX and petroleum hydrocarbon constituents were detected in all four (4) samples. The sample designated "MW-1" was collected from the well approximately five (5) minutes following start of combined vacuum extraction and compressed air injection below the water table. An additional sample designated "MW-1B" was collected from the well approximately 155 minutes after sparging commenced. The sample designated "MW-1" concentration was generally much higher than the sample collected later in the test ("MW-1B"). The lower vapor concentration following approximately 150 minutes of sparging may be due to the reduced dissolved concentration remaining in the water as the mass is transferred into the vapor-phase. Additionally, the vapor concentration may naturally vary over time given no air sparging is occurring due to variability in the subsurface.

The sample designated "MW-3" was collected from the well approximately 140 minutes following start of combined vacuum extraction and compressed air injection below the water table. An additional sample designated "MW-3B" was collected from the well approximately 240 minutes after sparging commenced. The sample designated "MW-3B" was generally higher than the sample collected earlier in the test. This may be due to a greater mass of dissolved-phase constituents within or in the close vicinity of this well when compared to MW-1. The mass of dissolved-phase hydrocarbons was not confirmed on this date, however, MW-3 is in a downgradient direction from the apparent source and may continue to receive dissolved-phase hydrocarbons due to groundwater transport.

## SUMMARY

The Soil Vapor Extraction (SVE) and Air Sparge (AS) pilot tests performed on the various site wells has yielded valuable information as to the magnitude and extent of petroleum impact to the soils and groundwater, the potential removal rates, spacing of SVE and AS wells, and the viability of this technology.

Significant adsorbed-phase contaminants exist in the shallow soils (2-7 feet depth) which warrant remediation due to their potential to continually leach out contaminants that are later transferred to the dissolved-phase. The SVE wells (SVE-1, SVE-2, and SVE-3) installed on the property appear to primarily influence the shallow soil zone although they are also screened within the deeper bedrock. Significant vapor-phase petroleum constituents were withdrawn from these wells during the tests.

The deeper monitoring wells (MW-1, MW-2, and MW-3 ) and RW-2 appear to be connected



above the static water levels in these wells. The SVE test performed on RW-2 in February 1998 indicated a high vacuum influence over most of the property within the deeper bedrock zone. Review of the data indicates that some preferential flow of vapors exist in the subsurface due primarily to the fractures within the bedrock. However, the current placement of the recovery well (RW-2), monitoring wells MW-1 and MW-3, and the SVE wells (SVE-1, SVE-2, and SVE-3) indicate adequate vacuum extraction coverage of the adsorbed-phase, dissolved-phase, and vapor-phase impacted areas of the property (see Appendix A, Figures 2 & 3). This coverage, coupled with air sparging in wells MW-1, MW-3, AS-1, and AS-2, should produce significant mass removal of dissolved-phase petroleum constituents. Therefore, CEG recommends utilizing wells MW-1, MW-3, RW-2, SVE-1, SVE-2, and SVE-3 as vacuum extraction wells (SVE wells) and utilizing wells MW-1, MW-3, AS-1, and AS-2 as air sparge wells.

Thank you for the opportunity to be of service. Please contact us at (814) 359-4520 if you have any questions or require additional information.

Sincerely,  
**CHAMBERS ENVIRONMENTAL GROUP, INC.**



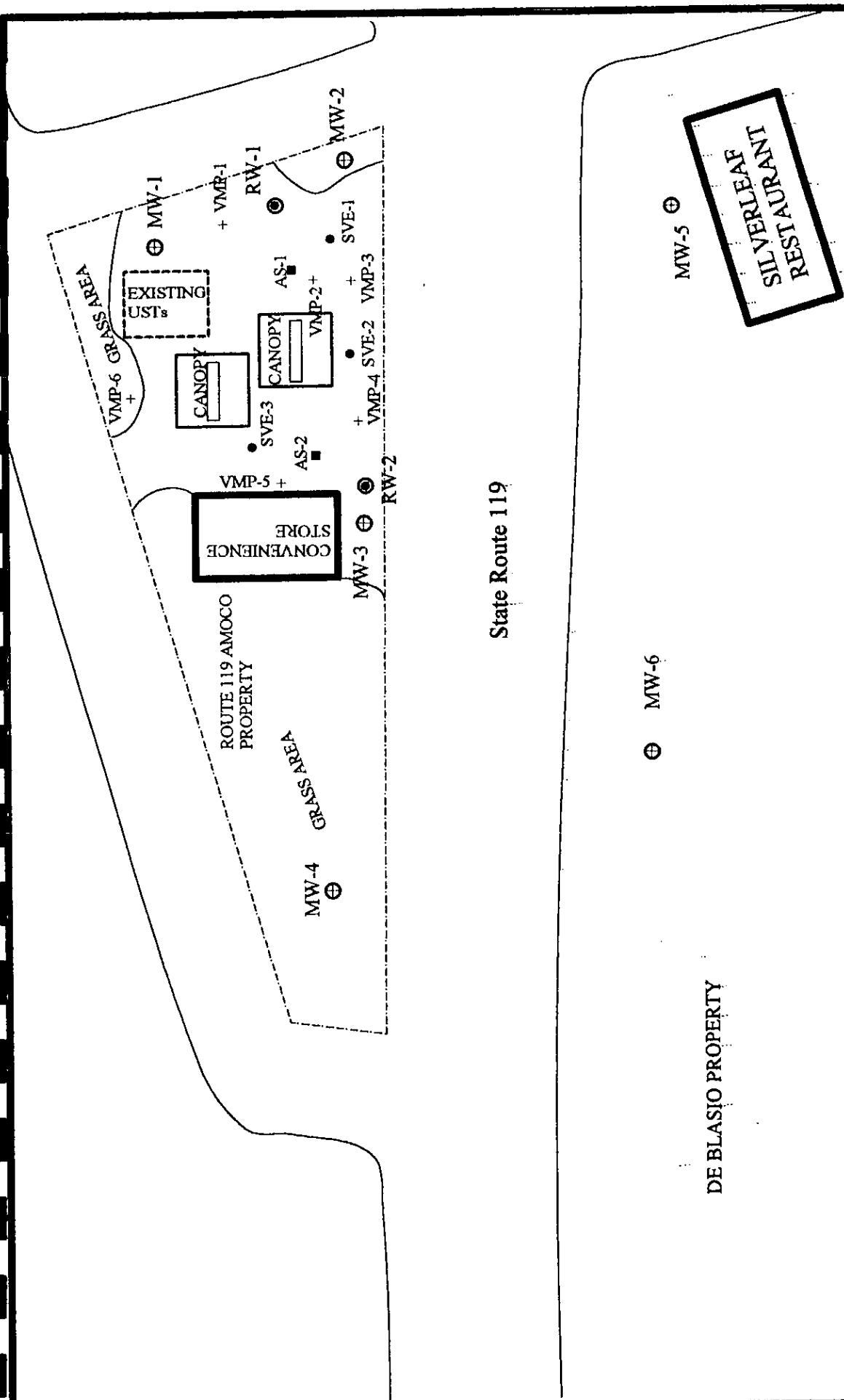
John S. Pace  
Remediation Project Manager

cc: Ron Hall (Route 119 Amoco)  
George Sakacs (USTIF/ICF Kaiser)  
File

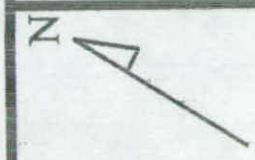
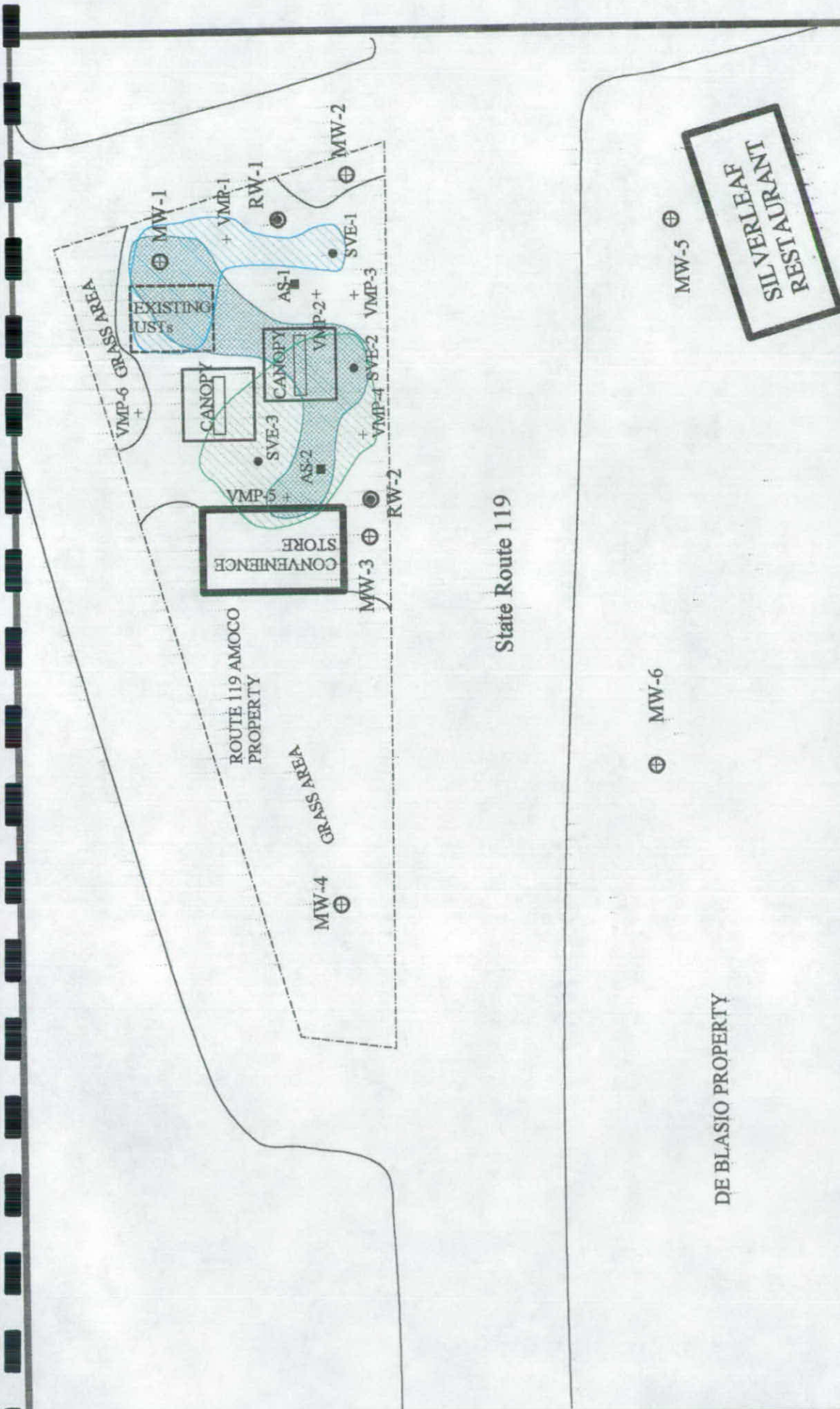
SVE/AS Pilot Test Report  
Route 119 Amoco, Facility ID # 26-18711  
Dunbar Twp. Fayette Co., PA

## Appendix A

### Figures



<p><b>CHAMBERS</b>  <b>ENVIRONMENTAL GROUP, INC.</b>          485 E. COLLEGE AVE.          PLEASANT GAP, PA</p>	<p><b>APPENDIX A, FIGURE 1</b>  <b>SVE TEST WELL LOCATION MAP</b>          JUNE 5, 1998</p> <p>          SVE-2 SOIL VAPOR EXTRACTION WELL   MONITORING WELL   VMP-4 VAPOR MONITORING PROBE   AS-2 AIR SPARGE WELL       </p>	<p>ROUTE 119 AMOCO          STATE ROUTE 119          CONNELLSVILLE, PA          DUNBAR TWP., FAYETTE CO          CEG PROJECT #96-05413-B</p>
<p><b>SCALE: 1"=50'</b></p>		<p><b>N</b></p>



APPENDIX A, FIGURE 2  
SHALLOW SVE TEST  
RADIUS OF INFLUENCE MAP  
JUNE 5, 1998

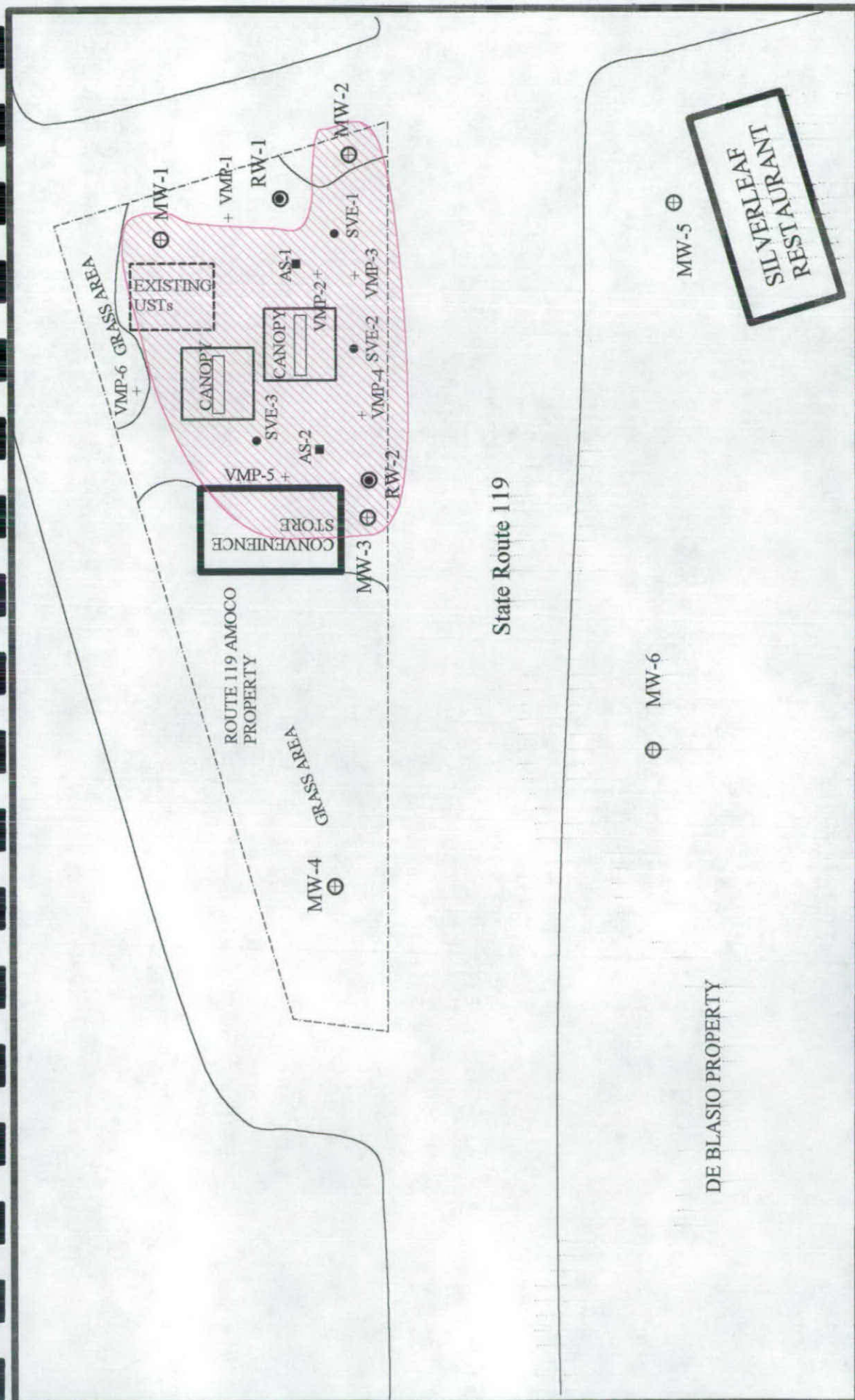
- Extent of Radius of Influence SVE-1
- Extent of Radius of Influence SVE-2
- Extent of Radius of Influence SVE-3

SCALE: 1"=50'

CHAMBERS  
ENVIRONMENTAL GROUP, INC.  
485 E. COLLEGE AVE.  
PLEASANT GAP, PA

ROUTE 119 AMOCO  
STATE ROUTE 119  
CONNELLVILLE, PA  
DUNBAR TWP., FAYETTE CO  
CEG PROJECT #96-05413-B





<p><b>CHAMBERS ENVIRONMENTAL GROUP, INC.</b> 485 E. COLLEGE AVE. PLEASANT GAP, PA</p>	<p><b>ROUTE 119 AMOCO</b> STATE ROUTE 119 CONNELLSVILLE, PA DUNBAR TWP., FAYETTE CO.</p>
<p><b>APPENDIX A, FIGURE 3</b> DEEPER WELL SVE TEST RADIUS OF INFLUENCE MAP FEBRUARY 20, 1998</p>	<p><b>CEG PROJECT #96-05413-B</b></p>
<p><b>DE BLASIO PROPERTY</b></p>	<p><b>SCALE: 1"=50'</b></p>

SVE/AS Pilot Test Report  
Route 119 Amoco, Facility ID # 26-18711  
Dunbar Twp. Fayette Co., PA

## Appendix B

### Air Quality Analytical Reports

## Laboratory Results Summary

Page 1 of 3  
C5106

Mr. Jeff Chambers  
Chambers Environmental Group  
485 East College Ave., Suite A  
Pleasant Gap, PA 16823

Project Manager: John Pace  
Project Name: 119 Amoco  
Project Number: n/a  
Sampler: S Keller, J Hughes  
Dates Sampled: June 4 & 5, 1998  
Date Received: June 9, 1998  
Time Received: 11:10 AM

### Analytical Testing Parameters

#### Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-01 • SVE-1 INFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	4.15	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	5.65	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	10.6	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	8.48	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	6.64	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	7.60	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	5.50	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

#### Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-02 • SVE-1 EFFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	<0.001	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	<0.001	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	<0.001	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	0.012	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	0.003	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	0.007	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	0.003	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

#### Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-03 • SVE-2 INFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	7.14	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	14.3	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	20.3	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	60.2	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	0.850	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	20.4	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	22.9	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Laboratory Results Summary

119 Amoco • Page 2 of 3

C5106

## Analytical Testing Parameters

## Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-04 • SVE-2 EFFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	0.047	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	0.018	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	0.042	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	0.423	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	0.061	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	0.140	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	0.047	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-05 • SVE-3 INFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	5.59	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	20.5	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	14.8	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	80.6	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	6.34	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	70.0	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	22.1	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-06 • SVE-3 EFFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	0.077	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	4.61	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	11.3	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	16.5	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	3.22	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	9.52	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	4.77	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-07 • SVE-3B INFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	0.907	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	0.351	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	2.06	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	5.90	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	0.667	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	1.44	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	0.336	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.



## Analytical Testing Parameters

## Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-08 • SVE 3 / AS-2 INFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	5.59	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	15.6	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	20.8	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	9.17	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	20.5	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	19.9	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	22.9	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-09 • SVE2 / AS-1 INFL

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	5.34	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	9.26	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	14.5	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	30.4	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	13.9	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	18.5	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	16.0	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5106-10 • SVE2 / AS-1 EFFL

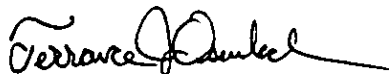
Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	0.104	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	0.024	ppm-V	0.001	EPA TO-3M	June 15, 1998	RMS
Benzene	0.320	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Toluene	1.36	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
Ethylbenzene	0.036	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS
m,p-Xylene	0.144	ppb-V	0.002	EPA TO-3M	June 15, 1998	RMS
o-Xylene	0.040	ppb-V	0.001	EPA TO-3M	June 15, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Reviewed and reported by:

Terry Osenbach, Laboratory Director  
PADEP Lab No. 22-478

C5106

Lab Sent To:	CHEN SPEC	Project Manager:	J. PACE	Turnaround Time Requested (please circle):	Normal	Rush
Address:		Project Name:	19 AMOCO	(Rush Results subject to prior approval and surcharge)		
Address:		Location:	HP			
Contact:		Sampler(s):	S. Kellix J. Hughes			
Phone:		PO #				
Fax:		Project Number:				

Sample Identification Description/Location	Date Collected	Time Collected	Total # of Containers	Matrix	Pres.	Remarks
1 SVE-1 INF1	6-4-98	1610	2	AIR		0.56.7KRS
2 SVE-1 EFF1		1615	1			2.06.7KRS
3 SVE-2 INF1		1930	2			0.5
4 SVE-2 EFF1		1935	1			
5 SVE-3 INF1		2200	2			0.56.7KRS
6 SVE-3 EFF1		2210	1			1.01.7KRS
7 SVE-3B INF1		2215	1			0.256.7KRS
8 SVE3/AS-2 INF1	6-5-98	0945	2			0.256.7KRS
9 SVE2/AS-1 INF1		1220	2			0.256.7KRS
10 SVE2/AS-1 EFF1		1215	1			1.006.7KRS
11						
12						
13						
14						
15						

Send Bill To:		Relinquished By:	M. Hamel	Date:	6-9-98	Time:	9:00am
		Relinquished By:		Date:		Time:	
		Relinquished By:	J. Hamel	Date:	6-9-98	Time:	11:10
Delivery Method:		Relinquished By:		Date:		Time:	

# CHEM SPEC

Analytical Laboratories, Inc.

## Laboratory Results Summary

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C5259

Mr. Jeff Chambers  
Chambers Environmental Group  
485 East College Ave., Suite A  
Pleasant Gap, PA 16823

Project Manager: J. Pace  
Project Name: 119 Amoco  
Project Number: n/a  
Sampler: S. Keller J. Hughes  
Date Sampled: June 18, 1998  
Date Received: June 23, 1998  
Time Received: 12:45 PM

### Analytical Testing Parameters

#### Volatile Organic Compounds in Ambient Air (bp. -10°C to 200°C)

Sample ID: C5259-01 • MW-1

##### Test / Parameter

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	0.361	ppm-V	0.001	EPA TO-3M	June 23, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	0.790	ppm-V	0.001	EPA TO-3M	June 23, 1998	RMS
Benzene	1.29	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
Toluene	5.29	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
Ethylbenzene	1.65	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
m,p-Xylene	2.50	ppb-V	0.002	EPA TO-3M	June 23, 1998	RMS
o-Xylene	1.65	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

#### Volatile Organic Compounds in Ambient Air (bp. -10°C to 200°C)

Sample ID: C5259-02 • MW-1B

##### Test / Parameter

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	0.217	ppm-V	0.001	EPA TO-3M	June 23, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	0.457	ppm-V	0.001	EPA TO-3M	June 23, 1998	RMS
Benzene	0.675	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
Toluene	5.92	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
Ethylbenzene	0.948	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
m,p-Xylene	2.07	ppb-V	0.002	EPA TO-3M	June 23, 1998	RMS
o-Xylene	1.00	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

#### Volatile Organic Compounds in Ambient Air (bp. -10°C to 200°C)

Sample ID: C5259-03 • MW-3

##### Test / Parameter

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	0.416	ppm-V	0.001	EPA TO-3M	June 23, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	1.85	ppm-V	0.001	EPA TO-3M	June 23, 1998	RMS
Benzene	2.47	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
Toluene	5.97	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
Ethylbenzene	2.60	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS
m,p-Xylene	3.81	ppb-V	0.002	EPA TO-3M	June 23, 1998	RMS
o-Xylene	3.19	ppb-V	0.001	EPA TO-3M	June 23, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

# CHEMSPEC

Analytical Laboratories, Inc.

## Laboratory Results Summary

119 Amoco • Page 2 of 2  
C5259

### Analytical Testing Parameters

#### Volatile Organic Compounds in Ambient Air (b.p. -10°C to 200°C)

Sample ID: C5259-04 • MW-58

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
C <sub>1</sub> - C <sub>4</sub> Range	1.56	ppm-V	0.001	EPA TO-3M	June 25, 1998	RMS
C <sub>4</sub> - C <sub>10</sub> Range	2.12	ppm-V	0.001	EPA TO-3M	June 25, 1998	RMS
Benzene	3.08	ppb-V	0.001	EPA TO-3M	June 25, 1998	RMS
Toluene	10.5	ppb-V	0.001	EPA TO-3M	June 25, 1998	RMS
Ethylbenzene	2.73	ppb-V	0.001	EPA TO-3M	June 25, 1998	RMS
m,p-Xylene	5.28	ppb-V	0.002	EPA TO-3M	June 25, 1998	RMS
o-Xylene	3.85	ppb-V	0.001	EPA TO-3M	June 25, 1998	RMS

ppm-V = Parts per Million (Volume) = mg/L (Air)

ppb-V = Parts per Billion (Volume) = µg/L (Air)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte

Reviewed and reported by:



Terry Osenbach, Laboratory Director  
PADEP Lab No. 22-478

SVE/AS Pilot Test Report  
Route 119 Amoco, Facility ID # 26-18711  
Dunbar Twp. Fayette Co., PA

## Appendix C

### Soil Quality Analytical Reports



## Laboratory Results Summary

Page 1 of 2  
C5047

Mr. Jeff Chambers

Chambers Environmental Group

485 East College Ave., Suite A

Pleasant Gap, PA 16823

Project Manager: John Pace

Project Name: Rt 119 Amoco

Project Number: 96-05413-B

Sampler: JRM

Date Sampled: June 1 and 2, 1998

Date Received: June 3, 1998

Time Received: 12:30 PM

## Analytical Testing Parameters

## Selected PA DEP UST Parameters: Unleaded Gasoline

Sample ID: C5047-01 • SVE-1 5'-6'

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
MTBE	0.232	ppm	0.002	SW846 8260B/5035	June 5, 1998	RMS
Benzene	0.553	ppm	0.002	SW846 8260B/5035	June 5, 1998	RMS
Toluene	0.160	ppm	0.002	SW846 8260B/5035	June 5, 1998	RMS
Ethylbenzene	0.135	ppm	0.002	SW846 8260B/5035	June 5, 1998	RMS
m,p-Xylene	0.157	ppm	0.004	SW846 8260B/5035	June 5, 1998	RMS
o-Xylene	0.030	ppm	0.002	SW846 8260B/5035	June 5, 1998	RMS
Isopropylbenzene (Cumene)	0.011	ppm	0.002	SW846 8260B/5035	June 5, 1998	RMS
Naphthalene	0.025	ppm	0.002	SW846 8260B/5035	June 5, 1998	RMS
% Moisture	12.54	%	0.01	EPA 160.3	June 3, 1998	RMS

ppm = Parts per Million = mg/Kg (Soil - Dry)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Selected PA DEP UST Parameters: Unleaded Gasoline

Sample ID: C5047-02 • SVE-2 5'-6'

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
MTBE	<0.200	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Benzene	0.227	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Toluene	1.27	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Ethylbenzene	1.04	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
m,p-Xylene	4.52	ppm	0.400	SW846 8260B/5035	June 5, 1998	RMS
o-Xylene	2.03	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Isopropylbenzene (Cumene)	0.317	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Naphthalene	2.05	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
% Moisture	8.55	%	0.01	EPA 160.3	June 3, 1998	RMS

ppm = Parts per Million = mg/Kg (Soil - Dry)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Selected PA DEP UST Parameters: Unleaded Gasoline

Sample ID: C5047-03 • SVE-3 5'-6'

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
MTBE	0.003	ppm	0.002	SW846 8260B/5035	June 8, 1998	RMS
Benzene	0.008	ppm	0.002	SW846 8260B/5035	June 8, 1998	RMS
Toluene	0.007	ppm	0.002	SW846 8260B/5035	June 8, 1998	RMS
Ethylbenzene	0.009	ppm	0.002	SW846 8260B/5035	June 8, 1998	RMS
m,p-Xylene	0.005	ppm	0.004	SW846 8260B/5035	June 8, 1998	RMS
o-Xylene	<0.002	ppm	0.002	SW846 8260B/5035	June 8, 1998	RMS
Isopropylbenzene (Cumene)	0.003	ppm	0.002	SW846 8260B/5035	June 8, 1998	RMS
Naphthalene	0.002	ppm	0.002	SW846 8260B/5035	June 8, 1998	RMS
% Moisture	8.72	%	0.01	EPA 160.3	June 3, 1998	RMS

ppm = Parts per Million = mg/Kg (Soil - Dry)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

## Laboratory Results Summary

Rt 119 Amoco • Page 2 of 2  
C5047

### Analytical Testing Parameters

#### Selected PA DEP UST Parameters: Unleaded Gasoline

Sample ID: C5047-04 • A5-1 5'-6'

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
MTBE	<0.200	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Benzene	0.444	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Toluene	0.258	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Ethylbenzene	0.371	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
m,p-Xylene	0.695	ppm	0.400	SW846 8260B/5035	June 5, 1998	RMS
o-Xylene	0.369	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Isopropylbenzene (Cumene)	<0.200	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Naphthalene	0.578	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
% Moisture	7.19	%	0.01	EPA 160.3	June 3, 1998	RMS

ppm = Parts per Million = mg/kg (Soil - Dry)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

#### Selected PA DEP UST Parameters: Unleaded Gasoline


Sample ID: C5047-05 • A5-2 5'-6'

Test / Parameter	Result	Units	MDL	Method	Test Date	Analyst
MTBE	<0.200	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Benzene	0.244	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Toluene	2.25	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Ethylbenzene	1.22	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
m,p-Xylene	5.88	ppm	0.400	SW846 8260B/5035	June 5, 1998	RMS
o-Xylene	3.27	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Isopropylbenzene (Cumene)	0.243	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
Naphthalene	2.83	ppm	0.200	SW846 8260B/5035	June 5, 1998	RMS
% Moisture	13.21	%	0.01	EPA 160.3	June 3, 1998	RMS

ppm = Parts per Million = mg/kg (Soil - Dry)

The MDL is the Method Detection Limit, defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Reviewed and reported by:



Terry Osenbach, Laboratory Director  
PADEP Lab No. 22-478

# Chambers Environmental Group, Inc.

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Pleasant Gap, PA 16823  
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## Chain of Custody Report

C5047

Page 1 of 1

Lab Sent To:	Chem Spec	Project Manager:	John Pace	Turnaround Time Requested (please circle):	Normal	Rush
Address:		Project Name:	Pleasant Gap	(Rush Results subject to prior approval and surcharge)		
Address:	Harrisburg, PA	Location:	Durban, PA			
Contact:		Sampler(s):	JRM			
Phone:		PO #				
Fax:		Project Number:	96-05413-B			
Sample Identification Description/Location		Date Collected	Time Collected	Total # of Containers	Matrix	Pres.
1 SVE-1 5'-6'	6/1/98	13:55	3	Soil	40	
2 SVE-2 5'-6'	6/2/98	15:30	1	Soil	40	
3 SVE-3 5'-6'	6/2/98	8:15	1	Soil	40	
4 AS-1 5'-6'	6/2/98	13:05	1	Soil	40	
5 AS-2 5'-6'	6/2/98	9:55	1	Soil	40	
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
Remarks						

Comments

Send Bill To:	CEG	Relinquished By:	John K. Mule	Date:	6/3/98	Time:	10:00 AM
		Relinquished By:		Date:		Time:	
Delivery Method:	Chem Spec Pick up	Relinquished By:	John K. Mule	Date:	6-3-98	Time:	11:00
		Relinquished By:		Date:		Time:	

Original - Return With Results Yellow - Lab Pink - Field Files