

ENVIRONMENTAL
PROTECTION

97 AUG 15 PM 2: 33

August 13, 1997

Mr. Alex Perez
Shell Oil Products Company
P.O. Box 4023
Concord, California 94524

RE: Site Investigation Report
Former Shell Service Station
15275 Washington Avenue
San Leandro, California
WIC #204-6852-1008

Dear Mr. Perez:

Enviros, Inc. (Enviros) has prepared this Site Investigation Report on behalf of Shell Oil Products Company to describe the performance of a soil vapor extraction test, installation of soil borings, and collection soil-gas samples at the above referenced site (Plates 1 and 2).

1.0 SITE CONDITIONS

1.1 Site Geology

Based on data collected from prior investigations, the subsurface geology consists primarily of a low permeability clay (CL and CH) with interspersed discreet stringers of sand (SC, SM and SP) and silt (ML). The upper water-bearing zone appears to extend from a depth of approximately 6 feet to 20 fbg.

A gravel/fill layer was encountered in borings S-1 through S-5, S-9, S-17, SG-3, and SR-1 at depths of approximately 0.5 - 3 fbg. A silty sand/clayey sand layer was identified in borings S-2 through S-5, SG-7, SG-8, and SR-1 at depths of approximately 4 - 6 fbg. Soil, ground water, and vapor samples suggest that these layers control the migration of petroleum hydrocarbons in the subsurface.

1.2 Site Hydrogeology

First encountered ground water occurs at depths ranging from approximately 6 to 20 fbg based on review of exploratory boring logs. Stabilized depths to ground water have ranged from approximately 4.5 to 9 fbg. Historically, ground water flow has been predominantly to the south/southwest. Based on a review of historical ground water elevation data, water level fluctuations appear to be approximately 2 to 4 feet seasonally.

1.3 Risk Based Corrective Action Evaluation

A Risk Based Corrective Action (RBCA) evaluation was performed by Weiss Associates (WA). This evaluation showed that site specific target levels SSTLs were exceeded for benzene for volatilization to indoor air from soil and ground water pathways.

Collection of additional soil gas data was proposed in this investigation to delineate the extent of the area in which benzene concentrations in soil gas exceed SSTLs.

2.0 SOIL VAPOR EXTRACTION TEST

To determine the applicability of soil vapor extraction as a remedial technique for soils and ground water at this site, a one-day soil vapor extraction test was performed on July 30, 1997.

2.1 Soil Vapor Extraction Test Procedure

As required by the Bay Area Air Quality Management District (BAAQMD), Enviro sent a soil vapor extraction test notification letter to the BAAQMD dated July 18, 1997. A site specific health and safety plan was prepared. Existing monitoring Wells S-1, S-3, S-5, S-7, and S-8 were utilized as extraction wells, and Wells S-1, S-3, S-5, S-6, S-7, S-8, S-9, and S-16 were utilized as vacuum monitoring wells. extraction wells were used as vacuum monitoring wells when not subject to vapor extraction. Vapor extraction was performed for 1.5 hours on each extraction well and induced vacuum response was measured in each vacuum monitoring well every 30 minutes.

A VR-Systems V2B internal combustion engine was utilized to provide extraction well vacuum and to provide air stream abatement. LPG (propane) vessels were used to provide supplemental fuel for the V2B.

Data collected during the soil vapor extraction test included extraction well vacuum, extracted vapor flow rate, extracted hydrocarbon concentrations, and induced vacuum response in the vacuum monitoring wells. Field data sheets are included in Appendix A. Influent vapor samples were collected from each SVE test well for laboratory analysis. Vapor samples were analyzed for TPPH according to EPA Method 8015 and for benzene, toluene, ethylbenzene, and xylenes (BTEX) and MTBE according to EPA Method 8020. The certified analytical reports for vapor samples are presented in Appendix B.

2.2 Soil Vapor Extraction Test Results

Soil vapor extraction test results are included on Tables 1 and 2 and Plate 3. Extracted vapor flow rates from each extraction well varied from 1 to 15 standard cubic feet per minute (scfm) at extraction vacuums of 25 to 140 inches of water. The extracted vapor flow rate from Well S-3 was 37 scfm at 6.5 inches of water, but this well had upper casing damage that prevented a positive vacuum seal to the extraction hose. When extraction vacuums exceeded approximately 50 inches of

water during the test, entrained ground water was produced from Wells S-1, S-5, and S-8. Well S-7 produced ground water during its entire test interval due to high well vacuum caused by a low vapor extraction flow rate.

Hydrocarbon Mass Removal

As shown on Table 1, extracted soil vapor TPPH concentrations ranged from 310 parts per million by volume (ppmv) to 51,000 ppmv, and TPPH mass flow rates varied from 0.003 to 4.43 pounds per hour. Extracted vapor benzene concentrations varied from not detected to 940 ppmv. ~~MTBE was not detected in any of the extracted vapor samples.~~ The vapor sample from Well S-3 was lost due to a punctured air bag according to Sequoia Analytical. Based on the measured vapor extraction flow rates and certified analytical reports of vapor sample TPPH concentrations, approximately 15 pounds of hydrocarbons were removed from subsurface soils and ground water during the test (Table 1).

Radius of Vacuum Influence Calculations

The radius of vacuum influence was evaluated by the method described in Timothy E. Buscheck, P.E. and Thomas R. Peargin, R.G., November 1991, *Summary of a Nation-Wide Vapor Extraction System Performance Study*. Subsurface induced vacuum declines approximately exponentially with distance from the extraction well and varies linearly with the amount of vacuum applied at the extraction well. Therefore, measured monitoring well vacuum response data should conform to a straight line fit when plotted versus distance from the extraction well on a semi-log plot. Because induced vacuum varies linearly with the amount of vacuum applied at the extraction well, monitoring well vacuum data can be normalized relative to extraction well vacuum by the following equation, allowing vacuum influence measurements (Table 2) from different extraction vacuums to be combined into one plot:

Normalized Vacuum Response = Monitoring Well Response / Extraction Well Vacuum

The normalized vacuum data points were then plotted versus the distance from the extraction well on semi-log paper (Plate 3). A best fit exponential curve was generated utilizing the Microsoft Excel® GROWTH function and plotted with the normalized vacuum data. The best fit exponential curve appears as a straight line due to the semi-log plot.

Because this method utilizes a semi-log plot of induced vacuum data, induced vacuum readings of zero cannot be included on the plot. The instrumentation used to monitor vacuum influence could detect a minimum of 0.01 inches of water vacuum. Thus, a reading of zero indicates that the induced vacuum is less than 0.01 inches of water. Induced vacuum was less than 0.01 inches of water in vacuum monitoring wells S-3, S-5, and S-7 for the duration of the SVE test. Therefore, data from these wells is not included on Table 2 or Plate 3.

According to Buscheck, et. al. (1991), vacuum influence is assumed to be effective within a radial distance from the extraction well where values between 0.1 to 1

percent of the extraction well vacuum are recorded. These values correspond to normalized values of 0.01 to 0.001. The best fit curve shown on Plate 3 does not intersect the normalized values of 0.01 to 0.001, indicating a small radius of vacuum influence. Results from the vapor extraction test indicate that the vadose zone sediments beneath the Shell site have low permeability to air flow. This is consistent with boring log data from the previous site investigations.

Based upon hydrocarbon extraction rates of up to 4.43 pounds per hour, the use of SVE is viable for removal of residual hydrocarbons present in soils and ground water at this site. The low apparent radius of influence data indicates that soil vapor extraction may only address soils and ground water in the near vicinity of the vapor extraction well.

3.0 SOIL GAS SURVEY

3.1 Field Procedures

Four soil gas survey points (SG-10 through SG-13) were installed on July 31, 1997 to collect soil gas samples. In addition to the soil gas samples, soil samples were also collected at each soil gas sample location. The probes were installed using GeoProbe drilling equipment which also allowed for collection of soil samples. The locations and designations of each boring are shown on Plate 2 and the Probe installation data is summarized in Table 3. An Enviro's geologist supervised the probe placement, vapor sample collection and soil sample collection activities.

Soil gas samples were collected from each probe location at the depth of 4 feet below grade (fbg). Clean sample tubing was placed into the probe and connected via tee-connector to a 1 liter SUMMA canister and to a vacuum pump. A minimum of 3 liters of soil gas was purged from the tubing with the vacuum pump prior to sample collection. After purging, the valve on the SUMMA canister was opened allowing the vacuum in the canister to collect the soil gas sample. The SUMMA canisters were then labeled, logged on to a chain-of-custody log, and shipped to Air Toxics Ltd. of Folsom, California for analysis.

After collection of the soil gas sample, a soil sample was collected from each probe location at a depth of 4 fbg. Soil sample tubes were covered with Teflon tape, capped, labeled, entered onto a chain-of-custody record, and stored in a cooler with ice. The samples were transported to Sequoia Analytical (Sequoia), a state-certified environmental laboratory located in Redwood City, California, for analysis.

The soil gas were analyzed for Total Purgeable Petroleum Hydrocarbons (TPPH) according to EPA Method 8015 (Modified), and benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl-tertiary-butyl-ether (MTBE) according to EPA Method TO-3.

Soil samples were analyzed for TPPH according to EPA Method 8015 (Modified), and BTEX, and MTBE according to EPA Method 8020.

3.2 Findings

Chemical Analytical Data

Soil chemical analytical data and soil gas chemical analytical data are presented in Table 4 and Table 5, respectively. The benzene data for both the soil samples and the soil gas sample are shown on Plate 2. Certified analytical reports are contained in Appendix C.

Soil Analytical Data

Soil samples collected from Probes SG-10 and SG-13 at 4 fbg contained non-detectable (ND) levels of TPPH and BTEX. The soil samples from Probes SG-11 and SG-12 at 4 fbg contained TPPH at concentrations of 30 ppm and 6.8 ppb, respectively. Benzene was detected in SG-11 at a concentration of 0.11 ppm. Benzene was not detected in the soil sample from SG-12.

Soil Gas Analytical Data

The soil gas sample collected from Probe SG-10 collected at 4 fbg contained 1,700 $\mu\text{g}/\text{m}^3$ TPPH and was ND for benzene. [REDACTED] from Probe SG-11 collected at 4 fbg contained 660 $\mu\text{g}/\text{m}^3$ TPPH and was ND benzene. The soil gas sample from Probe SG-12 collected at 4 fbg contained 5,000 $\mu\text{g}/\text{m}^3$ of TPPH and 16 $\mu\text{g}/\text{m}^3$ of benzene. The soil gas sample from SG-13 collected at 4 fbg contained 5,000 $\mu\text{g}/\text{m}^3$ of TPPH and was ND for benzene.

4.0 CONCLUSIONS

Soil gas samples and soil samples collected from Probes SG-10 through SG-13 contained concentrations of benzene which were non-detect or below SSTLs. Thus exposure levels for the volatilization from soil and ground water to indoor air pathway for the buildings located on the northern portion of the property adjacent to probe locations are acceptable per parameters of the RBCA evaluation.

The soil vapor extraction test data show that initial influent petroleum hydrocarbon concentrations from wells S-1, S-5, and S-8 ranged from 13,000 to 51,000 ppmv, resulting in hydrocarbon removal rates of 2.79 to 4.43 lbs./hour. The duration of the test was not long enough to predict how rapidly these concentrations will decline.


As expected due to subsurface lithology, the average vapor extraction flow rate was less than 10 scfm (excluding Well S-3, which could not be sealed properly). Measurable influence on surrounding wells was observed, however this influence was too small to predict a radius of influence by generally accepted techniques. Data suggest this radius would be ten feet or less.

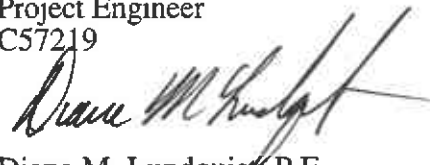
Despite the low flowrates and small radius of influence for soil vapor extraction, we believe this technique will be effective at this site. Use of horizontal extraction piping surrounding the southern building in conjunction with SVE as proposed in the Corrective Action Plan (CAP) will mitigate benzene concentrations in soil vapor beneath this building which presently exceed SSTLs. Use of the soil vapor extraction well configuration proposed in the CAP will serve to remove petroleum hydrocarbons from source areas, though at a limited rate. An additional soil vapor extraction well is proposed in the location shown on Plate 4 to enhance soil vapor extraction influence in the former dispenser island source area.

If you have any questions regarding the contents of this document, please call.

Sincerely,

Enviros, Inc.


Matthew E. Donohue, P.E.
Project Engineer
C57219


Diane M. Lundquist, P.E.
Senior Engineer
C46725



Attachments

Table 1: Vapor Extraction Test Analytical Data
Table 2: Vapor Extraction Influence Data
Table 3: Well/Boring/Probe Data
Table 4: Soil Analytical Data
Table 5: Soil Gas Analytical Data

Plate 1: Vicinity Map
Plate 2: Site Plan/Benzene Concentration Map
Plate 3: Monitoring Well Vacuum Response
Plate 4: Soil Vapor Extraction System Layout

Appendix A

Soil Vapor Extraction Test Field Data Sheets

Appendix B

Soil Vapor Extraction Test Certified Analytical Reports

Appendix C

Soil Chemical Data and Soil Gas Chemical Data - Certified Analytical Reports

cc: Mr. Brad Boschetto, Shell Oil Products Company
Mr. Erik Hansen, Shell Oil Products Company
Mr. Scott Seery, Alameda County Health Care Services, Environmental
Protection Division
Mr. Kevin Graves, Regional Water Quality Control Board, San Francisco
Bay Region
Mr. Mike Bakaldin, San Leandro Fire Department
Mr. John Verber, Larson and Burnham
Mr. Jonathan W. Redding
Mr. Richard P. Waxman

Table 1
Vapor Extraction Test Analytical Data
 Shell Oil Products Company
 15275 Washington Avenue
 San Leandro, California
 WIC# 204-6852-1008

Vapor Extraction Test Date:

30-Jul-97

Extraction Well/ Vapor Sample ID	Vapor Extraction Hours Per Well	Cumul. Hours Vapor Extraction	Average Vapor Flow Rate Per Well (scfm)	Influent Soil Vapor						Comments
				TPPH			Benzene	MTBE		
				Removal			Inf. Conc. Undiluted	Inf. Conc. Undiluted	Inf. Conc. Undiluted	
				Rate (lbs./hr.)	Per Well (lbs.)	Cum (lbs.)	(ppmv)	(ppmv)	(ppmv)	
S-1	1.5	1.5	6	4.43	6.64	6.64	51000	940	<1400	SVE Test Start Up
S-3	1.5	3.0	37	NA	NA	6.64	NA	NA	NA	vapor sample lost
S-5	1.5	4.5	15	2.78	4.17	10.81	13000	88	<1400	
S-7	1.5	6.0	1	0.003	0.004	10.81	310	<0.38	<35	
S-8	1.5	7.5	6	2.79	4.19	15.00	34000	750	<1400	SVE Test Shut Down

Note:
 Vapor sample S-3 was lost due to punctured sample bag according to Sequoia Analytical.

Abbreviations:
 TPPH = Total Purgeable Petroleum Hydrocarbons by EPA Method 8015 Modified
 SCFM = Standard Cubic Feet Per Minute
 NA = Not Available
 ppmv = parts per million by volume from certified analytical report
 <x = not detected at detection limit x

Table 2
Vapor Extraction Influence Data
 Shell Oil Products Company
 15275 Washington Avenue
 San Leandro, California
 WIC# 204-6852-1008

Vapor Extraction Test Date: 30-Jul-97

Extraction Well	Extraction Well of Day	Time	Monitoring Well S-1			Monitoring Well S-6			Monitoring Well S-8			Monitoring Well S-9			Monitoring Well S-16		
			Induced Vacuum (in. water)	Distance to Extraction Well (Feet)	Normalized Response (Induced vac./extract. vac.)	Induced Vacuum (in. water)	Distance to Extraction Well (Feet)	Normalized Response (Induced vac./extract. vac.)	Induced Vacuum (in. water)	Distance to Extraction Well (Feet)	Normalized Response (Induced vac./extract. vac.)	Induced Vacuum (in. water)	Distance to Extraction Well (Feet)	Normalized Response (Induced vac./extract. vac.)	Induced Vacuum (in. water)	Distance to Extraction Well (Feet)	Normalized Response (Induced vac./extract. vac.)
S-1	30	11:30	---	---	---	0.01	36	0.0003	0.00	144	0.0000	0.00	103	0.0000	0.03	62	0.0010
S-1	31	12:00	---	---	---	0.01	36	0.0003	0.01	144	0.0003	0.00	103	0.0000	0.03	62	0.0010
S-1	27	12:30	---	---	---	0.02	36	0.0007	0.02	144	0.0007	0.01	103	0.0004	0.04	62	0.0015
S-1	70	13:00	---	---	---	0.02	36	0.0003	0.01	144	0.0001	0.02	103	0.0003	0.02	62	0.0003
S-3	8	13:00	(>0.50)*	75	---	0.00	83	0.00	0.00	69	0.00	0.00	53	0.00	0.00	85	0.00
S-3	7	13:30	(>0.50)*	75	---	0.00	83	0.00	0.00	69	0.00	0.00	53	0.00	0.00	85	0.00
S-3	6	14:00	(0.45)*	75	---	0.00	83	0.00	0.00	69	0.00	0.00	53	0.00	0.00	85	0.00
S-3	5	14:30	(0.40)*	75	---	0.00	83	0.00	0.00	69	0.00	0.00	53	0.00	0.00	85	0.00
S-5	25	14:30	0.02	56	0.0008	0.00	72	0.0000	0.01	93	0.0004	0.01	54	0.0004	0.02	62	0.0008
S-5	24	15:00	0.02	56	0.0008	0.01	72	0.0004	0.00	93	0.0000	0.01	54	0.0004	0.00	62	0.0000
S-5	24	15:30	0.03	56	0.0013	0.03	72	0.0013	0.01	93	0.0004	0.01	54	0.0004	0.01	62	0.0004
S-5	50	16:00	0.01	56	0.0002	0.01	72	0.0002	0.00	93	0.0000	0.01	54	0.0002	0.03	62	0.0006
S-7	108	16:00	0.00	73	0.00	0.00	60	0.00	0.00	88	0.00	0.00	94	0.00	0.00	109	0.00
S-7	140	16:30	0.00	73	0.00	0.00	60	0.00	0.00	88	0.00	0.00	94	0.00	0.00	109	0.00
S-7	145	17:00	0.00	73	0.00	0.00	60	0.00	0.00	88	0.00	0.00	94	0.00	0.00	109	0.00
S-7	150	17:30	0.00	73	0.00	0.00	60	0.00	0.00	88	0.00	0.00	94	0.00	0.00	109	0.00
S-8	40	17:30	0.00	144	0.00	0.00	146	0.00	---	---	---	0.04	81	0.0010	0.00	146	0.00
S-8	45	18:00	0.00	144	0.00	0.00	146	0.00	---	---	---	0.05	81	0.0011	0.00	146	0.00
S-8	57	18:30	0.00	144	0.00	0.00	146	0.00	---	---	---	0.06	81	0.0011	0.00	146	0.00
S-8	60	19:00	0.00	144	0.00	0.00	146	0.00	---	---	---	0.06	81	0.0010	0.00	146	0.00

Notes:
 Data from monitoring Wells S-3, S-5, and S-7 were not included because no induced vacuum was recorded in these wells.
 * Induced vacuum readings are due to prior extraction from this well and are not included on plot.

**TABLE 3
WELL/BORING/PROBE DATA
Shell Oil Products Company
15275 Washington Avenue
San Leandro, CA
WIC# 204-6852-1008**

Name	Type	Date Installed	Surface Elev (ft)	Total Depth (ft)	Soil Sample		First Encountered GW		Screen Diam. (In)	Screen Depth (ft)		Packer Int. Depth (ft.)	Comments
					Incr. or	Depth(s)	Depth (ft)	Elev (ft)		Top	Bottom		
SG-10	Probe	31-Jul-97	NA	4.5	-	4 - 4.5	-	-	-	-	-	-	
SG-11	Probe	31-Jul-97	NA	4.5	-	4 - 4.5	-	-	-	-	-	-	
SG-12	Probe	31-Jul-97	NA	4.5	-	4 - 4.5	-	-	-	-	-	-	
SG-13	Probe	31-Jul-97	NA	4.5	-	4 - 4.5	-	-	-	-	-	-	

TABLE 4
SOIL ANALYTICAL DATA
Shell Oil Products Company
15275 Washington Avenue
San Leandro, CA
WIC# 204-6852-1008

Sample Depth (ft)	Date Sampled	TPPH (mg/Kg)	B (mg/Kg)	T (mg/kg)	E (mg/Kg)	X (mg/Kg)	MTBE (mg/Kg)	Primary Soil Type (Unified Soil Class)	Comments
SG-10-4									
4	31-Jul-97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	SM	
SG-11-4									
4	31-Jul-97	30	0.11	0.15	0.76	0.27	0.67	CL	
SG-12-4									
4	31-Jul-97	6.8	<0.0050	0.018	0.014	0.065	<0.025	CL	
SG-13-4									
4	31-Jul-97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	CL	

Abbreviations:

<x = Not detected at detection limit of x

TABLE 5

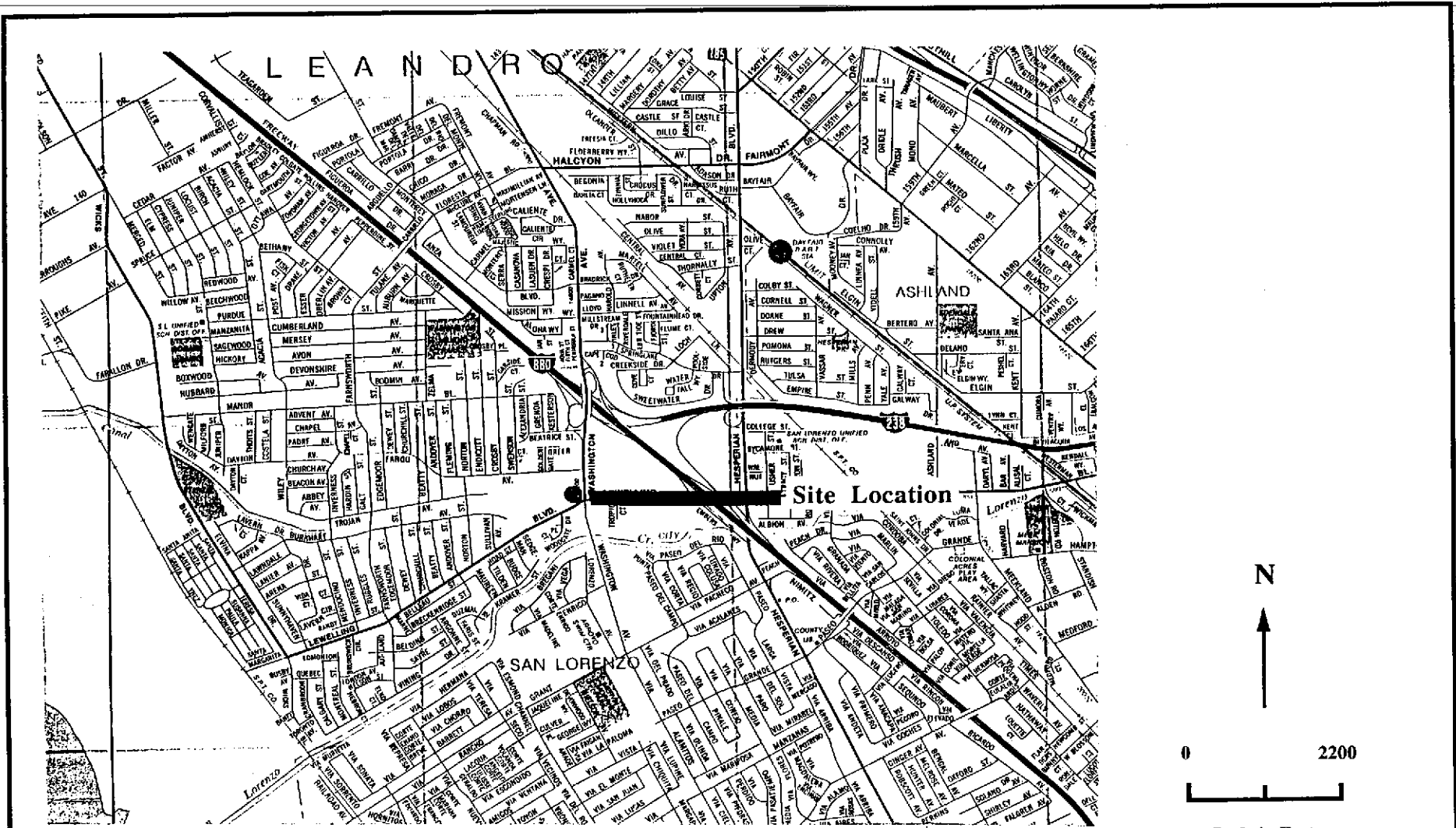
SOIL GAS SURVEY ANALYTICAL DATA
 Shell Oil Products Company
 15275 Washington Avenue
 San Leandro, CA
 WIC# 204-6852-1008

Sample Depth (ft)	Date Sampled	TPPH (µg/m³)	B (µg/m³)	T (µg/m³)	E (µg/m³)	X (µg/m³)	MTBE (µg/m³)	Comments
SG-10-4								
4	31-Jul-97	1700	<7.0	11	<9.5	22	11	
SG-11-4								
4	31-Jul-97	660	<6.7	<7.9	<9.0	<9.0	<7.5	
SG-12-4								
4	31-Jul-97	5000	16	<8.3	13	22	29	
SG-13-4								
4	31-Jul-97	5000	<71	<84	<97	<97	<81	

Abbreviations:

<x = Not detected at detection limit of x

NA = Not analyzed or not available

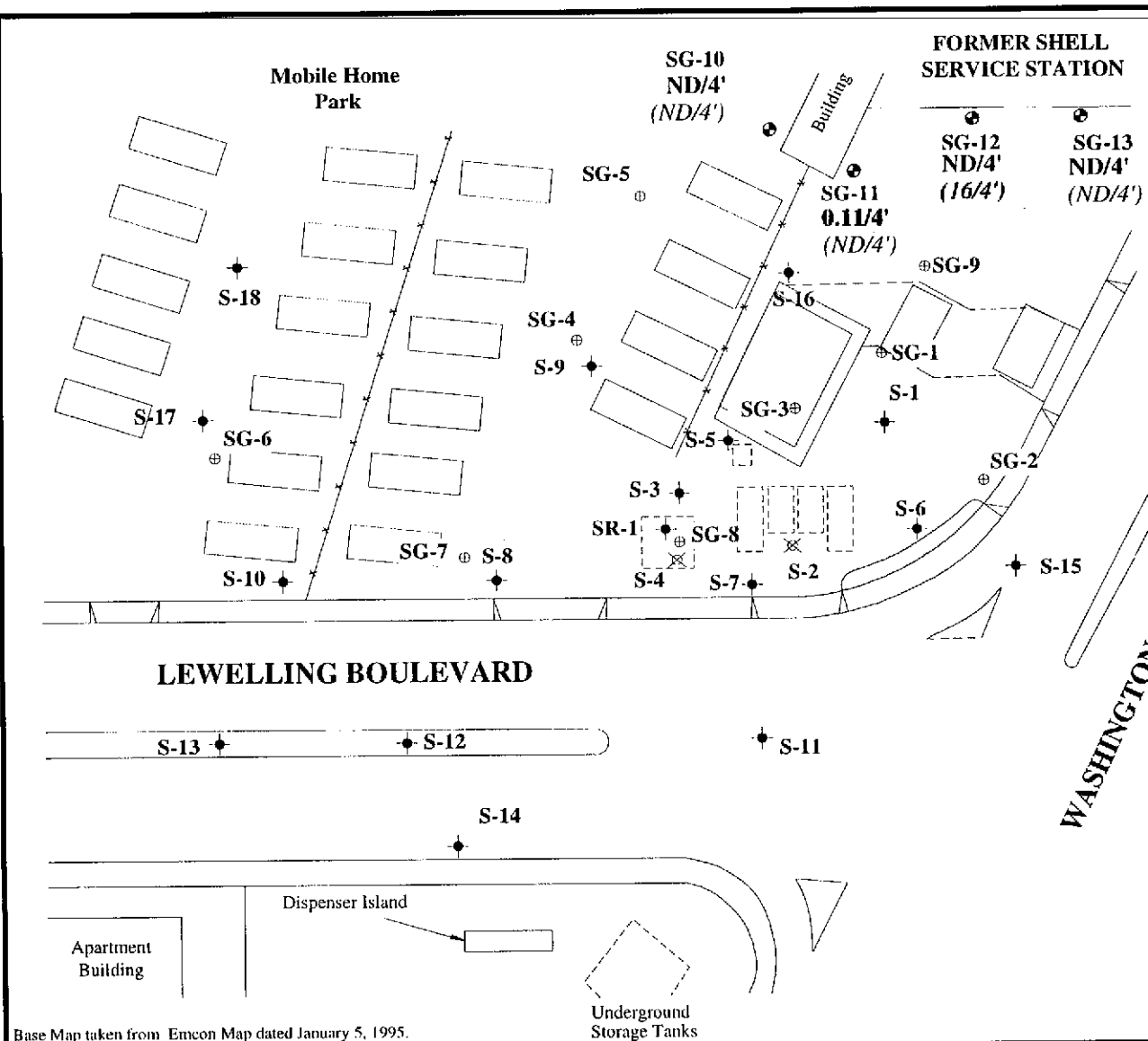


Note: Vicinity Map taken from California State Automobile Association Map.

<p>PLATE 1</p>	<p>SITE VICINITY MAP Shell Oil Company 15275 Washington Avenue San Leandro, California</p>
<p>Drawn By: JLP</p>	<p>Date: 3-23-95</p>

enviros[®]
95276.01

Approved By: AK Date: 8-13-97



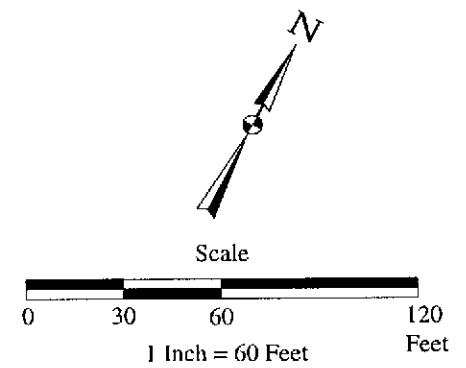
EXPLANATION

- ◆ Groundwater Monitoring Well
- ⊗ Abandoned Groundwater Monitoring Well
- ⊕ Weiss Associates Soil Boring
- ⊙ Envirosoil Soil Boring (31-Jul-97)

0.11/4'
Benzene/Depth in feet. Concentration in soil in parts per million.

(0.11/4')
Benzene/Depth in feet. Vapor concentration in soil in ug/cubic meter

ND None Detected



Base Map taken from Emcon Map dated January 5, 1995.

PLATE 2

SITE MAP / BENZENE CONCENTRATION MAP


Shell Oil Products Company
15275 Washington Avenue
San Leandro, California

enviros®

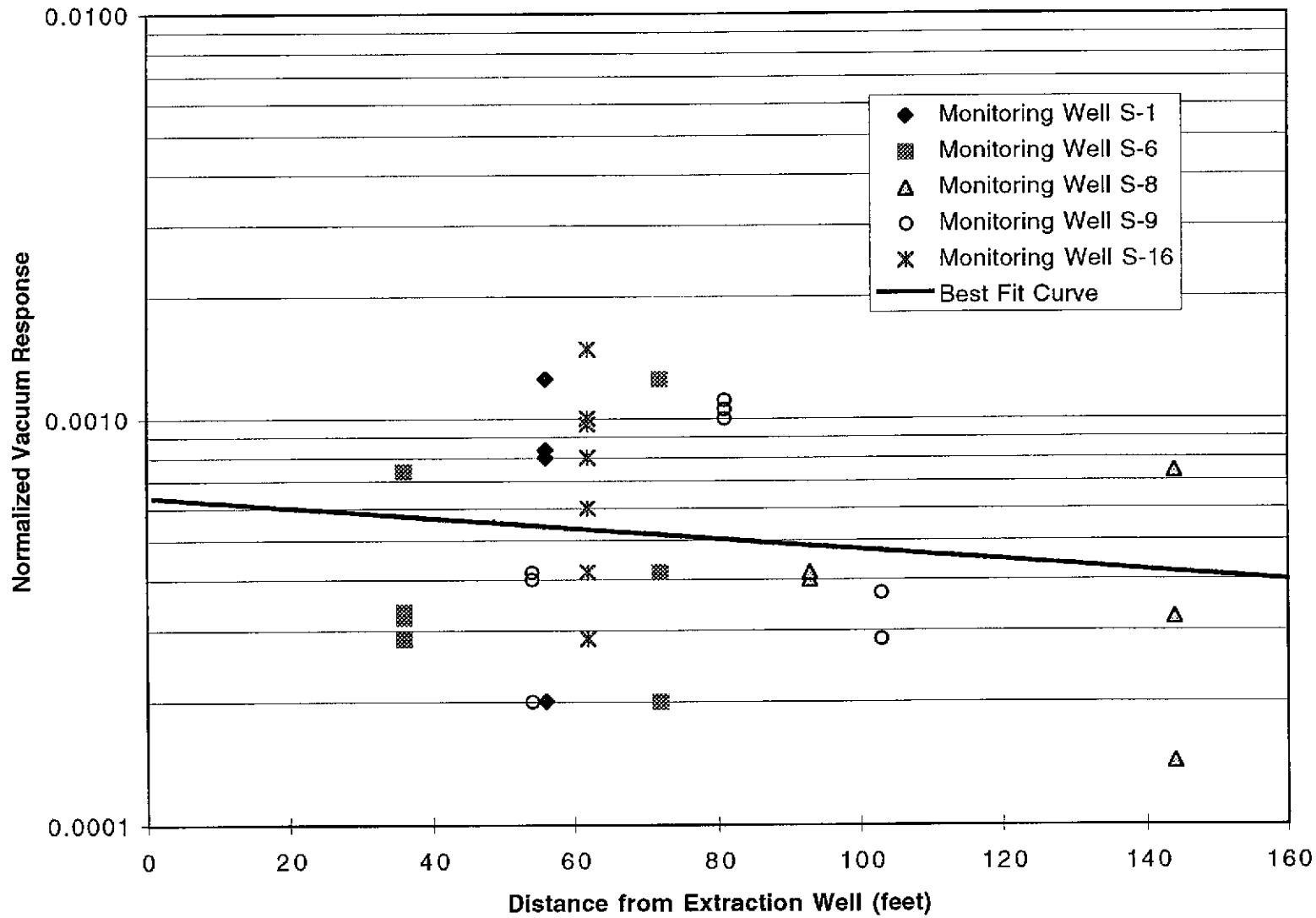
95276.01

Drawn By: DML

Date: 7-22-97

Approved By: 

Date: 8-13-97



PLATE

3

MONITORING WELL VACUUM RESPONSE

Former Shell Service Station
 15275 Washington Avenue
 San Leandro, California

enviros[®]

97276

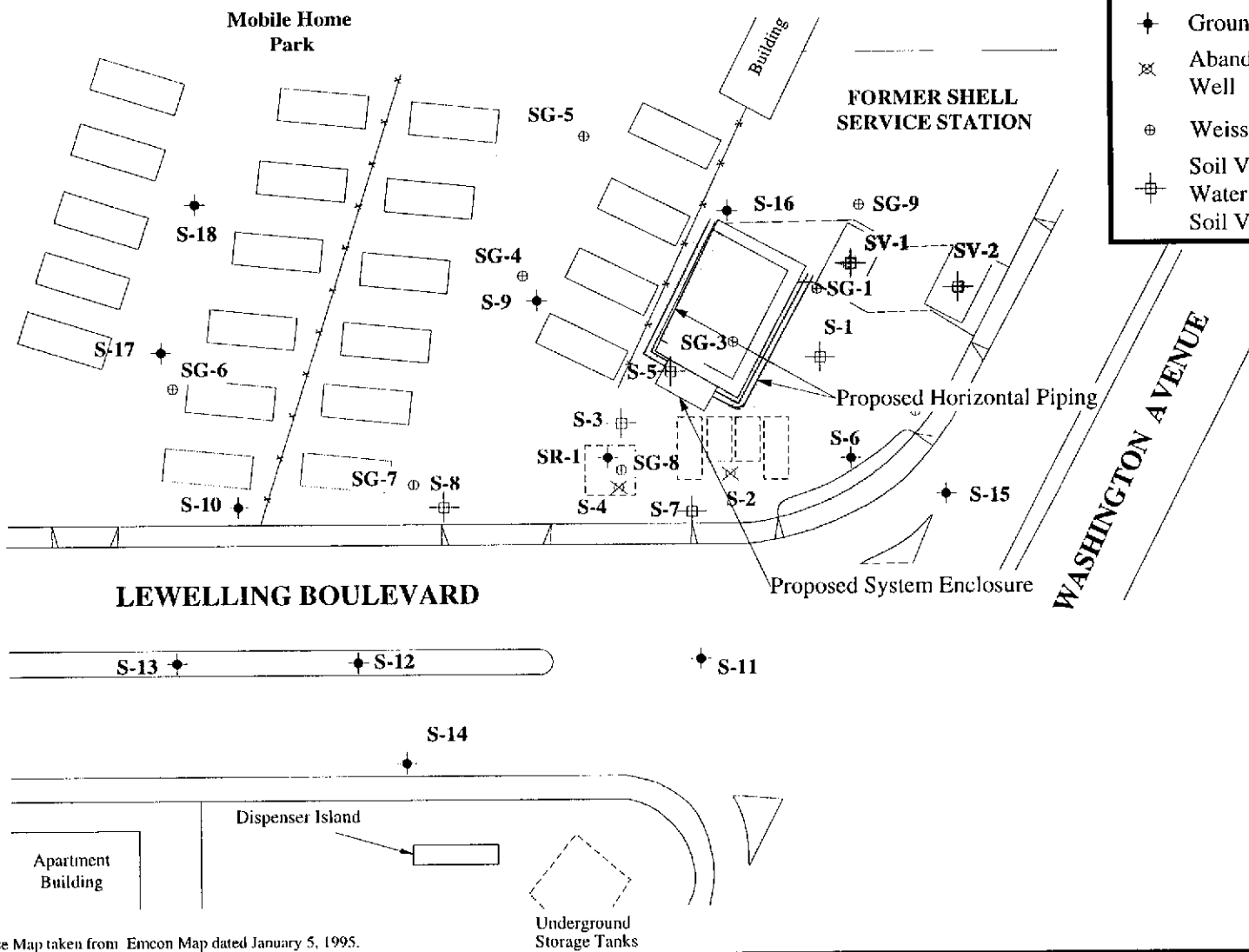
Drawn By: MED

Date: 5-Aug-97

Approved By: *MED*

Date: *8-13-97*

EXPLANATION	
◆	Groundwater Monitoring Well
×	Abandoned Groundwater Monitoring Well
⊕	Weiss Associates Soil Boring
⊕	Soil Vapor Extraction Well/Ground Water Monitoring Well Used for Soil Vapor Extraction



Base Map taken from Emcon Map dated January 5, 1995.

PLATE

4

SOIL VAPOR EXTRACTION SYSTEM LAYOUT

Shell Oil Products Company
15275 Washington Avenue
San Leandro, California

enviros
95276.01

Drawn By: DML

Date: 6-19-97

Approved By:

Date: 8-13-99

Appendix A

Soil Vapor Extraction Test Field Data Sheets

VAPOR EXTRACTION TEST
Extraction Well Data

Date 7.30.97

Client Slell

Well No. see left most column Address 15275 Washington, San Leandro

S-1

S-3

S-5

~~S-7~~

S-8

Reading Number	Time (military)	Pitot Tube Delta P (inches H2O)	Flow Temperature (degrees F)	Well Vacuum (inches H2O)	Influent Concentration (ppm)	Engine RPM	Dilution Valve (open/closed)	Extraction Well Flowrate (ACFM)
1	1130	—	—	30	191	2000	closed	7
2	1200	—	—	31	240	1985	"	7
3	1230	—	—	27	278	2120	"	7
4	1300	—	—	70	250	2000	"	8
5	1300	—	—	8	253	2099	"	40
6	1330	—	—	7	216	2083	"	37
7	1400	—	—	6	181	2065	"	41
8	1430	—	—	5	151	2091	"	40
9	1430	—	—	25	513	2205	"	16
10	1500	—	—	24	554	2337	"	17
11	1530	—	—	24	656	2167	"	17
12	1600	—	—	50	674	2256	"	35
13	1600	—	—	108	588	2106	"	2
14	1630	—	—	140	463	2288	"	<1
15	1700	—	—	145	430	2222	"	<1
16	1730	—	—	150	325	2103	"	<1
17	1730	—	—	40	245	2402	"	7
18	1800	—	—	45	238	2399	"	7
19	1830	—	—	57	263	2496	"	7
20	1900	—	—	60	184	2462	"	7
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Sample taken

influent water production

influent

infl. eff water production

water prod

influent

water prod

water prod

infl. water prod

VAPOR EXTRACTION TEST
Monitoring Well Data

Project No. 97276

Extraction Well No. see left most column date 7.30.97

Client Shell

Site Address 15275 Washington

Reading Number	Time (military)	Well No. S-1 Vacuum (inches H2O)	Well No. S-4 Vacuum (inches H2O) III	Well No. S-3 Vacuum (inches H2O)	Well No. S-16 Vacuum (inches H2O) II	Well No. S-5 Vacuum (inches H2O)	Well No. S-6 Vacuum (inches H2O) I	Well No. S-7 Vacuum (inches H2O)	Well No. S-8 Vacuum (inches H2O)	Well No. I Vacuum (inches H2O)	Well No. II Vacuum (inches H2O)	III
1	1130	—	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.03	0.00
2	1200	—	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.03	0.00
3	1230	—	0.01	0.00	0.04	0.00	0.02	0.00	0.02	0.02	0.04	0.00
4	1300	—	0.02	0.00	0.02	0.00	0.02	0.00	0.00 0.00	0.02 0.02	0.02	0.02
5	1300	— (70.5)	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	1330	— (20.5)	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	1400	— (0.45)	0.00	—	0.00	0.00	0.00	0.00	0.00			
8	1430	— (0.40)	0.00	—	0.00	0.00	0.00	0.00	0.00			
9	1430	0.02	0.01	0.00	0.02	—	0.00	0.00	0.01			
10	1500	0.02	0.01	0.00	0.00	—	0.01	0.00	0.00			
11	1530	0.03	0.01	0.00	0.01	—	0.03	0.00	0.01			
12	1600	0.01	0.01	0.00	0.03	—	0.01	0.00	0.00			
13	1600	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
14	1630	0.00	0.00	0.00	5.00	0.00	0.00	—	0.00			
15	1700	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00			
16	1730	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00			
17	1730	0.00	0.04	6.00	0.00	0.00	0.00	0.00	—			
18	1800	0.00	0.05	0.00	0.00	0.00	0.00	0.00	—			
19	1830	0.00	0.06	0.00	0.00	0.00	0.00	0.00	—			
20	1900	0.00	0.06	0.00	0.00	0.00	0.00	0.00	—			
21												
22												
23												
24												

Appendix B

Soil Vapor Extraction Test Certified Analytical Reports



Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834

(650) 364-9600
(510) 988-9600
(916) 921-9600

FAX (650) 364-9233
FAX (510) 988-9673
FAX (916) 921-0100

Enviros
270 Perkins Ave.
Sonoma, CA 95476
Attention: Matt Donohue

Project: Shell 15275 Washington, S.L.

Enclosed are the results from samples received at Sequoia Analytical on July 31, 1997.
The requested analyses are listed below:

RECEIVED
AUG - 7 1997

<u>SAMPLE #</u>	<u>SAMPLE DESCRIPTION</u>	<u>DATE COLLECTED</u>	<u>TEST METHOD</u>
9707F88 -01	AIR, S-1	07/30/97	TPGBMA Purgeable TPH/BTEX
9707F88 -03	AIR, S-5	07/30/97	TPGBMA Purgeable TPH/BTEX
9707F88 -04	AIR, Effluent (S-5)	07/30/97	TPGBMA Purgeable TPH/BTEX
9707F88 -05	AIR, S-7	07/30/97	TPGBMA Purgeable TPH/BTEX
9707F88 -06	AIR, S-8	07/30/97	TPGBMA Purgeable TPH/BTEX

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Mike Gregory
Project Manager





Enviros	Client Proj. ID: Shell 15275 Washington, S.L.	Sampled: 07/30/97
270 Perkins Ave.	Sample Descript: S-1	Received: 07/31/97
Sonoma, CA 95476	Matrix: AIR	
Attention: Matt Donohue	Analysis Method: 8015Mod/8020	Analyzed: 08/01/97
	Lab Number: 9707F88-01	Reported: 08/04/97

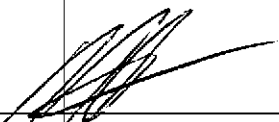
QC Batch Number: GC080197BTEX21A
Instrument ID: GCHP21

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ppmv	Sample Results ppmv
TPPH as Gas	1400	51000
Methyl t-Butyl Ether	1400	N.D.
Benzene	16	940
Toluene	13	180
Ethyl Benzene	12	110
Xylenes (Total)	12	90
Chromatogram Pattern:		C6-C12
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	132 Q

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


Mike Gregory
Project Manager





Enviros
270 Perkins Ave.
Sonoma, CA 95476

Client Proj. ID: Shell 15275 Washington, S.L.
Sample Descript: S-5
Matrix: AIR
Analysis Method: 8015Mod/8020
Lab Number: 9707F88-03

Sampled: 07/30/97
Received: 07/31/97
Analyzed: 08/01/97
Reported: 08/04/97

Attention: Matt Donohue

QC Batch Number: GC080197BTEX21A
Instrument ID: GCHP21

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ppmv	Sample Results ppmv
TPPH as Gas	1400	13000
Methyl t-Butyl Ether	1400	N.D.
Benzene	16	88
Toluene	13	N.D.
Ethyl Benzene	12	130
Xylenes (Total)	12	370
Chromatogram Pattern:		C6-C12
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	117

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


Mike Gregory
Project Manager





Enviros 270 Perkins Ave. Sonoma, CA 95476	Client Proj. ID: Shell 15275 Washington, S.L. Sample Descript: Effluent (S-5) Matrix: AIR Analysis Method: 8015Mod/8020 Lab Number: 9707F88-04	Sampled: 07/30/97 Received: 07/31/97 Analyzed: 08/01/97 Reported: 08/04/97
Attention: Matt Donohue		

QC Batch Number: GC080197BTEX21A
Instrument ID: GCHP21

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ppmv	Sample Results ppmv
TPPH as Gas	1.4	N.D.
Methyl t-Butyl Ether	1.4	N.D.
Benzene	0.016	0.053
Toluene	0.013	N.D.
Ethyl Benzene	0.012	N.D.
Xylenes (Total)	0.012	N.D.
Chromatogram Pattern:		
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	99

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Mike Gregory
Project Manager





Enviros 270 Perkins Ave. Sonoma, CA 95476	Client Proj. ID: Shell 15275 Washington, S.L. Sample Descript: S-7 Matrix: AIR Analysis Method: 8015Mod/8020 Lab Number: 9707F88-05	Sampled: 07/30/97 Received: 07/31/97 Analyzed: 08/01/97 Reported: 08/04/97
Attention: Matt Donohue		


QC Batch Number: GC080197BTEX21A
Instrument ID: GCHP21

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ppmv	Sample Results ppmv
TPPH as Gas	36	310
Methyl t-Butyl Ether	35	N.D.
Benzene	0.38	N.D.
Toluene	0.32	N.D.
Ethyl Benzene	0.28	6.2
Xylenes (Total)	0.28	17
Chromatogram Pattern:		C6-C12
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	92

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


Mike Gregory
Project Manager





Enviros 270 Perkins Ave. Sonoma, CA 95476	Client Proj. ID: Shell 15275 Washington, S.L. Sample Descript: S-8 Matrix: AIR Analysis Method: 8015Mod/8020 Lab Number: 9707F88-06	Sampled: 07/30/97 Received: 07/31/97 Analyzed: 08/01/97 Reported: 08/04/97
Attention: Matt Donohue		

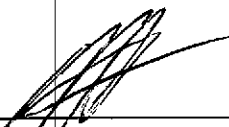
QC Batch Number: GC080197BTEX21A
Instrument ID: GCHP21

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ppmv	Sample Results ppmv
TPPH as Gas	1400	34000
Methyl t-Butyl Ether	1400	N.D.
Benzene	16	750
Toluene	13	34
Ethyl Benzene	12	N.D.
Xylenes (Total)	12	N.D.
Chromatogram Pattern:		C6-C12
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	122

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210



Mike Gregory
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834

(650) 364-9600
(510) 988-9600
(916) 921-9600

FAX (650) 364-9233
FAX (510) 988-9673
FAX (916) 921-0100

Enviros
270 Perkins Ave.
Sonoma, CA 95476
Attention: Matt Donohue

Client Project ID: Shell 15275 Washington, S.L.
Matrix: Liquid

Work Order #: 9707F88 -01, 03-06

Reported: Aug 5, 1997

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Gas
QC Batch#:	GC080197BTEX21A	GC080197BTEX21A	GC080197BTEX21A	GC080197BTEX21A	GC080197BTEX21A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015M
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030

Analyst:	D. Jirsa	D. Jirsa	D. Jirsa	D. Jirsa	D. Jirsa
MS/MSD #:	9707C2206	9707C2206	9707C2206	9707C2206	9707C2206
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97
Analyzed Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97
Instrument I.D.#:	GCHP21	GCHP21	GCHP21	GCHP21	GCHP21
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L	60 µg/L
Result:	9.6	9.6	9.7	29	53
MS % Recovery:	96	96	97	97	88
Dup. Result:	9.7	9.9	9.9	29	54
MSD % Recov.:	97	99	99	97	90
RPD:	1.0	3.1	2.0	0.0	1.9
RPD Limit:	0-25	0-25	0-25	0-25	0-25

LCS #:	BLK080197	BLK080197	BLK080197	BLK080197	BLK080197
Prepared Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97
Analyzed Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97
Instrument I.D.#:	GCHP21	GCHP21	GCHP21	GCHP21	GCHP21
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L	60 µg/L
LCS Result:	9.6	9.7	9.7	29	53
LCS % Recov.:	96	97	97	97	88

MS/MSD	60-140	60-140	60-140	60-140	60-140
LCS	70-130	70-130	70-130	70-130	70-130
Control Limits					

Please Note:

The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Mike Gregory
Project Manager

** MS=Matrix Spike, MSD=MS Duplicate, RPD=Relative % Difference

9707F88.EEE <1>





Enviros
270 Perkins Ave.
Sonoma, CA 95476
Attention: Matt Donohue

Client Proj. ID: Shell 15275 Washington, S.L.
Lab Proj. ID: 9707F88

Received: 07/31/97
Reported: 08/04/97

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 9 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

#Q - Surrogate coelution was confirmed.

SEQUOIA ANALYTICAL


Mike Gregory
Project Manager





Site Address: 15275 Washington, San Leandro

Analysis Required

LAB: Sequoia

WIC#: 204 6852 1008

Shell Engineer: Alex Perez
Phone No: 510 615 6168
Fax #: 6172

Consultant Name & Address: Envirog POB 259 Sonoma CA 95476

Consultant Contact: Matt Donohue
Phone No: 707 435 4853
Fax #: 6649

Comments:

Sampled by: MED

Printed Name: Matt Donohue

Sample ID	Date	Sludge	Soil	Water	Air	No. of conds.
S-1	7-30				X	1
S-3						
S-5						
Effluent (S-5)						
S-7						
S-8						

TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020 + MTBE	Asbestos	Container Size	Preparation Used	Composite Y/N
					X		Teller 10		N

CHECK ONE (1) BOX ONLY	CT/DI	TURN AROUND TIME
G.W. Monitoring <input type="checkbox"/>	4461	24 hours <input type="checkbox"/>
Site Investigation <input type="checkbox"/>	4441	48 hours <input type="checkbox"/>
Soil Classify/Disposal <input type="checkbox"/>	4442	15 days <input checked="" type="checkbox"/> (Normal)
Water Classify/Disposal <input type="checkbox"/>	4443	Other <input type="checkbox"/>
Soil/Air Rem. of Sys. O & M <input checked="" type="checkbox"/>	4462	
Water Rem. of Sys. O & M <input type="checkbox"/>	4453	
Other <input type="checkbox"/>		

NOTE: Holly Lab as soon as Possible of 24/48 hrs. TAT. 9707F88

UST AGENCY: 311223

MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS

Relinquished By (signature):	Printed Name: Matthew E. Donohue	Date: 7/31/97	Time: 10:55	Received (signature):	Printed Name: L. PENAFLORES	Date: 7/31/97	Time: 10:55
Relinquished By (signature):	Printed Name: L. PENAFLORES	Date: 7/31/97	Time: 11:00	Received (signature):	Printed Name: Matt	Date: 7/31/97	Time: 12:23
Relinquished By (signature):	Printed Name: Matt	Date: 7/31/97	Time: 12:23	Received (signature):	Printed Name: APP	Date: 7/31/97	Time: 12:23

Appendix C

**Soil Chemical Data and Soil Gas Chemical Data - Certified Analytical
Reports**



Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834

(415) 364-9600
(510) 988-9600
(916) 921-9600

FAX (415) 364-9233
FAX (510) 988-9673
FAX (916) 921-0100

Enviros
270 Perkins Ave.
Sonoma, CA 95476
Attention: Joe Neely

Project: Shell 15275 Washington, S.L.

Enclosed are the results from samples received at Sequoia Analytical on August 1, 1997.
The requested analyses are listed below:

<u>SAMPLE #</u>	<u>SAMPLE DESCRIPTION</u>	<u>DATE COLLECTED</u>	<u>TEST METHOD</u>
9708011 -01	SOLID, SG-10-4	07/31/97	TPGBMS Purgeable TPH/BTEX
9708011 -02	SOLID, SG-11-4	07/31/97	TPGBMS Purgeable TPH/BTEX
9708011 -03	SOLID, SG-12-4	07/31/97	TPGBMS Purgeable TPH/BTEX
9708011 -04	SOLID, SG-13-4	07/31/97	TPGBMS Purgeable TPH/BTEX

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Mike Gregory
Project Manager





Enviros 270 Perkins Ave. Sonoma, CA 95476	Client Proj. ID: Shell 15275 Washington, S.L. Sample Descript: SG-10-4 Matrix: SOLID Analysis Method: 8015Mod/8020 Lab Number: 9708011-01	Sampled: 07/31/97 Received: 08/01/97 Extracted: 08/01/97 Analyzed: 08/01/97 Reported: 08/04/97
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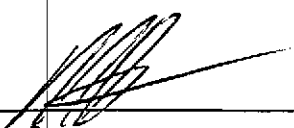
QC Batch Number: GC080197BTEXEXA
 Instrument ID: GCHP18

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Methyl t-Butyl Ether	0.025	N.D.
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Xylenes (Total)	0.0050	N.D.
Chromatogram Pattern:		
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	96
4-Bromofluorobenzene	60 140	80

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


 Mike Gregory
 Project Manager





Enviros 270 Perkins Ave. Sonoma, CA 95476	Client Proj. ID: Shell 15275 Washington, S.L. Sample Descript: SG-11-4 Matrix: SOLID Analysis Method: 8015Mod/8020 Lab Number: 9708011-02	Sampled: 07/31/97 Received: 08/01/97 Extracted: 08/01/97 Analyzed: 08/01/97 Reported: 08/04/97
Attention: Joe Neely		

QC Batch Number: GC080197BTEXEXA
Instrument ID: GCHP18


Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	10	30
Methyl t-Butyl Ether	0.25	0.67
Benzene	0.050	0.11
Toluene	0.050	0.15
Ethyl Benzene	0.050	0.76
Xylenes (Total)	0.050	0.27
Chromatogram Pattern:		C6-C12

Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70	130
4-Bromofluorobenzene	60	140

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


Mike Gregory
Project Manager





Enviros 270 Perkins Ave. Sonoma, CA 95476	Client Proj. ID: Shell 15275 Washington, S.L. Sample Descript: SG-12-4 Matrix: SOLID Analysis Method: 8015Mod/8020 Lab Number: 9708011-03	Sampled: 07/31/97 Received: 08/01/97 Extracted: 08/01/97 Analyzed: 08/01/97 Reported: 08/04/97
---	---	--

QC Batch Number: GC080197BTEXEXA
Instrument ID: GCHP18

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	6.8
Methyl t-Butyl Ether	0.025	N.D.
Benzene	0.0050	N.D.
Toluene	0.0050	0.018
Ethyl Benzene	0.0050	0.014
Xylenes (Total)	0.0050	0.065
Chromatogram Pattern:		C8-C12

Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70	130
4-Bromofluorobenzene	60	140

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Mike Gregory
Project Manager





Enviros 270 Perkins Ave. Sonoma, CA 95476	Client Proj. ID: Shell 15275 Washington, S.L. Sample Descript: SG-13-4 Matrix: SOLID Analysis Method: 8015Mod/8020 Lab Number: 9708011-04	Sampled: 07/31/97 Received: 08/01/97 Extracted: 08/01/97 Analyzed: 08/04/97 Reported: 08/04/97
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QC Batch Number: GC080197BTEXEXA
Instrument ID: GCHP7

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Methyl t-Butyl Ether	0.025	N.D.
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Xylenes (Total)	0.0050	N.D.
Chromatogram Pattern:		
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70	130
4-Bromofluorobenzene	60	140

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Mike Gregory
Project Manager





Enviros Client Project ID: Shell 15275 Washington, S.L.
 270 Perkins Ave. Matrix: Solid
 Sonoma, CA 95476
 Attention: Joe Neely Work Order #: 9708011 -01-04 Reported: Aug 5, 1997

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Gas
QC Batch#:	GC080197BTEXEXA	GC080197BTEXEXA	GC080197BTEXEXA	GC080197BTEXEXA	GC080197BTEXEXA
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015M
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030

Analyst:	A. Porter	A. Porter	A. Porter	A. Porter	A. Porter
MS/MSD #:	9707F2406	9707F2406	9707F2406	9707F2406	9707F2406
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97
Analyzed Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97
Instrument I.D.#:	GCHP7	GCHP7	GCHP7	GCHP7	GCHP7
Conc. Spiked:	0.20 mg/Kg	0.20 mg/Kg	0.20 mg/Kg	0.60 mg/Kg	1.2 mg/Kg
Result:	0.16	0.17	0.17	0.52	1.2
MS % Recovery:	80	85	85	87	100
Dup. Result:	0.16	0.17	0.17	0.52	1.1
MSD % Recov.:	80	85	85	87	92
RPD:	0.0	0.0	0.0	0.0	8.7
RPD Limit:	0-25	0-25	0-25	0-25	0-25

LCS #:	BLK080197	BLK080197	BLK080197	BLK080197	BLK080197
Prepared Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97
Analyzed Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97
Instrument I.D.#:	GCHP7	GCHP7	GCHP7	GCHP7	GCHP7
Conc. Spiked:	0.20 mg/Kg	0.20 mg/Kg	0.20 mg/Kg	0.60 mg/Kg	1.2 mg/Kg
LCS Result:	0.19	0.19	0.19	0.58	1.3
LCS % Recov.:	95	95	95	97	108

MS/MSD	60-140	60-140	60-140	60-140	60-140
LCS	70-130	70-130	70-130	70-130	70-130
Control Limits					

Please Note:
 The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

[Signature]
 Mike Gregory
 Project Manager

** MS= Matrix Spike, MSD= MS Duplicate, RPD= Relative % Difference

9708011.EEE <1>





Enviros
270 Perkins Ave.
Sonoma, CA 95476
Attention: Joe Neely

Client Proj. ID: Shell 15275 Washington, S.L.

Received: 08/01/97

Lab Proj. ID: 9708011

Reported: 08/04/97

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 8 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL


Mike Gregory
Project Manager





SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD

Date: 31-Jul-97

Serial No: _____

Page 1 of 1

Site Address: 15275 Washington Av, San Leandro

WIC#: 204-6852-1008

Shell Engineer: Alex Perez
 Phone No.: 510 675-6168
 Fax #: 675-6172

Consultant Name & Address: P.O. Box 259
 Enviro Inc., Sonoma, CA 95476

Consultant Contact: Joe Neely
 Phone No.: 707 935-4854
 Fax #: 935-6649

Comments:

Sampled by: JN.

Printed Name: Joe Neely

Analysis Required

TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020 & MTBE	Asbestos	Container Size	Preparation Used	Composite Y/N
					X				
					X				
					X				
					X				

LAB: Sequoia

CHECK ONE (1) BOX ONLY	CI/DI	TURN AROUND TIME
G.W. Monitoring <input type="checkbox"/>	4441	24 hours <input type="checkbox"/>
Site Investigation <input checked="" type="checkbox"/>	4441	48 hours <input checked="" type="checkbox"/>
Soil Classify/Disposal <input type="checkbox"/>	4442	16 days <input type="checkbox"/> (Normal)
Water Classify/Disposal <input type="checkbox"/>	4443	Other <input type="checkbox"/> Result
Soil/Air Rem. or Sys. O & M <input type="checkbox"/>	4452	NOTE: Notify Lab as soon as Possible of 24/48 hrs. TAT.
Water Rem. or Sys. O & M <input type="checkbox"/>	4453	
Other <input type="checkbox"/>		

UST AGENCY: 5112 06

Sample ID	Date	Sludge	Soil	Water	Air	No. of conds.	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
1 SG-10-4	31-Jul-97		X			2	9708011 (PW)	
2 SG-11-4							9708011	
3 SG-12-4								
4 SG-13-4								

Relinquished By (signature): <i>Joe Neely</i>	Printed Name: Joe Neely	Date: 1-Aug-97	Received (signature): <i>[Signature]</i>	Printed Name: PENAFLOZ	Date: 8/1/97
Relinquished By (signature): <i>[Signature]</i>	Printed Name: PENAFLOZ	Date: 8-1-97	Received (signature):	Printed Name:	Date: 10-29-97
Relinquished By (signature):	Printed Name:	Date:	Received (signature): <i>Mc</i>	Printed Name: M. Sanders	Date: 8-1-97

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN-OF-CUSTODY WITH INVOICE AND RESULTS

@AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

RECEIVED
AUG 11 1997

WORK ORDER #: 9708003

Work Order Summary

CLIENT: Mr. Joe Neely
Enviros Incorporated
270 Perkins Street
Sonoma, CA 95476

BILL TO: Accounts Payable
Shell Oil Products Company
P.O. Box 4023
Concord, CA 94524

PHONE: 707-935-4854
FAX: 707-935-6649

DATE RECEIVED: 8/1/97
DATE COMPLETED: 8/4/97
DATE RE-ISSUED: 8/7/97 To change reporting units per client's request.

P.O. # NR
PROJECT # 97276 San Leandro

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT</u> <u>VAC./PRES.</u>
01A	SG-10-4	TO-3	2.0 "Hg
02A	SG-11-4	TO-3	0.5 "Hg
03A	SG-12-4	TO-3	2.0 "Hg
04A	SG-13-4	TO-3	2.5 "Hg
05A	Lab Blank	TO-3	NA

CERTIFIED BY: *Rudolph J. Freeman*
Laboratory Director

DATE: *8/7/97*

Certification numbers: CA ELAP - 1149, NY ELAP - 11291, UT ELAP - E-217

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630
(916) 985-1000 • (800) 985-5955 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: SG-10-4

ID#: 9708003-01A

EPA METHOD TO-3
(Aromatic Volatile Organics in Air)

GC/PID

File Name:	6080407	Date of Collection: 7/31/97		
Dil. Factor:	2.16	Date of Analysis: 8/4/97		
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)
Benzene	0.002	7.0	Not Detected	Not Detected
Toluene	0.002	8.3	0.003	11
Ethyl Benzene	0.002	9.500	Not Detected	Not Detected
Total Xylenes	0.002	9.500	0.005	22
Methyl t-Butyl Ether	0.002	7.9	0.003	11

TOTAL PETROLEUM HYDROCARBONS

GC/FID

(Quantitated as Gasoline)

File Name:	6080407	Date of Collection: 7/31/97		
Dil. Factor:	2.16	Date of Analysis: 8/4/97		
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)
TPH* (C5+ Hydrocarbons)	0.022	90	0.42	1700
C2 - C4** Hydrocarbons	0.022	40	0.041	75

*TPH referenced to Gasoline (MW=100)

**C2 - C4 Hydrocarbons referenced to Propane (MW=44)

Container Type: 1 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: SG-11-4

ID#: 9708003-02A

EPA METHOD TO-3

(Aromatic Volatile Organics in Air)

GC/PID

File Name:	6080408	Date of Collection:	7/31/97	
Dil. Factor:	2.05	Date of Analysis:	8/4/97	
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)
Benzene	0.002	6.7	Not Detected	Not Detected
Toluene	0.002	7.9	Not Detected	Not Detected
Ethyl Benzene	0.002	9.0	Not Detected	Not Detected
Total Xylenes	0.002	9.0	Not Detected	Not Detected
Methyl t-Butyl Ether	0.002	7.5	Not Detected	Not Detected

TOTAL PETROLEUM HYDROCARBONS

GC/FID

(Quantitated as Gasoline)

File Name:	6080408	Date of Collection:	7/31/97	
Dil. Factor:	2.05	Date of Analysis:	8/4/97	
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)
TPH* (C5+ Hydrocarbons)	0.021	85	0.16	660
C2 - C4** Hydrocarbons	0.021	37	Not Detected	Not Detected

*TPH referenced to Gasoline (MW=100)

**C2 - C4 Hydrocarbons referenced to Propane (MW=44)

Container Type: 1 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: SG-12-4

ID#: 9708003-03A

EPA METHOD TO-3

(Aromatic Volatile Organics in Air)

GC/PID

File Name:	6080409	Date of Collection: 7/31/97		
Dil. Factor:	2.16	Date of Analysis: 8/4/97		
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)
Benzene	0.002	7.0	0.005	16
Toluene	0.002	8.3	Not Detected	Not Detected
Ethyl Benzene	0.002	9.500	0.003	13
Total Xylenes	0.002	9.500	0.005	22
Methyl t-Butyl Ether	0.002	7.9	0.008	29

TOTAL PETROLEUM HYDROCARBONS

GC/FID

(Quantitated as Gasoline)

File Name:	6080409	Date of Collection: 7/31/97		
Dil. Factor:	2.16	Date of Analysis: 8/4/97		
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)
TPH* (C5+ Hydrocarbons)	0.022	90	1.2	5000
C2 - C4** Hydrocarbons	0.022	40	Not Detected	Not Detected

*TPH referenced to Gasoline (MW=100)

**C2 - C4 Hydrocarbons referenced to Propane (MW=44)

Container Type: 1 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: SG-13-4

ID#: 9708003-04A

EPA METHOD TO-3

(Aromatic Volatile Organics in Air)

GC/PID

File Name:	6080411			Date of Collection:	7/31/97
Dil. Factor:	22.0			Date of Analysis:	8/4/97
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)	
Benzene	0.022	71	Not Detected	Not Detected	
Toluene	0.022	84	Not Detected	Not Detected	
Ethyl Benzene	0.022	97	Not Detected	Not Detected	
Total Xylenes	0.022	97	Not Detected	Not Detected	
Methyl t-Butyl Ether	0.022	81	Not Detected	Not Detected	

TOTAL PETROLEUM HYDROCARBONS

GC/FID

(Quantitated as Gasoline)

File Name:	6080411			Date of Collection:	7/31/97
Dil. Factor:	22.0			Date of Analysis:	8/4/97
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)	
TPH* (C5+ Hydrocarbons)	0.22	910	1.2	5000	
C2 - C4** Hydrocarbons	0.22	400	Not Detected	Not Detected	

*TPH referenced to Gasoline (MW=100)

**C2 - C4 Hydrocarbons referenced to Propane (MW=44)

Container Type: 1 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9708003-05A

EPA METHOD TO-3

(Aromatic Volatile Organics in Air)

GC/PID

File Name:	6080405			Date of Collection:	NA
Dil. Factor:	1.00			Date of Analysis:	8/4/97
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)	
Benzene	0.001	3.2	Not Detected	Not Detected	
Toluene	0.001	3.8	Not Detected	Not Detected	
Ethyl Benzene	0.001	4.4	Not Detected	Not Detected	
Total Xylenes	0.001	4.4	Not Detected	Not Detected	
Methyl t-Butyl Ether	0.001	3.7	Not Detected	Not Detected	

TOTAL PETROLEUM HYDROCARBONS

GC/FID

(Quantitated as Gasoline)

File Name:	6080405			Date of Collection:	NA
Dil. Factor:	1.00			Date of Analysis:	8/4/97
Compound	Det. Limit (ppmv)	Det. Limit (uG/m3)	Amount (ppmv)	Amount (uG/m3)	
TPH* (C5+ Hydrocarbons)	0.010	42	Not Detected	Not Detected	
C2 - C4** Hydrocarbons	0.010	18	Not Detected	Not Detected	

*TPH referenced to Gasoline (MW=100)

**C2 - C4 Hydrocarbons referenced to Propane (MW=44)

Container Type: NA



AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

No. **11810**

Page 1 of 1

Contact Person <u>Joe Neely</u>	Project info:	Turn Around Time:
Company <u>Enviros Inc</u>	P.O. # _____	<input type="checkbox"/> Normal
Address <u>270 Perkins St</u> City <u>Sacramento</u> State <u>CA</u> Zip <u>95476</u>	Project # <u>97276</u>	<input checked="" type="checkbox"/> Rush <u>24 hr - Results Mon.</u>
Phone <u>707-935-4454</u> FAX <u>707-935-6649</u>	Project Name <u>San Leandro</u>	Specify _____
Collected By: Signature <u>[Signature]</u>		

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum		
				Initial	Final	Receipt
<u>01A</u>	<u>SG-10-4</u>	<u>31-Jul-97</u>	<u>Gas, BTEX, MTBE</u>	<u>75</u>	<u>10</u>	<u>2.0" H₂O</u>
<u>02A</u>	<u>SG-11-4</u>	<u>31-Jul-97</u>	↓	<u>75</u>	<u>5</u>	<u>0.5" H₂O</u>
<u>03A</u>	<u>SG-12-4</u>	<u>31-Jul-97</u>		<u>55</u>	<u>10</u>	<u>2.0" H₂O</u>
<u>04A</u>	<u>SG-13-4</u>	<u>31-Jul-97</u>		<u>75</u>	<u>10</u>	<u>2.5" H₂O</u>
						<u>7/1/97</u>

Relinquished By: (Signature) <u>[Signature]</u> Date/Time <u>31-Jul-97/15:00</u>	Print Name <u>Joe Neely</u>	Notes: <u>Vacuum measurements are in inches of water.</u>
Relinquished By: (Signature) _____ Date/Time _____	Received By: (Signature) _____ Date/Time _____	
Relinquished By: (Signature) _____ Date/Time _____	Received By: (Signature) <u>[Signature]</u> Date/Time <u>8/1/97</u>	

Lab Use Only	Shipper Name <u>Fed Exp</u>	Air Bill # <u>4413148036</u>	Opened By <u>[Signature]</u>	Date/Time <u>8/1/97 1130</u>	Temp. (°C) <u>Ambient</u>	Condition <u>Good</u>	Custody Seals Intact? <u>Yes No None N/A</u>	Work Order # <u>9708003</u>
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