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Greater Bay Trust Company  
c/o Leah S. Goldberg, Esq.  
Hanson, Bridgett, Marcus, Vlahos & Rudy  
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**QUARTERLY GROUNDWATER MONITORING AND  
REMEDATION PROGRESS REPORT  
JULY 1999 QUARTERLY EVENT  
FORMER COX CADILLAC FACILITY  
230 BAY PLACE  
OAKLAND, CALIFORNIA**

Dear Ms. Goldberg:

**1.0 INTRODUCTION**

This report presents the results of groundwater monitoring conducted by PES Environmental, Inc. (PES) on July 7, 1999 at the former Bill Cox Cadillac facility at 230 Bay Place, Oakland, California. The work is being performed as part of response action to address releases from a former 10,000-gallon gasoline underground storage tank (UST) operated at the site by Bill Cox Cadillac. The location of the site is shown on Plate 1. The work was performed on behalf of Greater Bay Trust Company trustee for the property owner, and Hanson, Bridgett, Marcus, Vlahos and Rudy, legal counsel to the Shephard Trust (Hanson, Bridgett) in accordance with the agreement with Bill Cox Cadillac, the former tenant.

Groundwater remediation and monitoring are being conducted at the site as part of interim soil and groundwater remedial actions in accordance with PES' *Revised Interim Remedial Action Plan (IRAP)* dated October 31, 1996 and *Addendum, Revised Interim Remedial Action Plan* dated November 26, 1996 (collectively referred to as Remedial Plan). The remedial work was requested by Alameda County Environmental Health Services (ACEHS) in a letter to Ms. Leah Goldberg of Hanson, Bridgett dated October 24, 1996. The ACEHS approved the Remedial Plan in a letter dated November 27, 1996.

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The objective of the groundwater monitoring program at this site is to: (1) evaluate the presence of petroleum hydrocarbons in groundwater; and (2) provide data to assess the progress of the groundwater remedial program. The monitoring is performed in accordance with California Regional Water Quality Control Board (RWQCB) guidelines and the Remedial Plan.

## 2.0 BACKGROUND INFORMATION

One groundwater monitoring well (Well MW-1) and seven temporary monitoring wells (Wells TW-1 through TW-7) were installed at the site by PES to investigate subsurface conditions following removal of a 3,000-gallon waste oil storage tank in December 1988. MW-1 was installed in February 1993 down gradient of the former waste oil tank and a groundwater sample collected from it in March 1993. Elevated concentrations of total petroleum hydrocarbons quantified as gasoline (TPHg) were detected in the sample analyzed from Well MW-1. Gasoline detected in groundwater was characterized as "fresh" and no waste oil constituents were detected. Temporary wells, Wells TW-1 through TW-7 were subsequently installed in March 1993 to investigate the degree and extent, and the likely source of the gasoline contamination in groundwater. Results of the additional investigation indicated that elevated TPHg and benzene, toluene, ethylbenzene, and total xylenes (BTEX) were detected in groundwater samples from four of the temporary wells and in Well MW-1. MTBE was not detected in the samples. The highest concentrations of petroleum hydrocarbon constituents were detected in groundwater samples from two wells (TW-5 and TW-7) closest to a 10,000-gallon gasoline tank and associated product piping located to the west of the former waste oil tank. The results of the investigations were presented in PES' report, *Soil and Groundwater Investigation, Bill Cox Cadillac, 230 Bay Place, Oakland, California* dated December 23, 1993. The well locations and former waste oil tank location are shown on Plate 2.

The 10,000-gallon underground gasoline tank and product piping were removed by DECON Environmental Services of Hayward, California and observed and documented by Eisenberg, Olivieri & Associates (EOA) of Oakland, California in January 1994. During removal, a hole was observed in the product piping between the tank and dispenser. Floating free-phase product was observed on the groundwater surface in the tank excavation. EOA, on behalf of Bill Cox, subsequently performed limited investigations to evaluate the offsite extent of gasoline contamination. EOA performed quarterly groundwater monitoring of wells MW-1, TW-2, TW-6 and TW-7 between December 1994 and February 1996.

Soil and groundwater remediation was subsequently requested by ACEHS in a letter to Hanson, Bridgett dated October 24, 1996. In the letter, ACEHS specified that soil remediation consisting of excavation of hydrocarbon-affected soil, and groundwater remediation consisting of oxygen introduction was required. The PES Remedial Plan was

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developed in response to that request. As part of the Remedial Plan, site characterization, additional well installation, soil remediation, baseline groundwater monitoring, and initial groundwater remediation were conducted by PES between June 1997 and April 1999. The results of work conducted between June 1997 and April 1999 were previously submitted to you in PES' report, *Site Characterization and Interim Remedial Actions, Former Cox Cadillac Facility, Oakland, California*, dated September 30, 1999.

A pilot program commenced in January 1999 to test remediation of groundwater by applying a combination of in-situ bioremediation methods to introduce oxygen and nutrients into groundwater at the site to enhance natural biodegradation rates of petroleum hydrocarbons. The methods include: (1) adding a nutrient- and hydrogen peroxide-enriched water (hereinafter referred to as enriched water); and (2) placement of Oxygen Releasing Compound (ORC) in selected wells at the site.

The July 1999 monitoring is the second monitoring event since the groundwater remediation program and baseline monitoring was initiated by PES in January 1999. A groundwater monitoring report presenting the results of quarterly monitoring conducted on April 13, 1999 has previously been submitted to your attention. The results of the July 1999 groundwater monitoring are presented below.

### **3.0 GROUNDWATER MONITORING ACTIVITIES**

#### **3.1 Depth to Groundwater Measurements**

Water levels were measured by PES at monitoring wells MW-1, MW-2, TW-2, TW-4, TW-5, TW-6, and TW-7 on July 7, 1999. Depth-to-groundwater measurements were obtained using an electronic water-level indicator and recorded to the nearest 0.01-foot. The water-level indicator was cleaned with a solution of non-phosphate detergent and de-ionized water and then rinsed before each use. Groundwater elevation data are presented in Table 1 and groundwater elevation contours are presented on Plate 3. Prior to measuring groundwater levels, dissolved oxygen concentrations were measured in several wells. Dissolved oxygen measurement procedures and results are described below.

#### **3.2 Groundwater Sampling and Analyses**

Groundwater samples were collected from wells MW-1, MW-2, TW-2, TW-6, and TW-7 on July 7, 1999. After dissolved oxygen and water-level measurements were obtained, the wells were purged by bailing until approximately three well volumes of water were removed. During purging, the water was monitored for pH, temperature, conductivity, and turbidity. Purge water was collected in DOT-approved 55-gallon steel drums and stored on site. Following well purging, a groundwater sample was collected from each well using a

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disposable bailer. The sample was transferred to the appropriate laboratory sample containers using a bottom draining bailer stopcock. The sample containers were filled slowly to minimize sample volatilization and ensure that the sample was free of air bubbles. The sample containers were labeled with project site, well identification number, sample number, sampling date and time, and requested analyses. Well sampling documentation is presented in Appendix A.

The groundwater samples were transported in a chilled, thermally insulated cooler under chain-of-custody protocol to Entech Analytical Labs, Inc. of Sunnyvale, California, a California Department of Health Services-certified laboratory. The groundwater samples were analyzed for TPHg using EPA Test Method 8015 modified, BTEX using EPA Test Method 8020, and methyl tertiary butyl ether (MTBE) using EPA Test Method 8260. Groundwater sample analytical results are presented in Table 2 and shown on Plate 4. Copies of the laboratory reports and chain-of-custody documentation are presented in B.

### 3.3 Enriched Water Introduction

An oxygen source in the form of a solution of potable water, hydrogen peroxide, and a blend of nutrients (enriched water) was prepared and introduced to wells TW-4, TW-5, TW-6, TW-7, and MW-1 on June 1 and July 7, 1999. Concentrated hydrogen peroxide was added to a mixing tank where it was combined with potable water and small quantities of nitrogen and phosphorus nutrients. A centrifugal pump, gate valves, flow meters, and pipeline delivery system were attached to the mixing tank to allow controlled addition of enriched water to the designated wells.

The enriched water was mixed at a concentration to deliver as much oxygen as possible without causing accumulation of biomass in the immediate vicinity of the wells or precipitation of inorganic carbonates. An approximate volume of 475 gallons of enriched water at a concentration of 1,500 parts per million (ppm) hydrogen peroxide was introduced into the wells on June 1, 1999. An approximate volume of 768 gallons of enriched water at a concentration of 1,500 ppm hydrogen peroxide was introduced into the wells on July 7, 1999. A total of approximately 1,924 gallons of enriched water at a concentration up to 1,500 ppm hydrogen peroxide has been introduced into the wells since March 1999. Enriched water introduction through July 7, 1999 is summarized in Table 3.

Following enriched water introduction, Oxygen Releasing Compound (ORC) was installed in each of the five designated wells. The ORC is manufactured by Regenesi Bioremediation Products of San Juan Capistrano, California. The ORC is a powder form of time release magnesium peroxide. The ORC is blended with an inert carrier matrix of sand and the blend is contained in an approximately two-inch diameter polyethylene webbed sock in one foot lengths (ORC Filter Sock). The ORC Filter Socks become saturated following insertion into groundwater, and begin releasing oxygen into the subsurface. The ORC Filter Socks provide

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continuous supply of oxygen between enriched water introductions. Enriched water introductions are conducted twice per quarter (every six weeks).

### 3.4 Dissolved Oxygen Measurements

Dissolved oxygen measurements were collected twice from the wells by PES on June 1 and July 7, 1999. Total dissolved oxygen was measured on June 1, 1999 in monitoring wells MW-1, TW-4, TW-5, TW-6, and TW-7 before and after introduction of enriched water. Total dissolved oxygen was measured on July 7, 1999 in all seven monitoring wells, wells MW-1, MW-2, TW-2, TW-4, TW-5, TW-6, and TW-7, at the start of the day before measuring groundwater levels and purging and sampling, and at the end of the day after introduction of enriched water. The measurements were collected from each well within the middle portion of the water column using a YSI, Inc., Model 51B Dissolved Oxygen (DO) Meter. The equipment was calibrated according to the manufacturer's specifications before use. Prior to each measurement, the portion of the equipment submerged in the well was cleaned with a solution of non-phosphate detergent and de-ionized water then rinsed with de-ionized water. Total dissolved oxygen measurements through July 7, 1999 are summarized in Table 4.

## 4.0 GROUNDWATER MONITORING RESULTS

### 4.1 Groundwater Elevation Measurements

Depth-to-groundwater data collected from wells MW-1, MW-2, TW-2, TW-4, TW-5, TW-6 and TW-7 on July 7, 1999 were converted to groundwater elevations referenced to site datum. Groundwater elevations ranged from 91.68 feet in well MW-2 to 98.54 feet in well TW-2. Groundwater flow direction at the site is to the southwest, at a hydraulic gradient of approximately 0.057-foot per foot. No floating free product or hydrocarbon sheen was observed in the wells. Petroleum hydrocarbon odors were observed in purge water from well MW-1 and TW-7. Groundwater elevation data are presented in Table 1 and elevation contours are presented on Plate 3.

### 4.2 Groundwater Sample Analytical Results

The analytical results of the groundwater samples collected on July 7, 1999 are presented in Table 2 and shown on Plate 4. TPHg was detected in the samples from wells MW-1, TW-6, and TW-7 at concentrations of 31,000  $\mu\text{g/L}$ , 55  $\mu\text{g/L}$ , and 42,000  $\mu\text{g/L}$ , respectively. MTBE was detected in the samples from wells MW-2, TW-6, and TW-7 at concentrations of 7,000  $\mu\text{g/L}$ , 8.1  $\mu\text{g/L}$ , and 2,200  $\mu\text{g/L}$ , respectively. Benzene was detected in the samples from wells MW-1, TW-6 and TW-7 at concentrations of 1,900  $\mu\text{g/L}$ , 13  $\mu\text{g/L}$ , and 8,000  $\mu\text{g/L}$ , respectively. The highest concentrations of toluene, ethylbenzene and total

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xylenes were detected in the sample from well TW-7 at 4,500  $\mu\text{g/L}$ , 1,200  $\mu\text{g/L}$ , and 3,500  $\mu\text{g/L}$ , respectively. Copies of the laboratory reports and chain-of-custody documentation are presented in Appendix B.

#### 4.3 Dissolved Oxygen Measurement Results

Total dissolved oxygen concentrations before enriched water introduction on June 1, 1999 ranged from 0.7 milligrams per liter (mg/L) in well TW-7 to 11.6 mg/L in well TW-6. Total dissolved oxygen concentrations before enriched water introduction on July 7, 1999 ranged from 0.25 mg/L in well TW-5 to greater than 18 mg/L ( $> 18 \text{ mg/L}$ ) in well TW-6. The maximum range of the dissolved oxygen meter used on July 7 was 18 mg/L.

Wells TW-4, TW-5, TW-6, TW-7, and MW-1 are the wells that are included for enriched water introduction. Dissolved oxygen concentrations in these wells after enriched water introduction on June 1 and July 7, 1999 were greater than the maximum range of the dissolved oxygen meter ( $> 15 \text{ mg/L}$  for the meter used on June 1 and  $> 18 \text{ mg/L}$  for the meter used on July 7).

Wells TW-2 and MW-2 are the wells not included for enriched water introduction. Dissolved oxygen concentrations measured in well TW-2 before and after enriched water introduction on July 7, 1999 were 0.65 mg/L and 5.14 mg/L, respectively. Dissolved oxygen concentrations measured in well MW-2 before and after enriched water introduction on July 7, 1999 were 1.03 mg/L and 7.22 mg/L, respectively.

Dissolved oxygen concentrations measured during this monitoring period are included with the well sampling documentation presented in Appendix A. Dissolved oxygen concentrations measured through July 7, 1999 are presented in Table 4.

#### **5.0 SUMMARY**

Results of the July 1999 groundwater elevations indicate a general decrease since the April 1999 monitoring event. As with historical observations, the groundwater flow direction continues to be toward the southwest.

Concentrations of TPHg and total xylenes detected in the wells in July 1999 are similar to those detected in April 1999. However, significant concentration increases of MTBE in wells MW-2 and TW-7 and benzene, toluene, and ethylbenzene in wells MW-1 and TW-7 were observed in samples from July 1999 compared to April 1999. Consistent with historical findings, the highest concentrations were detected in the groundwater from wells nearest to the former gasoline UST and product piping, specifically Wells MW-1 and TW-7.

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MTBE concentrations in well MW-2, located offsite and downgradient adjacent to several utility trenches, are significantly higher than in onsite wells. The high concentrations of MTBE detected in samples from well MW-2 are likely the result of groundwater being affected by elevated concentrations from offsite sources that are being conveyed toward the site via preferential flow as a result of utility trenches adjacent to the well. In 1993 PES performed sampling of groundwater from Wells MW-1, TW-4, TW-5, TW-6, and TW-7 for analyses by EPA Test Method 8260. No MTBE was detected in the samples at that time. Additionally, a utility location assessment was conducted by EOA in late 1995/early 1996. EOA identified numerous utility trenches and vaults along the western property boundary and within Vernon Street, Bay Place, and Harrison Street surrounding the site. EOA interviews with utility providers indicated most utility trenches are backfilled with permeable materials including gravel and sand. The depth of many of these utility trenches is sufficient to intercept shallow groundwater flow in the site vicinity. The results of the EOA utility assessment were presented in a document titled *Corrective Action Plan Development Report, Phase I, Cox Cadillac, 230 Bay Place, Oakland, California*, dated April 1, 1996.


Dissolved oxygen concentrations were elevated on June 1 and July 7, 1999 as a result of oxygen enhancement following introduction of the enriched water solution as part of the bioremediation program.

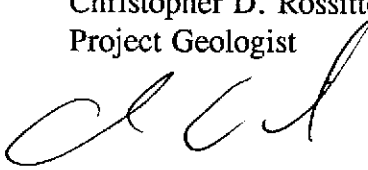
In accordance with the Remedial Plan, PES will continue with quarterly groundwater monitoring and introduction of enriched water twice per quarter.

If you have any questions or comments, please do not hesitate to call either of the undersigned.

Yours very truly,

PES ENVIRONMENTAL, INC.

  
Christopher D. Rossitto  
Project Geologist

  
Andrew A. Briefer, P. E.  
Principal Engineer

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Attachments: Table 1 Groundwater Elevation Data Through July 7, 1999  
Table 2 Groundwater Sample Analytical Results Through July 7, 1999  
Table 3 Summary of Enriched Water Introduction to Wells  
Table 4 Summary of Total Dissolved Oxygen Measurements  
Plate 1 Site Location Map  
Plate 2 Site Plan and Well Location Map  
Plate 3 Groundwater Elevation Contours on July 7, 1999  
Plate 4 Distribution of Dissolved Hydrocarbons in Groundwater - July 7,  
1999  
Appendix A Well Sampling Documentation  
Appendix B Laboratory Analytical Reports and Chain of Custody  
Documentation

cc: Ms. Cheryl Howell - Greater Bay Trust Company  
Mr. Thomas Peacock - Alameda County Environmental Health Services  
Mr. Mark Owens - California UST Cleanup Fund



**Table 1**  
**Groundwater Elevation Data Through July 1999**  
**Interim Remedial Actions**  
**Former Cox Cadillac, 230 Bay Place**  
**Oakland, California**

Well Number	Date Measured	Top-of-Casing Reference Elevation (feet*)	Depth to Water (feet BTOC)	Groundwater Elevation (feet*)
MW-1	1/12/99	100.00	2.79	97.21
	4/13/99	100.00	2.00	98.00
	7/7/99	100.00	2.60	97.40
MW-2	1/12/99	97.48	5.62	91.86
	4/13/99	97.48	5.30	92.18
	7/7/99	97.48	5.80	91.68
TW-2	1/12/99	100.43	1.91	98.52
	4/13/99	100.43	2.51	97.92
	7/7/99	100.43	1.89	98.54
TW-4	1/12/99	99.35	NM	NA
	4/13/99	99.35	1.82	97.53
	7/7/99	99.35	2.36	96.99
TW-5	1/12/99	99.40	NM	NA
	4/13/99	99.40	1.96	97.44
	7/7/99	99.40	3.12	96.28
TW-6	1/12/99	98.75	5.52	93.23
	4/13/99	98.75	4.91	93.84
	7/7/99	98.75	6.04	92.71
TW-7	1/12/99	97.96	4.81	93.15
	4/13/99	97.96	4.73	93.23
	7/7/99	97.96	5.17	92.79

**Notes:**

- \* = Referenced to site datum
- BTOC = Below top of casing
- NA = Data not available
- NM = Depth to water not measured

**Table 2**  
**Groundwater Sample Analytical Results Through July 1999**  
**Interim Remedial Actions**  
**Former Cox Cadillac, 230 Bay Place**  
**Oakland, California**

Well Number	Sample Date	TPH as Gasoline ( $\mu\text{g/L}$ )	MTBE ( $\mu\text{g/L}$ )	Benzene ( $\mu\text{g/L}$ )	Toluene ( $\mu\text{g/L}$ )	Ethyl-benzene ( $\mu\text{g/L}$ )	Total Xylenes ( $\mu\text{g/L}$ )
MW-1	1/12/99	39,000	800	2,600	970	2,900	5,700
	4/13/99	29,000	520	1,500	500	<50	4,000
	7/7/99	31,000	<250	1,900	870	1,600	3,900
MW-2	1/12/99	<50	2,900	1.5	<0.50	<0.50	<0.50
	4/13/99	<50	3,800	0.76	<0.50	<0.50	<0.50
	7/7/99	<2,500	7,000	<25	<25	<25	<25
TW-2	1/12/99	<50	<5.0	<0.50	<0.50	<0.50	<0.50
	4/13/99	<50	<5.0	<0.50	<0.50	<0.50	<0.50
	7/7/99	<50	<5.0	<0.50	<0.50	<0.50	<0.50
TW-6	1/12/99	29,000	210	9,900	4,100	1,000	4,000
	4/13/99	<50	22	0.70	<0.50	<0.50	0.62
	7/7/99	55	8.1	13	<0.50	<0.50	2.2
TW-7	1/12/99	29,000	<100	7,300	670	2,700	960
	4/13/99	54,000	1,200	4,500	1,800	180	8,200
	7/7/99	42,000	2,200	8,000	4,500	1,200	3,500

**Notes:**

TPH - Total Petroleum Hydrocarbons

MTBE - Methyl tert-butyl ether

 $\mu\text{g/L}$  = Micrograms per liter.

&lt;0.50 = Not detected at or above indicated laboratory reporting limit.

**Table 3**  
**Summary of Enriched Water Introduction to Wells**  
**Interim Remedial Actions**  
**Former Cox Cadillac, 230 Bay Place**  
**Oakland, California**

Well Name	Date Introduced	Flow Rate (gpm)	Volume of Enriched Water Introduced (gallons)	Concentration of H <sub>2</sub> O <sub>2</sub> (ppm)	Amount of O <sub>2</sub> Introduced (pounds)
MW-1	3/11/99	0.04	2.2	1,050	0.09
	3/17/99	0.33	70.2	1,050	2.75
	4/13/99	0.13	26.5	1,050	1.04
	6/1/99	0.27	41.1	1,500	1.61
	7/7/99	0	0	0	0.00
TW-4		0.05	3.0	1,050	0.12
	3/17/99	0.01	2.7	1,050	0.11
	4/13/99	0.12	23.8	1,050	0.93
	6/1/99	0.04	5.4	1,500	0.21
	7/7/99	0.05	8.8	1,500	0.34
TW-5	3/11/99	0.07	4.4	1,050	0.17
	3/17/99	0.05	10.3	1,050	0.40
	4/13/99	0.36	70.8	1,050	2.77
	6/1/99	0.83	125.1	1,500	4.90
	7/7/99	0.61	102.9	1,500	4.03
TW-6	3/11/99	0.29	17.3	1,050	0.68
	3/17/99	0.24	51.9	1,050	2.03
	4/13/99	1.63	322	1,050	12.62
	6/1/99	1.22	182.9	1,500	7.17
	7/7/99	1	278.1	1,500	10.90
TW-7	3/11/99	0.12	6.9	1,050	0.27
	3/17/99	0.07	15	1,050	0.59
	4/13/99	0.28	54.2	1,050	2.12
	6/1/99	0.8	119.9	1,500	4.70
	7/7/99	1.36	378.4	1,500	14.83
<b>TOTAL</b>			<b>1,923.8</b>	<b>TOTAL</b>	<b>75.39</b>

**Notes:**

gpm = gallons per minute

ppm = parts per million

Approximately 20 ppm of nitrogen as nitrate and 37 ppm of phosphate was present in solution.

**Table 4**  
**Summary of Total Dissolved Oxygen Measurements**  
**Interim Remedial Actions**  
**Former Cox Cadillac, 230 Bay Place**  
**Oakland, California**

Well Number	Date Measured	Time of Day	Total Dissolved Oxygen (mg/L)	Notes
MW-1	1/12/99	15:30	3.4	(1)
	3/11/99	15:46	0.72	(1)
	3/17/99	12:30	14.1	(2)
	3/17/99	18:13	> 15.0	(3)
	4/13/99	9:44	8.9	(2)
	6/1/99	14:59	6.2	(2)
	6/1/99	18:46	> 15.0	(3)
	7/7/99	9:20	3.55	(2)
	7/7/99	19:38	> 18.0	(3)
MW-2	1/12/99	12:30	3	(1)
	4/13/99	9:17	0.2	(2)
	4/13/99	19:11	0.6	(3)
	7/7/99	8:56	1.03	(2)
	7/7/99	19:13	7.22	(3)
TW-2	1/12/99	15:03	5.5	(1)
	4/13/99	9:10	2.6	(2)
	4/13/99	19:06	5.8	(3)
	7/7/99	8:50	0.65	(2)
	7/7/99	19:01	5.14	(3)
TW-4	3/11/99	15:20	3.4	(1)
	3/17/99	12:18	14.4	(2)
	3/17/99	17:54	12.6	(3)
	4/13/99	9:00	12.2	(2)
	4/13/99	19:03	> 15.0	(3)
	6/1/99	14:29	9.3	(2)
	6/1/99	18:33	> 15.0	(3)
	7/7/99	9:09	> 18.0	(2)
	7/7/99	19:36	> 18.0	(3)
TW-5	1/12/99	16:40	1.7	(1)
	3/11/99	15:36	0.58	(1)
	3/17/99	12:20	14.3	(2)
	3/17/99	17:57	14.6	(3)
	4/13/99	9:39	3.8	(2)
	4/13/99	19:28	> 15.0	(3)
	6/1/99	14:40	5.4	(2)
	6/1/99	18:38	> 15.0	(3)
	7/7/99	9:05	0.25	(2)
	7/7/99	19:32	> 18.0	(3)

**Table 4**  
**Summary of Total Dissolved Oxygen Measurements**  
**Interim Remedial Actions**  
**Former Cox Cadillac, 230 Bay Place**  
**Oakland, California**

Well Number	Date Measured	Time of Day	Total Dissolved Oxygen (mg/L)	Notes
TW-6	1/12/99	15:02	3.9	(1)
	3/11/99	15:39	0.62	(1)
	3/17/99	12:23	14.1	(2)
	3/17/99	18:06	> 15.0	(3)
	4/13/99	9:35	14.2	(2)
	4/13/99	19:23	> 15.0	(3)
	6/1/99	14:48	11.1	(2)
	6/1/99	18:40	> 15.0	(3)
	7/7/99	9:00	> 18.0	(2)
	7/7/99	19:21	> 18.0	(3)
TW-7	1/12/99	13:10	2.7	(1)
	3/11/99	15:42	0.74	(1)
	3/17/99	12:25	6.5	(2)
	3/17/99	18:12	14	(3)
	4/13/99	9:25	0.4	(2)
	4/13/99	19:16	> 15.0	(3)
	6/1/99	14:52	0.7	(2)
	6/1/99	18:43	> 15.0	(3)
	7/7/99	9:15	0.26	(2)
	7/7/99	19:26	> 18.0	(3)

**Notes:**

> 15 = Above indicated equipment quantification maximum.

(1) = Baseline measurement taken before initial introduction of enriched water

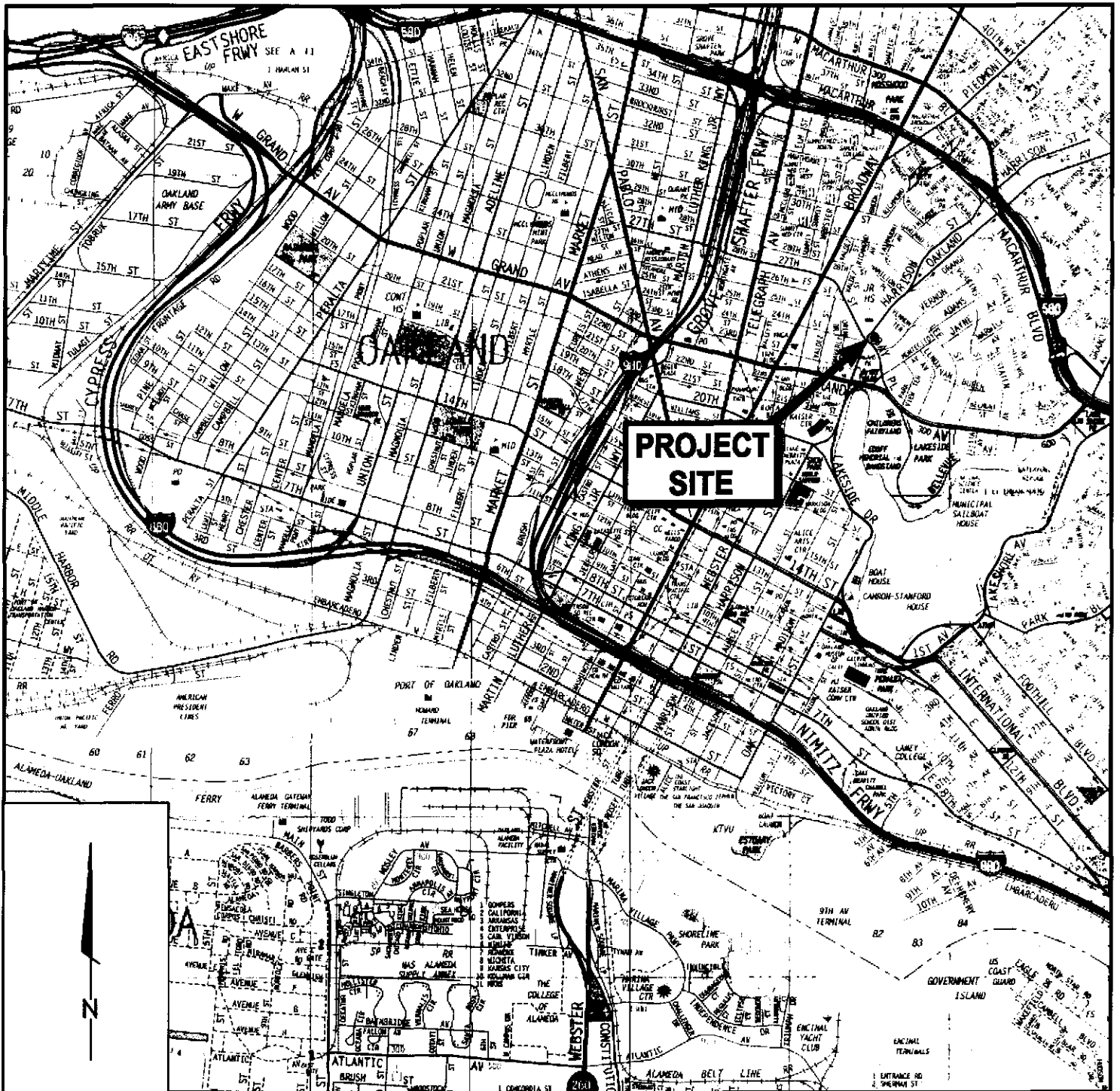
(2) = Measured prior to enriched water introduction

(3) = Measured after enriched water introduction

mg/L = milligrams per liter

An initial approximate 200 gallons of enriched water was introduced to wells MW-1, TW-4, TW-5,

TW-6, and TW-7 in the late afternoon of March 11 and 17, 1999 during setup, testing, and refinement of the remediation system. March 17 measurements reflect the initial introduction of enriched water.



**PROJECT SITE**



Ref: "The Thomas Guide- Alameda/Contra Costa Counties Street Guide and Directory" 1998 Edition



**Site Location Map**  
Quarterly Groundwater Monitoring  
Former Cox Cadillac-230 Bay Place  
Oakland, California

PLATE  
**1**

187.0201.006

167020006\_QTR

CDR

12/99

JOB NUMBER

DRAWING NUMBER

REVIEWED BY

DATE


Explanation

MW-1  Monitoring Well Location

TW-1  Temporary Well Location

 Fence

 Retaining Wall

 Curb

HARRISON STREET

BAY PLACE

SHOW ROOM

INDOOR SERVICE AREA

SERVICE PARKING

Fuel Dispenser Pad

MW-2

TW-7

TW-5

MW-1

TW-1

Former Gasoline Underground Storage Tank Location

TW-4

Former Waste Oil Underground Storage Tank Location

TW-3

TW-6

PARKING

TW-2

VERNON STREET



**PES Environmental, Inc.**  
Engineering & Environmental Services

Site Plan and Well Location Map  
Quarterly Groundwater Monitoring  
Former Cox Cadillac-230 Bay Place  
Oakland, California

PLATE  
**2**




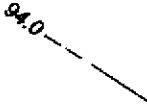
167.0201.006  
JOB NUMBER

167020006\_QTR  
DRAWING NUMBER

CDR  
REVIEWED BY

12/99  
DATE

**Explanation**

- MW-1  Monitoring Well Location
- TW-1  Temporary Well Location
-  Former UST Location
- (98.54) Groundwater Elevation (Referenced to Site Datum) measured July 7, 1999
- 94.0  Groundwater Elevation Contour, Dashed where Inferred (Contour interval is 1.00 feet)
- (NM) Water-level not measured

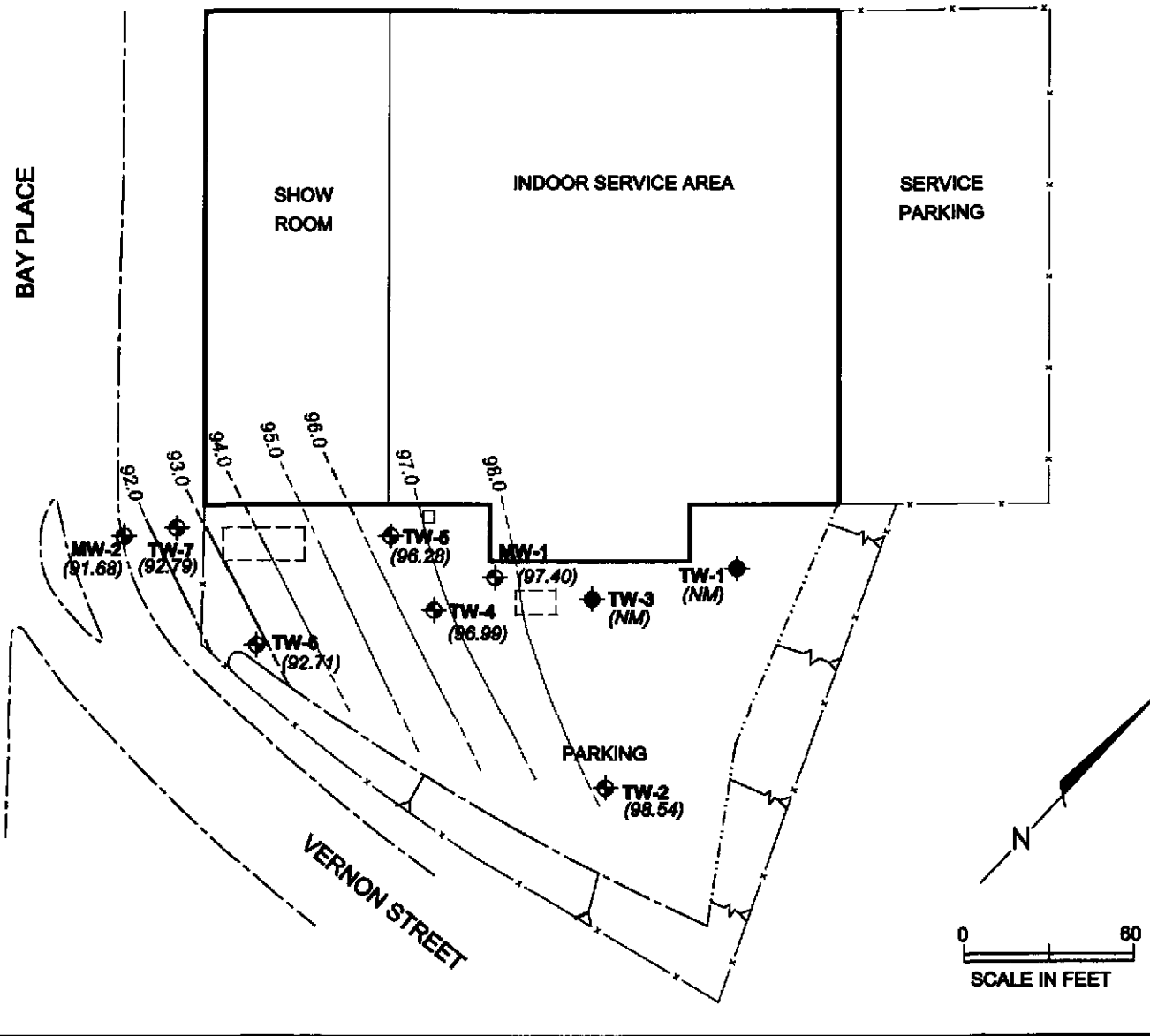
HARRISON STREET

BAY PLACE

SHOW ROOM

INDOOR SERVICE AREA

SERVICE PARKING



Groundwater Elevation Contours on July 7, 1999  
 Quarterly Groundwater Monitoring  
 Former Cox Cadillac-230 Bay Place  
 Oakland, California

PLATE

**3**



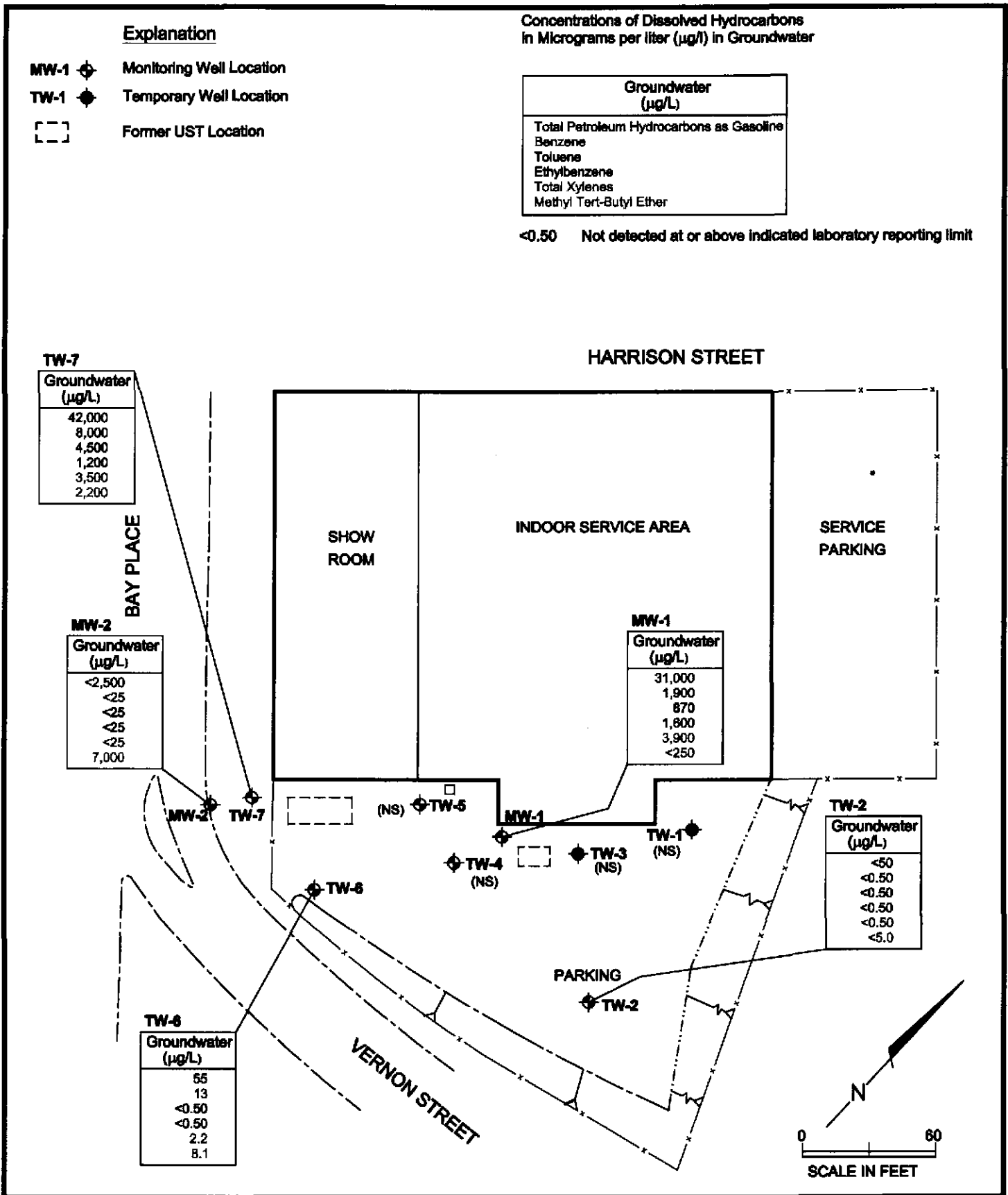
**Explanation**

- MW-1 Monitoring Well Location
- TW-1 Temporary Well Location
- Former UST Location

**Concentrations of Dissolved Hydrocarbons  
In Micrograms per liter ( $\mu\text{g/l}$ ) in Groundwater**

Groundwater ( $\mu\text{g/L}$ )
Total Petroleum Hydrocarbons as Gasoline
Benzene
Toluene
Ethylbenzene
Total Xylenes
Methyl Tert-Butyl Ether

<0.50 Not detected at or above indicated laboratory reporting limit



**PES Environmental, Inc.**  
Engineering & Environmental Services

**Distribution of Dissolved Hydrocarbons  
In Groundwater - July 7, 1999**  
Quarterly Groundwater Monitoring  
Former Cox Cadillac-230 Bay Place  
Oakland, California

PLATE

**4**

**APPENDIX A**

**WELL SAMPLING DOCUMENTATION**



Page: 1 of 1  
 Date/Time: 7/7/99  
 Project Name: Cox Cadillac  
 Job No.: 167-002-01-005  
 Recorded By: CJD & Rob Larson  
 Sampled By: Rob Larson

### GROUNDWATER SAMPLING FORM

Well No.: <u>MW-1</u>	Well Type: <input type="checkbox"/> Monitoring <input type="checkbox"/> Extraction <input type="checkbox"/> Other
	Well Material: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless Steel <input type="checkbox"/> Other

#### WELL PURGING

<b>PURGE VOLUME</b> Casing Diameter (D in inches) <input checked="" type="checkbox"/> 2-inch <input type="checkbox"/> 4-inch <input type="checkbox"/> 6-inch <input type="checkbox"/> Other _____ Total Depth of Casing (TD in feet below top of casing): <u>20</u> Water-Level Depth (WL in feet below top of casing): <u>2.6</u>	<b>PURGING METHOD</b> <input checked="" type="checkbox"/> Bailor - Type: <u>Teflon Disposable</u> <input type="checkbox"/> Submersible <input type="checkbox"/> Centrifugal <input type="checkbox"/> Bladder <input type="checkbox"/> Other - Type: _____
<b>PURGE VOLUME CALCULATIONS:</b> $\left( \frac{20 - 2.6}{\text{Well Depth} \quad \text{Depth to Water}} \right) \times \frac{2^2}{\text{Well Diameter}} \times 3 \text{ casing volumes} \times 0.0408 = 8.5 \text{ gallons}$ <p style="text-align: right;">Calculated Purge Volume</p>	<b>PUMP INTAKE SETTING</b> <input type="checkbox"/> Near Bottom <input type="checkbox"/> Near Top <input type="checkbox"/> Other _____ Depth in feet (BTOC): _____ Screen interval in feet (BTOC) from _____ to _____

#### FIELD PARAMETER MEASUREMENT

→ START TIME \_\_\_\_\_

Time	Total Gallons Removed	pH	Conductivity (umhos/cm <sup>3</sup> )	Temperature	Turbidity	Observations (color, well condition, odor, cloudiness, etc.)
11:35	1	7.19	3120	82.1	<del>284.1</del>	Gaseous odor
11:38	2	6.94	2820	81.1	>200	" "
11:41	3	6.78	3100	78.6		" "
11:43	4	<del>7.77</del> 6.90	2910	77.7 <del>76.8</del>		" "
11:46	5	6.83	2910	76.8		" "
11:50	6	6.81	3010	76.5		" "
11:53	7	6.86	3210	77.0		" "
11:55	8	6.79	3310	76.9		" "
11:57	9	6.74	3370	76.1		

→ STOP TIME 11:57 → TOTAL GALLONS REMOVED 9.0

#### WELL SAMPLING

**SAMPLING METHOD**  
 Bailor - Type: \_\_\_\_\_ WL = 3.43

Well No.	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
<u>MW-1</u>	<u>MW-1</u>	<u>13:48</u>	<u>3 VOA's</u>	<u>TPH<sub>3</sub>, BETEX, MTBE</u>	<u>HCl</u>	<u>Entech</u>

**QUALITY CONTROL SAMPLES**

Sample Type	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
Trip Blank						
Field Blank						
Duplicate						



Page: 1 of 1  
Date/Time: 7/7/99  
Project Name: Cox Cadillac  
Job No.: 169-002-01-005  
Recorded By: CJD and Rob Larson  
Sampled By: Rob Larson

### GROUNDWATER SAMPLING FORM

Well No.: <u>MW-2</u>	Well Type: <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Extraction <input type="checkbox"/> Other
Well Material: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless Steel <input type="checkbox"/> Other	

#### WELL PURGING

<b>PURGE VOLUME</b>	<b>PURGING METHOD</b>
Casing Diameter (D in inches) <input checked="" type="checkbox"/> 2-inch <input type="checkbox"/> 4-inch <input type="checkbox"/> 6-inch <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Baller - Type: <u>Disposable</u>
Total Depth of Casing (TD in feet below top of casing): <u><del>20</del> 20</u>	<input type="checkbox"/> Submersible <input type="checkbox"/> Centrifugal <input type="checkbox"/> Bladder
Water-Level Depth (WL in feet below top of casing): <u>5.8</u>	<input type="checkbox"/> Other - Type: _____
<b>PURGE VOLUME CALCULATIONS:</b>	<b>PUMP INTAKE SETTING</b>
$\left( \frac{20}{20} - 5.8 \right) \times 14.2^2 \times 3 \text{ casing volumes} \times 0.0408 = 6.95 \text{ gallons}$	<input type="checkbox"/> Near Bottom <input type="checkbox"/> Near Top <input type="checkbox"/> Other _____
Well Depth      Depth to Water      Well Diameter	Depth in feet (BTOC): _____
	Screen interval in feet (BTOC) from _____ to _____
	Calculated Purge Volume

FIELD PARAMETER MEASUREMENT						
→ START TIME _____						
Time	Total Gallons Removed	pH	Conductivity (umhos/cm3)	Temperature	Turbidity	Observations (color, well condition, odor, cloudiness, etc.)
10:16	1.0	6.09	3470	75.0	>200	Cloudy, No odor
10:21	2.0	6.28	3730	76.2	>200	" "
10:26	3.0	6.46	3360	76.5	>200	Cloudier
11:03	4.0	6.53	3930	76.5	>200	Cloudy
11:06	5.0	6.57	3430	76.3	>200	" "
11:10	6.0	6.56	3560	77.9	>200	" "
11:15	7.0	6.56	3630	75.5	>200	" "
→ STOP TIME <u>11:13</u> → TOTAL GALLONS REMOVED <u>7.0</u>						

#### WELL SAMPLING

<b>SAMPLING METHOD</b>						
Baller - Type: <u>Disposable</u> <u>WL = 5.96</u>						
Well No.	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
<u>MW-2</u>	<u>MW-2</u>	<u>12:58</u>	<u>3 VOAs</u>	<u>TPH, BETEX, NTDE</u>	<u>HCl</u>	<u>Entech</u>
<b>QUALITY CONTROL SAMPLES</b>						
Sample Type	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
Trip Blank						
Field Blank						
Duplicate						



Page: 1 of         
 Date/Time: 7/7/99  
 Project Name: Cor. Cad. Hwy  
 Job No.: 107-002-01-005  
 Recorded By: WD + RL  
 Sampled By: Rob Larson

### GROUNDWATER SAMPLING FORM

Well No.: <u>TW-2</u>	Well Type: <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Extraction <input type="checkbox"/> Other
	Well Material: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless Steel <input type="checkbox"/> Other

#### WELL PURGING

<b>PURGE VOLUME</b> Casing Diameter (D in inches) <input checked="" type="checkbox"/> 2-inch <input type="checkbox"/> 4-inch <input type="checkbox"/> 6-inch <input type="checkbox"/> Other _____ Total Depth of Casing (TD in feet below top of casing): <u>7.63</u> Water-Level Depth (WL in feet below top of casing): <u>1.89</u>	<b>PURGING METHOD</b> <input checked="" type="checkbox"/> Bailor - Type: <u>Disposable</u> <input type="checkbox"/> Submersible <input type="checkbox"/> Centrifugal <input type="checkbox"/> Bladder <input type="checkbox"/> Other - Type: _____ <b>PUMP INTAKE SETTING</b> <input type="checkbox"/> Near Bottom <input type="checkbox"/> Near Top <input type="checkbox"/> Other _____ Depth in feet (BTOC): _____ Screen interval in feet (BTOC) from _____ to _____
<b>PURGE VOLUME CALCULATIONS:</b> $\left( \frac{7.63 - 1.89}{\text{Well Depth} \quad \text{Depth to Water}} \right) \times \frac{2}{\text{Well Diameter}}^2 \times 3 \text{ casing volumes} \times 0.0408 = \frac{2.81}{\text{Calculated Purge Volume}} \text{ gallons}$	

FIELD PARAMETER MEASUREMENT						
→ START TIME _____						
Time	Total Gallons Removed	pH	Conductivity (umhos/cm3)	Temperature	Turbidity	Observations (color, well condition, odor, cloudiness, etc.)
9:40	1.0	7.37	4270	72.9	48.0	Debris in well casing
9:48	2.0	6.97	4080	75.8	118.3	" " " "
9:58	3.0	6.90	4310	75.6	180.1	" " " "
→ STOP TIME <u>9:58</u>		→ TOTAL GALLONS REMOVED <u>3.0</u>				

#### WELL SAMPLING

SAMPLING METHOD						
Bailor - Type: <u>Teflon Disposable</u> <span style="margin-left: 200px;"><u>WL = 1.95</u></span>						
Well No.	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
<u>TW-2</u>	<u>TW-2</u>	<u>14:12</u>	<u>3 VOA's</u>	<u>TPH<sub>g</sub>, BETEX, MTBE</u>	<u>HCl</u>	<u>Entech</u>
QUALITY CONTROL SAMPLES						
Sample Type	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
Trip Blank						
Field Blank						
Duplicate						

### GROUNDWATER SAMPLING FORM

Well No.: <u>TW-6</u>	Well Type: <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Extraction <input type="checkbox"/> Other
	Well Material: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless Steel <input type="checkbox"/> Other

#### WELL PURGING

<b>PURGE VOLUME</b>	<b>PURGING METHOD</b>
Casing Diameter (D in inches) <input checked="" type="checkbox"/> 2-inch <input type="checkbox"/> 4-inch <input type="checkbox"/> 6-inch <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Bailer - Type: <u>Disposable</u> <input type="checkbox"/> Submersible <input type="checkbox"/> Centrifugal <input type="checkbox"/> Bladder
Total Depth of Casing (TD in feet below top of casing): <u>7.6</u>	<input type="checkbox"/> Other - Type: _____
Water-Level Depth (WL in feet below top of casing): <u>2.36</u>	<b>PUMP INTAKE SETTING</b>
	<input type="checkbox"/> Near Bottom <input type="checkbox"/> Near Top <input type="checkbox"/> Other _____

**PURGE VOLUME CALCULATIONS:**

$$\left( \frac{7.6}{\text{Well Depth}} - \frac{2.36}{\text{Depth to Water}} \right) \times \frac{2}{\text{Well Diameter}}^2 \times 3 \text{ casing volumes} \times 0.0408 = \frac{2.6}{10.48} \text{ RL gallons}$$

Calculated Purge Volume

#### FIELD PARAMETER MEASUREMENT

→ START TIME \_\_\_\_\_

Time	Total Gallons Removed	pH	Conductivity (umhos/cm3)	Temperature	Turbidity	Observations (color, well condition, odor, cloudiness, etc.)
10:40	1.0	7.01	931	69.9	>200	Water level is low
10:45	1.4					Well is dewatering

→ STOP TIME 10:45 → TOTAL GALLONS REMOVED 1.4

#### WELL SAMPLING

SAMPLING METHOD  
Bailer - Type: Disposable DTW = 6.65

Well No.	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
<u>TW-6</u>	<u>TW-6</u>	<u>12:47</u>	<u>3 VOAS</u>	<u>TPH<sub>0</sub>, BTEX, MTBE</u>	<u>HCl</u>	<u>Entech</u>

QUALITY CONTROL SAMPLES

Sample Type	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
Trip Blank						
Field Blank						
Duplicate						



Page:	1	of	1
Date/Time:	7/7/99		
Project Name:	Coz Cadillac		
Job No.:	167-002-01-005		
Recorded By:	CJD & Rob Larson		
Sampled By:	Rob Larson		

## GROUNDWATER SAMPLING FORM

Well No.: <u>TW-7</u>	Well Type: <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Extraction <input type="checkbox"/> Other
	Well Material: <input type="checkbox"/> PVC <input type="checkbox"/> Stainless Steel <input type="checkbox"/> Other

### WELL PURGING

<b>PURGE VOLUME</b>		<b>PURGING METHOD</b>	
Casing Diameter (D in inches) <input checked="" type="checkbox"/> 2-inch <input type="checkbox"/> 4-inch <input type="checkbox"/> 6-inch <input type="checkbox"/> Other		<input checked="" type="checkbox"/> Baller - Type: <u>Disposable Teflon</u>	
Total Depth of Casing (TD in feet below top of casing): <u>9.9</u>		<input type="checkbox"/> Submersible <input type="checkbox"/> Centrifugal <input type="checkbox"/> Bladder	
Water-Level Depth (WL in feet below top of casing): <u>5.17</u>		<input type="checkbox"/> Other - Type: _____	
<b>PURGE VOLUME CALCULATIONS:</b>		<b>PUMP INTAKE SETTING</b>	
$(\frac{9.9}{5.17} - \frac{5.17}{9.9}) \times 2^2 \times 3 \text{ casing volumes} \times 0.0408 = 2.32 \text{ gallons}$		<input type="checkbox"/> Near Bottom <input type="checkbox"/> Near Top <input type="checkbox"/> Other	
Well Depth	Depth to Water	Well Diameter	Calculated Purge Volume

### FIELD PARAMETER MEASUREMENT

START TIME \_\_\_\_\_ STOP TIME 12:15 TOTAL GALLONS REMOVED 3.0

Time	Total Gallons Removed	pH	Conductivity (umhos/cm3)	Temperature	Turbidity	Observations (color, well condition, odor, cloudiness, etc.)
12:10	1.0	6.84	1250	82.4	853	Gassy odor
12:13	2.0	6.86	1264	80.9	106.5	" " cloudier
12:14	3.0	6.88	1283	80.8	136.2	" "

### WELL SAMPLING

SAMPLING METHOD  
Baller - Type: Teflon Disposable WL = 5.89

Well No.	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
TW-7	TW-7	13:27	3 VOA's	TPHg, BETEX, MTBE	HCl	Entech

QUALITY CONTROL SAMPLES

Sample Type	Sample No.	Time	Volume Collected	Analyses Requested	Preservatives	Laboratory
Trip Blank						
Field Blank						
Duplicate						

**APPENDIX B**

**LABORATORY ANALYTICAL REPORTS AND  
CHAIN-OF-CUSTODY DOCUMENTATION**



# Entech Analytical Labs, Inc.

RECEIVED JUL 29 1999

CA ELAP# I-2346

525 Del Rey Avenue, Suite E • Sunnyvale, CA 94086 • (408) 735-1550 • Fax (408) 735-1554

PES Environmental, Inc.  
1682 Novato Blvd., Suite 100  
Novato, CA 94947  
Attn: Chris Rositto


Date: 7/16/99  
Date Received: 7/8/99  
Project: 167-002-01-005  
PO #:  
Sampled By: Client

## Certified Analytical Report

### Water Sample Analysis:

Sample ID	TW-6			MW-2			TW-7				
Sample Date	7/7/99			7/7/99			7/7/99				
Sample Time	12:47			12:58			13:27				
Lab #	15151-001			15151-002			15151-003				
	Result	DF	DLR	Result	DF	DLR	Result	DF	DLR	PQL	Metfod
Results in µg/Liter:											
Analysis Date	7/9/99			7/12/99			7/9/99				
TPH-Gas	55	1.0	50	ND	50	2500	42,000	100	5000	50	8015M
Benzene	13	1.0	0.50	ND	50	25	8,000	100	50	0.50	8020
Toluene	ND	1.0	0.50	ND	50	25	4,500	100	50	0.50	8020
Ethyl Benzene	ND	1.0	0.50	ND	50	25	1,200	100	50	0.50	8020
Xylenes (total)	2.2	1.0	0.50	ND	50	25	3,500	100	50	0.50	8020
Analysis Date	7/15/99			7/15/99			7/15/99				
MTBE	8.1	1.0	5.0	7,000	50	250.0	2,200	100	500	5.0	8260

DF=Dilution Factor      ND= None Detected above DLR      PQL=Practical Quantitation Limit      DLR=Detection Reporting Limit  
• Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #I-2346)

  
Michelle L. Anderson, Lab Director

# Entech Analytical Labs, Inc.

CA ELAP# I-2346

525 Del Rey Avenue, Suite E • Sunnyvale, CA 94086 • (408) 735-1550 • Fax (408) 735-1554

PES Environmental, Inc.  
1682 Novato Blvd., Suite 100  
Novato, CA 94947  
Attn: Chris Rositto

Date: 7/16/99  
Date Received: 7/8/99  
Project: 167-002-01-005  
PO #:  
Sampled By: Client


## Certified Analytical Report

### Water Sample Analysis:

Sample ID	MW-1			TW-2						
Sample Date	7/7/99			7/7/99						
Sample Time	13:48			14:12						
Lab #	15151-004			15151-005						
	Result	DF	DLR	Result	DF	DLR			PQL	Metfod
<b>Results in µg/Liter:</b>										
Analysis Date	7/9/99			7/12/99						
TPH-Gas	31,000	100	5000	ND	1.0	50			50	8015M
Benzene	1,900	100	50	ND	1.0	0.50			0.50	8020
Toluene	870	100	50	ND	1.0	0.50			0.50	8020
Ethyl Benzene	1,600	100	50	ND	1.0	0.50			0.50	8020
Xylenes (total)	3,900	100	50	ND	1.0	0.50			0.50	8020
Analysis Date	7/15/99			7/15/99						
MTBE	ND <sup>1</sup>	50	250	ND	1.0	5.0			5.0	8260

DF=Dilution Factor      ND= None Detected above DLR      PQL=Practical Quantitation Limit      DLR=Detection Reporting Limit

1. Samples diluted due to high concentrations of non-target hydrocarbons
2. Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #I-2346)

  
Michelle L. Anderson, Lab Director

Entech Analytical Labs, Inc.

525 Del Rey Avenue, Suite E  
Sunnyvale, CA 94086

**QUALITY CONTROL RESULTS SUMMARY**

METHOD: Gas Chromatography  
Laboratory Control Sample

QC Batch #: GBG2990712

Matrix: Water  
Units: µg/Liter

Date Analyzed: 07/12/99  
Quality Control Sample: Blank Spike

PARAMETER	Method #	MB µg/Liter	SA µg/Liter	SR µg/Liter	SP µg/Liter	SP % R	SPD µg/Liter	SPD %R	RPD	QC LIMITS	
										RPD	%R
Benzene	8020	<0.50	5.0	ND	4.0	79	3.6	73	8.2	25	69-118
Toluene	8020	<0.50	25.0	ND	26	105	26	103	2.0	25	82-122
Ethyl Benzene	8020	<0.50	5.0	ND	5.4	109	5.2	104	4.9	25	77-114
Xylenes	8020	<0.50	25.0	ND	29	115	28	111	3.7	25	85-125
Gasoline	8015	<50.0	500	ND	461	92	440	88	4.7	25	75-125
aaa-TFT(S.S.)-PID	8020			99%	100%		99%				65-135
aaa-TFT(S.S.)-FID	8015			102%	103%		102%				65-135

Definition of Terms:

- na: Not Analyzed in QC batch
- MB: Method Blank
- SA: Spike Added
- SR: Sample Result
- RPD(%): Duplicate Analysis - Relative Percent Difference
- SP: Spike Result
- SP (%R): Spike % Recovery
- SPD: Spike Duplicate Result
- SPD (%R): Spike % Recovery
- nc: Not Calculated

**QUALITY CONTROL RESULTS SUMMARY**

METHOD: Gas Chromatography

Laboratory Control Sample

QC Batch #: GBG2990709

Matrix: Water

Units: µg/Liter

Date Analyzed: 07/09/99

Quality Control Sample: Blank Spike

PARAMETER	Method #	MB µg/Liter	SA µg/Liter	SR µg/Liter	SP µg/Liter	SP % R	SPD µg/Liter	SPD %R	RPD	QC LIMITS	
										RPD	%R
Benzene	8020	<0.50	5.0	ND	4.0	80	4.0	80	0.8	25	69-118
Toluene	8020	<0.50	25.0	ND	26	105	27	107	1.4	25	82-122
Ethyl Benzene	8020	<0.50	5.0	ND	5.6	111	5.4	108	2.7	25	77-114
Xylenes	8020	<0.50	25.0	ND	29	116	29	114	1.5	25	85-125
Gasoline	8015	<50.0	500	ND	543	109	541	108	0.4	25	75-125
aaa-TFT(S.S.)-PID	8020			100%	100%		102%				65-135
aaa-TFT(S.S.)-FID	8015			100%	103%		104%				65-135

Definition of Terms:

- na: Not Analyzed in QC batch
- MB: Method Blank
- SA: Spike Added
- SR: Sample Result
- RPD(%): Duplicate Analysis - Relative Percent Difference
- SP: Spike Result
- SP (%R): Spike % Recovery
- SPD: Spike Duplicate Result
- SPD (%R): Spike % Recovery
- nc: Not Calculated



# CHAIN OF CUSTODY RECORD

JOB NUMBER: 167-002-01-005  
NAME / LOCATION: Cox Cadillac  
PROJECT MANAGER: Chris Rositto

SAMPLERS: Chris Delaney  
Rob Larson  
RECORDER: Chris Delaney

DATE				SAMPLE NUMBER / DESIGNATION
YR	MO	DY	TIME	
99	07	07	12:47	TW-6
99	07	07	12:58	AW-2
99	07	07	13:27	TW-7
99	07	07	13:48	AW-1
99	07	07	14:12	TW-2

SOURCE CODE	MATRIX				# CONTAINERS & PRESERV.				DEPTH IN FEET	COL MTD CD	QA CODE
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl			
23	X							3	VOAs		
23	X							3	VOAs		
23	X							3	VOAs		
23	X							3	VOAs		
23	X							3	VOAs		

ANALYSIS REQUESTED						
EPA 601 / 8010	EPA 602 / 8020 (BTEX)	EPA 624 / 8240	EPA 625 / 8270	TPHg by 5030 / 8015 (mod)	TPHd by 3550 / 8015 (mod)	MTBE by 8260
X	X	X	X	X	X	X
X	X	X	X	X	X	X
X	X	X	X	X	X	X
X	X	X	X	X	X	X
X	X	X	X	X	X	X

Entech Lab

NOTE  
Standard TAT (5 day)

CHAIN OF CUSTODY RECORD			
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE	TIME
<u>Chris Delaney</u>	<u>R Larayse</u>	<u>7-8</u>	<u>09:50</u>
<u>Roger Larayse</u>			
DISPATCHED BY: (Signature)	DATE	TIME	RECEIVED FOR LAB BY: (Signature)
			<u>Jennifer Durkin</u>
METHOD OF SHIPMENT:			<u>7/8/99</u>