



May 26, 2000

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Mr. Thomas Peacock
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, #250
Alameda, California 94502-6577

**TRANSMITTAL
QUARTERLY GROUNDWATER MONITORING AND
YEAR-END BIO-REMEDICATION EVALUATION REPORT
AND RECOMMENDATIONS
FORMER COX CADILLAC FACILITY
230 BAY PLACE
OAKLAND, CALIFORNIA**

Dear Mr. Peacock:

PES Environmental, Inc. (PES) has enclosed the above-referenced report for your review. The report presents the results of the first year pilot program of groundwater remediation and monitoring conducted and recommendations for further investigation at the former Bill Cox Cadillac facility at 230 Bay Place, Oakland, California. The work was performed as part of response action requested by the Alameda County Environmental Health Services (ACEHS) to address releases from a former 10,000-gallon gasoline underground storage tank (UST) operated at the site by Bill Cox Cadillac. The work was conducted on behalf of Greater Bay Trust Company, trustee for the Shephard Trust property owner, and Hanson, Bridgett, Marcus, Vlahos and Rudy, legal counsel to the Shephard Trust (Hanson, Bridgett).

The pilot program commenced in January 1999 to test remediation of groundwater by applying a combination of passive in-situ bioremediation methods to introduce oxygen and nutrients into groundwater at the site to enhance natural biodegradation of petroleum hydrocarbons. The methods included: (1) adding a nutrient- and hydrogen peroxide-enriched water; and (2) placement of Oxygen Releasing Compound (ORC) in selected wells at the site. Remedial actions were conducted 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 program has been effective in reducing the concentrations of petroleum hydrocarbons in groundwater on site at the locations of wells MW-1 and TW-6, located up-

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gradient and cross-gradient of the former gasoline UST. However, the remedial actions have not shown significant progress in reducing petroleum hydrocarbons in well TW-7, located immediately down-gradient of the former UST.

Wells TW-7 and MW-2 are located nearest to several utility trenches and vaults along the western property boundary and within Vernon Street and Bay Place. MTBE concentrations have been increasing in MW-2 and TW-7 throughout the remedial program and appears to be the result of offsite sources. MTBE concentrations have been the highest in MW-2 since the start of monitoring for MTBE in January 1999. The high concentrations of MTBE detected in samples from well MW-2 are likely the result of an offsite source that is being conveyed toward the site via preferential flow as a result of utility trenches adjacent to the well. In 1993 PES sampled groundwater from Wells MW-1, TW-4, TW-5, TW-6, and TW-7 and analyzed the samples by EPA Test Method 8260. No MTBE was detected in the samples. 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 that 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.

It is PES' concern that MTBE and possibly other petroleum hydrocarbons are migrating towards the site and masking the affects of biodegradation from the pilot program. In order to evaluate that potential concern, PES recommends: (1) installing an offsite well between TW-7 and the intersection of Bay Place and Harrison Street to assess for offsite sources migrating toward the site; and (2) continuing the groundwater monitoring including the proposed new offsite well.

In addition, subsequent to preparing our 1996 Remedial Plan and initiating the pilot program, several tasks previously not included in the Remedial Plan were identified by PES as necessary for the implementation of the work plan. The tasks include temporary wellhead surface completion, permit acquisition, borehole clearance and utility marking, monitoring well redevelopment, well surveying, water provision, well completion report preparation, MTBE confirmation analyses, dissolved oxygen monitoring, and waste disposal. These tasks require approval for funding from the California Underground Storage Tank Cleanup Fund (UST Fund).

The scope of work described above represents appropriate and necessary action for moving towards closure of the site. In order for the project to maintain eligibility for reimbursement from the UST Fund, PES requests your written concurrence and direction to implement the scope of work presented herein.

Mr. Thomas Peacock

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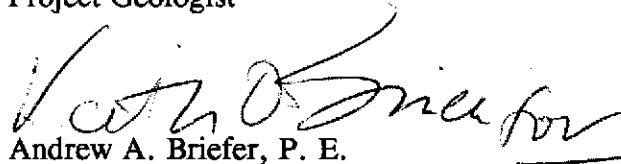
We look forward to your timely response to this letter. We trust that this is the information that you require at this time. If you have any questions or comments, please do not hesitate to call either of the undersigned.

Yours very truly,

PES ENVIRONMENTAL, INC.



Christopher D. Rossitto
Project Geologist



Andrew A. Briefer, P. E.
Principal Engineer

cc: Mr. Rory Campbell, Esq.
Leah S. Goldberg, Esq.



A Report Prepared For:

Greater Bay Trust Company
c/o Leah S. Goldberg, Esq.
Hanson, Bridgett, Marcus, Vlahos & Rudy
333 Market Street, Suite 2300
San Francisco, California 94105-2173

**QUARTERLY GROUNDWATER MONITORING AND
YEAR-END BIOREMEDIATION EVALUATION REPORT
FORMER COX CADILLAC FACILITY
230 BAY PLACE
OAKLAND, CALIFORNIA**

MAY 24, 2000

By:

A handwritten signature in cursive script, appearing to read "Chris Rossitto", is written over a horizontal line.

Christopher D. Rossitto
Project Geologist

A handwritten signature in cursive script, appearing to read "A. Briefer", is written over a horizontal line.

Andrew A. Briefer, P.E.
Principal Engineer

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DISTRIBUTION

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1.0 INTRODUCTION

This report presents the results of groundwater and bioremediation monitoring conducted by PES Environmental, Inc. (PES) on January 11, 2000 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 Shephard Trust 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.

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. PES' Remedial Plan was developed in response to that request. Between June 1997 and April 1999 PES conducted several tasks as part of the Remedial Plan including site characterization, additional well installation, soil remediation, baseline groundwater monitoring, and initial groundwater remediation activities. 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 January 2000 monitoring is the fourth monitoring event since the groundwater remediation program and baseline monitoring was initiated by PES in January 1999. Groundwater monitoring reports presenting the results of quarterly monitoring conducted in April, July and October 1999 have previously been submitted to your attention. The results of the January 2000 groundwater monitoring are presented below.

This report includes: (1) the results of the quarterly groundwater monitoring conducted on January 11, 2000; (2) the results of the groundwater remediation activities conducted since the last quarterly event in October 1999; (3) the results of the previous quarterly groundwater monitoring events and remediation activities; (4) a year-end evaluation of the groundwater remediation program; and (5) recommendations for future remedial actions.

3.0 JANUARY 2000 GROUNDWATER MONITORING ACTIVITIES

3.1 Depth to Groundwater Measurements

Water levels were measured by Blaine Tech Services (Blaine Tech) of San Jose, California at monitoring wells MW-1, MW-2, TW-2, TW-4, TW-5, TW-6, and TW-7 on January 11, 2000. 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 by Blaine Tech. Dissolved oxygen measurement procedures and results are described in Sections 3.3 and 4.3.

3.2 Groundwater Sampling and Analyses

Groundwater samples were collected from wells MW-1, MW-2, TW-2, TW-6, and TW-7 by Blaine Tech on January 11, 2000. 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 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 and methyl tertiary butyl ether (MTBE) using EPA Test Method 8020, and MTBE confirmation 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 Appendix B.

3.3 Dissolved Oxygen Measurements

Dissolved oxygen measurements were collected twice from the wells by PES on November 17, 1999 and once on January 11, 2000 by Blaine Tech. Total dissolved oxygen was measured on November 17, 1999 in monitoring wells MW-1, TW-4, TW-5, TW-6, and TW-7 once before

measuring groundwater levels, purging and sampling, and introduction of enriched water and once after introduction of enriched water. Total dissolved oxygen was measured once on January 11, 2000 in monitoring wells MW-1, MW-2, TW-2, TW-6, and TW-7, at the start of the day before measuring groundwater levels and purging and sampling. No enriched water was introduced into the wells on January 11, 2000. 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 January 11, 2000 are summarized in Table 4.

4.0 GROUNDWATER MONITORING RESULTS

4.1 Groundwater Elevation Measurements

Depth-to-groundwater data collected from the wells on January 11, 2000 were converted to groundwater elevations referenced to site datum. Groundwater elevations ranged from 91.75 feet in well MW-2 to 98.64 feet in well TW-2. Groundwater flow direction at the site is to the southwest, at a hydraulic gradient of approximately 0.05-foot per foot. Groundwater elevation data through January 11, 2000 are presented in Table 1. Groundwater elevation contours for measurements collected on January 11, 2000 are presented on Plate 3.

Results of the January 2000 groundwater elevations indicate a general increase since the October 1999 monitoring event. As expected, higher groundwater elevations were observed during wet weather months (January and April) and lower groundwater elevations were observed during dry weather months (July and October). As with historical observations, the groundwater flow direction continues to be toward the southwest.

4.2 Groundwater Sample Analytical Results

The analytical results of the groundwater samples collected on January 11, 2000 along with the previous quarterly results are presented in Table 2. Analytical results of the January 11, 2000 samples are also shown on Plate 4. TPHg was detected in the samples from wells MW-1, MW-2, and TW-7 at concentrations of 2,400 $\mu\text{g/L}$, 11,000 $\mu\text{g/L}$, and 52,000 $\mu\text{g/L}$, respectively. MTBE was detected in the samples from wells MW-2 and TW-7 at concentrations of 8,400 $\mu\text{g/L}$ and 2,600 $\mu\text{g/L}$, respectively. Benzene was detected in the samples from wells MW-1, MW-2, and TW-7 at concentrations of 52 $\mu\text{g/L}$, 890 $\mu\text{g/L}$, and 8,500 $\mu\text{g/L}$, respectively. The highest concentrations of toluene, ethylbenzene and total xylenes were detected in the sample from well TW-7 at 7,100 $\mu\text{g/L}$, 1,600 $\mu\text{g/L}$, and 6,700 $\mu\text{g/L}$, respectively. Copies of the laboratory reports and chain-of-custody documentation are presented in Appendix B.

Historically the highest concentrations of TPHg and BTEX have been detected in the groundwater from wells nearest to the former gasoline UST and product piping, specifically Wells MW-1 and TW-7. However, a significant decrease in concentrations of TPHg and BTEX, as well as MTBE, was observed in groundwater from well MW-1 in January 2000 compared to the previous sampling events. Increased concentrations of TPHg, toluene, total xylenes and MTBE were found in the January 2000 sample from well TW-7 compared to October 1999. Significant increases in TPHg, benzene and MTBE concentrations were observed in the January 2000 sample from MW-2 compared to the October 1999 sample. Similar to samples from October 1999, no detectable concentrations of TPHg, BTEX and MTBE were found in samples from TW-2 and TW-6.

MTBE concentrations in wells MW-2 and TW-7 located downgradient and nearest to several utility trenches, have been significantly higher than in onsite wells and increasing. The highest concentration of MTBE to date (8,400 $\mu\text{g/L}$) was found in the January 11, 2000 sample from well MW-2. MTBE concentrations have been the highest in MW-2 since the start of monitoring for MTBE in January 1999. The concentration of MTBE in TW-7 has increased each quarter since January 1999 except for the October 1999 quarter. The high concentrations of MTBE detected in samples from well MW-2 are likely the result of elevated concentrations from offsite that is being conveyed toward the site via preferential flow as a result of utility trenches adjacent to the well. In 1993 PES sampled groundwater from Wells MW-1, TW-4, TW-5, TW-6, and TW-7 and analyzed the samples by EPA Test Method 8260. No MTBE was detected in the samples. 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 that 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.

4.3 Dissolved Oxygen Measurement Results

Before well purging and enriched water introduction on November 17, 1999, total dissolved oxygen concentrations ranged from 0.8 milligrams per liter (mg/L) in well TW-5 to 10.6 mg/L in well TW-4. Before purging the wells on January 11, 2000, total dissolved oxygen concentrations ranged from 3.9 mg/L in well MW-2 to 5.2 mg/L in well TW-7.

After enriched water introduction into wells TW-4, TW-5, TW-6, TW-7, and MW-1 on November 17, 1999, dissolved oxygen concentrations were measured at greater than 15 mg/L (the maximum range of the dissolved oxygen meter used).

Dissolved oxygen concentrations measured during this monitoring period are included with the well sampling documentation presented in Appendix A. Dissolved oxygen concentrations measured through January 11, 2000 are also presented in Table 4.

Dissolved oxygen concentrations were elevated on November 17, 1999 and during previous events as a result of oxygen enhancement following introduction of the enriched water solution as part of the bioremediation program. Dissolved oxygen measurements are used as an indication of the effectiveness of the oxygenation achieved during groundwater remediation. The elevated concentrations of dissolved oxygen in the wells demonstrate that the enriched water introductions have been effective in providing a source of oxygen. Dissolved oxygen is an indirect indicator of hydrocarbon concentration. In areas of high hydrocarbon concentration, dissolved oxygen is expected to be consumed by the native bacteria and residual dissolved oxygen concentrations are expected to be low after some period following the introduction.

To assess the consumption of dissolved oxygen, PES conducted monitoring of the dissolved oxygen in July 1999. Dissolved oxygen was measured in the wells three days per week from July 9, 1999 through July 30, 1999, following the July 7, 1999 enriched water introduction, to assess the decline of oxygen in groundwater in the wells. In general, in wells receiving enriched water, the monitoring showed that the dissolved oxygen declined to background concentrations (concentrations prior introduction of oxygen at remediation startup) between approximately 7 and 20 days in wells with elevated hydrocarbon concentrations. In wells with low or non-detect hydrocarbons, the dissolved oxygen remained elevated throughout this same dissolved oxygen monitoring period. Prior to each event of enriched water introduction, approximately every six weeks, dissolved oxygen concentrations in the wells were measured.

5.0 GROUNDWATER REMEDIATION ACTIVITIES

Groundwater remediation was conducted 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 are described below.

5.1 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 November 17, 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.

An approximate volume of 900 gallons of enriched water at a concentration of 2,000 parts per million (ppm) hydrogen peroxide was introduced into the wells on November 17, 1999. A total of approximately 4,680 gallons of enriched water has been introduced into the wells since March 1999, resulting in the addition of approximately 183 pounds of oxygen to groundwater on site. Enriched water introductions were conducted twice per quarter (every six weeks) through November 17, 1999. Enriched water introduction through November 17, 1999 is summarized in Table 3.

5.2 Oxygen Releasing Compound (ORC) Installation

Following enriched water introduction, 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 2-inch diameter polyethylene webbed sock in 1-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 continuous supply of oxygen between enriched water introductions.

6.0 GROUNDWATER REMEDIATION RESULTS

The approach for remediation of groundwater has consisted of applying a combination of passive in-situ bioremediation methods to introduce oxygen and nutrients into groundwater at the site to enhance biodegradation of petroleum hydrocarbons. The methods have included introductions of enriched water and placement of ORC into selected wells at the site. Groundwater remediation has been ongoing since March 1999.

The objective of the groundwater remediation was to reduce the concentrations of petroleum hydrocarbons, specifically benzene, in soil and groundwater to achieve acceptable risk levels. The remedial goal for groundwater at the site was based on risk analyses conducted by EOA.

The remedial program has been effective in reducing the concentrations of petroleum hydrocarbons in groundwater on site at the locations of wells MW-1 and TW-6. Concentrations of hydrocarbons significantly decreased at well TW-6 by April 1999, soon after the initial enriched water introductions in March 1999. Concentrations of hydrocarbons significantly decreased at well MW-1 by January 2000, after 8 months of enriched water introductions. Results of the January 2000 sample analyses indicate that benzene concentrations in groundwater samples from wells TW-6 and MW-1 are below the remedial goal of 69 $\mu\text{g/L}$.

Monitoring has indicated that remediation activities have not reduced the concentrations of petroleum hydrocarbons in groundwater at the location of well TW-7. As mentioned in Section 4.2, wells MW-2 and TW-7 are located down-gradient and nearest to several utility

trenches and vaults along the western property boundary and within Vernon Street and Bay Place. TW-7 is near the former UST at the western property boundary and MW-2 is located offsite along the curb down-gradient of TW-7. MTBE concentrations have been increasing in MW-2 and TW-7 throughout the remedial program and appears to be the result of offsite sources that are migrating toward the site via the utility trenches adjacent to the site. Prior sampling by PES in 1993 indicated MTBE was not present in groundwater from onsite wells. Consequently, the presence of MTBE suggests that offsite sources of MTBE and petroleum hydrocarbons may be affecting groundwater on the downgradient portion of the site.

7.0 CONCLUSIONS AND RECOMMENDATIONS

In accordance with the Remedial Plan, PES has conducted 1-year of the pilot groundwater remediation program and quarterly groundwater monitoring at the site by application of a combination of passive in-situ bioremediation methods to introduce oxygen and nutrients into groundwater at the site to enhance biodegradation of hydrocarbons. The program has been effective at locations up-gradient and cross-gradient of the former gasoline UST. The remedial actions have not yet shown significant progress in reducing petroleum hydrocarbons in well TW-7 located immediately down-gradient of the former UST and adjacent to potential offsite contributing sources.

Based on the results of one year of groundwater remediation activities and quarterly monitoring, PES recommends: (1) installing an offsite well near the intersection of Bay Place and Harrison Street to assess for upgradient sources migrating toward the site; and (2) continuing the groundwater monitoring including the proposed upgradient well.

PES proposes that the additional groundwater monitoring well be installed northwest of MW-2 to characterize the nature of petroleum hydrocarbons from potential offsite sources. PES also proposes quarterly monitoring of groundwater using the new well in addition to the previously monitored wells.

Table 1
Groundwater Elevation Data Through January 11, 2000
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
	10/6/99	100.00	2.94	97.06
	1/11/00	100.00	2.69	97.31
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
	10/6/99	97.48	5.99	91.49
	1/11/00	97.48	5.73	91.75
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
	10/6/99	100.43	1.97	98.46
	1/11/00	100.43	1.79	98.64
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
	10/6/99	99.35	NM	NA
	1/11/00	99.35	2.63	96.72
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
	10/6/99	99.40	NM	NA
	1/11/00	99.40	1.03	98.37
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
	10/6/99	98.75	6.64	92.11
	1/11/00	98.75	6.41	92.34
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
	10/6/99	97.96	5.70	92.26
	1/11/00	97.96	5.42	92.54

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 January 11, 2000
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
	10/6/99	32,000	<250	2,100	910	1,800	4,400
	1/11/00	2,400	<5.0	52	3.9	63	12
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
	10/6/99	2,800	300	73	<25	<25	<25
	1/11/00	11,000	8,400	890	<100	<100	<100
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
	10/6/99	<50	<5.0	<0.50	<0.50	<0.50	<0.50
	1/11/00	<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
	10/6/99	<50	<5.0	0.59	<0.50	<0.50	<0.50
	1/11/00	<50	<5.0	<0.50	<0.50	<0.50	<0.50
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
	10/6/99	29,000	580	9,700	1,600	1,600	2,100
	1/11/00	52,000	2,600	8,500	7,100	1,600	6,700

Notes:

TPH - Total Petroleum Hydrocarbons

MTBE - Methyl tert-butyl ether

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

<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 ₂ O ₂ (ppm)	Amount of O ₂ 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
	8/19/99	0.3	86.1	1,500	3.37
	10/6/99	0.97	232.4	1,500	9.11
	11/17/99	0.9	240.1	2,000	9.41
TW-4	3/11/99	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
	8/19/99	0.04	12.3	1,500	0.48
	10/6/99	0.02	4.8	1,500	0.19
	11/17/99	0.03	7.2	2,000	0.28
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
	8/19/99	1.27	365	1,500	14.30
	10/6/99	1.15	275.3	1,500	10.79
	11/17/99	1.04	278.4	2,000	10.91
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
	8/19/99	1.03	296.7	1,500	11.63
	10/6/99	0.54	129.9	1,500	5.09
	11/17/99	0.62	166.3	2,000	6.52
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
	8/19/99	1.05	301.3	1,500	11.81
	10/6/99	0.63	151.9	1,500	5.95
	11/17/99	0.78	208.8	2,000	8.18
TOTAL			4,680.3	TOTAL	183.42

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)
	8/19/99	10:45	1.0	(2)
	8/19/99	18:48	> 15.0	(3)
	10/6/99	10:42	10.3	(2)
	10/6/99	17:11	> 15.0	(3)
	11/17/99	11:13	4.4	(2)
	11/17/99	17:34	> 15.0	(3)
1/11/00	NA	4.0	(2)	
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)
	10/6/99	10:10	1.2	(2)
	10/6/99	16:58	0.5	(3)
	1/11/00	NA	3.9	(2)
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)
	10/6/99	9:59	3.2	(2)
	10/6/99	16:48	2.6	(3)
	1/11/00	NA	4.6	(2)
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)

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-4 (continued)	8/19/99	10:41	13.4	(2)
	8/19/99	18:27	> 15.0	(3)
	10/6/99	9:50	> 15.0	(2)
	10/6/99	16:40	> 15.0	(3)
	11/17/99	11:16	10.6	(2)
	11/17/99	17:35	> 15.0	(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)
	8/19/99	10:38	1.0	(2)
	8/19/99	18:33	> 15.0	(3)
	10/6/99	10:31	0.2	(2)
	10/6/99	17:08	> 15.0	(3)
	11/17/99	11:22	0.8	(2)
11/17/99	17:37	> 15.0	(3)	
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)
	8/19/99	10:35	14.8	(2)
	8/19/99	18:38	> 15.0	(3)
	10/6/99	10:27	3.8	(2)
	10/6/99	17:06	> 15.0	(3)
	11/17/99	11:24	1.5	(2)
11/17/99	17:39	> 15.0	(3)	
	1/11/00	NA	4.9	(2)

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-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)
	8/19/99	10:30	0.9	(2)
	8/19/99	18:46	> 15.0	(3)
	10/6/99	10:19	0.5	(2)
	10/6/99	17:03	> 15.0	(3)
	11/17/99	11:28	1.1	(2)
	11/17/99	17:40	> 15.0	(3)
1/11/00	NA	5.2	(2)	

Notes:

> 15 = Above indicated equipment quantification maximum

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

(2) = Measured prior to enriched water introduction, and water-level measurement and well purging

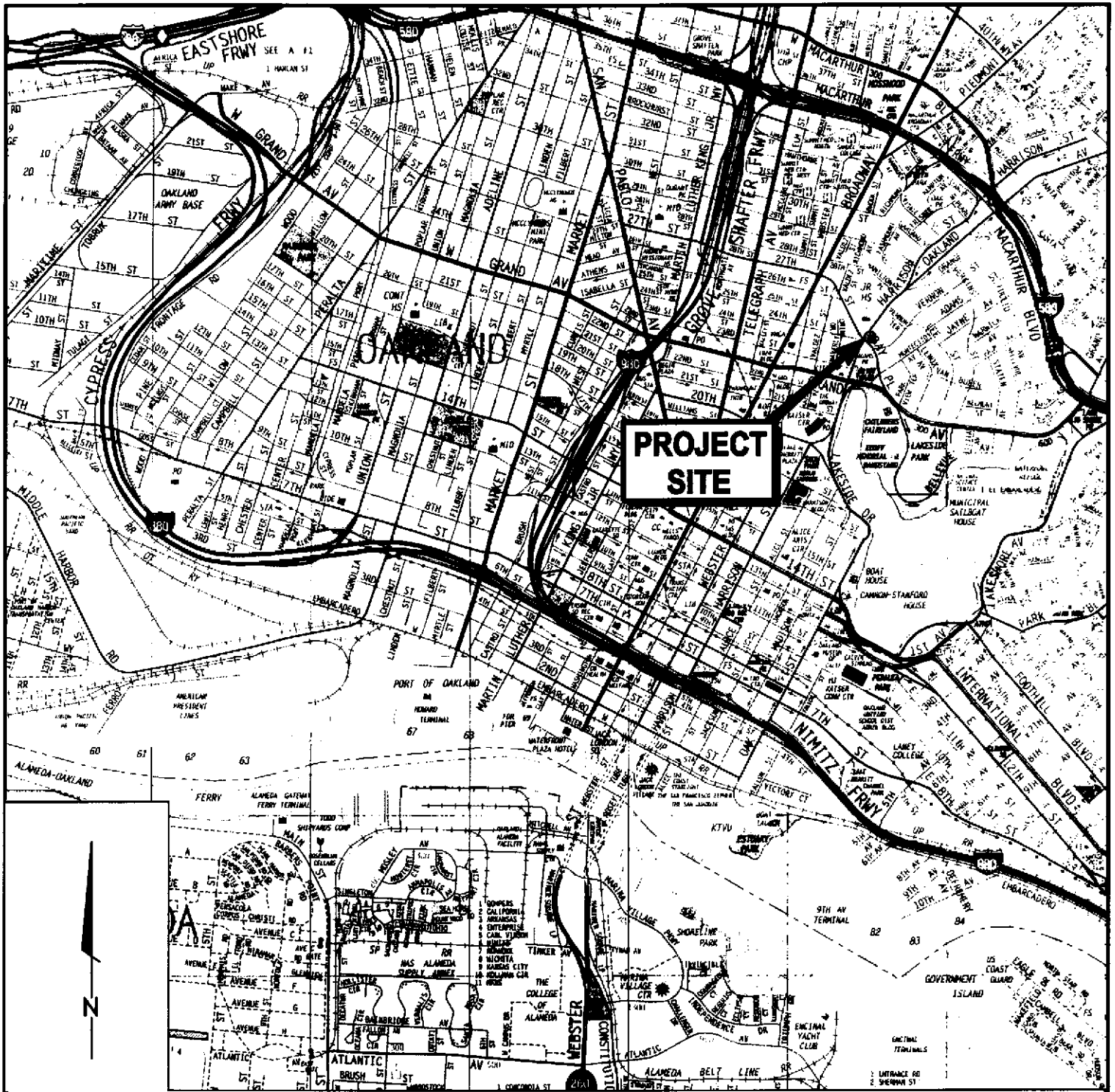
(3) = Measured after enriched water introduction

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.

NA = information not available



PROJECT SITE



Scale in Feet

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

167.0201.006

167020006_QTR-2000

CDR

03/00

JOB NUMBER

DRAWING NUMBER

REVIEWED BY

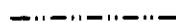
DATE

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

TW-3

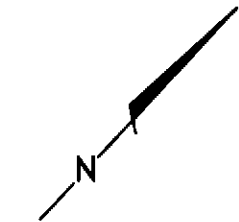
Former Waste Oil Underground Storage Tank Location

PARKING

TW-2

TW-6

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




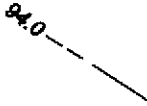
167.0201.000
JOB NUMBER

1670200006_QTR-2000
DRAWING NUMBER

CDR
REVIEWED BY

03/00
DATE

Explanation

- MW-1  Monitoring Well Location
- TW-1  Temporary Well Location
-  Former UST Location
- (97.31) Groundwater Elevation (Referenced to Site Datum) measured January 11, 2000
- 94.0  Groundwater Elevation Contour, Dashed where Inferred (Contour Interval is 1.00 feet)
- (NM) Water-level not measured

Note: TW-5 not included in groundwater elevation contours.

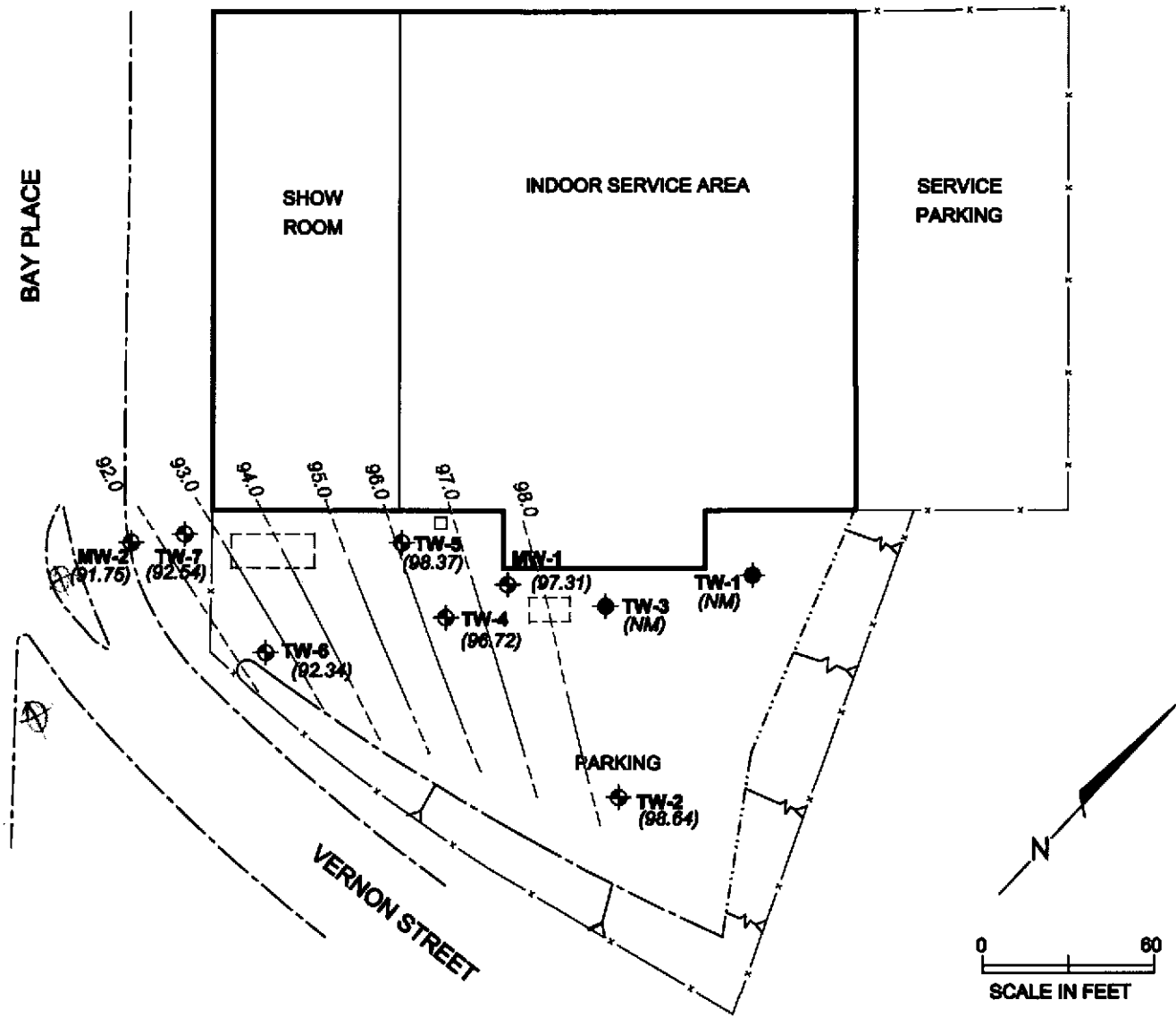
HARRISON STREET

BAY PLACE

SHOW ROOM

INDOOR SERVICE AREA

SERVICE PARKING



PES Environmental, Inc.
Engineering & Environmental Services

Groundwater Elevation Contours on January 11, 2000
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

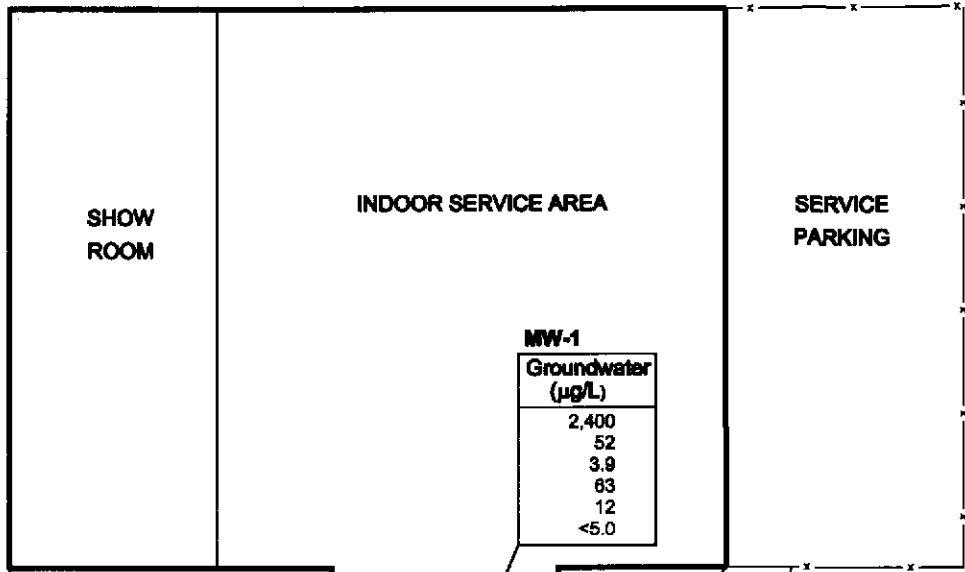
TW-7

Groundwater ($\mu\text{g/L}$)
52,000
8,500
7,100
1,600
6,700
2,600

MW-2

Groundwater ($\mu\text{g/L}$)
11,000
890
<100
<100
* <100
8,400

HARRISON STREET



MW-1

Groundwater ($\mu\text{g/L}$)
2,400
52
3.9
63
12
<5.0

SERVICE PARKING

TW-2

Groundwater ($\mu\text{g/L}$)
<50
<0.50
<0.50
<0.50
<0.50
<5.0

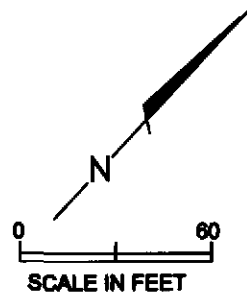
BAY PLACE

TW-8

Groundwater ($\mu\text{g/L}$)
<50
<0.50
<0.50
<0.50
<0.50
<5.0

VERNON STREET

PARKING



PES Environmental, Inc.
Engineering & Environmental Services

Distribution of Dissolved Hydrocarbons in Groundwater - January 11, 2000
Quarterly Groundwater Monitoring
Former Cox Cadillac-230 Bay Place
Oakland, California

PLATE
4

APPENDIX A

WELL SAMPLING DOCUMENTATION -

WELL MONITORING DATA SHEET

Project #: 000111-21	Client: PES
Sampler: P.F.	Start Date: 1-11-00
Well I.D.: mw-1	Well Diameter: (2) 3 4 6 8
Total Well Depth:	Depth to Water:
Before: 19.81 * After:	Before: 2.69 After: 4.51
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: PVC Grade	D.O. Meter (if req'd): YSI HACH

Purge Method: Bailer
Disposable Bailer
 Middleburg
 Electric Submersible
 Extraction Pump

Sampling Method: Bailer
Disposable Bailer
 Extraction Port
 Other: _____

Other: _____

Well Diameter	Multiplier	Well Diameter	Multiplier
2"	0.16	5"	1.02
3"	0.37	6"	1.47
4"	0.65	Other	radius ² * 0.163

2.7 (Gals.) X 3 = 8.1 Gals.
 1 Case Volume Specified Volumes Calculated Volume

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1122	64.3	6.8	1980	64	2.75	
1125	64.5	6.9	2800	122	5.5	
1128	64.7	6.9	2930	193	8.25	

Did well dewater? Yes No Gallons actually evacuated: 8.25

Sampling Time: 1130 Sampling Date: 1-11-00

Sample I.D.: mw-1 Laboratory: entech

Analyzed for: TPH-G BTEX MTBE TPH-D Other: _____

Equipment Blank I.D.: _____ @ _____ Time Duplicate I.D.: _____

Analyzed for: TPH-G BTEX MTBE TPH-D Other: _____

D.O. (if req'd):	Pre-purge: 4.0 mg/L	Post-purge: _____ mg/L
ORP (if req'd):	Pre-purge: _____ mV	Post-purge: _____ mV

WELL MONITORING DATA SHEET

Project #: 000111-I1	Client: PES
Sampler: P.F.	Start Date: 1-11-00
Well I.D.: MW-2	Well Diameter: (2) 3 4 6 8
Total Well Depth:	Depth to Water: 5.73
Before: 19.67 After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: PVC Grade	D.O. Meter (if req'd): YSI HACH

Purge Method: Bailer
 Disposable Bailer
 Middleburg
 Electric Submersible
 Extraction Pump
 Other: _____

Sampling Method: Bailer
 Disposable Bailer
 Extraction Port
 Other: _____

7.2 (Gals.) X 3 = 6.6 Gals.
 I Case Volume Specified Volumes Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
2"	0.16	5"	1.02
3"	0.37	6"	1.47
4"	0.65	Other	radius ² * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1100	66.2	7.0	2210	7200	2.25	
1104	66.4	7.0	2260	7200	4.5	
1108	66.3	7.1	2320	7200	6.75	

Did well dewater? Yes No Gallons actually evacuated: 6.75

Sampling Time: 1110 Sampling Date: 1-11-00

Sample I.D.: MW-2 Laboratory: entech

Analyzed for: TPH-G BTEX MTBE TPH-D Other:

Equipment Blank I.D.: @ Time Duplicate I.D.:

Analyzed for: TPH-G BTEX MTBE TPH-D Other:

D.O. (if req'd):	Pre-purge: 3.9 mg/L	Post-purge: mg/L
ORP (if req'd):	Pre-purge: mV	Post-purge: mV

WELL MONITORING DATA SHEET

Project #: 000111-E1	Client: PES
Sampler: P.F.	Start Date: 1-11-00
Well I.D.: TW-7	Well Diameter: (2) 3 4 6 8
Total Well Depth:	Depth to Water:
Before: 9.55 After:	Before: 5.42 After: 7.37
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: PVC Grade	D.O. Meter (if req'd): YSI HACH

Purge Method: Bailer
 Disposable Bailer
 Middleburg
 Electric Submersible
 Extraction Pump
 Other: _____

Sampling Method: Bailer
Disposable Bailer
 Extraction Port
 Other: _____

0.6 (Gals.) X 3 = 1.8 Gals.
 I Case Volume Specified Volumes Calculated Volume

Well Diameter	Multiplier	Well Diameter	Multiplier
2"	0.16	5"	1.02
3"	0.37	6"	1.47
4"	0.65	Other	radius ² * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1137	68.4	6.8	770	144	.75	
1139	68.8	6.8	740	171	1.5	
1141	68.9	6.7	730	7200	2.0	

Did well dewater? Yes No Gallons actually evacuated: 2.0

Sampling Time: 1144 Sampling Date: 1-11-00

Sample I.D.: TW-7 Laboratory: entech

Analyzed for: TPH-G BTEX MTBE TPH-D Other: _____

Equipment Blank I.D.: _____ @ _____ Time Duplicate I.D.: _____

Analyzed for: TPH-G BTEX MTBE TPH-D Other: _____

D.O. (if req'd):	Pre-purge:	5.2 mg/L	Post-purge:	mg/L
ORP (if req'd):	Pre-purge:	mV	Post-purge:	mV

APPENDIX B

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

Entech Analytical Labs, Inc.

CA ELAP# 1-2346

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

January 19, 2000

Chris Rossitto
PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947

RECEIVED MAR - 3 2000

Order: 18568

Date Collected: 1/11/00

Project Name:

Date Received: 1/12/00

Project Number: 000111-11

P.O. Number:

Project Notes:

On January 12, 2000, 5 samples were received under documented chain of custody. Results for the following analyses are attached:

<u>Matrix</u>	<u>Test</u>	<u>Method</u>
Liquid	BTEX	EPA 8020
	MTBE by EPA 8020	EPA 8020
	TPH as Gasoline	EPA 8015 MOD. (Purgeable)

Chemical analysis of these samples has been completed. Summaries of the data are contained on the following pages. USEPA protocols for sample storage and preservation were followed.

Entech Analytical Labs, Inc. is certified by the State of California (#2346). If you have any questions regarding procedures or results, please call me at 408-735-1550.

Sincerely,



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 Boulevard, Suite 100
Novato, CA 94947
Attn: Chris Rossitto

Date: 1/19/00
Date Received: 1/12/00
Project Name:
Project Number: 000111-II
P.O. Number:
Sampled By: Patrick Flaherly

Certified Analytical Report

Order ID: 18568

Lab Sample ID: 18568-001

Client Sample ID: MW-1

Sample Time: 11:30 AM

Sample Date: 1/11/00

Matrix: Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Benzene	52		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Toluene	3.9		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Ethyl Benzene	63		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Xylenes, Total	12		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate		Surrogate Recovery		Control Limits
						aaa-Trifluorotoluene		107		65 - 135

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Methyl-t-butyl Ether	18		1	5	5	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate		Surrogate Recovery		Control Limits
						aaa-Trifluorotoluene		107		65 - 135

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Gasoline	2400		1	50	50	µg/L		1/13/00	WGC1000112	EPA 8015 MOD. (Purgeable)
						Surrogate		Surrogate Recovery		Control Limits
						aaa-Trifluorotoluene		121		65 - 135


DF = Dilution Factor

ND = Not Detected

DLR = Detection Limit Reported

PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)


Michelle L. Anderson, Laboratory Director*Environmental Analysis Since 1983*

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 Boulevard, Suite 100
Novato, CA 94947
Attn: Chris Rossitto

Date: 1/19/00
Date Received: 1/12/00
Project Name:
Project Number: 000111-I1
P.O. Number:
Sampled By: Patrick Flaherly

Certified Analytical Report

Order ID: 18568

Lab Sample ID: 18568-002

Client Sample ID: MW-2

Sample Time: 11:10 AM

Sample Date: 1/11/00

Matrix: Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Benzene	890		200	0.5	100	µg/L		1/13/00	WGC1000112	EPA 8020
Toluene	ND		200	0.5	100	µg/L		1/13/00	WGC1000112	EPA 8020
Ethyl Benzene	ND		200	0.5	100	µg/L		1/13/00	WGC1000112	EPA 8020
Xylenes, Total	ND		200	0.5	100	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate		Surrogate Recovery		Control Limits
						aaa-Trifluorotoluene		118		65 - 135

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Methyl-t-butyl Ether	8100		200	5	1000	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate		Surrogate Recovery		Control Limits
						aaa-Trifluorotoluene		118		65 - 135

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Gasoline	11000	x	200	50	10000	µg/L		1/13/00	WGC1000112	EPA 8015 MOD. (Purgeable)
						Surrogate		Surrogate Recovery		Control Limits
						aaa-Trifluorotoluene		123		65 - 135


DF = Dilution Factor

ND = Not Detected

DLR = Detection Limit Reported

PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)


Michelle L. Anderson, Laboratory Director

Environmental Analysis Since 1983

Entech Analytical Labs, Inc.

CA ELAP# I-2346

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PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947
Attn: Chris Rossitto

Date: 1/19/00
Date Received: 1/12/00
Project Name:
Project Number: 000111-II
P.O. Number:
Sampled By: Patrick Flaherly

Certified Analytical Report

Order ID: 18568

Lab Sample ID: 18568-003

Client Sample ID: TW-2

Sample Time: 10:25 AM

Sample Date: 1/11/00

Matrix: Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Benzene	ND		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Toluene	ND		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Ethyl Benzene	ND		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Xylenes, Total	ND		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	107		65 - 135	

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Methyl-t-butyl Ether	ND		1	5	5	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	107		65 - 135	

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Gasoline	ND		1	50	50	µg/L		1/13/00	WGC1000112	EPA 8015 MOD. (Purgeable)
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	112		65 - 135	


DF = Dilution Factor

ND = Not Detected

DLR = Detection Limit Reported

PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)


Michelle L. Anderson, Laboratory Director

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Entech Analytical Labs, Inc.

CA ELAP# I-2346

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PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947
Attn: Chris Rossitto

Date: 1/19/00
Date Received: 1/12/00
Project Name:
Project Number: 000111-I1
P.O. Number:
Sampled By: Patrick Flaherly

Certified Analytical Report

Order ID: 18568 Lab Sample ID: 18568-004 Client Sample ID: TW-6
Sample Time: 10:45 AM Sample Date: 1/11/00 Matrix: Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Benzene	ND		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Toluene	ND		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Ethyl Benzene	ND		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
Xylenes, Total	ND		1	0.5	0.5	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	106		65 - 135	

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Methyl-t-butyl Ether	ND		1	5	5	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	106		65 - 135	

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Gasoline	ND		1	50	50	µg/L		1/13/00	WGC1000112	EPA 8015 MOD. (Purgeable)
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	112		65 - 135	


DF = Dilution Factor

ND = Not Detected

DLR = Detection Limit Reported

PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)


Michelle L. Anderson, Laboratory Director*Environmental Analysis Since 1983*

Entech Analytical Labs, Inc.

CA ELAP# I-2346

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PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947
Attn: Chris Rossitto

Date: 1/19/00
Date Received: 1/12/00
Project Name:
Project Number: 000111-II
P.O. Number:
Sampled By: Patrick Flaherly

Certified Analytical Report

Order ID: 18568

Lab Sample ID: 18568-005

Client Sample ID: TW-7

Sample Time: 11:44 AM

Sample Date: 1/11/00

Matrix: Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Benzene	8500		50	0.5	25	µg/L		1/13/00	WGC1000112	EPA 8020
Toluene	7100		50	0.5	25	µg/L		1/13/00	WGC1000112	EPA 8020
Ethyl Benzene	1600		50	0.5	25	µg/L		1/13/00	WGC1000112	EPA 8020
Xylenes, Total	6700		50	0.5	25	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	101		65 - 135	

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
Methyl-t-butyl Ether	2800		50	5	250	µg/L		1/13/00	WGC1000112	EPA 8020
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	101		65 - 135	

Parameter	Result	Flag	DF	PQL	DLR	Units	Extraction Date	Analysis Date	QC Batch ID	Method
TPH as Gasoline	52000		50	50	2500	µg/L		1/13/00	WGC1000112	EPA 8015 MOD. (Purgeable)
						Surrogate	Surrogate Recovery		Control Limits	
						aaa-Trifluorotoluene	103		65 - 135	

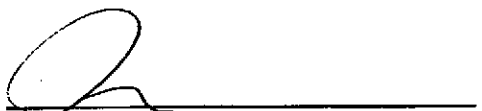
DF = Dilution Factor

ND = Not Detected

DLR = Detection Limit Reported

PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)



Michelle L. Anderson, Laboratory Director

Environmental Analysis Since 1983

BLAINE

TECH SERVICES, INC.

1680 ROGERS AVENUE
 SAN JOSE, CALIFORNIA 95112-1105
 FAX (408) 573-7771
 PHONE (408) 573-0555

CONDUCT ANALYSIS TO DETECT

LAB Entech

DHS #

ALL ANALYSES MUST MEET SPECIFICATIONS AND DETECTION LIMITS SET BY CALIFORNIA DHS AND

- EPA
- LA
- OTHER

RWQCB REGION _____

SPECIAL INSTRUCTIONS

Invoice and Report to : PES

Attn: Chris Rossitto

* Confirm MTBE hits by EPA 8260

CHAIN OF CUSTODY
 BTS # 000111-E1

CLIENT PES

SITE 230 Bay Place 1680

Oakland, CA ROGERS

C - COMPOSITE ALL CONTAINERS

TPH - Gas (8015)

BTEX (8020)

MTBE (8020) *

SAMPLE I.D.	DATE	TIME	MATRIX		CONTAINERS	C	TPH - Gas (8015)	BTEX (8020)	MTBE (8020) *						ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
			S-SOIL	W-H ₂ O														
MW-1	1-11-00	1130	✓		3		X	X										18568-001
MW-2		1110					X	X										002
TW-2		1025					X	X										003
TW-6		1045					X	X										004
TW-7		1144					X	X										-005

SAMPLING COMPLETED DATE 1-11-00 TIME 1144 SAMPLING PERFORMED BY Patrick Fjahnery RESULTS NEEDED NO LATER THAN Per Client

RELEASED BY Peter Stern DATE 1/12/00 TIME 11:25 RECEIVED BY Robert Panch DATE 1/12/00 TIME 11:30

RELEASED BY Robert Panch DATE 1/12/00 TIME 11:30 RECEIVED BY Arash Zeighani DATE 1-12-00 TIME 12:57

RELEASED BY _____ DATE _____ TIME _____ RECEIVED BY _____ DATE _____ TIME _____

SHIPPED VIA _____ DATE SENT _____ TIME SENT _____ COOLER # _____

Entech Analytical Labs, Inc.

CA ELAP# 2346

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

January 27, 2000

Chris Rossitto
PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Order: 18568

Date Collected: 1/11/00

Project Name:

Date Received: 1/12/00

Project Number: 000111-I1

P.O. Number:

Project Notes:

On January 12, 2000, 5 samples were received under documented chain of custody. Results for the following analyses are attached:

<u>Matrix</u>	<u>Test</u>	<u>Method</u>
Liquid	MTBE by EPA 8260B	EPA 8260B

Chemical analysis of these samples has been completed. Summaries of the data are contained on the following pages. USEPA protocols for sample storage and preservation were followed.

Entech Analytical Labs, Inc. is certified by the State of California (#2346). If you have any questions regarding procedures or results, please call me at 408-735-1550.

Sincerely,



Michelle L. Anderson
Lab Director

Entech Analytical Labs, Inc.

CA ELAP# 2346

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

PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947
Attn: Chris Rossitto

Date: 1/26/00
Date Received: 1/12/00
Project Name:
Project Number: 000111-11
P.O. Number:
Sampled By: Patrick Flaherty

Certified Analytical Report

Order ID: 18568

Lab Sample ID: 18568-001

Client Sample ID: MW-1

Sample Time: 11:30 AM

Sample Date: 1/11/00

Matrix: Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Analysis Date	QC Batch ID	Method
Methyl-t-butyl Ether	ND		1	5	5	µg/L	1/24/00	WMS000124	EPA 8260B
	Surrogate			Surrogate Recovery			Control Limits (%)		
	4-Bromofluorobenzene			90			65 - 135		
	Dibromofluoromethane			93			65 - 135		
	Toluene-d8			91			65 - 135		


DF = Dilution Factor

ND = Not Detected

DLR = Detection Limit Reported

PQL = Practical Quantitation Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)


Michelle L. Anderson, Laboratory Director

Page 1 of 3

Environmental Analysis Since 1983

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PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947
Attn: Chris Rossitto

Date: 1/26/00
Date Received: 1/12/00
Project Name:
Project Number: 000111-I1
P.O. Number:
Sampled By: Patrick Flaherty

Certified Analytical Report

Order ID: 18568

Lab Sample ID: 18568-002

Client Sample ID: MW-2

Sample Time: 11:10 AM

Sample Date: 1/11/00

Matrix: Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Analysis Date	QC Batch ID	Method
Methyl-t-butyl Ether	8400		100	5	500	µg/L	1/24/00	WMS000124	EPA 8260B
	Surrogate			Surrogate Recovery		Control Limits (%)			
	4-Bromofluorobenzene			94		65 - 135			
	Dibromofluoromethane			99		65 - 135			
	Toluene-d8			93		65 - 135			

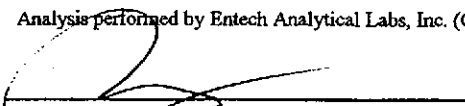
DF = Dilution Factor

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Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)


Michelle L. Anderson, Laboratory Director

Page 2 of 3

Entech Analytical Labs, Inc.

CA ELAP# 2346

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PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947
Attn: Chris Rossitto

Date: 1/26/00
Date Received: 1/12/00
Project Name:
Project Number: 000111-I1
P.O. Number:
Sampled By: Patrick Flaherty

Certified Analytical Report

Order ID: 18568

Lab Sample ID: 18568-005

Client Sample ID: TW-7

Sample Time: 11:44 AM

Sample Date: 1/11/00

Matrix: Liquid

Parameter	Result	Flag	DF	PQL	DLR	Units	Analysis Date	QC Batch ID	Method
Methyl-t-butyl Ether	2600		200	5	1000	µg/L	1/24/00	WMS000124	EPA 8260B
Surrogate		Surrogate Recovery		Control Limits (%)					
4-Bromofluorobenzene		94		65 - 135					
Dibromofluoromethane		99		65 - 135					
Toluene-d8		94		65 - 135					

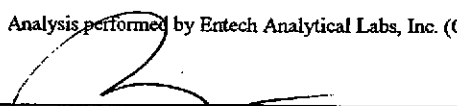
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Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2346)


Michelle L. Anderson, Laboratory Director

Page 3 of 3

Environmental Analysis Since 1983

Entech Analytical Labs, Inc.

525 Del Rey Avenue, Suite E
Sunnyvale, CA 94086

QUALITY CONTROL RESULTS SUMMARY

Volatile Organic Compounds
Laboratory Control Sample

QC Batch #: WMS000124

Matrix: Liquid

Units: µg/L

Date analyzed: 01/24/00

Spiked Sample: Blank Spike

PARAMETER	Method #	SA µg/L	SR µg/L	SP µg/L	SP %R	SPD µg/L	SPD %R	RPD		QC LIMITS
									RPD	%R
1,1- Dichloroethene	8240/8260	40	ND	41.5	104	42.4	106	2.1	25	50-150
Methyl-tert-butyl ether	8240/8260	40	ND	42.5	106	43.2	108	1.6	25	50-150
Benzene	8240/8260	40	ND	40.7	102	40.2	101	1.2	25	50-150
Trichloroethene	8240/8260	40	ND	41.6	104	41.7	104	0.2	25	50-150
Toluene	8240/8260	40	ND	39.4	99	38.3	96	2.8	25	50-150
Chlorobenzene	8240/8260	40	ND	40.8	102	39.9	100	2.2	25	50-150
<i>Surrogates</i>										
Dibromofluoromethane	8240/8260		97%	95%		103%				65-135
MTBE-d3	8240/8260		100%	106%		106%				65-135
Toluene -d8	8240/8260		94%	95%		95%				65-135
4-Bromofluorobenzene	8240/8260		93%	90%		94%				65-135

Definition of Terms:

- na: Not Analyzed in QC batch
- 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 Duplicate % Recovery

BLAINE

TECH SERVICES, INC.

1680 ROGERS AVENUE
 SAN JOSE, CALIFORNIA 95112-1105
 FAX (408) 573-7771
 PHONE (408) 573-0555

CONDUCT ANALYSIS TO DETECT

LAB

Entech

DHS #

ALL ANALYSES MUST MEET SPECIFICATIONS AND DETECTION LIMITS SET BY CALIFORNIA DHS AND

- EPA
- LIA
- OTHER

RWQCB REGION _____

CHAIN OF CUSTODY
 BTS # 000111-21

CLIENT PES

SITE 230 Bay Place 1680
 Oakland, CA ROGERS

C - COMPOSITE ALL CONTAINERS

SAMPLE I.D.	DATE	TIME	MATRIX		CONTAINERS	TPH - Gas (8015)	BTEX (8020)	MTBE (8020) *8260					ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
			S=SOIL	W=H ₂ O												
MW-1	1-11-00	1130	✓		3	X	X	X								18568-001
MW-2		1110				X	X	X								002
TW-2		1025				X	X									003
TW-6		1045				X	X									004
TW-7		1144				X	X	X								-005

SAMPLING COMPLETED DATE 1-11-00 TIME 1144 SAMPLING PERFORMED BY Patrick Fjanerly RESULTS NEEDED NO LATER THAN Per Client

RELEASED BY Peter Merr DATE 11/12/00 TIME 11:25 RECEIVED BY Robert Pamel DATE 11/12/00 TIME 11:30

RELEASED BY Robert Pamel DATE 11/12/00 TIME 11:30 RECEIVED BY Arash Zeighani DATE 1-12-00 TIME 12:57

RELEASED BY _____ DATE _____ TIME _____ RECEIVED BY _____ DATE _____ TIME _____

SHIPPED VIA DATE SENT TIME SENT COOLER #