PES Environmental, Inc.
Engineering & Environmental Services

A Report Prepared for:

Wells Fargo Bank
c/o Rory Campbell, Esq.
Hanson, Bridgett, Marcus, Vlahos & Rudy
333 Market Street, Suite 2300
San Francisco, California 94105-2173

REPORT
SOIL AND GROUNDWATER INVESTIGATION
BILL COX CADILLAC
230 BAY PLACE
OAKLAND, CALIFORNIA

ST 5494

December 23, 1993

Prepared by:

Daniel E. Trumbly
Senior Staff Geologist

Andrew A. Briefer, P.E.
Senior Engineer

Robert S. Creps, P.E.
Associate Engineer

for

167.0200.002

TABLE OF CONTENTS

TABLE OF CONTENTS
Continued

LIST OF TABLES

LIST OF ILLUSTRATIONS

1.0 INTRODUCTION

Presented herein are the results of groundwater investigations performed by PES Environmental, Inc. ("PES") in February, May and October 1993, at Bill Cox Cadillac ("the site") located at 230 Bay Place in Oakland, California. The location of the site is shown on Plate 1. The investigations were performed on behalf of Wells Fargo Bank, N.A. ("Wells Fargo"), trustee for the property owner, and Hanson, Bridgett, Marcus, Vlahos and Rudy, legal counsel to Wells Fargo ("Hanson, Bridgett").

1.1 Objectives and Scope

Two phases of the investigation were conducted. The investigation of February/March 1993 was performed to address a request from the Alameda County Department of Environmental Health ("ACDEH") for a soil and groundwater investigation to evaluate for the presence of residual contamination in connection with closure of a waste oil tank previously located at the site; the tank was removed in December 1988. Petroleum hydrocarbon contamination was confirmed during this initial investigation. The investigation of May 1993 was limited to a tidal influence study and is considered part of the February/March phase. The purpose was to evaluate whether tidal fluctuations of nearby Lake Merritt influence groundwater levels and flow characteristics at the site.

The investigation of October 1993 was performed to supplement information generated during the earlier investigations. The purposes of the October investigations were to: (1) further evaluate the chemical characteristics of the petroleum hydrocarbon contamination; (2) evaluate its distribution (i.e., locus and extent); and (3) identify potential sources of the contaminant release.

This report includes:

- a summary of background information;
- descriptions of the investigation activities including groundwater monitoring well installation and sampling conducted in February/March 1993, the May tidal influence study, and temporary groundwater monitoring well installation and groundwater sampling conducted in October 1993;
- lithologic logs of subsurface materials encountered during the investigations;
- tabulation and graphical presentation of the results of groundwater analyses;
- an assessment of the distribution of petroleum hydrocarbons in groundwater at the site;
- a discussion of the chemical characteristics of the petroleum hydrocarbons in groundwater;

- an assessment of the probable sources of the contamination; and
- conclusions and recommendations for further actions to be taken at the site.

1.2 Site Description

The nearly 2-acre site is bounded on the northwest by Harrison Street, the southwest by Bay Street, and on the southeast by Vernon Street. The subject area of these investigations is located within the service parking lot on the east side of the Cox Cadillac building, as shown on Plate 2. The northern and eastern boundaries of the parking lot abut a steep embankment which is partially supported by a retaining wall. The southern margin of the parking lot is located adjacent to Bay Place. Access to this parking lot is provided from Bay Place. This parking area is used for vehicles being serviced or undergoing repairs including wrecked vehicles which were observed to be leaking oil. The parking lot is paved with asphalt concrete. Many locations within the parking lot are oil-stained, and/or the pavement is degraded, possibly due to leaks or spills from vehicles undergoing maintenance.

The former underground waste oil storage tank was located within the parking lot adjacent to the Cox Cadillac service facility. The former tank location is delineated by an asphalt patch placed after tank removal and excavation backfilling. A 10,000-gallon gasoline underground storage tank and associated dispenser are located in the southwestern corner of the parking lot adjacent to Bay Place. These current and historical features are shown on the site plan attached hereto as Plate 2.

1.3 Background Information

The 3,000-gallon former waste oil storage tank was removed from the site in December, 1988 by R.S. Eagan & Company ("Eagan") of Concord, California. Representatives of Subsurface Consultants, Inc. of Oakland, California were present during removal of the tank. Holes in the tank were reportedly observed at the time of removal and floating product was present in the tank excavation. Soil and groundwater in the excavation were sampled at the time of tank removal; however, analytical data were inconclusive as to the presence of petroleum hydrocarbon compounds. Excavated soil was placed back in the ground. At the request of ACDEH, the area was re-excavated and soil and groundwater were sampled in March 1989. Total petroleum hydrocarbons ("TPH") quantified as gasoline ("TPHg") and TPH quantified as diesel ("TPHd") were detected at concentrations of 45 parts per million ("ppm") and 150 ppm, respectively, in a soil sample collected from 8 feet below ground surface ("bgs"). Analysis of a water sample collected from a holding tank storing rainwater pumped from the excavation revealed the presence of 550 parts per billion ("ppb") TPHg, 2,100 ppb TPHd, and 10,000 ppb total oil and grease. Benzene was not detected in soil or water samples. A total of 27 cubic yards of petroleum hydrocarbon-affected soil was excavated in March 1989 and off-hauled for disposal in June 1989. The excavation was backfilled by Eagan in June 1989 with imported fill.

The Eagan files indicate that during an April 1989 phone conversation, Mr. Dennis Byrne of ACDEH instructed Mr. Bob Corsun of Eagan that no further excavation was required although Mr. Byrne indicated that a groundwater monitoring well must be installed on the site. In correspondence dated December 28, 1990, Mr. Paul Smith of ACDEH requested that a workplan for groundwater monitoring well installation at the site be submitted to ACDEH. Mr. Thomas F. Peacock of ACDEH requested in a letter to Mr. Bill Theuringer of Bill Cox Cadillac dated December 15, 1992 that a workplan for a soil and groundwater investigation related to the former waste oil tank be submitted to ACDEH.

PES was retained by Wells Fargo and Hanson, Bridgett in January 1993 to prepare a workplan, and install one groundwater monitoring well down gradient of the former waste oil tank and obtain groundwater samples from the well for laboratory analyses. Monitoring well installation and sampling were performed in February and March 1993 in accordance with the approved workplan. The methods of that phase of the investigation are discussed in Section 2.1 of this report. The results of the groundwater sample analyses indicated that TPHg was present at a concentration of 110 ppm. Gasoline detected in groundwater was characterized as "fresh" and no waste oil constituents were detected. Consequently, an additional phase of investigation was conducted to investigate the degree and extent, and the likely source of the gasoline contamination. This subsequent investigation is described in Section 2.2.

2.0 FIELD INVESTIGATIONS

As noted above, two phases of field investigation were performed. The first was performed in February and March 1993 and entailed the installation of one groundwater monitoring well, well development, and groundwater sample collection and analysis. A limited tidal influence study was performed in May 1993 and is considered part of the first investigation phase. The second phase of investigation was performed in October 1993 and entailed the installation of seven temporary groundwater monitoring wells, well development, and groundwater sampling and analysis. Descriptions of field activities for each phase of investigation are provided in the following sections.

2.1 February/March 1993 Investigation

The field investigation was conducted on February 23, March 1, 3, and March 31, 1993. These activities included: (1) drilling and sampling one soil boring; (2) converting the soil boring to a groundwater monitoring well (Well MW-1, as shown on Plate 2); and (3) collecting a groundwater sample from the well for laboratory analyses.

The tidal influence study was performed on May 27.

PES prepared a site safety plan for the site activities and conducted an onsite health and safety meeting with the drilling contractor prior to drilling. To avoid damaging underground utilities, the soil boring location was cleared by California Utility Surveys ("CUS") prior to drilling using subsurface detection equipment.

2.1.1 Soil Sampling

The boring for well MW-1 was drilled using a CME-75 drill rig equipped with 7.25-inch outside diameter hollow-stem augers. The boring was advanced to a depth of 20 feet bgs. A PES geologist logged the boring for lithologic description in accordance with the Unified Soil Classification System ("USCS"). The boring log and USCS chart are presented in Appendix A.

Discrete soil samples were collected during drilling to make field observations and for possible analyses in the event that field observations or groundwater test results warranted soil testing. Samples were collected at approximately 5-foot intervals, at lithologic changes, and at the groundwater interface. The samples were collected by driving a 2-inch inside diameter ("I.D.") split barrel sampler, lined with stainless steel tubes, 18 inches into undisturbed soils beneath the cutting bit of the auger.

To avoid cross contamination between sampling events, equipment used for drilling and sampling was decontaminated prior to use and between each sampling event. Drilling equipment was cleaned using a combination steam/high pressure wash system. The soil sampling equipment was cleaned using a non-phosphate detergent solution and double rinsed with potable water.

Soil cuttings and rinsate water and sediment from cleaning activities are contained onsite in 55-gallon drums until proper disposal is arranged.

2.1.2 Groundwater Monitoring Well Installation and Development

When drilling and soil sampling were completed at the groundwater monitoring well location, the well casing was installed in the borehole through the hollow stem of the auger. The well casing consists of 20 feet of 2-inch diameter, Schedule 40, polyvinyl chloride ("PVC") pipe with flush-threaded connections. The well screen has 0.010-inch machined slots and was installed from a depth of 5 feet bgs to 20 feet bgs. A sand filter pack consisting of Monterey No. 2/12 sand was placed in the annular space from the bottom of the borehole to 4 feet bgs. A 1-foot-thick seal of bentonite pellets was placed above the sand filter pack. The seal was completed to 0.5 feet bgs with portland cement and the well was completed at the ground surface in a traffic-rated utility vault. The well casing was fitted with a bottom cap and locking expansion plug. Well completion details are provided in Table 1 and Plate A-2.

The well was developed by surging to sort the filter pack and pumping to remove fines from the well casing. Approximately 10 casing volumes of water were purged from the well during development. A copy of a report documenting well development is included in Appendix B.

2.1.3 Groundwater Sampling

Groundwater samples were collected from Monitoring Well MW-1 on March 3, 1993. A minimum of 3 casing volumes of water were purged from the well prior to sampling, using a teflon bladder pump. Samples were then obtained using a teflon bailer and decanted into the appropriate sample containers. Samples for metal analyses were field-filtered through a 45 micron filter. The sample containers were labeled, placed in a chilled, thermally-insulated cooler for transport to the project laboratory under chain-of-custody protocol. Purge water was placed in a 55-gallon drum which remains onsite until proper disposal is arranged.

2.1.4 Analytical Program

The groundwater samples were analyzed in accordance with the California Regional Water Quality Control Board - San Francisco Bay Region (RWQCB) *Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks* for waste oil tanks. The samples were analyzed for TPHg and TPHd by EPA Method 8015 Modified, total oil and grease by EPA Method 503 A&E, benzene, toluene, ethylbenzene and total xylenes ("BTEX") by EPA Method 8020, halogenated volatile organic compounds by EPA Method 8010, semivolatile organic compounds by EPA Method 8270, PCBs by EPA Method 8080 and dissolved concentrations of cadmium, chromium, lead, nickel and zinc by EPA Methods 6010/7000 Series.

It should be noted that a very thin layer of free-phase hydrocarbon fuel product was found in Well MW-1 during development. The free product was not observed during sampling. On March 31, 1993 a sample of water and sediment was collected and submitted to Friedman &

Bruya, Inc. of Seattle, Washington for detailed laboratory analyses of adsorbed phase hydrocarbon constituents using gas chromatography ("GC") techniques. For comparison, a sample of the fuel stored in the onsite 10,000-gallon gasoline tank was collected from the fuel dispenser and submitted to Friedman & Bruya, Inc. for analyses as per the sample obtained from MW-1.

2.1.5. Limited Tidal Influence Study

A limited tidal influence study was performed on May 27, 1993. The purpose of the study was to evaluate whether tidally-induced water surface fluctuations in Lake Merritt, located about one-eighth of a mile to the south of the site, induce groundwater level or potentiometric surface fluctuations at the subject site. The study consisted of measuring the water level in Well MW-1 at three times during the day: 7:25 AM, 1:45 PM and 6:36 PM. The times of the water level measurements corresponded with two high and one low tide at the Oakland Inner Harbor. Each water level determination was measured by taking 2 or 3 subsequent readings using an electronic sounder. Measurements were made relative to the top of the casing, which is located approximately 0.25 feet below the asphalt ground surface.

2.2 October 1993 Investigation

The field investigation was conducted on October 11 through 14, 1993. Field activities included: (1) drilling and collecting soil samples from seven soil borings; (2) converting the soil borings to temporary groundwater monitoring wells (Well TW-1 through TW-7); and (3) obtaining groundwater samples from the temporary monitoring wells and from the existing monitoring well MW-1 for laboratory analyses. Temporary monitoring well locations are shown on Plate 2 with the designation of each well by "TW" followed by the number assigned to the temporary well.

PES adapted the existing site health and safety plan for site activities and conducted an onsite health and safety meeting prior to commencing field activities. To avoid damaging underground utilities, boring locations were cleared by CUS prior to drilling using subsurface detection equipment.

2.2.1 Soil Sampling

The borings were drilled with a Deep Rock 10K drill rig equipped with 8-inch outside diameter (O.D.) hollow stem augers to depths of approximately 8 to 10 feet bgs. A PES geologist logged the borings for lithologic description of the soils encountered at each boring location in accordance with the USCS. The logs of borings are presented in Appendix A. Soil samples and soil cuttings were field-screened for the presence of volatile organic compounds ("VOCs") by collecting head-space readings using a photo-ionization detector organic vapor meter ("PID"). Head-space readings are recorded on the boring logs.

Discrete soil samples were collected for field observations and for possible analysis if field observations indicated unsaturated soil contamination was present. Samples were collected during drilling at selected depths, at lithologic changes, and at the groundwater interface.

The samples were collected by driving a 2-inch I.D. split barrel sampler lined with stainless steel tubes. The sampler was driven 18 inches into undisturbed soils beneath the cutting bit of the auger.

To avoid cross contamination between sampling, equipment used for drilling and sampling was decontaminated prior to use and/or between each sampling event. Drilling equipment was cleaned using a combination steam/high pressure wash system. The soil sampling equipment was cleaned using a non-phosphate detergent solution and double rinsed with potable water.

Soil cuttings from the borings are stored onsite on top of, and covered with 6 mil plastic sheeting until proper disposal can be arranged. Rinsate water and sediment from cleaning activities are contained onsite in 55-gallon drums until proper disposal can be arranged.

2.2.2 Groundwater Monitoring Well Installation and Development

To ensure representative sample quality, temporary wells installed during this investigation were constructed following protocol for permanent wells with the exception of their surface completion, as described below. When drilling and soil sampling were completed at each temporary well location, the well casing was installed in the borehole through the hollow stem of the augers. The well casing consists of 8 to 10 feet of 2-inch diameter, Schedule 40, PVC pipe with flush-threaded connections. The well screen has 0.010-inch machined slots and was installed from depths of 3 feet bgs to 10 feet bgs to monitor the shallow water-bearing zone. A sand filter pack consisting of Monterey No. 2/12 sand was placed in the annular space from the bottom of the borehole to approximately 1.5 feet above the screened interval. An approximate 1-foot-thick seal of bentonite pellets was placed above the sand filter pack.

The seals were completed with portland cement to 0.5 feet bgs. Well casings were fitted with bottom caps and locking expansion plugs. Well completion details are provided on boring logs presented as Appendix A and in Table 1.

To protect the temporary wells from damage, to ensure the safety of persons working around the temporary wells, and to prevent introduction of surface water or spills, the portion of the open borehole exposed at the ground surface was backfilled to the level of the adjacent pavement surface with pea-gravel. The parking area surface at the well locations was then restored with cold patch asphalt. In the near future the cold patch will be removed, and each temporary well will be removed or completed as a permanent well by installing a traffic-rated vault around the well head.

The temporary wells were developed by surging to sort the filter pack and bailing to remove fines from the well casing. Approximately 5 casing volumes of water were purged from each well during development. Development water is stored onsite in 55-gallon drums until proper disposal is arranged.

2.2.3 Groundwater Monitoring Well Sampling

Groundwater samples were collected from the seven new temporary monitoring wells and from the existing onsite well on October 13 and 14, 1993. A minimum of 3 casing volumes of water were purged from each well prior to sampling using an acrylic bailer and samples were obtained and decanted into 40-milliliter glass vials. The sample containers were labeled, placed in a chilled, thermally-insulated cooler for transport to the project laboratory under chain-of-custody protocol. Purge water was placed in 55-gallon drums which remain onsite until proper disposal is arranged.

2.2.4 Analytical Program

Samples were analyzed by a California-certified analytical laboratory. The groundwater samples collected from all monitoring wells during the October 1993 investigation were analyzed for TPHg, BTEX, 1,2-dichloroethane ("DCA"), and ethylene dibromide ("EDB") by EPA Test Method 8260 using gas chromatography/mass spectrophotometry ("GC/MS") techniques. DCA and EDB are lead "scavengers" that are typically added to leaded gasolines.

2.2.5 Monitoring Well Survey and Water-Level Measurement

The temporary monitoring wells and the existing monitoring well were surveyed for relative top-of-casing reference elevations and horizontal well coordinates. Elevations were measured to an accuracy of 0.01 foot. The reference datum for the elevations is 100 feet which was arbitrarily assigned to the top of the casing in MW-1. Water surface elevations in all wells were measured using an electronic sounder.

3.0 RESULTS OF INVESTIGATIONS

3.1 Subsurface Conditions

Surficial materials at the investigated locations consist of asphaltic concrete pavement over the entire parking area and concrete slab-on-grade in the sidewalk area. Materials beneath the paved areas consist of 2 to 4 inches of aggregate base which is underlain by gravelly sand, clayey gravel, clayey sand, and sand to depths of 1 to 1.5 feet bgs in Wells TW-2, TW-3, TW-5, and TW-6. The pavement materials in Wells TW-1 and TW-4 are underlain by silty clay and sandy clay which also underlie the shallow soils in wells TW-2, TW-3, TW-5, and TW-6. The 4-inch-thick concrete slab-on-grade sidewalk through which Well TW-7 is constructed is underlain by a second 4-inch-thick concrete slab. Materials below 2 feet bgs in all wells consist of predominantly sandy clay, silty sand, and silty clay with interbeds of sand. The sand interbeds range in thickness from 6 to 12 inches and occur at depths ranging from 3.5 to 5.5 feet bgs in all wells except TW-3 and TW-5 in which no interbedded sand was observed.

Unusual subsurface materials were encountered in Wells TW-4 and TW-5, as follows:

(1) In Well TW-4, a 6-inch-thick concrete slab was encountered at a depth of approximately 2.75 feet bgs in well TW-4. The borehole was relocated about 4 feet southwest of the initial TW-4 borehole and the concrete slab was encountered in the relocated hole at the same depth. The concrete slab was penetrated.

(2) A 2.5-feet-thick body of brick was found at a depth of 2 to 4.5 feet bgs in well TW-5.

Groundwater was encountered at depths ranging from 2.5 to 5 feet bgs in all borings except TW-6 in which water was encountered at a depth of about 6.5 feet bgs.

3.2 Evaluation of Hydrogeologic Conditions

Top of casing reference elevations, depth to groundwater, and groundwater elevations are presented in Table 2. The water-level elevations measured in October 1993 and groundwater surface contours are presented on Plate 3. On the basis of this data, the direction of groundwater flow is to the west-southwest, toward Bay Place, and the magnitude of the horizontal gradient is approximately 0.04 feet per foot.

A limited study of the potential for groundwater at the site to be affected by tidal fluctuations in Lake Merritt was performed in May 1993. PES reviewed USGS topographic maps and reviewed data from nearby sites for evidence of tidally influenced groundwater. On May 27, 1993 water levels were measured in MW-1 at 2.67, 2.73 and 2.77 feet below the top of the well casing at 7:25 AM, 1:45 PM and 5:25 PM, respectively. There was no appreciable water-level cycling in response to the tidal cycle. The observations showed a water-level drop of 0.1 foot during the day. This minor fluctuation may have been caused by a change in barometric pressure during the day. **The results of the study do not support the existence of tidally-influenced groundwater at the site.**

3.3 Results of Groundwater Sample Analyses

3.3.1 February/March 1993 Results

The results of analyses of groundwater in Well MW-1 in this investigation indicated the presence of a fresh gasoline. The concentrations of selected petroleum fuel analytes detected in groundwater are summarized in Table 3 and presented graphically on Plate 4. Copies of the laboratory reports and chain-of-custody documentation for the February/March investigation are presented as Appendix C.

The groundwater sample obtained from Well MW-1 on March 3, 1993 contained 110 ppm TPHg, 0.1 ppm TPHd, 8.5 ppm benzene, 7.5 ppm toluene, 4.4 ppm ethylbenzene and 15 ppm total xylenes. Total oil and grease was not detected above the method detection limit of 5 ppm.

Halogenated volatile organics (EPA Test Method 8010) were not detected with the exception of DCA, which was found at 0.35 ppm. Several semivolatile organic compounds were detected at low concentrations (near the method detection limits); the greatest concentrations being 2-methyl napthalene (0.078 ppm) and napthalene (0.21 ppm). These chemicals are constituents of gasoline. There were no PCB compounds detected in the sample. The metals cadmium, chromium, lead, zinc and nickel were either absent or found dissolved in the groundwater at only insignificant concentrations that could be attributable to natural conditions.

Copies of the Friedman & Bruya reports, including chromatograms, are also included in Appendix C. The adsorbed phase hydrocarbon analyzed from a sample obtained from MW-1 (Sample 930301-1) contained low and high boiling compounds such as those found in gasoline and wax. The gasoline-like material was characterized as mostly unweathered (i.e., a "fresh" gasoline) due to the relatively high amounts of the volatile fraction present in the sample. A halogenated compound which eluted from the column was initially thought to be EDB or tetrachloroethylene ("PCE"). A subsequent Friedman & Bruya evaluation of this sample (using their GSVL technique) indicated EDB may be present, and PCE was absent. No tetraethyl lead was detected. This was consistent with the results of the Test Method 8010 results, which showed the absence of PCE.

The gasoline fuel sample collected from the 10,000-gallon onsite tank (Sample 930331-2) contained low boiling point compounds such as those found in gasoline. No EDB or other halogenated compounds were present.

Based on a comparison of peak heights, and the presence of a halogenated compound in the MW-1 sample and its absence in the fuel sample, Friedman & Bruya indicated that the fresh gasoline in Well MW-1 did not match the gasoline from the tank.

3.3.2 October 1993 Results

The chemical analyses results from the October 1993 investigation revealed that petroleum hydrocarbons having characteristics of gasoline were present in samples from Wells MW-1, TW-4, TW-5, TW-6 and TW-7. No hydrocarbons were detected in samples from Wells TW-1, TW-2 and TW-3. Analytical results are presented in Table 3 and on Plate 4. Laboratory reports and chain of custody documentation for the October investigation are presented as Appendix D. Chromatograms are included with the analytical reports.

On October 14, 1993, Well MW-1 contained 74 ppm TPHg, 6.1 ppm benzene, 4.8 ppm toluene, 4 ppm ethylbenzene, 11 ppm total xylenes, 0.35 ppm DCA, and 0.08 ppm EDB. These results area consistent with those obtained from this well in March.

Sample TW-4 contained 2 ppm TPHg, 0.065 ppm benzene, 0.018 ppm toluene, 0.049 ppm ethylbenzene and 0.033 ppm total xylenes. DCA and EDB were not present in TW-4 above method detection limits.

Sample TW-5 contained 140 ppm TPHg, 20 ppm benzene, 25 ppm toluene, 3.8 ppm ethylbenzene, and 23 ppm total xylenes. DCA and EDB were not present in TW-6 above method detection limits.

Sample TW-6 contained 4.1 ppm TPHg, 3.8 ppm benzene, 1.6 ppm toluene, 0.11 ppm ethylbenzene, and 0.54 ppm xylenes. DCA and EDB were not present in TW-7 above method detection limits.

Sample TW-7 contained 100 ppm TPHg, 48 ppm benzene,15 ppm toluene, 3.4 ppm ethylbenzene, and 16 ppm xylenes. DCA and EDB were not present at or above method detection limits in TW-7.

4.0 CONCLUSIONS

Based on the results of the investigations, it is apparent that petroleum hydrocarbon fuel has been released to the subsurface at the site and that the primary source of the fuel release is centered around the 10,000 gallon UST on the site and its fuel dispenser. This conclusion is based on:

(1) the lack of fuel hydrocarbons detected in Wells TW-1, TW-2, and TW-3 which indicates that the fuel hydrocarbons are not migrating on to the site from an offsite, upgradient source;

(2) the source of the fuel hydrocarbon is not likely an offsite, downgradient source because: (a) the presence of a relatively steep, southwesterly hydraulic groundwater gradient would preclude migration of fuel hydrocarbon to the site from downgradient locations; and (b) the lack of tidal influence which could cause temporary variation or reversal of the hydraulic gradient;

(3) the locus of the petroleum hydrocarbon contamination is centered on the 10,000-gallon tank and its dispenser; and

(4) the fuel hydrocarbon release has occurred relatively recently (i.e., within approximately the last two years). This conclusion is based on the relatively high proportion of aromatic fuel hydrocarbon components in groundwater, and interpretation of chromatograms provided by the project analytical laboratories.

The source could be either a minor leak in the tank itself, a leak from the product piping or the dispenser, and/or tank overfilling.

The absence of waste oil constituents in Well MW-1 (such as solvents and metals) indicates that the remedial work conducted by Eagan in 1989 was likely adequate and the former waste oil tank is not a major contributor to the petroleum fuel contamination in Well MW-1 and downgradient wells.

The apparent lack of a correlation between samples collected from the 10,000-gallon gasoline tank and a sample from Well MW-1 was based on: (1) the absence of halogenated volatile compounds (EDB and DCA) in the fuel tank sample (as expected in an unleaded fuel) and their presence in the sample from Well MW-1; and (2) the existence of a second set of peaks at the heavier end of the well sample chromatogram (indicative of a wax). This information does not preclude the onsite tank from being the primary source because: (1) petroleum found in Wells TW-4, TW-5, TW-6 and TW-7 also did not contain EDB and DCA and is therefore indicative of an unleaded fuel; and (2) there are other possible contributing sources to the contamination near MW-1 as evidenced by the existence of wrecked cars with leaking fluids near MW-1, and the deteriorated condition of the asphalt possibly caused by fluid spills. The chemical characteristics of contaminants in Well MW-1 therefore can be explained as being from two or more sources: the primary source being a release from the gasoline tank which gives it its "fresh" characteristics; and one or more secondary sources such as a surface spill of automotive fluids, which could explain the existence of the EDB and DCA and the heavier hydrocarbon fraction.

5.0 RECOMMENDATIONS

Based on the findings of the investigations, PES recommends the following actions:

(1) Because an unauthorized release of petroleum hydrocarbon fuel has been confirmed from an onsite underground fuel tank, the release should be reported to ACDEH and RWQCB;

(2) Cox Cadillac should perform leak testing of the 10,000-gallon onsite tank. The product supply and vent lines, the product dispenser associated with this tank should also be tested;

(3) Permit and complete six of the temporary wells (TW-2 through TW-7) as permanent monitoring wells and abandon TW-1 in accordance with applicable regulations; and

(4) Investigate the downgradient extent of hydrocarbon contamination in soil and groundwater, and assess the need for and scope of remedial actions.

Table 1
Well Completion Details

Cox Cadillac
Oakland, California

Well Number	Casing Diameter (inches)	Installation Date	Total Depth (feet)	Screened Interval (feet bgs)	Sand Pack Interval (feet bgs)	Bentonite Seal Interval (feet bgs)
MW-1	2	02/23/93	20.0	5.0 - 20.0	4.0 - 20.0	3.0 - 4.0
TW-1	2	10/11/93	10.0	3.0 - 10.0	2.3 - 10.0	1.5 - 2.3
TW-2	2	10/11/93	8.0	3.0 - 8.0	2.0 - 8.0	1.0 - 2.0
TW -3	2	10/11/93	10.0	3.0 - 10.0	2.3 - 10.0	1.3 - 2.3
TW- 4	2	10/11/93	9.0	3.0 - 9.0	2.3 - 9.0	1.3 - 2.3
TW-5	2	10/12/93	8.0	3.0 - 8.0	2.0 - 8.0	1.0 - 2.0
TW-6	2	10/12/93	8.0	3.0 - 8.0	2.0 - 8.0	1.0 - 2.0
TW-7	2	10/12/93	10.0	3.0 - 10.0	2.0- 10.0	1.0 - 2.0

Notes:

feet bgs = feet below ground surface
See Plate 2 for location of monitoring wells

Table 2
Summary of Groundwater Elevations

Cox Cadillac
Oakland, California

Well Number	Date	Time	Measured By	Top of Casing Elevation (feet (1))	Total Depth of Casing (feet)	Depth to Water (feet)	Groundwater Elevations (feet)
TW-1	10/13/93	11:35	PES	100.91	8.50	0.06	100.85
TW-2	10/13/93	12:17	PES	100.43	7.63	2.32	98.11
TW-3	10/13/93	12:49	PES	100.46	9.45	4.43	96.03
TW-4	10/13/93	16:15	PES	99.35	8.50	2.73	96.62
TW-5	10/13/93	15:25	PES	99.40	7.47	4.84	94.56
TW-6	10/14/93	13:10	PES	98.75	7.60	5.40	93.35
TW-7	10/14/93	13:25	PES	97.96	7.68	5.40	92.56
MW-1	10/13/93	13:35	PES	100.00	20.00	3.55	96.45

Notes: (1) = All elevations relative to arbitrary reference datum of 100 feet at MW-1 top of casing

Table 3
Summary of Analytical Results for Groundwater Samples, March and October 1993

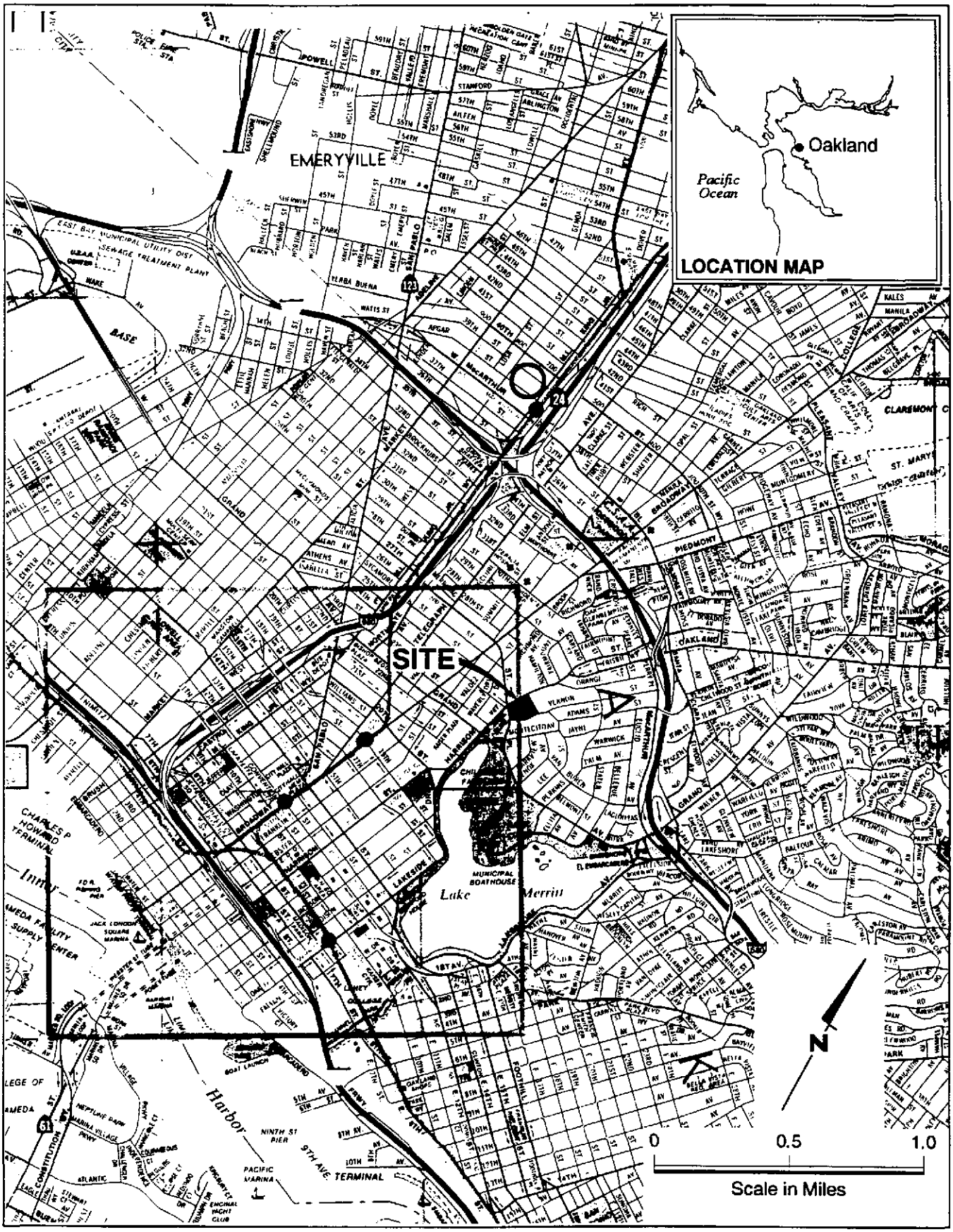
Cox Cadillac
Oakland, California

Concentrations expressed in *milligrams per liter* (mg/L) - equivalent to parts per million

Well Number	Sample Date	TPH as Gasoline	Benzene	Toluene	Ethyl-Benzne	Total Xylenes	1,2-DCA (1)	Ethylene Dibromide
TW-1	10/13/93	<0.050	<0.0005 (2)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
TW-2	10/13/93	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
TW-3	10/13/93	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
TW-4	10/13/93	2	0.065	0.018	0.049	0.033	<0.005	<0.005
TW-5	10/13/93	140	20	25	3.8	23	<0.1	<0.1
TW-6	10/14/93	4.1	3.8	1.6	0.11	0.54	<0.001	<0.001
TW-7	10/14/93	100	48	15	3.4	16	<0.05	<0.05
MW-1	3/3/93	110	8.5	7.5	4.4	15	0.35	NA (3)
MW-1	10/13/93	74	6.1	4.8	4	11	0.35	0.08

Notes:

(1) 1,2-DCA = 1,2-Dichlorethane
(2) < 0.0005 = Not detected at specified detection limit.
(3) NA = Not analyzed

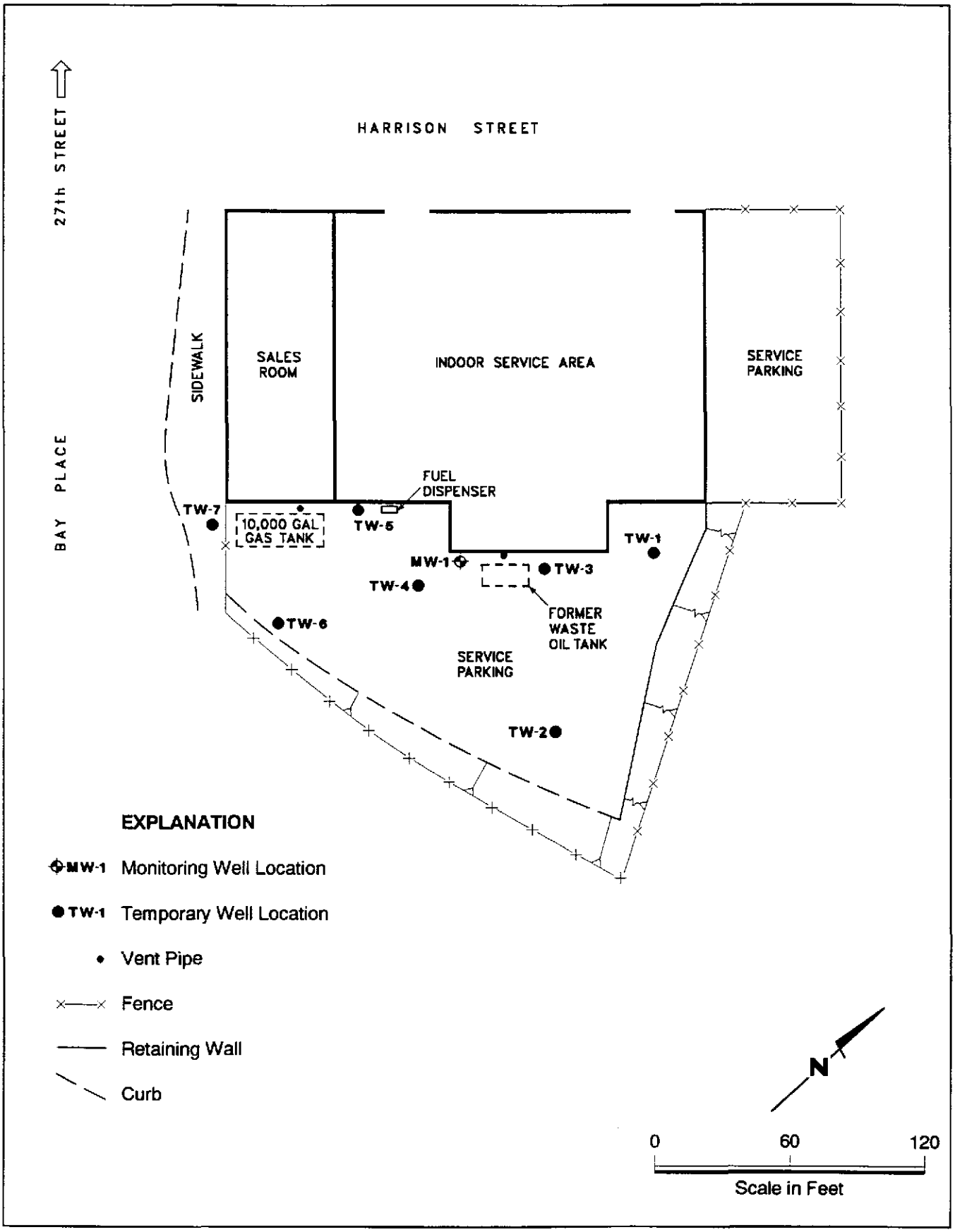


PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Cox Cadillac
230 Bay Place
Oakland, California

PLATE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
167.0200.002		11/93		

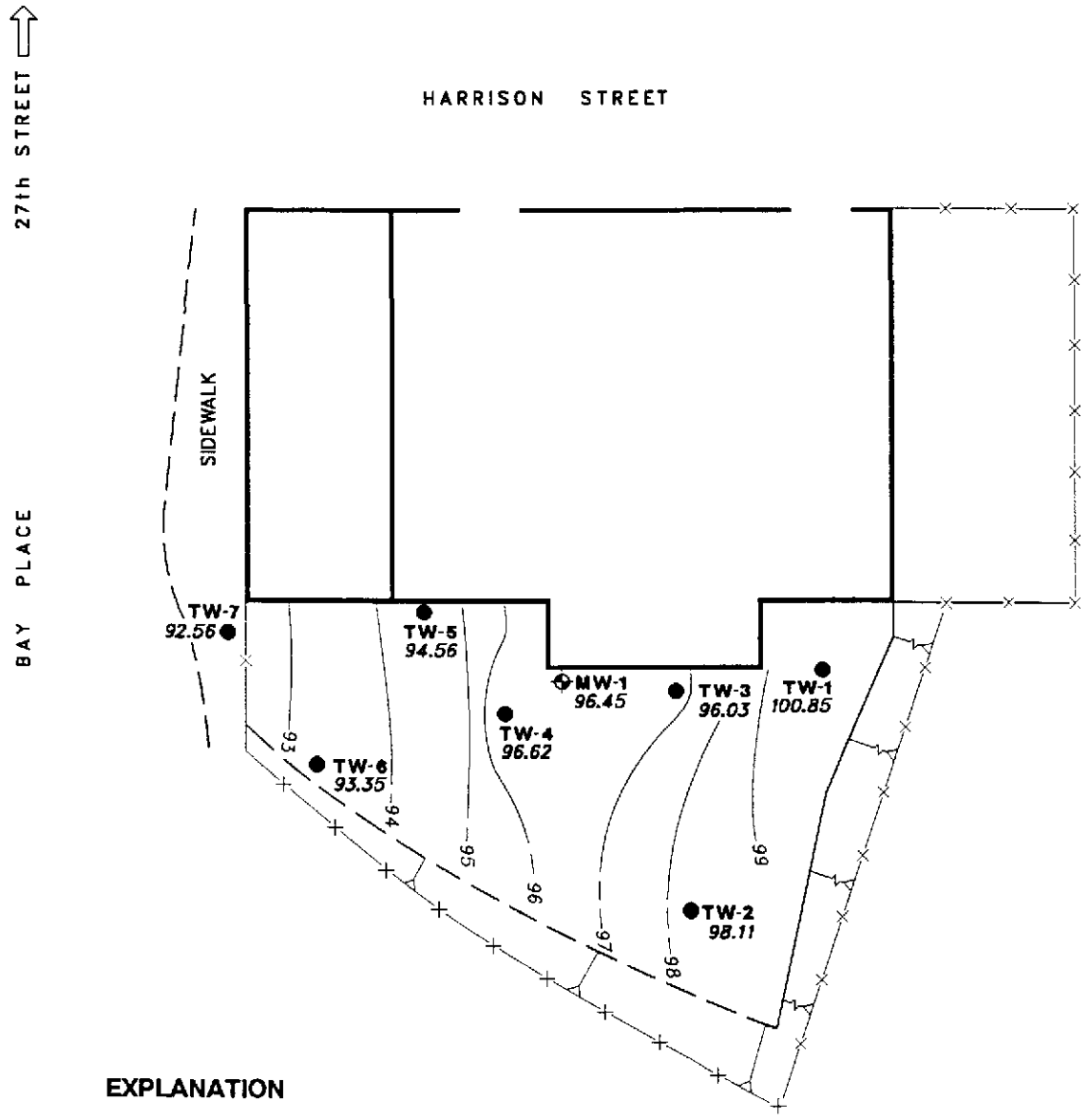


PES Environmental, Inc.
Engineering & Environmental Services

Site Plan
Cox Cadillac
230 Bay Place
Oakland, California

PLATE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
167.0200.002		11/93		



EXPLANATION

MW-1 Monitoring Well Location

TW-1 Temporary Well Location

96.45 Groundwater Elevation on October 13-14, 1993

99 Groundwater Elevation Contour (dashed where uncertain)

Note: All elevations relative to arbitary reference datum of 100 feet at MW-1 top to casing

N

0 60 120

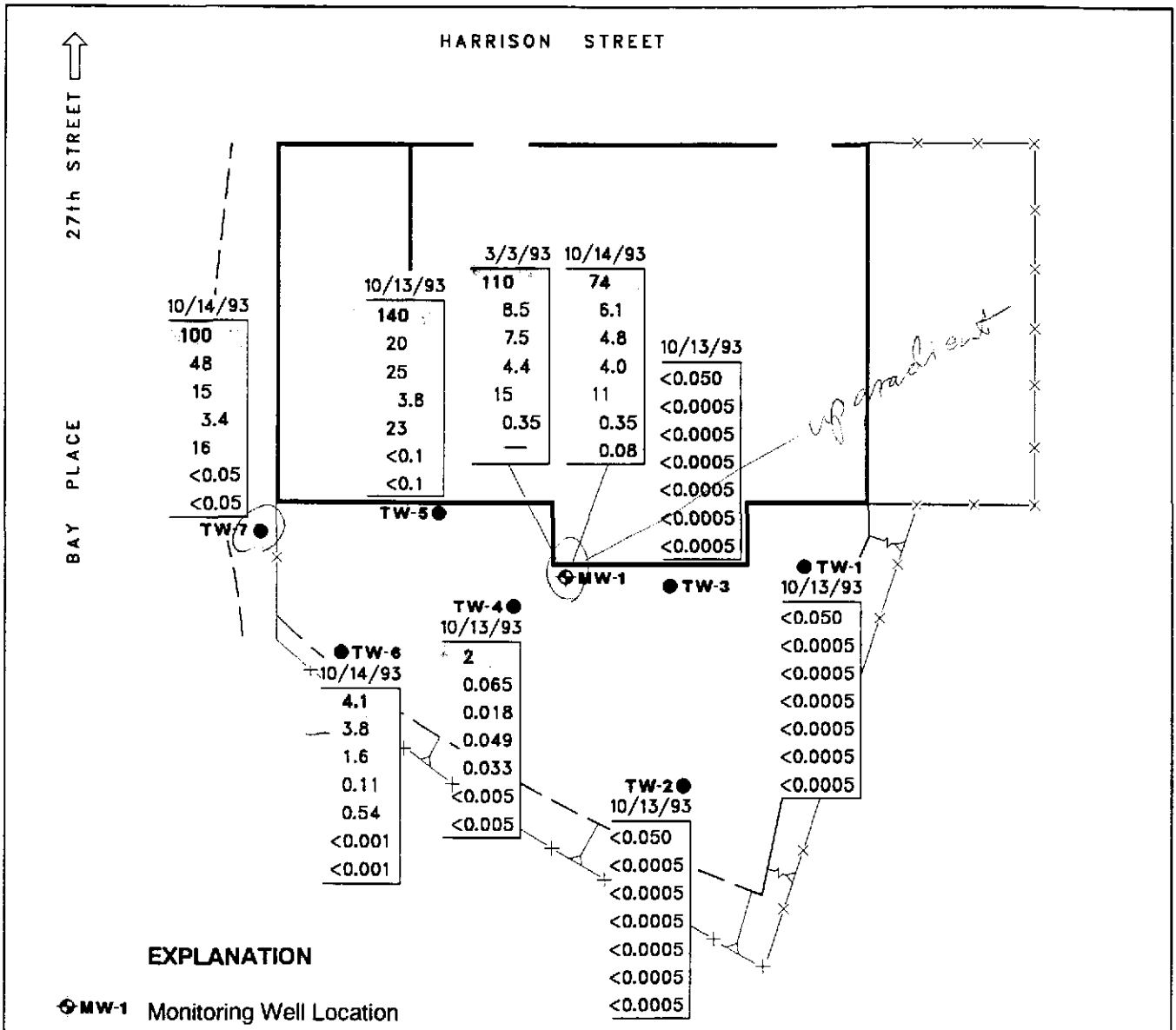
Scale in Feet

PES Environmental, Inc.
Engineering & Environmental Services

Groundwater Elevation Contours on October 13-14, 1993
Cox Cadillac
230 Bay Place
Oakland, California

PLATE **3**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
167.0200.002		11/93		



EXPLANATION

MW-1 Monitoring Well Location

TW-1 Temporary Well Location

Concentrations of Dissolved Hydrocarbons in parts per million

10/14/93	Sampling Date
100	TPH as Gasoline
48	Benzene
15	Toluene
3.4	Ethylbenzene
16	Xylenes
<0.05	1,2-Dichloroethane
<0.05	Ethylene Dibromide

<0.05 Not Detected above Specified Detection Limit

N

0 60 120

Scale in Feet

PES Environmental, Inc.
Engineering & Environmental Services

Distribution of Dissolved Hydrocarbons in Groundwater
Cox Cadillac
230 Bay Place
Oakland, California

PLATE **4**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
167.0200.002		11/93		

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

PID (PPM) - Photo Ionization Detector readings in parts per million from field headspace sample screening.

BLOWS/6" - Blows required to drive sampler 6 inches as indicated on the logs using sample drive hammer weight of 140 pounds falling 30 inches.

2.5YR 6/2 - Soil Color according to Munsell Soil Color Charts (1988 Edition)

feet MSL - feet above Mean Sea Level

☐ - No Soil Sample Recovered

☒ - Partial Soil Sample Recovered

⊠ - Undisturbed Soil Sample Recovered

■ - Soil Sample Submitted for Laboratory Analysis

▽ - First Encountered Ground Water Level

PES Environmental, Inc.
Engineering & Environmental Services

Unified Soil Classification System Chart
Cox Cadillac
230 Bay Place
Oakland, California

PLATE
A-1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
167.0200.002		11/93		

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF BORING MW-1

WELL CONSTRUCTION DETAIL	PID (PPM)	BLOWS/6"	DEPTH (FT)	SYMBOLS	MATERIALS DESCRIPTION
Christy Box					
2" dia. PVC blank casing					ASPHALTIC CONCRETE
					AGGREGATE BASE
					DARK BROWN SANDY CLAY (CL) WITH GRAVEL 10YR 3/3, medium stiff, moist, very fine-grained to coarse-grained sand.
					OLIVE SILTY CLAY (CL) WITH SAND 5Y 5/4, medium stiff, moist, very fine-grained sand.
cement/bentonite					DARK GRAY SAND (SP) 10YR 3/1, loose, moist to wet, very fine-grained to fine-grained sand, moderate hydrocarbon odor.
bentonite seal		7 11 16	5		
		5 7 12			LIGHT YELLOWISH BROWN CLAYEY SILTY SAND (SM/ML) 2.5Y 6/3, medium dense, moist, very fine-grained sand, iron stained.
					Fines decrease.
Monterey #2/12 sand					Moderate hydrocarbon odor.
		5 8 12	10		
2" dia. PVC 0.010 slotted screen					GREENISH GRAY SILTY SAND (SM) WITH CLAY 5G 5/1, medium dense, wet, very fine-grained sand, moderate to strong hydrocarbon odor.
		7 11 10	15		
					LIGHT YELLOWISH BROWN SANDY CLAY (CL/CH) 2.5Y 6/3, medium stiff, wet, very fine-grained sand.
		5 10 16	20		*Bottom of Boring at 20 feet below ground surface.*
			25		
			30		

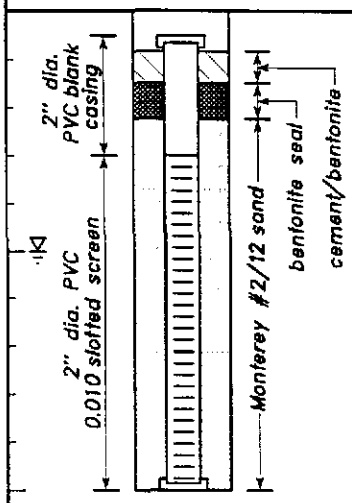
CLIENT	Cox Cadillac	DIAMETER OF HOLE	12" to 1' & 7.25" to 20'
LOCATION	230 Bay Place, Oakland, California	TOTAL DEPTH OF HOLE	20 feet
JOB NUMBER	167.0200.002	TOP OF CASING ELEVATION	0.25 feet below ground level
GEOLOGIST/ENGINEER	D. Trumbly	DATE STARTED	2/23/93
DRILL RIG	CME 75 with 7.25" Hollow Stem Auger	DATE COMPLETED	2/23/93

PLATE

A-2

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF WELL TW-1

WELL CONSTRUCTION DETAIL	PID (PPM)	BLOWS/6"	DEPTH (FT)	SYMBOLS	MATERIALS DESCRIPTION
			5 10		ASPHALTIC CONCRETE 2"; AGGREGATE BASE 6" LIGHT OLIVE BROWN SANDY SILTY CLAY (CL) 2.5Y 5/6, moist, medium stiff. LIGHT OLIVE BROWN SAND (SP) 2.5Y 5/6, wet, medium dense, very fine-grained and fine-grained sand. LIGHT OLIVE BROWN SILTY CLAY (CL) 2.5Y 5/6, wet, stiff. LIGHT YELLOWISH BROWN GRAVELLY SILTY SAND (SW) 2.5Y 6/4, wet, medium dense, very fine-grained to coarse-grained sand, fine-grained gravel. *Bottom of Boring at 10 feet below ground surface.*

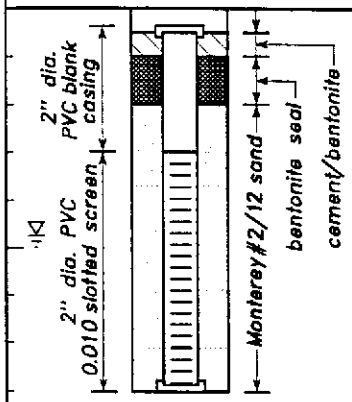
CLIENT	Cox Cadillac	DIAMETER OF HOLE	8 inches
LOCATION	230 Bay Place, Oakland, California	TOTAL DEPTH OF HOLE	10 feet
JOB NUMBER	167.0200.002	TOP OF CASING ELEVATION	0.5 feet below ground level
GEOLOGIST/ENGINEER	D. Trumbly	DATE STARTED	10/11/93
DRILL RIG	Deep Rock 10K with 8" Hollow Stem Auger	DATE COMPLETED	10/11/93

PLATE

A-3

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF WELL TW-2

WELL CONSTRUCTION DETAIL	PID (PPM)	BLOWS/6"	DEPTH (FT)	SYMBOLS	MATERIALS DESCRIPTION
					ASPHALTIC CONCRETE 2"; AGGREGATE BASE 4" DARK YELLOWISH BROWN CLAYEY GRAVEL (GC) 10YR 4/6, moist, dense, fine-grained gravel. LIGHT OLIVE BROWN SILTY CLAY (CL) 2.5Y 5/4, moist, medium stiff.
	0				LIGHT OLIVE BROWN SANDY SILTY CLAY (CL) 2.5Y 5/3, moist, stiff, very fine-grained sand.
	0		5		LIGHT OLIVE BROWN SAND (SP) 2.5Y 5/4, wet, medium dense, very fine-grained to medium-grained sand. LIGHT OLIVE BROWN SILTY CLAYEY SAND (SC) 2.5Y 5/3, wet, medium dense.
	0		10		*Bottom of Boring at 8 feet below ground surface.*

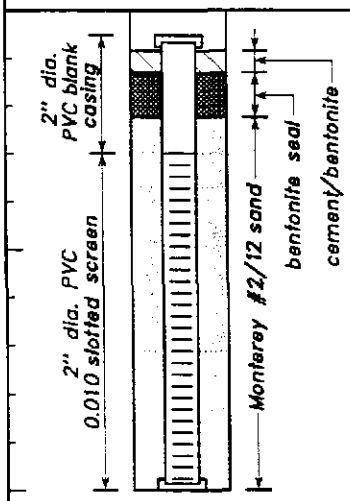
CLIENT	Cox Cadillac	DIAMETER OF HOLE	8 inches
LOCATION	230 Bay Place, Oakland, California	TOTAL DEPTH OF HOLE	8 feet
JOB NUMBER	167.0200.002	TOP OF CASING ELEVATION	0.3 feet below ground level
GEOLOGIST/ENGINEER	D. Trumbly	DATE STARTED	10/11/93
DRILL RIG	Deep Rock 10K with 8" Hollow Stem Auger	DATE COMPLETED	10/11/93

PLATE

A-4

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF WELL TW-3

WELL CONSTRUCTION DETAIL	PID (PPM)	BLOWS/6"	DEPTH (FT)	SYMBOLS	MATERIALS DESCRIPTION
			5 10		ASPHALTIC CONCRETE 2"; AGGREGATE BASE 6" DARK GRAYISH BROWN SAND (SW) 2.5Y 4/2, moist, medium dense, very fine-grained to coarse-grained sand. YELLOWISH BROWN SANDY CLAY / CLAYEY SAND (CL/SC) 10YR 5/4, moist to wet, very stiff / medium dense, very fine-grained and fine-grained sand, very slight hydrocarbon odor. LIGHT OLIVE BROWN SILTY CLAY (CL) WITH SAND 2.5Y 5/4, moist, very stiff, very fine-grained sand. LIGHT OLIVE BROWN SANDY SILT (ML) WITH CLAY 2.5Y 5/4, moist, very stiff, very fine-grained sand. *Bottom of Boring at 10 feet below ground surface.*

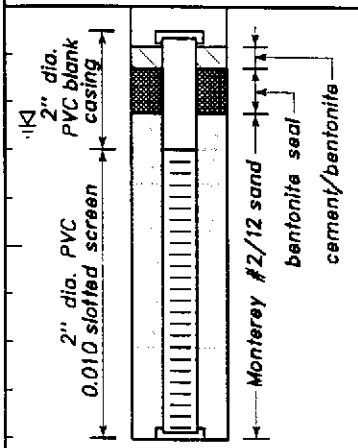
CLIENT	Cox Cadillac	DIAMETER OF HOLE	8 inches
LOCATION	230 Bay Place, Oakland, California	TOTAL DEPTH OF HOLE	10 feet
JOB NUMBER	167.0200.002	TOP OF CASING ELEVATION	0.5 feet below ground level
GEOLOGIST/ENGINEER	D. Trumbly	DATE STARTED	10/11/93
DRILL RIG	Deep Rock 10K with 8" Hollow Stem Auger	DATE COMPLETED	10/11/93

PLATE

A-5

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF WELL TW-4

WELL CONSTRUCTION DETAIL	PID (PPM)	BLOWS/6"	DEPTH (FT)	SYMBOLS	MATERIALS DESCRIPTION
					ASPHALTIC CONCRETE 1.5"; AGGREGATE BASE 6" LIGHT OLIVE BROWN SANDY CLAY (CL) 2.5Y 5/4, moist, medium stiff, very fine-grained sand. OLIVE GRAY SANDY CLAY (CL) moist to wet, medium stiff, very fine-grained sand, contains brick fragments. CONCRETE DARK GRAYISH BROWN GRAVELLY SAND (SW) 2.5Y 4/2, moist, loose.
	9.1	2 4 5			
	8.1	3 9 12	5		LIGHT OLIVE BROWN SILTY CLAY (CL) WITH SAND 2.5Y 5/4, moist, stiff to very stiff, very fine-grained sand.
	1.2	3 6 9			*Bottom of Boring at 9 feet below ground surface.*
			10		

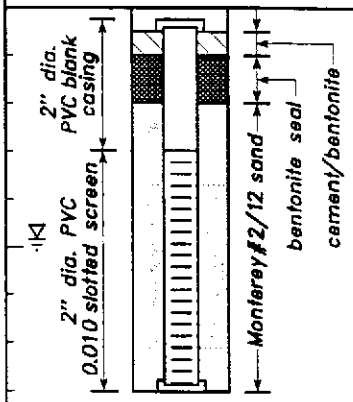
CLIENT	Cox Cadillac	DIAMETER OF HOLE	8 inches
LOCATION	230 Bay Place, Oakland, California	TOTAL DEPTH OF HOLE	9 feet
JOB NUMBER	167.0200.002	TOP OF CASING ELEVATION	0.5 feet below ground level
GEOLOGIST/ENGINEER	D. Trumbly	DATE STARTED	10/11/93
DRILL RIG	Deep Rock 10K with 8" Hollow Stem Auger	DATE COMPLETED	10/11/93

PLATE

A-6

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF WELL TW-5

WELL CONSTRUCTION DETAIL	PID (PPM)	BLOWS/6"	DEPTH (FT)	SYMBOLS	MATERIALS DESCRIPTION
					ASPHALTIC CONCRETE 2"; AGGREGATE BASE 4" DARK YELLOWISH BROWN CLAYEY SAND (SC) 10YR 3/6, moist, loose. GRAY SILTY CLAY (CL) WITH SAND 5Y 5/1, moist, soft. BRICK 10R 4/4.
	485	1 1 1	5		VERY DARK GRAY SANDY CLAY (CL) 10YR 3/1, moist, very soft, very fine-grained and fine-grained sand, moderate hydrocarbon odor. Hydrocarbon odor beomes strong. Becomes dark gray 5Y 4/1.
	648	2 2 2			*Bottom of Boring at 10 feet below ground surface.*
			10		

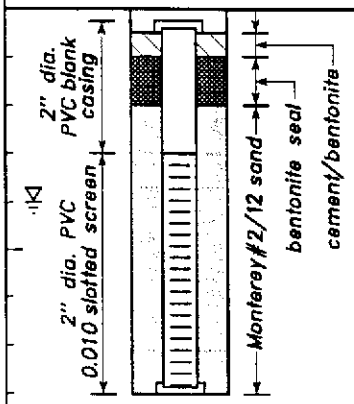
CLIENT	Cox Cadillac	DIAMETER OF HOLE	8 inches
LOCATION	230 Bay Place, Oakland, California	TOTAL DEPTH OF HOLE	8 feet
JOB NUMBER	167.0200.002	TOP OF CASING ELEVATION	0.25 feet below ground level
GEOLOGIST/ENGINEER	D. Trumbly	DATE STARTED	10/12/93
DRILL RIG	Deep Rock 10K with 8" Hollow Stem Auger	DATE COMPLETED	10/12/93

PLATE

A-7

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF WELL TW-6

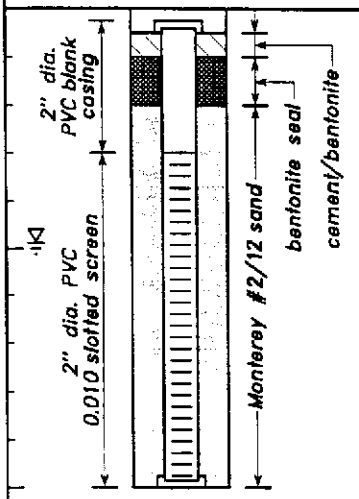
WELL CONSTRUCTION DETAIL	PID (PPM)	BLOWS/6"	DEPTH (FT)	SYMBOLS	MATERIALS DESCRIPTION
	4.6 21 18.4		5 10		ASPHALTIC CONCRETE 2"; AGGREGATE BASE 2" DARK YELLOWISH BROWN GRAVELLY SAND (SW) 10YR 4/6, moist, loose, fine-grained to coarse-grained sand, fine-grained gravel. LIGHT OLIVE BROWN SANDY CLAY (CL) 2.5Y 5/3, moist, medium stiff, very fine-grained and fine-grained sand. GREENISH GRAY SILTY SAND (SM) 5GY 6/1, moist to wet, medium dense, very fine-grained and fine-grained sand. GREENISH GRAY SAND (SW) 5GY 5/1, wet, medium dense, very fine-grained to coarse-grained sand. GREENISH GRAY AND DARK YELLOWISH BROWN SILTY SAND (SM) - 5GY 5/1 & 10YR 4/5, wet loose to medium dense, very fine-grained and fine-grained sand. *Bottom of Boring at 8 feet below ground surface.*

CLIENT	Cox Cadillac	DIAMETER OF HOLE	8 inches
LOCATION	230 Bay Place, Oakland, California	TOTAL DEPTH OF HOLE	8 feet
JOB NUMBER	167.0200.002	TOP OF CASING ELEVATION	0.25 feet below ground level
GEOLOGIST/ENGINEER	D. Trumbly	DATE STARTED	10/12/93
DRILL RIG	Deep Rock 10K with 8" Hollow Stem Auger	DATE COMPLETED	10/12/93

PLATE
A-8

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF WELL TW-7

WELL CONSTRUCTION DETAIL	PID (PPM)	BLOWS/6"	DEPTH (FT)	SYMBOLS	MATERIALS DESCRIPTION
	435	3 4 6	5		CONCRETE SLAB 4"; BEDDING MATERIAL; CONCRETE SLAB 4" VERY DARK GRAY SANDY CLAY (CL) 7.5YR N3/, moist, soft, very fine-grained sand. DARK GREENISH GRAY SILTY CLAY (CL) WITH SAND 5GY 4/1, moist, medium stiff, very fine-grained sand, with light hydrocarbon odor. LIGHT OLIVE BROWN SILTY CLAY (CL) WITH SAND 2.5Y 5/4, moist, medium stiff, very fine-grained sand, with moderate hydrocarbon odor. LIGHT OLIVE BROWN SILTY SAND (SM) WITH CLAY 2.5Y 5/4 moist to wet, loose, very fine-grained to medium-grained sand, with strong hydrocarbon odor.
	447	3 5 5			
	238	3 4 8	10		*Bottom of Boring at 10 feet below ground surface.*

CLIENT	Cox Cadillac	DIAMETER OF HOLE	8 inches
LOCATION	230 Bay Place, Oakland, California	TOTAL DEPTH OF HOLE	10 feet
JOB NUMBER	167.0200.002	TOP OF CASING ELEVATION	0.25 feet below ground level
GEOLOGIST/ENGINEER	D. Trumbly	DATE STARTED	10/12/93
DRILL RIG	Deep Rock 10K with 8" Hollow Stem Auger	DATE COMPLETED	10/12/93

PLATE

A-9

APPENDIX B

MW-1 WELL DEVELOPMENT AND SAMPLING REPORTS

BLAINE
TECH SERVICES INC.

985 TIMOTHY DRIVE
SAN JOSE, CA 95133
(408) 995-5535
FAX (408) 293-8773

March 12, 1993

PES Environmental, Inc.
1682 Novato Blvd.
Novato, CA 94947

Attention: Mary Holkenbrink

SITE:
Bill Cox Cadillac
230 Bay Place
Oakland, California

PROJECT:
Well Development

PROJECT INITIATED ON:
March 1,1993

WELL DEVELOPMENT REPORT 930301-Y-1

Blaine Tech Services, Inc. performs specialized environmental sampling and documentation as an independent third party. In order to avoid compromising the objectivity necessary for the proper and disinterested performance of this work, Blaine Tech Services, Inc. does not participate in the interpretation of analytical results or become involved with the marketing or installation of remedial systems. The interpretation of results should be performed by representatives of the interested regulatory agencies and those certified professionals who are engaged as paid consultants in the business of providing professional opinions along with recommendations and proposals for further investigative or remedial activities.

As an independent third party, Blaine Tech Services, Inc. routinely performs evacuation and sampling of groundwater wells. In addition, we are frequently asked to provide specialized personnel, instruments and equipment for well development work. Similar standards of care and cleanliness are required in all these activities and our personnel are accustomed to the safety measures that must be taken.

Scope of Requested Services

Blaine Tech Services, Inc. was asked to provide specialized equipment, instruments and personnel for a well development project being overseen by PES Environmental, Inc..

Execution of the Recent Work

Our personnel arrived at the site on Monday, March 1, 1993 and developed one well in accordance with our client's specifications communicated to us by Ms. Holkenbrink. A summary of the well development actions is presented in the table of field data which follow.

MW-1 WELL DEVELOPMENT LOG

Well Designation	Well Diameter (inches)	Well Depth (feet)	Initial Depth to Water (feet)	Volume of single case (gallons)
MW-1	2	21.10	4.14	2.50

Equipment Used: Middleburg / Bailer

Data collection during well development:

Date	Time	Gallons Removed	Temp. (F)	pH	EC (micromhos)	Turbidity (NTU)	Notes
03/01/93	9:50	2.5	63.6	7.4	2000	>200	Brown, silty,
		Pump was being repaired from 9:52-10:52					
	10:58	5.0	62.0	7.6	2000	>200	Brown, silty, gas odor.
	11:03	7.5	60.4	7.5	1900	>200	Brown, silty, gas odor, and a heavy sheen.
	11:07	10.0	62.6	7.4	1800	>200	Scattered bits of free product.
	11:12	12.5	63.0	7.3	2200	>200	Strong gas odor.
		Surged with Middleburg from 11:12-11:23					Slow pump rate.
	11:23	15.0	64.0	7.0	2600	>200	Strong gas odor.
	11:32	17.5	64.6	7.2	2400	>200	" " "
	11:45	20.0	65.0	7.4	2600	>200	" " "
	11:56	22.5	64.6	7.4	2400	>200	Light brown, fuel odor.
	12:16	25.5	60.8	7.2	2300	>200	" " " "
	12:16	End log.					

STANDARD PROCEDURES

Overview

Because formations vary in their geologic composition, transmissivity and water production capability, well development cannot be reduced to a set of fixed procedures that will always produce a complete and satisfactory result if just repeated for a predetermined period of time. Instead, well development is accomplished by selecting procedures that (a.) repair that portion of the native formation that was disrupted by the cutting action of the well drilling tool, and (b.) promote the flow of water out of the native formation into the newly installed well (through the granular filter pack and well screen). Execution of development actions that are not appropriate to the native formation will be inefficient and in some cases even deleterious.

Time constraints usually prevent a precise classification of the saturated zone materials by analysis of soil samples for physical characteristics at a laboratory equipped to do physical testing. Physical tests cannot usually be completed during the brief timespan of a project that combines exploration, design, and well installation into a one day effort. Instead, the subjective judgments of the field geologist are recorded in the boring log and well installation log. The field geologist must quickly evaluate soil types by their appearance and observable characteristics and record his or her estimation of the material in the log according to the categorical definitions provided by the Unified Soil Classification System. These categorical judgments are also the basis for determining the final construction specifications of the well.

The well's total depth, the length of the screened interval, the slot size, and the size of the sand used in the filter pack are all decided on the *appearance* of soil cuttings and whatever quick tests the field geologist can perform. Because the physical specifications for the well are set at that moment and cannot be corrected later, any misclassification of soil that results in a mismatching of the well to the native formation will have to be addressed and corrected (to whatever extent is possible) with well development actions, alone.

Well development work can be directed in two ways:

> First, specific well development actions can be called for by the geologist who installed the wells or by another professional reviewing that installation work. Typically, consultants specify the use of certain equipment and techniques.
>
> Second, the consultant or client can define the goal which is being sought and place limits on the amount of effort which should be taken to achieve the goal.

Of the two types of direction, the second is far more common and also more important. Defining the extent of effort which can be expended is vital to controlling costs on a project and scheduling personnel and equipment to complete the work. Moreover, it is possible to undertake and complete work without the added and frequently unnecessary effort of working out very detailed specification which may be impractical or unwarranted.

This does not mean that our personnel cannot make use of well installation logs when they are available or are not receptive to very specific directions from the consultant. It does, however, mean that when very detailed directions are given, rapid communications between our personnel and the geologist become very important. This is especially true of sites where multiple wells have been installed, because wells even a short distance apart may demonstrate quite different characteristics which may require a rapid reevaluation of what well development procedures are appropriate in light of the hydrologic condition presented by the native formation at that location on the site.

In most cases, tightly controlled action sequences are less productive than more general directions combined with plain statements of what evaluation criteria should be used for judging the progress and completeness of the well development work. The most common standards are volumetric (removal of set volumes of water), recharge rate, and water clarity (measured as nephelometric turbidity units). Given these goals and limitations, our personnel can work independently of the project geologist. In most cases, our personnel can proceed with the work without supervision or direction by relying on empirical information obtained directly from the water in the well.

Selection of Development Equipment

Each Blaine Tech Services, Inc. vehicle provided for a well development project will have a wide assortment of development tools including stainless steel surgeblocks and swabs, several types of pumps, and complete instrumentation for determining standard parameters. Special equipment which includes certain types of winches, jetting heads, and drop surging pumps can be provided.

General Policy

Truly difficult conditions which can only be resolved by the application of massive force or large volumes of high pressure air should be addressed by a drilling or pump installation contractor. Blaine Tech Services, Inc. is not in the heavy salvage business and has a general policy against the use of tools or techniques which provide enough mechanical advantage to pose a serious risk of damaging the well. The same policy prohibits introducing foreign materials into a well which could carry contaminants into the groundwater. In keeping with this policy, our personnel avoid surging with slugs of effluent water, or jetting with unfiltered air unless these actions are specifically requested by a registered professional who is cognizant of the problems and hazards that accompany the action. In a similar vein, our personnel will, whenever possible, avoid development actions that are likely to seal clay formations or promote bridging, and make every attempt to call obvious indications of such conditions to the attention of the project geologist so that a different regimen can be selected.

Effluent Materials

Groundwater well sampling protocols call for the evacuation of a sufficient volume of water from the well to insure that the sample is collected from water that has been newly drawn into the well from the surrounding geologic formation.

Well development routinely generates as much or more effluent water as does routine evacuation prior to monitoring. In some cases very large amounts of water must be removed from the well before a satisfactory level of development has been achieved. The effluent water from these development actions must be contained. Blaine Tech Services, Inc. will place this water in appropriate containers of the client's choice or bring new DOT 17 E drums to the site which are appropriate for the containment of the effluent materials. The determination of how to properly dispose of the effluent water must usually await the results of laboratory analyses of subsequent samples collected from each individual groundwater well. If those individual samples do not establish whether or not the effluent water is contaminated, or if effluent from more than one source has been combined in the same container, it may be necessary to conduct additional analyses on the effluent material.

Decontamination

All apparatus is brought to the site in clean and serviceable condition. The equipment will be decontaminated after use in each well and before leaving the site. Decontamination consists of complete disassembly of the device to a point where a jet of steam cleaner water can be directed onto all the internal surfaces. Blaine Tech Services, Inc. frequently modifies apparatus to allow complete disassembly and proper cleaning.

Personnel

All Blaine Tech Services, Inc. personnel receive 29 CFR 1910.120 training as soon after being hired as is practical. In addition, many of our personnel have additional certifications that include specialized training in level B supplied air apparatus and the supervision of employees working on hazardous materials sites. Employees are not sent to a site unless we are confident they can adhere to any site safety provisions in force at the site and unless we know that they can follow the written provisions of an SSP and the verbal directions of an SSO.

In general, employees sent to a site to perform groundwater well sampling will assume an OSHA level D (wet) environment exists unless otherwise informed. The use of gloves and double glove protocols protects both our employees and the integrity of the samples being collected. Additional protective gear and procedures for higher OSHA levels of protection are available.

Please call if we can be of any further assistance.

Richard C. Blaine

RCB/skt

BLAINE
TECH SERVICES INC.

985 TIMOTHY DRIVE
SAN JOSE, CA 95133
(408) 995-5535
FAX (408) 293-8773

March 15,1993

PES Environmental, Inc.
1628 Novato Blvd., Suite 100
Novato, CA 94947

Attn: Dan Trumbly

SITE:
Bill Cox Cadillac
230 Bay Place
Oakland, California

PROJECT:
PES Enviornmental, Inc.
well installation project

SAMPLING EVENT:
Evacuate and sample one well

DATE:
March 3, 1993

GROUNDWATER SAMPLING REPORT 930303-Y-1

Blaine Tech Services, Inc. performs specialized environmental sampling and documentation as an independent third party. In order to avoid compromising the objectivity necessary for the proper and disinterested performance of this work, Blaine Tech Services, Inc. does not participate in the interpretation of analytical results or become involved with the marketing or installation of remedial systems.

This report deals with the groundwater well sampling performed by our firm in response to your request. Data collected in the course of our work at the site is presented in the TABLE OF WELL MONITORING DATA. This data was collected during our inspection, well evacuation, and sample collection. Measurements include the total depth of the well and depth to water. Water surfaces were further inspected for the presence of immiscibles. A series of electrical conductivity, pH, and temperature readings were obtained during well evacuation and at the time of sample collection. Recharge performance can be evaluated by comparing the anticipated three, four, or five case volume evacuation gallonage with the volume which could actually be purged.

TABLE OF WELL MONITORING DATA

Well I.D.	MW-1		
Date Sampled	03/03/93		
Well Diameter (in.)	2		
Total Well Depth (ft.)	20.10		
Depth To Water (ft.)	2.92		
Free Product (in.)	NONE		
Reason If Not Sampled	--		
1 Case Volume (gal.)	2.7		
Did Well Dewater?	NO		
Gallons Actually Evacuated	14.0		
Purging Device	MIDDLEBURG		
Sampling Device	BAILER		
Time	9:50	9:56	10:29
Temperature (Fahrenheit)	63.6	62.9	62.8
pH	6.8	7.0	6.8
Conductivity (micromhos/cm)	3100	3000	3600
BTS Chain of Custody	930303-Y-1		
BTS Sample I.D.	MW-1		
DHS HMTL Laboratory	SUPERIOR		
Analysis	TPH (gas),BTEX, TPH (diesel),METALS EPA 8010,8080,8270.		

In the interest of clarity, an addendum has been appended to the **TABLE** which lists analytical results in such a way that our field observations are presented together with the analytical results. This addendum is entitled a **SUMMARY OF CAR RESULTS.** As indicated by the title, the source documents for these numbers are the laboratory's certified analytical reports. These **certified analytical reports** (CARs) are generated by the laboratory as the sole official documents in which they issue their findings. Any discrepancy between the CAR and a tabular or text presentation of analytical values must be decided in favor of the CAR on the grounds that the CAR is the authoritative legal document.

EQUIPMENT

Selection of Sampling Equipment

The determination of what apparatus is to be used on particular wells may be made by the property owner, but is usually made by the professional consultant directing the performance of the monitoring on the property owner's behalf. When no specific requirement is made, our personnel will select equipment that will accomplish the work in the most efficient manner. Our personnel are equipped with a variety of sampling devices that include USGS/Middleburg pumps, down hole electric submersible pumps, air lift pumps, suction pumps, and bailers made of both Teflon and stainless steel.

Evacuation and Sampling Equipment Mechanics

When equipment is not selected by the client, the apparatus for well evacuation and sample collection is selected by our field personnel based on an evaluation of the field conditions.
Bailers
USGS/Middleburg positive displacement sampling pumps

An USGS/Middleburg pump and a bailer were selected for the collection of samples at this site.

USGS/Middleburg Positive Displacement Sampling Pumps: USGS/Middleburg positive displacement sampling pumps are EPA approved pumps appropriate for use in wells down to two inches in diameter and depths up to several hundred feet. The pump contains a flexible Teflon bladder which is alternately allowed to fill with well water and then collapsed. Actuation of the pump is accomplished with compressed air supplied by a single hose to one side of the Teflon membrane. Water on the other side of the membrane is squeezed out of the pump and up a Teflon conductor pipe to the surface. Evacuation and sampling are accomplished as a continuum. The rate of water removal is relatively slow and loss of volatiles almost non-existent. There is only positive pressure on the water being sampled and there is no impeller cavitation or suction. The pumps can be placed at any location within the well, can draw water from the very bottom of the well case, and are virtually immune to the erosive effects of silt or lack of water which destroy other types of pumps.

Disadvantages associated with Middleburg pumps include their high cost, low flow rate, temperamental operation, and cleaning requirements which are both elaborate and time consuming.

Bailers: A bailer, in its simplest form, is a hollow tube which has been fitted with a check valve at the lower end. The device can be lowered into a well by means of a cord. When the bailer enters the water, the check valve opens and liquid flows into the interior of the bailer. The bottom check valve prevents water from escaping when the bailer is drawn up out of the well.

Two types of bailers are used in groundwater wells at sites where fuel hydrocarbons are of concern. The first type of bailer is made of a clear material such as acrylic plastic and is used to obtain a sample of the surface and the near surface liquids in order to detect the presence of visible or measurable fuel hydrocarbon floating on the surface. The second type of bailer is made of Teflon or stainless steel and is used as an evacuation and/or sampling device.

Bailers are inexpensive and relatively easy to clean. Because they are manually operated, variations in operator technique may have a greater influence than would be found with more automated sampling equipment. Also where fuel hydrocarbons are involved, the bailer may include near surface contaminants that are not representative of water deeper in the well.

STANDARD PRACTICES

Evacuation

Groundwater well sampling protocols call for the evacuation of a sufficient volume of water from the well to insure that the sample is collected from water than has been newly drawn into the well from the surrounding geologic formation. The protocol used on these wells called for a volumetric removal of three case volumes with stabilization of standard water parameters. There are situations where up to ten case volumes of evacuation may be removed, especially when attempting to stabilize turbidity in undeveloped wells. Different professional consultants may specify different levels of evacuation prior to sampling or may request that specific parameters be used to determine when to collect the sample. Our personnel use several standard instruments to record the changes in parameters as the well is evacuated. These instruments are used regardless of whether or not a specific volumetric standard has been called for. As a result, the consultant will always be provided with a record of the pH, EC, and temperature changes that occurred during the evacuation process. Additional information obtained with different types of instruments (such as dissolved oxygen and turbidity meters) can also be collected if requested in advance.

Effluent Materials

The evacuation of purge water creates a volume of effluent water which, in most cases, must be contained. Blaine Tech Services, Inc. will place this water in appropriate containers of the client's choice or bring new DOT 17 E drums to the site which are appropriate for the containment of the effluent materials. The determination of how to properly dispose of the effluent water must usually await the results of laboratory analyses of the sample collected from the groundwater well.

Observations and Measurements

Included in the scope of work are routine measurements and investigative procedures which are intended to determine if the wells are suitable for evacuation and sampling. These include measurement (from the top of the well case) of the total depth of the well; the depth to water, and the thickness of any free product zone (FPZ) encountered. The presence of a significant free product zone may interfere with efforts to collect a water sample that accurately reflects the condition of groundwater lying below the FPZ. This interference is caused by adhesion of petroleum to any device being lowered through the FPZ and the likelihood that minute globules of petroleum may break free of the sampling device and be included in the sample. Accordingly, evaluation of analytical results from wells containing any amount of free petroleum should take into account the possibility that positive results have been skewed higher by such an inclusion. The decision to sample or not sample such wells is left to the discretion of our field personnel at the site and the consultant who establishes sampling guidelines based on the need for current information on groundwater conditions at the site.

Sampling Methodology

Samples were obtained by standardized sampling procedures that follow an evacuation and sample collection protocol. The sampling methodology conforms with State and Regional Water Quality Control Board standards and specifically adheres to EPA requirements for apparatus, sample containers and sample handling as specified in publication SW 846 and the T.E.G.D. which is published separately.

Sample Containers

Sample material is collected in specially prepared containers appropriate to the type of analyses intended. Our firm uses new sample containers of the type specified by either EPA or the RWQCB. Often times analytical laboratories wish to supply the sample containers because checks performed on these bottles are often part of a comprehensive laboratory QC program. In cases where the laboratory does not supply sample containers our personnel collect water samples in new containers that are appropriate to the type of analytical procedure that the sample is to receive. For example, 40 ml volatile organic analysis vials (VOAs) are used when analysis for gasoline and similar light volatile compounds is intended. These containers are prepared according to EPA SW 846 and will usually contain a small amount of preservative when the analysis is for TPH as gasoline or EPA 602. Vials intended for EPA 601 analysis and EPA 624 GCMS procedures are not preserved. The closure of volatile organic analysis water sample containers is accomplished with an open headed (syringe accessible) plastic screw cap brought down on top of a Teflon faced septum which is used to seal the sample without headspace.

Water samples intended for semivolatile and nonvolatile analysis such as total oil and grease (TOG) and diesel (TPH HBF) are collected and transported in properly prepared new glass liter bottles. Dark amber glass is used in the manufacture of these bottles to reduce any adverse effect on the sample by sunlight. Antimicrobial preservative may be added to the sample liquid if a prolonged holding time is expected prior to analysis. Closure is accomplished with a heavy plastic screw cap.

Groundwater well samples intended for metals analysis are transported in new plastic bottles and preserved with nitric acid. Our personnel can field filter the sample liquid prior to placing it in the sample container if instructed to perform this procedure.

Sample Handling Procedures

Water samples are collected in any of several appropriate devices such as bailers, Coliwasas, Middleburg sampling pumps etc. which are described in detail only as warranted by their employment at a given site. Sample liquid is decanted into new sample containers in a manner which reduces the loss of volatile constituents and follows the applicable EPA procedures for handling volatile organic and semi-volatile compounds.

Groundwater samples that are to receive metals analyses can be filtered prior to being placed in the plastic sample bottles that contain the nitric acid preservative. The filtration process employs new glass containers which are discarded and laboratory quality disposable filtering containers which are also discarded. A frequently used filtering procedure employs a vacuum pump to draw sample material through a 0.45 micron filter. The 0.45 micron pore size is standard, but the amount of filter available varies with the type of package selected. Filters are selected on the basis of the relative turbidity of the water sample. Samples which are relatively clean can be efficiently filtered with relatively inexpensive filters while very turbid water will require a very large filter with a high tolerance for sediments. One of several such filters our firm uses are the Nalgene Type A filters in which an upper and lower receptacle chamber are affixed to the filter. Sample material is poured into the upper chamber and a vacuum pump attached to the lower chamber. Simple actuation of the vacuum pump induces the flow of water through the filter and into the lower chamber. The sample is then decanted into the laboratory container and the filter assembly discarded. Cartridge type flow-through filters are more expensive but can be fitted directly to the discharge line of most sampling pumps (USGS/Middleburg pumps) and electric submersible pumps.

Following collection, samples are promptly placed in an ice chest containing prefrozen blocks of an inert ice substitute such as Blue Ice or Super Ice. The samples are maintained in either an ice chest or a refrigerator until delivered into the custody of the laboratory.

Sample Designations

All sample containers are identified with both a sampling event number and a discrete sample identification number. Please note that the sampling event number is the number that appears on our chain of custody. It is roughly equivalent to a job number, but applies only to work done on a particular day of the year rather than spanning several days as jobs and projects often do.

Hazardous Materials Testing Laboratory

After completion of the field work, the sample containers were delivered to Superior Analytical Laboratory in San Francisco, California. Superior Analytical Laboratory is certified by the California Department of Health Services as a Hazardous Materials Testing Laboratory and is listed as DOHS HMTL #220.

All samples were turned over to Dan Trumbly, PES Environmental,Inc., representative, on site.

Certified Analytical Report

The certified analytical report (CAR) generated by the laboratory is the official document in which they issue their findings. Any discrepancy between verbally communicated results and the analytical values issued in a certified analytical report should be decided in favor of the CAR, for while it may, itself, be in error with regard to a particular number, the CAR remains the recognized authoritative legal document until such time as it is amended with a corrected report.

Personnel

All Blaine Tech Services, Inc. personnel receive 29 CFR 1910.120(e)(2) training as soon after being hired as is practical. In addition, many of our personnel have additional certifications that include specialized training in level B supplied air apparatus and the supervision of employees working on hazardous materials sites. Employees are not sent to a site unless we are confident they can adhere to any site safety provisions in force at the site and unless we know that they can follow the written provisions of an SSP and the verbal directions of an SSO.

In general, employees sent to a site to perform groundwater well sampling will assume an OSHA level D (wet) environment exists unless otherwise informed. The use of gloves and double glove protocols protects both our employees and the integrity of the samples being collected. Additional protective gear and procedures for higher OSHA levels of protection are available.

Decontamination

All apparatus is brought to the site in clean and serviceable condition. The equipment is decontaminated after each use and before leaving the site. Decontamination procedures include complete disassembly of the device to a point where a jet of steam cleaner water can be directed onto all the internal surfaces. Blaine Tech Services, Inc. frequently modifies apparatus to allow complete disassembly and proper cleaning.

Please call if we can be of any further assistance.

James Miller for:
Richard C. Blaine

RCB/skt

APPENDIX C

ANALYTICAL REPORTS FOR FEBRUARY/MARCH INVESTIGATION

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.:56120
CLIENT:PES Environmental Inc.
CLIENT PROJECT NO.:167.02.002

DATE RECEIVED: 03/04/93
DATE REPORTED:03/15/93

Following is a list of Cross referenced Lab Numbers and Sample I.D.'s for referring to the following reports.

Superior Lab Number	Subbed Lab Number	Customer Sample Identification
56120-1	93030.62-01A	MW-1

Subbed to: CLAYTON ENVIRONMENTAL CONSULTANTS DOHS#1196.

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

PES ENVIRONMENTAL, INC.
Attn: DAN TRUMBLY

Project 167.02.002
Reported 11-MARCH -1993

ANALYSIS FOR POLYCHLORINATED BIPHENYLS

Sample preparation by microextraction into hexane, and by gas chromatography using an electron capture detector. (EPA Method 8080).

Chronology

Laboratory Number 56120

Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
MW-1	03/03/93	03/04/93	03/10/93	03/10/93		1

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

PES ENVIRONMENTAL, INC.
Attn: DAN TRUMBLY

Project 167.02.002
Reported 11-MARCH -1993

ANALYSIS FOR POLYCHLORINATED BIPHENYLS

Laboratory Number	Sample Identification	Matrix
56120- 1	MW-1	Water

RESULTS OF ANALYSIS

Laboratory Number: 56120- 1

AROCLOR 1016:	ND<0.1
AROCLOR 1221:	ND<0.1
AROCLOR 1232:	ND<0.1
AROCLOR 1242:	ND<0.1
AROCLOR 1248:	ND<0.1
AROCLOR 1254:	ND<0.1
AROCLOR 1260:	ND<0.1
Concentration:	ug/L

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

ANALYSIS FOR POLYCHLORINATED BIPHENYLS
Quality Assurance and Control Data - Water
Laboratory Number 56003

Compound	Method Blank (ug/L)	PQL (ug/L)	Average Spike Recovery (%)	Limits (%)	RPD (%)
AROCLOR 1016:	ND<0.1	0.1			
AROCLOR 1221:	ND<0.1	0.1			
AROCLOR 1232:	ND<0.1	0.1			
AROCLOR 1242:	ND<0.1	0.1			
AROCLOR 1248:	ND<0.1	0.1			
AROCLOR 1254:	ND<0.1	0.1	96	60-140	6
AROCLOR 1260:	ND<0.1	0.1			

Definitions:

ND = Not Detected
RPD = Relative Percent Difference
PQL = Practical Quantitation Limit

QC File No. 56120

Richard Srna, PhD

Laboratory Director

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

PES ENVIRONMENTAL,INC.
Attn: DANIEL TRUMBLY

Project 167.02.002
Reported 03/11/93

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
56120- 1	MW-1	03/03/93	03/10/93	Water

RESULTS OF ANALYSIS

Laboratory Number: 56120- 1

Oil and Grease:	ND<5000
Diesel:	100*
Gasoline:	110000
Benzene:	8500
Toluene:	7500
Ethyl Benzene:	4400
Xylenes:	15000
Concentration:	ug/L

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 56120

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.3ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Oil and Grease:	76/76	0%	63-100
Diesel:	82/84	2%	75-125
Gasoline:	101/101	0%	76-111
Benzene:	91/95	4%	78-110
Toluene:	97/101	4%	78-111
Ethyl Benzene:	100/104	4%	78-118
Xylenes:	90/95	5%	73-113

* Does not match typical diesel pattern. Pattern of peaks observed in the chromatogram is typical of hydrocarbons lighter than diesel.

Richard Srna, Ph.D.

Laboratory Director

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 56120-1
CLIENT: PES ENVIRONMENTAL
JOB NO.: 167.02.002

DATE SAMPLED: 03/03/93
DATE RECEIVED: 03/04/93
DATE ANALYZED: 03/09/93

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: MW-1

Compound	MDL (ug/L)	RESULTS (ug/L)
Chloromethane/Vinyl Chloride	50	ND
Bromomethane/Chloroethane	50	ND
Trichlorofluoromethane	25	ND
1,1-Dichloroethene	25	ND
Methylene Chloride	25	ND
trans-1,2-Dichloroethene	25	ND
1,1-Dichloroethane	25	ND
cis-1,2-Dichloroethene	25	ND
Chloroform	25	ND
1,1,1-Trichloroethane	25	ND
Carbon tetrachloride	25	ND
1,2-Dichloroethane	25	350
Trichloroethylene	25	ND
1,2-Dichloropropane	25	ND
Bromodichloromethane	25	ND
Cis-1,3-Dichloropropene	25	ND
trans-1,3-Dichloropropene	25	ND
1,1,2-Trichloroethane	25	ND
Tetrachloroethene	25	ND
Dibromochloromethane	25	ND
Chlorobenzene	25	ND
Bromoform	25	ND
1,1,2,2-Tetrachloroethane	25	ND
1,3-Dichlorobenzene	25	ND
1,2-Dichlorobenzene	25	ND
1,4-Dichlorobenzene	25	ND

MDL = Method Detection Limit
ug/L = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD =< 15%
MS/MSD average recovery = 104 % :MS/MSD RPD = 2 %

Richard Srna, Ph.D.

Laboratory Director

Superior Precision Analytical, Inc.
P.O. Box 1545 • Martinez, California 94553 • (510) 229-1590 / fax (510) 229-0916

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 87996
CLIENT: PES ENVIRONMENTAL, INC.
CLIENT JOB NO.: 167.02.002

DATE RECEIVED: 03/04/93
DATE REPORTED: 03/10/93
DATE SAMPLED: 03/03/93

ANALYSIS FOR CADMIUM, CHROMIUM, LEAD & ZINC
by EPA SW-846 Method 6010

LAB #	Sample Identification	Concentration (mg/L) Cadmium	Chromium	Lead	Zinc
1	MW-1	ND<0.05	0.11	0.2	0.30

mg/L - parts per million (ppm)

Method Detection Limit for Cadmium in Water: 0.05 mg/L
Method Detection Limit for Chromium in Water: 0.05 mg/L
Method Detection Limit for Lead in Water: 0.1 mg/L
Method Detection Limit for Zinc in Water: 0.05 mg/L

QAQC Summary: MS/MSD Average Recovery : 90%
Duplicate RPD : 2 %

For Richard Srna, Ph.D.

Laboratory Manager 3/10/93

Superior Precision Analytical, Inc.
P.O. Box 1545 • Martinez, California 94553 • (510) 229-1590 / fax (510) 229-0916

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 87996
CLIENT: PES ENVIRONMENTAL, INC.
CLIENT JOB NO.: 167.02.002

DATE RECEIVED: 03/04/93
DATE REPORTED: 03/10/93
DATE SAMPLED : 03/03/93

ANALYSIS FOR TOTAL NICKEL
by SW-846 METHOD 6010

LAB #	Sample Identification	Concentration(mg/L) Total Nickel
1	MW-1	0.2

mg/L - parts per million (ppm)

Method Detection Limit for Nickel in Water: 0.1 mg/L

QAQC Summary: MS/MSD Average Recovery : 90%
Duplicate RPD : 1 %

For Richard Srna, Ph.D.

Laboratory Manager 3/10/93

PES Environmental, Inc.
Engineering & Environmental Services

1682 Novato Boulevard, Suite 100
Novato, California 94947
(415) 899-1600 FAX (415) 899-1601

CHAIN OF CUSTODY RECORD 3/12/93

SAMPLERS: Mary K Holkenbrink

JOB NUMBER: 167.02.002
NAME/LOCATION: Cox Cadillac/Oakland
PROJECT MANAGER: Daniel E Trumbly

RECORDER: Mary K Holkenbrink (Signature Required)

DATE				SAMPLE NUMBER OR LAB NUMBER		
YR	MO	DY	TIME	YR	WK	SEQ
93	03	03	1040	mw	-1	

SOURCE CODE	MATRIX: Water	Sedim't	Soil	Oil	# CONTAINERS & PRESERV: Unpres.	H_2SO_4	HNO_3	Filtered	HCl	DEPTH IN FEET	COL MTD CD	QA CODE
23	X				6				4			

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pollutant Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH as diesel	TRH as gasoline 8080	TOG
	✓		✓	✓			✓	✓	✓

see below

Please initial:
Samples Stored in Ice — AK ✓ 4°C
Appropriate containers ✓
Samples preserved ✓
VOA's without headspace
Comments:

NOTES: Quote #93-00032

Normal Turn around Time (5 DAY)

1. Gas/BTEX by EPA 5030/8015M/8020 2 VOA's ✓
2. TPHd by EPA 8015 (50 ppb MDL) 2 l ✓
3. TOG by DHS-LUFT 5520F 1 l ✓
4. VOC's by EPA 601/8010 2 VOA's ✓
5. Metals by ICP (6000 series - Cd, Cr, Pb, Ni, Zn) 500ml ✓
6. SOC's by EPA 8270 1 l (rec'd 3/16/93)
7. 8080 1 l ✓

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Mary K Holkenbrink	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature) Kulwant 771	RECEIVED BY: (Signature)	DATE 3/3	TIME 3:21
RELINQUISHED BY: (Signature) Gloria Chavez	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE	TIME
DISPATCHED BY: (Signature)	DATE	TIME	RECEIVED FOR LAB BY: (Signature) 3/4/93	DATE	TIME 10:15

METHOD OF SHIPMENT: Gloria Chavez

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

Western Operations

1252 Quarry Lane
P.O. Box 9019
Pleasanton, CA 94566
(510) 426-2600
Fax (510) 426-0106

Clayton
ENVIRONMENTAL
CONSULTANTS

March 12, 1993

Ms. Rowena Romero
SUPERIOR ANALYTICAL LABORATORY
1555 Burke Street, Unit 1
San Francisco, CA 94124

Client Ref. 56120
Clayton Project No. 93030.62

Dear Ms. Romero:

Attached is our analytical laboratory report for the samples received on March 5, 1993. A copy of the Chain-of-Custody form acknowledging receipt of these samples is attached.

Please note that any unused portion of the samples will be disposed of 30 days after the date of this report, unless you have requested otherwise.

We appreciate the opportunity to be of assistance to you. If you have any questions, please contact Suzanne Silvera, Client Services Supervisor, at (510) 426-2657.

Sincerely,

Ronald H. Peters, CIH
Director, Laboratory Services
Western Operations

RHP/caa
Attachments

Results of Analysis
for
Superior Analytical Laboratory

Client Reference: 56120
Clayton Project No. 93030.62

Sample Identification:	56120-1	Date Sampled:	03/03/93
Lab Number:	9303062-01A	Date Received:	03/05/93
Sample Matrix/Media:	WATER	Date Extracted:	03/08/93
Extraction Method:	EPA 3510	Date Analyzed:	03/10/93
Analytical Method:	EPA 8270		

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
Acid Extractables			
4-Chloro-3-methylphenol	59-50-7	ND	5
2-Chlorophenol	95-57-8	ND	5
2,4-Dichlorophenol	120-83-2	ND	5
2,4-Dimethylphenol	105-67-9	24	5
2,4-Dinitrophenol	51-28-5	ND	20
2-Methyl-4,6-dinitrophenol	534-52-1	ND	20
2-Methylphenol	95-48-7	28	5
4-Methylphenol	106-44-5	37	5
2-Nitrophenol	88-75-5	ND	5
4-Nitrophenol	100-02-7	ND	20
Pentachlorophenol	87-86-5	ND	20
Phenol	108-95-2	42	5
2,4,5-Trichlorophenol	95-95-4	ND	5
2,4,6-Trichlorophenol	88-06-2	ND	5
Base/Neutral Extractables			
Acenaphthene	83-32-9	ND	5
Acenaphthylene	208-96-8	ND	5
Anthracene	120-12-7	ND	5
Benzidine	92-87-5	ND	30
Benzoic acid	65-85-0	50	20
Benzo(a)anthracene	56-55-3	ND	5
Benzo(b)fluoranthene	205-99-2	ND	5
Benzo(k)fluoranthene	207-08-9	ND	5
Benzo(ghi)perylene	191-24-2	ND	5
Benzo(a)pyrene	50-32-8	ND	5
Benzyl alcohol	100-51-6	ND	10
Benzyl butyl phthalate	85-68-7	ND	5
Bis(2-chloroethoxy)methane	111-91-1	ND	5
Bis(2-chloroethyl)ether	111-44-4	ND	5
Bis(2-chloroisopropyl)ether	108-60-1	ND	5
Bis(2-ethylhexyl)phthalate	117-81-7	ND	10
4-Bromophenyl phenyl ether	101-55-3	ND	5
4-Chloroaniline	106-47-8	ND	20
2-Chloronaphthalene	91-58-7	ND	5

Results of Analysis
for
Superior Analytical Laboratory

Client Reference: 56120
Clayton Project No. 93030.62

Sample Identification:	56120-1	Date Sampled:	03/03/93
Lab Number:	9303062-01A	Date Received:	03/05/93
Sample Matrix/Media:	WATER	Date Extracted:	03/08/93
Extraction Method:	EPA 3510	Date Analyzed:	03/10/93
Analytical Method:	EPA 8270		

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
Base/Neutral Extractables (continued)			
4-Chlorophenyl phenyl ether	7005-72-3	ND	5
Chrysene	218-01-9	ND	5
Dibenzo(a,h)anthracene	53-70-3	ND	5
Dibenzofuran	132-64-9	ND	5
Di-n-butylphthalate	84-74-2	ND	5
1,2-Dichlorobenzene	95-50-1	ND	5
1,3-Dichlorobenzene	541-73-1	ND	5
1,4-Dichlorobenzene	106-46-7	ND	5
3,3'-Dichlorobenzidine	91-94-1	ND	40
Diethylphthalate	84-66-2	ND	5
Dimethylphthalate	131-11-3	ND	10
2,4-Dinitrotoluene	121-14-2	ND	5
2,6-Dinitrotoluene	606-20-2	ND	5
Di-n-octylphthalate	117-84-0	ND	5
Fluoranthene	206-44-0	ND	5
Fluorene	86-73-7	ND	5
Hexachlorobenzene	118-74-1	ND	5
Hexachlorobutadiene	87-68-3	ND	5
Hexachlorocyclopentadiene	77-47-4	ND	5
Hexachloroethane	67-72-1	ND	5
Indeno(1,2,3-cd)pyrene	193-39-5	ND	5
Isophorone	78-59-1	ND	5
2-Methyl naphthalene	91-57-6	78	5
Naphthalene	91-20-3	210	5
2-Nitroaniline	88-74-4	ND	20
3-Nitroaniline	99-09-2	ND	20
4-Nitroaniline	100-01-6	ND	20
Nitrobenzene	98-95-3	ND	5
N-Nitrosodiphenylamine	86-30-6	ND	5
N-Nitrosodi-n-propylamine	621-64-7	ND	5
Phenanthrene	85-01-8	ND	5
Pyrene	129-00-0	ND	5
1,2,4-Trichlorobenzene	120-82-1	ND	5

Results of Analysis
for
Superior Analytical Laboratory

Client Reference: 56120
Clayton Project No. 93030.62

Sample Identification:	56120-1	Date Sampled:	03/03/93
Lab Number:	9303062-01A	Date Received:	03/05/93
Sample Matrix/Media:	WATER	Date Extracted:	03/08/93
Extraction Method:	EPA 3510	Date Analyzed:	03/10/93
Analytical Method:	EPA 8270		

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
Surrogates		**Recovery (%)**	**QC Limits (%)**
2-Fluorobiphenyl	321-60-8	74	43 - 116
2-Fluorophenol	367-12-4	47	21 - 100
Nitrobenzene-d5	4165-60-0	67	35 - 114
Phenol-d6	13127-88-3	36	10 - 94
Terphenyl-d14	98904-43-9	85	33 - 141
2,4,6-Tribromophenol	118-79-6	85	10 - 123

ND: Not detected at or above limit of detection
--: Information not available or not applicable
Results are reported on a wet weight basis, as received

Results of Analysis
for
Superior Analytical Laboratory

Client Reference: 56120
Clayton Project No. 93030.62

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9303062-02A	Date Received:	--
Sample Matrix/Media:	WATER	Date Extracted:	03/08/93
Extraction Method:	EPA 3510	Date Analyzed:	03/10/93
Analytical Method:	EPA 8270		

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
Acid Extractables			
4-Chloro-3-methylphenol	59-50-7	ND	5
2-Chlorophenol	95-57-8	ND	5
2,4-Dichlorophenol	120-83-2	ND	5
2,4-Dimethylphenol	105-67-9	ND	5
2,4-Dinitrophenol	51-28-5	ND	20
2-Methyl-4,6-dinitrophenol	534-52-1	ND	20
2-Methylphenol	95-48-7	ND	5
4-Methylphenol	106-44-5	ND	5
2-Nitrophenol	88-75-5	ND	5
4-Nitrophenol	100-02-7	ND	20
Pentachlorophenol	87-86-5	ND	20
Phenol	108-95-2	ND	5
2,4,5-Trichlorophenol	95-95-4	ND	5
2,4,6-Trichlorophenol	88-06-2	ND	5
Base/Neutral Extractables			
Acenaphthene	83-32-9	ND	5
Acenaphthylene	208-96-8	ND	5
Anthracene	120-12-7	ND	5
Benzidine	92-87-5	ND	30
Benzoic acid	65-85-0	ND	20
Benzo(a)anthracene	56-55-3	ND	5
Benzo(b)fluoranthene	205-99-2	ND	5
Benzo(k)fluoranthene	207-08-9	ND	5
Benzo(ghi)perylene	191-24-2	ND	5
Benzo(a)pyrene	50-32-8	ND	5
Benzyl alcohol	100-51-6	ND	10
Benzyl butyl phthalate	85-68-7	ND	5
Bis(2-chloroethoxy)methane	111-91-1	ND	5
Bis(2-chloroethyl)ether	111-44-4	ND	5
Bis(2-chloroisopropyl)ether	108-60-1	ND	5
Bis(2-ethylhexyl)phthalate	117-81-7	ND	10
4-Bromophenyl phenyl ether	101-55-3	ND	5
4-Chloroaniline	106-47-8	ND	20
2-Chloronaphthalene	91-58-7	ND	5

Results of Analysis
for
Superior Analytical Laboratory

Client Reference: 56120
Clayton Project No. 93030.62

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9303062-02A	Date Received:	--
Sample Matrix/Media:	WATER	Date Extracted:	03/08/93
Extraction Method:	EPA 3510	Date Analyzed:	03/10/93
Analytical Method:	EPA 8270		

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
Base/Neutral Extractables (continued)			
4-Chlorophenyl phenyl ether	7005-72-3	ND	5
Chrysene	218-01-9	ND	5
Dibenzo(a,h)anthracene	53-70-3	ND	5
Dibenzofuran	132-64-9	ND	5
Di-n-butylphthalate	84-74-2	ND	5
1,2-Dichlorobenzene	95-50-1	ND	5
1,3-Dichlorobenzene	541-73-1	ND	5
1,4-Dichlorobenzene	106-46-7	ND	5
3,3'-Dichlorobenzidine	91-94-1	ND	40
Diethylphthalate	84-66-2	ND	5
Dimethylphthalate	131-11-3	ND	10
2,4-Dinitrotoluene	121-14-2	ND	5
2,6-Dinitrotoluene	606-20-2	ND	5
Di-n-octylphthalate	117-84-0	ND	5
Fluoranthene	206-44-0	ND	5
Fluorene	86-73-7	ND	5
Hexachlorobenzene	118-74-1	ND	5
Hexachlorobutadiene	87-68-3	ND	5
Hexachlorocyclopentadiene	77-47-4	ND	5
Hexachloroethane	67-72-1	ND	5
Indeno(1,2,3-cd)pyrene	193-39-5	ND	5
Isophorone	78-59-1	ND	5
2-Methyl naphthalene	91-57-6	ND	5
Naphthalene	91-20-3	ND	5
2-Nitroaniline	88-74-4	ND	20
3-Nitroaniline	99-09-2	ND	20
4-Nitroaniline	100-01-6	ND	20
Nitrobenzene	98-95-3	ND	5
N-Nitrosodiphenylamine	86-30-6	ND	5
N-Nitrosodi-n-propylamine	621-64-7	ND	5
Phenanthrene	85-01-8	ND	5
Pyrene	129-00-0	ND	5
1,2,4-Trichlorobenzene	120-82-1	ND	5

Results of Analysis
for
Superior Analytical Laboratory

Client Reference: 56120
Clayton Project No. 93030.62

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9303062-02A	Date Received:	--
Sample Matrix/Media:	WATER	Date Extracted:	03/08/93
Extraction Method:	EPA 3510	Date Analyzed:	03/10/93
Analytical Method:	EPA 8270		

Analyte	CAS #	Concentration (ug/L)	Limit of Detection (ug/L)
Surrogates		**Recovery (%)**	**QC Limits (%)**
2-Fluorobiphenyl	321-60-8	84	43 - 116
2-Fluorophenol	367-12-4	55	21 - 100
Nitrobenzene-d5	4165-60-0	88	35 - 114
Phenol-d6	13127-88-3	48	10 - 94
Terphenyl-d14	98904-43-9	107	33 - 141
2,4,6-Tribromophenol	118-79-6	68	10 - 123

ND: Not detected at or above limit of detection
--: Information not available or not applicable
Results are reported on a wet weight basis, as received

Quality Assurance Results Summary
for
Clayton Project No. 93030.62

Clayton Lab Number: 9303062-MB
Ext./Prep. Method: EPA3510
Date: 03/08/93
Analyst: HYT
Std. Source: M921202-01W
Sample Matrix/Media: WATER

Analytical Method: EPA625 8270
Instrument ID: 05624
Date: 03/10/93
Time: 11:41
Analyst: AC
Units: UG/L

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
1,2,4-Trichlorobenzene	ND	100	63.0	63	60.0	60	62	39	98	4.9	28
1,4-Dichlorobenzene	ND	100	63.0	63	62.0	62	63	36	97	1.6	28
2,4-Dinitrotoluene	ND	100	70.0	70	70.0	70	70	24	96	0.0	38
2-Chlorophenol	ND	100	71.0	71	79.0	79	75	27	123	11	40
4-Chloro-m-cresol	ND	100	64.0	64	66.0	66	65	23	97	3.1	42
4-Nitrophenol	ND	100	15.0	15	17.0	17	16	10	80	13	50
Acenaphthene	ND	100	69.0	69	66.0	66	68	46	118	4.4	31
N-Nitrosodipropylamine	ND	100	91.0	91	89.0	89	90	41	116	2.2	38
Pentachlorophenol	ND	100	51.0	51	63.0	63	57	9	103	21	50
Phenol	ND	100	40.0	40	44.0	44	42	12	89	9.5	42
Pyrene	ND	100	80.0	80	77.0	77	79	26	127	3.8	31

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection
LCL = Lower Control Limit
UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Section I

Chain of Custody and Analysis Request

page 1 of 1

From: Superior Precision Analytical, Inc.
1555 Burke St. Unit I
San Francisco, CA 92124
Phone No. (415) 647-2081 Fax No. (415) 821-7123
Contact: ROWENA ROMERO
P.O. No. 52120

Turn Around Time (circle one)
Same Day 72 Hrs
24 Hrs (5 Day)
48 Hrs 10 Day

Superior Precision Analytical, Inc.
P.O. Box 1545
Martinez, California 94553

Work Subcontracted to: Clayton

Section II: Analysis Request

	Laboratory Sample Identification	S = Soil A = Air W = Water Matrix	CAM17	Metals:	418.1	8270	8080 (pest. and PCB's)					Client Sample Identification	Number of Containers	Preservative (yes or no)			Sampling Remarks
1	52120-1	W				X						MW-1	1	Y			Chevron ☐ Non-Chevron ☒ **Please Fax Results** Superior 821-7123
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	

Relinquished by: [illegible] Organization: Superior Analytical	Date/Time: 3/4/13 6:00 PM	Received by: [illegible] Organization: GCEC	Date/Time: 3/5/13 3:45	Lab please initial the following: Samples Stored in Ice CH; Appropriate Containers N/A; Samples Preserved N/A; VOAs without Headspace N/A; Comments Rec'd 11.8C
Relinquished by: Organization:	Date/Time:	Received by: Organization:	Date/Time:	
Relinquished by: Organization:	Date/Time:	Received by: Organization:	Date/Time:	

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3008-B 16th Avenue West
Seattle, WA 98119
FAX: (206) 283-5044

April 8, 1993

Andrew Briefer, Project Leader
PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94948

Dear Mr. Briefer:

Enclosed are the amended results from the testing of material submitted on April 1, 1993 from Project 167.02.002, Cox Cadillac/Oakland. The retention times for the second envelope of peaks have been corrected.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

Kathy McMullen

Kathy McMullen
Chemist

KMC/dp

Enclosures

FAX: (415) 899-1601

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

AMENDED 4/08/93

Date of Report: April 5, 1993
Date Received: April 1, 1993
Project: 167.02.002, Cox Cadillac/Oakland

RESULTS FROM THE ANALYSIS OF THE WATER AND SOIL SAMPLE FOR FINGERPRINT CHARACTERIZATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID) AND ELECTRON CAPTURE DETECTOR (ECD)

Sample #	GC Characterization
930301-1 (Well MW-1)	The gas chromatographic FID trace showed the presence of low and high boiling compounds, such as those found in gasoline and wax. This characterization is based on the presence of a relatively smooth envelope of peaks present from ca *n*-C_7 to *n*-C_{12} with a maximum near *n*-C_7, as well as a second envelope of peaks from ca *n*-C_{24} to beyond *n*-C_{35} with a maximum near *n*-C_{31}. Augmented levels of benzene, toluene, ethylbenzene and the xylenes were seen which are common to most gasolines. The material appeared to be mostly unweathered due to the amount of the more volatile fraction present. The large peak seen near 26 minutes is pentacosane, a compound added as a QA/QC check. The GC/ECD trace showed the presence of halogenated compounds, including a large peak at ca 4 minutes which may be tetrachloroethylene or ethylene dibromide, although this would be somewhat unusual since there is no peak for tetraethyl lead present. The GC/FID trace lacks the later eluting gasoline-range material seen in 930331-2. Also, the peak at ca 4 minutes was not seen on the GC/ECD trace of 930331-2. This data does not confirm that the source of 930331-1 came from 930331-2.

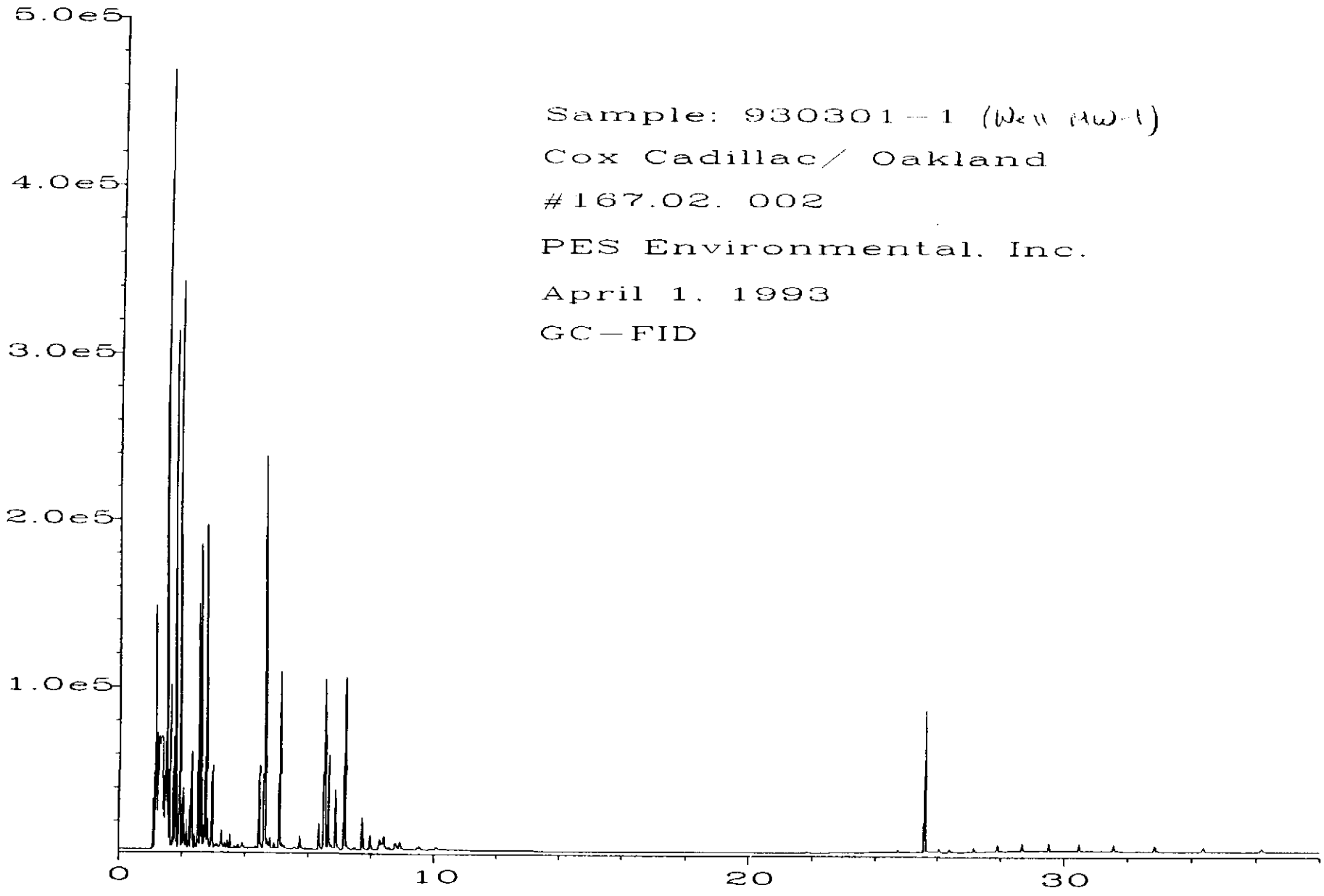
FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

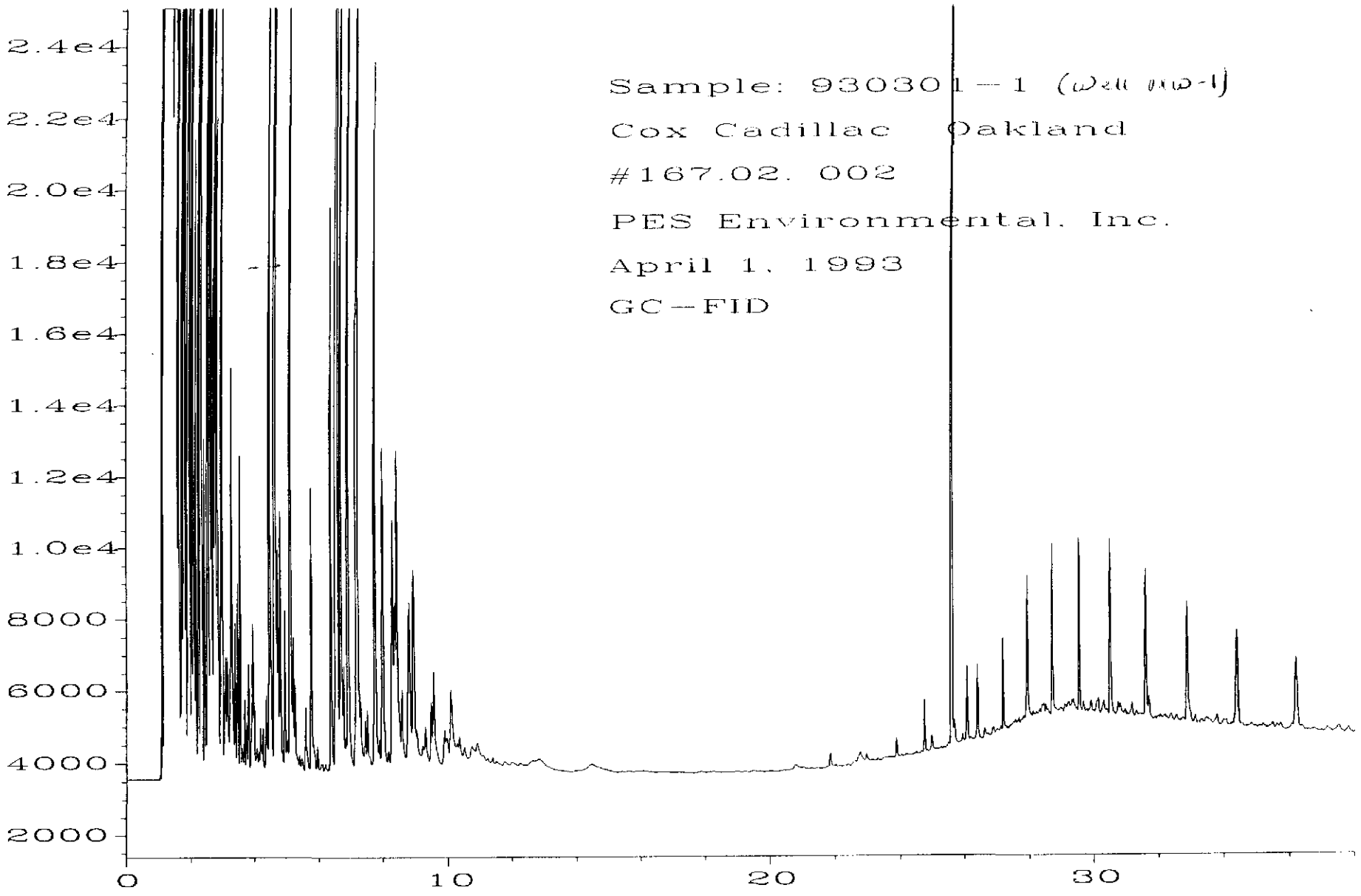
Date of Report: April 5, 1993
Date Received: April 1, 1993
Project: 167.02.002, Cox Cadillac/Oakland

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR FINGERPRINT CHARACTERIZATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID) AND ELECTRON CAPTURE DETECTOR (ECD)

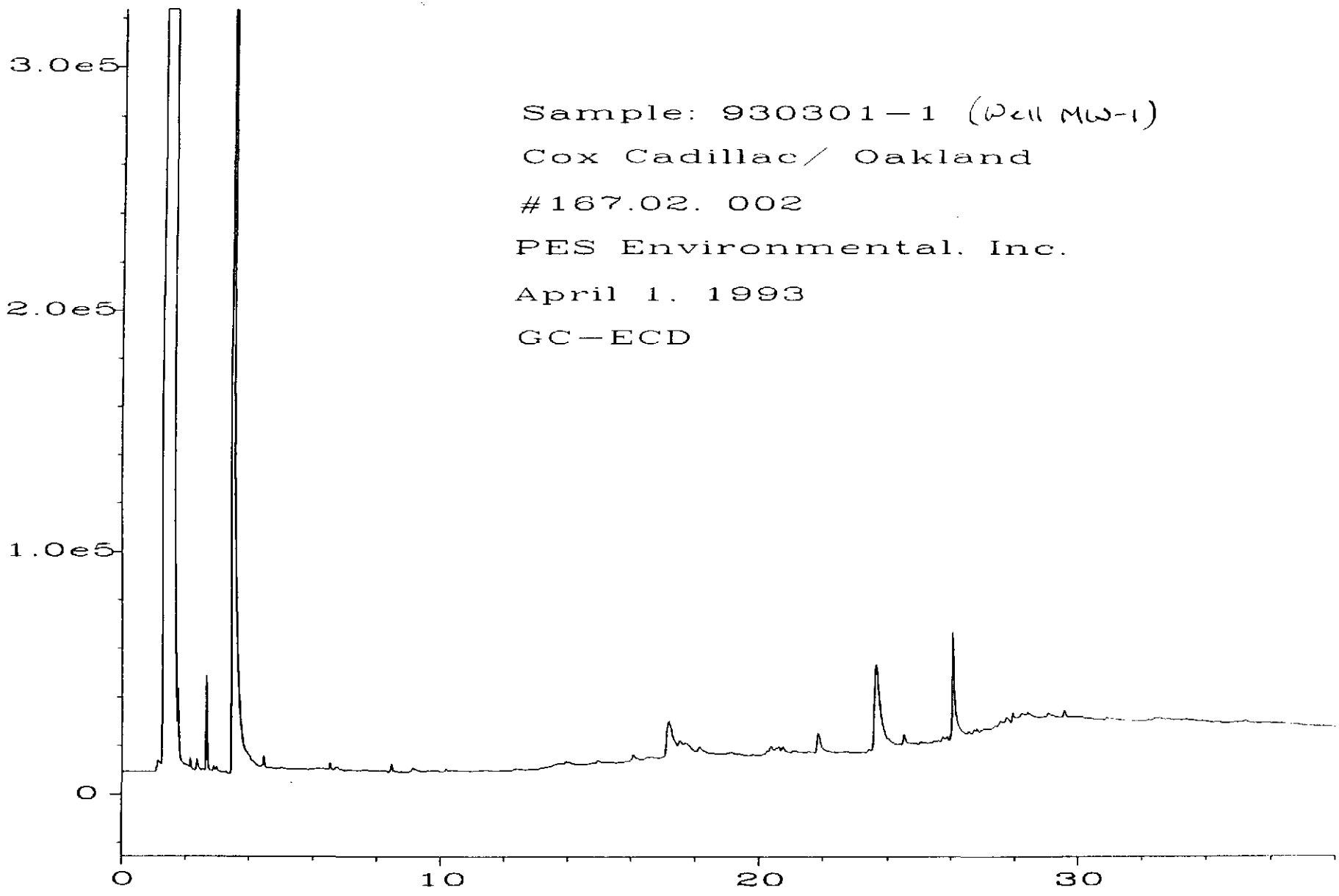
Sample #	GC Characterization
930331-2 (Fuel Tanks)	The gas chromatographic FID trace showed the presence of low boiling compounds, such as those found in gasoline. This characterization is based on the presence of a relatively smooth envelope of peaks present from ca n-C_7 to beyond n-C_{13} with a maximum near n-C_8. Augmented levels of benzene, toluene, ethylbenzene and the xylenes were seen which are common to most gasolines. The large peak seen at 26 minutes is pentacosane, a compound added as a QA/QC check. The GC/ECD trace showed an absence of material.



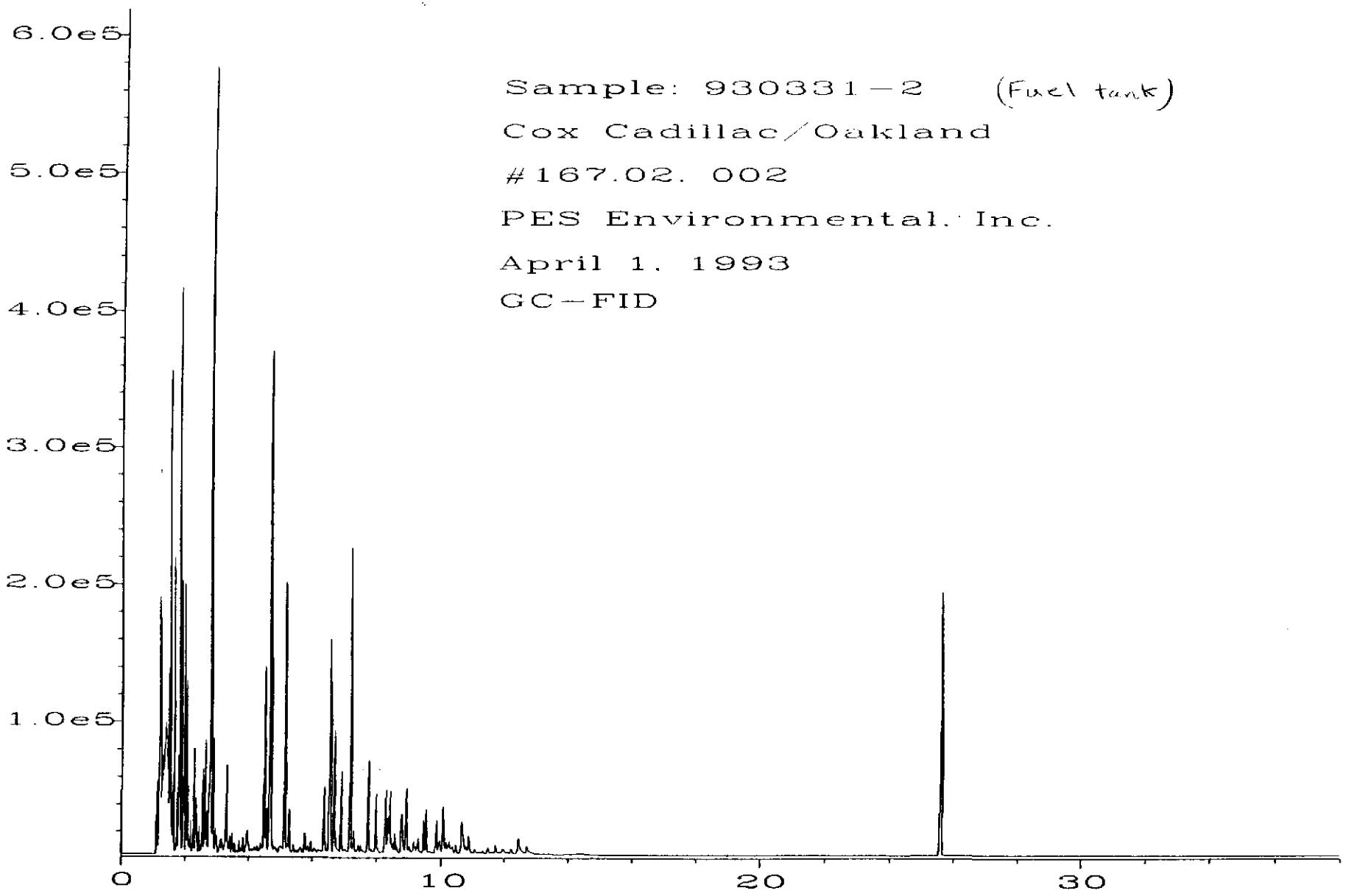
Sig. 1 in C:\HPCHEM\4\DATA\04-01-93.C\023F0701.D



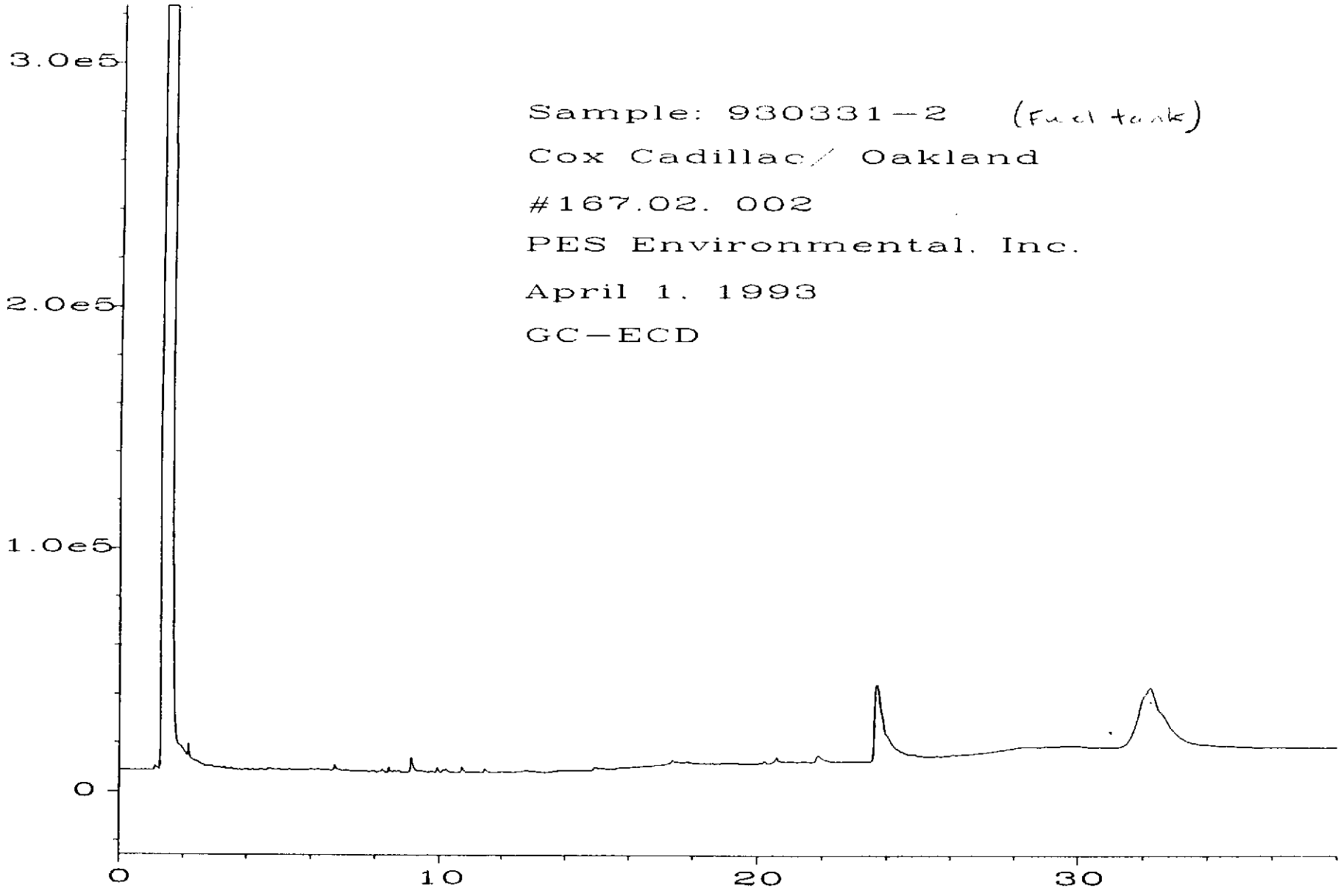
Sig. 1 in C:\HPCHEM\4\DATA\04-01-93.C\023F0701.D



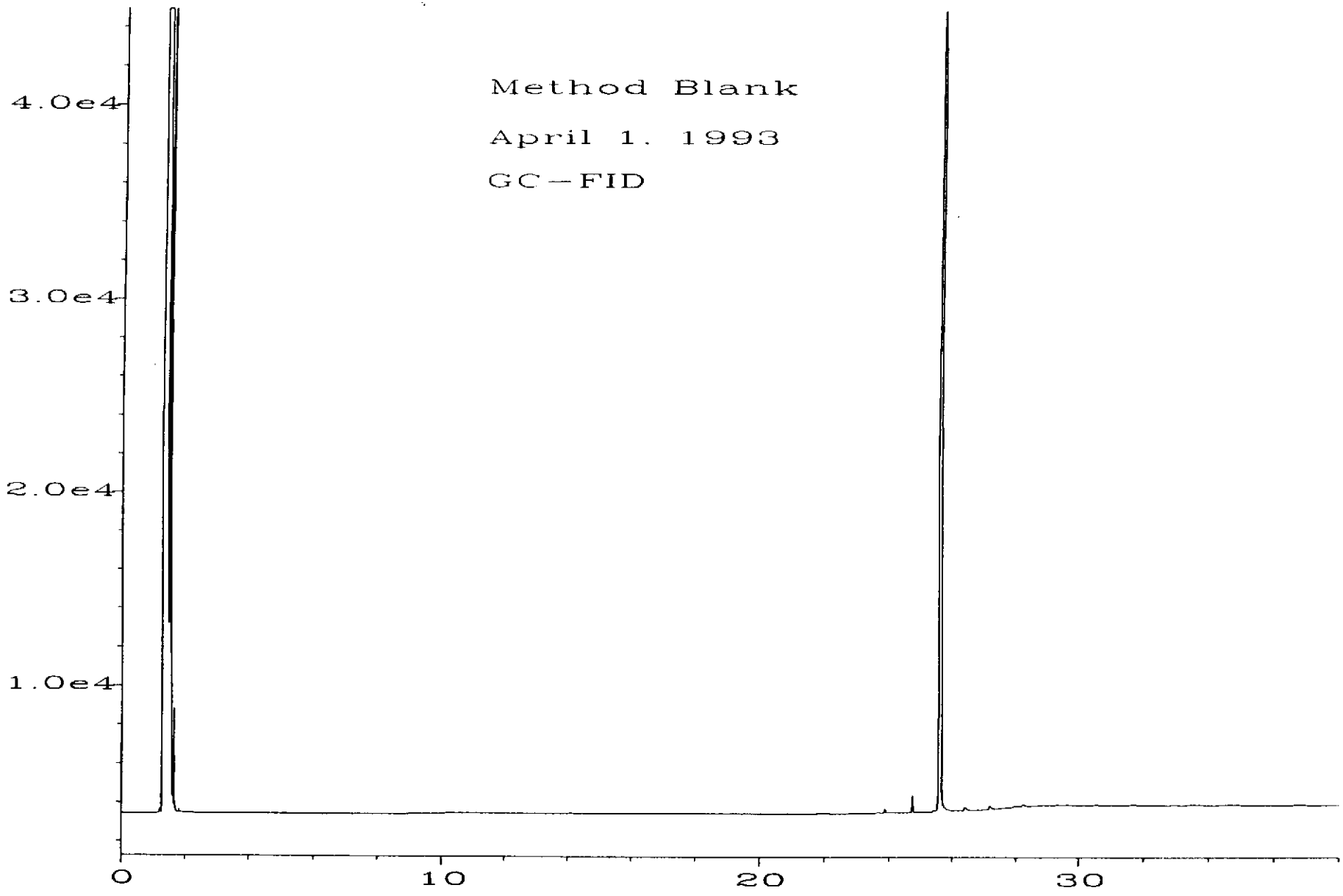
Sig. 2 in C:\HPCHEM\4\DATA\04-01-93.C\023R0701.D



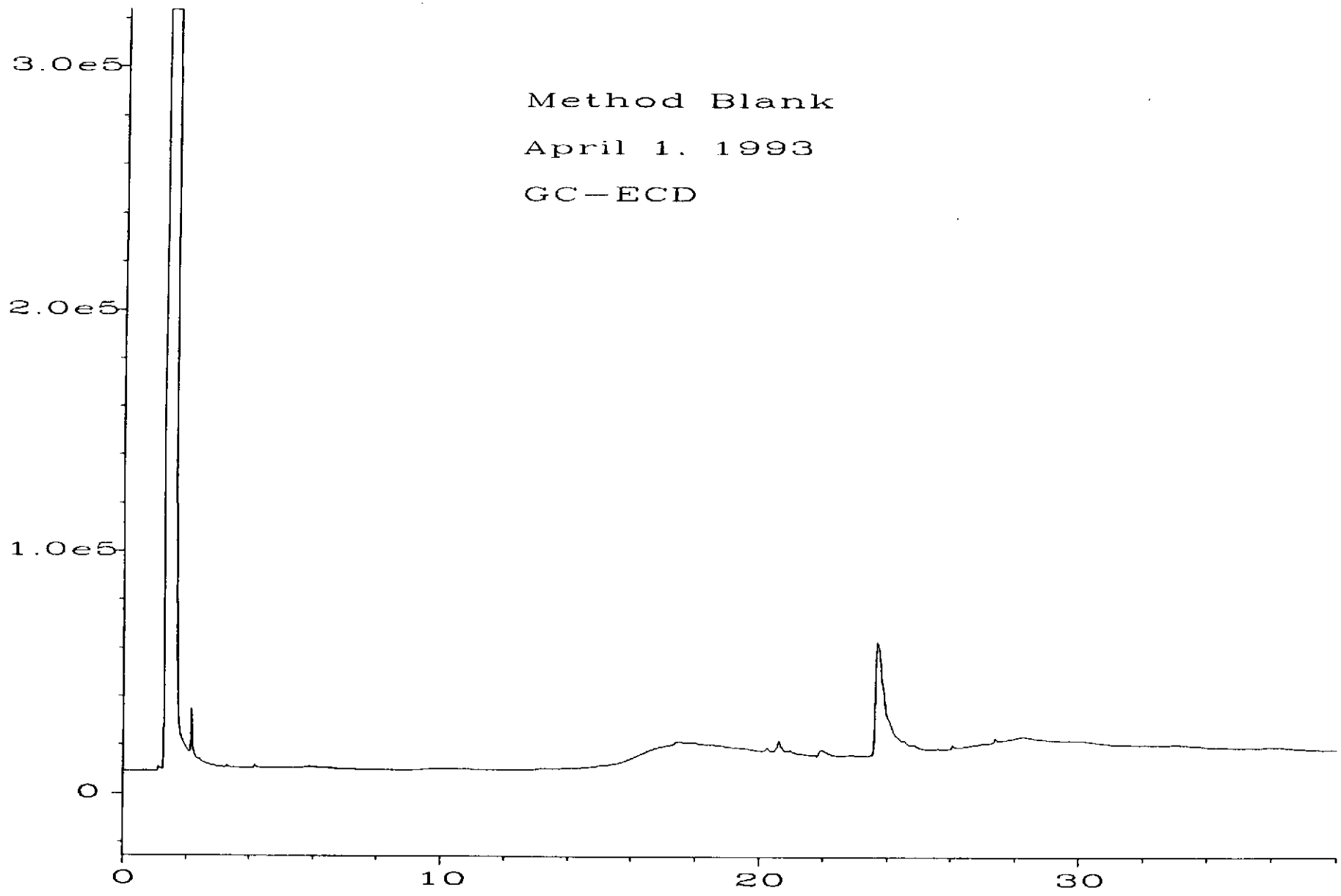
Sig. 1 in C:\HPCHEM\4\DATA\04-01-93.C\022F0701.D



Sig. 2 in C:\HPCHEM\4\DATA\04-01-93.C\022R0701.D



Sig. 1 in C:\HPCHEM\4\DATA\04-01-93.C\021F0701.D



Sig. 2 in C:\HPCHEM\4\DATA\04-01-93.C\021R0701.D

4.APR.A 1 10.45am
4.1.93

PES Environmental, Inc.
Engineering & Environmental Services

CHAIN OF CUSTODY RECORD

1682 Novato Boulevard, Suite 100
Novato, California 94947
(415) 899-1600 FAX (415) 899-1601

JOB NUMBER: 167.03.002
NAME/LOCATION: EXCALIBUR/OAKLAND
PROJECT MANAGER: ROBERT S CREPS

SAMPLERS: D TRUMBLY
RECORDER: (Signature Required)

DATE YR	MO	DY	TIME	SAMPLE NUMBER OR LAB NUMBER YR	WK	SEQ	SOURCE CODE	MATRIX Fuel	Water	Sedim't	Soil	Oil	# CONTAINERS & PRESERV. Unpres.	H_2SO_4	HNO_3	Filtered	Ice	DEPTH IN FEET	COL MTD CD	QA CODE
92	03	31	1220	93	03	31-1 *			X				X				X	3894748		
92	03	31	1320	93	03	31-2		X					X				X	3897950		
92	03	01	1100	93	03	01-1			X				X				X	38951		

* Sample 930331-1 seal broke during shipping (1 of 3)

ANALYSIS REQUESTED	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pollutant Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.
					M	M	1000 ES

NOTES	CHAIN OF CUSTODY RECORD			
PRODUCT SAMPLES FOR FUEL FINGERPRINT CALL ANDREW FREEER, PES ENVIRONMENTAL ON RECEIPT OF SAMPLES. (415) 899-1600 TO DISCUSS ANALYTICAL PROGRAM	RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature) Virginia Wagner	DATE 4/1/93	TIME 1045
	RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE	TIME
	RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE	TIME
	RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE	TIME
	DISPATCHED BY: (Signature)	DATE / TIME	RECEIVED FOR LAB BY: (Signature)	DATE / TIME

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3008-B 16th Avenue West
Seattle, WA 98119
FAX: (206) 283-5044

April 7, 1993

Andrew Briefer, Project Leader
PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94948

Dear Mr. Briefer:

Enclosed are the results from the testing of material submitted on April 1, 1993 from Project 167.02 002, Cox Cadillac/Oakland.

The GSVL data indicates that sample 930301-1 came from a different gasoline than 930331-2.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

Kathy McMullen

Kathy McMullen
Chemist

KMC/dp

Enclosures

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: April 7, 1993
Date Received: April 1, 1993
Project: 167.02 002, Cox Cadillac/Oakland

RESULTS OF ANALYSIS OF GASOLINE COMPARISON BY INDIVIDUAL COMPONENTS (GC-FID)

(Relative Abundance as Ratio of Peak Height to Peak A)

Sample ID	Peak A	B	C	D
930331-2	1.0	1.05	1.28	1.21
930301-1	1.0	1.03	0.14	0.12
Quality Assurance				
Blank	1.0	0	0	0

PES Environmental, Inc.
Engineering & Environmental Services

CHAIN OF CUSTODY RECORD

1682 Novato Boulevard, Suite 100
Novato, California 94947
(415) 899-1600 FAX (415) 899-1601

SAMPLERS: D. TRUMBLY

JOB NUMBER: 167.02 002

NAME/LOCATION: COX CADILLAC/OAKLAND

PROJECT MANAGER: ROBERT S. CEEPS

RECORDER: (Signature Required)

DATE YR	MO	DY	TIME	SAMPLE NUMBER OR LAB NUMBER YR	WK	SEQ	SOURCE CODE	MATRIX Fuel	Water	Sedim't	Soil	Oil	# CONTAINERS & PRESERV. Unpres.	H_2SO_4	HNO_3	Filtered	4°C	DEPTH IN FEET	COL MTD CD	QA CODE
9 3 0 3 3 1	1 2 2 0			9 3 0 3 3 1	- 1 *			X				X				X	38947.48		
9 3 0 3 3 1	1 3 2 0			9 3 0 3 3 1	- 2		X					X				X	38949.50		
7 3 0 3 0 1	1 1 5 0			9 3 0 3 0 1	- 1			X				X				X	38951		

* Sample 930331-1 seal broke during shipping (1 of 3)

GIA 4.1.93

Jane Tribble GIA 4.1.93

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pollutant Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.

SEE NOTES

Run 38951 KMK 4.2.93

Copy Andrew Brief

NOTES

PRODUCT SAMPLES FOR FUEL FINGERPRINT.
CALL ANDREW BRIEFER, PES ENVIRONMENTAL ON RECEIPT OF SAMPLES. (415) 899-1600 TO DISCUSS ANALYTICAL PROGRAM
DO HC ID's on Water samples (the prod. fraction) & Match against Product. If no prod to anlyz, call Andy. KMK
Jane says run 38951 only and if we find 4.1.93
Run 38949 (product) GIA 4.1.93

recoveries were
calibration results
matrix effect

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature) Angela Lloyd	DATE 4.1.93	TIME 10:45a.
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
DISPATCHED BY: (Signature)	DATE	TIME	RECEIVED FOR LAB BY: (Signature)	DATE	TIME

METHOD OF SHIPMENT:

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3008-B 16th Avenue West
Seattle, WA 98119
FAX: (206) 283-5044

April 9, 1993

Mr. Robert S. Creps
PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94948

Dear Mr. Creps:

(Well MW-1) Regarding your project Cox Cadillac/Oakland, project 167.02.002, we ran sample 930301-1 on our GSVL analysis and determined it contains a peak eluting within the retention time of ethylene dibromide but no peak within a retention time for tetrachloroethylene.

We appreciate this opportunity to be of service to you and hope you will call should you have any questions.

Sincerely,

Kathy McMullen

Kathy McMullen
Chemist

KMC/dp

4.1.93 10:45am

Engineering & Environmental Services

CHAIN OF CUSTODY RECORD

1682 Novato Boulevard, Suite 100
Novato, California 94947
(415) 899-1600 FAX (415) 899-1601

JOB NUMBER: 167.02 002

NAME/LOCATION: Cox Cadillac/Oakland

PROJECT MANAGER: Robert S. Creps

SAMPLERS: D. Trumbly

RECORDER: (Signature Required)

DATE				SAMPLE NUMBER OR LAB NUMBER			SOURCE CODE	MATRIX					# CONTAINERS & PRESERV.					DEPTH IN FEET	COL MTD CD	QA CODE
YR	MO	DY	TIME	YR	WK	SEQ		Fuel	Water	Sediment	Soil	Oil	Unpres.	H_2SO_4	HNO_3	Filtered	1-L			
9	3	0	3 3 1 1 2 2 0	9	3	0 3 3 1 - 1 *			X				X				X	38947.48		
9	3	0	3 3 1 1 3 2 0	9	3	0 3 3 1 - 2		X					X				X	38949.50		
9	3	0	3 0 1 1 1 5 0	9	3	0 3 0 1 - 1			X				X				X	(38951)		

* Sample 930331-1 seal broke during shipping (1 of 3)

Told Rob GSK data used to QA if EDB or PCE was present KMC 4.1.93

CIA KMC 4.1.93

Sam Varoda KMC 4.1.93

Check to see if 930301-V contains EDB or PCE per Mr. Creps KMC 4.8.93

ANALYSIS REQUESTED

- EPA 601/8010
- EPA 602/8020
- EPA 624/8240
- EPA 625/8270
- Priority Pollutant Metals
- Benzene/Toluene/Xylene
- Total Petrol. Hydrocarb.

Use Notes

Run GSK KMC 4.2.93

Run GSK per Andrew Brigh.

NOTES

Product Samples For Fuel Fingerprint
Call Andrew Brieger, PES Environmental
on Receipt of Samples. (415) 899-1600
To Discuss Analytical Program
(the prod. fraction)
Do HCID's on Water samples. Match against
product. If no prod to analyze, call Andy.
KMC
Andy says run 38951 only and if we find 4.1.93
it, run 38949 (product) KMC 4.1.93

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature) Angela Lloyd	DATE 4.1.93	TIME 10:45 a.
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
DISPATCHED BY: (Signature)	DATE	TIME	RECEIVED FOR LAB BY: (Signature)	DATE	TIME
METHOD OF SHIPMENT:					

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

APPENDIX D

ANALYTICAL REPORTS FOR OCTOBER 1993 INVESTIGATION

COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

Lab Number : JJ-2054-4
Project : Cox Cadillac

CLIENT: Andy Briefer
PES Environmental Inc
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Analyzed : 10/20/93
Analyzed by: ON
Method : As Listed

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
MW1	Aqueous	Paul Lohman	10/13/93	10/13/93

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		50.	6100.	
Toluene		50.	4800.	
Ethylbenzene		50.	4000.	
Xylenes		50.	11000.	
1,2-Dichloroethane		50.	350.	
Ethylene dibromide		50.	80.	
Total Petroleum Hydrocarbons (Gasoline)		5000.	74000.	
Total Petroleum Hydrocarbons (Diesel 2)		5000.	ND	
Percent Surrogate Recovery			87.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AS96A
MC/et/mcc/on
MSD1-1020

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

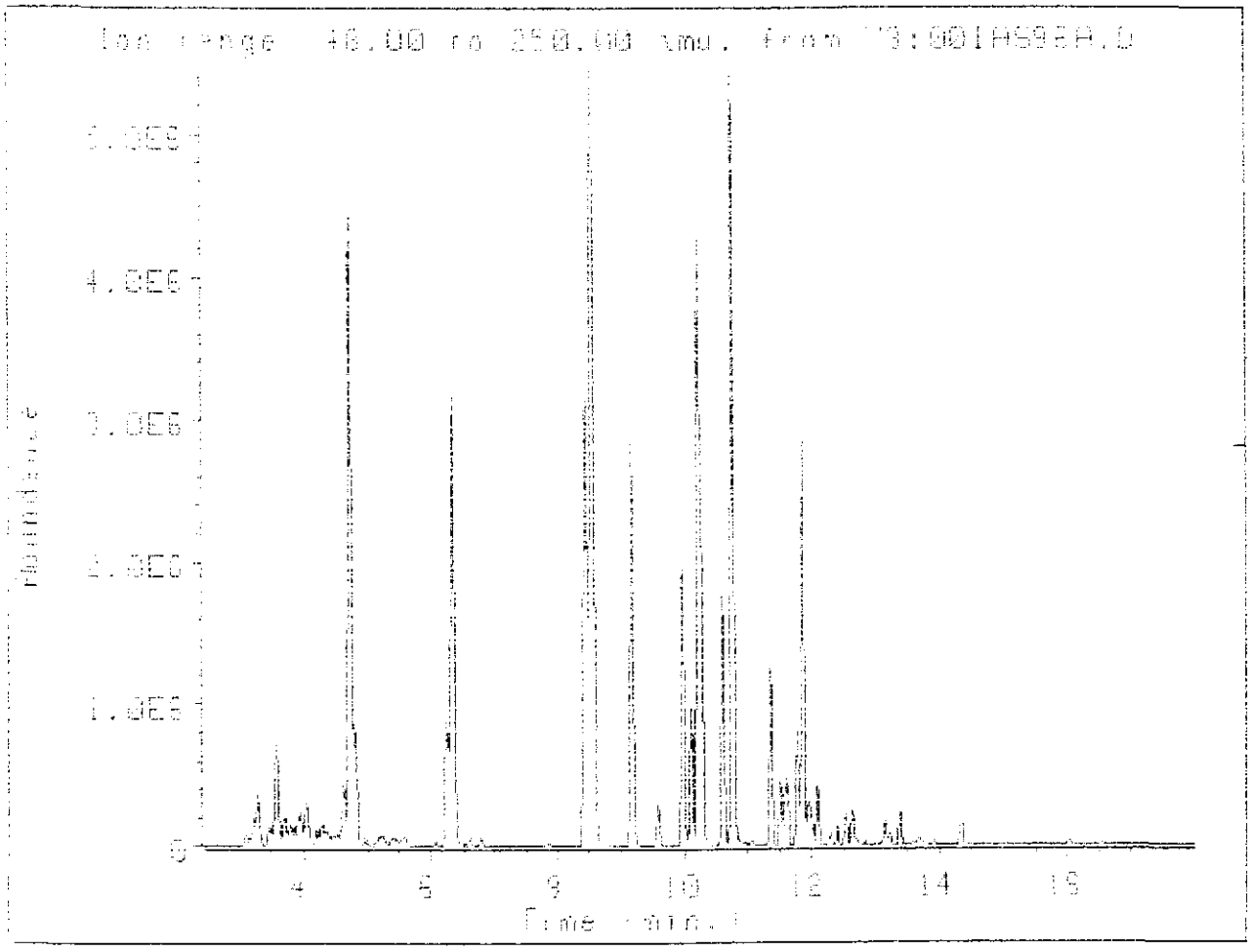
Marissa Coronel
Laboratory Director

Data file: D:001HS96A.D
File type: GC / MS DATA FILE

Name info: 93C054-4 MW-1
Misc info: HLS#11
Operator : DN 10.20.93

Date : 20 Oct 93 3:04 am
Instrment: MS_5970
Inlet : GC

Sequence index : 19
Als bottle num : 96
Replicate num : 1



COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA • Goleta, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

CLIENT: Andy Briefer
PES Environmental Inc
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Lab Number : JJ-2054-1
Project : Cox Cadillac

Analyzed : 10/20/93
Analyzed by: ON
Method : As Listed

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
TW1	Aqueous	Paul Lohman	10/13/93	10/13/93

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		0.5	ND	
Toluene		0.5	ND	
Ethylbenzene		0.5	ND	
Xylenes		0.5	ND	
1,2-Dichloroethane		0.5	ND	
Ethylene dibromide		0.5	ND	
Total Petroleum Hydrocarbons (Gasoline)		50.	ND	
Total Petroleum Hydrocarbons (Diesel 2)		50.	ND	
Percent Surrogate Recovery			86.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AS89A
MC/et/mcc/on
MSD1-1020

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

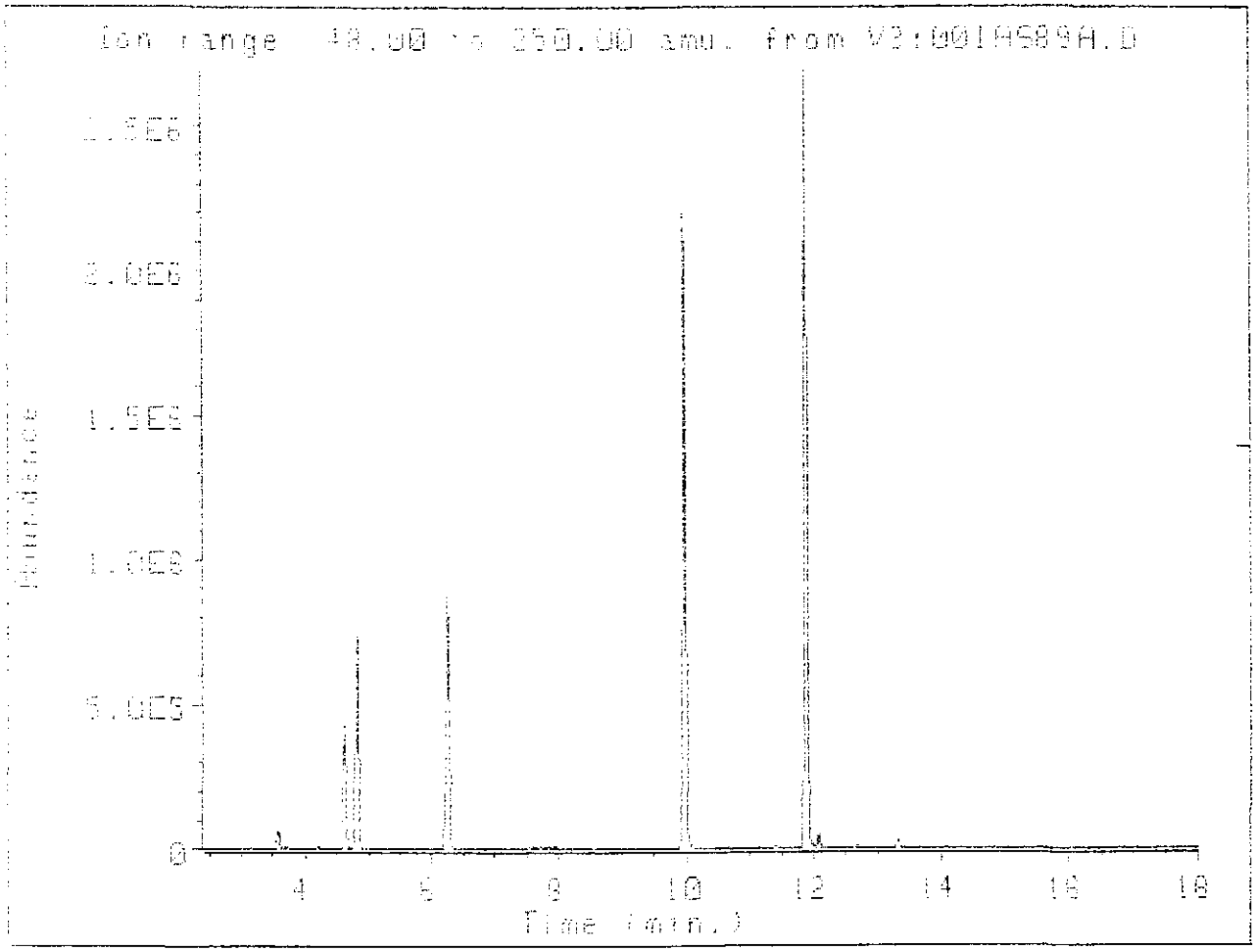
Marissa Coronel
Laboratory Director

Data File: V3:001AS89A.D
File type: GC / MS DATA FILE

Name Info: JJ2054-1 TW-1
Misc Info: ALS#4 0ML
Operator : DN 10.28.93

Date : 19 Oct 93 11:25 pm
Instrment: MS_5870
Inlet : GC

Sequence index : 13
Als bottle num : 59
Replicate num : 1



COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

CLIENT: Andy Briefer
PES Environmental Inc
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Lab Number : JJ-2054-2
Project : Cox Cadillac

Analyzed : 10/20/93
Analyzed by: ON
Method : As Listed

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
TW2	Aqueous	Paul Lohman	10/13/93	10/13/93

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		0.5	ND	
Toluene		0.5	ND	
Ethylbenzene		0.5	ND	
Xylenes		0.5	ND	
1,2-Dichloroethane		0.5	ND	
Ethylene dibromide		0.5	ND	
Total Petroleum Hydrocarbons (Gasoline)		50.	ND	
Total Petroleum Hydrocarbons (Diesel 2)		50.	ND	
Percent Surrogate Recovery			85.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AS94A
MC/et/mcc/on
MSD1-1020

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

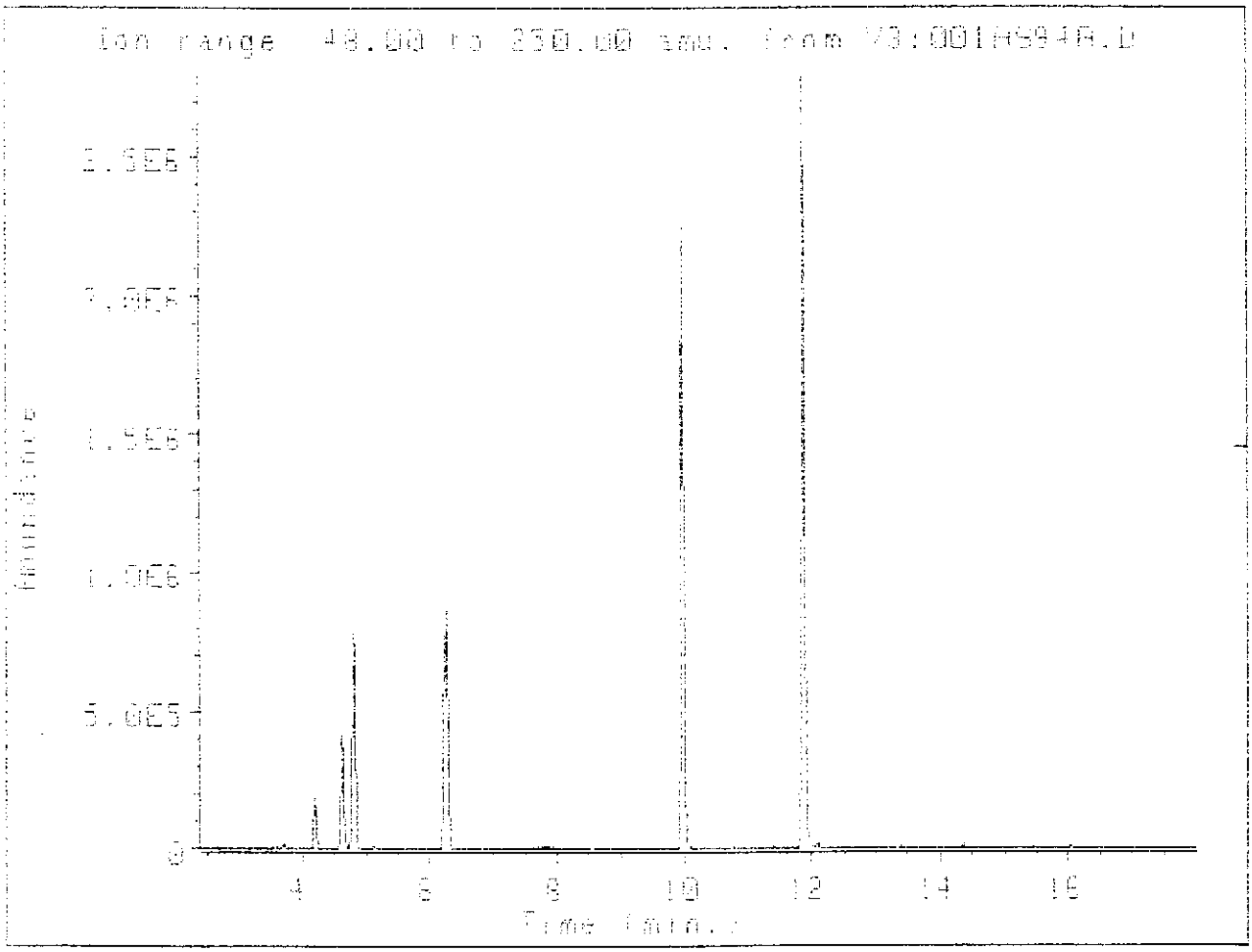
Marissa Coronel
Laboratory Director

Data File: V5:001A894A.D
File Type: GC / MS DATA FILE

Name Info: JJ2054-2 **TW-2**
Misc Info: HLS#9
Operator : DN 10.20.95

Date : 20 Oct 95 2:14 am
Instrment: MS_5970
Inlet : GC

Sequence Index : 19
Hls bottle num : 34
Replicate num : 1



COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

Lab Number : JJ-2054-3
Project : Cox Cadillac

CLIENT: Andy Briefer
PES Environmental Inc
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Analyzed : 10/20/93
Analyzed by: ON
Method : As Listed

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
TW3	Aqueous	Paul Lohman	10/13/93	10/13/93

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		0.5	ND	
Toluene		0.5	ND	
Ethylbenzene		0.5	ND	
Xylenes		0.5	ND	
1,2-Dichloroethane		0.5	ND	
Ethylene dibromide		0.5	ND	
Total Petroleum Hydrocarbons (Gasoline)		50.	ND	
Total Petroleum Hydrocarbons (Diesel 2)		50.	ND	
Percent Surrogate Recovery			73.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AS95A
MC/et/mcc/on
MSD1-1020

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

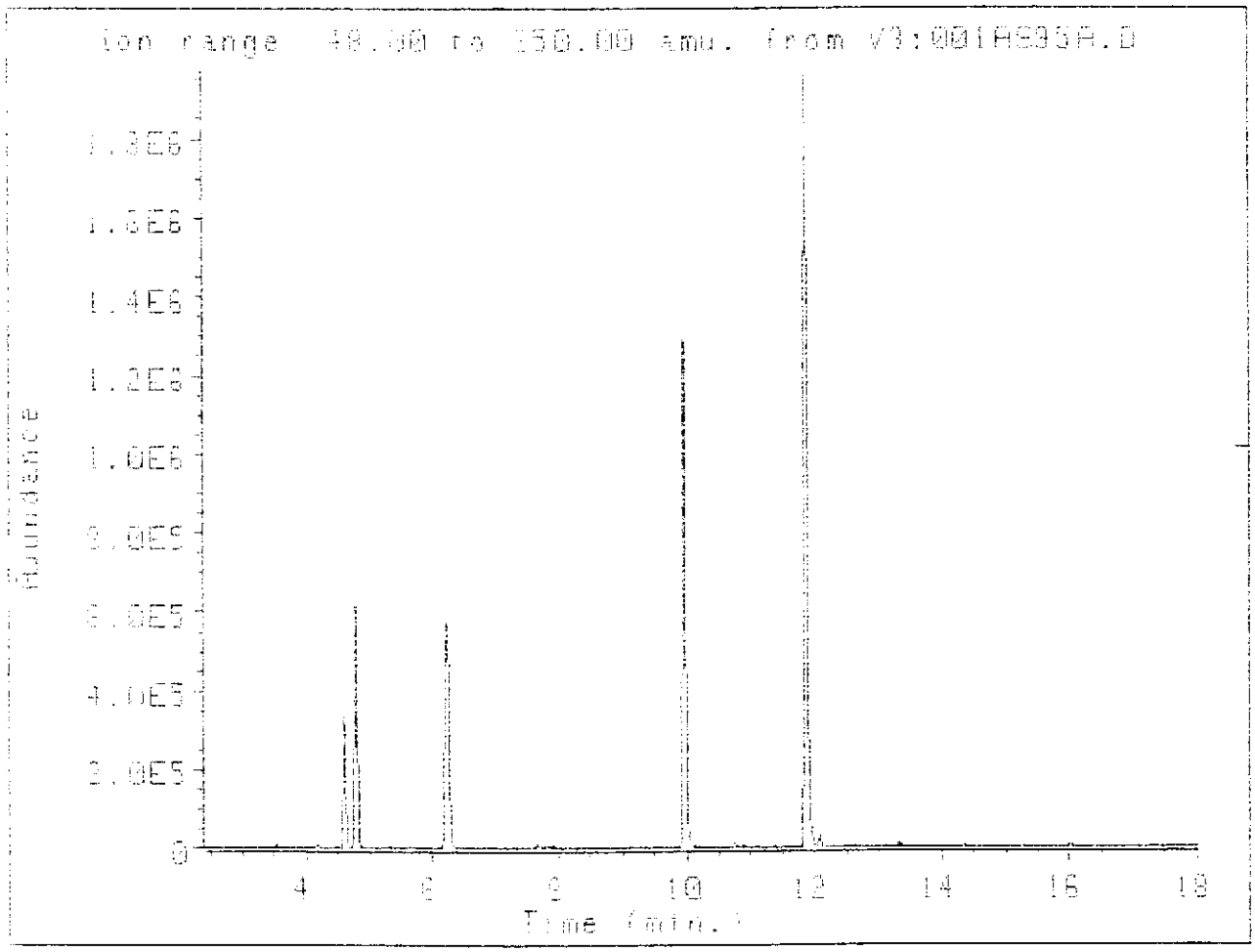
Marissa Coronel
Laboratory Director

Data file: V3:001A695A.D
File type: GC / MS DATA FILE

Name Info: JJ2054-3 TW-3
Misc Info: ALS#10
Operator : ON 10.20.93

Date : 20 Oct 93 2:39 am
Instrment: MS_5970
Inlet : GC

Sequence index : 19
Als bottle num : 35
Replicate num : 1



COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

CLIENT: Andy Briefer
PES Environmental Inc
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Lab Number : JJ-2054-6
Project : Cox Cadillac

Analyzed : 10/20/93
Analyzed by: ON
Method : As Listed

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
TW4	Aqueous	Paul Lohman	10/13/93	10/13/93

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		5.	65.	
Toluene		5.	18.	
Ethylbenzene		5.	49.	
Xylenes		5.	33.	
1,2-Dichloroethane		5.	ND	
Ethylene dibromide		5.	ND	
Total Petroleum Hydrocarbons (Gasoline)		500.	2000.	
Total Petroleum Hydrocarbons (Diesel 2)		500.	ND	
Percent Surrogate Recovery			88.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AS98A
MC/et/mcc/on
MSD1-1020

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

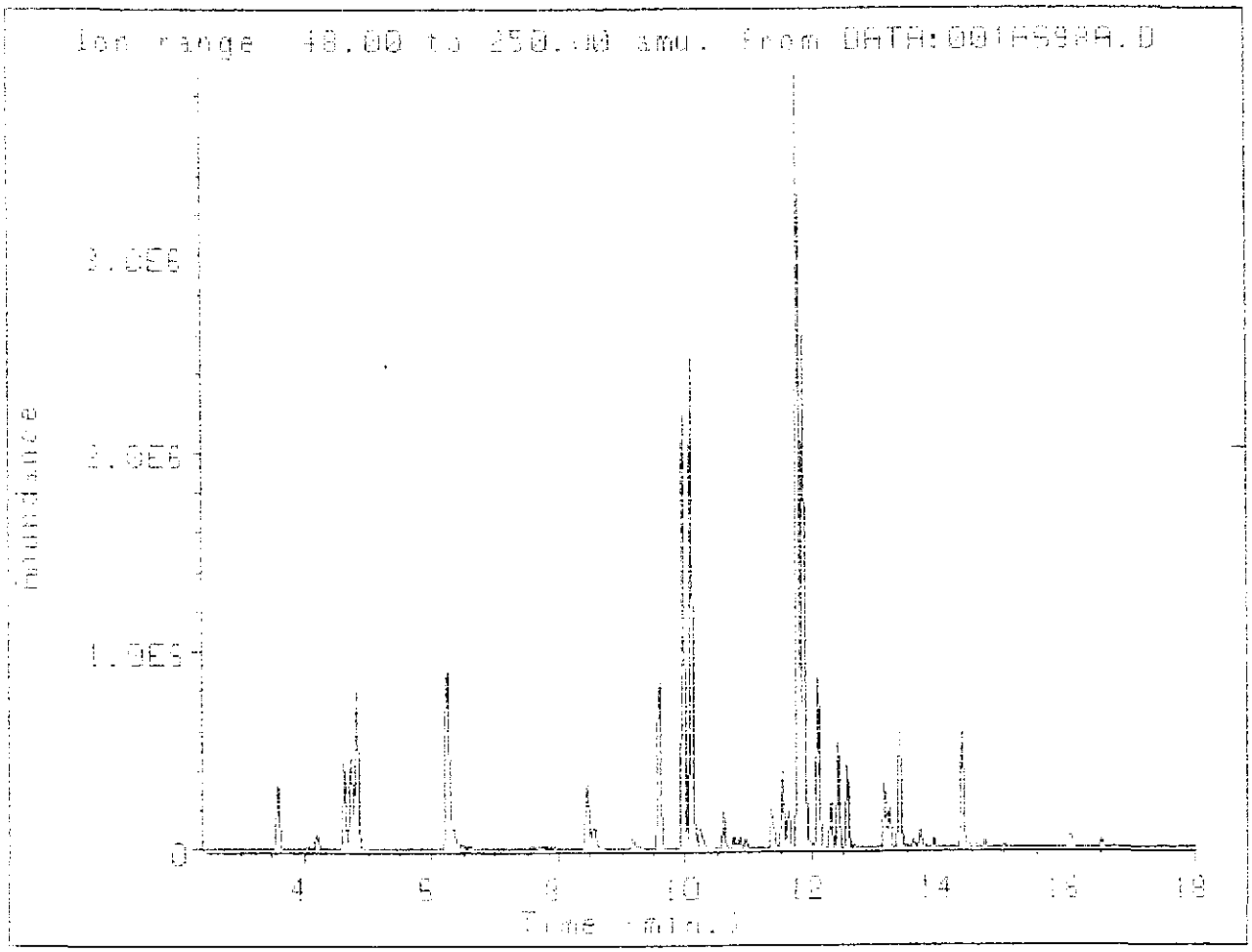
Marissa Coronel
Laboratory Director

Data File: DATA:001A3389.D
File type: GC / MS DATA FILE

Name Info: JJ2054-6 TW-4
Misc Info: ALS#13
Operator : DN 10.20.93

Date : 20 Oct 93 3:54 am
Instrment: MS_5970
Inlet : GC

Sequence index : 19
Als bottle num : 38
Replicate num : 1



COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

CLIENT: Andy Briefer
PES Environmental Inc
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Lab Number : JJ-2054-5
Project : Cox Cadillac

Analyzed : 10/22/93
Analyzed by: ON
Method : As Listed

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
TW5	Aqueous	Paul Lohman	10/13/93	10/13/93

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		100.	20000.	
Toluene		100.	25000.	
Ethylbenzene		100.	3800.	
Xylenes		100.	23000.	
1,2-Dichloroethane		100.	ND	
Ethylene dibromide		100.	ND	
Total Petroleum Hydrocarbons (Gasoline)		10000.	140000.	
Total Petroleum Hydrocarbons (Diesel 2)		10000.	ND	
Percent Surrogate Recovery			84.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AT25A/S97A
MC/et/mcc/on
MSD1-1020

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

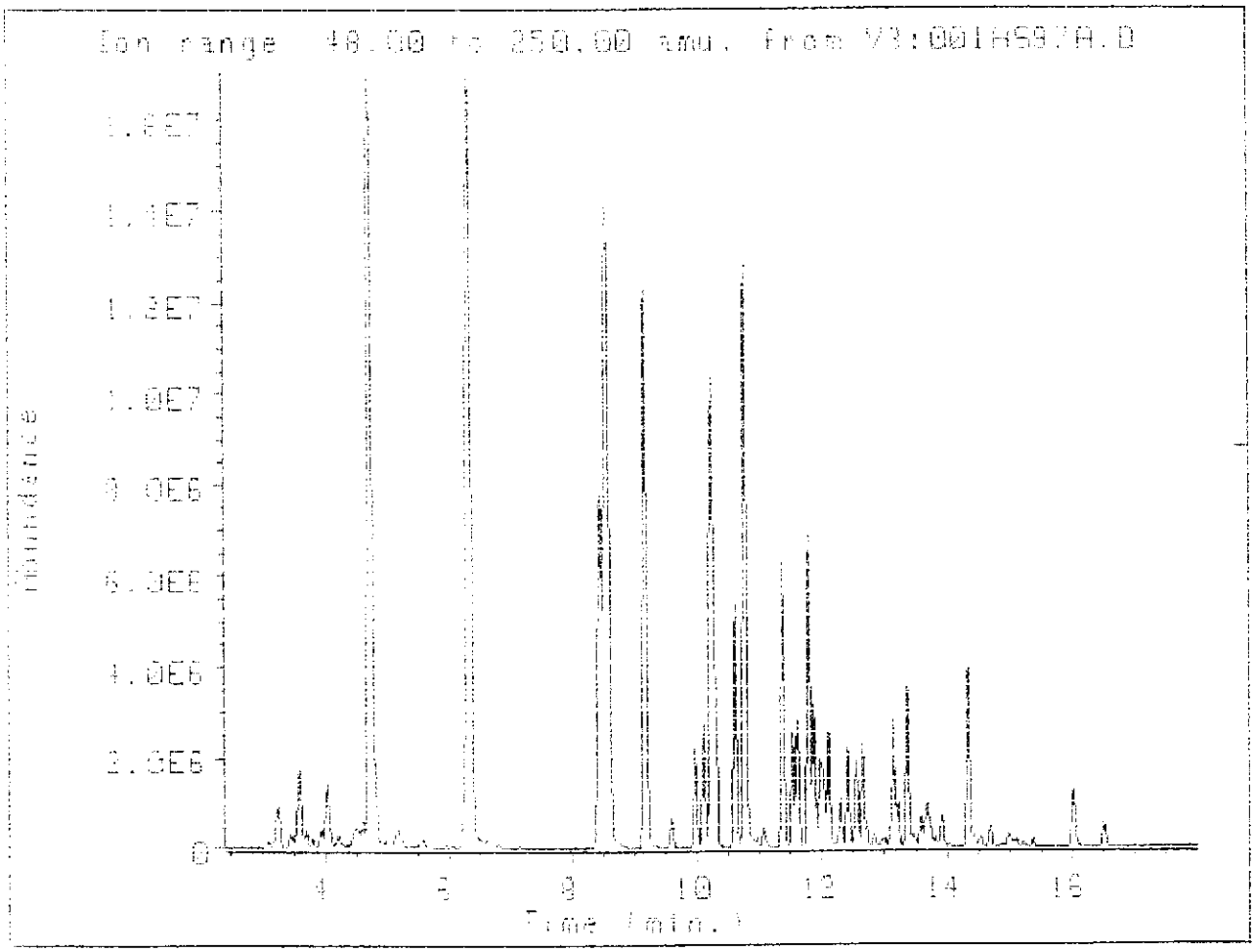
Marissa Coronel
Laboratory Director

Data file: V3:001A5876.D
File type: GC / MS DATA FILE

Name Info: JJ2054-9 TW-5
Misc Info: ALS#12
Operator : ON 10.20.93

Date : 20 Oct 93 3:03 am
Instrment: MS_5970
Inlet : GC

Sequence index : 18
Als bottle num : 37
Replicate num : 1



COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

QC Batch ID: MSD1-1020

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 10/20/93
Analyzed by: ON
Method : As Listed

METHOD BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
METHOD BLANK	Aqueous			

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		0.5	ND	
Toluene		0.5	ND	
Ethylbenzene		0.5	ND	
Xylenes		0.5	ND	
1,2-Dichloroethane		0.5	ND	
Ethylene dibromide		0.5	ND	
Total Petroleum Hydrocarbons (Gasoline)		50.	ND	
Total Petroleum Hydrocarbons (Diesel 2)		50.	ND	
Percent Surrogate Recovery			83.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AS87A
MC/et/mcc/on
JJ2054-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Marissa Coronel
Laboratory Director

COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

QC Batch ID: MSD1-1020

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 10/20/93
Analyzed by: ON
Method : As Listed

QC MATRIX SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
MATRIX SPIKE	Aqueous			

CONSTITUENT	ORIGINAL RESULT	SPIKE AMOUNT	RESULT µg/L	%REC	NOTE
FUEL FINGERPRINT ANALYSIS					1,2
Benzene	ND	10.	9.9	99.	
Toluene	ND	10.	11.	110.	
Ethylbenzene	ND	10.	11.	110.	
Xylenes	ND	10.	10.	100.	
1,2-Dichloroethane	ND	10.	9.8	98.	
Ethylene dibromide	ND	10.	9.8	98.	
Total Petroleum Hydrocarbons (Gasoline)	ND	250.	300.	120.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AS90A/92A
MC/et/mcc/on
JJ2054-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Marissa Coronel
Laboratory Director

COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

QC Batch ID: MSD1-1020

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 10/20/93
Analyzed by: ON
Method : As Listed

QC MATRIX SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
MATRIX SPIKE DUPLICATE	Aqueous		

CONSTITUENT	ORIGINAL RESULT	SPIKE AMOUNT	RESULT µg/L	%REC	%DIFF	NOTE
FUEL FINGERPRINT ANALYSIS						1,2
Benzene	ND	10.	10.	100.	1.	
Toluene	ND	10.	11.	110.	0.	
Ethylbenzene	ND	10.	10.	100.	9.5	
Xylenes	ND	10.	10.	100.	0.	
1,2-Dichloroethane	ND	10.	10.	100.	2.	
Ethylene dibromide	ND	10.	11.	110.	12.	
Total Petroleum Hydrocarbons (Gasoline)	ND	250.	280.	112.	6.9	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/23/93
MSD1/1AS91A/93A
MC/et/mcc/on
JJ2054-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Marissa Coronel
Laboratory Director

PES Environmental, Inc.
Engineering & Environmental Services

1682 Novato Boulevard, Suite 100
Novato, California 94947
(415) 899-1600 FAX (415) 899-1601

CHAIN OF CUSTODY RECORD

SAMPLERS: PAUL LOHMAN

JOB NUMBER:

NAME/LOCATION: COX CADILLAC

PROJECT MANAGER: ANDY BRIEFER

RECORDER: Paul Roth (Signature Required)

DATE				SAMPLE NUMBER OR LAB NUMBER			SOURCE CODE	MATRIX				# CONTAINERS & PRESERV.					DEPTH IN FEET	COL MTD CD	QA CODE
YR	MO	DY	TIME	YR	WK	SEQ		Water	Sedim't	Soil	Oil	Unpres.	H_2SO_4	HNO_3	Filtered	HCl			
93	10	13	1125	TW	1			X								5	11/2054-1		
			1240	TW	2												-2		
			1320	TW	3												-3		
			1440	TW	4												-4		
			1555	TW	5												-5		
			1640	TW	6												-6		
			1530	TW	7			X								2	-7		

ANALYSIS REQUESTED											
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pollutant Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.		TPH as FF	BTEX 8260	per Andy 10/14 (#3)	
								X	X		
								X	X	HOLD (#3) look for free product and 2nd phase & contact client per Andy 10/14/93.	

NOTES

Regular TAT confirmed per Andy 10/14. (#2)
Vials placed in guard bottles & labs.

CHAIN OF CUSTODY RECORD

		DATE	TIME
RELINQUISHED BY: (Signature) Paul Roth	RECEIVED BY: (Signature) Brad Lerga	10/13	1700
RELINQUISHED BY: (Signature) Brad Lerga	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE	TIME
DISPATCHED BY: (Signature) DATE TIME	RECEIVED FOR LAB BY: (Signature) Allison Abrahams cool, intact	DATE 10/13/93	TIME 1805

METHOD OF SHIPMENT: World Courier

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

CLIENT: Andy Briefer
PES Environmental Inc
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Lab Number : JJ-2066-1
Project : 167.0200.002, Cox Cadillac
Analyzed : 10/22/93
Analyzed by: ON
Method : As Listed

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
TW6	Aqueous	Paul Lohman	10/14/93	10/14/93

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		1.	3800.	
Toluene		1.	1600.	
Ethylbenzene		1.	110.	
Xylenes		1.	540.	
1,2-Dichloroethane		1.	ND	
Ethylene dibromide		1.	ND	
Total Petroleum Hydrocarbons (Gasoline)		100.	4100.	
Percent Surrogate Recovery			83.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/25/93
MSD1/1AT32A/40A
MC/mcc/on
MSD1-1022

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

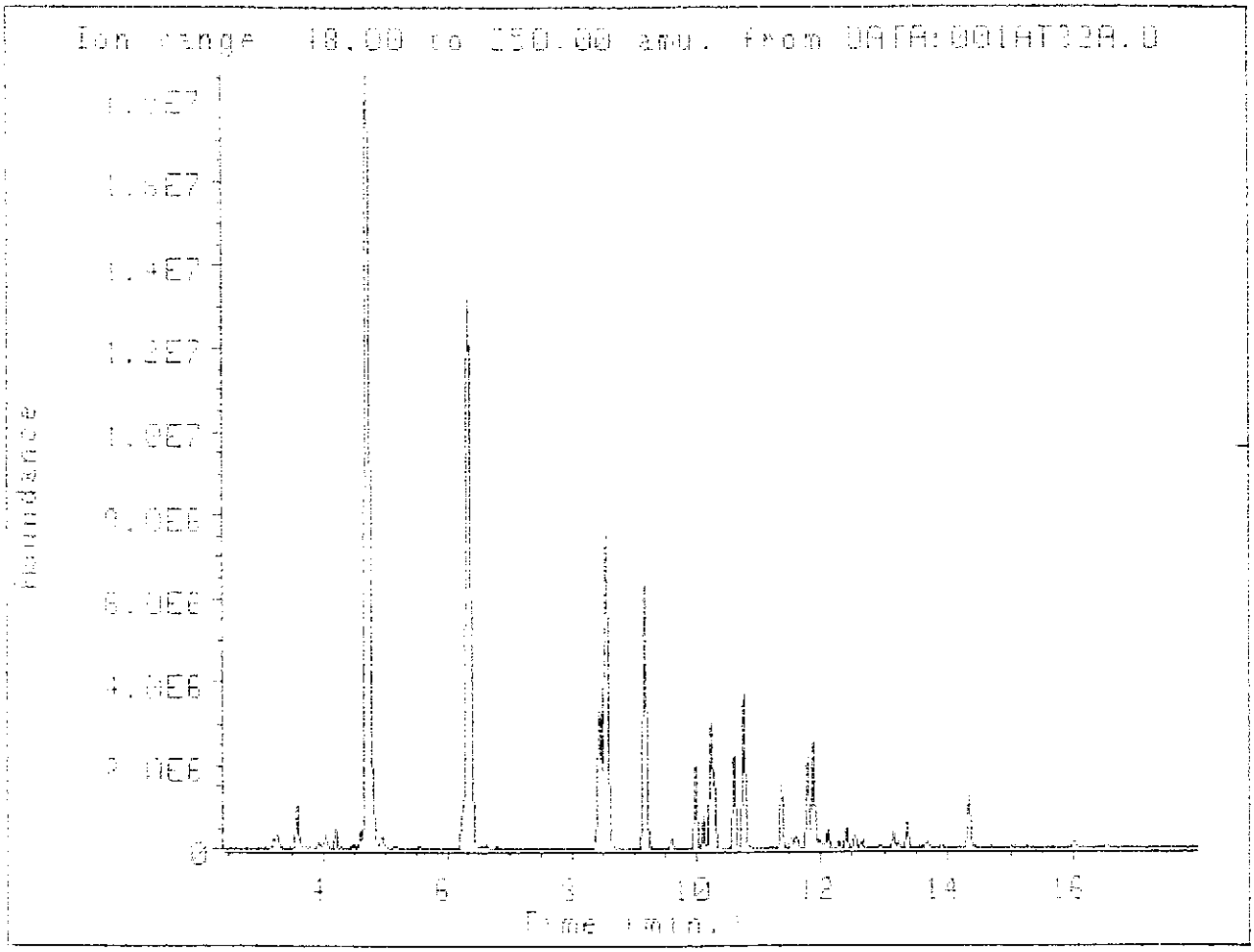
Marissa Coronel
Laboratory Director

Data file: DATA:001AT32A.D
File type: GC / MS DATA FILE

Name Info: JJ2066-1 TW-6
Misc Info: +LS#11 +ML
Operator : ON 10.22.93

Date : 22 Oct 93 3:54 am
Instrment: MS_5970
Inlet : GC

Sequence index : 20
Als bottle num : 32
Replicate num : 1



COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA
Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory) San Jose, CA 95131
2059 Junction Ave. (408) 955-9077

CLIENT: Andy Briefer
PES Environmental Inc
1682 Novato Boulevard, Suite 100
Novato, CA 94947

Lab Number : JJ-2066-2
Project : 167.0200.002, Cox Cadillac
Analyzed : 10/22/93
Analyzed by: ON
Method : As Listed

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
TW7	Aqueous	Paul Lohman	10/14/93	10/14/93

CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE
FUEL FINGERPRINT ANALYSIS				1,2
Benzene		50.	48000.	
Toluene		50.	15000.	
Ethylbenzene		50.	3400.	
Xylenes		50.	16000.	
1,2-Dichloroethane		50.	ND	
Ethylene dibromide		50.	ND	
Total Petroleum Hydrocarbons (Gasoline)		5000.	100000.	
Percent Surrogate Recovery			85.	

San Jose Lab Certifications: CAELAP #1204
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)
(2) ANALYZED by CAL DHS DRAFT TPH, EPA 8260 modified (GC/MS)

10/25/93
MSD1/1AT33A/41A
MC/mcc/on
MSD1-1022

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

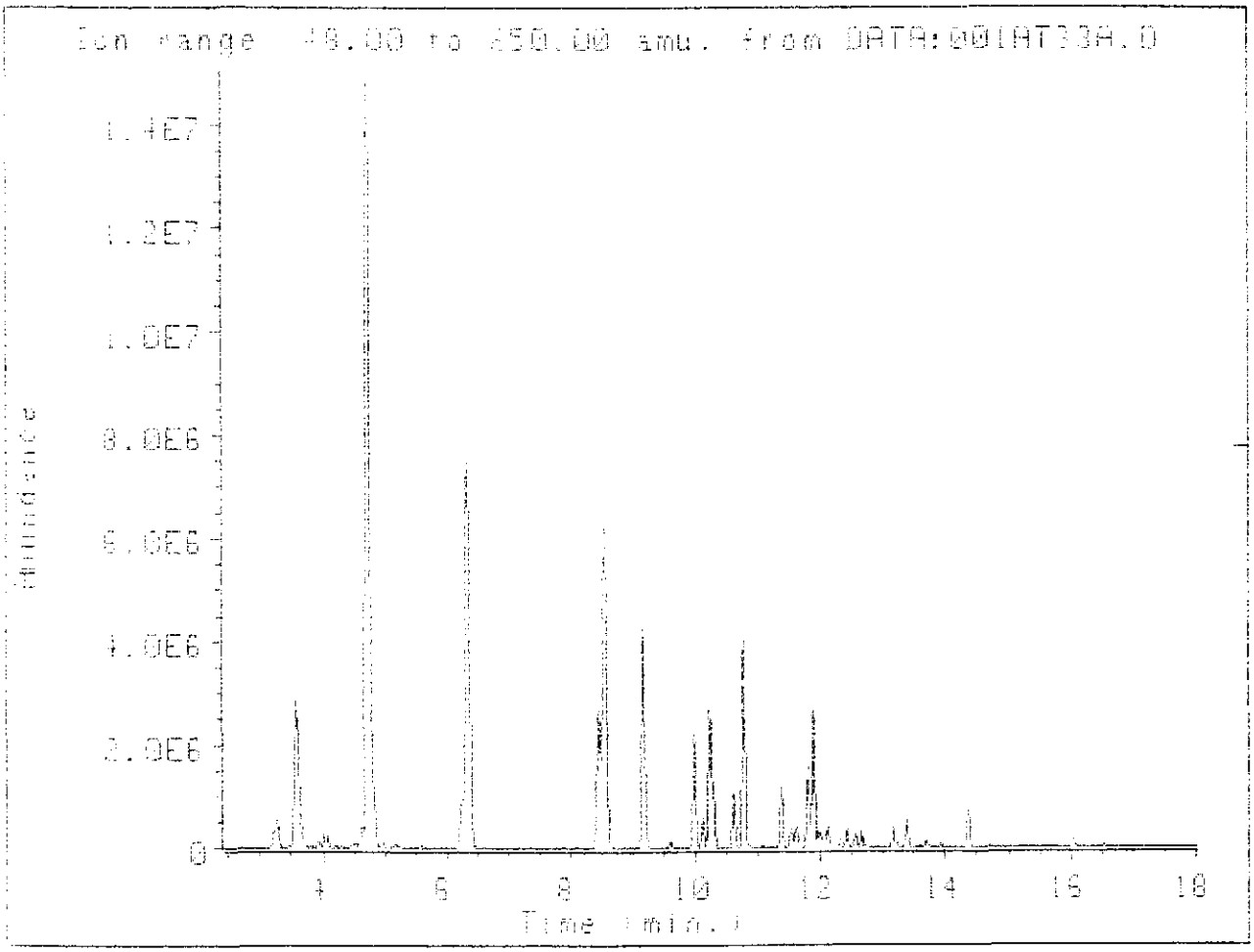
Marissa Coronel
Laboratory Director

Data file: DATA:001AT33A.D
File type: GC / MS DATA FILE

Name Info: JJC066-2 TW-7
Misc Info: ALS#12 130UL
Operator : ON 10.22.93

Date : 22 Oct 93 3:19 am
Instrment: MS_5970
Inlet : GC

Sequence index : 10
Als bottle num : 33
Replicate num : 1



PES Environmental, Inc.
Engineering & Environmental Services

1682 Novato Boulevard, Suite 100
Novato, California 94947
(415) 899-1600 FAX (415) 899-1601

CHAIN OF CUSTODY RECORD

JOB NUMBER: 167.0220.002
NAME/LOCATION: COX CADILLAC
PROJECT MANAGER: ANDY BEETER

SAMPLERS: PAUL LOTHMAN
RECORDER: Paul R Lothman (Signature Required)

DATE				SAMPLE NUMBER OR LAB NUMBER		
YR	MO	DY	TIME	YR	WK	SEQ
93	10	14	1350	T	W6	
93	10	14	1305	T	W7	

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	# CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	Filtered	4/1	DEPTH IN FEET	COL MTD CD	QA CODE
	X								5			12066 - 1
	X								3 (3)			12066 - 2

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/6270	Priority Pollutant Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH GAS 8015 MOD	BTEX 8020	
							X	X	
							X	X	

Andy 10/18/93

NOTES

vials placed in guard bottles @ lab

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Paul R Lothman			RECEIVED BY: (Signature)	DATE 10/14	TIME 1:23
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)			RECEIVED BY: (Signature)	DATE	TIME
DISPATCHED BY: (Signature)	DATE	TIME	RECEIVED FOR LAB BY: (Signature) Alison A Abraham	DATE 10/19/93	TIME 1730

METHOD OF SHIPMENT: VIA HAND COURIER TO CCAS SAN JOSE

cool, intact

Laboratory Copy White | Project Office Copy Yellow | Field or Office Copy Pink

DISTRIBUTION

REPORT
SOIL AND GROUNDWATER INVESTIGATION
BILL COX CADILLAC
230 BAY PLACE
OAKLAND, CALIFORNIA

December 23, 1993

COPY NO. 4

		Copy No.
2 Copies	Mr. Rory Campbell, Esq. Hanson, Bridgett, Marcus, Vlahos & Rudy 333 Market Street, Suite 2300 San Francisco, California 94105-2173	1-2
1 Copy	Mr. Steven Schulman Wells Fargo Bank c/o Mr. Rory Campbell, Esq. Hanson, Bridgett, Marcus, Vlahos & Rudy 333 Market Street, Suite 2300 San Francisco, California 94105-2173	3
1 Copy	Brian Oliva Alameda County Environmental Health Services Hazardous Materials Division 80 Swan Way, Room 200 Oakland, California 94621	4
2 Copies	PES Job Files	5-6