



November 11, 1998

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618.0101.003

Alameda County
Environmental Health Services
Environmental Protection
1131 Harbour Bay Parkway, Suite 250
Alameda, California 94502-6577

Attention: Mr. Barney Chan

**TRANSMITTAL
RESULTS OF ADDITIONAL SOIL AND
GROUNDWATER INVESTIGATION
1009 66TH AVENUE
OAKLAND, CALIFORNIA**

Dear Mr. Chan:

This letter report has been prepared by PES Environmental, Inc. (PES) on behalf of Pacific Electric Motor Company (PEM) to document recent soil sampling and analyses activities at the PEM facility located at 1009 66th Avenue, Oakland, California (Plate 1). Soil and groundwater sampling in the vicinity of a former underground storage tank (UST) at the site was requested by Alameda County Environmental Health Services (ACEHS) in a letter to PEM dated May 13, 1998. PES prepared a work plan, dated July 7, 1998, describing the proposed sampling and analytical methods. ACEHS approved the work plan in a letter dated July 9, 1998. The sampling activities and analytical results are described below.

SAMPLING ACTIVITIES

As requested by ACEHS, the sampling activities included: (1) drilling two soil borings within the backfill of the former UST excavation; (2) drilling and installing one groundwater monitoring well downgradient of the former UST excavation; and (3) collecting soil and groundwater samples at all three drilling locations. Field activities occurred on September 14 and 15, 1998. These activities are described below.

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Permitting and Utility Survey

All soil boring and well installation activities were performed under a drilling permit (Permit Number 98WR386) from Alameda County Public Works Agency. Prior to conducting the subsurface work, PES contracted with Foresite Utility Services of Pleasant Hill, California, to clear the proposed sampling locations. Underground Service Alert was also contacted prior to drilling to request that member organization locate utilities in the vicinity of the work area.

Borehole Drilling

Soil borings SB-1 and SB-2, and monitoring well MW-4 were drilled and constructed at the locations shown on Plate 2, as specified in the approved work plan. The drilling and well installation activities were performed on September 14, 1998, by Gregg Drilling of Martinez, California under the direction of PES. Borings SB-1 and SB-2 were each drilled to 10 feet below ground surface (bgs), and Well MW-4 was drilled to 25 feet bgs.

Soil samples were collected every 5 feet to document subsurface conditions. The soil lithology was logged from cuttings and from samples in accordance with the Unified Soil Classification System (USCS) by a PES geologist under the supervision of a California Registered Geologist. The USCS chart is presented on Plate A-1 and boring logs are shown on Plates A-2 through A-4 (Appendix A). Soil samples were collected by driving a modified California split spoon sampler lined with three 6-inch long stainless steel liners approximately 18 inches into undisturbed soil. The first (lead) liner of each sample was field screened for volatile organic chemicals (VOC) in the sample headspace using a photo ionization detector (PID) and the readings were recorded on the boring logs.

Soil samples were collected from 5 feet bgs from Borings SB-1 and SB-2, and from 5, 10, and 15 feet bgs from Well MW-4 for laboratory chemical analysis. Additionally, grab groundwater samples were collected from Borings SB-1 and SB-2 after drilling to the total depth of the boring. Samples were transported under chain-of-custody protocol to Entech Analytical Labs of Sunnyvale, California, for analysis of: (1) total petroleum hydrocarbons quantified as gasoline (TPH-g) using EPA Test Method 8015 modified; and (2) benzene, toluene, ethyl benzene, and total xylenes (BTEX) and methyl tert-butyl ether (MTBE) using EPA Test Method 8020. After collecting the groundwater samples, the borings were backfilled with neat cement using a tremie pipe to grout the borehole from the bottom to the ground surface.

To avoid cross contamination, drilling and sampling equipment was decontaminated prior to use and between each sampling location. The equipment was cleaned using a combination steam/high pressure wash system. Sampling equipment rinsate and soil cuttings were collected in sealed containers and stored onsite until appropriate disposal arrangements are made.

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Well Installation

The boring for the groundwater monitoring well was drilled to 25 feet bgs using the equipment and methodology described above. The monitoring well was completed by placing well casing through the hollow stem of the augers and, as the augers were removed, backfilling the annular space between the borehole sidewall and well casing with a sand filter pack, bentonite pellet seal, and cement sanitary seal. Casing used for the wells was 2-inch diameter, flush-threaded, 0.020-inch machine slotted PVC screen, and blank PVC casing to the ground surface. The screened interval of the well was selected based on depth to water measurements and the screened intervals of existing onsite wells. A threaded bottom cap was placed at the bottom of the casing. The sand filter pack, consisting of clean graded Monterey #3 sand, was placed from the bottom of the borehole to approximately 1-foot above the top of the well screen. A 1-foot thick bentonite pellet seal was placed above the sand pack and a Portland cement grout was placed above the bentonite pellet seal to the ground surface. The wellhead was completed with a locking water-tight cap within a flush-mounted traffic-rated vault box set in concrete. The well construction details for monitoring well MW-4 are summarized in Table 1 and shown on Plate A-4 (Appendix A).

The well top-of-casing elevation and location were surveyed by Kier & Wright, Civil Engineers and Surveyors, Inc., a California-licensed land surveyor. The elevation was measured relative to existing monitoring wells at the site. Kier & Wright calculated a top of casing elevation for Well MW-4 at 100.32 feet, referenced to site datum. Monitoring well survey data is provided in Appendix B.

Well Development and Sampling

Well MW-4 was developed on September 15, 1998 by Gregg Drilling under the direction of PES. Well development was performed to remove sediment from the casing and filter pack, and to improve the hydraulic connection between the well and the aquifer. Development was performed by purging the well using a submersible centrifugal pump after removing fine sand from the well and sand pack using a stainless steel bailer and surge block. The volume of water purged from the well during development exceeded 10 casing volumes. Development discharge water was monitored for pH, temperature, turbidity, and electrical conductivity during development. Development equipment was cleaned prior to use. Records of the well development are included in Appendix C. Development water was collected in DOT-approved 55-gallon steel drums and stored onsite prior to disposal.

Water-Level Measurements

Water levels in the four onsite groundwater monitoring wells (Wells MW-1 through MW-4) were measured by PES on September 24, 1998 (Table 2). Depth-to-water in the monitoring

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wells was measured from the top-of-casing (TOC) reference benchmark to a precision of 0.01 foot using an electronic water-level indicator/interface probe. Depth-to-water measurements were converted to water-level elevations referenced to mean sea level (MSL) by subtracting the depth to water from the TOC reference elevation. Free product was not observed in any of the monitoring wells.

To prevent cross-contamination between wells, the portion of the water-level indicator that was submerged in the well was cleaned between well measurements using a phosphate-free detergent/deionized water solution and double rinsed with deionized water.

RESULTS

Soil Analytical Results

Laboratory analytical results for soil are summarized in Table 3 and analytical laboratory reports are presented in Appendix C. In the soil samples collected at SB-1 and SB-2 within the backfill of the former UST excavation, only xylenes were detected in the sample from SB-1 at a concentration of 0.012 milligrams per kilogram (mg/kg). TPH-g, BTEX, and MTBE were generally detected in all three samples collected at MW-4. The highest concentrations were observed in the sample collected from 10.5 feet bgs, with the exception of MTBE, which was only detected in the sample collected from 15.5 feet bgs.

Water Analytical Results

Laboratory analytical results for water are summarized in Table 4 and analytical laboratory reports are presented in Appendix C. In the grab groundwater samples collected from SB-1 and SB-2, MTBE was detected at concentrations of 14 and 0.20 milligrams per liter (mg/L), respectively. There were no detectable concentrations of TPHg or BTEX in these samples. In the groundwater sample collected from MW-4, TPHg (170 mg/L); MTBE (26 mg/L); benzene (26 mg/L); toluene (32 mg/L); ethylbenzene (3 mg/L) and total xylenes (18 mg/L) were detected.

Water-Level Elevations

Depth-to-water measurements for October 1998, ranged from 5.83 feet (MW-2) to 6.36 feet (MW-1) below the TOC. Groundwater water-level elevations ranged from 93.97 feet (MW-3) to 94.31 feet (MW-1) referenced to site datum established by ENVIRON in 1997. Depth-to-water measurements and calculated water-level elevations since installation of the monitoring wells in June 1997 and for the current period are presented in Table 2.

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Plate 3 presents water-level elevation contours developed from water levels measured on October 1, 1998. The contoured water-level elevations indicate that groundwater flow is generally to the west. Groundwater flow direction at the site has ranged from southwest to west since June 1997. The groundwater gradient is approximately 0.0004 foot per foot (ft/ft).

DISCUSSION AND RECOMMENDATIONS

Petroleum hydrocarbons were generally not detected in soil and groundwater in the excavation backfill. In soil, only toluene was detected in the sample from SB-1. However, groundwater samples collected from both SB-1 and SB-2 indicated the presence of MTBE. The concentration of MTBE appears to be higher in the western portion of the excavation backfill.

At monitoring well MW-4, petroleum hydrocarbons were detected in soil samples collected at 5, 10.5, and 15.5 feet bgs, and in the groundwater sample from the well. Well MW-4 is located approximately 25 feet west of W.A. Craig¹ sampling point 11-TB, where TPH-g and benzene were detected in soil at concentrations of 2,800 and 18 mg/kg. The presence of these compounds in soil and groundwater at MW-4 indicates that additional petroleum hydrocarbons are present west of the UST excavation. Petroleum hydrocarbon concentrations appear to be decreasing laterally to the west away from the UST excavation. Additionally, because the highest concentrations were detected in the sample collected from 10.5 feet bgs, concentrations appear to decrease with depth.

The high concentrations in the groundwater sample collected from MW-4 may be the result of petroleum hydrocarbons adsorbed to soil particles present in the groundwater sample. During the first two quarterly groundwater monitoring events during the second and third quarters 1997, petroleum hydrocarbon concentrations in Well MW-1 were elevated. These concentrations decreased significantly during the fourth quarter 1997 and first quarter 1998. If the elevated concentrations reported in Well MW-4 are due to suspended sediments in the well, a similar trend of decreasing concentrations may occur at Well MW-4.

Water-level elevations measured in October 1998 indicate an apparent groundwater flow direction to the west. Previous monitoring events have observed groundwater flow ranging from the west to south. Based on this reported variation in groundwater flow direction, monitoring wells MW-2 and MW-3 are properly located to evaluate groundwater conditions downgradient from MW-4 and the former UST excavation.

To evaluate petroleum hydrocarbons in groundwater downgradient of the former UST, PES recommends further groundwater monitoring at the site. Groundwater monitoring activities should consist of water-level measurements and groundwater sampling and analysis for TPH-g,

¹ W.A. Craig, 1997. Excavation and Sampling Report. May 12.

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BTEX, and MTBE. We propose to initially perform these activities on a quarterly basis. After four quarters of monitoring and reporting, we request a review of the data to evaluate reduction in the frequency, or possibly termination, of groundwater monitoring.

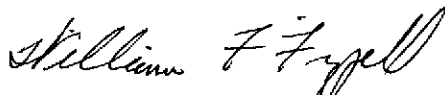
We trust that the information presented in this transmittal fulfills the requirements of ACEHS. We look forward to receiving your comments. If you require any additional information, please do not hesitate to contact either of the undersigned at (415) 899-1600.

Yours very truly,

PES ENVIRONMENTAL, INC.



William W. Mast, R.G.
Associate Engineer



William F. Frizzell, P.E.
Principal Engineer

cc: Mr. Rand Perry, Pacific Electric Motor Company
Mr. Dan Neal, Pacific Electric Motor Company

Attachments:

Table 1	Monitoring Well Completion Details
Table 2	Water-Level Elevation Data
Table 3	Soil Sample Analytical Results
Table 4	Groundwater Sample Analytical Results
Plate 1	Site Location Map
Plate 2	Sampling Location
Plate 3	Water-Level Elevation Map
Appendix A	Boring Logs and Well Completion Details
Appendix B	Surveyor's Report
Appendix C	Well Development and Sampling Records
Appendix D	Laboratory Reports and Chain-of-Custody Records

**Table 1. Monitoring Well Completion Details
Pacific Electric Motor Company
1009 66th Avenue
Oakland, California**

Well Number	Date Installed	Installed By	TOC Elevation (feet*)	Boring Diameter (inches)	Casing Diameter (inches)	Total Depth Boring (feet bgs)	Total Depth of Casing (feet bgs)	Screened Interval Depth (feet bgs)	
								Top	Bottom
MW-1	6/10/97	ENVIRON	101.04	8	2	26.5	25.5	5	25
MW-2	6/10/97	ENVIRON	100.12	8	2	25.5	25.5	5	25
MW-3	6/10/97	ENVIRON	100.23	8	2	25.5	25.5	5	25
MW-4	9/14/98	PES	100.32	8	2	25.0	25.0	15	25

Notes:

* = Site datum.

bgs = Below ground surface.

Reference: ENVIRON, 1997.

PES = PES Environmental, Inc.

**Table 2. Water-Level Elevation Data
Pacific Electric Motor Company
1009 66th Avenue
Oakland, California**

Well Number	Date	Measured By	Top of Casing Elevation (feet above assumed datum)	Depth to Water (feet BTOC)	Water-level Elevation (feet above assumed datum)
MW-1	6/19/97	ENVIRON	100.67	5.87	94.80
	7/1/97	ENVIRON	100.67	5.88	94.79
	9/29/97	PES	100.67	6.45	94.22
	12/16/97	PES	100.67	3.42	97.25
	3/10/98	PES	100.67	3.06	97.61
	10/1/98	PES	100.67	6.36	94.31
MW-2	6/19/97	ENVIRON	99.85	5.30	94.55
	7/1/97	ENVIRON	99.85	5.37	94.48
	9/29/97	PES	99.85	6.05	93.80
	12/16/97	PES	99.85	3.81	96.04
	3/10/98	PES	99.85	2.89	96.96
	10/1/98	PES	99.85	5.83	94.02
MW-3	6/19/97	ENVIRON	99.93	5.50	94.43
	7/1/97	ENVIRON	99.93	5.52	94.41
	9/29/97	PES	99.93	6.16	93.77
	12/16/97	PES	99.93	5.52	94.41
	3/10/98	PES	99.93	3.11	96.82
	10/1/98	PES	99.93	5.96	93.97
MW-4	10/1/98	PES	100.32	6.32	94.00

Notes:

Site datum established by ENVIRON (1997).

BTOC = Below top of casing.

PES = PES Environmental, Inc.

**Table 3. Soil Sample Analytical Results
Pacific Electric Motor Company
1009 66th Avenue
Oakland, California**

Sample Location	Date Sampled	Depth	TPH-g	Benzene	Toluene	EB	Total Xylenes	MTBE
SB-1	9/14/98	5.5	<1.0	<0.005	<0.005	<0.005	0.012	<0.05
SB-2	9/14/98	5.5	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05
MW-4	9/14/98	5	21	0.085	0.28	0.23	1.7	<0.25
		10.5	660	2.8	34	13	70	<0.25
		15.5	3.9	0.77	0.037	0.10	0.31	3.8

@ CW
- SW

Notes:

All results in milligrams per kilogram (mg/kg).

TPH-g = Total petroleum hydrocarbons quantified as gasoline.

EB = Ethyl Benzene

MTBE = Methyl Tertiary Butyl Ether

**Table 4. Groundwater Sample Analytical Results
Pacific Electric Motor Company
1009 66th Avenue
Oakland, California**

Sample Location	Date Sampled	TPH-Gas	Benzene	Toluene	EB	Total Xylenes	MTBE
SB-1	9/14/98	<5.0	<0.50	<0.50	<0.50	<0.50	14
SB-2	9/14/98	<0.50	<0.00050	<0.00050	<0.00050	<0.00050	0.20
MW-4	9/15/98	170	26	32	3	18	26

↑
was 1 to 2 in 1998

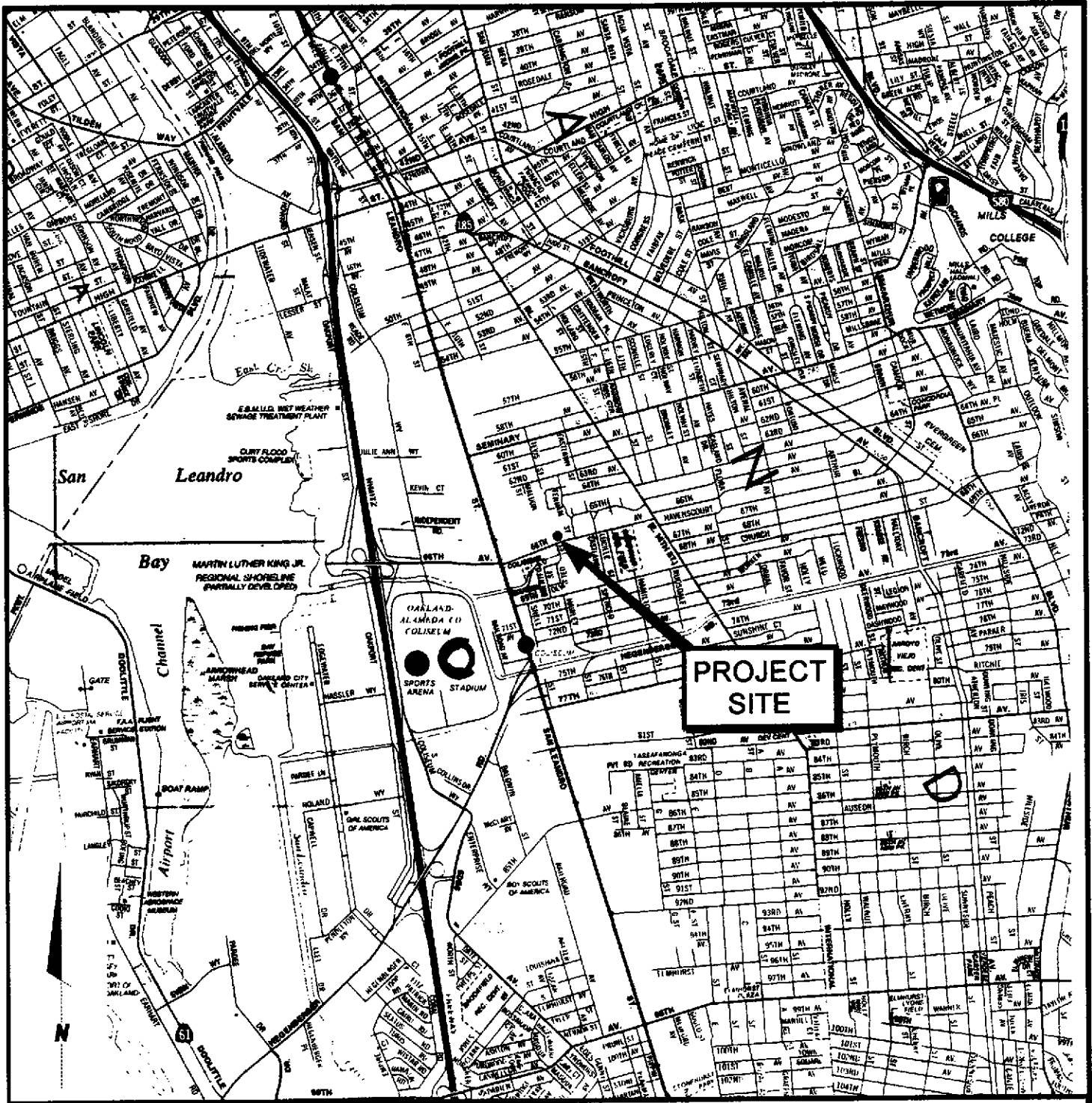
Notes:

All results in milligrams per liter (mg/L).

TPH-Gas = Total petroleum hydrocarbons quantified as gasoline.

MTBE = Methyl Tertiary Butyl Ether

EB = Ethyl Benzene



0 2000 4000
Scale in Feet

Oakland Map, California State Automobile Association, 1997.



PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Pacific Electric Motor Company
1009 66th Avenue
Oakland, California

PLATE
1

618.0101.003
JOB NUMBER

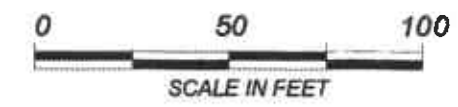
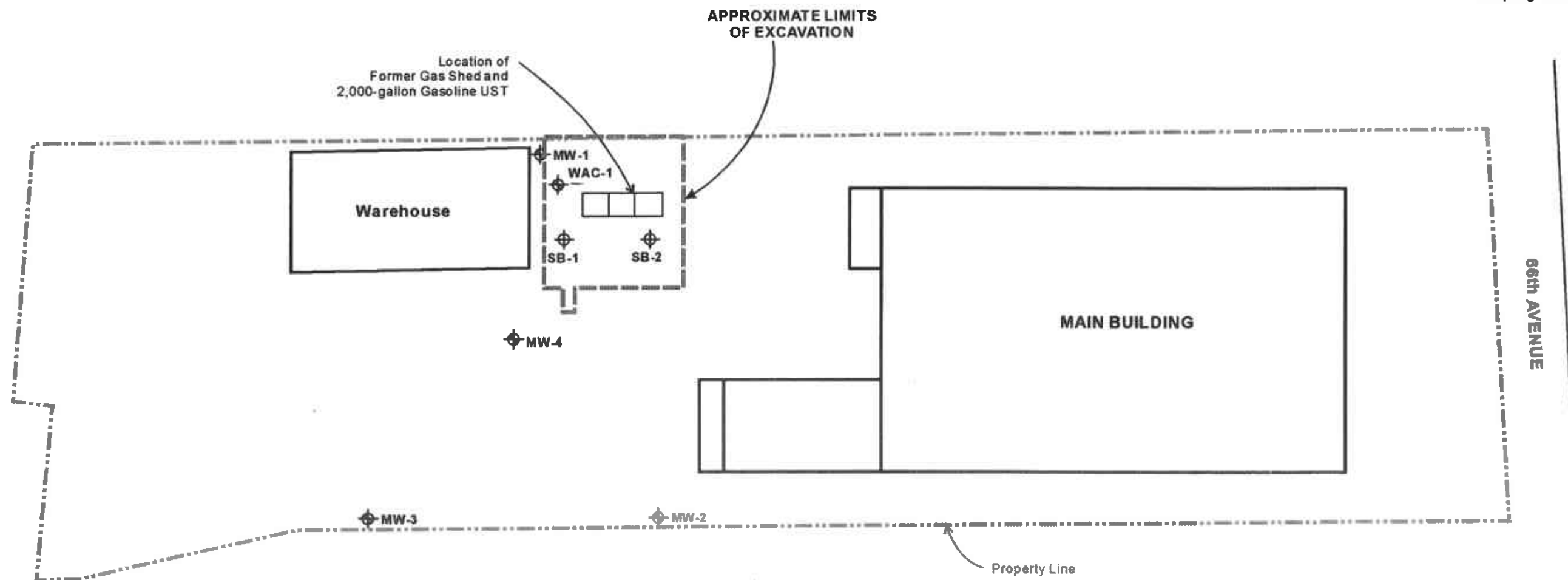
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DRAWING NUMBER

WJM
REVIEWED BY

10/98
DATE



Explanation

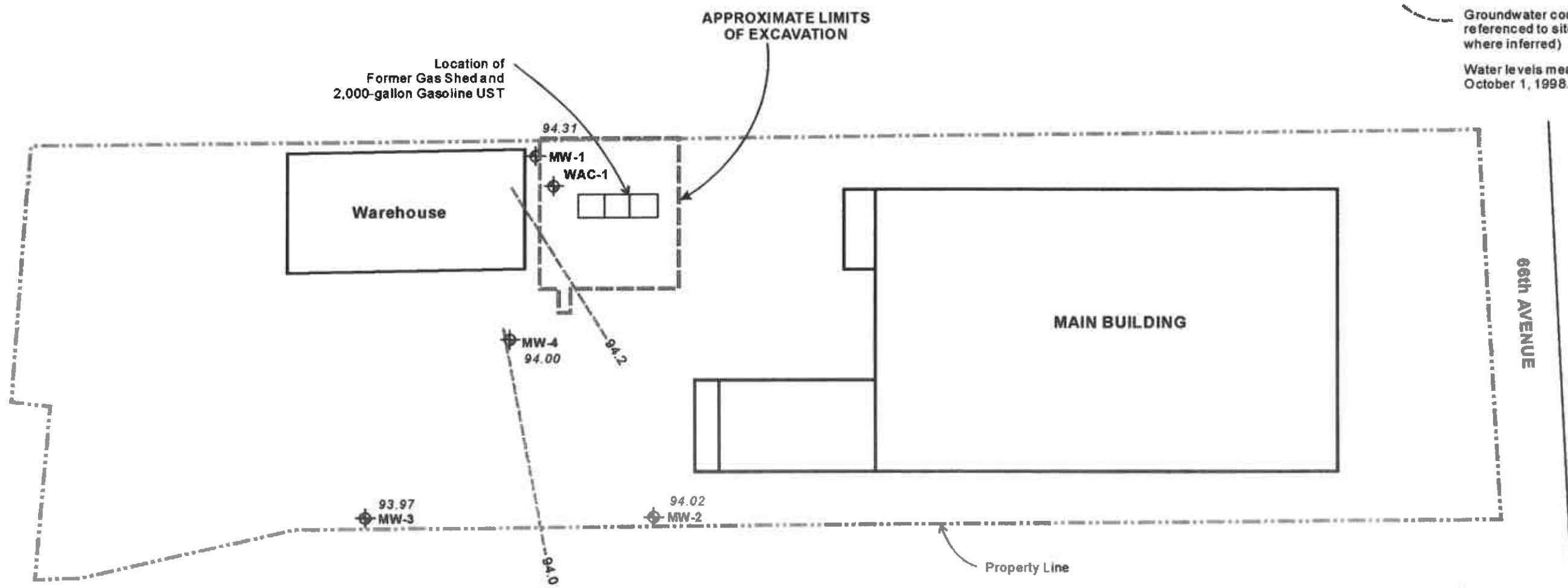
- ◆ Monitoring Well Location
- ◆ Grab Groundwater Sampling Location



Drawing modified from ENVIRON, 1997

Explanation

-  Monitoring Well Location
- 94.39 Water-Level Elevation (in feet, referenced to site datum.
-  Groundwater contour (in feet referenced to site datum; dashed where inferred)
- Water levels measured on October 1, 1998.



Drawing modified from ENVIRON, 1997

APPENDIX A
BORING LOGS AND WELL COMPLETION DETAILS

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 LESS THAN 15% FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND
		GRAVELS WITH 15% OR MORE FINES	GM		SILTY GRAVELS WITH OR WITHOUT SAND
			GC		CLAYEY GRAVELS WITH OR WITHOUT SAND
	SANDS MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 15% FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL
		SANDS WITH 15% OR MORE 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 OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND AND GRAVEL
			OL		ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, WITH OR WITHOUT SAND OR GRAVEL
			OH		ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
HIGHLY ORGANIC SOILS		PT		PEAT AND OTHER HIGHLY ORGANIC SOILS	

ABBREVIATION KEY

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 (1994 Revised Edition)
feet MSL	-feet above Mean Sea Level
feet BGS	-feet below ground surface

SYMBOLS KEY

	- No Soil Sample Recovered
	- Partial Soil Sample Recovered
	- Undisturbed Soil Sample Recovered
	- Soil Sample Submitted for Laboratory Analysis
	- Hydropunch Sample
	- First Encountered Groundwater Level
	- Piezometric Groundwater Level




PES Environmental, Inc.
Engineering & Environmental Services

Unified Soil Classification System Chart
Pacific Electric Motor Company
1009 66th Avenue
Oakland, California

PLATE

A-1



BLOWS/6 IN.	PID (PPM)	SAMPLE ID	DEPTH (FT)	GRAPHIC LOG	MATERIALS DESCRIPTION
					Asphalt
			2		
			4		
		SB1-5.5	6		Excavation Backfill
	0				
					Driller noted wet soil at 7 feet bgs.
			8		
		SB1-W	10		Bottom of borehole @ 10.0 feet below ground surface.
			12		
			14		

6180101003_log.CDR

PROJECT	Pacific Electric Motor Company, 1009 66th Avenue	DIAMETER OF HOLE	6 inches
LOCATION	Oakland, CA	TOTAL DEPTH OF HOLE	10 feet
JOB NUMBER	618.0101.003	TOP OF CASING ELEVATION	NA
GEOLOGIST/ENGINEER	Jenny Han	DATE STARTED	9/14/98
DRILL RIG/SAMPLING METHOD	Rhino LAR	DATE COMPLETED	9/14/98

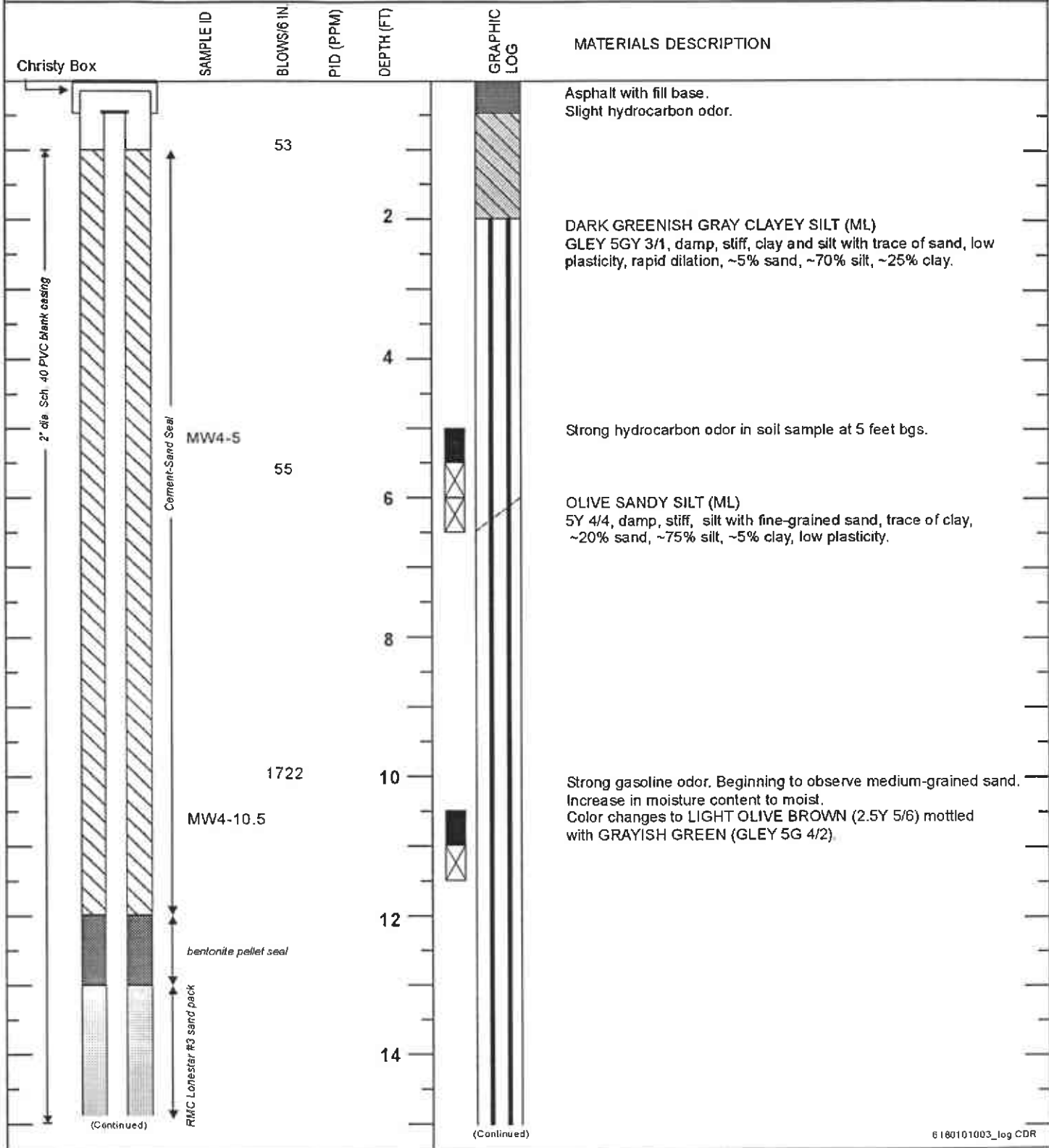
PLATE
A-2



BLOWS/6 IN	PID (PPM)	SAMPLE ID	DEPTH (FT)	GRAPHIC LOG	MATERIALS DESCRIPTION
					Asphalt
			2		Excavation Backfill
		SB2-5.5	6		
					Driller noted wet soil at 6.5 feet bgs.
		SB2-W	10		
					Bottom of borehole @ 10.0 feet below ground surface.

6180101003_log.CDR

PROJECT	Pacific Electric Motor Company, 1009 66th Avenue	DIAMETER OF HOLE	6 inches	PLATE A-3
LOCATION	Oakland, CA.	TOTAL DEPTH OF HOLE	10 feet	
JOB NUMBER	618 0101.003	TOP OF CASING ELEVATION	NA	
GEOLOGIST/ENGINEER	Jenny Han	DATE STARTED	9/14/98	
DRILL RIG/SAMPLING METHOD	Rhino LAR	DATE COMPLETED	9/14/98	

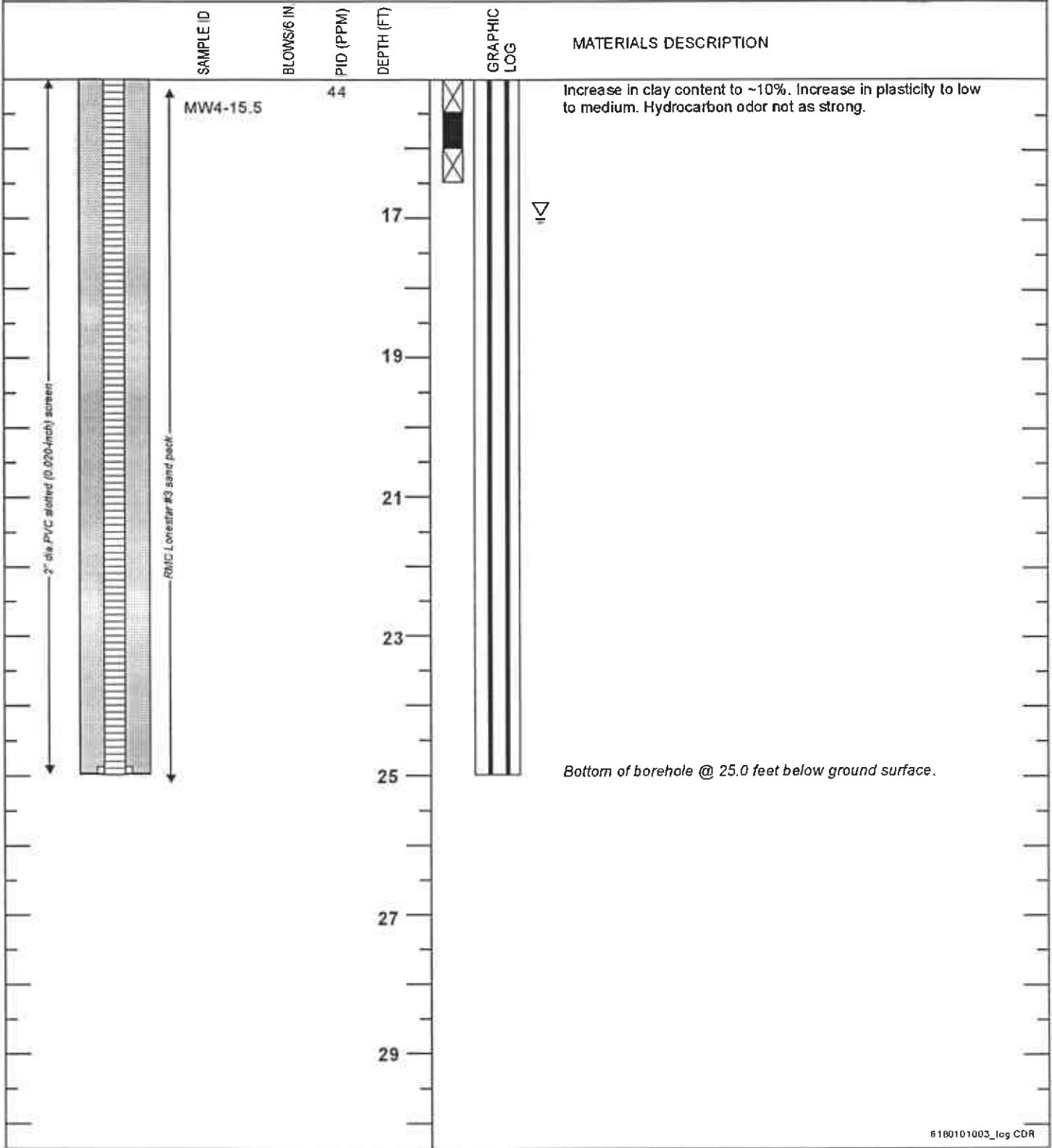


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PROJECT Pacific Electric Motor Company, 1009 66th Avenue
 LOCATION Oakland, CA
 JOB NUMBER 618.0101.003
 GEOLOGIST/ENGINEER Jenny Han
 DRILL RIG/SAMPLING METHOD Rhino LAR

DIAMETER OF HOLE 8 inches
 TOTAL DEPTH OF HOLE 25 feet
 TOP OF CASING ELEVATION 100.32 ft.
 DATE STARTED 9/14/98
 DATE COMPLETED 9/14/98

PLATE
A-4



6180101003_log CDR

PROJECT Pacific Electric Motor Company, 1009 66th Avenue
 LOCATION Oakland, CA.
 JOB NUMBER 618.0101.003
 GEOLOGIST/ENGINEER Jenny Han
 DRILL RIG/SAMPLING METHOD Rhino LAR

DIAMETER OF HOLE 8 inches
 TOTAL DEPTH OF HOLE 25 feet
 TOP OF CASING ELEVATION 100.32 ft.
 DATE STARTED 9/14/98
 DATE COMPLETED 9/14/98

PLATE
A-4

APPENDIX B
SURVEYOR'S REPORT

Survey Date 9/15/98
Revised Date 10/20/98
Job No. 98609

Table of Elevations

Pacific Electrical
1009 66th Avenue
Oakland, California

<u>Well No.</u>	<u>Elevation</u>
MW 4	100.32 Top of PVC Casing at black mark (west side) 100.66 Top Lid on well cover (west side)

Benchmark: Top of Casing MW 1
Elevation = 100.67 Assumed Datum

KIER & WRIGHT CIVIL ENGINEERS & SURVEYORS, INC.

5880 WEST LAS POSITAS BOULEVARD, SUITE 34 • PLEASANTON, CALIFORNIA 94588 • (510) 734-8060 • (510) 734-8064

APPENDIX C
WELL DEVELOPMENT AND SAMPLING RECORDS



Page: 1 of 1
 Date/Time: 9/15/98
 Project Name: Pacific Electric Motor
 Job No.: 618.0101.002
 Recorded By: Ann Loomis
 Sampled By: Ann Loomis, Gregg Drilling

WELL DEVELOPMENT FORM

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

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches)
 2-inch 4-inch 6-inch Other _____
 Total Depth of Casing (TD in feet below top of casing): 24.7
 Water-Level Depth (WL in feet below top of casing): 6.95

PURGING METHOD

Bailor - Type: Beart
 Submersible Centrifugal Bladder
 Other - Type: _____

PUMP INTAKE SETTING

Near Bottom Near Top Other _____
 Depth in feet (BTOC): 24'
 Screen Interval in feet (BTOC) from 15 to 24.7

PURGE VOLUME CALCULATIONS:

$$\left(\frac{24.7}{\text{Well Depth}} - \frac{6.95}{\text{Depth to Water}} \right) \times \frac{2}{\text{Well Diameter}}^2 \times 10 \text{ casing volumes} \times 0.0408 = \frac{28.97}{\text{Calculated Purge Volume}} \text{ gallons}$$

FIELD PARAMETER MEASUREMENT

→ START TIME 16:58

Minutes Since Pumping	Gallons Removed	pH	Conductivity	Temperature	Turbidity	Observations (color, well condition, odor, cloudiness, etc.)
16:59	0.5	6.94	.19	78.3	32.0	Milky brown
3	1.5	6.95	.11	76.2	49	
8	4	6.89	.16	75.0	100+	Milky
11	6	6.77	.12	74.0	100+	
14	9	6.77	.12	71.5	100+	Clearing slightly
16	10	6.59	.12	68.8		Clearing considerably - milky tan
20	12	6.58	.11	68.3	132.8	Much clearer
26	16	6.40	.13	67.1	89.0	
29	18	6.35	.15	67.3		
34	20	6.43	.11	67.0	50.4	
38	22	6.39	.12	66.7	41.1	
41	24	6.40	.41	67.3	30.9	
45	26	6.37	.34	65.5	23.5	
48	28	6.36	.51	64.5	22.0	
50	30	6.40	.49	62.5	19.8	Pump off for 2 min.
54	31	6.40	.66	62.7	100+	
60	32		1000 Mc/cm			Interrupted by phone conversation
67	35	6.56	.86	62.0	22.5	Flow rate to 220 ml/min
74	38	6.43	.97	61.8	15.6	
77	37	6.41	1.05	61.2	8.75	
81	38.5	6.41	1.17	61.4	5.7	
83	39	6.41	1.15	60.6	1.0	
86	39.5	6.43	1.33	60.6	0.55	
			1.58			

→ DEVELOPMENT COMPLETION TIME 18:28

TOTAL GALLONS REMOVED 40

APPENDIX D

LABORATORY REPORTS AND CHAIN-OF-CUSTODY RECORDS

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

PES Environmental, Inc.
 1682 Novato Boulevard, Suite 100
 Novato, CA 94947
 Attn: Will Mast

Date: 9/22/98
 Date Received: 9/16/98
 Project: 618.0101.002
 PO #:
 Sampled By: Client

Certified Analytical Report

Soil Sample Analysis: (All results in mg/kg)

Sample ID	SB1-5.5			SB2-5.5							
Sample Date	9/14/98			9/14/98							
Sample Time	12:08			13:15							
Lab #	E16735			E16736							
	Result	DF	DLR	Result	DF	DLR				PQL	Method
Analysis Date	9/19/98			9/19/98							
TPH-Gas	ND	1.0	1.0	ND	1.0	1.0				1.0	8015M
MTBE	ND	1.0	0.05	ND	1.0	0.05				0.05	8020
Benzene	ND	1.0	0.005	ND	1.0	0.005				0.005	8020
Toluene	ND	1.0	0.005	ND	1.0	0.005				0.005	8020
Ethyl Benzene	ND	1.0	0.005	ND	1.0	0.005				0.005	8020
Xylenes	0.012	1.0	0.005	ND	1.0	0.005				0.005	8020

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

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2224)



Michelle L. Anderson, Lab Director

Entech Analytical Labs, Inc.

RECEIVED SEP 23 1998

CA ELAP# 2224

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

PES Environmental, Inc.
1682 Novato Boulevard, Suite 100
Novato, CA 94947
Attn: Will Mast

Date: 9/22/98
Date Received: 9/16/98
Project: 618.0101.002
PO #:
Sampled By: Client

Certified Analytical Report

Soil Sample Analysis: (All results in mg/kg)

Sample ID	MW4-5			MW4-10.5			MW4-15.5				
Sample Date	9/14/98			9/14/98			9/14/98				
Sample Time	9:30			9:40			9:55				
Lab #	E16732			E16733			E16734				
	Result	DF	DLR	Result	DF	DLR	Result	DF	DLR	PQL	Method
Analysis Date	9/19/98			9/18/98			9/19/98				
TPH-Gas	21	5.0	5.0	660	50	50	3.9	1.0	1.0	1.0	8015M
MTBE	ND	5.0	0.25	ND	50	2.5	3.8	1.0	0.05	0.05	8020
Benzene	0.085	5.0	0.025	2.8	50	0.25	0.77	1.0	0.005	0.005	8020
Toluene	0.28	5.0	0.025	34	50	0.25	0.037	1.0	0.005	0.005	8020
Ethyl Benzene	0.23	5.0	0.025	13	50	0.25	0.10	1.0	0.005	0.005	8020
Xylenes	1.7	5.0	0.025	70	50	0.25	0.31	1.0	0.005	0.005	8020

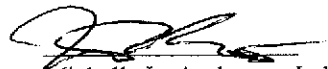
DF=Dilution Factor

ND= None Detected above DLR

PQL=Practical Quantitation Limit

DLR=Detection Reporting Limit

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2224)



Michelle L. Anderson, Lab Director

Entech Analytical Labs, Inc.

CA ELAP# 2224

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Project: 618.0101.002
PO #:
Sampled By: Client

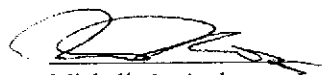
Certified Analytical Report

Water Sample Analysis:

Sample ID	SB1-W			SB2-W					
Sample Date	9/14/98			9/14/98					
Sample Time	12:40			13:40					
Lab #	E16737			E16738					
	Result	DF	DLR	Result	DF	DLR			PQL Method
Results in µg/Liter:									
Analysis Date	9/19/98			9/19/98					
TPH-Gas	ND	100	5000	ND	1.0	50			50 8015M
MTBE	14,000	100	500	200	1.0	5.0			5.0 8020
Benzene	ND	100	50	ND	1.0	0.50			0.50 8020
Toluene	ND	100	50	ND	1.0	0.50			0.50 8020
Ethyl Benzene	ND	100	50	ND	1.0	0.50			0.50 8020
Xylenes	ND	100	50	ND	1.0	0.50			0.50 8020

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

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2224)



Michelle L. Anderson, Lab Director

Entech Analytical Labs, Inc.

CA ELAP# 2224

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PES Environmental, Inc.
1682 Novato Blvd., Suite 100
Novato, CA 94947
Attn: Will Mast

Date: 9/22/98
Date Received: 9/16/98
Project: 618.0101.002
PO #:
Sampled By: Client

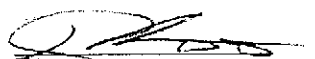
Certified Analytical Report

Water Sample Analysis:

Sample ID	MW-4									
Sample Date	9/15/98									
Sample Time	16:33									
Lab #	E16731									
	Result	DF	DLR						PQL	Method
Results in µg/Liter:										
Analysis Date	9/19/98									
TPH-Gas	170,000	100	5000						50	8015M
MTBE	26,000	100	500						5.0	8020
Benzene	26,000	100	50						0.50	8020
Toluene	32,000	100	50						0.50	8020
Ethyl Benzene	2,900	100	50						0.50	8020
Xylenes	18,000	100	50						0.50	8020

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

Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2224)



Michelle L. Anderson, Lab Director

Entech Analytical Labs, Inc.

CA ELAP# 2224

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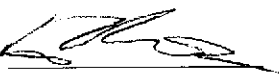
Date: 9/22/98
Date Received: 9/16/98
Project: 618.0101.002
PO #:
Sampled By: Client

Certified Analytical Report

Water Sample Analysis:

Sample ID	MW-4									
Sample Date	9/15/98									
Sample Time	16:30									
Lab #	E16731									
	Result	DF	DLR						PQL	Method
Results in mg/Liter:										
Analysis Dates:	9/18/98									
Total Dissolved Solids	3300	1.0	10						10	160.1

DF=Dilution Factor ND=None Detected above DLR PQL=Practical Quantitation Limit DLR=Detection Reporting Limit
Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #2224)



Michelle L. Anderson, Lab Director

Environmental Analysis Since 1983

QUALITY CONTROL RESULTS SUMMARY

METHOD: Gas Chromatography

QC Batch #: GBG4980919

Matrix: Water

Units: ug/L

Date Analyzed: 09/19/98

Quality Control Sample: Blank Spike

PARAMETER	Method #	MB ug/L	SA ug/L	SR ug/L	SP ug/L	SP % R	SPD ug/L	SPD %R	RPD	QC LIMITS	
										RPD	%R
Benzene	8020	<0.50	80	ND	80	100	78	97	2.3	25	77-116
Toluene	8020	<0.50	80	ND	78	98	78	97	0.6	25	76-116
Ethyl Benzene	8020	<0.50	80	ND	79	99	77	97	1.8	25	77-116
Xylenes	8020	<0.50	240	ND	228	95	234	98	2.9	25	76-118
Gasoline	8015	<50.0	1000	ND	1070	107	1040	104	2.8	25	64-136

Note: LCS and LCSD results reported for the following Parameters:

All

Acceptable LCS and LCSD results are reported when matrix interferences cause MS and MSD results to fall outside established QC limits.

Definition of Terms:

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

QUALITY CONTROL RESULTS SUMMARY

METHOD: Gas Chromatography

QC Batch #: GBG2980919
Matrix: Water
Units: ug/L

Date Analyzed: 09/19/98
Quality Control Sample: E16759

PARAMETER	Method #	MB ug/L	SA ug/L	SR ug/L	SP ug/L	SP % R	SPD ug/L	SPD %R	RPD	QC LIMITS	
										RPD	%R
Benzene	8020	<0.50	40	ND	42	106	41	102	3.6	25	78-112
Toluene	8020	<0.50	40	ND	39	98	38	95	3.4	25	79-111
Ethyl Benzene	8020	<0.50	40	ND	39	97	38	94	3.6	25	79-113
Xylenes	8020	<0.50	120	ND	117	97	111	93	4.7	25	79-115
Gasoline	8015	<50.0	1000	ND	810	81	790	79	2.5	25	64-126

Note: LCS and LCSD results reported for the following Parameters:
Gasoline

Acceptable LCS and LCSD results are reported when matrix interferences cause MS and MSD results to fall outside established QC limits.

Definition of Terms:

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

QUALITY CONTROL RESULTS SUMMARY

METHOD: Gas Chromatography

QC Batch #: GBG4980919

Date Analyzed: 09/19/98

Matrix: Soil

Quality Control Sample: E16860

Units: ug/kg

PARAMETER	Method #	MB ug/kg	SA ug/kg	SR ug/kg	SP ug/kg	SP % R	SPD ug/kg	SPD %R	RPD	QC LIMITS	
										RPD	%R
Benzene	8020	<5.0	80	ND	82	102	82	103	0.2	25	76-117
Toluene	8020	<5.0	80	ND	82	102	82	103	0.8	25	76-117
Ethyl Benzene	8020	<5.0	80	ND	83	104	82	103	0.7	25	74-119
Xylenes	8020	<5.0	240	ND	248	103	248	103	0.0	25	75-120
Gasoline	8015	<1000.00	1000	ND	1070	107	1040	104	2.8	25	58-120

Note: LCS and LCSD results reported for the following Parameters:

Gasoline

Acceptable LCS and LCSD results are reported when matrix interferences cause MS and MSD results to fall outside established QC limits.

Definition of Terms:

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

QUALITY CONTROL RESULTS SUMMARY

METHOD: Gas Chromatography

QC Batch #: GBG4980918

Matrix: Soil

Units: ug/kg

Date Analyzed: 09/18/98

Quality Control Sample: E16875

PARAMETER	Method #	MB ug/kg	SA ug/kg	SR ug/kg	SP ug/kg	SP % R	SPD ug/kg	SPD %R	RPD	QC LIMITS	
										RPD	%R
Benzene	8020	<5.0	80	ND	84	105	84	106	0.8	25	76-117
Toluene	8020	<5.0	80	ND	83	104	83	103	0.2	25	76-117
Ethyl Benzene	8020	<5.0	80	ND	82	103	81	101	2.0	25	74-119
Xylenes	8020	<5.0	240	ND	243	101	241	100	0.8	25	75-120
Gasoline	8015	<1000.00	1000	ND	1130	113	1130	113	0.0	25	58-120

Note: LCS and LCSD results reported for the following Parameters:

Gasoline

Acceptable LCS and LCSD results are reported when matrix interferences cause MS and MSD results to fall outside established QC limits.

Definition of Terms:

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



CHAIN OF CUSTODY RECORD

JOB NUMBER: 6130101002
NAME / LOCATION: PACIFIC ELECTRIC MOTOR
PROJECT MANAGER: Will Mast

SAMPLERS: Ann Loomis, Jenny Ham,
Gregg Drilling
RECORDER: Ann Loomis

DATE				SAMPLE NUMBER / DESIGNATION
YR	MO	DY	TIME	
98	09	14	0930	MW4-5
98	09	14	0940	MW4-10.5
98	09	14	0955	MW4-15.5
98	09	14	1208	SB1-5.5
98	09	14	1240	SB1-W
98	09	14	1340	SB2-W
98	09	14	1315	SB2-5.5

SOURCE CODE	MATRIX				# CONTAINERS & PRESERV.					DEPTH IN FEET	COL MTD CD	QA CODE	
	Water	Sedim't	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	HCl	Filtered				
43			X		X					E16732	5	38	10
48			X		X					E16733	10.5	38	10
48			X		X					E16734	15.5	38	10
48			X		X					E16735	5.5	38	10
10	X							3		E16737		26	10
10	X							3		E16738		26	10
48			X		1					E16736	5.5		

ANALYSIS REQUESTED											
EPA 601 / 8010	EPA 602 / 8020 (BTEX)	EPA 624 / 8240	EPA 625 / 8270	TPHg by 5030 / 8015 (mod)	TPHd by 3650 / 8015 (mod)	EPA 8020 MTBC					
X	X		X	X	X						
X	X		X	X	X						
X	X		X	X	X						
X	X		X	X	X						
X	X		X	X	X						
X	X		X	X	X						

NOTE
Regular 5-day turnaround time
Need results by Tues 9/22

CHAIN OF CUSTODY RECORD					
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE	TIME		
<u>Ann Loomis</u>	<u>M. Howard</u>	<u>9/16/98</u>	<u>09:30</u>		
<u>M. Howard</u>					
DISPATCHED BY: (Signature)	DATE	TIME	RECEIVED FOR LAB BY: (Signature)	DATE	TIME
			<u>Howard</u>	<u>9/16/98</u>	<u>12:30p</u>
METHOD OF SHIPMENT: <u>World Courier</u>					



CHAIN OF CUSTODY RECORD

JOB NUMBER: 618.0101.002
NAME / LOCATION: Pacific Electric Motor
PROJECT MANAGER: WMM

SAMPLERS: Ann Loomis, Gregg Drilling
RECORDER: Ann Loomis

DATE				SAMPLE NUMBER / DESIGNATION
YR	MO	DY	TIME	
98	09	15	16:30	MW-4 (E1673)
98	09	15	16:33	MW-4 (J)

SOURCE CODE	MATRIX				# CONTAINERS & PRESERV.					DEPTH IN FEET	COL MTD CD	QA CODE
	Water	Sedim't	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	HCl	Filtered			
10	X				1						27	10
10	X						3				27	10

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

NOTE	CHAIN OF CUSTODY RECORD					
Regular 5-day turnaround time Need results by Tues 9/22	RELINQUISHED BY: (Signature)	Ann Loomis		RECEIVED BY: (Signature)	M Howard	
	RELINQUISHED BY: (Signature)	M Howard		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:	World Courier					