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GROUNDWATER MONITORING AND SAMPLING REPORT

Pacific Gas and Electric Company
Oakland Power Plant
50 Martin Luther King, Jr. Way
Oakland, California

July 94

PG&E Project No. 0530-EC
Alisto Project No. 10-179

July 1994



GROUNDWATER MONITORING AND SAMPLING REPORT

**Pacific Gas and Electric Company
Oakland Power Plant
50 Martin Luther King, Jr. Way
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**PG&E Project No. 0530-EC
Alisto Project No. 10-179-01-004**

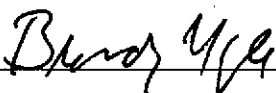
Prepared for:

**Pacific Gas and Electric Company
3400 Crow Canyon Road
San Ramon, California**

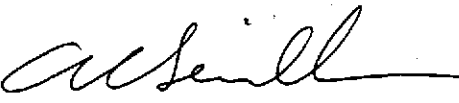
Prepared by:

**Alisto Engineering Group
1777 Oakland Boulevard, Suite 200
Walnut Creek, California**

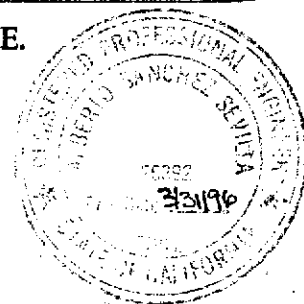
July 27, 1994



**Brady Nagle
Project Manager**



**Al Sevilla, P.E.
Principal**



GROUNDWATER MONITORING AND SAMPLING REPORT

Pacific Gas and Electric Company
Oakland Power Plant
50 Martin Luther King, Jr. Way
Oakland, California.

TESA Project No. 0530-EC
Alisto Project No. 10-179-01-004

July 27, 1994

INTRODUCTION

This report presents the results and findings of the June 29, 1994 groundwater monitoring and sampling conducted by Alisto Engineering Group at Pacific Gas and Electric Company's Oakland Power Plant, 50 Martin Luther King Jr. Way, Oakland, California. A site vicinity map is shown in Figure 1.

FIELD PROCEDURES

Field activities were performed in accordance with the procedures and guidelines of the Alameda County Health Care Services Agency and the California Regional Water Quality Control Board, San Francisco Bay Region.

Before purging and sampling, the groundwater level in each well was measured from a permanent mark on top of the casing to the nearest 0.01 foot using an electronic sounder. The depth to groundwater and top of casing elevation data were used to calculate the groundwater elevation in each well. The survey data and groundwater elevation measurements collected to date are presented in Table 1. The field procedures for groundwater monitoring well sampling are presented in Appendix A.

SAMPLING AND ANALYTICAL RESULTS

The results of monitoring and laboratory analysis of the groundwater samples for this and previous quarters are summarized in Table 1. The potentiometric groundwater elevations as interpreted from the results of this monitoring event are shown in Figure 2. The results of groundwater analysis are shown in Figure 3. The field procedures for chain of custody documentation, laboratory reports, and chain of custody records are presented in Appendix B.



SUMMARY OF FINDINGS

The findings of the June 29, 1994 groundwater monitoring and sampling event are summarized as follows:

- Free product was not observed in any of the groundwater monitoring wells.
- Groundwater elevation data indicated a northwesterly flow direction with a hydraulic gradient of 0.001 foot per foot.
- Total petroleum hydrocarbons as diesel was detected in samples collected from each of the wells at concentrations of up to 920 micrograms per liter in MW-2-3.
- Benzene, toluene, ethylbenzene, and total xylenes were not detected in the sample collected from well MW-2-3.



TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING
 PACIFIC GAS AND ELECTRIC COMPANY'S OAKLAND POWER PLANT
 50 MARTIN LUTHER KING, JR. WAY, OAKLAND, CALIFORNIA

ALISTO PROJECT NUMBER 10-179

WELL ID	DATE OF SAMPLING/ MONITORING	CASING ELEVATION (a) (Feet)	DEPTH TO WATER (Feet)	GROUNDWATER ELEVATION (b) (Feet)	TPH-D (ppb)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	LAB
MW-1-2	06/22/93	13.95	5.05	8.90	1500 (c)	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-2	09/22/93	13.95	5.91	8.04	240	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-1	(d) 09/22/93	---	---	---	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-2	12/28/93	13.95	4.77	9.18	200	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-1	(d) 12/28/93	---	---	---	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-2	04/11/94	13.95	4.66	9.29	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-1	(d) 04/11/94	---	---	---	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-2	04/20/94	13.95	4.86	9.09	600	---	---	---	---	CHR
MW-1-2	06/22/94	13.95	5.18	8.77	---	---	---	---	---	CHR
MW-1-3	06/22/93	14.01	5.15	8.86	160 (c)	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-3	09/22/93	14.01	5.57	8.44	430	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-3	12/28/93	14.01	5.13	8.88	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-1-3	04/11/94	14.01	5.01	9.00	---	ND<0.5	ND<0.5	ND<0.5	0.50	CHR
MW-1-3	04/20/94	14.01	5.09	8.92	ND<50	---	---	---	---	CHR
MW-1-3	06/22/94	14.01	5.30	8.71	---	---	---	---	---	CHR
MW-2-3	06/22/93	13.91	5.00	8.91	560 (e)	3.1	ND<0.5	ND<0.5	ND<0.5	CHR
MW-2-3	09/22/93	13.91	5.50	8.41	460	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-2-3	12/28/93	13.91	4.74	9.17	ND<50 (f)	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-2-3	04/11/94	13.91	4.62	9.29	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
MW-2-3	04/20/94	13.91	4.83	9.08	ND<50	---	---	---	---	CHR
MW-2-3	06/22/94	13.91	5.14	8.77	---	ND<0.5 (g)	ND<0.5	ND<0.5	ND<0.5	CHR
QC-2	(h) 06/22/93	---	---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-2	(h) 09/22/93	---	---	---	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-2	(h) 12/28/93	---	---	---	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR
QC-2	(h) 04/11/94	---	---	---	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	CHR

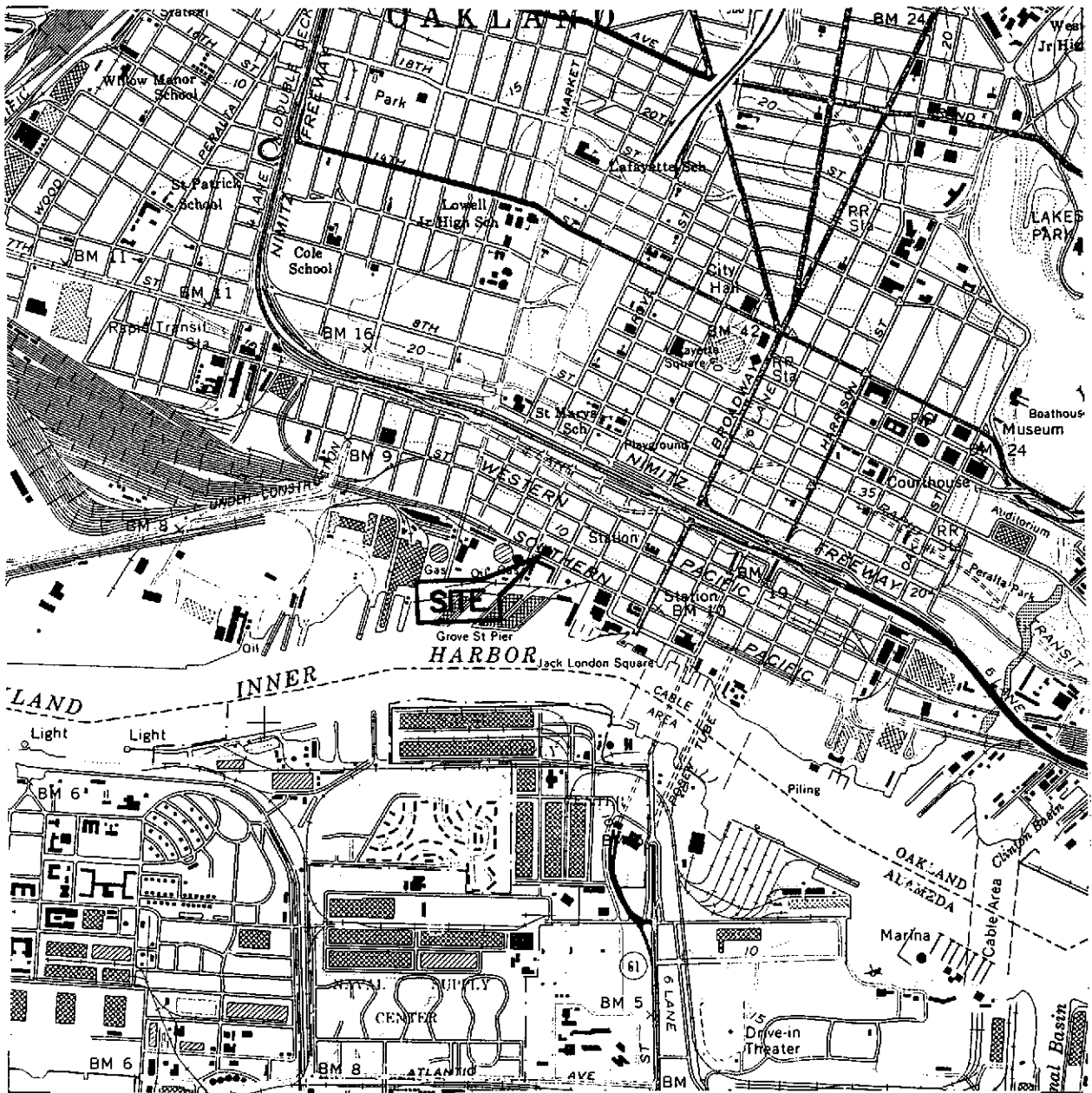
ABBREVIATIONS:

TPH-D Total petroleum hydrocarbons as diesel
 B Benzene
 T Toluene
 E Ethylbenzene
 X Total xylenes
 ug/L Micrograms per liter
 --- Not analyzed/applicable
 ND Not detected above reported detection limit
 CHR Chromalab, Inc.

NOTES:

- (a) Top of casing elevations surveyed relative to mean sea level.
- (b) Groundwater elevations in feet above mean sea level.
- (c) Unknown hydrocarbon in diesel range quantified as diesel. ✓
- (d) Blind duplicate.
- (e) Motor oil at a concentration of 3.1 mg/L detected in sample.
- (f) Motor oil at a concentration of 2.9 mg/L detected in sample.
- (g) Unknown hydrocarbon in motor oil range was also observed in sample. ✓
- (h) Travel blank.

EA10-179-179-1-4.WQ1



SOURCE:
 USGS MAP, OAKLAND WEST QUADRANGLE,
 CALIFORNIA, 7.5 MINUTE SERIES, 1959.
 PHOTOREVISED 1980.

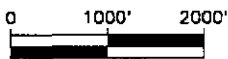


FIGURE 1

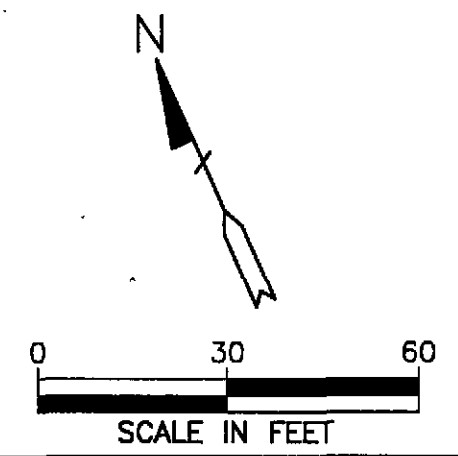
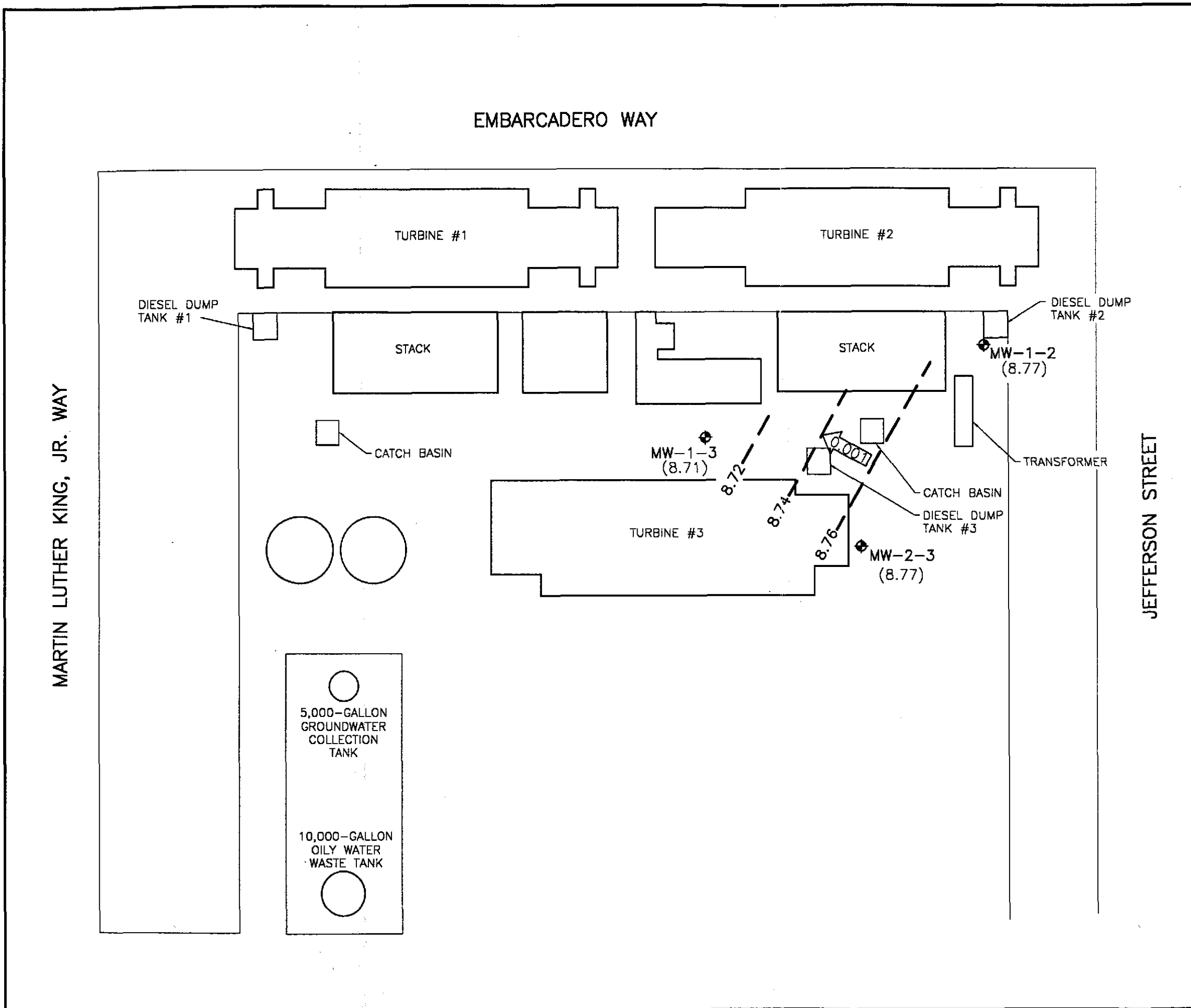
SITE VICINITY MAP

PACIFIC GAS AND ELECTRIC COMPANY
 OAKLAND POWER PLANT
 50 MARTIN LUTHER KING, JR. WAY
 OAKLAND, CALIFORNIA

PROJECT NO. 10-179



ALISTO ENGINEERING GROUP
 WALNUT CREEK, CALIFORNIA



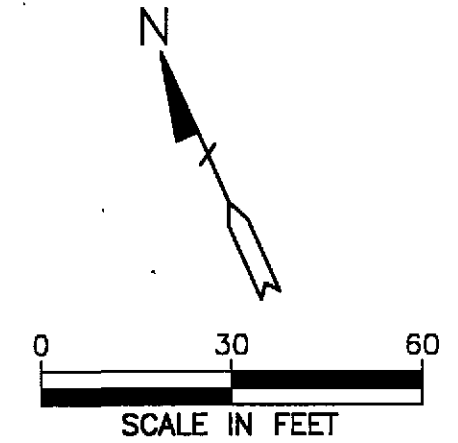
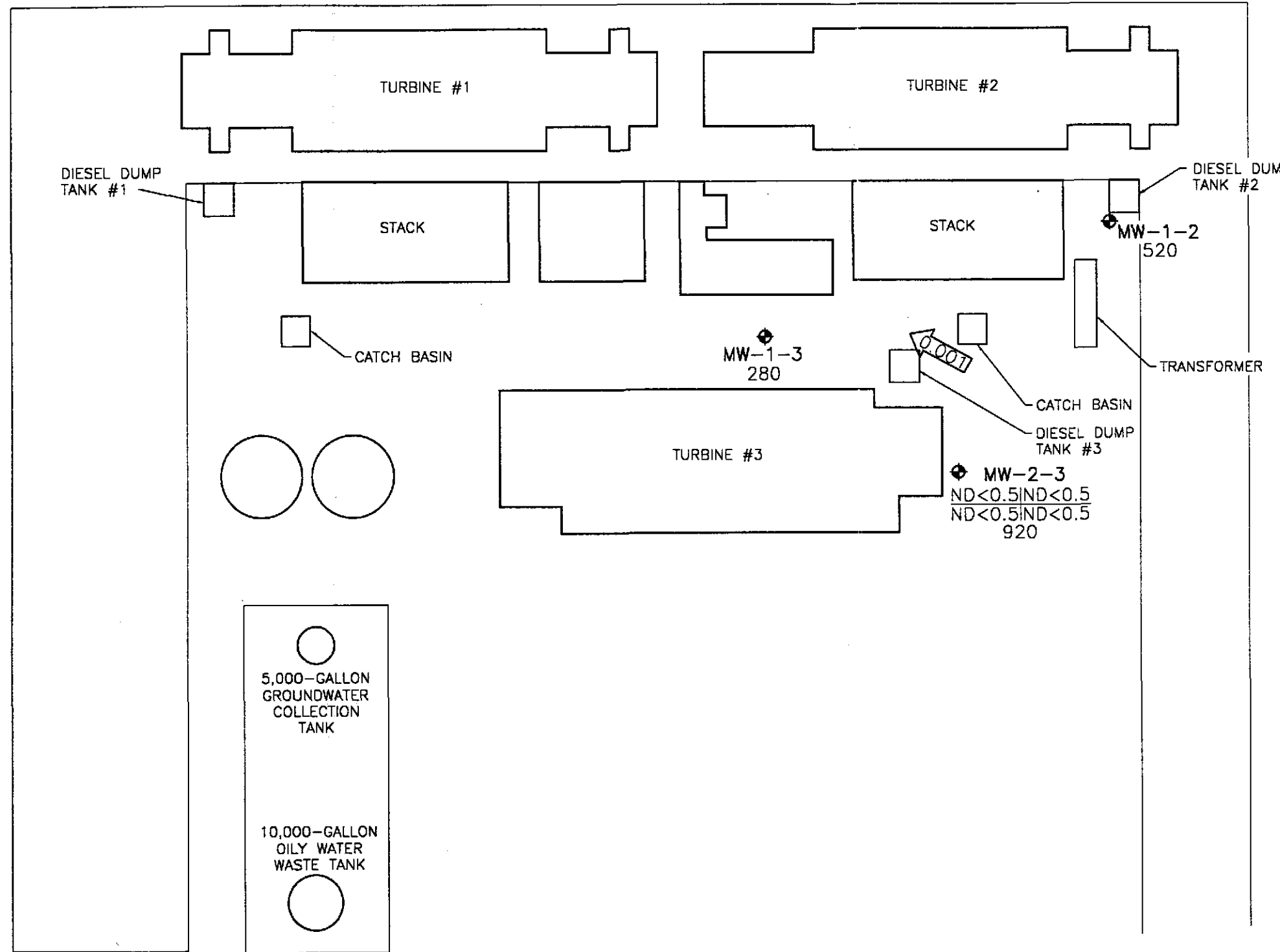
- LEGEND**
- ⊕ GROUNDWATER MONITORING WELL
 - (8.77) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
 - 8.76 - GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL-0.02 FOOT)
 - ←0.001 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT

FIGURE 2
POTENTIOMETRIC GROUNDWATER ELEVATION CONTOUR MAP
JUNE 29, 1994
 PACIFIC GAS AND ELECTRIC COMPANY
 OAKLAND POWER PLANT
 50 MARTIN LUTHER KING, JR. WAY
 OAKLAND, CALIFORNIA
 PROJECT NO. 10-179

EMBARCADERO WAY

MARTIN LUTHER KING, JR. WAY

JEFFERSON STREET



LEGEND

- ◆ GROUNDWATER MONITORING WELL
- B | T
E | X
TPH-D CONCENTRATION OF CONSTITUENTS IN MICROGRAMS PER LITER
- B BENZENE
- T TOLUENE
- E ETHYLBENZENE
- X TOTAL XYLENES
- TPH-D TOTAL PETROLEUM HYDROCARBONS AS DIESEL
- ND NOT DETECTED ABOVE REPORTED DETECTION LIMIT
- ←0.001 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT

FIGURE 3
CONCENTRATIONS OF PETROLEUM HYDROCARBONS IN GROUNDWATER

JUNE 29, 1994

PACIFIC GAS AND ELECTRIC COMPANY
OAKLAND POWER PLANT
50 MARTIN LUTHER KING, JR. WAY
OAKLAND, CALIFORNIA

PROJECT NO. 10-179

APPENDIX A

**FIELD PROCEDURES FOR
GROUNDWATER MONITORING WELL SAMPLING
AND WATER SAMPLING FIELD SURVEY FORMS**

**FIELD PROCEDURES
FOR
GROUNDWATER MONITORING WELL SAMPLING**

Groundwater Level Measurement

Before commencing groundwater sampling, the groundwater level in each well was measured from the marked survey reference point at the top of the well casing. Groundwater in each well was monitored for free product or sheen. The depth to groundwater was measured to an accuracy of 0.01 foot from the top of the PVC well casing using an electronic sounder.

Groundwater Monitoring Well Sampling

To ensure that the groundwater samples were representative of the aquifer, the wells were purged of 3 well casing volumes before sample collection. This purging was accomplished using a clean bailer or pump.

The samples were collected using a disposable bailer and then transferred into laboratory-supplied containers. Care was taken to avoid turbulence when transferring the water samples, and all volatile analysis vials were filled so that no air bubbles were trapped. The sampling technician wore nitrile gloves at all times during purging and well sampling. The samples were clearly labeled with the well number, site identification, date and time of sample collection, and sampler's initials, and transported in an iced cooler maintained at 4 degrees Centigrade to a state-certified laboratory following proper preservation and chain of custody protocol.

ALISTO ENGINEERING GROUP GROUNDWATER MONITORING

Client: **PGE**
 Alisto Project No: **10-179-01-004 /**
 Service Station No: **OAKLAND POWER PLANT**

Date: **6-29-94 W**
 Field Personnel: **DJB**
 Site Address: **50 MLK JR. BLVD
OAKLAND**

FIELD ACTIVITY:

QUALITY CONTROL SAMPLES:

Groundwater Monitoring
 Groundwater Sampling **X**
 Well Development

~~None~~ QC-1 Sample Duplicate (Well ID)
 QC-2 Trip Blank
~~X~~QC-3 Rinsate Blank

Well ID	Well Diam	Order Measured/ Sampled	Total Depth	Depth to Water	Depth to Product	Product Thick-ness	Comments
MN1-2	4"	2/2	13.62'	5.18'	None	None	TPH-D
MN1-3	4"	3/3	7.24'	5.30'	None	None	TPH-D
MN2-3	4"	1/1	13.30'	5.14'	None	None	TPH-D/BTEX

Notes:

ALISTO ENGINEERING GROUP

Groundwater Development and Sampling Form

Client: **PGE**
 Alisto Project No: **10-179-01-004**
 Service Station No: **OAKLAND POWER PLANT**

Date: **6-29-94**
 Field Personnel: **DJ BIRCH**
 Address: **50 MLK JR. BND.**

Well ID: **1-2** Field Activity: Well Development Well Sampling Product Bailing

Casing Diameter:

- 2 Inch (0.16 Gal/foot)
- 3 Inch (0.37 Gal/foot)
- 4 Inch (0.65 Gal/foot)
- 4.5 Inch (0.83 Gal/foot)
- 6 Inch (1.47 Gal/foot)

Purge Method:

- Pump (dispos. Poly Tubing)
- Disposable Bailers
- Other

Well Data:

- Depth to Product
- Product Thickness
- 5.18** Depth to Water

Sampling Method:

- Disposable Bailer
- Pump

Decontamination Method:

- Triple Rinse (Liquinox)
- Steam Cleaned

MW-1-2

Calculated Purge Volume

$$\frac{13.62}{\text{Total Depth of Well}} - \frac{5.18}{\text{Depth to Water}} = 8.44 \text{ ft} \times \frac{.65 \text{ Gal/Ft}}{\text{Water Conversion Column Factor}} = 5.4 \text{ Gal} \times \frac{3}{\text{Vols to Purge}} = 16.4 \text{ Total Volume}$$

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos/cm)	Purge Vol (Gal)	Comments/Turbidity	Analysis Required	Container Type	Preserv
1352	74.9	7.31	1690	2		TPH-G/BTEX	VOA	HCL
1353	71.4	7.36	1170	4		<input checked="" type="checkbox"/> TPH-Diesel	Amber Liter	
1358	69.0	7.29	1110	10		EPA 601	VOA	
1432					time sampled	TOG 5520BF	Amber Liter	H ₂ SO ₄

Purged dry at 8 and 10 gallons.

ALISTO ENGINEERING GROUP

Groundwater Development and Sampling Form

Client: PGE
 Alisto Project No: 10-179-01-004
 Service Station No: OAKLAND POWER PLANT

Date: 6-29-94
 Field Personnel: DTB
 Address: 50 MLK JR. BLD

Well ID: MW23 Field Activity: Well Development Well Sampling Product Bailing

Casing Diameter:

- 2 Inch (0.16 Gal/foot)
- 3 Inch (0.37 Gal/foot)
- 4 Inch (0.65 Gal/foot)
- 4.5 Inch (0.83 Gal/foot)
- 6 Inch (1.47 Gal/foot)

Purge Method:

- Pump (dispos. Poly Tubing)
- Disposable Bailers
- Other

Well Data:

- Depth to Product
- Product Thickness
- 5.14 Depth to Water

Sampling Method:

- Disposable Bailer
- Pump

Decontamination Method:

- Triple Rinse (Liquinox)
- Steam Cleaned

MW 2-3

Calculated Purge Volume

$$\frac{13.30}{3} \cdot \frac{5.14}{3} = 8.16 \text{ ft} \times 0.65 \text{ Gal/Ft} = 5.3 \text{ Gal} \times 3 = 15.9$$

Total Depth of Well
Depth to Water
Water Column
Conversion Factor
Casing Vol
Vols to Purge
Total Volume

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos/cm)	Purge Vol (Gal)	Comments/ Turbidity NTU's	Analysis Required	Container Type	Preserv
1317	70.7	7.31	2420	1		<input checked="" type="checkbox"/> BTEX	VOA	HCL
1322	73.8	7.26	2320	8	23.1 / Purged dry.	<input checked="" type="checkbox"/> TPH-Diesel	Amber Liter	Solvent Rinsed
1331	73.7	7.29	2370	10	29.7 / Dry	EPA 601	VOA	
						TOG 5520BF	Amber Liter	H ₂ O

Purged dry twice allowed recharge then sampled.

APPENDIX B

**FIELD PROCEDURES FOR CHAIN OF CUSTODY DOCUMENTATION,
LABORATORY REPORTS, AND CHAIN OF CUSTODY RECORDS**

**FIELD PROCEDURES
FOR
CHAIN OF CUSTODY DOCUMENTATION**

The samples collected were handled in accordance with the California Department of Health Services guidelines. The samples were labeled in the field and immediately stored in coolers and preserved with blue ice for transport to a state-certified laboratory for analysis.

A chain of custody record accompanied the samples, and included the site and sample identification, date and time of collection, analysis requested, and the name and signature of the sampling technician. When transferring possession of the samples, the transferee signed and dated the chain of custody record.

CHROMALAB, INC.

Environmental Services (SDB)

JUL 21 1994

July 11, 1994

Submission #: 9407021

ALISTO ENGINEERING GROUP INC

Atten: Bill Howell

Project: OAKLAND POWER PLNT ✓

Project #: 0530-EC

Received: July 1, 1994

10-179-1-4 ✓

re: 3 samples for Diesel analysis

Matrix: WATER

Sampled: June 29, 1994 ✓

Analyzed: July 9, 1994

Method: EPA 3510/8015

Sample #	Client Sample ID	Diesel (µg/L)
56413	MW1-2 ✓	520 ✓
56414	MW1-3 ✓	280 ^a ✓
56415	MW2-3 ✓	920 ^{a,b} ✓

a - Unknown Hydrocarbon in diesel range quantified as diesel.

b - Unknown Hydrocarbon in motor oil range was also observed in sample.

Blank	N.D.
Spike Recovery	82%
Dup Spike Recovery	79%
Reporting Limit	50

ChromaLab, Inc.

Sirirat Chullakorn ✓

Sirirat Chullakorn
Analytical Chemist

Ali Kharrazi

Ali Kharrazi
Organic Manager

gg

CHROMALAB, INC.

Environmental Services (SDB)

July 12, 1994

Submission #: 9407021

ALISTO ENGINEERING GROUP INC

Atten: Bill Howell

Project: OAKLAND POWER PLNT

Project#: 0530-EC

Received: July 1, 1994

re: 1 sample for BTEX analysis.

Matrix: WATER

Sampled: June 29, 1994

Lab Run#: 3289

Analyzed: July 6, 1994

Method: EPA 602

<u>Spl # CLIENT SMPL ID</u>	<u>Benzene (ug/L)</u>	<u>Toluene (ug/L)</u>	<u>Ethyl Benzene (ug/L)</u>	<u>Total Xylenes (ug/L)</u> ✓
56415 MW2-3	N.D. /	N.D. /	N.D. /	N.D.
Reporting Limits	0.5	0.5	0.5	0.5
Blank Result	N.D.	N.D.	N.D.	N.D.
Blank Spike Result (%)	102	108	104	111

ChromaLab, Inc.


Jack Kelly
Chemist

for Jack Kelly


Ali Kharrazi
Organic Manager

GARY 10/16/11

CHROMALAB, INC.

DOHS 1094

SUBM #: 9407021
 CLIENT: ALISTO
 DUE: 07/11/94
 REF: 17087

Order # 17087
 02156413-56415

Chain of Custody

DATE 7-1-94 PAGE 1 OF 1

PROJ. MGR. BILL HOWELL
 COMPANY ALISTO ENG. GROUP
 ADDRESS 1777 OAKLAND BLVD, 200
WALNUT CREEK

SAMPLERS (SIGNATURE) DJ Bid (PHONE NO.) 510 295 1650

SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.	ANALYSIS REPORT													NUMBER OF CONTAINERS					
					TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) w/BTEX (EPA 602, 8020)	TPH - Diesel (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520, B+F, E+F)	PCB (EPA 608, 8080)	PESTICIDES (EPA 608, 8080)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)		PRIORITY POLLUTANT METALS (13)	TOTAL LEAD	EXTRACTION (TCLP, STLC)		
MW1-2	6/29/94	1432	W	None			X															1	
MW1-3		1427		None			X																1
MW2-3	.v	1350		None 170			X	X															4

PROJECT INFORMATION		SAMPLE RECEIPT			
PROJECT NAME: <u>OAKLAND Power Plant</u>	TOTAL NO. OF CONTAINERS <u>6410</u>	HEAD SPACE <u>120</u>	REC'D GOOD CONDITION/COLD <u>11/1</u>	CONFORMS TO RECORD <u>425</u>	
PROJECT NUMBER: <u>0530-EC</u>					
P.O. #					
TAT	<u>STANDARD 5-DAY</u>	24	48	72	OTHER
SPECIAL INSTRUCTIONS/COMMENTS:					

RELINQUISHED BY 1.		RELINQUISHED BY 2.		RELINQUISHED BY 3.	
(SIGNATURE) <u>DJ Bid</u>	(TIME)	(SIGNATURE)	(TIME)	(SIGNATURE)	(TIME)
(PRINTED NAME) <u>DAN BIRCH</u>	(DATE)	(PRINTED NAME)	(DATE)	(PRINTED NAME)	(DATE)
(COMPANY) <u>ALISTO 7-1-94</u>		(COMPANY)		(COMPANY)	
RECEIVED BY 1.		RECEIVED BY 2.		RECEIVED BY (LABORATORY) 3.	
(SIGNATURE)	(TIME)	(SIGNATURE)	(TIME)	(SIGNATURE) <u>B. Morgan 1336</u>	(TIME)
(PRINTED NAME)	(DATE)	(PRINTED NAME)	(DATE)	(PRINTED NAME) <u>B. Morgan 7-1-94</u>	(DATE)
(COMPANY)		(COMPANY)		(LAB) <u>Chromalab</u>	