# GROUNDWATER MONITORING AND SAMPLING REPORT

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

PG&E Project No. 0530-EC
Alisto Project No. 10-179-01-001

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

October 19, 1993

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

PG&E Project No. 0530-EC
Alisto Project No. 10-179-01-001

October 19, 1993

## INTRODUCTION

This report presents the results and findings of the September 22, 1993 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 the 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 the previous quarter are summarized in Table 1. The potentiometric groundwater elevations as interpreted from the results of this monitoring event are shown in Figure 2. The field procedures for chain of custody documentation, laboratory report, and chain of custody record are presented in Appendix B.

## SUMMARY OF FINDINGS

The findings of the September 22, 1993 groundwater monitoring and sampling event are summarized as follows:

- Free product was not observed in any of the groundwater monitoring wells.
- Groundwater elevation data indicate a gradient of 0.005 foot per foot in a northeasterly direction.
- Analysis of the samples collected from monitoring wells MW-1-2, MW-1-3, and MW-2-3 detected total petroleum hydrocarbons as diesel at concentrations of 240, 430, and 460 micrograms per liter, respectively.
- Benzene, toluene, ethylbenzene, and total xylenes were not detected in the groundwater samples collected from any of the monitoring wells.

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

ALISTO PROJECT NO. 10-179

| WELL ID | DATE OF SAMPLING/ MONITORING | CASING ELEVATION (a) (Feet) | DEPTH TO WATER (Feet) | GROUNDWATER ELEVATION (b) (Feet) | TPH-D (ug/L) | 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 | 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 (c) | 09/22/93 | --- | --- | --- | --- | ND<0.5 | ND<0.5 | ND<0.5 | ND<0.5 | |
| MW-1-3 | 06/22/93 | 14.01 | 5.15 | 8.86 | 160 | 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-2-3 | 06/22/93 | 13.91 | 5.00 | 8.91 | 560 | 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 |
| QC-2 (d) | 06/22/93 | --- | --- | --- | ND<0.5 | ND<0.5 | ND<0.5 | ND<0.5 | ND<0.5 | CHR |
| QC-2 (d) | 08/18/93 | --- | --- | --- | --- | ND<0.5 | ND<0.5 | ND<0.5 | ND<0.5 | CHR |
| QC-2 | 9-22 | | | | | ND | | | | |

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. |

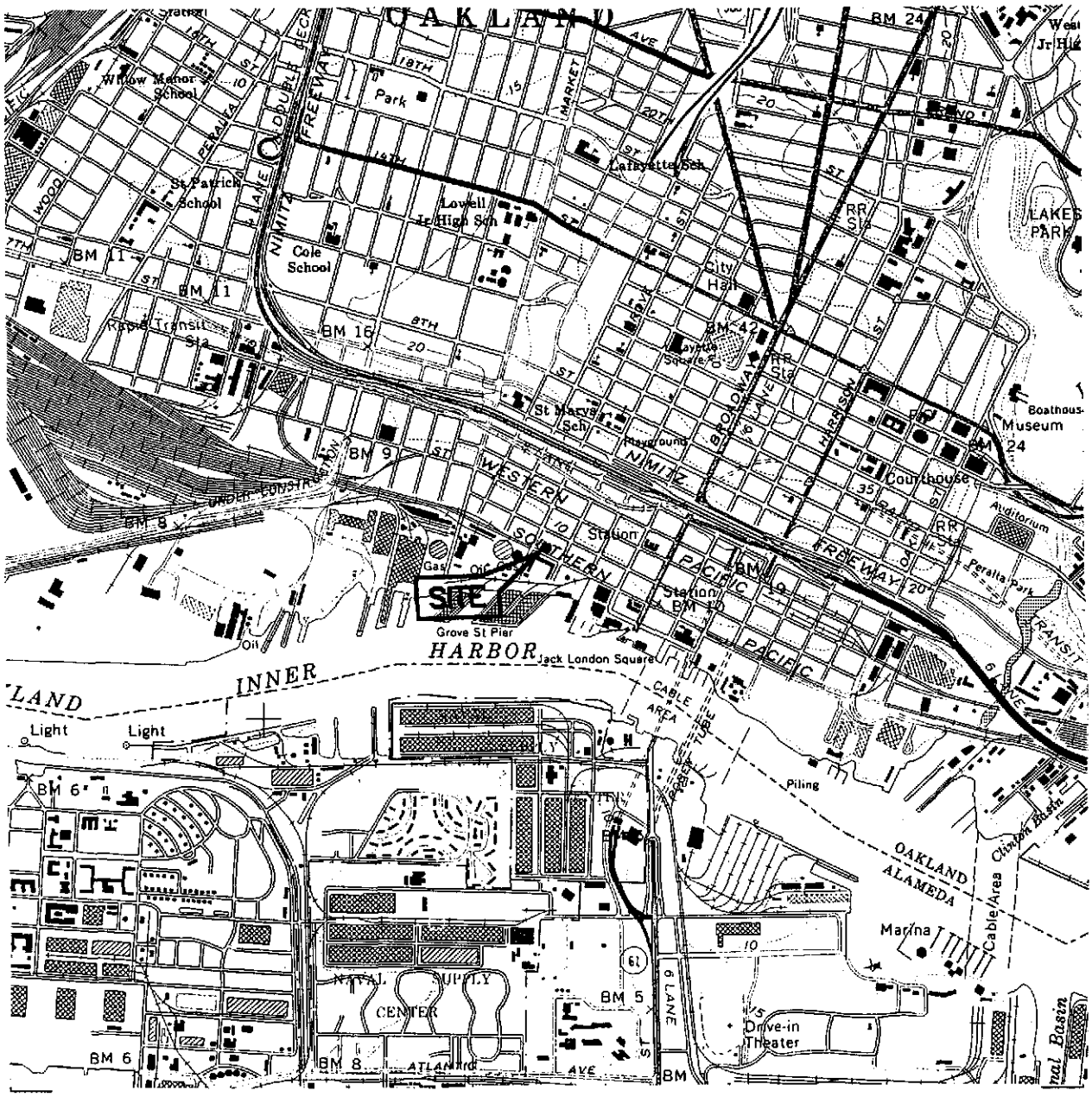
NOTES:

(a) Top of casing elevations surveyed relative to mean sea level

(b) Groundwater elevation in feet above mean sea level.

(c) Blind duplicate.

(d) Travel blank.




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

N

0 1000' 2000'

# FIGURE 1

## SITE VICINITY MAP

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

PROJECT NO. 10-179

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

10179B---.DWG 10-18-93 RKW 1-1

# 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 activities, 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 the presence or absence of free product or sheen. The depth to groundwater was measured to an accuracy of 0.01 foot from the top of the polyvinyl chloride well casing using an electronic sounder.

## Groundwater Monitoring Well Sampling

To ensure that the groundwater sample was representative of the aquifer, the wells were purged of 3 well casing volumes before sample collection unless the monitoring well would not produce sufficient groundwater. This purging was accomplished using a clean bailer or pump.

The groundwater samples were collected using a disposable bailer, and then carefully transferred into the appropriate clean, glass, 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 California-certified laboratory following proper preservation and chain of custody protocol.

# ALISTO ENGINEERING GROUP
# GROUNDWATER MONITORING

Client: PGE
Alisto Project No: 10-179-01-001
Service Station No: OAKLAND POWER PLANT

Date: 9-22-93
Field Personnel: DJB
Site Address: 50 Martin L.K.Jr WAY

FIELD ACTIVITY:

___Groundwater Monitoring
_X_Groundwater Sampling
___Well Development

QUALITY CONTROL SAMPLES:

(MW-2) X QC-1 Sample Duplicate (Well ID)
___ QC-2 Trip Blank
___ QC-3 Rinsate Blank

| Well ID | Well Diam | Order Measured/ Sampled | Total Depth | Depth to Water | Depth to Product | Product Thick-ness | Comments |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| MW-1-2 | 4" | 1 / 1 | 7.24 | 5.91 | | | QC-1 |
| | | | | | | | |
| MW-2-3 | 4" | 2 / 2 | 13.30 | 5.50 | | | |
| | | | | | | | |
| MW-3 | 4" | 3 / 3 | 13.62 | 5.57 | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Notes:

FORM: FS2/121592

# ALISTO ENGINEERING GROUP
## Groundwater Development and Sampling Form

Client: PG E
Alisto Project No: 10-179-01-001
Service Station No: OAKLAND POWER PLANT

Date: 9-22-93
Field Personnel: DJB
Address: 5D MLK JR WAY

Well ID: MW-1-2 Field Activity: Well Development (Well Sampling) Product Bailing

**Casing Diameter:**

___2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

**Purge Method:**

X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

**Well Data:**

___Depth to Product
___Product Thickness
5.52 Depth to Water

**Sampling Method:**

X Disposable Bailer
___Pump

**Decontamination Method:**

___ Triple Rinse (Liquinox)
___ Steam Cleaned

MW1-2

**Calculated Purge Volume**

13.62 (Total Depth of Well) - 5.57 (Depth to Water) = 8.05 ft (Water Column) X .65 (Conversion Factor) Gal/Ft = 5.23 Gal (Casing Vol) X 3 (Vols to Purge) = 15.6 (Total Volume)

**Well Development/Sampling Parameters**

| Time | Temp °F | pH | Cond. (umhos /cm) | Purge Vol (Gal) | Comments/ Turbidity | Analysis Required | Container Type | Preserv. |
|---|---|---|---|---|---|---|---|---|
| 1425 | 68.4 | 7.28 | 10.16 | 3 | 121.4 | X TPH-G/BTEX | VOA | HCL |
| 1426 | 68.0 | 7.18 | 9.43 | 4 | 151.7 | X TPH-Diesel | Amber Liter | Solvent Rinsed |
| 1427 | 68.1 | 7.14 | 9.27 | 6 | 155.4 NTU's | EPA 601 | VOA | |
| | | | | | | TOG 5520BF | Amber Liter | $H_2SO_4$ |
| | | | | | | | | |

Purged dry @ 6 gallons. QC-1 from MW1-2

# ALISTO ENGINEERING GROUP
## Groundwater Development and Sampling Form

Client: P&E
Alisto Project No: 10-179-01-001
Service Station No: OAKLAND POWER PLANT

Date: 9-22-93
Field Personnel: DTB
Address: 50 MILKER WAY

Well ID: MW-2-3 Field Activity: Well Development (Well Sampling) Product Bailing

**Casing Diameter:**

___2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

**Purge Method:**

X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

**Well Data:**

___Depth to Product
___Product Thickness
5.50 Depth to Water

**Sampling Method:**

X Disposable Bailer
___Pump

**Decontamination Method:**

___ Triple Rinse (Liquinox)
___ Steam Cleaned

MW 2-3

**Calculated Purge Volume**

13.30 (Total Depth of Well) - 5.50 (Depth to Water) = 7.8 ft (Water Column) X .65 (Conversion Factor) Gal/Ft = 5.07 Gal (Casing Vol) X 3 (Vols to Purge) = 15.21 (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. |
|---|---|---|---|---|---|---|---|---|
| 1407 | 71.4 | 7.49 | >20 | 3 | 121.7 | X ~~TPH-~~ G/BTEX | VOA | HCL |
| 1409 | 73.7 | 7.16 | >20 | 5 | 111.9 | X TPH-Diesel | Amber Liter | Solvent Rinsed |
| 1421 | 73.1 | 7.12 | >20 | 6 | 100.4 | EPA 601 | VOA | |
| | | | | | | TOG 5520BF | Amber Liter | $H_2SO_4$ |
| | | | | | | | | |

Purged dry @ 5 gallons. Purged dry @ 6 gallons.

# ALISTO ENGINEERING GROUP
## Groundwater Development and Sampling Form

Client: PG&E
Alisto Project No: 10-179-01-001
Service Station No: OAKLAND POWER PLANT

Date: 9-22-93
Field Personnel: DJB
Address: 50 MILK FARM WAY

Well ID: MW-3 Field Activity: Well Development (Well Sampling) Product Bailing

**Casing Diameter:**

__2 Inch (0.16 Gal/foot)
__3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
__4.5 Inch (0.83 Gal/foot)
__6 Inch (1.47 Gal/foot)

**Purge Method:**

X Pump (dispos. Poly Tubing)
__Disposable Bailers
__Other
__1.66 PVC Standard Bailer
__3.50 PVC Standard Bailer

**Well Data:**

__Depth to Product
__Product Thickness
5.59 Depth to Water

**Sampling Method:**

X Disposable Bailer
__Pump

**Decontamination Method:**

__ Triple Rinse (Liquinox)
__ Steam Cleaned

MW1-3

**Calculated Purge Volume**

7.24 (Total Depth of Well) - 5.59 (Depth to Water) = 1.65 ft (Water Column) X .65 Gal/Ft (Conversion Factor) = 1.07 Gal (Casing Vol) X 3 (Vols to Purge) = 3.2 (Total Volume)

**Well Development/Sampling Parameters**

| Time | Temp °F | pH | Cond. (umhos /cm) | Purge Vol (Gal) | Comments/ Turbidity | Analysis Required | Container Type | Preserv. |
|---|---|---|---|---|---|---|---|---|
| 1451 | 72.7 | 7.41 | 12.24 | 1 | 91.6 | X ~~TPH~~ G/BTEX | VOA | HCL |
| 1455 | 71.3 | 7.40 | 12.19 | 2 | 93.4 | X TPH-Diesel BTEX | Amber Liter | Solvent Rinsed |
| | | | | | | EPA 601 | VOA | |
| | | | | | | TOG 5520BF | Amber Liter | $H_2SO_4$ |
| | | | | | | | | |

Purged dry @ 2 gallons.

# APPENDIX B

## FIELD PROCEDURES FOR CHAIN OF CUSTODY DOCUMENTATION, LABORATORY REPORT, AND CHAIN OF CUSTODY RECORD

## FIELD PROCEDURES
## FOR
## CHAIN OF CUSTODY DOCUMENTATION

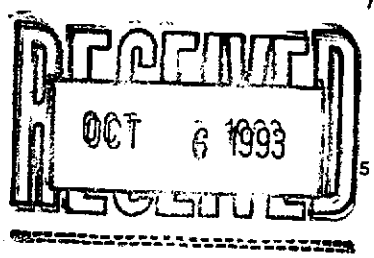
The samples collected were properly handled in accordance with the California Department of Health Services guidelines. Each sample was properly labeled in the field, and immediately stored in coolers and preserved with blue ice for transport to a California-certified laboratory for analysis.

The official 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.

10-179-01-001

# CHROMALAB, INC.

Environmental Laboratory (1094)




5 DAYS TURNAROUND

September 30, 1993 ChromaLab File No.: 9309307

P.G.& E. WATER QUAL GP S RAMON

Attn: Gary Nulty

RE: Five water samples for BTEX analysis

Project Name: PGE-50 MLK JR. WAY
Project Number: 10-179-01-01/0530-EC
Date Sampled: Sept. 22, 1993 Date Submitted: Sept. 23, 1993
Date Analyzed: Sept. 27, 1993

RESULTS:

| Sample I.D. | Benzene (µg/L) | Toluene (µg/L) | Ethyl Benzene (µg/L) | Total Xylenes (µg/L) |
|---|---|---|---|---|
| MW1-2 | N.D. | N.D. | N.D. | N.D. |
| MW2-3 | N.D. | N.D. | N.D. | N.D. |
| MW1-3 | N.D. | N.D. | N.D. | N.D. |
| QC-1 | N.D | N.D. | N.D. | N.D. |
| QC-2 | N.D. | N.D. | N.D. | N.D. |
| BLANK | N.D. | N.D. | N.D. | N.D. |
| SPIKE RECOVERY | 100% | 102% | 102% | 102% |
| DUP SPIKE RECOVERY | 103% | 105% | 108% | 107% |
| DETECTION LIMIT | 0.5 | 0.5 | 0.5 | 0.5 |
| METHOD OF ANALYSIS | 602 | 602 | 602 | 602 |

ChromaLab, Inc.

Jack Kelly
Analytical Chemist

Eric Tam
Laboratory Director

jm

2239 Omega Road,#1 • San Ramon, California 94583
(510) 831-1788 • Facsimile (510) 831-8798
Federal ID #68-0140157

# CHROMALAB, INC.

Environmental Laboratory (1094)

5 DAYS TURNAROUND

October 1, 1993 ChromaLab File No.: 9309307

P.G.& E. WATER QUAL GP S RAMON

Attn: Gary Nulty

RE: Three water samples for Diesel analysis

Project Name: PGE-50 MLK JR. WAY
Project Number: 10-179-01-01/0530-EC
Date Sampled: Sept. 22, 1993 Date Submitted: Sept. 23, 1993
Date Extracted: Sept. 29, 1993 Date Analyzed: Sept. 30, 1993

RESULTS:

| Sample I.D. | Diesel (µg/L) |
|---|---|
| MW1-2 | 240 |
| MW1-3 | 430 |
| MW2-3 | 460 |
| BLANK | N.D. |
| SPIKE RECOVERY | 92% |
| DUP SPIKE RECOVERY | 96% |
| DETECTION LIMIT | 50 |
| METHOD OF ANALYSIS | 3510/8015 |

ChromaLab, Inc.

Alex Tam
Analytical Chemist

Eric Tam
Laboratory Director

cc

2239 Omega Road,#1 • San Ramon, California 94583
(510) 831-1788 • Facsimile (510) 831-8798
Federal ID #68-0140157

SUBM #: 9309307
CLIENT: PGE-WAT
DUE: 09/30/93
2 REF: 13424

307/20375 – 20379
013424

# CHROMALAB, INC.

DOHS 1094

## Chain of Custody

DATE 9-23-93 PAGE 931 OF 1

PROJ. MGR. GARY NOLTE
COMPANY PGE
ADDRESS 3400 Crow Canyon Rd
San Ramone

SAMPLERS (SIGNATURE) (PHONE NO.)
VOA 452 0718

| SAMPLE ID. | DATE | TIME | MATRIX | PRESERV. | TPH - Gasoline (EPA 5030, 8015) | ~~TPH - Gasoline (5030, 8015)~~ +/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) | | | | NUMBER OF CONTAINERS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW1-2 | 9/22/93 | | W | HCl | | X | X | | | | | | | | | | | | | | | | | | 5 |
| MW2-3 | ↓ | | ↓ | ↓ | | X | X | | | | | | | | | | | | | | | | | | 5 |
| MW1-3 | | | | | | X | X | | | | | | | | | | | | | | | | | | 5 |
| QC-1 | | | | | | X | | | | | | | | | | | | | | | | | | | 3 |
| QC-2 | ↓ | | ↓ | ↓ | | X | | | | | | | | | | | | | | | | | | | 1 |

### PROJECT INFORMATION

PROJECT NAME: PGE- SO MLK Jr. WAY
PROJECT NUMBER: 10-179-01-01
P.O.# 0530-EC

### SAMPLE RECEIPT

| | |
|---|---|
| TOTAL NO. OF CONTAINERS | |
| HEAD SPACE | |
| REC'D GOOD CONDITION/COLD | |
| CONFORMS TO RECORD | |

TAT: STANDARD 5-DAY | | | 24 | 48 | 72 | OTHER

SPECIAL INSTRUCTIONS/COMMENTS: Please send a copy of Chemical results to: Bill Howell 1777 OAKLAND BLVD, STE 200 WALNUT CREEK.

| RELINQUISHED BY 1. | RELINQUISHED BY 2. | RELINQUISHED BY 3. |
|---|---|---|
| (SIGNATURE) (TIME) 1300 | (SIGNATURE) (TIME) | (SIGNATURE) (TIME) |
| (PRINTED NAME) Dan Birch (DATE) 9-23-93 | (PRINTED NAME) (DATE) | (PRINTED NAME) (DATE) |
| (COMPANY) BTS | (COMPANY) | (COMPANY) |
| **RECEIVED BY 1.** | **RECEIVED BY 2.** | **RECEIVED BY (LABORATORY) 3.** |
| (SIGNATURE) (TIME) | (SIGNATURE) (TIME) | (SIGNATURE) (TIME) |
| (PRINTED NAME) (DATE) | (PRINTED NAME) (DATE) | (PRINTED NAME) (DATE) |
| (COMPANY) | (COMPANY) | (LAB) |

EMBARCADERO WAY

MARTIN LUTHER KING JR. WAY

JEFFERSON STREET

TURBINE #1

TURBINE #2

TURBINE #3

DIESEL DUMP TANK #1

DIESEL DUMP TANK #2

DIESEL DUMP TANK #3

STACK

STACK

CATCH BASIN

CATCH BASIN

TRANSFORMER

MW-1-2 (8.04)

MW-1-3 (8.44)

MW-2-3 (8.41)

8.10

8.20

8.30

8.40

0.005

5,000 GALLON GROUNDWATER COLLECTION TANK

10,000 GALLON OILY WATER WASTE TANK

N

0 30 60

SCALE IN FEET

## LEGEND

- ◆ GROUNDWATER MONITORING WELL
- (8.04) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 8.10 GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL-0.10 FOOT)
- 0.005 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT

FIGURE 2

POTENTIOMETRIC GROUNDWATER ELEVATION CONTOUR MAP

SEPTEMBER 22, 1993

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

PROJECT NO. 10-179

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

10179D-C.DWG 10-19-93 RKW 1=30