

**GROUNDWATER MONITORING AND SAMPLING  
REPORT**

**OAKLAND POWER PLANT  
50 MARTIN LUTHER KING JR. WAY  
OAKLAND, CALIFORNIA  
FOURTH QUARTER, 1995**

Prepared for  
Pacific Gas and Electric company  
January 1996

Prepared by  
EMCON  
1433 North Market Boulevard  
Sacramento, California 95834

Project 0143-117.01

## 1 INTRODUCTION

This report presents data collected during the fourth quarter 1995 monitoring period at Pacific Gas and Electric Company (PG&E) Oakland Power Plant, 50 Martin Luther King, Jr. Way, Oakland, California (see Figure 1).

## 2 GROUNDWATER GRADIENT AND DIRECTION

Fourth quarter groundwater levels were measured at PG&E's Oakland Power Plant on January 18, 1996, using an electronic sounding device, and recorded on the monitoring well data form included in Appendix A. The groundwater elevations are summarized in the table. The January data were used in constructing a groundwater contour map (see Figure 2). January water levels ranged from a low of 9.29 feet above mean sea level (MSL) in well MW-1-3 to a high of 9.76 feet above MSL in wells MW-1-2 and MW-2-3. The estimated groundwater gradient is approximately 0.007 foot per foot (ft/ft) to the northwest.

## 3 SAMPLING, ANALYSIS, AND MONITORING PROGRAM RESULTS

Groundwater samples were collected from wells MW-1-2, MW-1-3, and MW-2-3 on January 18, 1996, consistent with the protocol presented in Figure 3. Samples collected from wells MW-1-2, MW-1-3, and MW-2-3 were analyzed for diesel by the U.S. Environmental Protection Agency (USEPA) Method 3510/8015M. According to a letter dated January 11, 1996, from Hazardous Materials Specialist, Jennifer Eberle, with the Alameda County Health Care Services Department, the BTEX analysis was eliminated from well MW-2-3. Field readings from the fourth quarter 1995 monitoring event are recorded on the water sample field data sheets (see Appendix A) and summarized in the table.

The analytical results are discussed below. Fourth quarter 1995 and historical analytical data are summarized in the table. Certified analytical reports and chain-of-custody records are included in Appendix B.

An unknown hydrocarbon in the diesel range was detected from wells MW-1-2, MW-1-3, and MW-2-3 at concentrations of 600, 240, and 370 micrograms per liter ( $\mu\text{g/L}$ ), respectively.

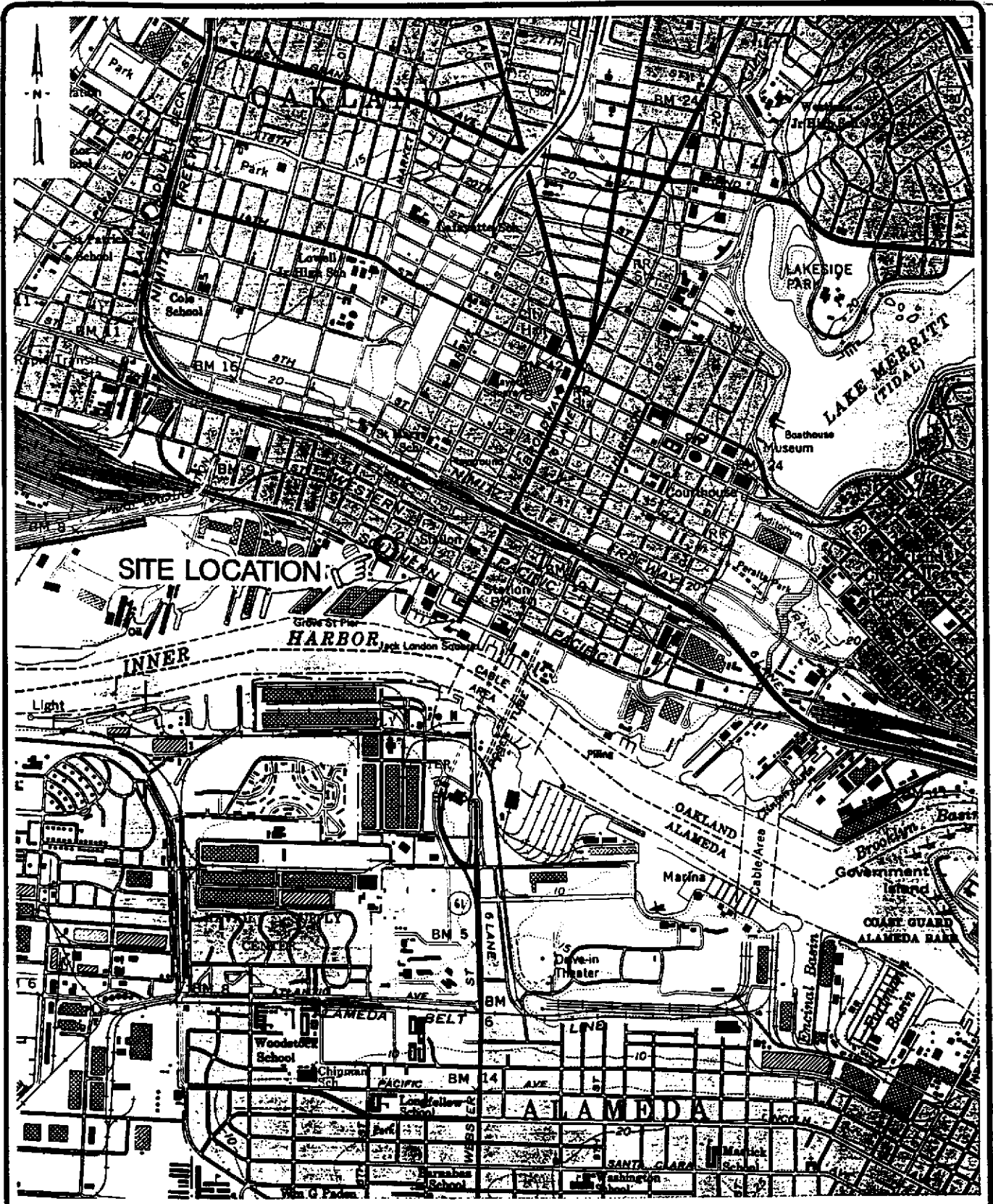
## 4 FIELD AND LABORATORY QUALITY CONTROL RESULTS

Analytical data were evaluated for accuracy and precision based on field and laboratory quality control (QC) sample performance. The field QC consisted of collecting one field blank and analyzing it for diesel.

The field blank was collected to assess the effect of field environments on the analytical results and to identify false positives. No parameters were detected above their respective method

**Table  
Oakland Power Plant  
Fourth Quarter 1995 Monitoring Data**

Sample Designation	Sampling Date	Top of Casing (ft/MSL)	Depth to Groundwater (ft)	Groundwater Elevation (ft/MSL)	TPHD ug/L	Benzene ug/L	Toluene ug/L	Ethyl-benzene ug/L	Total Xylenes ug/L
MW-1-2	06/22/93	13.95	5.05	8.90	1,500 <sup>1</sup>	<0.5	<0.5	<0.5	<0.5
MW-1-2	09/22/93		5.91	8.04	240	<0.5	<0.5	<0.5	<0.5
Dup	09/22/93		---	---	---	<0.5	<0.5	<0.5	<0.5
MW-1-2	12/28/93		4.77	9.18	200	<0.5	<0.5	<0.5	<0.5
Dup	12/28/93		---	---	---	<0.5	<0.5	<0.5	<0.5
MW-1-2	04/11/94		4.66	9.29	---	<0.5	<0.5	<0.5	<0.5
Dup	04/11/94		---	---	---	<0.5	<0.5	<0.5	<0.5
MW-1-2	04/20/94		4.86	9.09	600	---	---	---	---
MW-1-2	06/29/94		5.18	8.77	520	---	---	---	---
MW-1-2	10/07/94		4.55	9.40	590	---	---	---	---
MW-1-2	01/03/95		4.11	9.84	650 <sup>1</sup>	---	---	---	---
MW-1-2	03/24/95		3.57	10.38	740 <sup>1</sup>	---	---	---	---
MW-1-2	06/30/95		4.69	9.26	540	---	---	---	---
MW-1-2	10/12/95		5.35	8.60	230 <sup>1</sup>	---	---	---	---
MW-1-2	04/13/96		4.19	9.76	600 <sup>1</sup>	---	---	---	---
MW-1-3	06/22/93	14.01	5.15	8.86	160 <sup>1</sup>	<0.5	<0.5	<0.5	<0.5
MW-1-3	09/22/93		5.57	8.44	430	<0.5	<0.5	<0.5	<0.5
MW-1-3	12/28/93		5.13	8.88	<50	<0.5	<0.5	<0.5	<0.5
MW-1-3	04/11/94		5.01	9.00	---	<0.5	<0.5	<0.5	<0.5
MW-1-3	04/20/94		5.09	8.92	<50	---	---	---	---
MW-1-3	06/29/94		5.30	8.71	280 <sup>1</sup>	---	---	---	---
MW-1-3	10/07/94		5.69	8.32	160 <sup>1</sup>	---	---	---	---
MW-1-3	01/03/95		4.62	9.39	210 <sup>1</sup>	---	---	---	---
MW-1-3	06/30/95		4.89	9.12	231 <sup>1</sup>	---	---	---	---
MW-1-3	10/12/95		5.43	8.58	190 <sup>1</sup>	---	---	---	---
MW-1-3	04/13/96		4.72	9.29	300 <sup>1</sup>	---	---	---	---
MW-2-3	06/22/93	13.91	5.00	8.91	560 <sup>2</sup>	3	<0.5	<0.5	<0.5
MW-2-3	09/22/93		5.50	8.41	460	<0.5	<0.5	<0.5	<0.5
MW-2-3	12/28/93		4.74	9.17	<50 <sup>3</sup>	<0.5	<0.5	<0.5	<0.5



Base map from U.S. Geologic Survey 7.5 minute series  
 quadrangle: Oakland West, California

SCALE: 0 2000 FEET

10/85

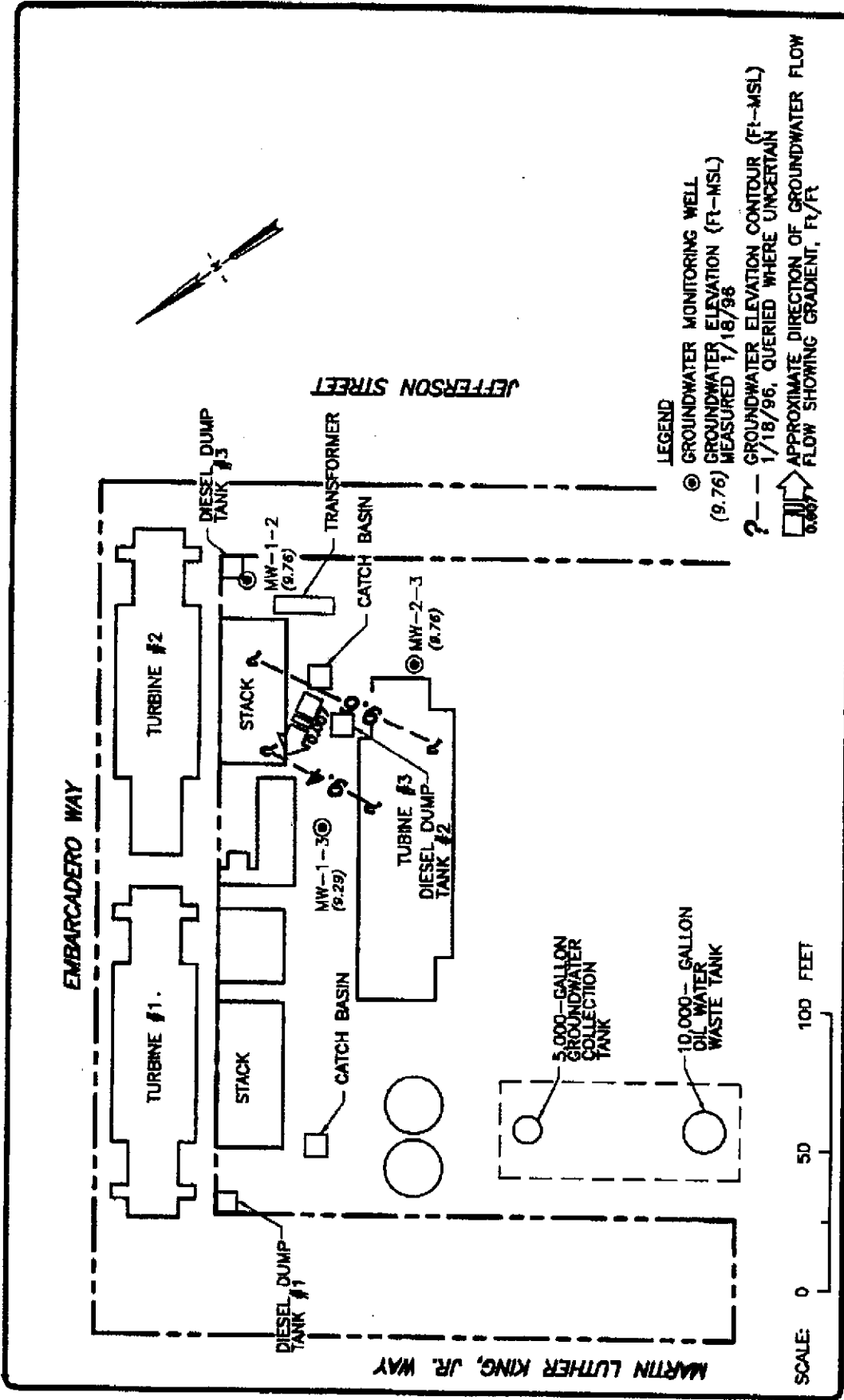


PACIFIC GAS AND ELECTRIC COMPANY  
 OAKLAND POWER PLANT  
 50 MARTIN LUTHER KING, JR. WAY  
 OAKLAND, CALIFORNIA

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SITE LOCATION MAP

FIGURE  
 1  
 PROJECT NO.  
 0143-117.01



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

GROUNDWATER CONTOUR MAP, FOURTH QUARTER 1995

FIGURE **2**

PROJECT NO.  
 0143-117.001

\\PBAE\117\GND\DWG  
 1-23-96

*not 1-18-96?*



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# MONITORING WELL PURGING PROTOCOL

MEASURE AND RECORD DEPTH TO WATER AND WELL TOTAL DEPTH

CHECK FOR FLOATING PRODUCT

YES

MEASURE AND DOCUMENT FLOATING PRODUCT THICKNESS. DO NOT SAMPLE WELL FOR DISSOLVED CONSTITUENTS.

NO

CALCULATE PURGE VOLUME BY USING THE FOLLOWING EQUATION:

$$P = \pi r^2 h \times 7.48 \times 3$$

where:

- P = calculated purge volume (gallons)
- $\pi$  = 3.14
- r = radius of well casing in feet
- h = height of water column in feet

WELL EVACUATED TO PRACTICAL LIMITS OF DRYNESS BEFORE REMOVING CALCULATED PURGE VOLUME

EVACUATE WATER FROM WELL EQUAL TO THE CALCULATED PURGE VOLUME WHILE MONITORING GROUND-WATER STABILIZATION INDICATOR PARAMETERS (pH, CONDUCTIVITY, TEMPERATURE) AND TURBIDITY AT INTERVALS OF ONE CASING VOLUME.

NO

YES

FINAL TWO SETS OF GROUND-WATER STABILIZATION INDICATOR PARAMETER MEASUREMENTS MEET THE FOLLOWING CRITERIA:

- pH = ± 0.05 pH units
- COND. = ± 3 %
- TEMP. = ± 1.0 °F
- TURBIDITY = ± <5 NTU

YES

WELL PURGING CRITERIA MET; PROCEED TO WELL SAMPLING

NO

CONTINUE PURGING; EVACUATE ADDITIONAL CASING VOLUME OF WATER, MONITORING INDICATOR PARAMETERS FOR STABILITY.

YES

FIELD TEST FIRST RECHARGE WATER FOR INDICATOR PARAMETERS AND TURBIDITY, THEN PROCEED TO WELL SAMPLING.

NO

RECORD WELL AS DRY FOR PURPOSES OF SAMPLING.



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MONITORING WELL PURGING PROTOCOL

FIGURE

3

**EMCON  
GROUNDWATER SAMPLING AND ANALYSIS REQUEST FORM**

**PROJECT NAME: PACIFIC GAS & ELECTRIC-Oakland**  
50 Martin Luther King Way

**DATE SUBMITTED: 18-Jan-95**

**SPECIAL INSTRUCTIONS / CONSIDERATIONS :**  
*Annual Water Quality Monitoring - First Month of the Quarter*

**BRING TWO DRUMS AND A TRIP BLANK (QC-1) FOR TPH-DIESEL  
MUST BE ON SITE BY 10:00AM.** Gate is not staffed. Ring bell to be let in.  
Take some extra locks along  
Survey water levels prior to well purging and sampling.  
Purge three casing volumes prior to sample collection  
Purge with a jacuzzi or with bailers; sample with teflon bailers.  
Drum purge water. Label and store drums by Hazardous  
Waste storage area shed on the west side of the yard.

**Deliver the samples to Chromalab when finished. (See attached map)**

Authorization: \_\_\_\_\_

Project No. : 20143-117.001

Task Code: \_\_\_\_\_

Send Results To: J. C. Isham

Coordinator: Steve Horton

Well Locks:
3490

TES Contact: Gary Nulty  
Site Contact: NA

Phone No.: (510) 866-5812  
Phone No.: NA

Well ID or Source	Casing Diameter (inches)	Casing Length (feet)	Floating Product Thickness	ANALYSES REQUESTED
MW-1-2	4.0	13.5	ND	<b>TPHD by EPA 3510/8015M (Fill 2, 1 Liter Glass, NP)</b>
MW-1-3	4.0	7.2	ND	
MW-2-3	4.0	12.3	ND	
<b>Sample In Indicated Order</b>				
QC-1		(Trip Blank)		<b>TPHD by EPA 3510/8015M (2, 1 Liter Glass, NP)</b>

*Completed 1-18-96  
J William*

and Lab QC Instructions: **24HR RUSH TURNAROUND** Tier I QC; all samples are to be analyzed by  
Please send results to J. C. Isham



EMCON ASSOCIATES

# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 20143-117-001

SAMPLE ID: MW-1-2

PURGED BY: WILLIAMS

CLIENT NAME: PG&E

SAMPLED BY: [Signature]

LOCATION: Oakland CA

TYPE: Ground Water  Surface Water  Treatment Effluent  Other

CASING DIAMETER (inches): 2  3  4  4.5  6  Other

CASING ELEVATION (feet/MSL): 12 VOLUME IN CASING (gal.): 3.13  
 DEPTH TO WATER (feet): 4.19 CALCULATED PURGE (gal.): 9.41  
 DEPTH OF WELL (feet): 13.6 ACTUAL PURGE VOL (gal.): 10

DATE PURGED: 01-18-96 Start (2400 Hr) 1112 End (2400 Hr) 1121  
 DATE SAMPLED: [Signature] Start (2400 Hr) --- End (2400 Hr) 1128

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (Visual)
<u>1115</u>	<u>3.5</u>	<u>7.28</u>	<u>1409</u>	<u>62.1</u>	<u>GRAY</u>	<u>HEAVY</u>
<u>1118</u>	<u>7</u>	<u>7.31</u>	<u>1422</u>	<u>62.3</u>	<u>GRAY</u>	<u>HEAVY</u>
<u>1121</u>	<u>10</u>	<u>7.29</u>	<u>1436</u>	<u>62.8</u>	<u>GRAY</u>	<u>HEAVY</u>
---	---	---	---	---	---	---
---	---	---	---	---	---	---

D. O. (ppm): NR ODOR: STRONG NR NR  
 (COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR Parameters field filtered at this well: NR

### PURGING EQUIPMENT

- 2" Bladder Pump
- Centrifugal Pump
- Submersible Pump
- Well Wizard™
- Bailer (Teflon®)
- Bailer (PVC)
- Bailer (Stainless Steel)
- Dedicated

Other: \_\_\_\_\_

### SAMPLING EQUIPMENT

- 2" Bladder Pump
- DDL Sampler
- Clipper
- Well Wizard™
- Bailer (Teflon®)
- Bailer (Stainless Steel)
- Submersible Pump
- Dedicated

Other: \_\_\_\_\_

WELL INTEGRITY: OK LOCK #: 5800

REMARKS: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Meter Calibration: Date: 1-18-96 Time: 1100 Meter Serial #: 9021 Temperature °F: 59.8  
 (EC 1000 983 / 1000) (DI \_\_\_\_\_) (pH 7 7.15 / 7.00) (pH 10 10.04 / 10.00) (pH 4 3.98 / \_\_\_\_\_)

Location of previous calibration: \_\_\_\_\_

Signature: [Signature] Reviewed By: KR Page 1 of 3





EMCON ASSOCIATES

# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 20143-117-001  
PURGED BY: J WILLIAMS  
SAMPLED BY: ↓

SAMPLE ID: MW-2-3  
CLIENT NAME: PG&E  
LOCATION: Oakland CA

TYPE: Ground Water  Surface Water  Treatment Effluent  Other   
CASING DIAMETER (inches): 2  3  4  4.5  6  Other

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 5.97  
DEPTH TO WATER (feet): 4.15 CALCULATED PURGE (gal.): 17.98  
DEPTH OF WELL (feet): 13.3 ACTUAL PURGE VOL (gal.): 8

DATE PURGED: 01-18-96 Start (2400 Hr) 1202 End (2400 Hr) 1207  
 DATE SAMPLED: ↓ Start (2400 Hr) — End (2400 Hr) 1215

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	EC (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (visual)
<u>1205</u>	<u>6</u>	<u>6.59</u>	<u>2680</u>	<u>63.5</u>	<u>CLAY</u>	<u>HEAVY</u>
	<u>DRIED 8 GALLONS</u>	<u>NR</u>	<u>NR</u>			
<u>1217</u>	<u>Recharge</u>	<u>6.39</u>	<u>2580</u>	<u>65.0</u>	<u>CLAY</u>	<u>HEAVY</u>

D. O. (ppm): NR ODOR: STRONG NR NR  
 (COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR Parameters field filtered at this well: NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
<input type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon®)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon®)
<input type="checkbox"/> Centrifugal Pump	<input checked="" type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated
Other: _____		Other: _____	

WELL INTEGRITY: OK LOCK #: 3490

REMARKS : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Meter Calibration: Date: 1-18-96 Time: 1100 Meter Serial #: 9021 Temperature °F: \_\_\_\_\_  
( EC 1000 \_\_\_\_\_ / \_\_\_\_\_ ) ( DI \_\_\_\_\_ ) ( pH 7 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 10 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 4 \_\_\_\_\_ / \_\_\_\_\_ )  
Location of previous calibration: MW-1-2

Signature: J. Williams Reviewed By: KR Page 3 of 3

**CHROMALAB, INC.**

Environmental Services (SDB)

January 19, 1996

Submission #: 9601551

EMCON ASSOCIATES-SACRAMENTO


Atten: J.C. Isham

Project: PG&E, OAKLAND  
Received: January 18, 1996

Project#: 20143-117.001

re: 4 samples for TPH - Diesel analysis.  
Method: EPA 3550/8015MMatrix: WATER  
Sampled: January 18, 1996 Run#: 525  
Extracted: January 18, 1996  
Analyzed: January 18, 1996

Spl#	CLIENT SPL ID	DIESEL (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
78093	MW-1-2	N.D.	50	N.D.	73.1	1
	Note: Hydrocarbons in the diesel range, conc. = 600ug/L.					
78094	MW-1-3	N.D.	50	N.D.	73.1	1
	Note: Hydrocarbons in the diesel range, conc. = 240ug/L.					
78095	MW-2-3	N.D.	50	N.D.	73.1	1
	Note: Hydrocarbons in the diesel range, conc. = 370ug/L.					
78096	QC-1	N.D.	50	N.D.	73.1	1

  
 Kayvan Kimyai  
 Chemist

  
 Alex Tam  
 Semivolatiles Supervisor