

**Pacific Gas and Electric Company**

Hunters Point/Potrero/  
Oakland Power Plants  
Steam Generation  
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San Francisco, CA 94124  
415/695-2200

Kim A. Sloat  
Manager

January 26, 1993



*J.E.*  
Ms. Susan Hugo  
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Oakland, CA 94621

18  
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San Francisco, CA 94124  
415/695-2200

Subject: Shallow Soil and Ground Water Investigation at Oakland Power Plant

Dear Ms. Hugo:

A subsurface investigation which included soil and ground water analysis was conducted in the vicinity of former diesel dump tanks #2 and #3 at Oakland Power Plant, as per your request. A copy of the report is enclosed. The work was performed in accordance with the Leaking Underground Fuel Tank Manual and based on our work plan which you approved in a letter dated September 2, 1992.

**The results of the report indicate that subsurface contamination associated with the tanks (which were removed on 11/6/91) is confined to the immediate vicinity of the former tanks, entirely within the Oakland Power Plant site. For this reason, we do not believe that a threat to the environment outside the facility exists, and request that this matter be closed.**

If you have any questions, please contact Mr. Rex Bell at (415) 695-2205.

Sincerely,

*K.A. Sloat*  
KIM A. SLOAT  
Plant Manager

RB

cc: Mr. Rich Hiatt  
RWQCB, San Francisco Bay Region  
2101 Webster Street, Suite 500  
Oakland, CA 94612

Report Issued:

January 4, 1993

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**Shallow Soil and  
Groundwater Investigation  
Surrounding the Diesel Dump Tanks  
at PG&E's Oakland Power Plant  
Alameda County, California**

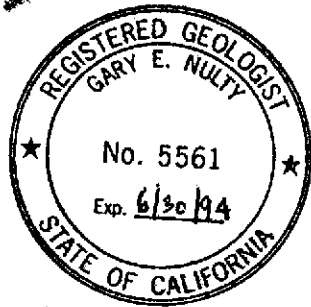
Prepared by  
**Land and Water Quality Unit**

Prepared for  
**Steam Generation**

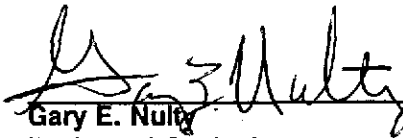
January 1993

Report 402.331-92.58


**Pacific Gas and Electric Company  
Technical and Ecological Services  
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Prepared by:

  
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# CONTENTS

	Page
<b>INTRODUCTION</b> .....	1
<b>BACKGROUND</b> .....	2
SITE DESCRIPTION .....	2
PRELIMINARY SOIL INVESTIGATION .....	2
EXCAVATION SOIL SAMPLES .....	7
CONFIRMATION SOIL SAMPLING SURROUNDING DIESEL TANKS #2 AND #3 .....	7
<b>SOIL SAMPLING AND SHALLOW GROUNDWATER SURVEY</b> .....	12
SOIL SAMPLING .....	12
SHALLOW GROUNDWATER SURVEY .....	12
INSTALLATION OF TEMPORARY MONITORING WELLS .....	14
<b>WASTE DISPOSAL</b> .....	16
<b>RESULTS</b> .....	17
SUBSURFACE CONDITIONS .....	17
SOIL ANALYSES .....	17
GROUNDWATER ANALYSES .....	18
<b>SUMMARY</b> .....	21
<b>REFERENCES</b> .....	22
Appendix A:	
<b>BORING AND WELL CONSTRUCTION LOGS</b>	
Appendix B:	
<b>UNIFORM HAZARDOUS WASTE MANIFESTS</b>	
Appendix C:	
<b>SOIL ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORM</b>	
Appendix D:	
<b>GROUNDWATER ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORM</b>	

## FIGURES

Figure		Page
1	Site location map .....	3
2	Locations of three diesel dump tanks, PG&E's Oakland Power Plant .....	4
3	Locations of exploratory soil borings, conducted in September 1990, near the diesel dump tanks, PG&E's Oakland Power Plant .....	6
4	Locations of soil pile and excavation soil samples near the diesel dump tanks, PG&E's Oakland Power Plant .....	8
5	Locations of confirmation soil borings collected on 6/3/92 near the diesel dump tanks, PG&E's Oakland Power Plant .....	10
6	Locations of soil, shallow groundwater survey points, and temporary monitoring wells near the diesel dump tanks, PG&E's Oakland Power Plant .....	13

## TABLES

Table		Page
1	Summary of Preliminary Soil Sample Analytical Results Collected Near the Diesel Dump Tanks .....	5
2	Summary of Soil Sample Analytical Results Collected From Soil Piles and Excavations, November 1991, PG&E Oakland Power Plant .....	9
3	Summary of Confirmation Soil Analytical Results, PG&E Oakland Power Plant Diesel Dump Tanks #2 and #3 .....	11
4	Summary of Soil Analytical Results Collected During the Shallow Groundwater Investigation .....	18
5	Shallow Groundwater Survey Analytical Results, PG&E Oakland Power Plant .....	20

## INTRODUCTION

This report presents the results of additional site investigation activities performed near two diesel dump tanks at Pacific Gas and Electric Company's (PG&E) Oakland Power Plant. This investigation was conducted to further define the horizontal and vertical extent of diesel in the soils and shallow groundwater immediately adjacent to the tanks. The work was performed as required by Alameda County Department of Environmental Health in accordance with the Leaking Underground Fuel Tank Manual (LUFT) revised October 1989 and based on PG&E's "Work Plan for the Soil and Shallow Groundwater Investigation Surrounding the Diesel Dump Tanks at PG&E's Oakland Power Plant Alameda County, California" dated August 1992.

The shallow soil and groundwater survey was performed in October 1992 and included collection of soil samples and in-situ groundwater sampling from 16 survey points near diesel dump tanks #2 and #3. Five of the 16 survey points were completed as temporary monitoring wells pending evaluation of the results of site investigation.

This report contains a site description, a brief site history, discussion of soil and shallow groundwater collection methods, a description of temporary monitoring well installation procedures and subsurface conditions, and a summary of soil and groundwater test results.

## BACKGROUND

### SITE DESCRIPTION

PG&E's Oakland Power Plant is located at 50 Martin Luther King Jr. Way in Oakland, and lies at an elevation of less than 10 feet above mean sea level (Figure 1). The site is located in an industrial area adjacent to San Francisco Bay.

The facility is used to generate electricity during peak loads by burning diesel oil through three jet turbine generators located at the site (turbines #1, #2, and #3) (Figure 2). Each turbine had a 75-gallon underground diesel dump tank for temporary storage of diesel fuel associated with its operation. These former tanks were cylindrical in shape and were located approximately 1 to 4.5 feet below the ground surface. The diesel fuel was intermittently drained into the tank from each turbine when the fuel lines are purged of unused diesel fuel. The 75-gallon diesel dump tanks were removed and replaced with double-walled tanks contained in sealed concrete vaults in November 1991.

### PRELIMINARY SOIL INVESTIGATION

A preliminary soil investigation study was conducted during September 1990 near the three diesel dump tanks to determine if tank overflow or leakage had occurred and whether the soil near the tanks was affected by diesel fuel. The investigation consisted of drilling and sampling several soil borings in the immediate vicinity of each tank (Figure 3). Results of the preliminary soil investigation are presented in Table 1. As shown, total petroleum hydrocarbons as diesel (TPH-D) were detected in the soils near all three diesel dump tanks, but the concentrations of TPH-D were highly variable from tank to tank. The highest concentration of TPH-D near tank #1 was 70 mg/kg from soil sample OPB 1-2B collected at a depth of 5.5 to 6.0 feet. The highest concentration of TPH-D near tank #2 was 10,000 mg/kg from soil sample OPB 2-2B collected at a depth of 5.0 to 5.5 feet. The highest concentration of TPH-D near tank #3 was 12,000 mg/kg from soil sample OPB 3-2B at 4.5 to 5.0 feet.

Aromatic hydrocarbons, including benzene, toluene, ethylbenzene, and xylenes (BTEX) were nondetectable in all soil samples except one near tank #3 (OPB 3-2B). Analytical results for sample OPB 3-2B (at a depth of 4.5 to 5.0 feet) showed concentrations of benzene at 1.7 mg/kg, toluene at 0.2 mg/kg, ethylbenzene at 0.4 mg/kg, and xylenes at 1.5 mg/kg. These results were presented in PG&E Report No. 402.331-90.55, issued December 1990.

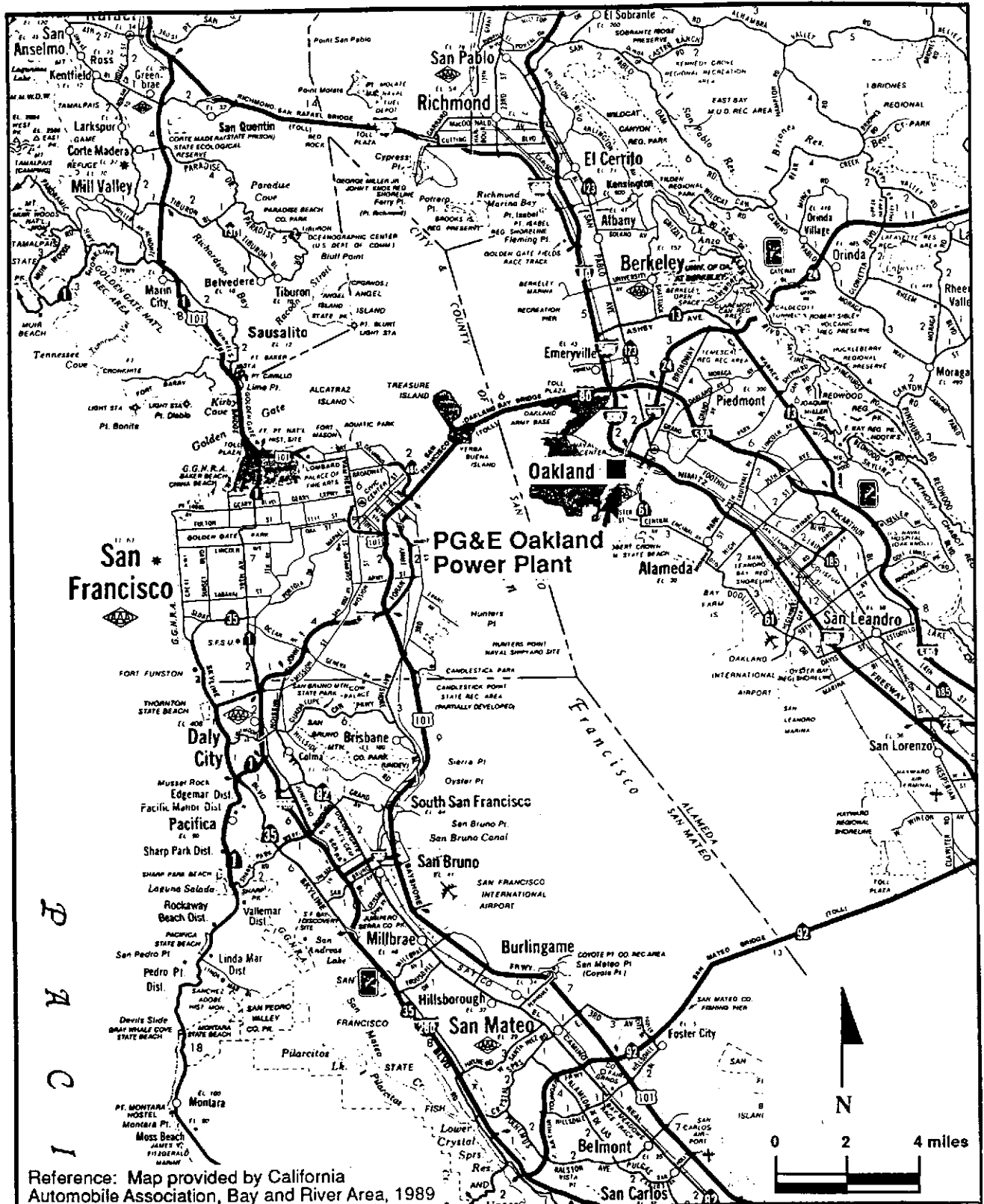


Figure 1. Site location map.



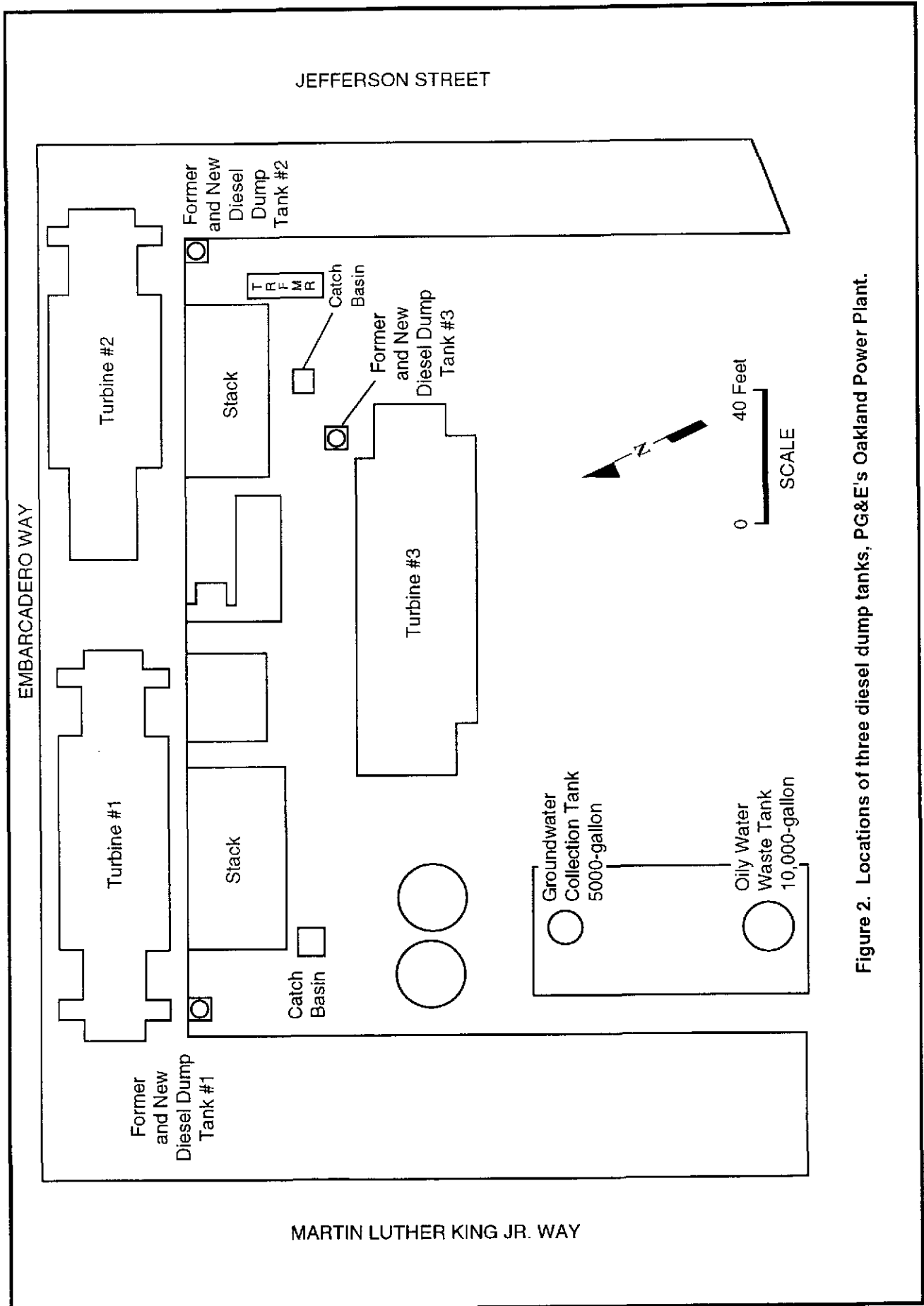


Figure 2. Locations of three diesel dump tanks, PG&E's Oakland Power Plant.

Table 1

Summary of Preliminary Soil Sample Analytical Results Collected Near the Diesel Dump Tanks

(all concentrations in mg/kg)

Sample ID	Depth (feet)	Date Sampled	TPH-D	Aromatic Hydrocarbons			
				B	T	E	X
<b>Tank #1</b>							
OPB 1-1A	2.5-3.0	9/26/90	26	<0.005	<0.005	<0.005	<0.005
OPB 1-1B	5.5-6.0	9/26/90	12	<0.005	<0.005	<0.005	<0.005
OPB 1-2A	4.0-4.5	9/26/90	60	<0.005	<0.005	<0.005	<0.005
OPB 1-2B	5.5-6.0	9/26/90	70	<0.005	<0.005	<0.005	<0.005
<b>Tank #2</b>							
OPB 2-1A	2.5-3.0	9/25/90	150	<0.005	<0.005	<0.005	<0.005
OPB 2-1B	4.0-4.5	9/25/90	1,000	<0.025	<0.025	<0.025	<0.025
OPB 2-2A	2.5-3.0	9/25/90	60	<0.005	<0.005	<0.005	<0.005
OPB 2-2B	5.0-5.5	9/25/90	10,000	<1	<1	<1	<1
<b>Tank #3</b>							
OPB 3-1A	3.0-3.5	9/24/90	1,300	<0.025	<0.025	<0.025	<0.025
OPB 3-2A	3.0-3.5	9/24/90	4,100	<0.4	<0.4	<0.4	<0.4
OPB 3-2B	4.5-5.0	9/24/90	12,000	1.7	0.2	0.4	1.5
OPB 3-3A	3.5-4.0	9/24/90	210	<0.005	<0.005	<0.005	<0.005

TPH-D = Total petroleum hydrocarbons as diesel  
 B = Benzene  
 T = Toluene  
 E = Ethylbenzene  
 X = Xylene  
 < = Concentrations of analyte were nondetectable at or above stated detection limit.

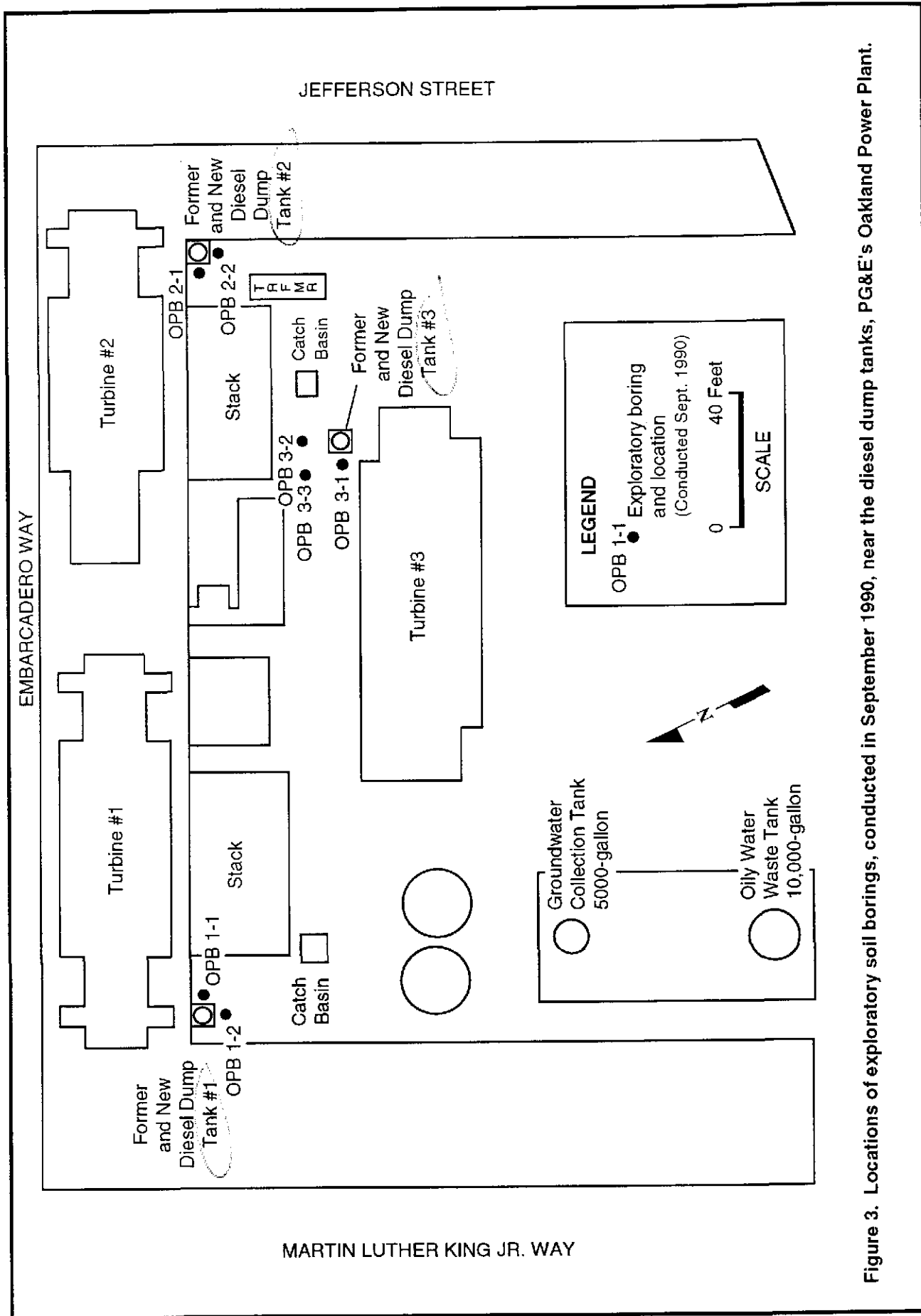


Figure 3. Locations of exploratory soil borings, conducted in September 1990, near the diesel dump tanks, PG&E's Oakland Power Plant.

## **EXCAVATION SOIL SAMPLES**

The three 75-gallon diesel dump tanks were excavated and replaced in November 1991. Six soil samples were collected (one sample from each excavation and one sample from each soil pile) and analyzed for TPH-D and BTEX (Figure 4) during excavation. The analytical results for these samples are presented in Table 2.

No TPH-D or BTEX was measured in samples obtained from the excavation associated with Tank #1. Only ethylbenzene was detected in the soil pile at 0.3 mg/kg.

Tank #2 soil samples reported elevated concentrations of TPH-D from the samples collected from the bottom of the excavation (4901 mg/kg) and soil pile (2770 mg/kg). Non-detectable concentrations of aromatic hydrocarbons (detection limit 0.005 mg/kg) were reported in all samples collected from the Tank #2 location except for low levels of ethylbenzene (0.2 and 0.4 mg/kg).

Soil samples obtained from the Tank #3 soil pile reported nondetectable concentrations of TPH-D (detection limit 1.0 mg/kg) and BTEX. Elevated concentrations of TPH-D were measured in the soil sample collected from the bottom of the excavation (7999 mg/kg).

## **CONFIRMATION SOIL SAMPLING SURROUNDING DIESEL TANKS #2 AND #3**

After the new tanks were installed and the excavations backfilled with clean fill, Alameda County Department of Environmental Health approved PG&E's proposal to conduct confirmation soil sampling immediately adjacent to diesel tanks #2 and #3. On June 3, 1992, nine soil samples were collected from four borings designated as UT 1 and UT 2 (Tank #2), and UT 3 and UT 4 (Tank #3) (Figure 5). The samples were analyzed for TPH-D and BTEX. Analytical results for these soil samples are presented in Table 3.

Results of the confirmation soil sampling near Tank #2 showed elevated concentrations of TPH-D, non-detectable concentrations of benzene, and detectable concentrations of toluene, ethylbenzene, and xylenes. TPH-D concentrations ranged from 72 to 3800 mg/kg, toluene concentrations from non-detect to 130  $\mu\text{g}/\text{kg}$ , ethylbenzene concentrations from non-detect to 140  $\mu\text{g}/\text{kg}$ , and xylenes from 6.3 to 1300  $\mu\text{g}/\text{kg}$ .

Results of the confirmation soil sampling near Tank #3 showed elevated concentrations of TPH-D, non-detectable concentrations for benzene, and detectable concentrations of toluene, ethylbenzene, and xylenes. TPH-D concentrations ranged from 20 to 2900 mg/kg, toluene concentrations from non-detect to 10  $\mu\text{g}/\text{kg}$ , ethylbenzene from non-detect to 22  $\mu\text{g}/\text{kg}$ , and xylenes from non-detect to 140  $\mu\text{g}/\text{kg}$ . These results were presented in PG&E Report No. 402.331-92.35, dated June 1992.

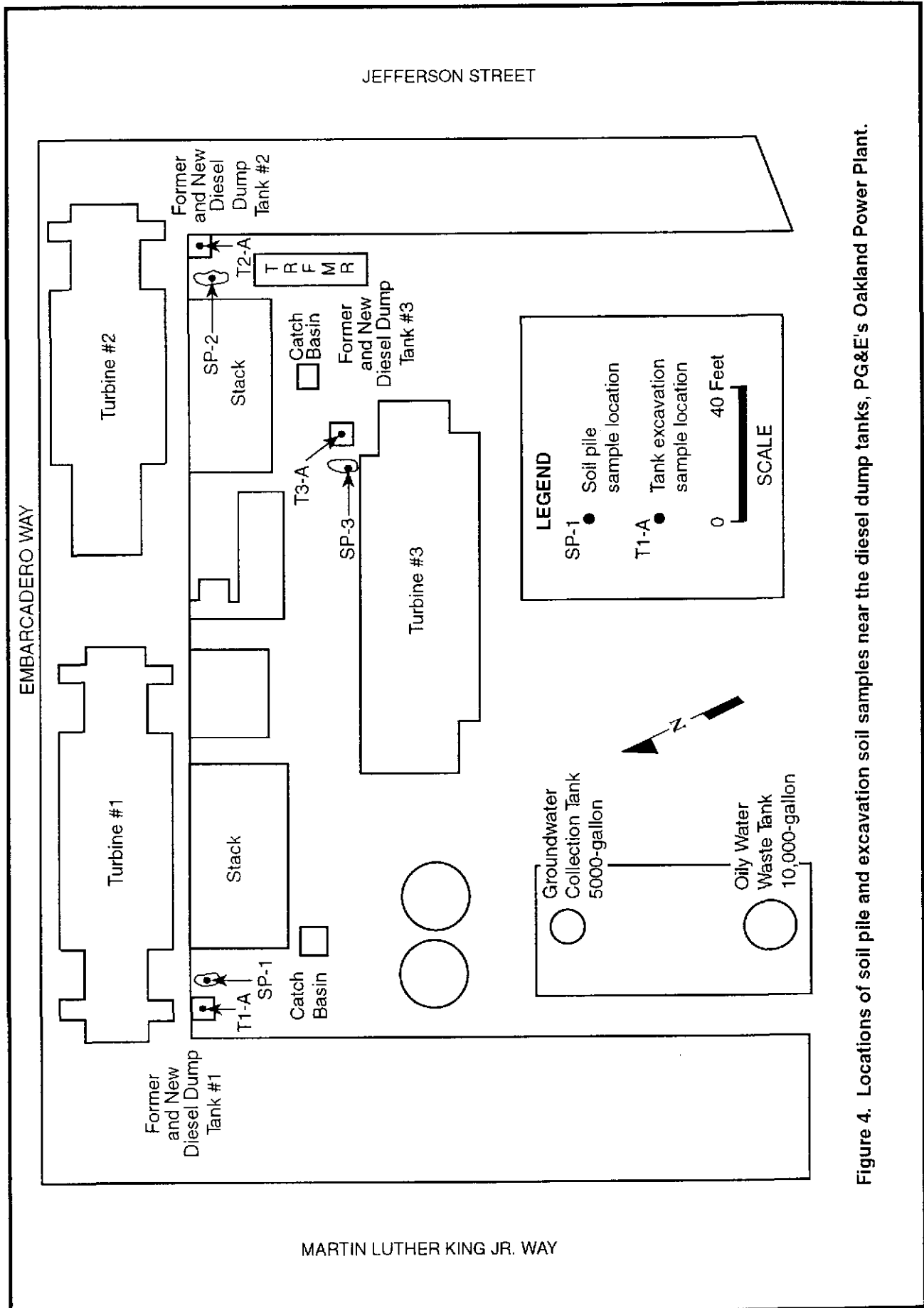


Figure 4. Locations of soil pile and excavation soil samples near the diesel dump tanks, PG&E's Oakland Power Plant.

Table 2

Summary of Soil Sample Analytical Results  
 Collected from Soil Piles and Excavations, November 1991  
 PG&E Oakland Power Plant  
 (mg/kg)

Location	Sample ID	TPH-D	Benzene	Toluene	Ethyl Benzene	Xylenes
Tank #1	T1-A	<1.0	<0.005	<0.005	<0.005	<0.005
Tank #2	T2-A	4901	<0.005	<0.005	0.2	<0.005
Tank #3	T3-A	7999	<0.005	<0.005	<0.005	<0.005
Tank #1	SP-1	<1.0	<0.005	<0.005	0.3	<0.005
Tank #2	SP-2	2770	<0.005	<0.005	0.4	<0.005
Tank #3	SP-3	<1.0	<0.005	<0.005	<0.005	<0.005
Detection Limit		1.0	0.005	0.005	0.005	0.005

- <1.0 = Detection limit, analytes not detected at or above stated detection limit  
 T1-A = Sample collected from excavation  
 SP-1 = Sample collected from soil pile removed from excavation

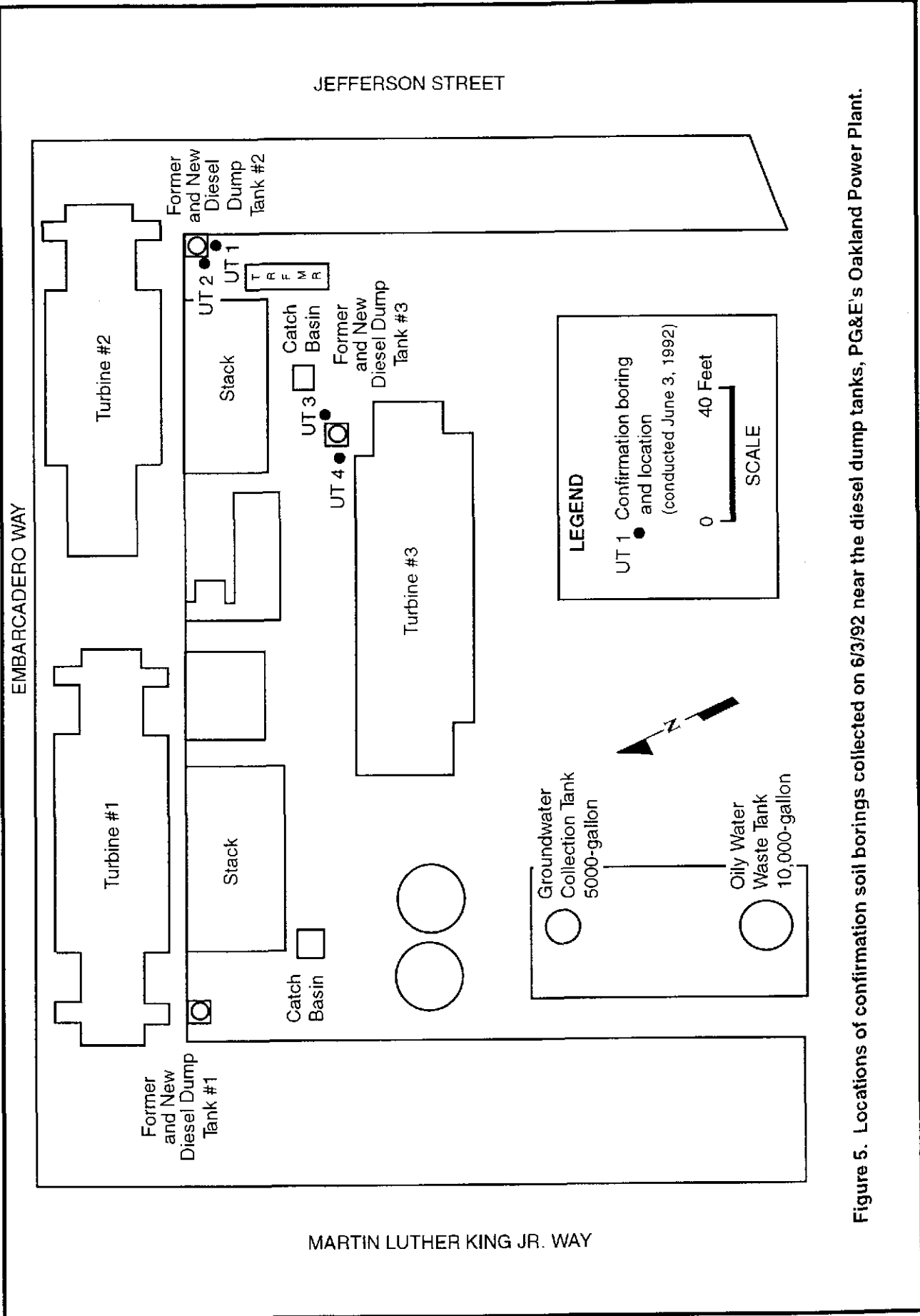


Figure 5. Locations of confirmation soil borings collected on 6/3/92 near the diesel dump tanks, PG&E's Oakland Power Plant.

Table 3

Summary of Confirmation Soil Analytical Results  
 PG&E Oakland Power Plant  
 Diesel Dump Tanks #2 and #3

Location	Boring	Date Sampled	B μg/kg	T μg/kg	E μg/kg	X μg/kg	TPH-D mg/kg
Tank #2	UT1 5.5-6.0	6/3/92	<5.0	<5.0	<5.0	6.3	2,700
Tank #2	UT1 6.5-7.0	6/3/92	<5.0	130	140	1,300	72
Tank #2	UT2 4.5-5.0	6/3/92	<5.0	10	<5.0	10	2,500
Tank #2	UT2 6.5-7.0	6/3/92	<5.0	8.7	28	220	3,800
Tank #3	UT3 4.5-5.0	6/3/92	<5.0	<5.0	<5.0	10	530
Tank #3	UT3 5.5-6.0	6/3/92	<5.0	6.7	17	140	2,900
Tank #3	UT3 6.5-7.0	6/3/92	<5.0	10	22	57	170
Tank #3	UT4 4.5-5.0	6/3/92	<5.0	<5.0	<5.0	<5.0	20
Tank #3	UT4 5.5-6.0	6/3/92	<5.0	<5.0	5.7	29	140

- TPH-D = Total Petroleum Hydrocarbons as Diesel  
 B = Benzene  
 T = Toluene  
 E = Ethylbenzene  
 X = Xylenes  
 < = Concentrations of analyte were non-detectable at or above stated detection limit.



## SOIL SAMPLING AND SHALLOW GROUNDWATER SURVEY

The shallow soil and groundwater survey was performed to further delineate the extent of diesel fuel present in the soils and groundwater adjacent to diesel dump tanks #2 and #3. The work was performed in accordance with the work plan approved by Alameda County's Department of Environmental Health in a letter dated September 2, 1992 and under the direction of a California Registered Geologist.

### SOIL SAMPLING

Soil samples were collected using portable hydraulically-operated equipment and a CME B-55 drilling rig. All soil sampling equipment was cleaned with potable water and trisodium phosphate before each sample was collected. A 2-inch and 2.5-inch split spoon sampler containing three 6-inch brass tubes were used to collect the samples. One soil sample was collected from each of the 15 locations shown on Figure 6. These locations were selected based on site access, surface and subsurface conditions. Sampling proceeded in a lateral direction until the diesel concentration was nondetectable (or approached the method detection limit) or until surface or subsurface obstructions were encountered which prevented further boring.

All soil samples and cuttings from the boreholes were examined by the field geologist and logged according to the Unified Soil Classification System. The soil samples in the brass tubes were quickly removed from the sampler, capped with aluminum foil and plastic caps, sealed with tape, labeled, enclosed in a zip-lock bag, and placed in a cooler containing frozen chemical ice. A chain-of-custody form was initiated to identify and ensure the traceability and integrity of the samples collected. The samples were maintained at 4°C until submitted to the laboratory for chemical analyses. Soil samples GWS-3BS, GWS-3DS, GWS-3ES, and GWS-3GS were submitted to Chromalab, Inc., a California state-certified laboratory, for chemical analyses. All other soil samples were submitted to NET Pacific Inc., a California state-certified mobile laboratory, for analyses. Due to hydraulic probe refusal, a drilling rig was used to collect additional subsurface samples near Tank #3, approximately two weeks after the start of the investigation. A mobile laboratory was not used during this phase of the investigation and the samples were submitted to Chromalab, Inc. for chemical analyses.

The soil samples were analyzed for total petroleum hydrocarbons as diesel (TPH-D) by EPA methods 3550/8015 modified and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA method 8020.

### SHALLOW GROUNDWATER SURVEY

To determine the horizontal and vertical extent of TPH-D and BTEX in the shallow groundwater, a shallow groundwater survey was conducted at each sampling location as shown on Figure 6. Depending on site access and subsurface conditions, groundwater was sampled by advancing either a 2-inch hydraulic punch

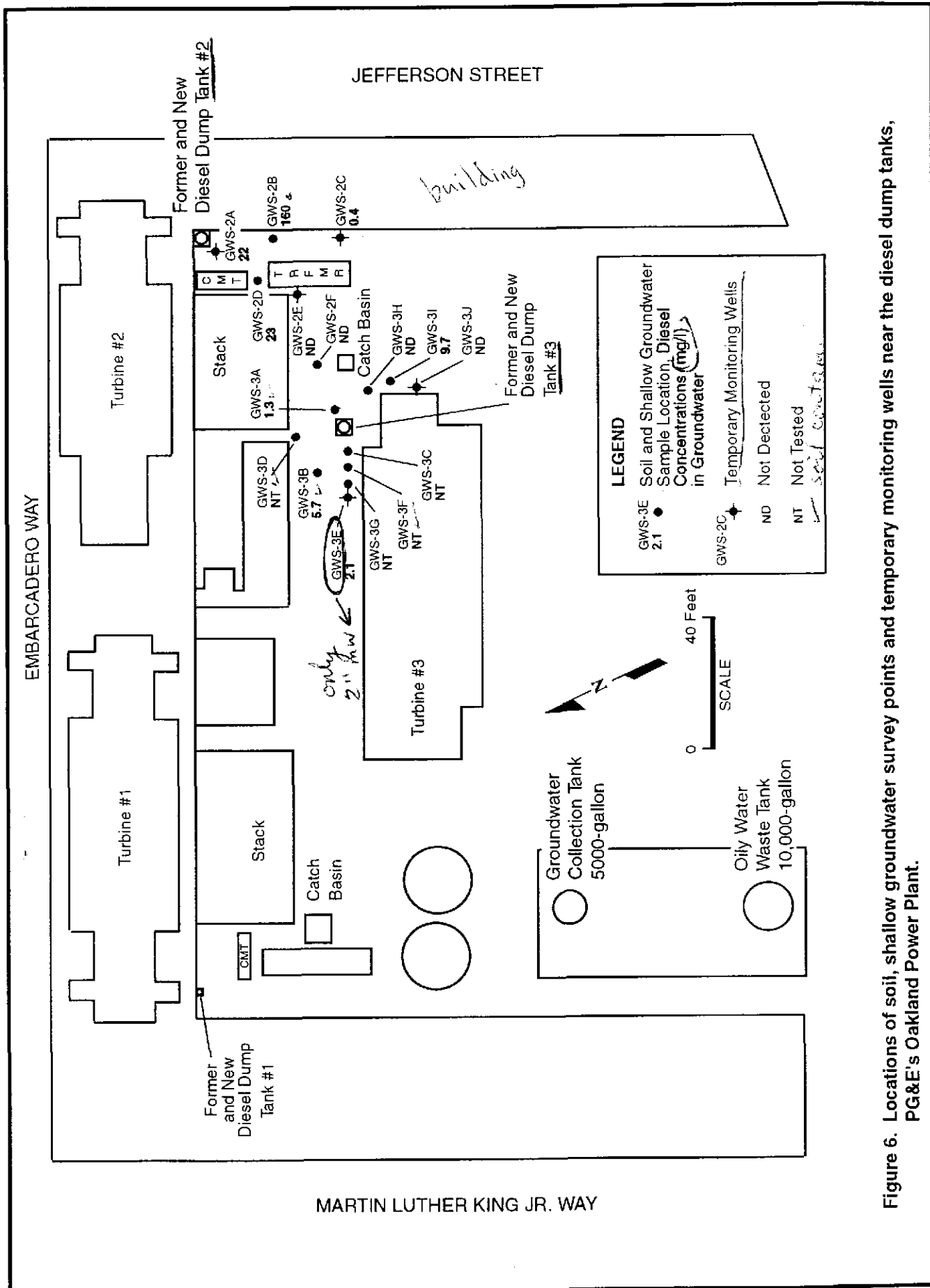


Figure 6. Locations of soil, shallow groundwater survey points and temporary monitoring wells near the diesel dump tanks, PG&E's Oakland Power Plant.

or 8.5-inch O.D. continuous flight hollow stem augers into the water table. Once the probes or augers penetrated a sufficient depth to collect a groundwater sample, a decontaminated 1-inch or 2-inch diameter, schedule 80 PVC well screen (5 or 10 ft slotted screen), equipped with 0.01 or 0.02-inch wide slots, was placed in the hole. Depth to water was measured and floating product was checked with an interface probe. If the holes contained sufficient volumes of water, the holes were purged of approximately three well volumes.

Due to subsurface obstructions at locations GWS-3C, 3D, 3F, and 3G, the drill auger or hydraulic punch could not be advanced to the water table and groundwater samples could not be collected. These locations are designated as NT (not tested) on the site sampling map presented in Figure 6.

Groundwater samples were collected using clean disposable bailers. The sample was carefully transferred to 40-ml VOA and 1-liter amber glass bottles. Sample bottles were filled to overflowing with a positive meniscus and sealed such that no head space existed within the vial. Chain-of-custody documentation was initiated and the containers were appropriately labeled, placed in a cooler containing frozen chemical ice and maintained at 4°C until analyzed. Samples GWS-3A, GWS-3B, and GWS-3E were submitted to Chromalab, Inc, a California state-certified laboratory, for chemical analyses. All other groundwater samples were analyzed on-site by NET Pacific Inc., a California state-certified mobile laboratory.

The groundwater samples were analyzed for TPH-D by EPA methods 3510/8015 modified and BTEX by EPA methods 8020/602.

#### **INSTALLATION OF TEMPORARY MONITORING WELLS**

At five shallow groundwater survey locations (GWS-2A, GWS-2C, GWS-2E, GWS-3J, and GWS-3E), the borehole was completed as a temporary monitoring well to allow follow-up or confirmation groundwater sampling. These temporary wells were constructed with the verbal approval from Alameda County's Department of Environmental Health. The wells consist of either 1-inch or 2-inch diameter schedule 40 PVC casing, with 0.020-inch screen extending from the bottom of the hole to 2 to 3 feet above the groundwater level. Blank casing extends from the top of the slotted screen to the ground surface. Lonestar #3 sand was used as a filter pack from the bottom of the hole to approximately 1 to 2 feet above the slotted interval. A one-foot seal of 3/8-inch bentonite pellets was placed above the filter pack and the remaining annular space from the top of the bentonite to the surface was backfilled with type I-II cement. A slip cap was placed over the 1-inch pipe and a 2-inch locking cap was placed over the 2-inch pipe to prevent infiltration from surface water. Once in place, a disposable bailer was used to collect water samples from each temporary well.

With the exception of the temporary wells, all borings and shallow groundwater sampling locations constructed at the site were cemented from the bottom of the hole to the surface with type I-II cement. Soil boring logs and temporary well construction details are presented in Appendix A. Wells GWS-2A, 2C, 2E, 3J, and 3E may be utilized as monitoring locations to facilitate future groundwater sample collection.

↓  
only 2" mw.

## WASTE DISPOSAL

All waste generated during this investigation was stored in DOT-approved 55-gallon drums pending laboratory analytical results. After laboratory analyses, the wastes solids were properly manifested, and transported by Stamco Inc. to Chemical Waste Management in Kettleman City. Waste fluids from this investigation were included with plant process water and transported to Gibson Oil in Bakersfield. Copies of the Uniform Hazardous Waste Manifests are presented in Appendix B.

## RESULTS

### SUBSURFACE CONDITIONS

The site is covered by two to six-inches of asphalt. Based on an examination of soils samples obtained during this investigation, shallow soils generally consist of artificial fill which contains varying amounts of clay, silt, gravelly sand and red brick. Near Tank #2, subsurface materials consist of silty sand interbedded with grey clays, red brick, and black glassy shards. Some of the samples contained fibrous organic material, and oyster shells with a strong organic odor. Saturated soils were encountered approximately 6 feet below the surface. Near locations GWS-2B and GWS-2C, old foundation (concrete), red brick, and yellow, hard weathered rock were encountered which prevented probe or drill auger advancement beyond 2 to 3 feet below ground surface at these locations. Groundwater recharge near tank #2 was generally very slow and some of the borings were deepened to enhance recharge.

Subsurface conditions near Tank #3 generally consisted of silts, clays, silty sands, fine grained sands, red brick, and concrete. Saturated soils were encountered approximately 6 to 7 feet below the surface. Near Tank #2, concrete and red brick prevented the probes or drill bit from penetrating below a depth from approximately 2 to 3 feet below the ground surface. Groundwater recharge was generally very good at locations GWS-3A, GWS-3B, GWS-3E, GWS-3H, and GWS-3J. Near Tank #3, locations GWS-3A, and GWS-3B encountered a cavern with high water recharge and very low turbidity.

### SOIL ANALYSES

Soil sample results are summarized in Table 4. The laboratory analytical reports and chain-of-custody forms are presented in Appendix C. The soil analytical results show nondetectable concentrations of TPH-D in all the samples tested except in samples GWS-2BS (5.5-6 feet deep), GWS-3AS (6.6.5 feet deep), GWS-3BS (7-7.5 feet deep), GWS-3DS (5.5-6 feet deep), and GWS-3FS (5.5-6 feet deep). Soil analytical results also show nondetectable concentrations of BTEX in all the samples tested except samples GWS-3BS and GWS-3GS. Soil sample GWS-2BS had 310 mg/kg of TPH-D and sample GWS-3AS had 4100 mg/kg of TPH-D. Soil sample GWS-3BS exhibited 130 mg/kg of TPH-D (140 mg/kg of motor oil was also reported in this sample), ethylbenzene at 7.3  $\mu\text{g/l}$ , and xylenes at 27  $\mu\text{g/l}$ . Soil sample GWS-3DS reported 320 mg/kg of TPH-D, sample GWS-3FS reported 33 mg/kg of TPH-D, and sample GWS-3GS reported 22  $\mu\text{g/l}$  of xylenes.

Table 4

**Summary of Soil Analytical Results  
Collected During the Shallow Groundwater Investigation  
PG&E Oakland Power Plant**

Sample Name	Sample Date	TPH as Diesel mg/Kg	Benzene µg/Kg	Toluene µg/Kg	Ethylbenzene µg/Kg	Xylenes µg/Kg
GWS-2BS (5.5-6')	10/07/92	310	<5.0	<5.0	<5.0	<10.0
GWS-2CS (5.5-6')	10/07/92	<5.0	<5.0	<5.0	<5.0	<10.0
GWS-2DS (3.5-4')	10/07/92	<5.0	<5.0	<5.0	<5.0	<10.0
GWS-2ES (5.5-6')	10/07/92	<5.0	<5.0	<5.0	<5.0	<10.0
GWS-2FS (5.5-6')	10/07/92	<5.0	<5.0	<5.0	<5.0	<10.0
GWS-3AS (6-6.5')	10/07/92	4100	<5.0	<5.0	<5.0	<10.0
GWS-3BS (7-7.5')	10/14/92	130*	<5.0	<5.0	<5.0	<5.0
GWS-3CS (5.5-6')	10/07/92	<5.0	<5.0	<5.0	<5.0	<10.0
GWS-3DS (5.5-6.0')	10/14/92	320	<5.0	<5.0	<5.0	<5.0
GWS-3ES (6-6.5')	10/14/92	<1.0	<5.0	<5.0	<5.0	<5.0
GWS-3FS (5.5-6')	10/08/92	33	<5.0	<5.0	<5.0	<10.0
GWS-3GS (5.5-6.0')	10/14/92	<1.0	<5.0	<5.0	<5.0	<5.0
GWS-3HS (5.5-6')	10/07/92	<5.0	<5.0	<5.0	<5.0	<10.0
GWS-3IS (5.5-6')	10/07/92	<5.0	<5.0	<5.0	<5.0	<10.0
GWS-3JS (5.5-6')	10/08/92	<5.0	<5.0	<5.0	<5.0	<10.0

<1.0 = Not detected at or above stated detection limit.

\* = 140 mg/Kg of motor oil was found in this sample.

TPH-D = Total petroleum hydrocarbons as diesel.

mg/Kg = Milligrams per Kilograms.

µg/Kg = Micrograms per Kilogram.

## GROUNDWATER ANALYSES

Groundwater analytical results are shown in Table 5. The laboratory analytical reports and the chain-of-custody forms are presented in Appendix D. Groundwater analytical results indicate detectable concentrations of TPH-D were found in all the samples analyzed except samples GWS-2E, GWS-2F, GWS-3H, and GWS-3J. Nondetectable concentrations of BTEX were reported in all the groundwater samples collected except samples GWS-2B and GWS-2D. Adjacent to Tank #2, TPH-D was measured in GWS-2A at 22 mg/l, GWS-2B at 160 mg/l, GWS-2C at 0.4 mg/l and GWS-2D at 23 mg/l. TPH-D was reported at concentrations of 1.3, 5.7, and 2.1 mg/l at GWS-3A, 3B, and 3E, respectively, near Tank #3. Floating product was not present in any of the shallow groundwater sample locations.



**Table 5**  
**Shallow Groundwater Survey Analytical Results**  
**PG&E Oakland Power Plant**

Sample Name	Sample Date	TPH as Diesel mg/l	Benzene µg/l	Toluene µg/l	Ethylbenzene µg/l	Xylenes µg/l
GWS-2A	10/7/92	22	<0.5	<0.5	<0.5	<1.0
GWS-2B	10/7/92	160	<0.5	<0.5	9.0	100
GWS-2C	10/7/92	0.4	<0.5	<0.5	<0.5	<1.0
GWS-2D	10/7/92	23	<0.5	<0.5	<0.5	130
GWS-2E	10/7/92	<0.1	<0.5	<0.5	<0.5	<1.0
GWS-2F	10/7/92	<0.1	<0.5	<0.5	<0.5	<1.0
GWS-3A	10/14/92	1.3	<0.5	<0.5	<0.5	<1.5
GWS-3B	10/14/92	5.7	<0.5	<0.5	<0.5	<1.5
GWS-3E	10/14/92	2.1	<0.5	<0.5	<0.5	<1.5
GWS-3H	10/7/92	<0.1	<0.5	<0.5	<0.5	<1.0
GWS-3I	10/7/92	9.7	<0.5	<0.5	<0.5	<1.0
GWS-3J	10/7/92	<0.1	<0.5	<0.5	<0.5	<1.0

<0.1 = Not detected at or above stated analytical reporting limit.

mg/l = Milligrams per liter.

µg/l = Micrograms per liter.

## REFERENCES

Pacific Gas and Electric Company. December 1990. *Preliminary Soil Investigation Report for the PG&E Oakland Power Plant Diesel Oil Tanks*. Technical and Ecological Services - Water Resources Unit, Report No. 402.331-90.55.

\_\_\_\_\_. June 1992. *Oakland Power Plant Confirmation Soil Sampling Surrounding Diesel Tank #2 and #3*. Technical and Ecological Services - Land and Water Quality, Report No. 402.331-92.35.

\_\_\_\_\_. August 1992. *Work Plan for the Soil and Shallow Groundwater Investigation Surrounding the Diesel Dump Tanks at PG&E's Oakland Power Plant, Alameda County, California*.

## SUMMARY

The shallow soil and groundwater survey demonstrates that detectable concentrations of petroleum hydrocarbons are present in the subsurface near diesel tanks #2 and #3. In the soil samples near Tank #2, TPH-D was not detected except in sample GWS-2BS (TPH-D at 310 mg/kg) and BTEX was not detected from any of the soil samples. Groundwater samples collected near Tank #2 reported TPH-D from non-detect to 160 mg/l. Benzene and toluene were not detected in any of the groundwater samples collected, and ethylbenzene and xylenes were only present in groundwater samples GWS-2B and GWS-2D. Sample GWS-2B reported ethylbenzene at 9.0 µg/l and xylenes at 100 µg/l. Sample GWS-2D reported xylenes at 130 µg/l.

BTEX was not detected in any of the soil samples collected near Tank #3. TPH-D ranged from non-detect to 4100 mg/kg (GWS-3AS). Sample GWS-3BS reported 140 mg/kg of motor oil in addition to 130 mg/kg of TPH-D. Groundwater samples collected near Tank #3 contained TPH-D ranging from non-detect to 9.7 mg/l. BTEX was not detected in any of the groundwater samples collected near Tank #3.

Saturated soils occurred from 6 to 7 feet below the surface. The shallow lithology consist of silts, clays, silty and fine grained sands, red brick, and concrete with rebar. A subsurface vault is present below Tank #3. The nature and size of this vault is not well defined but it was encountered in borings GWS-3A and GWS-3B. or  
cavern?

Five temporary wells were completed at locations GWS-2A, GWS-2C, GWS-2E, GWS-3E, and GWS-3J. These temporary wells may be used as monitoring wells or abandoned, based on future site requirements.

? temp = permanent?

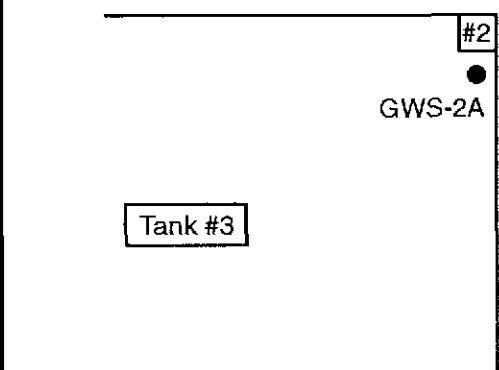
Appendix A

**BORING AND WELL CONSTRUCTION LOGS**



# BORING AND WELL CONSTRUCTION LOG

### BORING LOG SKETCH



Not To Scale

JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA	BORING ID: GWS-2A
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
DRILLING CO./DRILLER'S NAME: Power Core/Mike Nosewicz			
RIG TYPE: Power Core/Hydraulic			
SAMPLER TYPE:			
GROUND SURFACE ELEV./COORDINATES:		<b>START</b>	<b>STOP</b>
TOTAL DEPTH: 8'	DEPTH TO WATER: 6' 1" ±	DATE: 10/6/92	DATE: 10/6/92
FIELD GEOLOGIST: G. Nulty		TIME: 9:10 AM	TIME: 9:30 AM

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	TEMPORARY WELL DETAILS
0				SURFACE: 0-6": Asphalt Lonestar Type I-II Cement	PVC Slip Cap 2" O.D. Hole
0				Blank 1.25" OD PVC Casing	
0-2			Backfill	0-8": Backfill sand	
2-4			Sand	Bentonite Chips	
4-6				1.25" Slotted Casing 0.02" Slots	
6-8				Monterey #3 Sand	
8			8' TD	Flush Threaded Cap	8' TD
10				Water level 15' 1.1" - 9' = 6' 1.1"	
				No floating product, measured with interface probe	

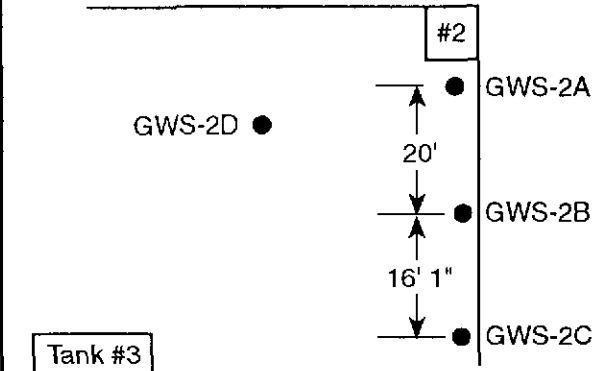




# BORING AND WELL CONSTRUCTION LOG

Sheet 1 of 1

## BORING LOG SKETCH



Not To Scale

JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA	BORING ID: GWS-2C
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
DRILLING CO./DRILLER'S NAME: Power Core/Mike Nosewicz			
RIG TYPE: Hydraulic			
SAMPLER TYPE:			
GROUND SURFACE ELEV./COORDINATES:		START DATE: 10/6/92	STOP DATE: 10/6/92
TOTAL DEPTH: 10 Feet	DEPTH TO WATER: 6'	TIME: 11:40 AM	TIME: 1:30 PM
FIELD GEOLOGIST: G. Nulty			

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	TEMPORARY WELL DETAILS
0				PVC Slip Cap	2" O.D. Hole
0				SURFACE: 0-6": Asphalt Lonestar Type I-II Cement	
0				Blank 1.25" OD PVC Casing	
2			SM/SW	6"-3': Red brick, silty sands, some (15%) dark black organic material, no petroleum odor	
4				Bentonite Chips	
4				Monterey #3 Sand	
6			SM	3'-7': Silty sand, 10% black, organic matter, no petroleum odor, wet at 6'-7'	
6				1.25" Slotted Casing 0.02" Slots	
8			SP		
10				Flush Threaded Cap	
10			10' TD	7'-9': Grey sand, has 1-2" thick dark black (fused) vitreous material	10' TD
12				9'-10': Dark grey clay with 1.5" thick black, vitreous material, strong organic odor, 1" x 0.5" oyster shell	
				Set screen 5-10' 0.02" below grade, some petroleum odor	
				Water level 15' - 9' = 6'	
				No floating product, measured with interface probe	



# BORING AND WELL CONSTRUCTION LOG

Sheet 1. of ...1.

BORING LOG SKETCH		JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA	BORING ID: GWS-2D
		JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
		DRILLING CO./DRILLER'S NAME: Power Core/Mike Nosewicz			
		RIG TYPE: Power Core/Hydraulic			
		SAMPLER TYPE:			
GROUND SURFACE ELEV./COORDINATES:		<b>START</b>	<b>STOP</b>		
TOTAL DEPTH: 15'	DEPTH TO WATER: 6'	DATE: 10/6/92	DATE: 10/7/92		
FIELD GEOLOGIST: G. Nulty		TIME: 9:40 AM	TIME: 10:30 AM		

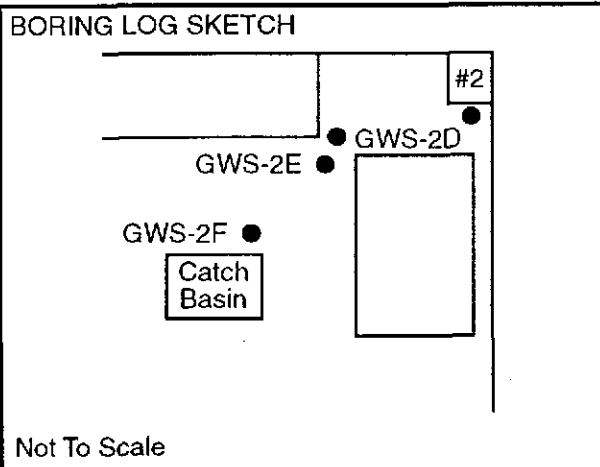
DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	WELL DETAILS
0				SURFACE: 0-6": Asphalt	
2			CL	6"-2': Grey clay with pebbles, no petroleum odor	
4			SM	2'-3.5': Light brown sand, no petroleum odor	
6			OL	3.5'-6': Dark black pebbly, glassy coal material, strong petroleum odor, wet at 6'	
8			GC		
10			OH	6'-8': Rubble, pebbles, concrete, rebar with some clay and silt, strong petroleum organic odor	
12			OH	8'-10': Dark grey to black clay, some organic material, strong petroleum odor	
14				10'-15': Dark grey to black clay	
16			15' TD	Water level interface probe 15' - 9' = 6'	
				No free product	
				Screened 5-15', 0.02"-slots, 1"-ID	
				Extended boring to 15' on 10/7 to improve recharge	





# BORING AND WELL CONSTRUCTION LOG

Sheet 1.. of ...1..



JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA	BORING ID: GWS-2E
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
DRILLING CO./DRILLER'S NAME: Power Core/Mike Nosewicz			
RIG TYPE: Hydraulic			
SAMPLER TYPE:			
GROUND SURFACE ELEV./COORDINATES:		<b>START</b>	<b>STOP</b>
TOTAL DEPTH: 14'	DEPTH TO WATER: 5' 9"	DATE: 10/7/92	DATE: 10/7/92
FIELD GEOLOGIST: G. Nulty		TIME: 3:50 PM	TIME: 4:30 PM

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	TEMPORARY WELL DETAILS
0				PVC Slip Cap	2" O.D. Hole
0				SURFACE: 0-6": Asphalt Lonestar Type I-II Cement	
0				Blank 1.25" OD PVC Casing	
2			Fill	6"-3': Fill, fill consists of imported sand with 5% pebbles, no petroleum odor	
4				Bentonite Chips	
4				3'-5': Fill, as above Monterey #3 Sand	
6			SM	1.25" Slotted Casing 0.02" Slots	
6			OL	5'-6': Silty sand dark brown, 10% black carbonaceous material, 5% pebbles, no petroleum odor, moist soil	
8	2 ppm		OH	Flush Threaded Cap	
10				6'-7': Hard, black carbonaceous material, 5% shell fragments, wet	10' TD
12			SP	7'-9': Dark brown silt, 10% grey clay, wet, no petroleum odor	
14			14' TD	9'-12': Black carbonaceous material, pebbles, shell fragments	
16				12'-14': Dark grey to black sand, organic odor	
				Water level 14' 9" - 9' = 5' 9"	
				No floating product	
				Set casing to 10', couldn't go any deeper due to sluff	



# BORING AND WELL CONSTRUCTION LOG

Sheet 1.. of ...1..

BORING LOG SKETCH		JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA	BORING ID: GWS-2F
		JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
		DRILLING CO./DRILLER'S NAME: Power Core/Mike Nosewicz			
		RIG TYPE: Hydraulic			
		SAMPLER TYPE:			
GROUND SURFACE ELEV/COORDINATES:		<b>START</b>		<b>STOP</b>	
TOTAL DEPTH: 11'	DEPTH TO WATER: 5.5'	DATE: 10/7/92	DATE: 10/7/92		
FIELD GEOLOGIST: G. Nulty		TIME: 2:00 PM	TIME: 3:15 PM		

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	WELL DETAILS
0				SURFACE: 0-6": Asphalt	
2			Fill	6"-3': Fill material, yellow weathered rock, some silt and pebbles, no petroleum odor	
4			Fill/OH	3'-6': Fill with black carbon material, pebbles 1/2" long, 10% silty sand, slightly moist from 5.5'-6'	
6			Fill/SM	6'-9': Poor sample recovery, recovered 4" at 9', looks like fill yellow rocks as above with some silty sand, wet, oil staining throughout sample	
10			GP/OH		
12			11' TD	9'-11': Gravelly sand, some organic material, oil staining on surfaces, moderate petroleum odor	
				Water level 14' 5.5" - 9' = 5' 5.5"	
				No floating product	



# BORING AND WELL CONSTRUCTION LOG

Sheet 1... of ...1...

BORING LOG SKETCH		JOB NAME: Oakland Power Plant Diesel Tanks	JOB ID: 60007194/EA	BORING ID: GWS-3A
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland				
DRILLING CO./DRILLER'S NAME: Power Core-Mike Nosewicz/HEW Drilling-Phil				
RIG TYPE: Hydraulic/CME-55 (10/14/92) & Power Core (10/6/92)				
SAMPLER TYPE:				
GROUND SURFACE ELEV./COORDINATES:			<b>START</b>	<b>STOP</b>
TOTAL DEPTH: 12' 8"	DEPTH TO WATER: 7' 4" (10/14/92)	DATE: 10/6/92	DATE: 10/14/92	
FIELD GEOLOGIST: G. Nulty			TIME: 2:30 PM	TIME: 8:45 AM

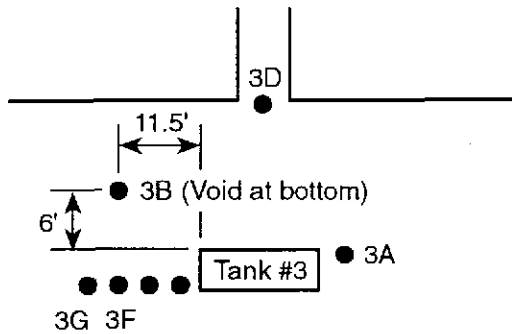
DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	WELL DETAILS
0				SURFACE: 0-6": Asphalt	
2			Fill	See previous confirmation soil sampling report dated 6/25/92	
4				Fill material to = 6.0'	
6	GWS-3AS 10 ppm 10/8/92		SC	6'-7': Silts, clayey sands with red brick on bottom	
7	7' TD			Moist soil on bottom, deepened hole on 10/8/92 to 7' set csg at 7', insufficient water for sample collection	
10			CAVERN		
12				7'-10': Drilled on 10/14/92 with CME-55 rig 8" OD hole: hard concrete, rebar, red brick PID 10 ppm	
14	12' 8" TD 10/14/92			10'-12'8": Cavern, void space, tunnel (?)	
				Placed 2"-csg. 0.01" slot in hole; placed 10' screen in hole, balance blank, Lonestar #2-16 sand	
				9 bags sand -8" rise, hole difficult to fill, 8" hole, used 15 total sacks of sand, no effect, cavern with very clear water, pulled casing and plugged hole with cement after setting bridge with spent sand sacks	
				Water level 19' 4" - 9 = 10' 4" - 3' (top auger) = 7' 4"	



# BORING AND WELL CONSTRUCTION LOG

Sheet 1.. of ...1.

## BORING LOG SKETCH



Not To Scale

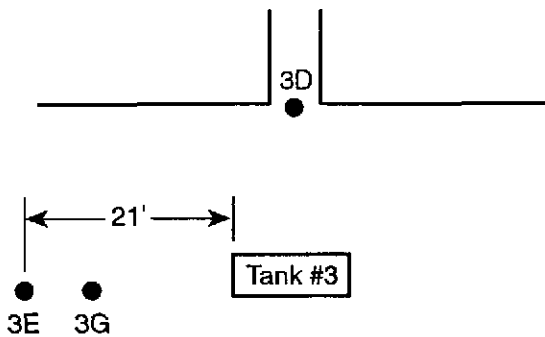
#2	JOB NAME: Oakland Power Plant Diesel Tanks	JOB ID: 60007194/EA	BORING ID: GWS-3B
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
DRILLING CO./DRILLER'S NAME: HEW Drilling/Phil			
RIG TYPE: CME-55/Hydraulic			
SAMPLER TYPE:			
GROUND SURFACE ELEV./COORDINATES:		<b>START</b>	<b>STOP</b>
TOTAL DEPTH: 12.5'	DEPTH TO WATER: 6' 1.5"	DATE: 10/14/92	DATE: 10/14/92
FIELD GEOLOGIST: G. Nulty		TIME: 11:20 AM	TIME: 12:00 PM

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	WELL DETAILS
0				SURFACE: 0-6": Asphalt	
2				6"-5.5': Silt and clay with rounded pebbles, loose, dry samples	
4			GC/SM	5.5'-7': No recovery, placed sample catcher in barrel and re-sampled, 7'-8.5' petroleum staining and sheen on augers and soil samples, root fragments and clay on bottom, white clay	
6	No Recovery	7			
6.5	GWS-3BS	11			
8		15	Concrete Rebar, Red Brick	7'-8': Silty sands, some red brick	
10	9-10 ppm		CAVERN	8'-10': Concrete, red brick, rebar	
10	10' TD				
10	Void				
12.5			12.5' TD	10'-12.5': Cavern	
12.5					
14				Water level 16' 3" -9' = 7' 3" at 12 PM	
				Note: Void space below 10' TD, total depth 12.5', very clear water, good recharge	





**BORING LOG SKETCH**



Not To Scale

JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA		BORING ID: GWS-3E	
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland					
DRILLING CO./DRILLER'S NAME: HEW Drilling/Phil					
RIG TYPE: CME-55/Hydraulic					
SAMPLER TYPE:					
GROUND SURFACE ELEV./COORDINATES:				<b>START</b>	
TOTAL DEPTH: 7'				DATE: 10/14/92	
DEPTH TO WATER: 5' 9.5"				DATE: 10/14/92	
FIELD GEOLOGIST: G. Nulty				TIME: 1:30 PM	
				TIME: 3:00 PM	

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	TEMPORARY WELL DETAILS
0				Locking Cap	
0				SURFACE: 0-6": Asphalt Lonestar Type I-II Cement	
2			CL	Bentonite Chips	
2				6"-5.5': Silty clay with pebbles fill (?), moist at 7', chunks of concrete, no petroleum odor	
4				Blank 2" Casing	
4				2" slotted casing 0.01"	
6			OH	Lonestar #2/16 sand	
6				Flush Threaded Cap	
7			7' TD	5.5'-7': Silty clay with pebbles, silty clay is dark brown to black, pebbles appear to be fill, organic odor	
8				Casing 5' screen threaded cap with 0.01" slots, 5' blank (cut at surface), locking cap	
				Water level ≈ 6.0' ±	
				Note: No sample with sample catcher from 5.5'-7', collected sample from auger at 6'-6.5', placed in brass tube	





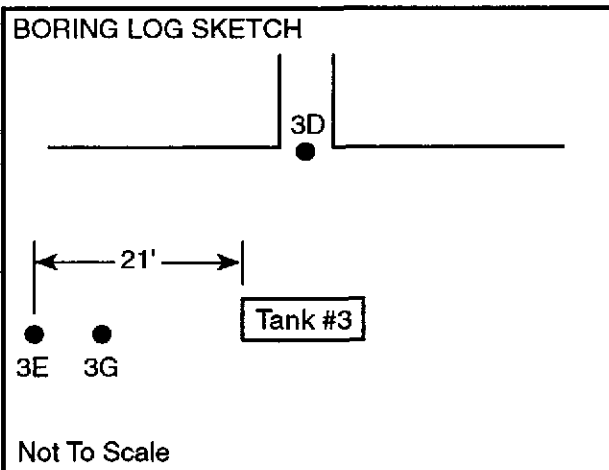


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# BORING AND WELL CONSTRUCTION LOG

Sheet 1 of 1



JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA	BORING ID: GWS-3E
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
DRILLING CO./DRILLER'S NAME: HEW Drilling/Phil			
RIG TYPE: CME-55/Hydraulic			
SAMPLER TYPE:			
GROUND SURFACE ELEV./COORDINATES:		<b>START</b>	<b>STOP</b>
TOTAL DEPTH: 7'	DEPTH TO WATER: 5' 9.5"	DATE: 10/14/92	DATE: 10/14/92
FIELD GEOLOGIST: G. Nulty		TIME: 1:30 PM	TIME: 3:00 PM

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	TEMPORARY WELL DETAILS
0				SURFACE: 0-6": Asphalt Lonestar Type I-II Cement	
2			CL	6"-5.5': Silty clay with pebbles fill (?), moist at 7', chunks of concrete, no petroleum odor	
4				2" slotted casing 0.01"	
6			OH	Lonestar #2/16 sand	
7			7' TD	5.5'-7': Silty clay with pebbles, silty clay is dark brown to black, pebbles appear to be fill, organic odor	
8				Casing 5' screen threaded cap with 0.01" slots, 5' blank (cut at surface), locking cap	7' TD
				Water level = 6.0' ±	
				Note: No sample with sample catcher from 5.5'-7', collected sample from auger at 6'-6.5', placed in brass tube	



# BORING AND WELL CONSTRUCTION LOG

Sheet 1 of 1

<b>BORING LOG SKETCH</b>		JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA		BORING ID: GWS-3H	
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland							
DRILLING CO./DRILLER'S NAME: Power Core/Mike Nosewicz							
RIG TYPE: Hydraulic							
SAMPLER TYPE:							
GROUND SURFACE ELEV./COORDINATES:						<b>START</b>	<b>STOP</b>
TOTAL DEPTH: 14'		DEPTH TO WATER: 6' 2"		DATE: 10/6/92		DATE: 10/6/92	
FIELD GEOLOGIST: G. Nulty						TIME: 1:45 PM	TIME: 2:40 PM

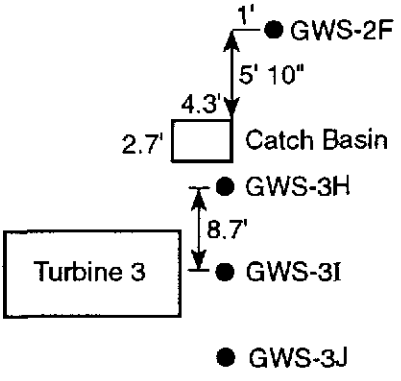
DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	WELL DETAILS
0				SURFACE: 0-6": Asphalt	
2			SP	6"-2.5': Sand, some 10% pebbles, sand looks imported, no petroleum odor	
4					
6	GWS-3HS		SM/SC	2.5'-6': Silty sand, light brown with black-grey clay, moist soil	
8				6'-9': Grey wet sand with some clay (10%), no petroleum odor	
10	10' TD 10/6/92		CH	9'-10': Grey clay, brown iron oxide mottling, sand 20%	
12			CH/SM		
14	14' TD 10/7/92		14' TD	10'-14': Grey clay, silty sands	
16				Set csg 5'-10'	
				Water level 15' 2" - 9' = 6' 2"	
				No floating product	
				Purged hole = 3 PM	
				Deepened hole on 10/7/92 to 14', used 10' screen for better water recharge	



# BORING AND WELL CONSTRUCTION LOG

Sheet 1... of ...1...

## BORING LOG SKETCH



Not To Scale

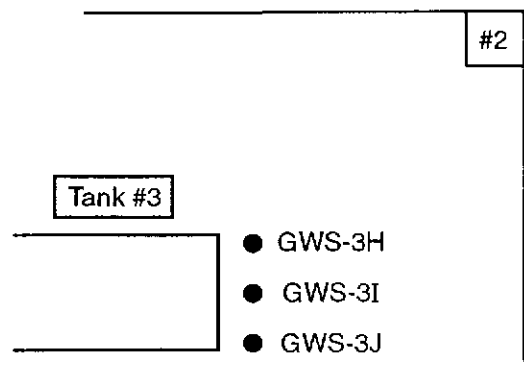
JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA	BORING ID: GWS-3I
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
DRILLING CO./DRILLER'S NAME: Power Core/Mike Nosewicz			
RIG TYPE: Hydraulic			
SAMPLER TYPE:			
GROUND SURFACE ELEV./COORDINATES:		<b>START</b>	<b>STOP</b>
TOTAL DEPTH: 14'	DEPTH TO WATER: 6' 4"	DATE: 10/7/92	DATE: 10/7/92
FIELD GEOLOGIST: G. Nulty		TIME: 9:30 AM	TIME: 10:15 AM

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	WELL DETAILS
0				SURFACE: 0-6": Asphalt	
0-6"			SP	6"-2': Sand, pebbles (15%), no petroleum odor, fill	
2					
4			SM	2'-7': Silts dark brown, clay grey to black, organic odor, fragments of red brick, moist	
6					
6				7'-9': Sand, dark brown to black sand, some brick fragments, organic odor, no petroleum odor, wet	
8					
10			SP	9'-14': Grey, dark and light brown to black sand, wet, orange iron oxide mottling throughout samples, no petroleum odor	
12					
14			14' TD		
16					



# BORING AND WELL CONSTRUCTION LOG

## BORING LOG SKETCH



Not To Scale

JOB NAME: Oakland Power Plant Diesel Tanks		JOB ID: 60007194/EA	BORING ID: GWS-3J
JOB LOCATION: 50 Martin Luther King Jr. Way, Oakland			
DRILLING CO./DRILLER'S NAME: Power Core/Mike Nosewicz			
RIG TYPE: Hydraulic			
SAMPLER TYPE:			
GROUND SURFACE ELEV./COORDINATES:		<b>START</b>	<b>STOP</b>
TOTAL DEPTH: 14'	DEPTH TO WATER: 6'	DATE: 10/8/92	DATE: 10/8/92
FIELD GEOLOGIST: G. Nulty		TIME: 11:20 AM	TIME: 13:30

DEPTH (FEET)	PID (PPM)	BLOW COUNTS	USCS CLASS	DESCRIPTION	TEMPORARY WELL DETAILS
0				PVC Slip Cap	<p>2" O.D. Hole</p>
0			Fill	SURFACE: 0-6": Asphalt Lonestar Type I-II Cement	
0			Fill	Blank 1.25" OD PVC Casing	
2			Fill	6"-2': Sand, appears to be imported fill sand with some brown clay	
2			Fill	Bentonite Chips and rounded pebbles	
4			SC	1.25" Slotted Casing 0.02" Slots	
6			SC	3'-6': Sand, poor recovery, some clay	
6			SC	Monterey #3 Sand	
8			SC	6'-14': Sand, clayey sand, wet, occasional iron oxide mottling, well sorted, fine grain sand, no petroleum odor	
10			SC		
12			SC		
14			14' TD	Flush Threaded Cap	
14			14' TD	Set casing at 14' TD	
14			14' TD	Water level at = 6', no floating product	

Appendix B

**UNIFORM HAZARDOUS WASTE MANIFESTS**

Environmental Protection Agency  
 Approved OMB No. 2050-0039 (Expires 9-30-94)  
 Please print or type. Form designed for use on elite (12-pitch) typewriter.

See Instructions on back of page 6.

Department of Toxic Substances Control  
 Sacramento, California

916-850-7450  
 CALIFORNIA  
 916-880-7450  
 CENTRAL  
 916-880-7450  
 HILL  
 916-880-7450  
 FACILITY

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator's US EPA ID No. CA1080111679	Manifest Document No. 77675	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.
3. Generator's Name and Mailing Address PACIFIC GAS AND ELECTRIC COMPANY/OAKLAND POWER PLANT 50 MARTIN LUTHER KING JR. WAY, OAKLAND, CA 94607 4. Generator's Phone (415) 695-2261 attn: Melissa Johnson					
5. Transporter 1 Company Name STAMCO, INC.		6. US EPA ID Number CAD063547996			
<del>American Environmental Mgmt.</del>		<del>CAD093445918</del>			
7. Transporter 2 Company Name		8. US EPA ID Number			
9. Designated Facility Name and Site Address CHEMICAL WASTE MANAGEMENT 35251 OLD SKYLINE ROAD NETTLEMAN CITY, CA 93239		10. US EPA ID Number CA10101646117			
11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)		12. Containers		13. Total	14. Unit
		No.	Type	Quantity	Wt/Vol
a. NON RCRA HAZARDOUS WASTE, SOLID (SOIL CONTAINING DILSEL FUEL)		001	DM	00430	P
b.					
c.					
d.					
15. Special Handling Instructions and Additional Information wear personal protective clothing when handling. 24 Hour Emergency phone (800) 352-2646 321-1030					
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable federal, state and international laws. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.					
Printed/Typed Name Melissa D. Johnson		Signature <i>Melissa Johnson</i>		Month Day Year 11 10 1992	
17. Transporter 1 Acknowledgement of Receipt of Materials Printed/Typed Name <i>TELLY PERRY</i>		Signature <i>Telly Perry</i>		Month Day Year 11 16 92	
18. Transporter 2 Acknowledgement of Receipt of Materials Printed/Typed Name		Signature		Month Day Year	
19. Discrepancy Indication Space					
20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in item 19. Printed/Typed Name		Signature		Month Day Year	

DO NOT WRITE BELOW THIS LINE.

Blue: GENERATOR SENDS THIS COPY TO DTSC WITHIN 30 DAYS.  
 To: P.O. Box 400, Sacramento, CA 95812-0400

Please print or type. Form designed for use on elite (12-pitch) typewriter.

See instructions on back of page 6.

Department of Toxic Substances Control  
Sacramento, California

**UNIFORM HAZARDOUS WASTE MANIFEST**

1. Generator's US EPA ID No.

Manifest Document No.

2. Page 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address

PACIFIC GAS AND ELECTRIC COMPANY/OAKLAND POWER PLANT  
50 MARTIN LUTHER KING JR. DRIVE, OAKLAND, CA 94607

4. Generator's Phone (415) 695-2261

5. Transporter 1 Company Name

6. US EPA ID Number

STANCO, INC.

CA 01063547996

7. Transporter 2 Company Name

8. US EPA ID Number

9. Designated Facility Name and Site Address

10. US EPA ID Number

GIBSON OIL  
COMMERCIAL DRIVE  
SACRAMENTO, CA 95808

CA 010981263177

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)

12. Containers

13. Total Quantity

14. Unit Wt/Val

a. NON HCRS HAZARDOUS WASTE, LIQUID  
(OIL, WATER AND DIESEL FUEL)

0 0 1 I T

EST  
0416666

G

15. Special Handling Instructions and Additional Information

wear personal protective clothing and respirator as needed when handling.  
24 HOUR PHONO: 1-800-521-1030 EXT. 2000  
LRGP 31

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable federal, state and international laws.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name

Signature

Month Day Year  
11 21 15 9 12

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year  
11 21 15 9 12

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name

Signature

Month Day Year

DO NOT WRITE BELOW THIS LINE.

IN CASE OF EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA, CALL 1-800-852-7777

GENERATOR

TRANSPORTER

FACILITY



Appendix C

**SOIL ANALYTICAL RESULTS  
AND  
CHAIN-OF-CUSTODY FORM**



NATIONAL  
ENVIRONMENTAL  
TESTING, INC.

NET Pacific, Inc.  
1072 Serpentine Lane  
Suite D  
Pleasanton, CA 94566  
Tel: (510) 462-4004  
Fax: (510) 462-4357

Mobile Field Services Lab # III

PG&E  
CROW CANYON ROAD  
SAN RAMON, CA 94583

Date Analyzed : 10/08/92  
Report Date : 10/19/92  
Matrix : SOIL  
Instrument # : GC

Project Name : 60007194EA TESA

Project Manager : Gary Nulty

Sample Name	Date Sampled	Dilution Factor	8015-M	8020	8020	8020	8020
			Units mg/Kg Rpt. Limit=5.0	Units µg/Kg Rpt. Limit=5.0	Units µg/Kg Rpt. Limit=5.0	Units µg/Kg Rpt. Limit=5.0	Units µg/Kg Rpt. Limit=10.0
			TPH as DIESEL	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENE
GWS-2BS-(5.5-6')	10/07/92	1	310	ND	ND	ND	ND
GWS-2CS-(5.5-6')	10/07/92	1	ND	ND	ND	ND	ND
GWS-2DS-(3.5-4')	10/07/92	1	ND	ND	ND	ND	ND
GWS-2ES-(5.5-6')	10/07/92	1	ND	ND	ND	ND	ND
GWS-2FS-(5.5-6')	10/07/92	1	ND	ND	ND	ND	ND
GWS-3AS-(6-6.5')	10/07/92	10	4100	ND	ND	ND	ND
GWS-3CS-(5.5-6')	10/07/92	1	ND	ND	ND	ND	ND
GWS-3FS-(5.5-6')	10/08/92	1	33	ND	ND	ND	ND
GWS-3HS-(5.5-6')	10/07/92	1	ND	ND	ND	ND	ND
GWS-3IS-(5.5-6')	10/07/92	1	ND	ND	ND	ND	ND
GWS-3JS-(5.5-6')	10/08/92	1	ND	ND	ND	ND	ND

# CHROMALAB, INC.

5 DAYS TURNAROUND

Environmental Laboratory (1094)

October 22, 1992

ChromaLab File No.: 1092146

PG&E

Attn: Gary E. Nulty

RE: Four soil and three water samples for Diesel and BTEX analyses

Project Name: OAKLAND POWER PLANT

Project Number: 60007194 EA TESA

Date Sampled: Oct. 14, 1992

Date Submitted: Oct. 15, 1992

Date Extracted: Oct. 20, 1992

Date Analyzed: Oct. 20, 1992

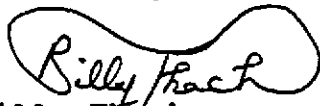
## RESULTS:


Sample I.D.	Diesel (mg/Kg)	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethyl Benzene (µg/Kg)	Total Xylenes (µg/Kg)
GWS-3BS(7-7.5')	130*	N.D.	N.D.	7.3	27
GWS-3DS(5.5'-6.0')	320	N.D.	N.D.	N.D.	N.D.
GWS-3ES(6'-6.5')	N.D.	N.D.	N.D.	N.D.	N.D.
GWS-3G(5.5'-6.0')	N.D.	N.D.	N.D.	N.D.	22
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	110%	104%	95%	95%	97%
DUP SPIKE RECOVERY	96%	94%	97%	96%	98%
DETECTION LIMIT	1.0	5.0	5.0	5.0	5.0
METHOD OF ANALYSIS	3550/8015	8020	8020	8020	8020

\*140 mg/Kg of Motor Oil was found in this sample.

Sample I.D.	Diesel (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Total Xylenes (µg/L)
GWS-3A	1300	N.D.	N.D.	N.D.	N.D.
GWS-3B	5700	N.D.	N.D.	N.D.	N.D.
GWS-3E	2100	N.D.	N.D.	N.D.	N.D.
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	94%	98%	98%	96%	96%
DUP SPIKE RECOVERY	95%	104%	107%	102%	100%
DETECTION LIMIT	50	0.5	0.5	0.5	1.5
METHOD OF ANALYSIS	3510/8015	602	602	602	602

ChromaLab, Inc.

  
Billy Mach  
Analytical Chemist

  
Eric Tam  
Laboratory Director



# CHROMALAB, INC.

2239 Or 5

ORDER #

8172

ROM B # 92

# Chain of Custody

DATE 10/15/92 PAGE 1 OF 2

PROJ. MGR. GARY E. AULTY  
 COMPANY GEIE  
 ADDRESS 3500 Cross Canyon Rd  
San Ramon, CA 94583  
 (PHONE NO.)  
925-750-8658

ANALYSIS REPORT												NUMBER OF CONTAINERS										
SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015)	TPH - Diesel (EPA 3510/3550, 8015)	PURGEABLE AROMATICS (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 8242)	BASE/NEUTRALS, ACIDS (EPA 825/827, 8270, 825)	TOTAL OIL & GREASE (EPA 5520 E&F)	PESTICIDES/PCB (EPA 808, 8080)	PHENOLS (EPA 604, 8040)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	EXTRACTION (TCLP, STLC)			
GWS-3BS(7-1-8)	10/14/92	1200	Soil				X	X													1	
GWS-3DS(5-5-6)	10/14/92	1125	Soil				X	X														1
GWS-3ES(6-6-5)	10/14/92	1435	Soil				X	X														1
GWS-3GS(5-6-0)	10/14/92	1035	Soil				X	X														1

**PROJECT INFORMATION**

PROJECT NAME: Chloroform Power Plant

PROJECT NUMBER: 6607194 FA TESA

SHIPPING ID. NO.:

VIA:

**SAMPLE RECEIPT**

TOTAL NO. OF CONTAINERS: 4

CHAIN OF CUSTODY SEALS

REC'D GOOD CONDITION/COLD

CONFORMS TO RECORD

LAB NO.:

RELINQUISHED BY		RECEIVED BY	
(SIGNATURE)	(TIME)	(SIGNATURE)	(TIME)
<u>Gary E. Aulty</u>	<u>8:50</u>	<u>Gary Cook</u>	<u>8:55</u>
<u>GARY E. AULTY</u>	<u>10/15/92</u>	<u>Gary Cook</u>	<u>8:55</u>
<u>Chromalab, Inc.</u>		<u>Chromalab</u>	

**SPECIAL INSTRUCTIONS/COMMENTS:**

Use lowest detection limits

**<** : Less than; When appearing in results column indicates analyte not detected at the value following. This datum supersedes the listed Reporting Limit.

**+** : Reporting Limits are a function of the dilution factor for any given sample. To obtain actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).

**CVS** : Initial Calibration Verification Standard (External Standard).

**mean** : Average; sum of measurements divided by number of measurements.

**g/Kg (ppm)** : Concentration in units of milligrams of analyte per kilogram of sample, (parts per million).

**mg/L** : Concentration in units of milligrams of analyte per liter of sample.

**mL/L/hr** : Milliliters per liter per hour.

**MPH/100 mL** : Most probable number of bacteria per one hundred milliliters of sample.

**N/A** : Not applicable.

**A** : Not analyzed.

**ND** : Not detected; the analyte concentration is less than applicable listed reporting limit.

**NTU** : Nephelometric turbidity units.

**RPD** : Relative percent difference,  $100 \text{ [Value 1 - Value 2]}/\text{mean value}$ .

**SNA** : Standard not available.

**g/Kg (ppb)** : Concentration in units of micrograms of analyte per kilogram of sample, (parts per billion).

**ug/L** : Concentration in units of micrograms of analyte per liter of sample.

**umhos/cm** : Micromhos per centimeter.

#### Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

Appendix D

**GROUNDWATER ANALYTICAL RESULTS  
AND  
CHAIN-OF-CUSTODY FORM**



NATIONAL  
ENVIRONMENTAL  
TESTING, INC. ®

NET Pacific, Inc.  
1072 Serpentine Lane  
Suite D  
Pleasanton, CA 94566  
Tel: (510) 462-4004  
Fax: (510) 462-4357

### Mobile Field Services Lab # III

PG&E  
4 CROW CANYON ROAD  
SAN RAMON, CA 94583

Date Analyzed : 10/07/92  
Report Date : 10/19/92  
Matrix : WATER  
Instrument # : GC

Project Name : 60007194EA TESA

Project Manager : Gary Nulty

Sample Name	Date Sampled	Dilution Factor	8015-M	8020	8020	8020	8020
			Units mg/L Rpt. Limit=.1	Units µg/L Rpt. Limit=0.5	Units µg/L Rpt. Limit=0.5	Units µg/L Rpt. Limit=0.5	Units µg/L Rpt. Limit=1.0
			TPH as DIESEL	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENE
GWS-2A	10/07/92	0.2	22	ND	ND	ND	ND
GWS-2B	10/07/92	0.2	160	ND	ND	9.0	100
GWS-2C	10/07/92	0.2	0.4	ND	ND	ND	ND
GWS-2D	10/07/92	0.2	23	ND	ND	ND	130
GWS-2E	10/07/92	0.2	ND	ND	ND	ND	ND
GWS-2F	10/07/92	0.2	ND	ND	ND	ND	ND
GWS-3H	10/07/92	0.2	ND	ND	ND	ND	ND
GWS-3I	10/07/92	0.2	9.7	ND	ND	ND	ND







NET Pacific, Inc

## KEY TO ABBREVIATIONS and METHOD REFERENCES

- < : Less than; When appearing in results column indicates analyte not detected at the value following. This datum supersedes the listed Reporting Limit.
- \* : Reporting Limits are a function of the dilution factor for any given sample. To obtain actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
- ICVS : Initial Calibration Verification Standard (External Standard).
- mean : Average; sum of measurements divided by number of measurements.
- mg/Kg (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, (parts per million).
- mg/L : Concentration in units of milligrams of analyte per liter of sample.
- mL/L/hr : Milliliters per liter per hour.
- MPH/100 mL : Most probable number of bacteria per one hundred milliliters of sample.
- N/A : Not applicable.
- NA : Not analyzed.
- ND : Not detected; the analyte concentration is less than applicable listed reporting limit.
- NTU : Nephelometric turbidity units.
- RPD : Relative percent difference,  $100 \text{ [Value 1 - Value 2]}/\text{mean value}$ .
- SNA : Standard not available.
- ug/Kg (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, (parts per billion).
- ug/L : Concentration in units of micrograms of analyte per liter of sample.
- umhos/cm : Micromhos per centimeter.

### Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

# CHROMALAB, INC.

5 DAYS TURNAROUND

Environmental Laboratory (1094)

October 22, 1992

ChromaLab File No.: 1092146

PG&E

Attn: Gary E. Nulty

**RE:** Four soil and three water samples for Diesel and BTEX analyses

Project Name: OAKLAND POWER PLANT

Project Number: 60007194 EA TESA

Date Sampled: Oct. 14, 1992

Date Submitted: Oct. 15, 1992

Date Extracted: Oct. 20, 1992

Date Analyzed: Oct. 20, 1992

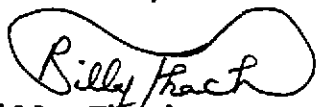
## RESULTS:

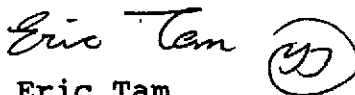
Sample I.D.	Diesel (mg/Kg)	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethyl Benzene (µg/Kg)	Total Xylenes (µg/Kg)
GWS-3BS (7-7.5')	130*	N.D.	N.D.	7.3	27
GWS-3DS (5.5'-6.0')	320	N.D.	N.D.	N.D.	N.D.
GWS-3ES (6'-6.5')	N.D.	N.D.	N.D.	N.D.	N.D.
GWS-3G (5.5'-6.0')	N.D.	N.D.	N.D.	N.D.	22
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	110%	104%	95%	95%	97%
DUP SPIKE RECOVERY	96%	94%	97%	96%	98%
DETECTION LIMIT	1.0	5.0	5.0	5.0	5.0
METHOD OF ANALYSIS	3550/8015	8020	8020	8020	8020

\*140 mg/Kg of Motor Oil was found in this sample.

Sample I.D.	Diesel (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Total Xylenes (µg/L)
GWS-3A	1300	N.D.	N.D.	N.D.	N.D.
GWS-3B	5700	N.D.	N.D.	N.D.	N.D.
GWS-3E	2100	N.D.	N.D.	N.D.	N.D.
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	94%	98%	98%	96%	96%
DUP SPIKE RECOVERY	95%	104%	1075	102%	100%
DETECTION LIMIT	50	0.5	0.5	0.5	1.5
METHOD OF ANALYSIS	3510/8015	602	602	602	602

ChromaLab, Inc.

  
Billy Thach  
Analytical Chemist

  
Eric Tam  
Laboratory Director

MOBILE LAB DIVISION, 1072 SERPENTINE LANE, SUITE D, PLEASANTON, CA 94566  
 (510) 462-4004 PHONE (510) 462-4357 FAX

COMPANY **PG&E - SAN RAMON**  
 ADDRESS **3400 CROWCROFT RD SAN RAMON 94583**  
 PHONE **510-866-5812** FAX  
 PROJECT NAME/LOCATION **OAKLAND POWER PLANT**  
 PROJECT NUMBER **60007199 EA TESA**  
 PROJECT MANAGER **GARY NULTY**

SAMPLED BY **GARY NULTY**  
 (PRINT NAME)

*Gary Nulty*  
 SIGNATURE

(PRINT NAME)

**ANALYSES**

TURNAROUND TIME \_\_\_\_\_ DAY (S)

*3/14/92*  
*5230*  
*000060*  
*BTEX - 4000*  
*4000*

DATE	TIME	SAMPLE ID/DESCRIPTION	GRAB	COMP	# OF CONTAINERS	MATRIX	PRESERVED Y/N	COMMENTS
		GWS	✓		2	w		
		GWS - 2A			2			X
		GWS - 2B			2			X
		GWS - 2C			2			X
		GWS - 2D			2			X
		GWS - 3H			2			X
		GWS - 3I			2			X
		GWS - 2F			2			X
		GWS - 2E			3			X

**RESULTS TO:**

**INVOICE TO:**

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
RELINQUISHED BY:	DATE/TIME	RECEIVED FOR LABORATORY BY:	DATE/TIME
METHOD OF SHIPMENT		REMARKS:	

*Gary Nulty*  
 RECEIVED BY: *Richard Hines*  
 DATE/TIME: *10/19/92 5:00 PM*



