Report Issued:

July 19, 1991

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94607

Shallow Groundwater

Investigation Report

for PG&E's

Oakland Power Plant

Diesel Oil Tanks

7/91

Prepared by

Water Resources Unit

Prepared for

Oakland Power Plant

July 1991

Report 402.331-91.48

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INTRODUCTION

This report presents the results of additional site characterization near three 75-gallon diesel dump tanks at PG&E's Oakland Power Plant. The investigation consisted of a shallow groundwater survey, and included the collection and analyses of groundwater samples to determine if groundwater has been affected by accidental releases of diesel fuel from the tanks. This work was based on the results of a Preliminary Soil Investigation conducted during September 1990, adjacent to the diesel dump tanks (PG&E, 1990) which revealed the presence of petroleum hydrocarbons as diesel in soils near the tanks. During the soil investigation, groundwater was encountered approximately five feet below the surface, and based on the results of the soil analytical results, additional investigation of the groundwater was warranted. This investigation was performed at the request of PG&E's Oakland Power Plant.

SCOPE OF WORK

The scope of this investigation is to determine the presence (and lateral extent) or absence of diesel fuel in the groundwater near the three dump diesel tanks. The results of this investigation will be used to assist with planning the removal and replacement of the tanks presently scheduled for late 1991 and any further site investigation needed at the site.

SITE DESCRIPTION

9607

PG&E's Oakland Power Plant is located at 50 Martin Luther King Jr. Way, and lies at an elevation of less than 10 feet above mean sea level. The site is located in an industrial area approximately 300' east of San Francisco Bay (Figure 1). Based on previous site borings, shallow groundwater occurs at a depth of approximately 5-10 feet below the ground surface.

The facility is used to generate electricity by burning diesel fuel through jet turbine generators only during peak load periods. Three turbines are located at the site (i.e., turbines #1, #2, and #3) and each turbine has an underground 75-gallon diesel dump tank used for temporary storage of diesel fuel drained from the turbine fuel lines (Figure 2). The diesel dump tanks have been in operation since 1978. These tanks are cylindrical in shape and are located approximately 1 to 4.5 feet below the ground surface.

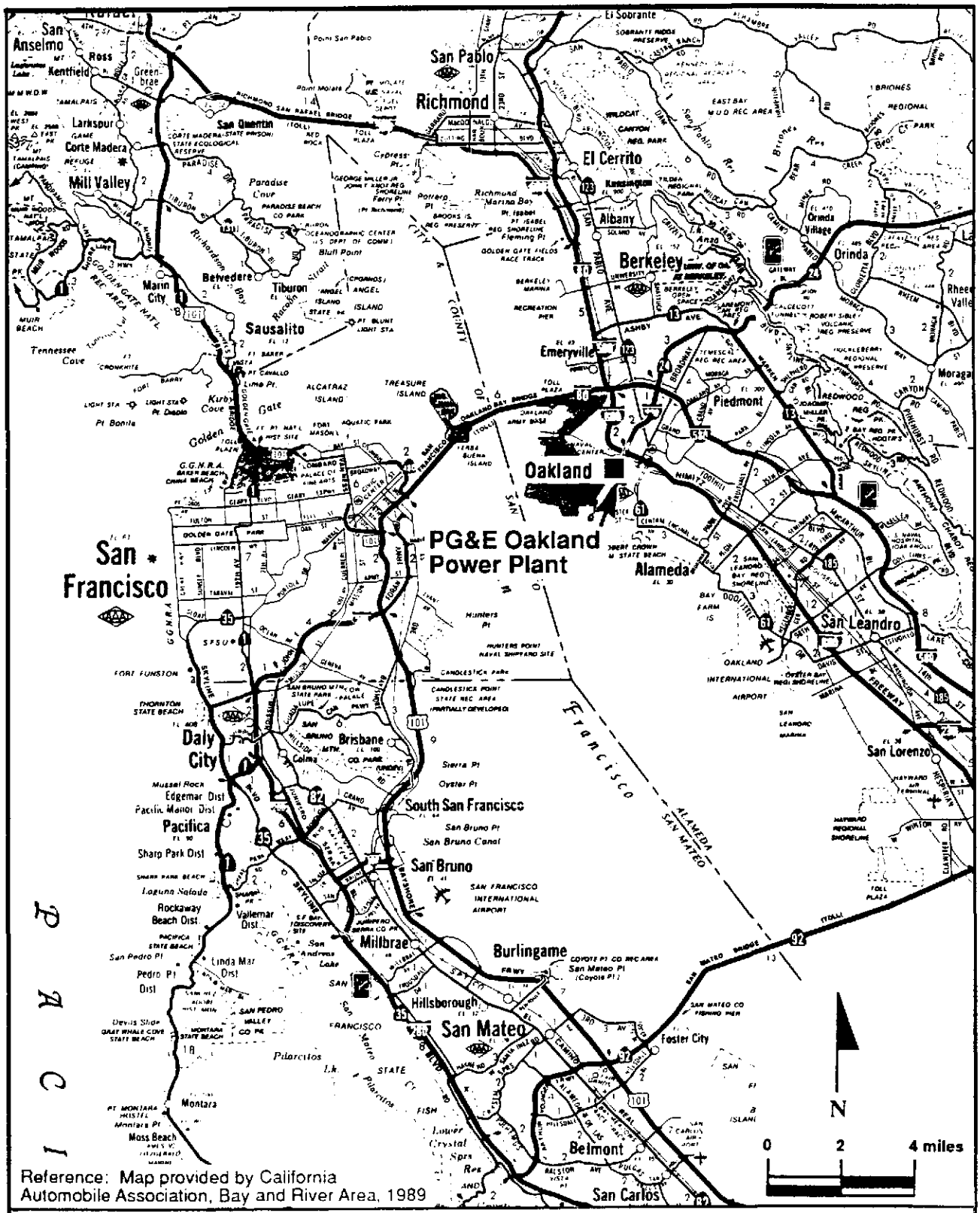

Figure 1. Site location map.

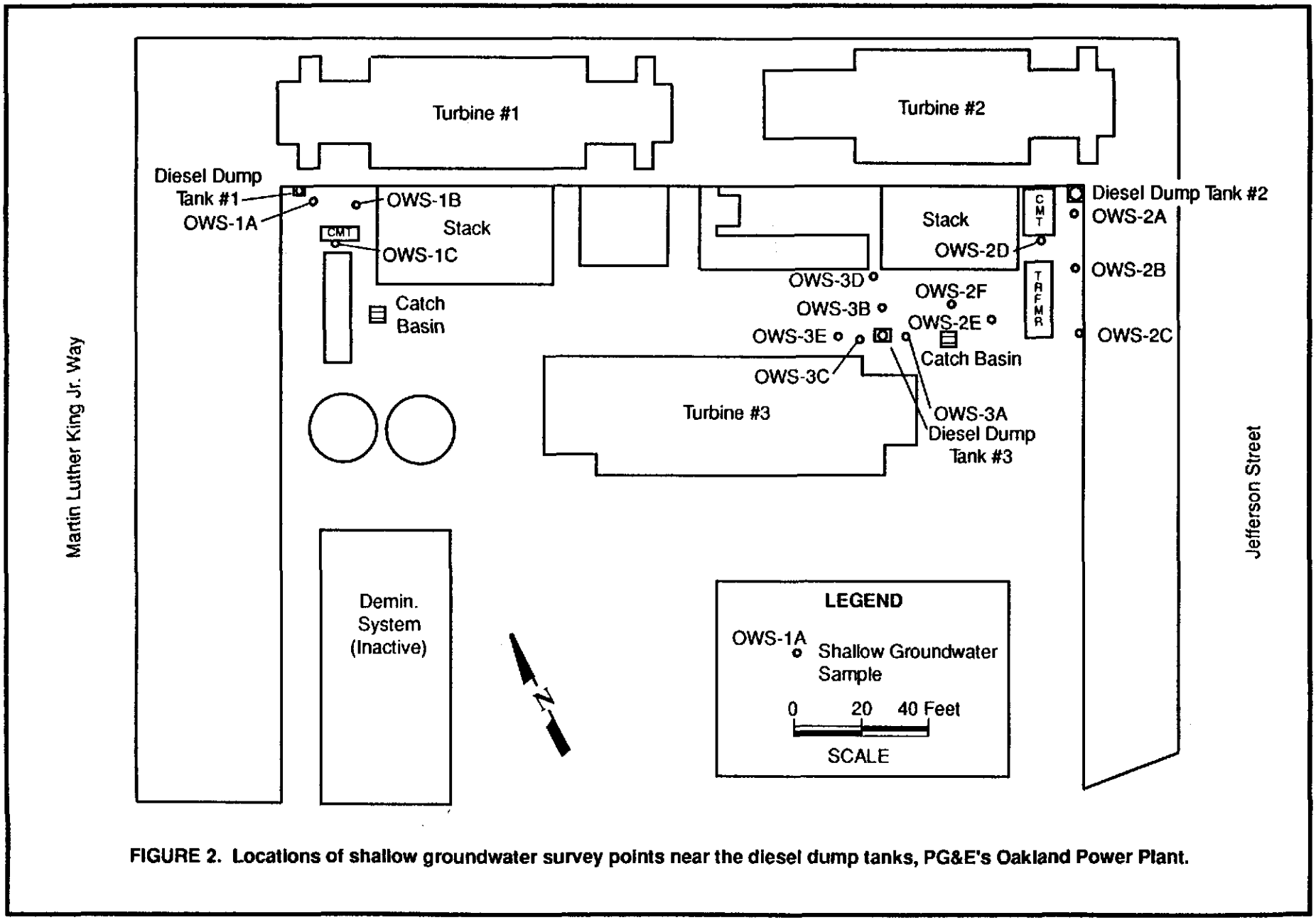

FIGURE 2. Locations of shallow groundwater survey points near the diesel dump tanks, PG&E's Oakland Power Plant.

BACKGROUND

A preliminary soil investigation study was conducted in September 1990 near the three diesel dump tanks to determine if the soil near the tanks was affected by diesel fuel. The results of the soil investigation indicated the presence of variable concentrations of total petroleum hydrocarbons as diesel (TPH-D) near all three diesel dump tanks. Soil samples near Tank #1 had TPH-D concentrations up to 70 mg/kg at a depth of 5.5 to 6.0 feet. Soil samples near Tank #2 had TPH-D concentrations up to 10,000 mg/kg at a depth of 5.0 to 5.5 feet. Soil samples near Tank #3 had TPH-D concentrations up to 12,000 mg/kg at a depth of 4.5 to 5.0 feet.

Aromatic hydrocarbons were not detected in the soil samples tested except for one sample which was collected near Tank #3. This sample, which was collected from a depth of 4.5 to 5.0 feet, contained 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 (BTEX).

A complete discussion of the soil sample analytical results taken near the three diesel dump tanks is presented in TES Report No. 402.331-90.55 (Preliminary Soil Investigation Report for the PG&E Oakland Power Plant Diesel Oil Tanks, December 1990).

SHALLOW GROUNDWATER SURVEY METHODOLOGY

SHALLOW GROUNDWATER SURVEY

A shallow groundwater survey was conducted on May 13 and 14, 1991, to determine if diesel fuel is present in the shallow groundwater in the immediate vicinity of the diesel dump tanks. The survey was performed by NET Pacific Inc. under the supervision of a PG&E geologist. A California-certified mobile laboratory was provided by NET Pacific for on-site analyses of the groundwater samples. The number and location of sampling points was determined by accessibility, location of underground utilities and the results obtained from the prior soil sampling. Shallow groundwater sampling generally continued outward from each diesel dump tank until the petroleum hydrocarbon concentrations were near or below the method detection limit. A total of 14 shallow groundwater sampling points were installed: this included 3 points near tank #1, 6 points near tank #2, and 5 points near tank #3.

SHALLOW GROUNDWATER SAMPLING EQUIPMENT AND PROCEDURE

The shallow groundwater survey consisted of the installation of sampling probes at the locations shown in Figure 2. The groundwater sampling probes consisted of 3/4-inch outside diameter standard galvanized steel pipe which was dedicated for each sampling point. Prior to sampling, each sampling probe was steamed cleaned and heat treated so that no off-site or cross contamination could affect the results. Each sampling probe was equipped with reinforced driving points to assist in penetrating the soil. Each probe was driven into the soil by pneumatic impact to a sufficient depth (approximately 5-12 feet) to penetrate the saturated zone (i.e., the water table). Once the probes penetrated a sufficient depth to collect a groundwater sample, the depth to groundwater was approximated and a water sample was subsequently collected using a clean bailer. The retrieved fluid was carefully transferred to 40-ml VOA vials and l-liter amber glass bottles. Sample containers were appropriately labeled and the chain-of-custody documentation was initiated for each sample. A copy of the chain-of-custody form is presented in Appendix A.

Due to slow recharge of the groundwater sampling reservoir, very low volumes of purge water were collected (approximately 1/2 gallon). Evidence of floating product in the purge water from each groundwater sampling probe was checked. The purged water was retained by NET Laboratory and properly disposed according to federal, state, county, and local regulations. No soil cuttings were generated during the groundwater sampling period.

All of the groundwater samples were analyzed for TPH-D (EPA method 3550 modified 8015) and BTEX (EPA method 8020) by NET Pacific Inc. in their on-site mobile lab. After the groundwater samples were collected and analyzed, the sample holes were backfilled with cement from the total depth of the hole to the ground surface.

SHALLOW GROUNDWATER SURVEY RESULTS

A summary the groundwater analytical results obtained during the shallow groundwater survey (including free product observation) are presented in Table 1. Copies of the analytical results are presented in Appendix A.

TANK #1

Three groundwater samples were collected near Tank #1 (OWS-1A, OWS-1B, and OWS-1C). The depth-to-groundwater at locations OWS-1A and 1B was approximately 10 feet below ground surface and the depth-to-groundwater at location OWS-1C was approximately 7 feet. Although the sample locations are only fifteen feet apart, this three foot difference in groundwater level may be attributable to an old concrete foundation that separates OWS-1A and 1B from OWS-1C.

Sample OWS-1A (located closest to the tank) yielded non-detectable levels of benzene and toluene. Ethylbenzene was detected at 8.7 μg/L, xylenes were detected at 16 μg/L, and diesel was detected at 1.9 mg/L. Samples OWS-1B and OWS-1C yielded non-detectable concentrations of BTEX and diesel.

TANK #2

Six groundwater samples were collected near Tank #2 (OWS 2A through 2F). Depth-to-groundwater was approximately 5 feet below the ground surface for all sample locations. Samples OWS-2C, 2E, and 2F contained non-detectable concentrations of diesel and BTEX. Free product was observed in the purge water at OWS-2A, OWS-2B, and OWS-2D. Sample OWS-2A yielded non-detectable levels of benzene, ethylbenzene, and toluene. Xylenes and diesel were detected in this sample at 51 μg/L and 68 mg/L, respectively. Sample OWS-2B had non-detectable levels of BTEX, however, diesel was detected at 12 mg/L. Sample OWS-2D yielded non-detectable levels of benzene, ethylbenzene, and toluene. Xylenes and diesel were detected in this sample at 73 μg/L and 204 mg/L, respectively.

TANK #3

Five groundwater samples were collected near Tank #3 (OWS-3A through 3E). Depth-to-groundwater was approximately 5 to 5.5 feet below the ground surface. Sample OWS-3A yielded non-detectable levels of diesel and toluene. Benzene, ethylbenzene, and xylenes were detected in this sample at 1.5 μg/L, 1.5 μg/L, and 2.4 μg/L, respectively. Sample OWS-3B yielded non-detectable concentrations of benzene, toluene, and xylenes. Ethylbenzene and diesel were detected in this sample at 26 μg/L, and 19 mg/L, respectively. Free product was observed in the purge water at this survey point. Sample OWS-3C contained benzene (3.4 μg/L), ethylbenzene (4.4 μg/L), toluene (1.4 μg/L), xylenes (5.7 μg/L), and diesel (8.5 mg/L). Sample OWS-3D did not contain a detectable concentration of toluene, however, benzene, ethylbenzene, xylenes and diesel were detected at 1.1 μg/L, 1.3 μg/L, 1.0 μg/L, and 1.0 mg/L, respectively. Sample OWS-3E had non-detectable concentrations of diesel and BTEX.

Table 1

Summary of Shallow Groundwater Analytical Results Collected Near Three Diesel Dump Tanks at PG&E's Oakland Power Plant

Sample Description	Sample Date	B (µg/l)	E (µg/l)	T (µg/l)	X (µg/l)	Diesel (mg/l)
Tank 1						
OWS-1A	5/14/91	<0.04	8.7	<0.04	16	1.9
OWS-1B	5/14/91	<0.04	<0.05	<0.04	<0.05	<0.05
OWS-1C	5/14/91	<0.04	<0.05	<0.04	<0.05	<0.05
Tank 2						
OWS-2A	5/13/91	<0.5	<0.5	<0.5	51	68*
OWS-2B	5/13/91	<0.5	<0.5	<0.5	<0.5	12*
OWS-2C	5/13/91	<0.04	<0.05	<0.04	<0.05	<0.05
OWS-2D	5/13/91	<0.04	<0.05	<0.04	73	204*
OWS-2E	5/14/91	<0.5	<0.5	<0.5	<0.5	<0.2
OWS-2F	5/14/91	<0.04	<0.05	<0.04	<0.05	<0.05
Tank 3						
OWS-3A	5/13/91	1.5	1.5	<0.04	2.4	<0.05
OWS-3B	5/13/91	<0.04	26	<0.04	<0.05	19*
OWS-3C	5/14/91	3.4	4.4	1.4	5.7	8.5
OWS-3D	5/14/91	1.1	1.3	<0.04	1.0	1.0
OWS-3E	5/14/91	<0.5	<0.5	<0.5	<0.5	<0.2

< = Not detectable above stated detection limit.
* = Free product observed during purging procedures.
B = Benzene
E = Ethylbenzene
T = Toluene
X = Xylenes

SUMMARY OF RESULTS

The following is a summary of the shallow groundwater survey conducted near the three diesel dump tanks:

1. The presence of diesel was detected in the shallow groundwater near all three tanks, however, the concentrations of diesel were variable from tank to tank. Samples collected near tanks 1, 2, and 3 yielded concentrations of diesel from below the detection limit to 1.9 mg/L (OWS-1A), 204 mg/L (OWS-2D), and 19 mg/L (OWS-3B), respectively.

2. The levels of aromatic hydrocarbons (benzene, ethylbenzene, toluene, and xylenes) in the groundwater ranged from below the detection limit to relatively low concentrations. Samples obtained near tank #1 yielded non-detectable concentrations of BTEX except for sample OWS-1A which contained ethylbenzene (8.7 μg/L) and xylenes (16 μg/L). Shallow groundwater near tank #2 yielded non-detectable concentrations of BTEX except for samples OWS-2A and 2D. Samples OWS-2A and 2D contained xylenes at 51 μg/L and 73 μg/L, respectively. Groundwater samples near tank #3 yielded concentrations of benzene from non-detect up to 3.4 μg/L (OWS-3C), ethylbenzene from non-detect up to 26 μg/L (OWS-3B), toluene from non-detect up to 1.4 μg/L (OWS-3C), and xylenes from non-detect up to 5.7 μg/L (OWS-3C).

3. Groundwater was generally encountered five to six feet below the ground surface except for locations OWS-1A and 1B. At these locations, groundwater occurred between 10 and 11 feet below the ground surface.

REFERENCE

Pacific Gas and Electric Company, December 1990. Preliminary Soil Investigation Report for the PG&E Oakland Power Plant Diesel Oil Tanks, Report 402.331-90.55.

NET Pacific, Inc.

435 TESCONI CIRCLE
SANTA ROSA, CA 95401

TEL: 707-526-7200
FAX: 707-526-9623

7480

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
8011	PGE 3400 Crow Canyon Rd San Ramon Ca. 94583

SAMPLERS: (Signature) Gary Nulty

Emil J. Kaufman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Diesel / BTEX	REMARKS
OWS 2A	5/13/91	9:45		✓		2 liters 2 VOA		
OWS 2B		10:10		✓		2 Liters 2 VOA		
OWS 2C		11:00		✓		2 liters 2 VOA		
OWS 2D		12:00		✓		2 liters 2 VOA		
OWS 3A		2:30		✓		2 liters 2 VOA		
OWS 3B		3:30		✓		2 liters 2 VOA		
OWS 3C	5/14/91	8:30		✓		"		
OWS 3D		10:10		✓		"		
OWS 2E		10:40		✓		"		
" 3E		11:30		✓		"		
" 2F		12:00		✓		"		
" 1A		1:40		✓		"		
" 1B		2:25		✓		"		
" 1C		3:30		✓		"		

All tests have been run

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	5/15/91 9:30				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[signature]	5/15/91 0930		

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Gary Nulty
PG&E
Dept. of Engineering Res.
3400 Crow Canyon Road
San Ramon, Ca., 95483

Date: 05-22-91
NET Client Acct No: 70.7
NET Pacific Log No: 7480
Received: 05-15-91 0930

REVISED 07-10-91

Client Reference Information

Project: 8011

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Troy K. Mikell
Field Services
Division Manager

TKM/lmb
Enclosure(s)

NET Pacific, Inc.

Client No: 70.7
Client Name: PG&E
NET Log No: 7480

Date: 05-22-91

Ref: Project: 8011

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results OWS 2B 05-13-91 1010 85414	 OWS 3E 05-14-91 1130 85421	Units
METHOD 8020					
DATE ANALYZED			05-13-91	05-14-91	
DILUTION FACTOR*			50	1	
PETROLEUM HYDROCARBONS					
Benzene		0.5	ND	ND	ug/L
Ethyl benzene		0.5	ND	ND	ug/L
Toluene		0.5	ND	ND	ug/L
Xylenes, total		0.5	ND	ND	ug/L
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (WATER)			--	--	
DILUTION FACTOR*			1	1	
DATE ANALYZED			05-13-91	05-14-91	
METHOD 8015 MOD/3550			--	--	
as Diesel		0.2	12	ND	mg/L

NET Pacific, Inc.

Client No: 70.7
Client Name: PG&E
NET Log No: 7480

Date: 05-22-91
Page: 5

Ref: Project: 8011

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results OWS 2D 05-13-91 1200 85416	 OWS 1A 05-14-91 1340 85423	Units
METHOD 8020					
DATE ANALYZED			05-13-91	05-14-91	
DILUTION FACTOR*			50	1	
PETROLEUM HYDROCARBONS					
Benzene		0.04	ND	ND	ug/L
Ethyl benzene		0.05	ND	8.7	ug/L
Toluene		0.04	ND	ND	ug/L
Xylenes, total		0.05	73	16	ug/L
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (WATER)			--	--	
DILUTION FACTOR*			1	1	
DATE ANALYZED				05-14-91	
METHOD GC FID/3550			--	--	
as Diesel		0.05	204	1.9	mg/L

NET Pacific, Inc.

Client No: 70.7
Client Name: PG&E
NET Log No: 7480

Date: 05-22-91
Page: 7

Ref: Project: 8011

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results OWS 3C 05-14-91 0830 85418	 OWS 1C 05-14-91 1330 85425	Units
METHOD 8020					
DATE ANALYZED			05-14-91	05-14-91	
DILUTION FACTOR*			1	1	
PETROLEUM HYDROCARBONS					
Benzene		0.04	3.4	ND	ug/L
Ethyl benzene		0.05	4.4	ND	ug/L
Toluene		0.04	1.4	ND	ug/L
Xylenes, total		0.05	5.7	ND	ug/L
PETROLEUM HYDROCARBONS			--	--	
EXTRACTABLE (WATER)			--	--	
DILUTION FACTOR*			1	1	
DATE ANALYZED			05-14-91	05-14-91	
METHOD GC FID/3550			--	--	
as Diesel		0.05	8.5	ND	mg/L