SEMI-ANNUAL MONITORING REPORT
(OCTOBER 1, 1997 TO MARCH 31, 1998)
OAKLAND FUELING AREA
UNION PACIFIC RAILROAD
1717 MIDDLE HARBOR ROAD
OAKLAND, CALIFORNIA

STID 4020

Laidlaw Project No. 792930

April 28, 1998

Prepared For:
Union Pacific Railroad
Omaha, Nebraska

LAIDLAW ENVIRONMENTAL SERVICES

Prepared By:
Laidlaw Environmental Services, Inc.
Consulting Services
5665 Flatiron Parkway
Boulder, Colorado 80301

LAIDLAW ENVIRONMENTAL SERVICES

April 28, 1998

Mr. Harry Patterson
Union Pacific Railroad
1416 Dodge Street, Room 930
Omaha, Nebraska 68179

RE: *Semi-Annual Monitoring Report (October 1, 1997 Through March 31, 1998)*, Oakland Fueling Area in the Oakland TOFC Railyard, Oakland, California

Dear Mr. Patterson:

Enclosed is the final copy of the *Semi-Annual Monitoring Report (October 1, 1997 Through March 31, 1998)*, for the Union Pacific Railroad Fueling Area at the trailer-on-flat-car (TOFC) loading facility at 1717 Middle Harbor Road in Oakland, California.

If you have any questions, please call us at (303) 938-5500.

Sincerely,

Lisa Hennessy

Lisa Hennessy, Engineer
Project Manager

Sam Marquis

Sam Marquis, R.G., P.G.
Project Hydrogeologist

cc: Larry Seto, ACDEH
John Prall, Port of Oakland
Jack Murphy, APL

Enclosure
LH

5665 Flatiron Parkway Boulder, Colorado 80301-2800
Phone 303.938.5500 Fax 303.938.5520

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OAKLAND FUELING AREA
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1717 MIDDLE HARBOR ROAD
OAKLAND, CALIFORNIA
Laidlaw Project No. 792930

Prepared for:

Union Pacific Railroad
Environmental Management - Room 930
1416 Dodge Street
Omaha, Nebraska 68179

For submittal to:

Mr. Larry Seto
Alameda County
Department of Environmental Health
1131 Harbor Bay Parkway, Second Floor
Alameda, California 94502-6577

Prepared by:

Laidlaw Environmental Services, Inc.
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5665 Flatiron Parkway
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Lisa Hennessy
Engineer
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Sam Marquis
Project Hydrogeologist
R.G. No. 5110

April 28, 1998

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

The purpose of this report is to provide groundwater monitoring information pertaining to the hydrocarbon recovery system located at the fueling area of the Union Pacific Railroad Oakland Trailer on Flat Car (TOFC) railyard at 1717 Middle Harbor Road in Oakland, California. The semi-annual period covered by this report is from October 1, 1997 through March 31, 1998. This report was prepared by Consulting Services of Laidlaw Environmental Services, Inc. (Laidlaw) for Union Pacific Railroad (UPRR). It has been prepared in fulfillment of the requirements cited in the September 21, 1994 letter prepared by the Alameda County Department of Environmental Health (ACDEH), and submitted to the UPRR. The objectives of the groundwater monitoring program are to evaluate changes in the distribution of petroleum hydrocarbons in groundwater and to assess the effectiveness of the hydrocarbon recovery system.

This report presents the results of fluid-level measurements collected in November 1997, February 1998, and March 1998, in addition to analytical results for groundwater samples obtained on February 4, 1998. In accordance with a letter from ACDEH dated March 21, 1997, and submitted to UPRR, groundwater sampling is performed semi-annually (during the first and third quarters of the year) to account for seasonal groundwater fluctuations.

2. BACKGROUND INFORMATION

The fueling area is located in the northern portion of the UPRR Oakland TOFC Yard, which is adjacent to the Oakland Inner Harbor or Oakland Estuary (Figures 1 and 2). The area surrounding the site is used for heavy to light commerce. Residential areas are located approximately one-half mile north of the site and across the Oakland Estuary one-half mile south of the site.

Previous investigations indicated the presence of light non-aqueous phase liquid petroleum hydrocarbons (diesel) floating on the groundwater near the fueling area. A hydrocarbon recovery and groundwater treatment system was installed to remove mobile diesel from near the fueling area.

The results from prior investigations and environmental engineering activities conducted by Laidlaw have been documented in previous reports. The results of the initial site investigation were presented in the *Hydrocarbon Investigation and Remediation Design* report dated June 10, 1991, which also presented a conceptual design of the system. The system design was outlined in the *Draft Preliminary Design Report*, dated September 5, 1991. As-built information for the system has been presented in the *Hydrocarbon Recovery System, As-Built Construction Report* of July 20, 1992. Process changes to the system were presented in the permit renewal application letter prepared by Laidlaw for UPRR, dated March 22, 1993.

An *Additional Remediation Workplan* was submitted by Laidlaw and approved by ACDEH on March 21, 1997. The workplan proposed:

- the recovery of total fluids (water and diesel) from groundwater monitoring well OMW-9 and piezometer OP-4; and
- treatment of these fluids at the existing system.

The workplan was implemented on June 24 and 25, 1997 by Burns & McDonnell as a subconsultant to Laidlaw. New recovery pumps were installed in wells OMW-9 and OP-4, and became operational on June 26, 1997. Due to an operational problem with the air compressor, which supplies pressurized air for the recovery pumps, the entire system has remained inoperable since the end of September 1997.

3. CURRENT ACTIVITIES

The current activities at the site consist of performing maintenance on the system and conducting a groundwater monitoring and sampling program.

3.1 System Activities

Water samples are collected from the water stream of the system periodically. Reporting of the system monitoring is conducted on a semi-annual frequency with the next report due July 1998. The samples are collected to assess the performance of the system and to compare the concentrations of the discharge with limits established by the East Bay Municipal Utility District.

Water samples are collected from sampling ports located before, between, and after the two granular activated carbon vessels at varying frequencies.

- On a quarterly basis, samples are collected from before and after the carbon vessels. The samples are analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA method 8020 and total petroleum hydrocarbons as diesel (TPH-D) using EPA method 8015 modified.

- On a monthly basis, water samples are collected from sample ports before and between the carbon vessels and analyzed for TPH-D. The water samples collected from between the two vessels are also analyzed for BTEX.

Samples have not been collected from the system since September 1997 because of system shutdown. Sampling activities will resume once a new air compressor is in place and the system is turned back on. The approximate restart date for the system is mid May, 1998.

System maintenance consists of changing particulate filters, backwashing the carbon, and checking the chlorine feed system. Operational readings (cumulative flow, hydrocarbon storage volume, and pressure drop across the particle filters) are collected during each site visit.

3.2 Groundwater Monitoring

Groundwater monitoring activities consist of collecting fluid-level measurements in the groundwater monitoring wells on a bi-monthly basis, and collecting groundwater samples on a semi-annual basis. Due to the system being inoperable since September 1997, fluid-level measurements have been collected on a quarterly basis since November 1997.

Fluid-level measurements are used to generate potentiometric surface maps. The potentiometric surface maps provide information about the groundwater gradient and the operation of the recovery wells. The data used in these maps include measurements obtained from monitoring wells and piezometers in which diesel is found. The groundwater elevations in these wells are corrected to account for the diesel overlying the water column in the well. The correction is performed by multiplying the specific gravity of the diesel by the diesel layer thickness and adding this value to the water elevation measurement from the well.

During a sampling event, groundwater samples are collected from wells in which diesel is absent. The samples are submitted to a certified laboratory and analyzed for BTEX and TPH-D. For wells that indicate the presence of diesel, the diesel is recovered by hand using disposable bailers.

4. System Operations

The recovery system, consisting of recovery wells ORW-1, ORW-2, ORW-3, OMW-9 and OP-4, has not been operative since the last week of September 1997 due to a broken air compressor. A replacement air compressor has been obtained by UPRR. Burns and McDonnell will assist with the new compressor installation and system start-up. This is expected to be complete and the system operational by mid-May, 1998.

Detailed performance records and monitoring results for the recovery system are included in the semi-annual reports prepared following the second and fourth quarters of each year. These records will be included in the semi-annual report due in July 1998.

5. GROUNDWATER MONITORING

The following sections provide information about the recent groundwater monitoring.

5.1 Fluid-level Measurements

Overall, the monitoring wells and piezometers at the site showed an increase in corrected groundwater elevations between November 1997 and March 1998, except for OMW-6 and OP-1 which showed slight decreases. The average correction in groundwater elevations was an increase of approximately 1.6 feet with the maximum increase being 3.02 feet in monitoring well OMW-7. Measurements from wells OMW-9 and OP-4 could not be collected due to the presence of pumping components in the well casing. The increase of groundwater elevations between November and March is consistent with previous site data. Historical fluid-levels for each well are provided in Table 1.

A potentiometric surface map created with measurements collected from groundwater monitoring wells and piezometers at the fueling area on November 18, 1997 are presented in Figure 3. The potentiometric surface results for November indicate that groundwater flow is to the south. The hydraulic gradient ranges from 0.001 to 0.004 feet/foot (5 to 22 feet/mile). There is an increase in groundwater elevations in the area of the recovery system (wells ORW-1, ORW-2, ORW-3, OMW-9, and OP-4) that is most likely due to the lack of a groundwater depression caused by the inoperable recovery pumps.

During the February 4, 1998 sampling event fluid-level measurements were obtained from seven monitoring wells (OMW-1, OMW-2, OMW-3, OMW-5, OMW-6, OMW-8 and OMW-10). On March 31, 1998, Burns & McDonnell obtained the fluid-level measurements from the five remaining wells (OMW-4, OMW-7, ORW-1, ORW-2, and ORW-3) and three remaining piezometers (OP-1, OP-2, and OP-3) located at the site. The potentiometric map for March 1998 was generated using the combined fluid-level measurements from February and March 1998 and is presented as Figure 4. The potentiometric surface results for February-March 1998 indicate that groundwater flow is to the south. The hydraulic gradient ranges from 0.004 to 0.006 feet/foot (21 to 32 feet/mile)

During the November 1997, February and March 1998 monitoring events, diesel was observed in two groundwater monitoring wells (OMW-4 and OMW-7) and three piezometers (OP-1, OP-2, and OP-3). There was a sheen noted in piezometer OP-1 in November, but no noticeable product thickness was observed. Figures 5 and 6 illustrate the diesel thicknesses as measured in the monitoring wells and piezometers during the November 1997 and February- March 1998 monitoring events, respectively. The approximate extent of the diesel plume did not change significantly during the November and February-March monitoring events, and it is consistent with previous monitoring events.

5.2 Groundwater Sampling

The most recent semi-annual groundwater sampling event was conducted on February 4, 1998. Groundwater samples were obtained from monitoring wells OMW-1, OMW-2, OMW-3, OMW-5, OMW-6, OMW-8 and OMW-10.

Analytical results indicate that BTEX concentrations in all monitoring wells sampled are below the method detection limit (MDL) of 0.0005 mg/l except for OMW-2 and OMW-10. OMW-2 had an ethylbenzene concentration of 0.0023 mg/l and OMW-10 had a benzene concentration of 18 mg/l. These results are consistent with previous sampling data except for well OMW-10. Previously, monitoring well OMW-10 had a maximum benzene concentration of 2.8 ppm in November 1992. TPH-D concentrations range from below the MDL of 0.005 mg/l in OMW-1 to 9.1 mg/l in OMW-10. The TPH-D concentrations show an increase from the previous sampling event, but remain within historic ranges. Historical analytical results are presented in Table 2. Laboratory analytical reports for the February 1997 sampling event are included in Appendix A. Sampling and well stabilization forms are included as Appendix B. The next sampling event is scheduled for August 1998.

6. CONCLUSIONS

On the basis of the semi-annual monitoring event, the following conclusions have been made:

- The recovery pumps have been inoperable since September 1997. This has resulted from a malfunctioning air compressor. A replacement air compressor has been obtained by UPRR, and installation and system startup is expected to be completed by mid May, 1998.
- An increase in groundwater elevations was observed and the groundwater depressions created by the recovery pumps are no longer evident.
- The groundwater gradient outside of the zone of influence of the currently inoperable recovery wells is consistent with previous monitoring events.
- The approximate extent of the diesel plume has not changed significantly and is consistent with previous monitoring events.
- BTEX concentrations were below the MDL for all wells sampled with two exceptions. These include monitoring wells OMW-2 and OMW-10, which showed an ethylbenzene concentration of 0.0023 ppb and a benzene concentration of 18 ppb respectively.
- TPH-D concentrations show an increase from the previous sampling event, but remain within historic ranges.

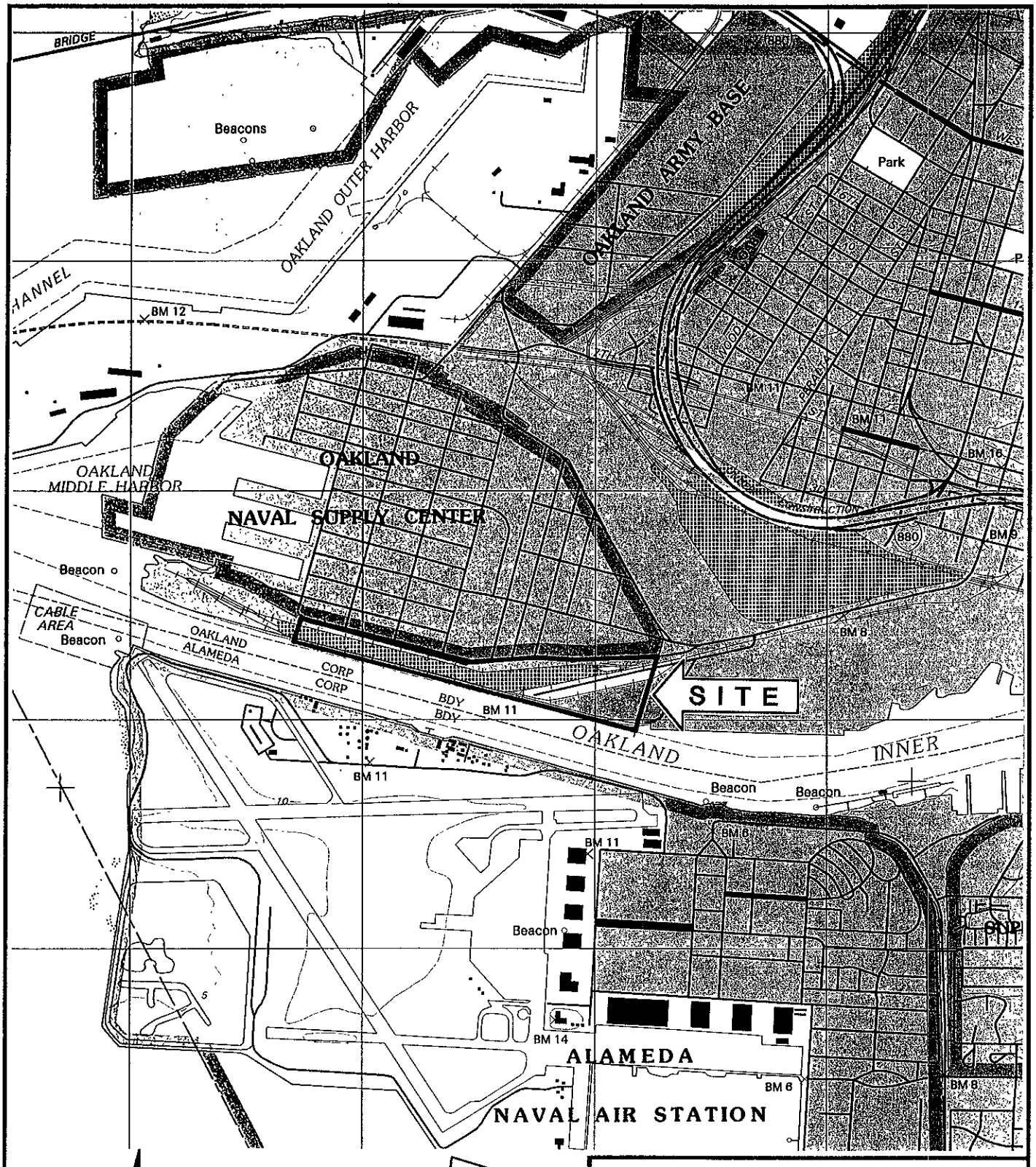
7. LIMITATIONS

The project and this report were undertaken for the exclusive use of the Union Pacific Railroad. Use by any other person or organization is subject to no warranty by UPRR or Laidlaw Environmental Services.

The conclusions provided in this report are based solely upon information provided to Laidlaw by UPRR, Burns & McDonnell, and as generated by Laidlaw for this project. Additional investigations as well as information not available to UPRR and Laidlaw at the time this project and report were completed may result in modifications to the understanding of the site, conclusions, and other items generated as part of the work.

The project and this report were conducted and prepared in accordance with generally accepted environmental and engineering practices with a standard of care appropriate to the project. UPRR and Laidlaw express and imply no other warranty.

FIGURES



LOCMAP

LAIDLAW ENVIRONMENTAL SERVICES

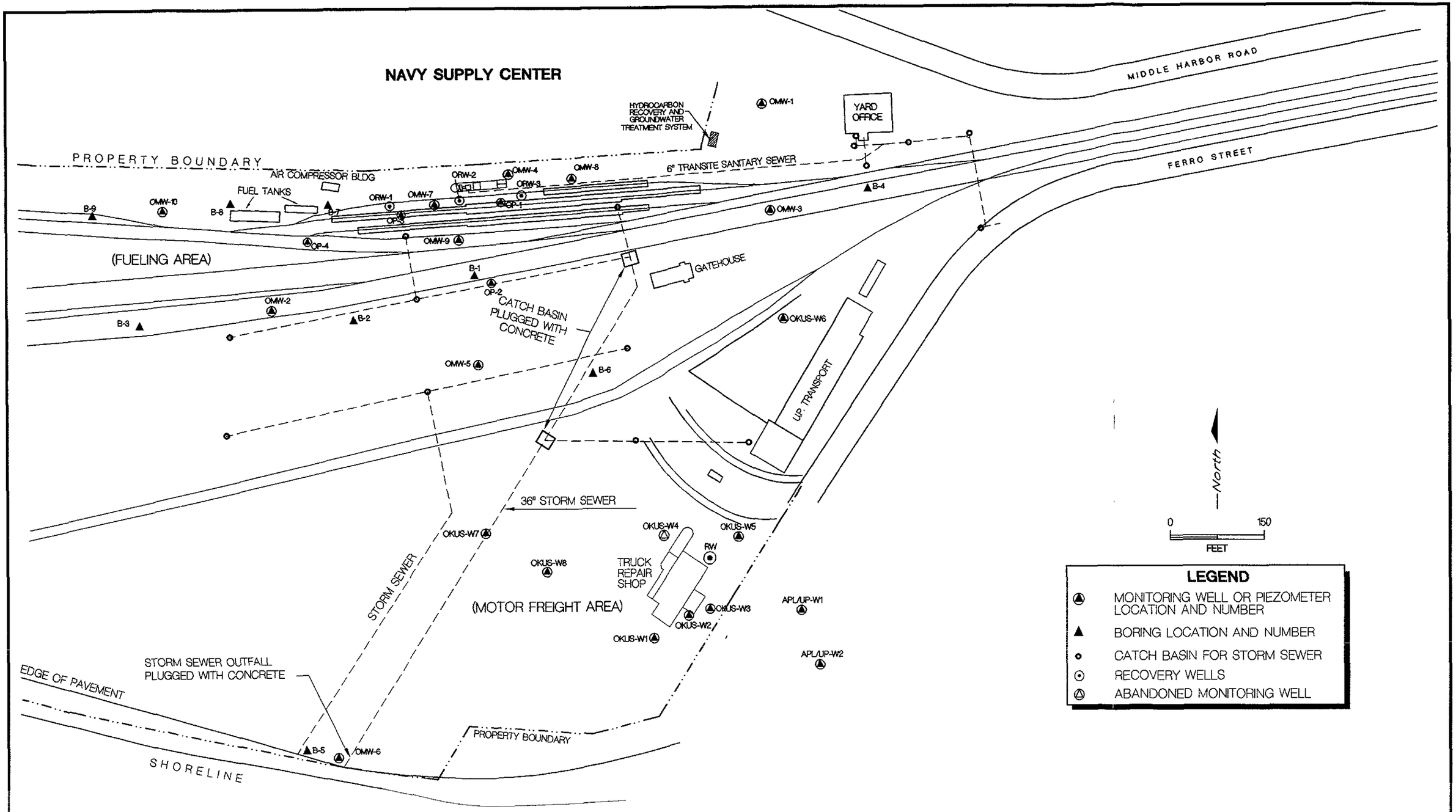
UPRR TOFC RAILYARD - OAKLAND, CA

FIGURE 1

SITE LOCATION MAP

SCALE	DATE
1" = 2000'	4/7/98

NAVY SUPPLY CENTER



LEGEND

- MONITORING WELL OR PIEZOMETER LOCATION AND NUMBER
- BORING LOCATION AND NUMBER
- CATCH BASIN FOR STORM SEWER
- RECOVERY WELLS
- ABANDONED MONITORING WELL

	BY	DATE
DRAWN	CJJ	10/15/97
CHECKED		
APPROVED		
APPROVED		
APPROVED		

LAIDLAW ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD
UPMF REPAIR SHOP- OAKLAND, CALIFORNIA

FIGURE 2
SITE VICINITY MAP

SCALE: 1" = 150'

DWG NO: 96120-861

NAVY SUPPLY CENTER

PROPERTY BOUNDARY

OMW-1 2.21

YARD OFFICE

AIR COMPRESSOR BLDG

FUEL TANKS

OMW-7 2.3 | ORW-2 2.46 | OP-1 3.37 | OMW-4 2.54 | ORW-3 2.91 | OMW-8 2.25

6" TRANSITE SANITARY SEWER

OMW-10 2.93

ORW-1 2.65

OP-3 2.31

OMW-3 1.89

OP-4 NA

OMW-9 NA

OP-2 2.2

GATEHOUSE

OMW-2 3.77

CATCH BASIN PLUGGED WITH CONCRETE

OMW-5 2.29

UP TRANSPORT

CROSSTIES LEFT OFF FOR CLARITY

36" STORM SEWER

STORM SEWER

TRUCK REPAIR SHOP

EDGE OF PAVEMENT

SHORELINE

STORM SEWER OUTFALL PLUGGED WITH CONCRETE

OAKLAND ESTUARY

OMW-6 0.89

PROPERTY BOUNDARY

North

0 150

FEET

LEGEND

- MONITORING WELL OR PIEZOMETER LOCATION AND NUMBER
- CATCH BASIN FOR STORM SEWER
- RECOVERY WELLS
- GROUNDWATER ELEVATION IN FEET

	BY	DATE
DRAWN	WRB	12/22/97
CHECKED		
APPROVED		
APPROVED		
APPROVED		

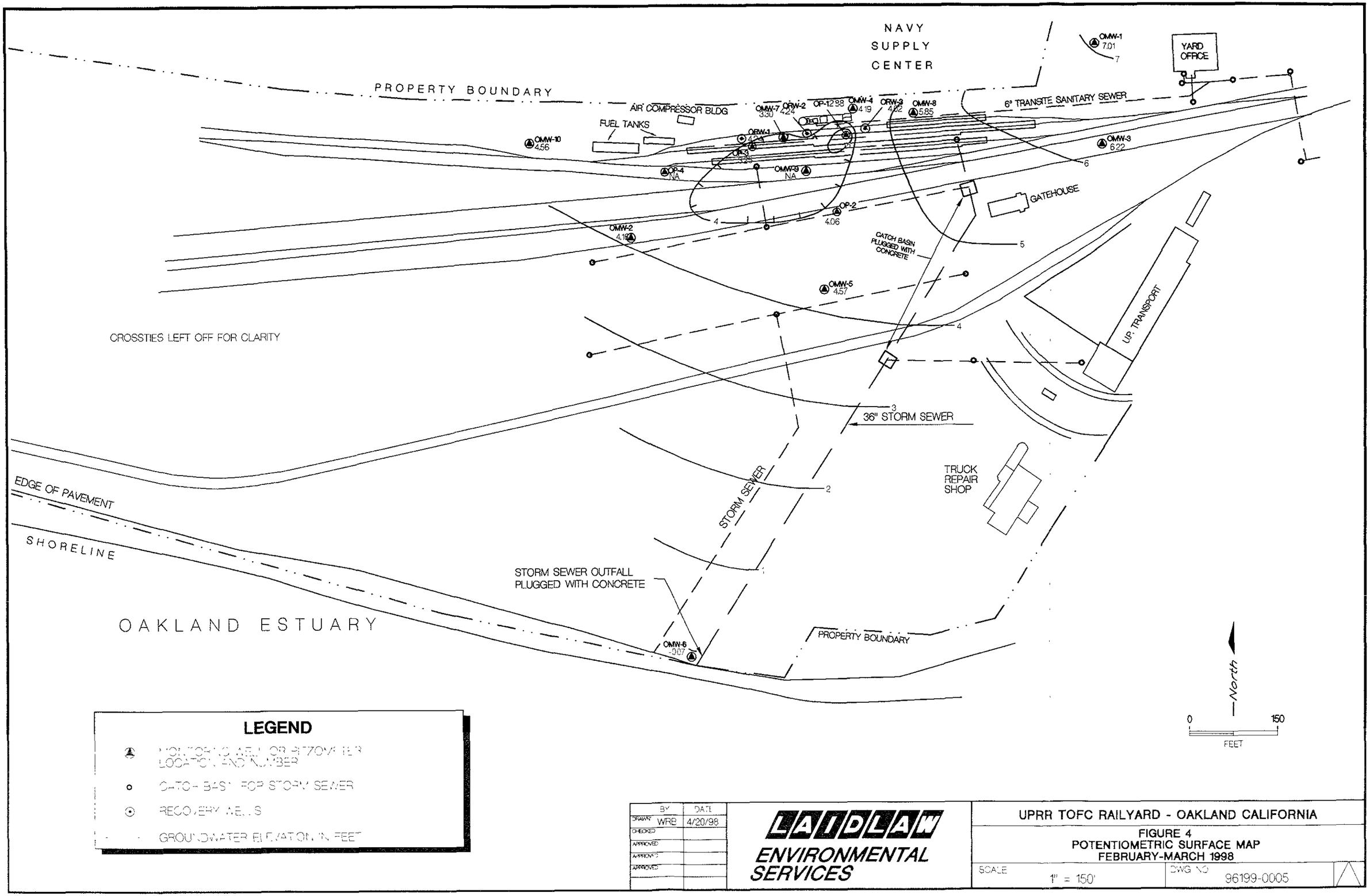
LAIDLAW ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD - OAKLAND CALIFORNIA

FIGURE 3
POTENTIOMETRIC SURFACE MAP
NOVEMBER 1997

SCALE 1" = 150'

DWG NO 96199-0002



LEGEND

- MONITORING WELL OR PIEZOMETER LOCATION AND NUMBER
- CATCH BASIN FOR STORM SEWER
- RECOVERY WELLS
- GROUNDWATER ELEVATION IN FEET

BY	DATE
DRAWN WRB	4/20/98
CHECKED	
APPROVED	
APPROVED	
APPROVED	

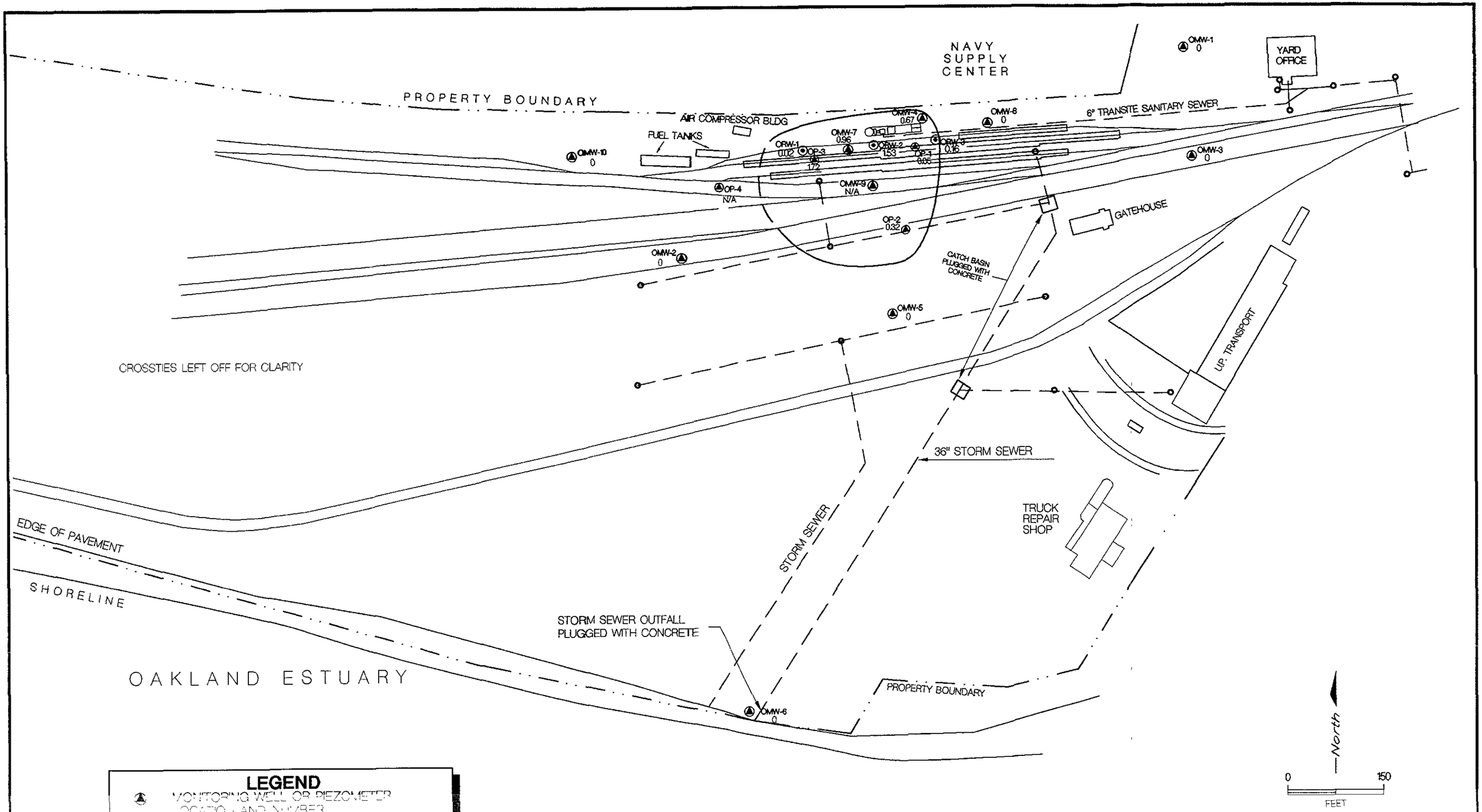
LAIDLAW ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD - OAKLAND CALIFORNIA

FIGURE 4
POTENTIOMETRIC SURFACE MAP
FEBRUARY-MARCH 1998

SCALE 1" = 150'

DWG NO 96199-0005



LEGEND

- MONITORING WELL OR PIEZOMETER LOCATION AND NUMBER
- CATCH BASIN FOR STORM SEWER
- RECOVERY WELLS
- PRODUCT THICKNESS (FT)
- APPROXIMATE LATERAL EXTENT OF DIESEL
- N/A NOT AVAILABLE

BY	DATE
DRAWN WRB	12/20/97
CHECKED	
APPROVED	
APPROVED	
APPROVED	

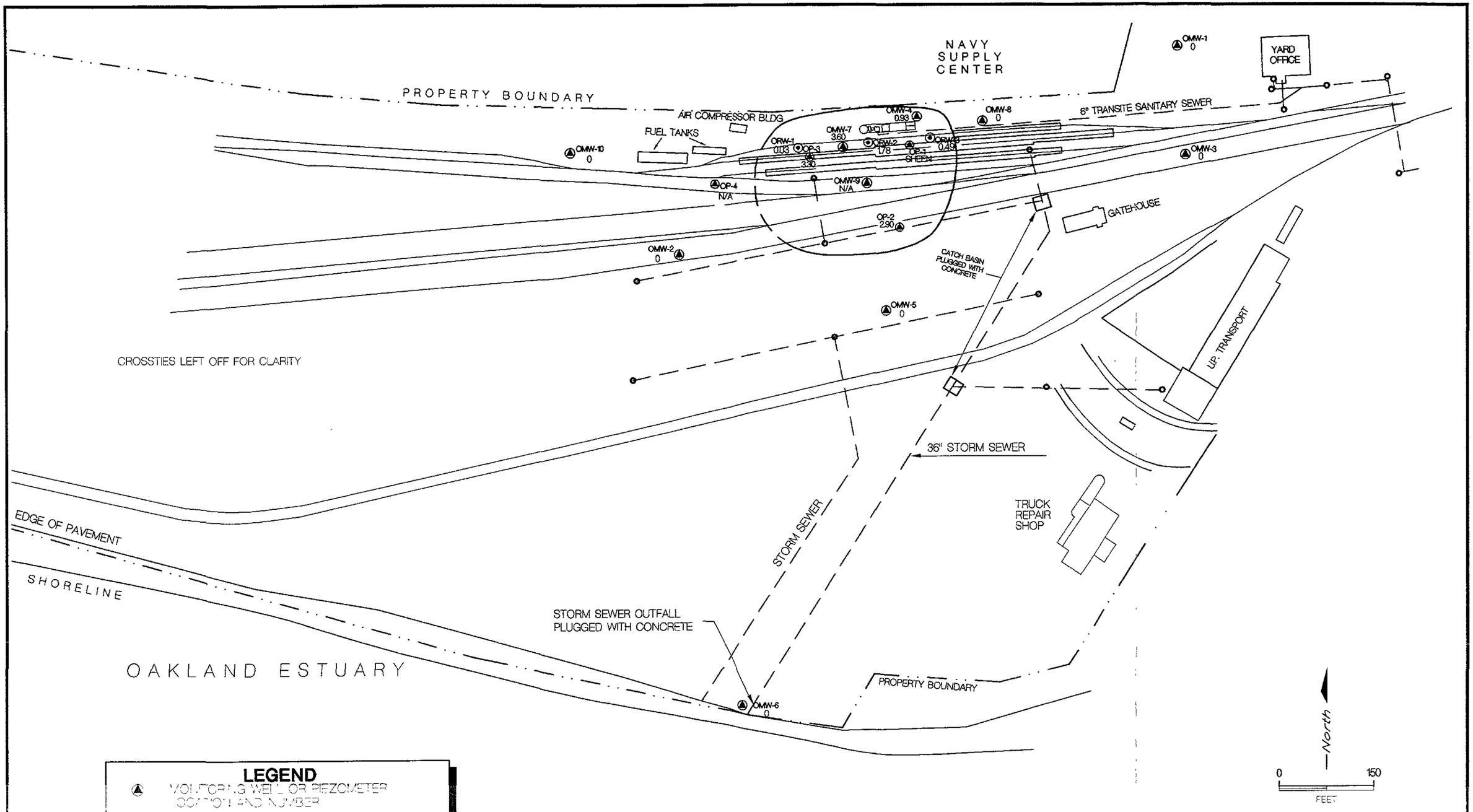
LAIDLAW ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD - OAKLAND CALIFORNIA

FIGURE 5
APPROXIMATE LATERAL EXTENT OF DIESEL
NOVEMBER 1997

SCALE 1" = 150'

DWG NO 96199-0004



LEGEND

- ▲ MONITORING WELL OR PIEZOMETER LOCATION AND NUMBER
- ○ CATCH BASIN FOR STORM SEWER
- ⊙ RECOVERY WELLS
- ## PRODUCT THICKNESS (FT)
- ——— APPROXIMATE LATERAL EXTENT OF DIESEL
- N.A. NOT AVAILABLE

BY	DATE
DRAWN WRB	12/20/97
CHECKED	
APPROVED	
APPROVED	
APPROVED	

LAIDLAW ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD - OAKLAND CALIFORNIA

FIGURE 6
APPROXIMATE LATERAL EXTENT OF DIESEL
FEBRUARY-MARCH 1998

SCALE 1" = 150'

DWG NO 96199-0006

TABLES

APPENDICES

APPENDIX A

Analytical Results

TABLE 1
Fluid Level Measurements
Union Pacific Railroad - Oakland Fueling Area

Well No.	Date	Well Elev. Above M.S.L. (FT)	Depth to Product (FT)	Depth to Water (FT)	Water Level Elevation (FT)	Product Thickness (FT)	Corr Water Level Elevation* (FT)
OMW-1		8.79					
	01/25/95			2.52	6.27		6.27
	05/09/95			5.55	3.24		3.24
	05/17/95			4.43	4.36		4.36
	07/31/95			6.43	2.36		2.36
	09/07/95			6.86	1.93		1.93
	11/30/95			7.69	1.10		1.10
	01/10/96			6.48	2.31		2.31
	03/25/96			5.00	3.79		3.79
	05/17/96			2.98	5.81		5.81
	07/25/96			6.29	2.50		2.50
	09/16/96			7.05	1.74		1.74
	11/12/96			7.51	1.28		1.28
	01/20/97			4.26	4.53		4.53
	03/06/97			4.65	4.14		4.14
	05/20/97			6.11	2.68		2.68
	07/15/97			6.66	2.13		2.13
	08/28/97			6.58	2.21		2.21
	09/15/97			7.16	1.63		1.63
	11/18/97			6.58	2.21		2.21
	02/04/98			1.78	7.01		7.01
OMW-2		5.88					
	01/25/95			3.35	2.53		2.53
	05/09/95		NOT GAUGED				
	05/17/95			2.44	3.44		3.44
	07/31/95		NOT GAUGED				
	09/07/95			4.35	1.53		1.53
	11/30/95			5.12	0.76		0.76
	01/10/96			2.60	3.28		3.28
	03/25/96			2.35	3.53		3.53
	05/17/96			1.73	4.15		4.15
	07/25/96			4.07	1.81		1.81
	09/16/96			4.60	1.28		1.28
	11/12/96			4.93	0.95		0.95
	01/20/97			2.44	3.44		3.44
	03/06/97			4.26	1.62		1.62
	05/20/97			4.65	1.23		1.23
	07/15/97			4.64	1.24		1.24
	08/28/97			4.58	1.30		1.30
	09/15/97			4.90	0.98		0.98
	11/18/97			2.11	3.77		3.77
	02/04/98			1.72	4.16		4.16
OMW-3		7.16					
	01/25/95		NOT GAUGED - WELL UNDER WATER				
	05/09/95			4.37	2.79		2.79
	05/17/95			4.46	2.70		2.70
	07/31/95			5.22	1.94		1.94
	09/07/95			5.64	1.52		1.52
	11/30/95			6.36	0.80		0.80
	01/10/96			5.13	2.03		2.03
	03/25/96			4.08	3.08		3.08
	05/17/96			2.61	4.55		4.55
	07/25/96			5.26	1.90		1.90
	09/16/96			5.90	1.26		1.26
	11/12/96			6.22	0.94		0.94
	01/20/97			3.79	3.37		3.37

TABLE 1

Fluid Level Measurements

Union Pacific Railroad - Oakland Fueling Area

Well No.	Date	Well Elev. Above M.S.L. (FT)	Depth to Product (FT)	Depth to Water (FT)	Water Level Elevation (FT)	Product Thickness (FT)	Corr Water Level Elevation* (FT)
OMW-3	03/06/97			4.02	3.14		3.14
	05/20/97			5.34	1.82		1.82
	07/15/97			5.64	1.52		1.52
	08/28/97			5.79	1.37		1.37
	09/15/97			5.95	1.21		1.21
	11/18/97			5.27	1.89		1.89
	02/04/98			0.94	6.22		6.22
OMW-4		7.41					
	01/25/95		6.23	7.12	0.29	0.89	1.04
	05/09/95		4.99	6.38	1.03	1.39	2.20
	05/17/95		5.19	6.58	0.83	1.39	2.00
	07/31/95		5.78	6.99	0.42	1.21	1.44
	09/07/95		6.01	6.92	0.49	0.91	1.25
	11/30/95		6.60	7.06	0.35	0.46	0.74
	01/10/96		5.73	6.48	0.93	0.75	1.56
	03/25/96		5.22	6.19	1.22	0.97	2.03
	05/17/96		5.23	6.26	1.15	1.03	2.02
	07/25/96		TRACE	5.82	1.59		1.59
	09/16/96		6.11	7.55	-0.14	1.44	1.07
	11/12/96		6.58	8.12	-0.71	1.54	0.58
	01/20/97		4.75	6.45	0.96	1.70	2.39
	03/06/97		5.25	6.24	1.17	0.99	2.00
	05/20/97		5.83	6.35	1.06	0.52	1.50
	07/15/97		6.24	6.75	0.66	0.51	1.09
	08/28/97		6.46	7.05	0.36	0.59	0.86
	09/15/97		6.40	7.11	0.30	0.71	0.90
	11/18/97		4.76	5.43	1.98	0.67	2.54
	03/31/98		3.07	4.00	3.41	0.93	4.19
OMW-5		7.62					
	01/25/95		NOT GAUGED				
	05/09/95		NOT GAUGED				
	05/18/95			4.84	2.78		2.78
	07/31/95		NOT GAUGED				
	09/07/95			5.85	1.77		1.77
	11/30/95			6.55	1.07		1.07
	01/10/96			5.46	2.16		2.16
	03/25/96			4.63	2.99		2.99
	05/17/96			4.83	2.79		2.79
	07/25/96			5.66	1.96		1.96
	09/16/96			6.17	1.45		1.45
	11/12/96		TRACE	6.59	1.03		1.03
	01/20/97			3.73	3.89		3.89
	03/06/97			5.34	2.28		2.28
	05/20/97			5.59	2.03		2.03
	07/15/97			6.15	1.47		1.47
	08/28/97			6.36	1.26		1.26
	09/15/97			6.58	1.04		1.04
	11/18/97			5.33	2.29		2.29
	02/04/98			3.05	4.57		4.57
OMW-6		5.78					
	01/25/95			6.91	-1.13		-1.13
	05/09/95			7.19	-1.41		-1.41
	05/17/95			6.84	-1.06		-1.06
	07/31/95			5.65	0.13		0.13
	09/07/95			5.51	0.27		0.27
	11/30/95			6.71	-0.93		-0.93
	01/10/96			6.72	-0.94		-0.94

TABLE 1

Fluid Level Measurements

Union Pacific Railroad - Oakland Fueling Area

Well No.	Date	Well Elev. Above M.S.L. (FT)	Depth to Product (FT)	Depth to Water (FT)	Water Level Elevation (FT)	Product Thickness (FT)	Corr Water Level Elevation* (FT)
OMW-6	03/25/96			6.73	-0.95		-0.95
	05/17/96			6.50	-0.72		-0.72
	07/25/96			6.62	-0.84		-0.84
	09/16/96			6.44	-0.66		-0.66
	11/12/96			5.65	0.13		0.13
	01/20/97			5.52	0.26		0.26
	03/06/97			7.17	-1.39		-1.39
	05/20/97			6.39	-0.61		-0.61
	07/15/97			6.77	-0.99		-0.99
	08/28/97			6.59	-0.81		-0.81
	09/15/97			6.02	-0.24		-0.24
	11/18/97			4.89	0.89		0.89
	02/04/98			5.85	-0.07		-0.07
OMW-7		7.03					
	01/25/95		3.31	9.53	-2.50	6.22	2.72
	05/09/95		5.22	9.25	-2.22	4.03	1.17
	05/17/95		5.41	8.38	-1.35	2.97	1.14
	07/31/95		5.61	8.83	-1.80	3.22	0.90
	09/07/95		5.80	7.97	-0.94	2.17	0.88
	11/30/95		6.49	7.54	-0.51	1.05	0.37
	01/10/96		5.40	8.33	-1.30	2.93	1.16
	03/25/96		5.46	9.60	-2.57	4.14	0.91
	05/17/96		5.40	8.79	-1.76	3.39	1.09
	07/25/96		5.92	9.32	-2.29	3.40	0.57
	09/16/96		6.18	8.86	-1.83	2.68	0.42
	11/12/96		6.50	8.79	-1.76	2.29	0.16
	01/20/97		4.95	10.76	-3.73	5.81	1.15
	03/06/97		5.26	7.70	-0.67	2.44	1.38
	05/20/97		5.71	8.26	-1.23	2.55	0.91
	07/15/97		6.21	9.67	-2.64	3.46	0.27
	08/28/97		6.39	9.10	-2.07	2.71	0.21
	09/15/97		6.51	8.03	-1.00	1.52	0.28
	11/18/97		4.58	5.54	1.49	0.96	2.30
	03/31/98		3.15	6.75	0.28	3.60	3.30
OMW-8		7.52					
	01/25/95		TRACE	3.55	3.97		3.97
	05/09/95			5.00	2.52		2.52
	05/17/95			5.16	2.36		2.36
	07/31/95			5.70	1.82		1.82
	09/07/95			5.99	1.53		1.53
	11/30/95			6.53	0.99		0.99
	01/10/96			5.87	1.65		1.65
	03/25/96			5.01	2.51		2.51
	05/17/96			5.18	2.34		2.34
	07/25/96			5.77	1.75		1.75
	09/16/96			6.21	1.31		1.31
	11/12/96			6.69	0.83		0.83
	01/20/97			4.84	2.68		2.68
	03/06/97			5.15	2.37		2.37
	05/20/97			5.81	1.71		1.71
	07/15/97			6.12	1.40		1.40
	08/28/97			6.29	1.23		1.23
	09/15/97			6.40	1.12		1.12
	11/18/97			5.27	2.25		2.25
	02/04/98			1.67	5.85		5.85

TABLE 1

Fluid Level Measurements

Union Pacific Railroad - Oakland Fueling Area

Well No.	Date	Well Elev. Above M.S.L. (FT)	Depth to Product (FT)	Depth to Water (FT)	Water Level Elevation (FT)	Product Thickness (FT)	Corr Water Level Elevation* (FT)
OMW-9		6.64					
	01/25/95		3.83	6.25	0.39	2.42	2.42
	05/09/95		4.94	9.02	-2.38	4.08	1.05
	05/17/95		4.18	8.95	-2.31	4.77	1.70
	07/31/95		6.07	8.46	-1.82	2.39	0.19
	09/07/95		5.23	6.89	-0.25	1.66	1.14
	11/30/95		5.76	7.25	-0.61	1.49	0.64
	01/10/96		4.45	9.00	-2.36	4.55	1.46
	03/25/96		4.19	8.96	-2.32	4.77	1.69
	05/17/96		5.41	7.40	-0.76	1.99	0.91
	07/25/96		5.16	8.41	-1.77	3.25	0.96
	09/16/96		5.75	6.19	0.45	0.44	0.82
	11/12/96		5.84	8.37	-1.73	2.53	0.40
	01/20/97		4.10	9.42	-2.78	5.32	1.69
	03/06/97		4.55	7.95	-1.31	3.40	1.55
	05/20/97		5.09	7.11	-0.47	2.02	1.23
	07/15/97			* 8.8	-2.16		-2.16
	08/28/97			* 8.8	-2.16		-2.16
	09/15/97			7.80	-1.16		-1.16
	11/18/97			NA	NA		NA
	02/04/98			NA	NA		NA
OMW-10		7.56					
	01/25/95		NOT GAUGED - WELL COVERED				
	05/09/95		NOT GAUGED - WELL COVERED				
	05/17/95		TRACE	4.64	2.92		2.92
	07/31/95		NOT GAUGED - WELL COVERED				
	09/07/95			6.02	1.54		1.54
	11/30/95		TRACE	7.78	-0.22		-0.22
	01/10/96		TRACE	4.68	2.88		2.88
	03/25/96			4.58	2.98		2.98
	05/17/96			4.75	2.81		2.81
	07/25/96			5.79	1.77		1.77
	09/16/96			6.33	1.23		1.23
	11/12/96		TRACE	6.50	1.06		1.06
	01/20/97			4.33	3.23		3.23
	03/06/97			5.05	2.51		2.51
	05/20/97			5.69	1.87		1.87
	07/15/97			6.71	0.85		0.85
	08/28/97			6.11	1.45	SHEEN	1.45
	09/15/97			6.75	0.81	SHEEN	0.81
	11/18/97			4.63	2.93		2.93
	02/04/98			3.00	4.56		4.56
ORW-1		6.59					
	01/25/95		NOT GAUGED				
	05/09/95		NOT GAUGED				
	05/18/95		8.77	9.76	-3.17	0.99	-2.34
	07/31/95		8.35	10.55	-3.96	2.20	-2.11
	09/07/95		8.55	11.03	-4.44	2.48	-2.36
	11/30/95		5.92	5.98	0.61	0.06	0.66
	01/10/96		TRACE	11.20	-4.61		-4.61
	03/25/96			11.20	-4.61		-4.61
	05/17/96			11.40	-4.81		-4.81
	07/25/96		TRACE	10.90	-4.31		-4.31
	09/16/96			9.60	-3.01		-3.01
	11/12/96			9.60	-3.01		-3.01
	01/20/97		NOT GAUGED				

TABLE 1

Fluid Level Measurements

Union Pacific Railroad - Oakland Fueling Area

Well No.	Date	Well Elev. Above M.S.L. (FT)	Depth to Product (FT)	Depth to Water (FT)	Water Level Elevation (FT)	Product Thickness (FT)	Corr Water Level Elevation* (FT)
ORW-1	03/06/97		9.55	9.75	-3.16	0.20	-2.99
	05/20/97		9.75	9.86	-3.27	0.11	-3.18
	07/15/97			7.98	-1.39	SHEEN	-1.39
	08/28/97		NOT GAUGED				
	09/15/97		NOT GAUGED				
	11/18/97		3.94	3.96	2.63	0.02	2.65
	03/31/98		2.25	2.88	3.71	0.63	4.24
ORW-2		6.79					
	01/25/95		NOT GAUGED				
	05/09/95		NOT GAUGED				
	05/18/95		9.55	9.56	-2.77	0.01	-2.76
	07/31/95		9.30	9.45	-2.66	0.15	-2.53
	09/07/95		9.45	9.50	-2.71	0.05	-2.67
	11/30/95		9.66	9.68	-2.89	0.02	-2.87
	01/10/96		9.55	9.60	-2.81	0.05	-2.77
	03/25/96		10.75	11.85	-5.06	1.10	-4.14
	05/17/96		10.60	11.60	-4.81	1.00	-3.97
	07/25/96		11.70	12.30	-5.51	0.60	-5.01
	09/16/96		10.95	12.30	-5.51	1.35	-4.38
	11/12/96		9.63	10.87	-4.08	1.24	-3.04
	01/20/97		9.61	11.00	-4.21	1.39	-3.04
	03/06/97		10.05	11.09	-4.30	1.04	-3.43
	05/20/97		10.70	11.46	-4.67	0.76	-4.03
	07/15/97		11.68	12.01	-5.22	0.33	-4.94
	08/28/97		11.60	11.87	-5.08	0.27	-4.85
	09/15/97		11.90	12.08	-5.29	0.18	-5.14
	11/18/97		4.09	5.62	1.17	1.53	2.46
	03/31/98		2.27	4.05	2.74	1.78	4.24
ORW-3		6.30					
	01/25/95		NOT GAUGED				
	05/09/95		NOT GAUGED				
	05/18/95		9.45	9.48	-3.18	0.03	-3.15
	07/31/95		TRACE	9.68	-3.38		-3.38
	09/07/95		9.57	9.60	-3.30	0.03	-3.27
	11/30/95		TRACE	9.67	-3.37		-3.37
	01/10/96		TRACE	9.55	-3.25		-3.25
	03/25/96		11.55	12.05	-5.75	0.50	-5.33
	05/17/96		11.60	12.10	-5.80	0.50	-5.38
	07/25/96			11.60	-5.30		-5.30
	09/16/96		11.40	11.90	-5.60	0.50	-5.18
	11/12/96		11.63	11.87	-5.57	0.24	-5.37
	01/20/97		NOT GAUGED		6.30	0.00	6.30
	03/06/97		11.20	11.50	-5.20	0.30	-4.95
	05/20/97		8.60	11.49	-5.19	2.89	-2.76
	07/15/97			11.46	-5.16	SHEEN	-5.16
	08/28/97			11.55	-5.25		-5.25
	09/15/97		11.40	11.47	-5.17	0.07	-5.11
	11/18/97		3.36	3.52	2.78	0.16	2.91
	03/31/98		2.20	2.69	3.61	0.49	4.02
OP-1	05/18/95	6.71	3.84	5.05	1.66	1.21	2.68
	07/31/95		5.23	5.35	1.36	0.12	1.46
	09/07/95		5.55	6.13	0.58	0.58	1.07
	11/30/95		5.81	9.36	-2.65	3.55	0.33
	01/10/96		TRACE	4.41	2.30		2.30
	03/25/96			3.78	2.93		2.93
	05/17/96			2.18	4.53		4.53
	07/25/96			3.71	3.00		3.00

TABLE 1

Fluid Level Measurements

Union Pacific Railroad - Oakland Fueling Area

Well No.	Date	Well Elev. Above M.S.L. (FT)	Depth to Product (FT)	Depth to Water (FT)	Water Level Elevation (FT)	Product Thickness (FT)	Corr Water Level Elevation* (FT)
OP-1	09/16/96			3.15	3.56		3.56
	11/12/96		TRACE	2.90	3.81		3.81
	01/20/97		TRACE	3.90	2.81		2.81
	03/06/97		TRACE	4.19	2.52		2.52
	05/20/97		4.87	4.94	1.77	0.07	1.83
	07/15/97		4.91	5.18	1.53	0.27	1.76
	08/28/97		4.55	4.64	2.07	0.09	2.15
	09/15/97		4.89	5.03	1.68	0.14	1.80
	11/18/97		3.33	3.38	3.33	0.05	3.37
	03/31/98		SHEEN	3.83	2.88		2.88
OP-2	05/18/95	7.80	5.15	6.97	0.83	1.82	2.36
	07/31/95		NOT GAUGED				
	09/07/95		6.04	7.85	-0.05	1.81	1.47
	11/30/95		6.85	7.26	0.54	0.41	0.88
	01/10/96		5.70	6.25	1.55	0.55	2.01
	03/25/96		5.00	6.67	1.13	1.67	2.53
	05/17/96		5.30	6.45	1.35	1.15	2.32
	07/25/96		5.97	6.62	1.18	0.65	1.73
	09/16/96		6.25	8.15	-0.35	1.90	1.25
	11/12/96		6.66	8.79	-0.99	2.13	0.80
	01/20/97		4.74	6.35	1.45	1.61	2.80
	03/06/97		5.38	6.40	1.40	1.02	2.26
	05/20/97		5.92	7.26	0.54	1.34	1.67
	07/15/97		6.34	8.37	-0.57	2.03	1.14
	08/28/97		6.55	8.45	-0.65	1.90	0.95
	09/15/97		6.62	8.59	-0.79	1.97	0.86
	11/18/97		5.55	5.87	1.93	0.32	2.20
	03/31/98		3.28	6.18	1.62	2.90	4.06
OP-3	05/18/95	6.48	4.88	9.86	-3.38	4.98	0.80
	07/31/95		5.32	8.46	-1.98	3.14	0.66
	09/07/95		5.16	8.22	-1.74	3.06	0.83
	11/30/95		5.75	6.52	-0.04	0.77	0.61
	01/10/96		4.84	10.20	-3.72	5.36	0.78
	03/25/96		5.12	9.84	-3.36	4.72	0.60
	05/17/96		5.03	10.29	-3.81	5.26	0.61
	07/25/96		TRACE	5.61	0.87		0.87
	09/16/96		5.75	9.29	-2.81	3.54	0.16
	11/12/96		6.14	8.89	-2.41	2.75	-0.10
	01/20/97		4.96	8.20	-1.72	3.24	1.00
	03/06/97		4.75	8.42	-1.94	3.67	1.14
	05/20/97		6.38	6.95	-0.47	0.57	0.01
	07/15/97		5.87	7.64	-1.16	1.77	0.33
	08/28/97		6.89	8.65	-2.17	1.76	-0.69
	09/15/97		6.03	8.03	-1.55	2.00	0.13
	11/18/97		3.89	5.61	0.87	1.72	2.31
	03/31/98		2.70	6.00	0.48	3.30	3.25
OP-4	05/18/95	6.32	3.28	7.15	-0.83	3.87	2.42
	07/31/95		NOT GAUGED				
	09/07/95		4.64	6.17	0.15	1.53	1.44
	11/30/95		5.56	5.75	0.57	0.19	0.73
	01/10/96		3.43	6.45	-0.13	3.02	2.41
	03/25/96		3.11	6.89	-0.57	3.78	2.61
	05/17/96		3.30	6.43	-0.11	3.13	2.52
	07/25/96		4.30	7.58	-1.26	3.28	1.50
	09/16/96		4.71	8.09	-1.77	3.38	1.07
	11/12/96		5.10	8.56	-2.24	3.46	0.67

TABLE 1

Fluid Level Measurements

Union Pacific Railroad - Oakland Fueling Area

Well No.	Date	Well Elev. Above M.S.L. (FT)	Depth to Product (FT)	Depth to Water (FT)	Water Level Elevation (FT)	Product Thickness (FT)	Corr Water Level Elevation* (FT)
OP-4	01/20/97		3.30	6.49	-0.17	3.19	2.51
	03/06/97		3.80	4.99	1.33	1.19	2.33
	05/20/97		4.59	5.28	1.04	0.69	1.62
	07/15/97			* 6.32	-1.68		-1.68
	08/28/97			* 6.32	-1.68		-1.68
	09/15/97			9.90	-3.58		-3.58
	11/18/97			NA	NA		NA
	02/04/98			NA	NA		NA

* Water and product levels below pump housing - reported value is depth to pump.
Data collected prior to 1995 was submitted in previous reports.
M.S.L. = Mean Sea Level
NA = Not Applicable. Wells are not gauged due to pump components blocking casing.

TABLE 2
Analytical Results
Groundwater Monitoring Wells
Union Pacific Railroad
Oakland Fueling Area

Well Number	Date Sampled	Total Petroleum Hydrocarbons-Diesel (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)
OMW-1	05/11/92	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	08/11/92	0.060	<0.0005	<0.0005	<0.0005	<0.0005
	11/13/92	0.067	<0.0005	0.00061 *	<0.0005	<0.0005
	05/14/93	<0.050	<0.0003	<0.0003	<0.0003	<0.0009
	11/10/93	<0.050	<0.0003	<0.0003	<0.0003	<0.0009
	05/02/94	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	11/15/94	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	05/17/95	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	11/30/95	0.240	<0.0005	<0.0005	<0.0005	<0.0005
	05/29/96	0.056	<0.0005	<0.0005	<0.0005	<0.0005
	11/12/96	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	08/28/97	0.13	<0.0005	<0.0005	<0.0005	<0.0005
	02/05/98	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
OMW-2	05/11/92	4.5	<0.0005	<0.0005	<0.0005	<0.0005
	08/11/92	2.7	<0.0005	<0.0005	<0.0005	<0.0005
	11/13/92	3.4	<0.0005	0.00057 *	0.0011	0.0033
	05/14/93	<0.050	<0.0003	<0.0003	<0.0003	<0.0009
	11/10/93	<0.050	<0.0003	<0.0003	<0.0003	<0.0009
	05/02/94	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	11/16/94	0.26	<0.0005	<0.0005	<0.0005	<0.0005
	05/17/95	0.082	<0.0005	<0.0005	<0.0005	<0.0005
	11/30/95	4.0	<0.0005	<0.0005	<0.0005	<0.0005
	05/29/96	0.58	<0.0005	<0.0005	<0.0005	<0.0005
	11/12/96	3.4	<0.0005	<0.0005	<0.0005	<0.0005
	08/28/97	0.72	<0.0005	<0.0005	<0.0005	<0.0005
	02/05/98	1.8	<0.0005	<0.0005	0.0023	<0.0005
OMW-3	05/11/92	2.3	.0003 J	0.0013	.0003 J	0.0034
	08/11/92	5.8	<0.0005	0.00071	<0.0005	.0017
	11/13/92	110	<0.0005	0.00089 *	0.0015	.0084
	05/14/93	0.180	<0.0003	0.036	<0.0003	.0027
	11/10/93	1.8	<0.0003	0.0005	<0.0003	<0.0009
	05/02/94	1.8	<0.0005	0.0023	<0.0005	0.00089
	11/15/94	1.2	<0.0005	<0.0005	<0.0005	<0.0005
	05/17/95	0.46	<0.0005	0.0013	<0.0005	<0.0005
	11/30/95	2.4	<0.0005	<0.0005	<0.0005	<0.0005
	05/29/96	2.3	<0.0005	<0.0005	<0.0005	<0.0005
	11/12/96	3.1	<0.0005	<0.0005	<0.0005	<0.0005
	08/28/97	1.4	<0.0005	<0.0005	<0.0005	<0.0005
	02/05/98	1.3	<0.0005	<0.0005	<0.0005	<0.0005
OMW-5	05/11/92	2.1	<0.0005	.0004 J	<0.0005	0.0003
	08/11/92	2.1	<0.0005	<0.0005	<0.0005	<0.0005
	11/13/92	4.4	<0.0005	0.00078 *	<0.0005	<0.0005
	05/14/93	11	<0.0003	0.0018	<0.0003	<0.0009
	11/10/93	<0.050	<0.0003	0.0006	<0.0003	<0.0009
	05/02/94	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	11/16/94	0.52	<0.0005	0.0012	0.0014	0.0077
	05/18/95	2.4	<0.0005	<0.0005	<0.0005	0.0017
	11/30/95	13	<0.0005	<0.0005	<0.0005	<0.0005
	05/29/96	5.8	<0.0005	<0.0005	<0.0005	<0.0005
	11/12/96	****** NOT SAMPLED - Well Contained Product/Sheen******				
	08/28/97	1.7	<0.0005	<0.0005	<0.0005	<0.0005
	02/05/98	2.2	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 2
Analytical Results
Groundwater Monitoring Wells
Union Pacific Railroad
Oakland Fueling Area

Well Number	Date Sampled	Total Petroleum Hydrocarbons-Diesel (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)
OMW-6	05/11/92	0.52	<0.0005	<0.0005	<0.0005	0.0016
	08/11/92	0.55	<0.0005	<0.0005	<0.0005	<0.0005
	11/13/92	6.0	<0.0005	0.00077 *	<0.0005	<0.0005
	05/14/93	0.18	<0.0003	<0.0003	<0.0003	<0.0009
	11/10/93	<0.050	<0.0003	<0.0003	<0.0003	<0.0009
	05/02/94	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	11/16/94	0.46	<0.0005	<0.0005	<0.0005	<0.0005
	05/17/95	1.1	<0.0005	<0.0005	<0.0005	<0.0005
	11/30/95	2.5	<0.0005	<0.0005	<0.0005	<0.0005
	05/29/96	2.3	<0.0005	<0.0005	<0.0005	<0.0005
	11/12/96	1.9	<0.0005	<0.0005	<0.0005	<0.0005
	08/28/97	0.99	<0.0005	<0.0005	<0.0005	<0.0005
	02/05/98	1.5	<0.0005	<0.0005	<0.0005	<0.0005
OMW-8	05/11/92	0.24	<0.0005	<0.0005	<0.0005	<0.0005
	08/11/92	0.22	<0.0005	<0.0005	<0.0005	<0.0005
	11/13/92	0.26	<0.0005	0.00058 *	<0.0005	<0.0005
	05/14/93	<0.050	<0.0003	<0.0003	<0.0003	<0.0009
	11/10/93	<0.050	<0.0003	<0.0003	<0.0003	<0.0009
	05/02/94	<0.050	<0.0005	<0.0005	<0.0005	<0.0005
	11/15/94	0.26	<0.0005	<0.0005	<0.0005	<0.0005
	05/17/95	0.26	<0.0005	<0.0005	<0.0005	<0.0005
	11/30/95	1.7	<0.0005	<0.0005	<0.0005	<0.0005
	05/29/96	1.3	<0.0005	<0.0005	<0.0005	<0.0005
	11/12/96	1.3	<0.0005	<0.0005	<0.0005	<0.0005
	08/28/97	1.3	<0.0005	<0.0005	<0.0005	<0.0005
	02/05/98	1.9	<0.0005	<0.0005	<0.0005	<0.0005
OMW-10	05/11/92	2.1	0.033	<0.0005	<0.0005	0.0027
	08/11/92	1.3	0.0096	<0.0005	<0.0005	.00062
	11/13/92	2.8	0.0066	0.00084 *	<0.0005	.00062
	05/14/93	****** NOT SAMPLED - Well Contained Product/Sheen******				
	11/10/93	2.6	0.0043	0.0011	<0.0003	.00012
	05/02/94	2.6	0.00052	<0.0005	<0.0005	<0.0005
	11/16/94	****** NOT SAMPLED - Well Contained Product/Sheen******				
	05/17/95	****** NOT SAMPLED - Well Contained Product/Sheen******				
	11/30/95	****** NOT SAMPLED - Well Contained Product/Sheen******				
	05/29/96	****** NOT SAMPLED - Well Contained Product/Sheen******				
	11/12/96	****** NOT SAMPLED - Well Contained Product/Sheen******				
	08/28/97	****** NOT SAMPLED - Well Contained Product/Sheen******				
	02/05/98	9.1	18	<0.0005	<0.0005	<0.0005

NOTES: J = Estimated value below reporting limit.

* 0.00062 mg/L was detected in the trip blank.

Due to the presence of product, recovery wells ORW-1, ORW-2, ORW-3, and monitoring wells OMW-4, OMW-7, and OMW-9 were not sampled.

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Laidlaw Environmental Service
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Lisa Hennessy

Client Project ID: Oakland
Sample Matrix: Water
Analysis Method: EPA 5030/8015 Mod./8020
First Sample #: 802-0520

Sampled: Feb 5, 1998
Received: Feb 6, 1998
Reported: Feb 23, 1998

QC Batch Number:	GC021798 802004A	GC021798 802004A	GC021898 802004A	GC021798 802004A	GC021798 802004A	GC021898 802004A

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 802-0520 OMW-1	Sample I.D. 802-0521 OMW-8	Sample I.D. 802-0522 OMW-10	Sample I.D. 802-0523 OMW-6	Sample I.D. 802-0524 OMW-3	Sample I.D. 802-0525 APL/UP-W1
Purgeable Hydrocarbons	50	N.D.	N.D.	190	N.D.	N.D.	640
Benzene	0.50	N.D.	N.D.	18	N.D.	N.D.	55
Toluene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	22
Chromatogram Pattern:		--	--	Unidentified Hydrocarbons >C8 & Discrete Peaks <C7	--	--	Gasoline & Discrete Peak

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	2.0	1.0	1.0	5.0
Date Analyzed:	2/17/98	2/17/98	2/18/98	2/17/98	2/17/98	2/18/98
Instrument Identification:	HP-4	HP-4	HP-4	HP-4	HP-4	HP-4
Surrogate Recovery, %: (QC Limits = 70-130%)	107	109	106	113	112	113

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Project Manager

Please Note:
** Revised report issued 03/13/98 **

8020520.LLL <1>

Sequoia Analytical

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Laidlaw Environmental Service	Client Project ID:	Oakland	Sampled: Feb 5 - 6, 98
5665 Flatiron Pkwy	Sample Matrix:	Water	Received: Feb 6, 1998
Boulder, CO 80301	Analysis Method:	EPA 5030/8015 Mod./8020	Reported: Feb 23, 1998
Attention: Lisa Hennessy	First Sample #:	802-0526	

QC Batch Number:	GC021798 802004A	GC021798 802009A	GC021798 802009A	GC021798 802009A	GC021798 802009A	GC021898 802009A

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 802-0526 APL/UP -W2	Sample I.D. 802-0527 OKUS-W7	Sample I.D. 802-0528 OKUS-W8	Sample I.D. 802-0529 OMW-5	Sample I.D. 802-0530 OMW-2	Sample I.D. 802-0531 OKUS-3
Purgeable Hydrocarbons	50	180	N.D.	56	N.D.	N.D.	6,000
Benzene	0.50	15	0.79	N.D.	N.D.	N.D.	210
Toluene	0.50	N.D.	N.D.	N.D.	N.D.	2.3	N.D.
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.50	4.9	N.D.	N.D.	N.D.	N.D.	N.D.
Chromatogram Pattern:		Gasoline & Discrete Peak	--	Unidentified Hydrocarbons >C8	--	--	Gasoline & Discrete Peak

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	100
Date Analyzed:	2/17/98	2/17/98	2/17/98	2/17/98	2/17/98	2/18/98
Instrument Identification:	HP-4	HP-9	HP-9	HP-9	HP-9	HP-9
Surrogate Recovery, %: (QC Limits = 70-130%)	123	103	104	104	103	103

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Project Manager

Please Note:
** Revised report issued 03/13/98 **

8020520.LLL <2>

Sequoia Analytical

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Laidlaw Environmental Service	Client Project ID:	Oakland	Sampled: Feb 6, 1998
5665 Flatiron Pkwy	Sample Matrix:	Water	Received: Feb 6, 1998
Boulder, CO 80301	Analysis Method:	EPA 5030/8015 Mod./8020	Reported: Feb 23, 1998
Attention: Lisa Hennessy	First Sample #:	802-0532	

QC Batch Number:	GC021798	GC021798	GC021798	GC021798	GC021898	GC021898
	802009A	802009A	802004A	802009A	802004A	802009A

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 802-0532 OKUS-2	Sample I.D. 802-0547 Trip Blank	Sample I.D. Method Blank	Sample I.D. Method Blank	Sample I.D. Method Blank	Sample I.D. Method Blank
Purgeable Hydrocarbons	50	1,100	N.D.	N.D.	N.D.	N.D.	N.D.
Benzene	0.50	72	N.D.	N.D.	N.D.	N.D.	N.D.
Toluene	0.50	11	N.D.	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.50	18	N.D.	N.D.	N.D.	N.D.	N.D.
Chromatogram Pattern:		Gasoline & Discrete Peak	--	--	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	20	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	2/17/98	2/17/98	2/17/98	2/17/98	2/18/98	2/18/98
Instrument Identification:	HP-9	HP-9	HP-4	HP-9	HP-4	HP-9
Surrogate Recovery, %: (QC Limits = 70-130%)	103	104	110	106	112	105

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Project Manager

Please Note:
** Revised report issued 03/13/98 **

8020520.LLL <3>

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Laidlaw Environmental Service	Client Project ID:	Oakland	Sampled: Feb 5, 1998
5665 Flatiron Pkwy	Sample Matrix:	Water	Received: Feb 6, 1998
Boulder, CO 80301	Analysis Method:	EPA 3510/8015 Mod.	Reported: Feb 23, 1998
Attention: Lisa Hennessy	First Sample #:	802-0520	

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 802-0520 OMW-1B	Sample I.D. 802-0521 OMW-8B	Sample I.D. 802-0522 OMW-10B	Sample I.D. 802-0523 OMW-6B	Sample I.D. 802-0524 OMW-3B	Sample I.D. 802-0525 APL/UP-W1B
QC Batch Number:		SP021298 8015EXA	SP021298 8015EXA	SP021298 8015EXA	SP021298 8015EXA	SP021298 8015EXA	SP021298 8015EXA
Extractable Hydrocarbons	50	N.D.	1,900	9,100	1,500	1,300	1,000
Chromatogram Pattern:		--	Diesel	Diesel	Diesel	Diesel	Diesel & Unidentified Hydrocarbons <C12

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Extracted:	2/12/98	2/12/98	2/12/98	2/12/98	2/12/98	2/12/98
Date Analyzed:	2/12/98	2/12/98	2/12/98	2/12/98	2/12/98	2/12/98
Instrument Identification:	HP-3A	HP-3A	HP-3A	HP-3B	HP-3B	HP-3A

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Client Services Representative

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Laidlaw Environmental Service	Client Project ID:	Oakland	Sampled: Feb 5-6, 1998
5665 Flatiron Pkwy	Sample Matrix:	Water	Received: Feb 6, 1998
Boulder, CO 80301	Analysis Method:	EPA 3510/8015 Mod.	Reported: Feb 23, 1998
Attention: Lisa Hennessy	First Sample #:	802-0526	

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 802-0526 APL/UP -W2B	Sample I.D. 802-0527 OKUS-W7B	Sample I.D. 802-0528 OKUS-W8B	Sample I.D. 802-0529 OMW-5B	Sample I.D. 802-0530 OMW-2B	Sample I.D. 802-0531 OKUS-3B
QC Batch Number:		SP021298 8015EXA	SP021298 8015EXA	SP021298 8015EXA	SP021298 8015EXA	SP021298 8015EXA	SP021298 8015EXA
Extractable Hydrocarbons	50	730	1,500	1,400	2,200	1,800	3,400
Chromatogram Pattern:		Diesel & Unidentified Hydrocarbons <C12	Diesel	Diesel & Discrete Peaks	Diesel & Unidentified Hydrocarbons >C18	Diesel	Diesel & Unidentified Hydrocarbons <C14

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Extracted:	2/12/98	2/12/98	2/12/98	2/12/98	2/12/98	2/12/98
Date Analyzed:	2/12/98	2/12/98	2/12/98	2/13/98	2/12/98	2/12/98
Instrument Identification:	HP-3B	HP-3A	HP-3A	HP-3B	HP-3A	HP-3B

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Client Services Representative

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Laidlaw Environmental Service	Client Project ID:	Oakland	Sampled: Feb 6, 1998
5665 Flatiron Pkwy	Sample Matrix:	Water	Received: Feb 6, 1998
Boulder, CO 80301	Analysis Method:	EPA 3510/8015 Mod.	Reported: Feb 24, 1998
Attention: Lisa Hennessy	First Sample #:	802-0532	

QC Batch Number: SP021298 SP021298

8015EXA 8015EXA

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 802-0532 OKUS-2B	Sample I.D. Method Blank
Extractable Hydrocarbons	50	1,600	N.D.
Chromatogram Pattern:		Diesel & Unidentified Hydrocarbons <C12	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0
Date Extracted:	2/12/98	2/12/98
Date Analyzed:	2/12/98	2/12/98
Instrument Identification:	HP-3A	HP-3B

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Client Services Representative

Sequoia Analytical

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Laidlaw Environmental Service
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Lisa Hennessy

Client Project ID: Oakland
Matrix: Liquid

QC Sample Group: 8020520-547

Reported: Feb 23, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Diesel
QC Batch#:	GC021798	GC021798	GC021798	GC021798	SP021298
	802009A	802009A	802009A	802009A	8015EXA
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015M
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 3510
Analyst:	K. Nill	K. Nill	K. Nill	K. Nill	K. Grubb
MS/MSD #:	8020703	8020703	8020703	8020703	BLK021298
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	2/17/98	2/17/98	2/17/98	2/17/98	2/12/98
Analyzed Date:	2/17/98	2/17/98	2/17/98	2/17/98	2/12/98
Instrument I.D.#:	HP-9	HP-9	HP-9	HP-9	HP3B
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	500 µg/L
Result:	21	22	22	67	380
MS % Recovery:	105	110	110	112	76
Dup. Result:	20	21	20	62	270
MSD % Recov.:	100	105	100	103	54
RPD:	4.9	4.7	9.5	7.8	35
RPD Limit:	0-20	0-20	0-20	0-20	0-50

LCS #:	9LCS021798	9LCS021798	9LCS021798	9LCS021798	LCS021298
Prepared Date:	2/17/98	2/17/98	2/17/98	2/17/98	2/12/98
Analyzed Date:	2/17/98	2/17/98	2/17/98	2/17/98	2/12/98
Instrument I.D.#:	HP-9	HP-9	HP-9	HP-9	HP-3B
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	500 µg/L
LCS Result:	21	22	22	66	430
LCS % Recov.:	105	110	110	110	86

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130	60-140

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Client Services Representative

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

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Laidlaw Environmental Service
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Lisa Hennessy

Client Project ID: Oakland
Matrix: Liquid

QC Sample Group: 8020520-547

Reported: Feb 23, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC021798	GC021798	GC021798	GC021798
	802004A	802004A	802004A	802004A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	K. Nill	K. Nill	K. Nill	K. Nill
MS/MSD #:	8020736	8020736	8020736	8020736
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	2/17/98	2/17/98	2/17/98	2/17/98
Analyzed Date:	2/17/98	2/17/98	2/17/98	2/17/98
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Result:	21	20	19	59
MS % Recovery:	105	100	95	98
Dup. Result:	20	20	18	57
MSD % Recov.:	100	100	90	95
RPD:	4.9	0.0	5.4	3.4
RPD Limit:	0-20	0-20	0-20	0-20

LCS #:	4LCS021798	4LCS021798	4LCS021798	4LCS021798
Prepared Date:	2/17/98	2/17/98	2/17/98	2/17/98
Analyzed Date:	2/17/98	2/17/98	2/17/98	2/17/98
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
LCS Result:	21	20	19	59
LCS % Recov.:	105	100	95	98
MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Client Services Representative

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Laidlaw Environmental Service
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Lisa Hennessy

Client Project ID: Oakland
Matrix: Liquid

QC Sample Group: 8020520-547

Reported: Feb 25, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC021898	GC021898	GC021898	GC021898
	802004A	802004A	802004A	802004A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	K. Nill	K. Nill	K. Nill	K. Nill
MS/MSD #:	8020736	8020736	8020736	8020736
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	2/17/98	2/17/98	2/17/98	2/17/98
Analyzed Date:	2/17/98	2/17/98	2/17/98	2/17/98
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Result:	21	20	19	59
MS % Recovery:	105	100	95	98
Dup. Result:	20	20	18	57
MSD % Recov.:	100	100	90	95
RPD:	4.9	0.0	5.4	3.4
RPD Limit:	0-20	0-20	0-20	0-20

LCS #:	4LCS021898	4LCS021898	4LCS021898	4LCS021898
Prepared Date:	2/18/98	2/18/98	2/18/98	2/18/98
Analyzed Date:	2/18/98	2/18/98	2/18/98	2/18/98
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
LCS Result:	18	18	17	54
LCS % Recov.:	90	90	85	90

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Client Services Representative

Sequoia Analytical

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Laidlaw Environmental Service
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Lisa Hennessy

Client Project ID: Oakland
Matrix: Liquid

QC Sample Group: 8020520-547

Reported: Feb 25, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC021898 802009A	GC021898 802009A	GC021898 802009A	GC021898 802009A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	K. Nill	K. Nill	K. Nill	K. Nill
MS/MSD #:	8020821	8020821	8020821	8020821
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	2/18/98	2/18/98	2/18/98	2/18/98
Analyzed Date:	2/18/98	2/18/98	2/18/98	2/18/98
Instrument I.D.#:	HP-9	HP-9	HP-9	HP-9
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Result:	20	21	21	64
MS % Recovery:	100	105	105	107
Dup. Result:	21	21	21	64
MSD % Recov.:	105	105	105	107
RPD:	4.9	0.0	0.0	0.0
RPD Limit:	0-20	0-20	0-20	0-20

LCS #:	9LCS021898	9LCS021898	9LCS021898	9LCS021898
Prepared Date:	2/18/98	2/18/98	2/18/98	2/18/98
Analyzed Date:	2/18/98	2/18/98	2/18/98	2/18/98
Instrument I.D.#:	HP-9	HP-9	HP-9	HP-9
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
LCS Result:	19	20	20	61
LCS % Recov.:	95	100	100	102

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Client Services Representative

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

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Laidlaw Environmental Service
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Lisa Hennessy

Client Project ID: Oakland
Lab Number: 8020520-547

Received: Feb 6, 1998
Reported: Mar 13, 1998

LABORATORY NARRATIVE

EPA 5030/8015 Mod./8020: Total Purgeable Petroleum Hydrocarbons with BTEX Distinction

A discrete peak was noted on samples 802-0525, 802-0526, 802-0531, and 802-0532 between the retention times for Chlorobenzene and Ethyl Benzene. This peak was identified as a non-gasoline compound by GC/MS.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Project Manager

SEQUOIA ANALYTICAL
CHAIN OF CUSTODY

❑ 680 Chesapeake Drive • Redwood City, CA 94063 • (650) 364-9600 FAX (650) 364-9233
❑ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600 FAX (916) 921-0100
❑ 404 N. Wiget Lane • Walnut Creek, CA 94598 • (510) 988-9600 FAX (510) 988-9673

Company Name: LAIDLAW ENVIRONMENTAL SERVICES	Project Name: OAKLAND
Address: 5665 FLATIRON PKWY	Billing Address (if different):
City: Boulder State: Co. Zip Code: 80301	
Telephone: (303) 938-5500 FAX #:	P.O. #:
Report To: DENTON MAULDIN Sampler: JOE FRANZEN	QC Data: ❑ Level D (Standard) ❑ Level C ❑ Level B ❑ Level A

Turnaround Time: ❑ 10 Working Days ❑ 7 Working Days ❑ 5 Working Days ❑ 3 Working Days ❑ 2 Working Days ❑ 24 Hours ❑ 2 - 8 Hours

❑ Drinking Water ❑ Waste Water ❑ Other

Analyses Requested

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Sequoia's Sample #	BTEX	TPH-D	Comments
1. OMW-1B	2/5/98 0745	H2O	1		8020520	AB	X	
2. OMW-1	2/5/98 0745	H2O	1			X		
3. OMW-8B	2/5/98 1030	H2O	1		8020521	AB	X	
4. OMW 8	2/5/98 1030	H2O	1			X		
5. OMW-10B	2/5/98 1102	H2O	1		8020522	AB	X	
6. OMW-10	2/5/98 1102	H2O	1			X		
7. OMW-6B	2/5/98 1155	H2O	1		8020523	AB	X	
8. OMW-6	2/5/98 1155	H2O	1			X		
9. OMW-3B	2/5/98 1448	H2O	1		8020524	AB	X	
10. OMW-3	2/5/98 1448	H2O	1			X		

Relinquished By: Joe Franzen	Date: 2/6/98	Time: 1240	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab: C. Palmer	Date: 2/6/98	Time: 1240

Samples Received in Good Condition? ❑ Yes ❑ No Samples on Ice? ❑ Yes ❑ No Method of Shipment

Pink - Client
Yellow - Sequoia
White - Sequoia

SEQUOIA ANALYTICAL
CHAIN OF CUSTODY

❑ 680 Chesapeake Drive • Redwood City, CA 94063 • (650) 364-9600 FAX (650) 364-9233
❑ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600 FAX (916) 921-0100
❑ 404 N. Wiget Lane • Walnut Creek, CA 94598 • (510) 988-9600 FAX (510) 988-9673

Company Name: LAIDLAW ENVIRONMENTAL SERVICES	Project Name: OAKLAND
Address: 5645 FLATIRON PKWY	Billing Address (if different):
City: BOULDER State: Co. Zip Code: 80301	
Telephone: (303) 938-5300 FAX #:	P.O. #:
Report To: DENTON MAULDIN Sampler: JOE FRANZEN (F)	QC Data: ❑ Level D (Standard) ❑ Level C ❑ Level B ❑ Level A

Turnaround Time:
- ❑ 10 Working Days
- ❑ 7 Working Days
- ❑ 5 Working Days
- ❑ 3 Working Days
- ❑ 2 Working Days
- ❑ 24 Hours
- ❑ 2 - 8 Hours

- ❑ Drinking Water
- ❑ Waste Water
- ❑ Other

Analyses Requested

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Sequoia's Sample #	BTEX	TPH-D	Comments
1. APL/UP-W1B	2/5/98 1523	H2O	1		8020525	AB	X	
2. APL/UP-W1	2/5/98 1523					X		
3. APL/UP-W2B	2/5/98 1548				8020526	AB	X	
4. APL/UP-W2	2/5/98 1548					X		
5. OKUS-W7B	2/5/98 1645				8020527	AB	X	
6. OKUS-W7	2/5/98 1645					X		
7. OKUS-W8B	2/5/98 1722				8020528	AB	X	
8. OKUS-W8	2/5/98 1722					X		
9. OMW-5B	2/5/98 1310				8020529	AB	X	
10. OMW-5	2/5/98 130					X		

Relinquished By:	Date: 2/6/98	Time: 1240	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab: C. Palmer	Date: 2/6/98	Time: 1240

Pink - Client
Yellow - Sequoia
White - Sequoia

APPENDIX B

Sampling and Well Stabilization Forms

SEQUOIA ANALYTICAL
CHAIN OF CUSTODY

❑ 680 Chesapeake Drive • Redwood City, CA 94063 • (650) 364-9600 FAX (650) 364-9233
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❑ 404 N. Wiget Lane • Walnut Creek, CA 94598 • (510) 988-9600 FAX (510) 988-9673

Company Name: LAIDLAW ENVIRONMENTAL	Project Name: OAKLAND
Address: 5665 FLATIRON PKWY	Billing Address (if different):
City: Boulder State: Co. Zip Code: 80301	
Telephone: (303) 938-5580 FAX #:	P.O. #:
Report To: DENTON MAULDEN Sampler: JOE FRANZEN (F)	QC Data: ❑ Level D (Standard) ❑ Level C ❑ Level B ❑ Level A

Turnaround Time:
- ☒ 10 Working Days
- ❑ 7 Working Days
- ❑ 5 Working Days
- ❑ 3 Working Days
- ❑ 2 Working Days
- ❑ 24 Hours
- ❑ 2 - 8 Hours

- ❑ Drinking Water
- ❑ Waste Water
- ☒ Other

Analyses Requested

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Sequoia's Sample #	BTEX	TPH-D	Comments
1. OMW-2B	2/6/98 0825	H2O	1		8020530	AB	X	
2. OMW-2	2/6/98 0825					X		
3. OKUS-3D	2/6/98 0857				8020531	AB	X	
4. OKUS-3	2/6/98 0857					X		
5. OKUS-2B	2/6/98 0925				8020532	AB	X	
6. OKUS-2	2/6/98 0925					X		
7. Trip Blank	2/2/98				8020547			
8.								
9.								
10.		↓	↓					

Relinquished By:	Date: 2/6/98	Time: 1240	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab: C. Palmer	Date: 2/6/98	Time: 1240

Pink - Client
Yellow - Sequoia
White - Sequoia

LAIDLAW SAMPLING AND WELL STABILIZATION FORM

Laidlaw Project Name: **UP Fueling Area**

Laidlaw Project Number: **96199**

Measuring Point (MP) Location: **Top Of Casing**

Well No. OMW-1

Well Depth: (Below MP): **12.02 feet**

Casing Diameter: **2 inches**

Sampling Date: **2/5/98**

Depth to Ground Water (Below MP): **1.78 feet**

Sample ID No. **OMW-1 and OMW-1B**

Method of Well Development:

Time: **0945**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump

Riser Elevation (MP):

☑ Bailer ☐ Centrifugal Pump ☐ Other

Top of Screen Elevation:

Sampling Collection Method:

Sample Appearance: **Rust**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample

Odor: **None**

☑ Bailer Type ○ Teflon ○ Stainless Steel

Sampling Problems (if any):

○ ABS Plastic ○ PVC ◉ HDPE

Pump Intake Or Bailer Set At N/A Feet Below MP

Decontamination Performed:

Tubing Type (if used):

Tubing Used For: ☐ Sample Collection ☐ Well Development/Field Tests

Samples Collected: **BTEX, TPH-D**

Time	pH (Units)	Temperature Corrected Conductance (umho/cm)	Temperature (Centigrade)	Water Level (Nearest 0.01 Ft.)	Cumulative Volume of Water Removed From Well (Gallons)	Pumping Rate in gallons Minute (GPM)
0935	**5.3**	**5,180**	**15.0**		**2**	
0940	**5.3**	**5,160**	**15.5**		**4**	
0945	**5.3**	**5,120**	**16.0**		**6**	

At Least 3 Well Bore Volumes Were Evacuated Before Sampling

Comments: **Well cap is broken. Duplicate sample OMW-100 taken at 1415 on 2-6-98.**

[Comments may continue on back]

Form Completed By: **Joe Franzen**

Witnessed By:

LAIDLAW SAMPLING AND WELL STABILIZATION FORM

Laidlaw Project Name: **UP Fueling Area**

Laidlaw Project Number: **96199**

Measuring Point (MP) Location: **Top Of Casing**

Well No. OMW-2

Well Depth: (Below MP): **9.97 feet**

Casing Diameter: **2 inches**

Sampling Date: **2/6/98**

Depth to Ground Water (Below MP): **1.72 feet**

Sample ID No. **OMW-2 and OMW-2B**

Method of Well Development:

Time: **0825**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump

Riser Elevation (MP):

☑ Bailer ☐ Centrifugal Pump ☐ Other

Top of Screen Elevation:

Sampling Collection Method:

Sample Appearance: **Light brown, floating particles**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample

Odor: **slight diesel**

☑ Bailer Type ○ Teflon ○ Stainless Steel

Sampling Problems (if any): **Rain**

○ ABS Plastic ○ PVC ◉ HDPE

Pump Intake Or Bailer Set At N/A Feet Below MP

Decontamination Performed:

Tubing Type (if used):

Tubing Used For: ☐ Sample Collection ☐ Well Development/Field Tests

Samples Collected: **BTEX, TPH-D**

Time	pH (Units)	Temperature Corrected Conductance (umho/cm)	Temperature (Centigrade)	Water Level (Nearest 0.01 Ft.)	Cumulative Volume of Water Removed From Well (Gallons)	Pumping Rate in gallons/Minute (GPM)
0808	5.3	1,750	15.0		2.5	
0816	5.3	2,980	15.0		5.0	
0821	5.3	3,520	15.0		7.5	

At Least 3 Well Bore Volumes Were Evacuated Before Sampling

Comments:

[Comments may continue on back]

Form Completed By: **Joe Franzen**

Witnessed By:

LAIDLAW SAMPLING AND WELL STABILIZATION FORM

Laidlaw Project Name: **UP Fueling Area**

Laidlaw Project Number: **96199**

Measuring Point (MP) Location: **Top Of Casing**

Well No. OMW-3

Well Depth: (Below MP): **12.41 feet**

Casing Diameter: **2 inches**

Sampling Date: **2/5/98**

Depth to Ground Water (Below MP): **.94 feet**

Sample ID No. **OMW-3 and OMW-3B**

Method of Well Development:

Time: **1448**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump

Riser Elevation (MP):

☑ Bailer ☐ Centrifugal Pump ☑ Other

Top of Screen Elevation:

Sampling Collection Method:

Sample Appearance: **Orange**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample

Odor: **None**

☑ Bailer Type ○ Teflon ○ Stainless Steel

Sampling Problems (if any):

○ ABS Plastic ○ PVC ◉ HDPE

Pump Intake Or Bailer Set At N/A Feet Below MP

Decontamination Performed:

Tubing Type (if used):

Tubing Used For: ☐ Sample Collection ☐ Well Development/Field Tests

Samples Collected: **BTEX, TPH-D**

Time	pH (Units)	Temperature Corrected Conductance (umho/cm)	Temperature (Centigrade)	Water Level (Nearest 0.01 Ft.)	Cumulative Volume of Water Removed From Well (Gallons)	Pumping Rate in gallons/Minute (GPM)
1439	5.3	2,380	15.5		2	
1442	5.3	2,350	15.0		4	
1445	5.3	2,310	15.0		6	

At Least 3 Well Bore Volumes Were Evacuated Before Sampling

Comments:

[Comments may continue on back]

Form Completed By: **Joe Franzen**

Witnessed By:

LAIDLAW SAMPLING AND WELL STABILIZATION FORM

Laidlaw Project Name: **UP Fueling Area**

Laidlaw Project Number: **96199**

Measuring Point (MP) Location: **Top Of Casing**

Well No. OMW-5

Well Depth: (Below MP): **12.45 feet**

Casing Diameter: **2 inches**

Sampling Date: **2/5/98**

Depth to Ground Water (Below MP): **3.05 feet**

Sample ID No. **OMW-5 and OMW-5B**

Method of Well Development:

Time: **1308**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump

Riser Elevation (MP):

☑ Bailer ☐ Centrifugal Pump ☑ Other

Top of Screen Elevation:

Sampling Collection Method:

Sample Appearance: **Black**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample

Odor: **A slight sulfur odor**

☑ Bailer Type ○ Teflon ○ Stainless Steel

Sampling Problems (if any): **Rain and wind**

○ ABS Plastic ○ PVC ◉ HDPE

Pump Intake Or Bailer Set At N/A Feet Below MP

Decontamination Performed:

Tubing Type (if used):

Tubing Used For: ☐ Sample Collection ☐ Well Development/Field Tests

Samples Collected: **BTEX, TPH-D**

Time	pH (Units)	Temperature Corrected Conductance (umho/cm)	Temperature (Centigrade)	Water Level (Nearest 0.01 Ft.)	Cumulative Volume of Water Removed From Well (Gallons)	Pumping Rate in gallons/Minute (GPM)
1232	5.7	1,840	18.5		2	
1240	5.7	2,250	19.0		4	
1308	6.2	2,470	18.5		6	

At Least 3 Well Bore Volumes Were Evacuated Before Sampling

Comments:

[Comments may continue on back]

Form Completed By: **Joe Franzen**

Witnessed By:

LAIDLAW SAMPLING AND WELL STABILIZATION FORM

Laidlaw Project Name: **UP Fueling Area**

Laidlaw Project Number: **96199**

Measuring Point (MP) Location: **Top Of Casing**

Well No. OMW-6

Well Depth: (Below MP): **11.76 feet**

Casing Diameter: **2 inches**

Sampling Date: **2/5/98**

Depth to Ground Water (Below MP): **5.85 feet**

Sample ID No. **OMW-6 and OMW-6B**

Method of Well Development:

Time: **1155**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump

Riser Elevation (MP):

☑ Bailer ☐ Centrifugal Pump ☑ Other

Top of Screen Elevation:

Sampling Collection Method:

Sample Appearance: **Cloudy, grey**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample

Odor: **None**

☑ Bailer Type ○ Teflon ○ Stainless Steel

Sampling Problems (if any):

○ ABS Plastic ○ PVC ◉ HDPE

Pump Intake Or Bailer Set At N/A Feet Below MP

Decontamination Performed:

Tubing Type (if used):

Tubing Used For: ☐ Sample Collection ☐ Well Development/Field Tests

Samples Collected: **BTEX, TPH-D**

Time	pH (Units)	Temperature Corrected Conductance (umho/cm)	Temperature (Centigrade)	Water Level (Nearest 0.01 Ft.)	Cumulative Volume of Water Removed From Well (Gallons)	Pumping Rate in gallons/Minute (GPM)
1141	6.2	3,460	16.5		1	
1148	6.5	3,800	17.0		2	
1155	6.5	4,130	17.5		3	

At Least 3 Well Bore Volumes Were Evacuated Before Sampling

Comments:

[Comments may continue on back]

Form Completed By: **Joe Franzen**

Witnessed By:

LAIDLAW SAMPLING AND WELL STABILIZATION FORM

Laidlaw Project Name: **UP Fueling Area**

Laidlaw Project Number: **96199**

Measuring Point (MP) Location: **Top Of Casing**

Well No. OMW-8

Well Depth: (Below MP): **10.58 feet**

Casing Diameter: **2 inches**

Sampling Date: **2/5/98**

Depth to Ground Water (Below MP): **1.67 feet**

Sample ID No. **OMW-8 and OMW-8B**

Method of Well Development:

Time: **1030**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump

Riser Elevation (MP):

☑ Bailer ☐ Centrifugal Pump ☑ Other

Top of Screen Elevation:

Sampling Collection Method:

Sample Appearance: **Cloudy, brown**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample

Odor: **None**

☑ Bailer Type ○ Teflon ○ Stainless Steel

Sampling Problems (if any): **Rain**

○ ABS Plastic ○ PVC ◉ HDPE

Pump Intake Or Bailer Set At N/A Feet Below MP

Decontamination Performed:

Tubing Type (if used):

Tubing Used For: ☐ Sample Collection ☐ Well Development/Field Tests

Samples Collected: **BTEX, TPH-D**

Time	pH (Units)	Temperature Corrected Conductance (umho/cm)	Temperature (Centigrade)	Water Level (Nearest 0.01 Ft.)	Cumulative Volume of Water Removed From Well (Gallons)	Pumping Rate in gallons/Minute (GPM)
1022	5.3	2,640	15.0		1.5	
1027	5.3	2,660	15.0		3.0	
1032	5.3	2,830	15.0		4.5	

At Least 3 Well Bore Volumes Were Evacuated Before Sampling

Comments:

[Comments may continue on back]

Form Completed By: **Joe Franzen**

Witnessed By:

LAIDLAW SAMPLING AND WELL STABILIZATION FORM

Laidlaw Project Name: **UP Fueling Area**

Laidlaw Project Number: **96199**

Measuring Point (MP) Location: **Top Of Casing**

Well No. OMW-10

Well Depth: (Below MP): **12.85 feet**

Casing Diameter: **2 inches**

Sampling Date: **2/6/98**

Depth to Ground Water (Below MP): **3.00 feet**

Sample ID No. **OMW-10 and OMW-10B**

Method of Well Development:

Time: 1102

☐ Tap ☐ Submersible Pump ☐ Bladder Pump

Riser Elevation (MP):

☑ Bailer ☐ Centrifugal Pump ☐ Other

Top of Screen Elevation:

Sampling Collection Method:

Sample Appearance: **brown, cloudy**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample

Odor: **diesel**

☑ Bailer Type ○ Teflon ○ Stainless Steel

Sampling Problems (if any):

○ ABS Plastic ○ PVC ◉ HDPE

Pump Intake Or Bailer Set At N/A Feet Below MP

Decontamination Performed:

Tubing Type (if used):

Tubing Used For: ☐ Sample Collection ☐ Well Development/Field Tests

Samples Collected: **BTEX, TPH-D**

Time	pH (Units)	Temperature Corrected Conductance (umho/cm)	Temperature (Centigrade)	Water Level (Nearest 0.01 Ft.)	Cumulative Volume of Water Removed From Well (Gallons)	Pumping Rate in gallons/Minute (GPM)
1050	**5.9**	**1,849**	**18.0**		**2.0**	
1056	**5.9**	**1,927**	**17.5**		**4.0**	
1101	**5.9**	**1,875**	**18.0**		**6.0**	

At Least 3 Well Bore Volumes Were Evacuated Before Sampling

Comments:

[Comments may continue on back]

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