SEMI-ANNUAL MONITORING REPORT
HYDROCARBON RECOVERY SYSTEM
(DECEMBER 1, 1997 TO JUNE 30, 1998)
OAKLAND FUELING AREA
UNION PACIFIC RAILROAD YARD
1717 MIDDLE HARBOR ROAD
OAKLAND, CALIFORNIA

July 27, 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

UNION PACIFIC RAILROAD COMPANY

K. R. (KEN) WELCH
Assistant Vice President
Environmental Management

Mailing Address.
Room 930
1416 Dodge Street
Omaha, Nebraska 68179
Fax No. (402) 271-4461

File: Oakland, Ca.
Environmental

G. (GLENN) THOMAS
Director-Environmental Operations South
S W. (STEVE) BERKI
Director-Environmental Operations-Central
L. A. (LANNY) SCHMID
Director-Environmental Operations-West
B. A. (BROCK) NELSON
Director-Environmental Operations-North
R. L (RICK) EADES
Director-Environmental Site Remediation

July 30, 1998

Mr. Raymond A. Maxwell
East Bay Municipal Utility District
Source Control Division, Mail Slot 702
375 Eleventh Street
Post Office Box 24055
Oakland, Ca. 94623-1055

Dear Mr. Maxwell:

Semi-Annual Monitoring Report for Groundwater Discharge Permit account number 502-51231, for Union Pacific Railroad's Hydrocarbon Recovery System in Oakland, Ca.

Attached is the Semi-Annual (December 1, 1997 to June 30, 1998) Monitoring Report for our Hydrocarbon Recovery System in Oakland.

If you have any questions on the report, please call me at (402) 271-4078.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true , accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Yours truly,

Harry P. Patterson, P.E.
Manager Environmental Site Remediation

ENVIRONMENTAL
PROTECTION

98 JUL 34 PM 2:17

CC: Mr. Larry Seto
Alameda County Dept of Environmental Health
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502-6577

Mr. John Prall
Port of Oakland
530 Water Street
Oakland, Ca. 94607

Ms. Jami Matanky
American President Line
1111 Broadway
Oakland, California 94607

Jeff Asay - Law - Los Angeles
Lanny Schmid - Room 930
Denton Mauldin - Laidlaw

SEMI-ANNUAL MONITORING REPORT
HYDROCARBON RECOVERY SYSTEM
(DECEMBER 1, 1997 TO JUNE 30, 1998)
OAKLAND FUELING AREA
UNION PACIFIC RAILROAD YARD
1717 MIDDLE HARBOR ROAD
OAKLAND, CALIFORNIA

July 27, 1998

Prepared For:
Union Pacific Railroad
Omaha, Nebraska

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

SEMI-ANNUAL MONITORING REPORT
HYDROCARBON RECOVERY SYSTEM
DECEMBER 1, 1997 TO JUNE 30, 1998
UNION PACIFIC RAILROAD YARD
1717 MIDDLE HARBOR ROAD
OAKLAND, CALIFORNIA

Prepared for:

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

For submittal to:

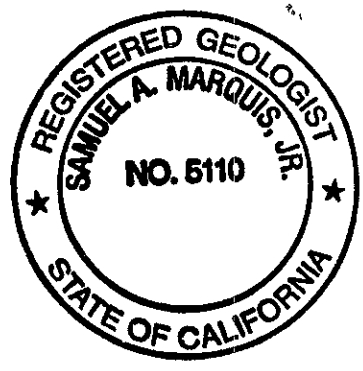
Raymond Maxwell
East Bay Municipal Utility District
Post Office Box 24055
Source Control Division, Mail Slot 702
Oakland, California 94623-1056

Prepared by:

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

Lisa Hennessy
Engineer
E.I.T. No. 18534

Sam Marquis,
Project Hydrogeologist
R.G. No. 5110



July 27, 1998

TABLE OF CONTENTS

List of Figures

List of Tables

List of Appendices

1. INTRODUCTION

This report presents the results from the semi-annual monitoring program conducted at the fueling area of the Union Pacific Railroad (UPRR) Oakland trailer-on-flat-car (TOFC) railyard at 1717 Middle Harbor Road in Oakland, California for the period of December 1, 1997 to June 30, 1998. The report was prepared by Consulting Services of Laidlaw Environmental Services, Inc. (Laidlaw) for UPRR in accordance with the East Bay Municipal Utility District (EBMUD) permit number 502-51231. The objectives of the monitoring program are to evaluate changes in the distribution of petroleum hydrocarbons in groundwater and to assess the effectiveness of the hydrocarbon recovery system.

The purpose of this report is to provide semi-annual monitoring information pertaining to the hydrocarbon recovery and groundwater treatment system and the groundwater monitoring wells at the fueling area. This report also contains quarterly groundwater monitoring information requested in a letter by Alameda County Department of Environmental Health (ACDEH), dated September 21, 1994.

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 (Figure 1). The motor freight portion of the TOFC yard, approximately 700 feet southeast and downgradient of the fueling area is currently undergoing groundwater remediation for recovery of non-aqueous phase liquid as diesel. (The motor freight area is a separate project and is not the subject of this report.) 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 (described below) 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 (system) was installed to remove diesel on the groundwater 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 *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*, dated 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, 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 system was remained inoperable from September 1997 to June 1998. A new air compressor has been installed and the system was restarted on June 22, 1998.

3. CURRENT ACTIVITIES

The current activities at the site consist of performing the system and groundwater monitoring activities described in the following sections.

3.1 System Monitoring

Samples are collected from the water stream of the system to assess the performance of the system and to compare discharge concentrations with limits established by the EBMUD. At varying frequencies, water samples are collected from sampling ports located before (influent), between (midfluent), and after (effluent) the two granular activated carbon vessels. On a quarterly basis, samples are collected from the influent and effluent water streams through 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 the influent, midfluent , and effluent of the water stream through the carbon vessels. The influent samples are analyzed for BTEX and TPH-D. TPH-D is used for estimating the loading of contaminants on the first vessel. Midfluent water samples are collected and analyzed for BTEX and used to monitor for the breakthrough of organics from the first vessel. Effluent water samples are analyzed for BTEX and TPH-D. The BTEX sample results are used to determine compliance with the discharge permit levels established by EDMUD.

System maintenance consists of changing particulate filters (typically weekly), back-washing 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.

However, due to the inoperable status of the system, no sampling or weekly system maintenance has occurred from September 26, 1997 to June 21, 1998. When the system was restarted in June 1998, Burns and McDonnell resumed their weekly system maintenance and monthly sampling activities.

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. In accordance with a letter dated March 21, 1997, groundwater sampling activities are performed during the first and third quarters of each year. However, due to the inoperable status of the recovery system, site visits were conducted on a quarterly basis by Laidlaw personnel and fluid level measurements were taken then. Beginning June 22, 1998, when the recovery system was restarted, Burns and McDonnell resumed their monthly well gauging activities.

Fluid-level measurements are used to generate potentiometric surface maps, which provide information about the groundwater gradient and the operation of the recovery wells. The data used in these maps include wells with diesel. The groundwater elevations in these wells are corrected to account for the diesel overlying the water column in the well. This correction is performed by multiplying the specific gravity of the diesel by the diesel 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 state-certified laboratory and analyzed for BTEX and TPH-D. Diesel is first recovered by hand using disposable bailers from wells containing measurable amounts of diesel.

4. System Monitoring

The recovery of diesel is accomplished by depressing the groundwater table with total-fluids pumps to recover diesel and water and creating a cone of depression surrounding the recovery wells. The recovery and treatment system consists of five recovery wells, a diesel/water separator, a recovered diesel storage tank, and an activated carbon treatment system. The recovered groundwater is treated and discharged to the EBMUD sanitary sewer. The locations of the five recovery wells (ORW-1, ORW-2, ORW-3, OMW-9, and OP-4) and the water treatment facility are indicated on Figure 2.

4.1 System Operation

During the operating period of December 1, 1997 to June 30, 1998, the groundwater recovery and treatment system treated approximately 135,000 gallons of groundwater. Since start-up on May 12, 1992, until June 30, 1998, the system has recovered approximately 5,925,800 gallons of water (Table 4) and 10,553 gallons of diesel (Table 7).

Until September 29, 1997, the system operated with only minor down time for required periodic maintenance. On September 29, 1997, the air compressor which supplies pressurized air to the recovery pumps became inoperable. A new air compressor for the recovery pumps was installed and the system was restarted on June 22, 1998.

Combined pumping rates for ORW-1, ORW-2, ORW-3, OMW-9, and OP-4 averaged approximately 3.7 gallons per minute (gpm). This is based on the operating period of June 22 to June 30, 1998. The system was inoperable prior to this time for this semi-annual period. Copies of the field logs for the hydrocarbon recovery system are included in Appendix A.

4.2 Analytical Results

Influent, midfluent, and effluent sample were collected on June 25, 1998, three days after the recovery system was restarted. Analytical results of BTEX and TPH-D from the influent to the activated carbon system are presented in Table 1. The EBMUD discharge limits for BTEX, as well as the analytical results from the sampling of the effluent from the water treatment system, are listed in Table 2. A summary of results from the samples collected between carbon vessels are included as Table 3. Laboratory analytical reports from the system sampling are included in Appendix B.

4.2.1 Influent Water Stream To Carbon Units

For the June 25, 1998 sampling event the analytical results for BTEX from the influent water stream to the carbon units indicated the presence of benzene at a concentration of 0.0046 milligrams per liter (mg/l), ethylbenzene at a concentration of 0.0053 mg/l, and xylenes at 0.0105 mg/l. Toluene was not detected above the method detection limit (MDL) of 0.0005 mg/l. Influent TPH-D concentrations were 26.5 mg/l.

4.2.2 Effluent Water Stream From Carbon Units

Analytical results indicate that all BTEX concentrations in the effluent samples were below the MDLs of 0.0005 mg/l for benzene, toluene, and ethylbenzene and below 0.001 mg/l for xylenes during the June 1998 sampling event. The effluent TPH-D concentration was less than 0.1 mg/l.

4.2.3 Water Stream Between Carbon Units

Analytical results indicate that all BTEX concentrations in the midfluent samples were below the MDLs of 0.0005 mg/l for benzene, toluene, and ethylbenzene and 0.001 mg/l for xylenes following the restart of the recovery system. The midfluent TPH-D concentration was 1.9 mg/l.

4.3 Granular Activated Carbon Usage

This section provides an estimate of carbon usage for the first or "lead" vessel. Two 2,000 pound granular activated carbon vessels are connected in series to remove organic compounds dissolved in the recovered groundwater. The second vessel prevents a release of water above the discharge limits once the first carbon vessel is loaded with organics or "breakthrough" occurs.

Table 4 presents the estimated amount of spent carbon (adsorption sites loaded with contaminants) and the expected life of the vessel. The lead carbon vessel was last replaced with fresh activated carbon on August 8, 1997, as noted in the table. Analytical results from the June 1998 sampling event suggest that breakthrough has occurred in the lead vessel. The midfluent stream was resampled the first week in July, and if analytical results confirm a breakthrough has occurred then the vessel will be replaced. The methodologies for performing calculations (represented in Table 4) were originally presented in the *Hydrocarbon Recovery System Quarterly Monitoring Report*, Second Quarter, 1992.

5. Groundwater Monitoring

The following sections present information that has been collected since the most recent ACDEH submittal. Groundwater sampling results from February 1998 were included in the *Semi-Annual Monitoring Report* (October 1997 to March 1998), submitted to ACDEH on April 28, 1998. Historical fluid levels and groundwater sampling results are presented in Tables 5 and 6, respectively.

5.1 Fluid-level Measurements

Overall, the monitoring wells and piezometers at the site showed a slight decrease in corrected groundwater elevations between March and May 1998, except for OP-1 which remained the same. The average change in groundwater elevations was an increase of approximately 1.5 feet, with the maximum increase being 2.91 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. Measurements from OP-2 were not taken due to Laidlaw staff's inability to locate the piezometer. The

decrease of groundwater elevations between March and May 1998 is consistent with site data from the previous year. Historical fluid-levels for each well are provided in Table 5.

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 created using fluid-level measurements from the fueling area and the adjacent motor freight area. The map was generated using the combined fluid-level measurements from February and March 1998 and is presented in Figure 3. The potentiometric surface results for February-March 1998 indicate that groundwater flow is to the south. The hydraulic gradient ranges from 0.004 to 0.005 feet/foot (21 to 26 feet/mile)

A potentiometric surface map created with measurements collected from groundwater monitoring wells and piezometers at the fueling area and the adjacent motor freight area on May 21, 1998 are presented in Figure 4. The potentiometric surface results for May indicate that groundwater flow is to the south. The hydraulic gradient ranges from 0.002 to 0.004 feet/foot (10 to 21 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). Th cause of the water table rise is most likely due to the lack of a groundwater depression resulting from the inoperable status of the recovery pumps.

During the February and March 1998, and the May 1998 monitoring events, diesel was observed in two groundwater monitoring wells (OMW-4 and OMW-7). Diesel was present during the February and March 1998 event in three piezometers (OP-1, OP-2, and OP-3), but only present in peizometer OP-3 for the May 1998 event. Piezometer OP-2 was not gauged because Laidlaw personnel was unable to locate it. Figures 5 and 6 illustrate the diesel thicknesses as measured in the monitoring wells and piezometers during the February-March 1998 and May 1998 monitoring events, respectively. The approximate extent of the diesel plume did not change significantly during the February-March and May monitoring events, and it is consistent with previous monitoring events.

5.2 Groundwater Sampling

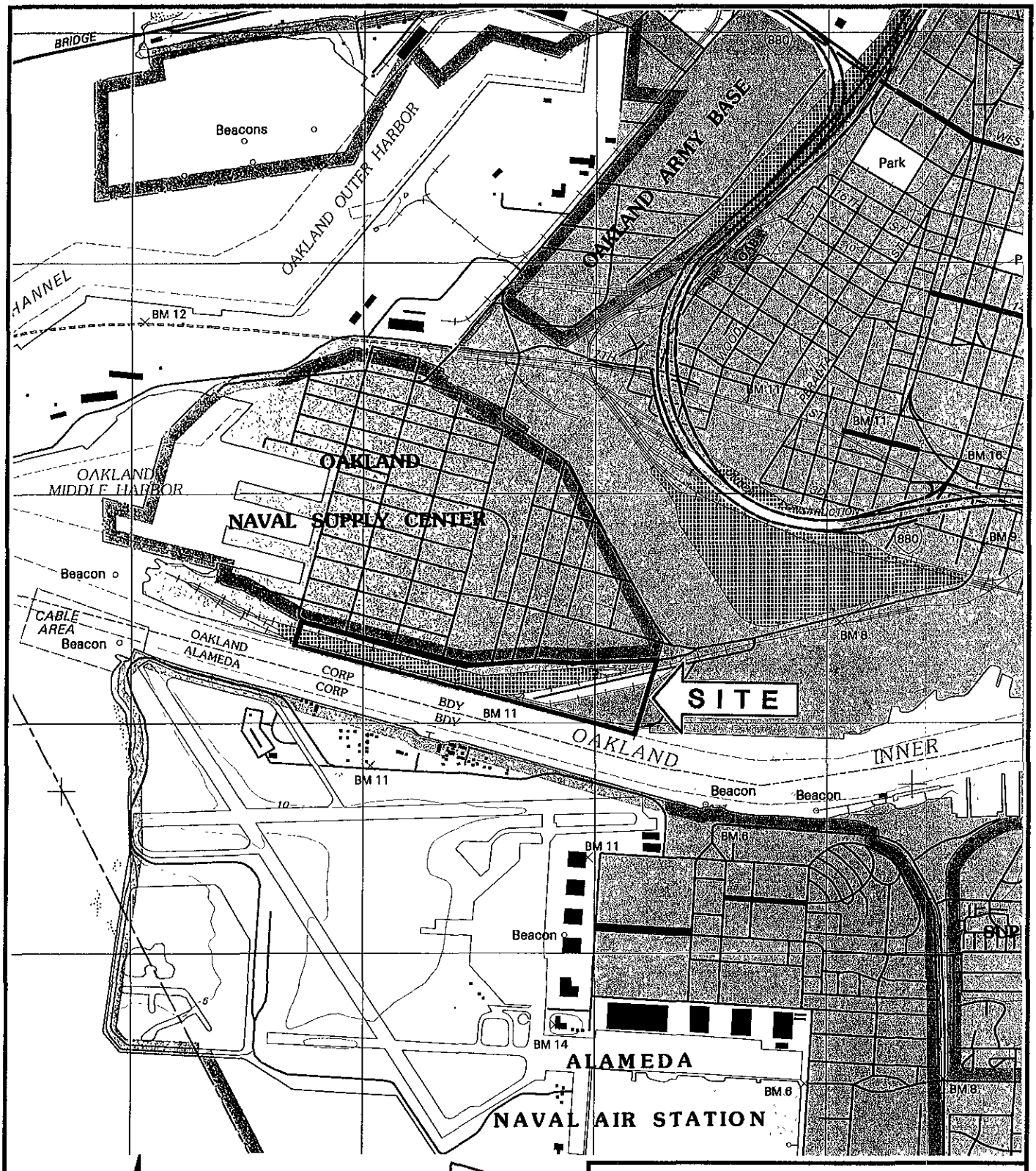
The most recent semi-annual groundwater sampling event was conducted on February 4, 1998. Groundwater samples were obtained from monitoring wells OMW-1, OMW-2, OMW-3, OMW-5, OMW-6, OMW-8, and OMW-10. A discussion of the groundwater analytical results from this event was included with the semi-annual monitoring report that was submitted to ACDEH in April 1998. The next analytical results are included in Table 5. The next sampling event is scheduled for August 1998.

6. CONCLUSIONS

The following conclusions have been drawn from the system and groundwater monitoring data collected from December 1, 1997 to June 30, 1998:

- Water discharge from the system did not exceed the EBMUD discharge limits during this semi-annual monitoring period.
- An overall decrease in groundwater elevations was observed between the March and May events. This decrease is consistent with data for the same period in the previous year.
- The groundwater gradient outside the zone of influence of the recovery system is consistent with previous monitoring events.
- Groundwater depressions created by the recovery pumps noted in the July 1 to November 30, 1997 semi-annual report are no longer evident.
- The recovery system has been repaired and was restarted on June 22, 1998.
- The system has removed 135,800 gallons of water and recovered 53 gallons of diesel since it was restarted in June 1998.
- The system has removed a total of 10,553 gallons of diesel between the start-up on May 12, 1992 and June 30, 1998.
- There was breakthrough in the lead carbon vessel in June 1998. Resampling of the midfluent stream was done the first week in July to confirm breakthrough. If breakthrough has occurred then the vessel will be replaced.

FIGURES



LOCMAP

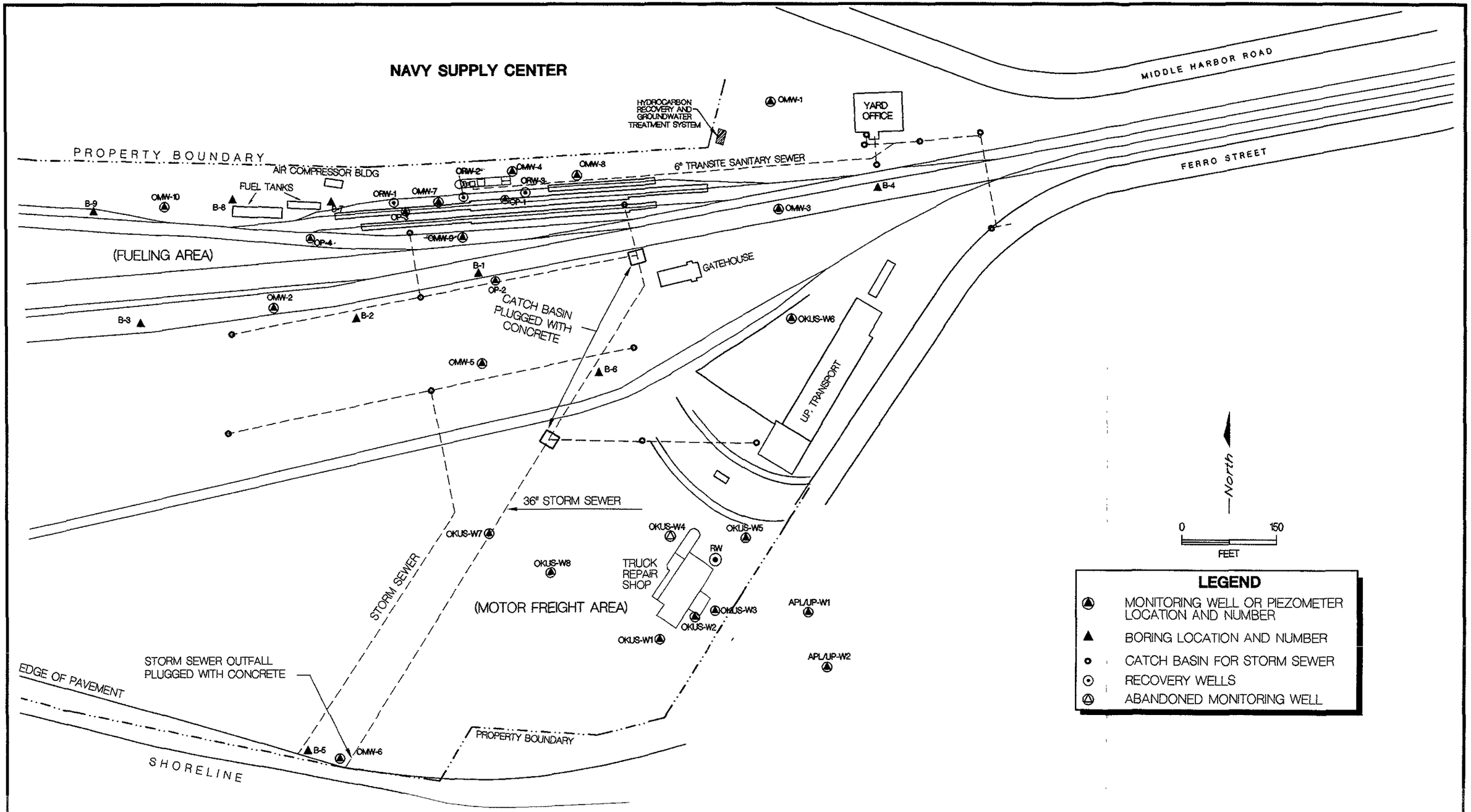
LAIDLAW ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD - OAKLAND, CA

FIGURE 1

SITE LOCATION MAP

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



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

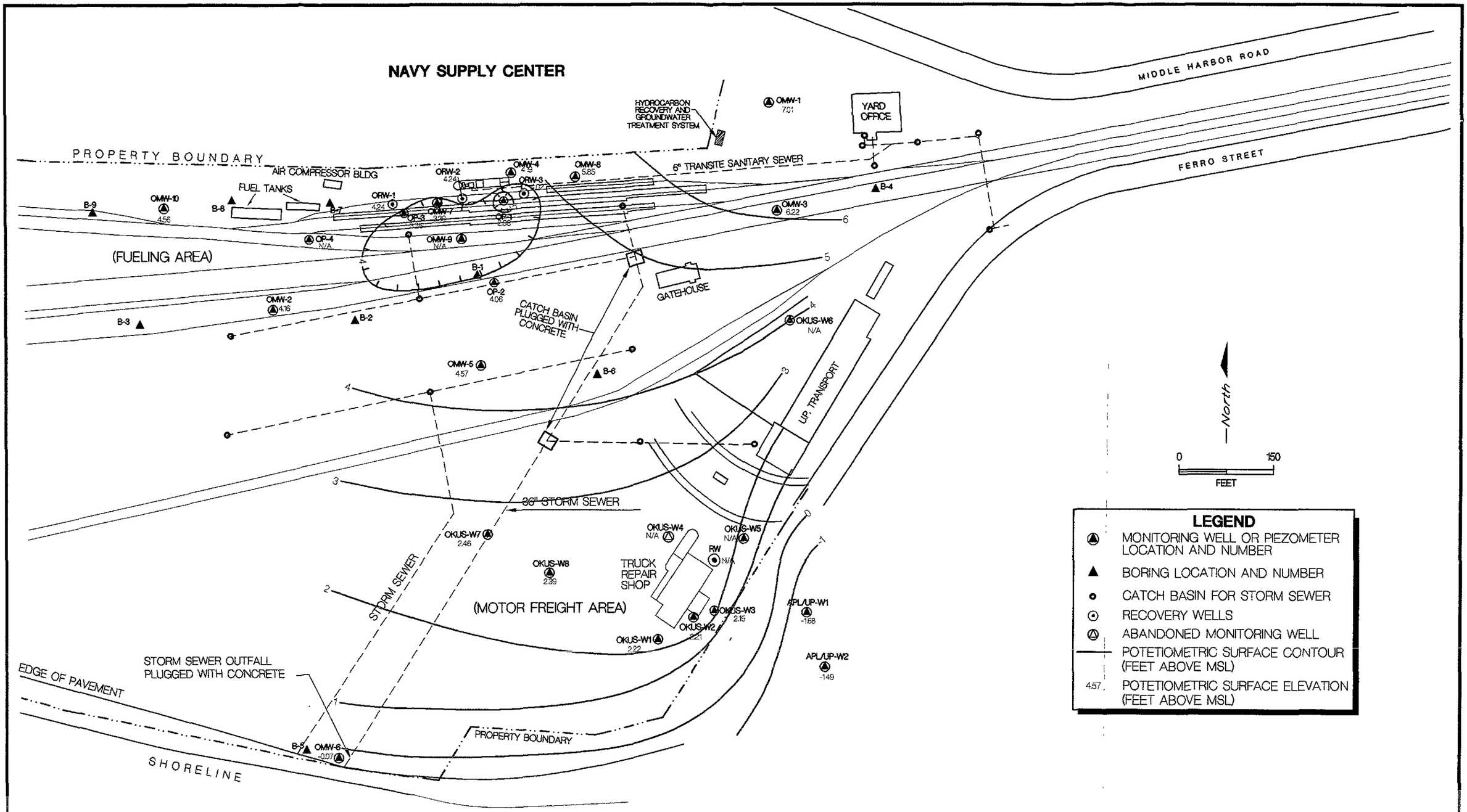
EARTH LAW
ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD
UPMF REPAIR SHOP- OAKLAND, CALIFORNIA

FIGURE 2
SITE VICINITY MAP

SCALE: 1" = 150'

DWG NO: 96199-0007



BY	DATE
DRAWN CW	7/28/98
CHECKED	
APPROVED	
APPROVED	
APPROVED	

LAUDLAW ENVIRONMENTAL SERVICES

FIGURE 3

UPRR TOFC RAILYARD
UPMF REPAIR SHOP- OAKLAND, CALIFORNIA

NON-PUMPING GROUNDWATER POTETIOMETRIC SURFACE MAP - FEBRUARY 1998

SCALE 1" = 150'

DWG NO 96199-0010

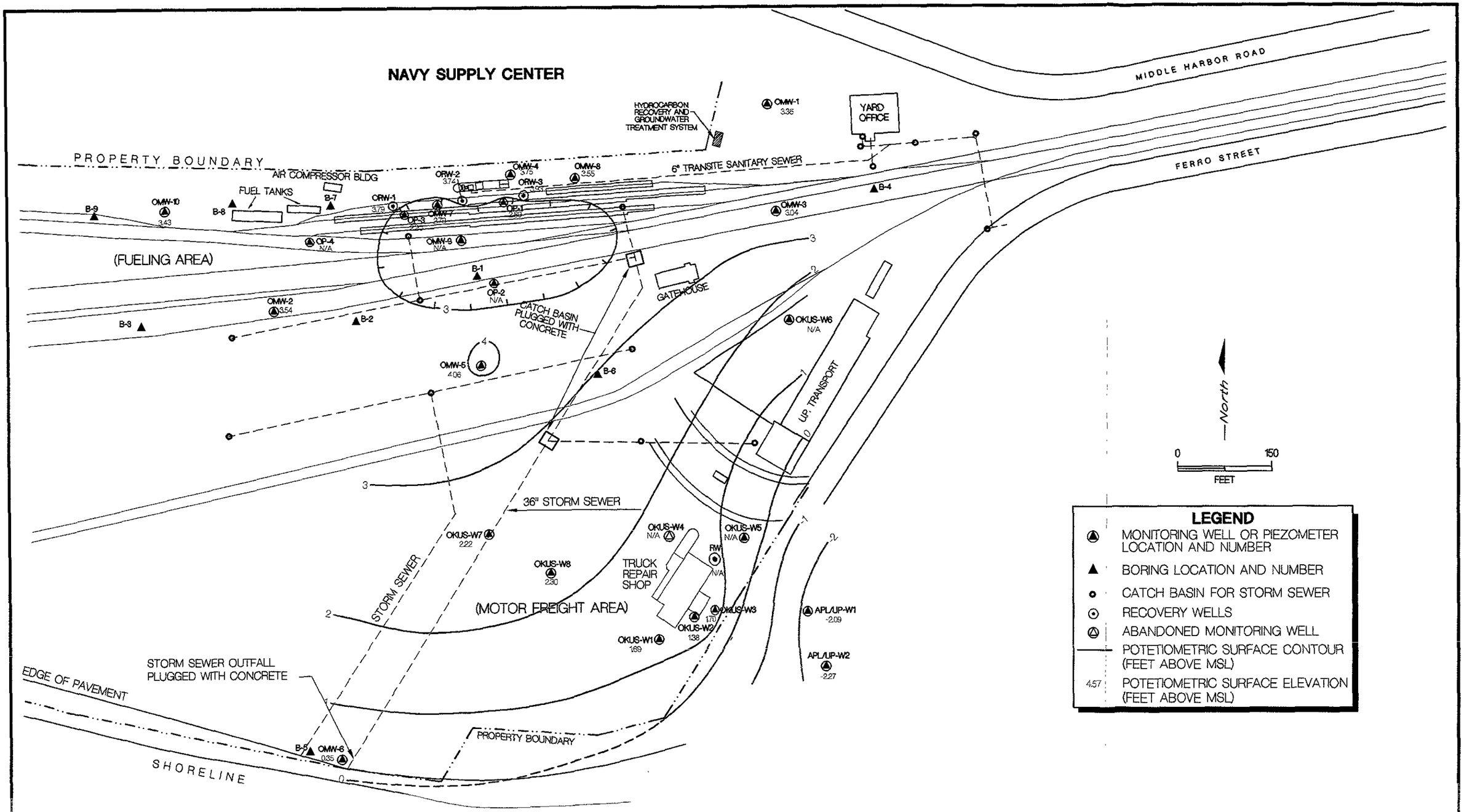


FIGURE 4

BY	DATE
DRAWN CJJ	7/28/98
CHECKED	
APPROVED	
APPROVED	
APPROVED	

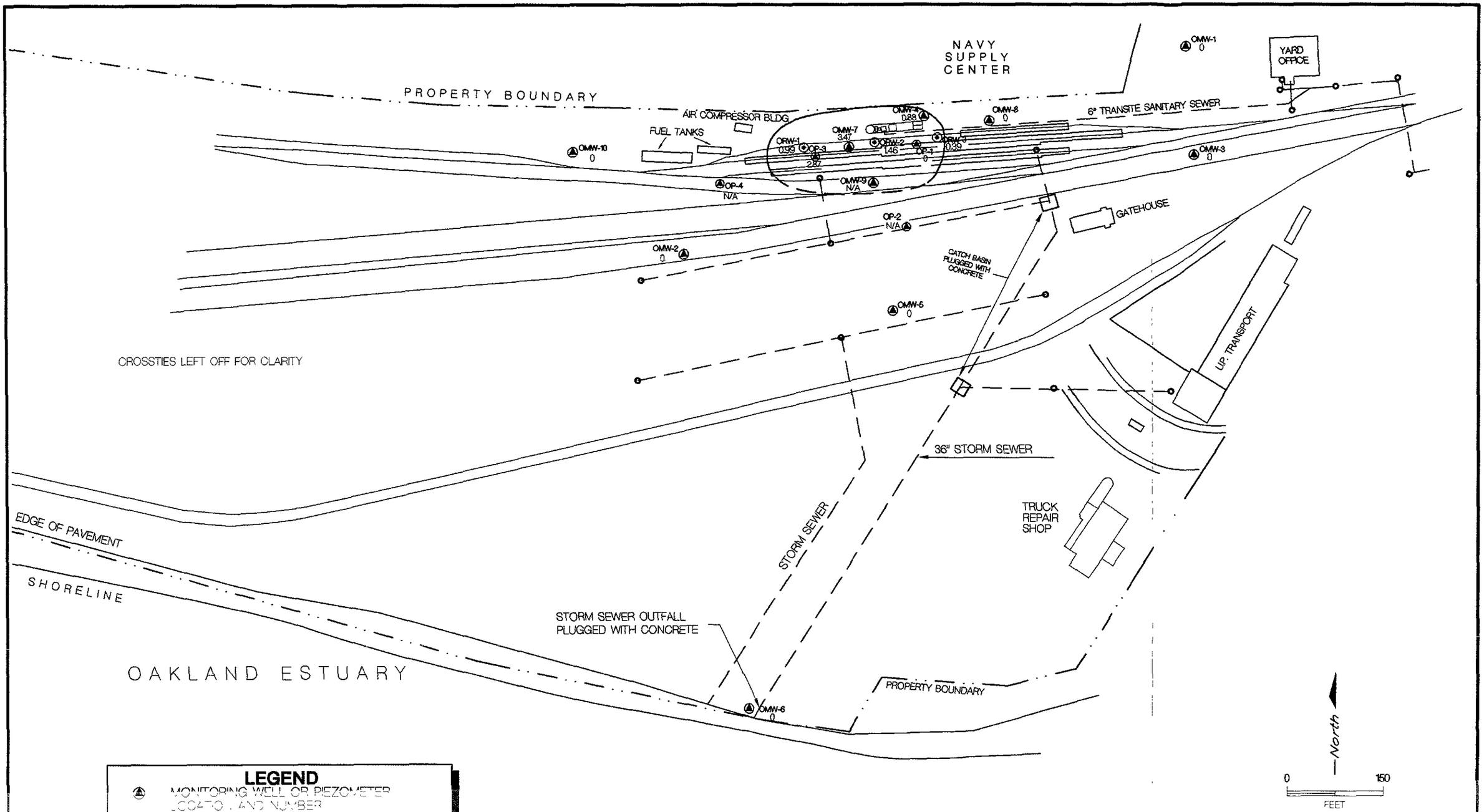
LAIDLAW ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD
UPMF REPAIR SHOP- OAKLAND, CALIFORNIA

NON-PUMPING GROUNDWATER POTETIOMETRIC SURFACE MAP - MAY 1998

SCALE 1" = 150'

DWG NO 96199-0011



LEGEND

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

	BY	DATE
DRAWN	CJJ	7/14/98
CHECKED		
APPROVED		
APPROVED		
APPROVED		

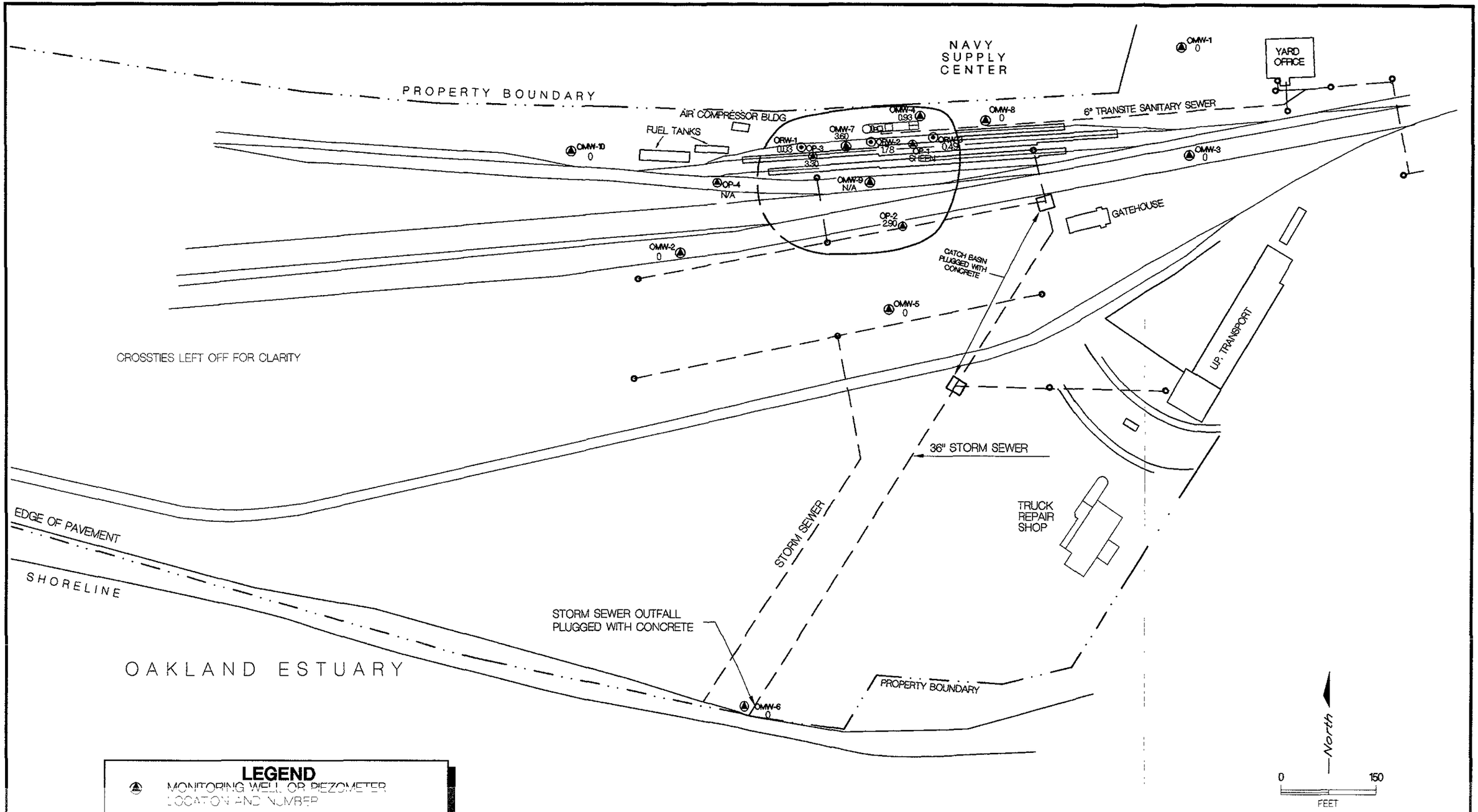
LAIDLAW ENVIRONMENTAL SERVICES

UPRR TOFC RAILYARD - OAKLAND CALIFORNIA

FIGURE 6
APPROXIMATE LATERAL EXTENT OF DIESEL
MAY 1998

SCALE 1" = 150'

DWG NO 96199-0009



LEGEND

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

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

LAWLAW 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

TABLE 1
Analytical Results
Influent Water Stream to Carbon Units
Hydrocarbon Treatment System
Oakland Fueling Area

Date Collected	Benzene *(mg/L)*	Toluene *(mg/L)*	Ethylbenzene *(mg/L)*	Xylenes *(mg/L)*	Total Petroleum Hydrocarbons as Diesel *(mg/L)*
01/05/95	NA	NA	NA	NA	140
01/25/95	<0.03	<0.03	<0.03	<0.03	550
04/12/95	0.0015	<0.0003	<0.0003	0.0023	3.7
05/29/95	NA	NA	NA	NA	<0.02*
06/30/95	NA	NA	NA	NA	25
07/19/95	0.011	0.0006	0.005	0.015	13
08/08/95	NA	NA	NA	NA	11
09/08/95	NA	NA	NA	NA	11
10/13/95	0.009	0.0006	0.010	0.020	66
11/22/95	NA	NA	NA	NA	38
12/15/95	NA	NA	NA	NA	19
01/08/96	0.013	<0.0005	0.010	0.021	<0.05
02/12/96	NA	NA	NA	NA	56
03/12/96	NA	NA	NA	NA	42
04/10/96	0.0097	<0.0005	0.0067	0.010	36
05/13/96	NA	NA	NA	NA	14
06/13/96	NA	NA	NA	NA	18
07/17/96	<0.0005	<0.0005	<0.0005	<0.002	9.7
08/19/96	NA	NA	NA	NA	14
09/16/96	NA	NA	NA	NA	14
10/17/96	<0.0005	<0.0005	<0.0005	<0.001	11
11/25/96	NA	NA	NA	NA	13
12/13/96	NA	NA	NA	NA	14
01/14/97	0.0061	<0.0005	<0.0005	0.0039	22
02/11/97	NA	NA	NA	NA	13
03/10/97	NA	NA	NA	NA	16
04/04/97	0.003	<0.0005	<0.0005	<0.001	8.7
05/15/97	NA	NA	NA	NA	8.5
07/18/97	0.0024	<0.0005	<0.0005	0.0011	18
08/15/97	NA	NA	NA	NA	12
09/05/97	NA	NA	NA	NA	14
06/25/98	0.0046	<0.0005	0.0053	0.0105	26.5

NA - Not Analyzed
*Unknown hydrocarbon in the Diesel range reported concentration of 14 mg/L

TABLE 2
Analytical Results
Effluent Water Stream from Carbon Units
Hydrocarbon Treatment System
Oakland Fueling Area

Date Collected	Benzene *(mg/L)*	Toluene *(mg/L)*	Ethylbenzene *(mg/L)*	Xylenes *(mg/L)*	Total Petroleum Hydrocarbons as Diesel *(mg/L)*
EBMUD Discharge Limit*	0.005	0.005	0.005	0.005	N/A
05/12/92	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
05/19/92	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
05/27/92	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
06/02/92	<0.0005	<0.0005	<0.0005	<0.0005	0.12
07/07/92	<0.0005	<0.0005	<0.0005	0.0011	18
08/11/92	<0.0005	<0.0005	<0.0005	<0.0005	1.3
09/25/92	<0.001	<0.001	<0.001	0.0014	9.7
11/16/92	<0.0005	<0.0005	<0.0005	<0.0005	0.53
12/04/92	<0.0005	<0.0005	<0.0005	<0.0005	0.24
02/02/93	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
03/30/93	<0.0005	<0.0005	<0.0005	<0.0005	0.074
04/30/93	<0.0003	<0.0003	<0.0003	<0.0009	<0.050
05/27/93	<0.0003	<0.0003	<0.0003	<0.0009	<0.050
06/30/93	<0.0003	<0.0003	<0.0003	<0.0009	<0.050
07/28/93	<0.0003	<0.0003	<0.0003	<0.0009	<0.100
08/31/93	<0.0003	<0.0003	<0.0003	<0.0009	<0.050
09/30/93	<0.0003	<0.0003	<0.0003	<0.0009	<0.050
10/28/93	<0.0003	<0.0003	<0.0003	<0.0009	<0.050
11/30/93	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
12/28/93	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
01/31/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
02/25/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
03/30/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
05/03/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
06/01/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.050
07/29/94	<0.0005	<0.0005	<0.0005	0.0007	<0.050
10/27/94	<0.0005	<0.0005	<0.0005	0.0006	<0.050
01/25/95	<0.03	<0.03	<0.03	<0.03	470
04/12/95	<0.0003	<0.0003	<0.0003	<0.0003	<0.050
07/19/95	<0.0005	<0.0005	<0.0005	<0.002	1.5
10/13/95	<0.0005	<0.0005	<0.0005	<0.002	<0.050
01/08/96	<0.0005	<0.0005	<0.0005	<0.002	36
04/10/96	<0.0005	<0.0005	<0.0005	<0.002	1.8
07/17/96	<0.0005	<0.0005	<0.0005	<0.002	0.12
10/17/96	<0.0005	<0.0005	<0.0005	<0.001	<0.050
01/11/97	<0.0005	<0.0005	<0.0005	<0.001	<0.050
04/04/97	<0.0005	<0.0005	<0.0005	<0.001	<0.050
07/18/97	<0.0005	<0.0005	<0.0005	<0.001	0.096
06/25/98	<0.0005	<0.0005	<0.0005	<0.001	<0.1

* - Discharge limits updated on July 1, 1996.

N/A - Not Applicable

TABLE 3
Analytical Results
Water Stream Between Carbon Units
Hydrocarbon Treatment System
Oakland Fueling Area

Date Collected	Benzene *(mg/L)*	Toluene *(mg/L)*	Ethylbenzene *(mg/L)*	Xylenes *(mg/L)*
01/05/95	0.0048	0.0035	<0.003	0.015
01/25/95	<0.03	<0.03	<0.03	<0.03
04/12/95	0.0013	<0.0003	<0.0003	<0.0003
05/29/95	0.0032	<0.0005	<0.0005	<0.0005
06/30/95	0.002	<0.0005	<0.0005	<0.002
07/19/95	0.002	<0.0005	<0.0005	<0.002
08/08/95	<0.0005	<0.0005	<0.0005	<0.002
09/08/95	<0.0005	0.0008	<0.0005	<0.002
11/22/95	<0.0005	<0.0005	<0.0005	<0.002
12/15/95	<0.0005	<0.0005	<0.0005	<0.002
01/08/96	0.0008	<0.0005	<0.0005	<0.002
02/12/96	0.0012	0.0005	<0.0005	<0.002
03/12/96	<0.0005	<0.0005	<0.0005	<0.002
04/10/96	0.0018	<0.0005	0.0005	<0.002
05/13/96	<0.0005	<0.0005	<0.0005	<0.002
06/13/96	<0.0005	<0.0005	<0.0005	<0.002
07/17/96	<0.0005	<0.0005	<0.0005	<0.002
08/19/96	<0.0005	<0.0005	<0.0005	<0.001
09/16/96	<0.0005	<0.0005	<0.0005	<0.001
10/17/96	<0.0005	<0.0005	<0.0005	<0.001
11/25/96	0.023	0.0037	<0.0005	0.031
12/13/96	<0.0005	<0.0005	<0.0005	<0.001
01/14/97	<0.0005	<0.0005	<0.0005	<0.001
02/11/97	<0.0005	<0.0005	<0.0005	<0.001
03/10/97	<0.0005	<0.0005	<0.0005	<0.001
04/04/97	<0.0005	<0.0005	<0.0005	<0.001
05/15/97	<0.0005	<0.0005	<0.0005	<0.001
07/18/97	<0.0005	<0.0005	<0.0005	<0.001
08/15/97	<0.0005	<0.0005	<0.0005	<0.001
09/05/97	<0.0005	<0.0005	<0.0005	<0.001
06/25/98	<0.0005	<0.0005	<0.0005	<0.001

TABLE 4
Hydrocarbon Treatment System
Granular Activated Carbon Usage
Oakland Fueling Area

Date	Time	Volume (gallons)	Periodic Flowrate (gpm)	Average Flowrate (gpm)	Infl Conc TPHd (mg/l)	Carbon Used (pounds)	Spent Carbon (pounds)	Remaining Pumpable (gallons)	Remaining Pumpable (days)	Projected Breakthru Date
01/25/95	01:30 PM	2468180	2.11	1.44	35 **	812	812	203706	99	May-95
04/12/95	10:50 AM	2549270	0.73	1.20	3.7	246	1059	1527342	883	Sep-97
05/29/95	03:30 PM	2732640	2.70	1.58	0	418	1476	1527342	673	Apr-97
06/30/95	02:00 PM	2830380	2.13	1.69	25	259	1736	63424	26	Jul-95
07/19/95	02:30 PM	2882550	1.90	1.72	13	134	1870	59968	24	Aug-95
07/21/95	11:00 AM	2890500	2.98	2.98	12 *	0	0	1000655	233	Mar-96
08/08/95	04:00 PM	2986700	3.67	3.32	11	184	184	991051	207	Mar-96
09/08/95	02:00 PM	3108110	2.73	3.12	11	229	413	865962	192	Mar-96
10/13/95	10:30 AM	3206500	1.96	2.83	66	410	823	107058	26	Nov-95
11/22/95	03:30 PM	3318600	1.94	2.65	38	515	1338	104523	27	Dec-95
12/15/95	08:00 AM	3369800	1.57	2.47	19	223	1562	138533	39	Jan-96
01/08/96	11:45 AM	3554790	5.32	2.88	0.05	691	2253	255074	62	Mar-96
02/12/96	08:00 AM	3714500	3.18	2.92	56	708	2961	4150	1	Feb-96
03/12/96	11:00 AM	3814170	2.38	2.86	42	470	3432	2610	1	Mar-96
04/10/96	08:00 AM	3927670	2.73	2.84	36	550	3982	3011	1	Apr-96
05/06/96	08:00 AM	4035290	2.87	2.87	25 *	0	0	480314	116	Aug-96
05/13/96	08:00 AM	4055530	2.69	2.78	14	66	66	829513	207	Dec-96
06/13/96	07:00 AM	4172140	2.62	2.73	18	369	435	522088	133	Oct-96
07/17/96	07:50 AM	4343300	3.49	2.92	9.7	475	910	674587	161	Dec-96
08/19/96	08:00 AM	4478300	2.84	2.90	14	363	1273	311757	75	Nov-96
09/16/96	10:00 AM	4556200	1.93	2.74	14	205	1478	223934	57	Nov-96
10/17/96	02:55 PM	4645700	1.99	2.63	11	225	1703	162148	43	Nov-96
11/25/96	10:25 AM	4781700	2.43	2.61	13	336	2039	-18021	-5	Nov-96
12/13/96	09:35 AM	4829600	1.85	2.52	14	118	2157	-67181	-18	Nov-96
12/19/96	09:40 AM	4840900	1.31	1.31	17 *	0	0	706345	375	Dec-97
01/14/97	01:00 PM	4914200	1.95	1.63	22	238	238	480841	205	Aug-97
02/11/97	02:30 PM	5072700	3.92	2.39	13	462	700	600366	174	Aug-97
03/10/97	10:00 AM	5186800	2.96	2.53	16	276	976	384394	105	Jun-97
04/04/97	11:00 AM	5288500	2.82	2.59	8.7	209	1185	562565	151	Sep-97
05/15/97	07:30 AM	5435800	2.50	2.58	8.5	211	1396	426769	115	Sep-97
06/30/97	11:25 AM	5484800	0.74	2.31	8.5 *	69	1465	377769	113	Oct-97
07/18/97	01:00 PM	5580700	3.69	2.48	18	212	1677	107798	30	Aug-97
08/08/97	09:00 AM	5666400	2.86	2.86	18 *	0	0	667103	162	Jan-98
08/15/97	11:00 AM	5679200	1.25	2.06	12	32	32	984655	333	Jul-98
09/05/97	11:00 AM	5790000	3.66	2.59	14	240	272	741104	199	Mar-98
6/30/1998	Not Recorded	5925800	10.48	4.56	26.5	458	730	287755	44	Aug-98

* - Concentration estimate

** - Concentration represents the average estimated value from January to the next sampling event.

*** - Recovery system was inoperable from Sept. 22, 1997 to June 22, 1998. Readings reflect the first 7 days after the system was restarted.

+ - Changed carbon vessel on this date.

TABLE 5

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
	05/21/98			5.43	3.36		3.36
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
	05/21/98			2.34	3.54		3.54
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

TABLE 5

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	01/20/97			3.79	3.37		3.37
	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
	05/21/98			4.12	3.04		3.04
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
	05/22/98		3.52	4.40	3.01	0.88	3.75
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
	05/21/98			3.56	4.06		4.06
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
OMW-6	07/31/95			5.65	0.13		0.13
	09/07/95			5.51	0.27		0.27

TABLE 5

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)
	11/30/95			6.71	-0.93		-0.93
	01/10/96			6.72	-0.94		-0.94
	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
	05/21/98			6.13	-0.35		-0.35
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
	05/21/98		3.68	7.15	-0.12	3.47	2.79
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

TABLE 5

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-8	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
	05/21/98			3.97	3.55		3.55
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
	05/21/98			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
	05/21/98			4.13	3.43		3.43
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

TABLE 5
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	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				
	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
	05/21/98		2.66	3.65	2.94	0.99	3.77
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
	05/21/98		2.77	4.53	2.26	1.76	3.74
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

TABLE 5

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-3	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
	05/21/98		2.31	2.70	3.60	0.39	3.93
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
	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
	05/21/98			3.82	2.89		2.89
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
	05/21/98		NOT GAUGED				
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

TABLE 5

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-3	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
	05/21/98		3.80	6.77	-0.29	2.97	2.20
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
	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
	05/22/98			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 6
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

TABLE 6
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-5	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
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.

TABLE 7
Diesel Recovery
Union Pacific Railroad
Oakland Fueling Area

DATE	TOTAL VOLUME RECOVERED (gallons)	RECOVERY RATE (gal/day)	NOTES
03/02/93	1500	--	VOLUME ESTIMATED FROM GAUGE
05/11/93	1700	2.9	TANK EMPTIED
06/10/93	1900	6.7	VOLUME ESTIMATED FROM GAUGE
09/03/93	2700	9.4	TANK EMPTIED
11/30/93	3400	8.0	VOLUME ESTIMATED FROM GAUGE
02/25/94	4200	9.2	VOLUME ESTIMATED FROM GAUGE
06/01/94	4800	6.3	VOLUME ESTIMATED FROM GAUGE
06/27/94	4900	3.8	TANK EMPTIED
09/23/94	5500	6.8	TANK EMPTIED
12/27/94	6000	5.3	TANK EMPTIED
03/17/95	6300	3.8	TANK EMPTIED
07/14/95	6900	5.0	TANK EMPTIED
10/18/95	7500	6.3	TANK EMPTIED
01/30/96	8200	6.7	TANK EMPTIED
07/08/96	9000	5.0	TANK EMPTIED
01/02/97	9800	4.5	TANK EMPTIED
08/05/97	9800	0.0	TANK EMPTIED
06/30/98*	9853	7.6	VOLUME ESTIMATED FROM GAUGE

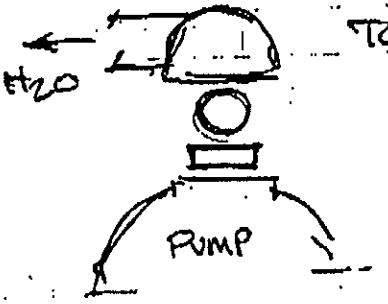
* Recovery system was inoperable from Sept. 22, 1997 to June 22, 1998. Readings reflect the first 7 days after the system was restarted.

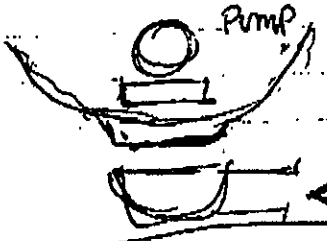
APPENDIX A

FIELD LOGS
GROUNDWATER RECOVERY AND TREATMENT SYSTEM

NEP 5877800
SIG 330800
FLOW —
OIL Ø
PSI IN
PSI OUT —

- On way to site, rec'd Alert #4 (compressor down) and High Temp alarm (103° F).
- reset high temp limit to 107° F (unit limit is 123° F)
- inspected compressor: Shut down due to air tests. Contacted UP compressor maint. person Mike (Car Dept. 891-7604). Said air dryer failed (moist. source) so compressor shut down. No plans to restart due to maint. shop closure.
- Inspected moist. trap. ½ full. Drained (gravity)
- Inspected blue controller tubes. All clear/dry except one tube in ORW-1. Disconnected and drained.
- All wells inoperative due to compressor shut down.
- Removed body of pump in ORW-2 to bring back to office for maint. / new parts. Fluid motor section





10/3/97 SK on-site @ 1300 Clear, 80's

- On 10/2 U checked system status via autodial "Alert Conditions OK" (compressor back on)
- Upon arrival 10/3, Compressor down again. Unable to restart system.
- Abbie replaced ORW-2 pump parts in office and U reinstalled pump.
- Still need to replace bubbler line fittings for easy adjustment @ controllers

6/22/98 K.G. & D.C. on site

0800 D.C. arrive @ site overcast, cool (~65F)

- Control boxes had previously been removed by B&M & refurbished by PNEUCON.
- New compressor arrived & installed ~3 weeks prior. U.P. installed new compressor & tied into existing air line. Ends of airline not used were cut & isolated (compressor is only pressurizing portions of airline that are necessary).

- Installed refurbished control boxes, reset bubbler pressures and levels on all 3 units. Install new pressure gauges on 2 auto pumps.

- Remove portion of OWS lid to check function.
- Skimmer completely blocked by bio (?) sludge. Used portable vacuum unit ("Mr. Sucky") and toilet brush to clean OWS oil skimmer. Upon addition of clean water to the OWS, function seems to have returned to normal (Upon initial startup after new compressor was installed, oil was getting past skimmer and into clear water chamber).
- Changed bag filters.
- Reinstalled lid on OWS
- Reprogrammed auto dialer
- turn on CL pump.

- System seems to function normally

- Also met w/ Integrated Waste Stream Management and DECON to get quotes on cleaning & disposing of sludge on bottom of OWS

1630 DC on site. Overcast, cool (~60 F), moderate breeze.

NEP = 15 GPM (very rough est. my watch battery died)
SIG = 4.7 GPM
NEP TOTALIZER = 5888255 GAL
SIG TOTALIZER = 340340 GAL
OIL = 16"
PSI in = 11
PSI out = 5
OP-4 = 414295 ⇒ (set pressure ≈ 40 psi max)
OMW = 344666 ⇒ (set pressure ≈ 25 psi)
- Set Cl pump to full (100)
Check all air pumps - operation normal
Backwash primary carbon unit ~15 mins.
Changed bag filters ⇒

1730 PSI in = 9
PSI out = 8.5
SIG FLOW = 24.2 GPM
NEP FLOW = 30.0 GPM

- reset Cl pump to below 0 %, leave on.
1735 leave site.

6/25/98

1545 DC on site. Sunny, clear, ~68°F, moderate breeze
Surge tank pump is off. ~~Jumper~~ Short to start surge tank pump @ 1600

1605 NEP FLOW = 30 gpm
NEP TOTALIZER = 5898860 gal
SIG FLOW = 24.8 gpm
SIG TOTALIZER = 350250 gal
OIL = 16"
PSI IN = 9.5
PSI out = 9.0
OP-4 = 422738
OMW = 405384

1730 - Leave site

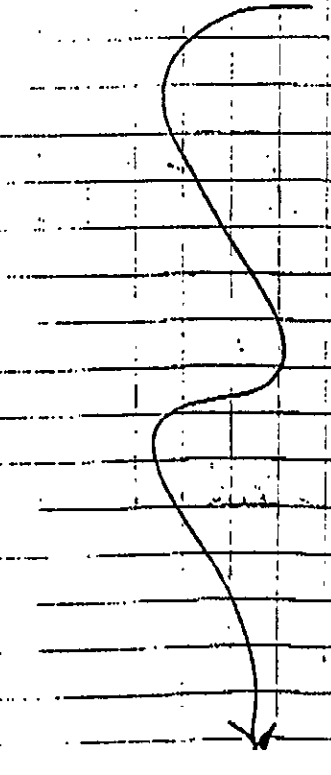
Collect samples:
INFLUENT - GW @ 1655
M/DFLUENT - GW @ 1700
EFFLUENT - GW @ 1705

All samples analyzed for: TPH-d (EPA 8015M)
BTEX (EPA 8020)

6/30 MF part sun, 60's, breeze

NEP	59285800
SIG	~~207 GPM~~ 315260
FLOW	20.7 GPM
OIL	19.0 INCHES
PSI IN	10.0 PSI
PSI OUT	75 PSI
OMW-9	430883
OP-4	554344

- BACKFLUSHED CARBON UNIT, LITTLE FOULING NOTICED.
- CHANGED BAG FILTERS, BOTH FAIRLY CLEAN.
- PUMP IN OP-4 ADJUSTED FROM 40 PSI UP TO 50 PSI - PUMP SOUNDED AS IF IT WERE STRUGGLING
- ALL OTHER PUMPS OPERATING PROPERLY
- COMPRESSOR BLED OF LIQUID, OIL CHECKED, AIR FILTER CHECKED ALL O.K.
- CHLORINE PUMP TO BE PLUGGED IN UPON ARRIVAL AND TURNED OFF AT DEPARTURE



5/21/98

ARRIVED AT ORCHARD RANCH AT 1215

TIME	WELL	DTP	DTW	TD
1245	OMW-1	✓	5.43 ✓	
1313	OMW-6	✓	6.13 ✓	
	~~OMW-2~~			
1325	OMW-2	✓	2.34 ✓	
1332	OMW-5	✓	3.56 ✓	
1345	OMW-8	✓	3.97 ✓	
1406	OMW-10	✓	4.13 ✓	
1420	OKUS-7		4.69	
1426	OKUS-8		4.45	
1446	APLUP-W2		9.58	16.97
1454	APLUP-W1		10.21	21.85
1510	OMW-3	✓	4.12 ✓	
1522	OKUS-W1		7.48	
1526	OKUS-W2		8.33	22.31
1532	OKUS-W3		8.65	22.10
1557	ORW-3	2.31 ✓	2.70	
1603	OP-1		3.82 ✓	
1607	ORW-2	2.77 ✓	4.53	
1613	OMW-7	3.68	7.15 ✓	
1622	OP-3 ✓	3.80	6.77	
1632	ORW-1	2.66 ✓	3.65	
5/22/98				
~~OMW-4~~ 1510	OMW-4	3.52	4.40 ✓	

TW
2.62
85
21
05
72
42
1110
AT'S KEY

APPENDIX B

ANALYTICAL RESULTS

Request for Chemical Analysis and Chain of Custody Record

Burns & McDonnell Waste Consultants, Inc.
9400 Ward Parkway
Kansas City, Missouri 64114
Phone: (816) 333-8787 Fax: (816) 822-3463

Attention: Scott Kellstedt

Laboratory: Curtis & Tompkins
Address: 2323 - 5th St.
City/State/Zip: Berkeley, CA
Telephone: 486-0900

Document Control No.: 062598
Lab. Reference No. or Episode No.:

Project Number:
Project Name: UP/OAKLAND
Site, Group, or SWMU Name:

	Sample Number		Sample Event		Sample Depth (in feet)		Sample Collected		Sample Type: Matrix					Number of Containers	Analysis: TEH-d	Analysis: BTEX	Remarks
	Sample Point	Sample Designator	Round	Year	From	To	Date	Time	Liquid	Solid	Gas	Composite	Grab				
1	INFLUENT	GW					4/25/98	1655	X					4	X	X	Std. TAT
2	MIDFLUENT	GW						1700	X					4	X	X	
3	EFFLUENT	GW						1705	X					4	X	X	

Sampler (signature): Dave Cheng
Sampler (signature):

Relinquished By: 1. Dave Cheng (signature) — Date/Time: 4/25/98 1730 — Received By: (signature) — Date/Time: 4/26/98

Relinquished By: 2. (signature) — Date/Time — Received By: (signature) — Date/Time

Special Instructions:

Condition of Shipping Container: Good [✓] Fair [ ] Poor [ ]
Ice Present in Container: Yes [✓] No [ ]
Comments:

061896 FormWCI-OP1

BTXE

Client: Burns & McDonnell
Location: UP/Oakland

Analysis Method: EPA 8020A
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134291-001	INFLUENT_GW	41871	06/25/98	07/09/98	07/09/98	
134291-002	MIDFLUENT_GW	41871	06/25/98	07/09/98	07/09/98	
134291-003	EFFLUENT_GW	41871	06/25/98	07/09/98	07/09/98	

Matrix: Water

Analyte Diln Fac:	Units	134291-001 1	134291-002 1	134291-003 1
Benzene	ug/L	4.6	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	5.3	<0.5	<0.5
m,p-Xylenes	ug/L	9.3	<0.5	<0.5
o-Xylene	ug/L	1.2	<0.5	<0.5
Surrogate				
Trifluorotoluene	%REC	80	80	78
Bromofluorobenzene	%REC	90	78	79

TEH-Tot Ext Hydrocarbons

Client: Burns & McDonnell
Location: UP/Oakland

Analysis Method: EPA 8015M
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
134291-001	INFLUENT_GW	41838	06/25/98	07/06/98	07/08/98	
134291-002	MIDFLUENT_GW	41838	06/25/98	07/06/98	07/08/98	
134291-003	EFFLUENT_GW	41838	06/25/98	07/06/98	07/08/98	

Matrix: Water

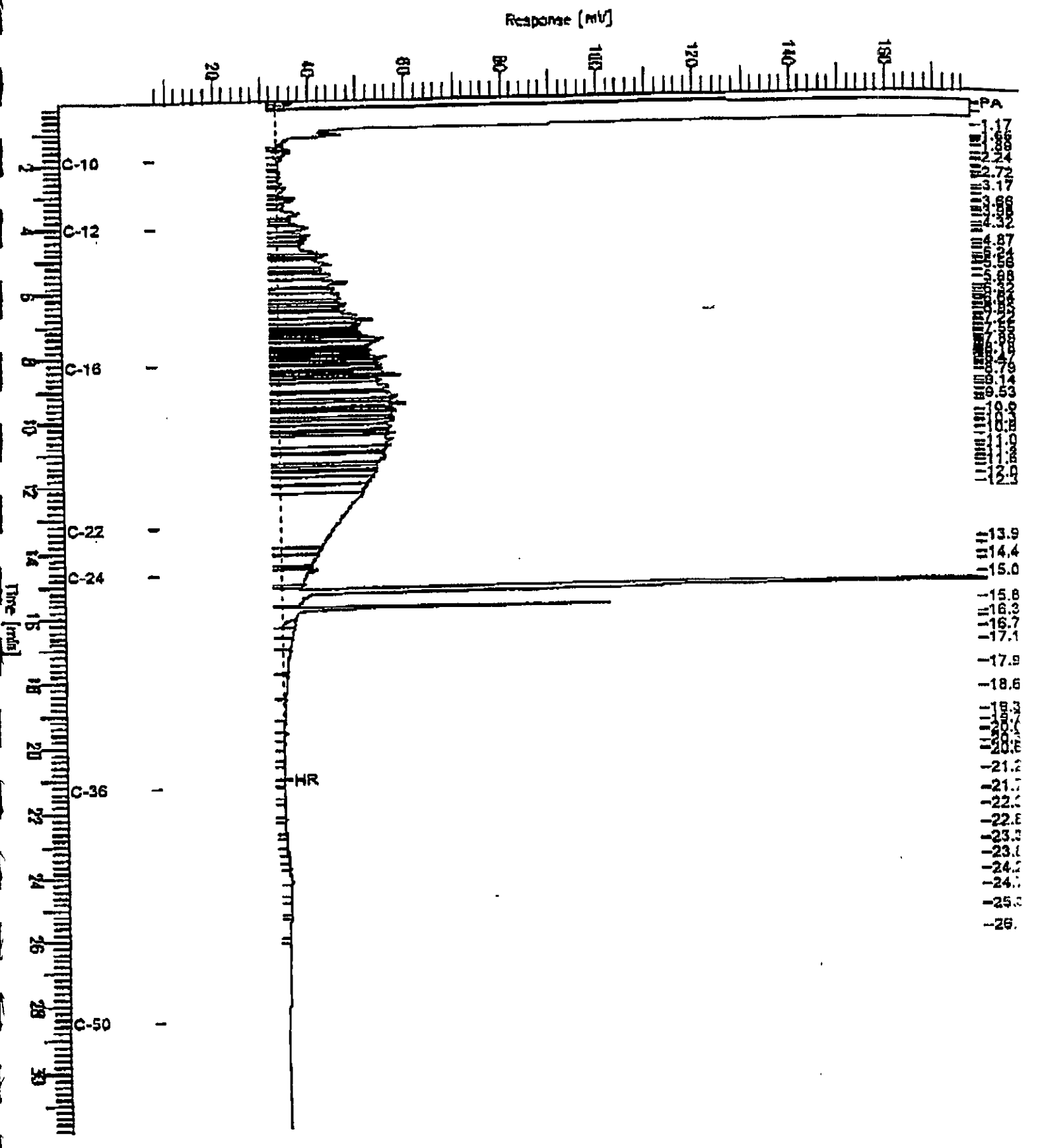
Analyte	Units	134291-001		134291-002		134291-003
Dilu Fac:		1		1		1
Jet Fuel A C10-C16	ug/L	8500	YH	500	YH	<50
Diesel C12-C22	ug/L	18000		1400		<50
Surrogate						
Hexacosane	%REC	95		99		84

Y: Sample exhibits fuel pattern which does not resemble standard
H: Heavier hydrocarbons than indicated standard

Chromatogram

Sample Name : 134291-002,41838
FileName : D:\GC13\CHB\188B030.RAW
Method : BTEH181.MTH
Start Time : 0.07 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 6 mV

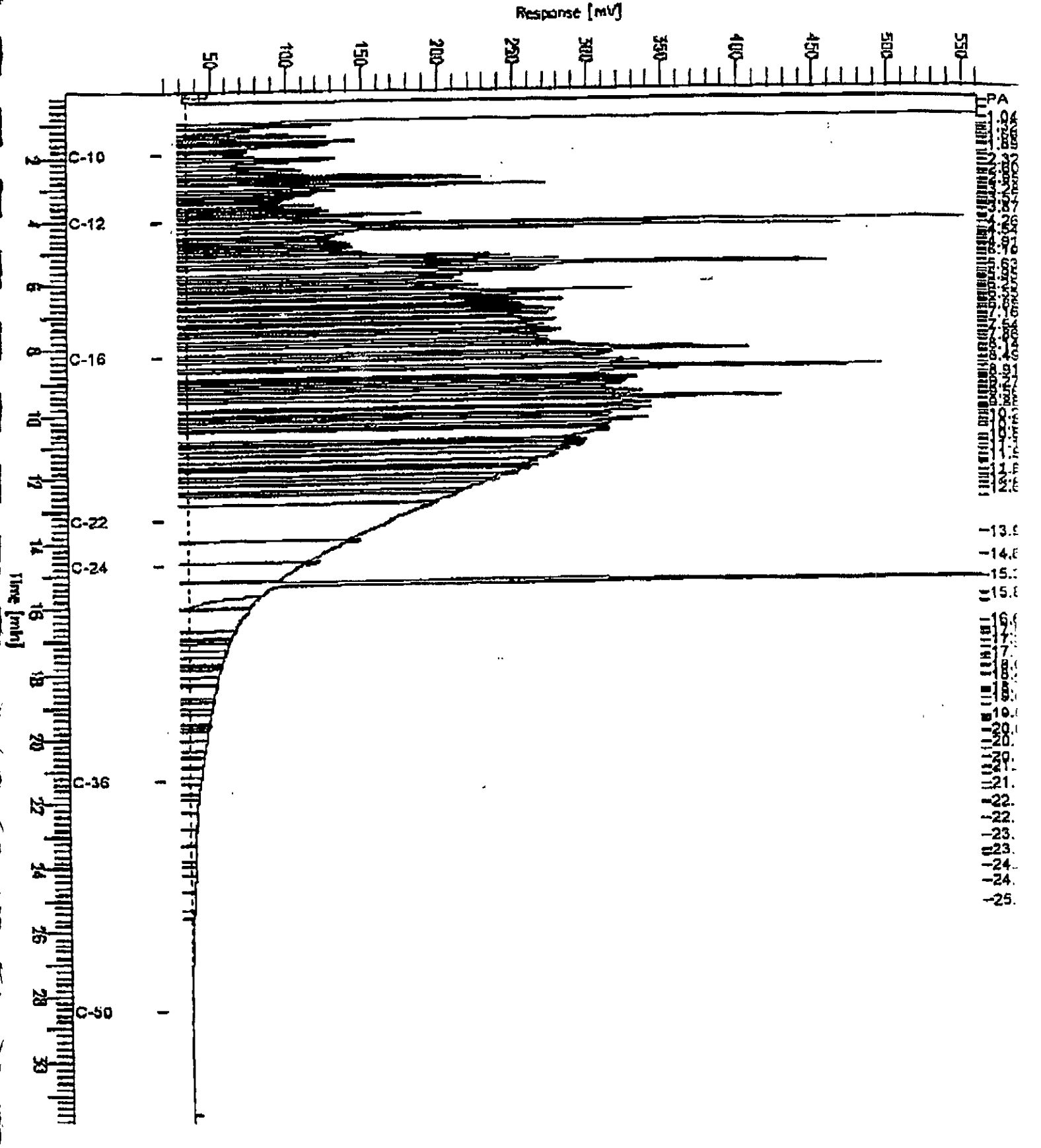
Sample #: 41838
Date : 7/9/96 12:06 PM
Time of Injection: 7/8/96 03:30 PM
Low Point : 7.63 mV High Point : 177.73 mV
Plot Scale: 170.1 mV



Chromatogram

Sample Name : 134291-001,41630
FileName : D:\dc13\CH8\1999029.RAW
Method : BT&H181.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 17 mV

Sample #: 41630
Date : 7/9/99 12:04 PM
Time of Injection: 7/8/99 02:48 PM
Low Point : 17.29 mV High Point : 560.81 mV
Plot Scale: 543.5 mV



LAIDLAW ENVIRONMENTAL SERVICES

PURCHASE ORDER NUMBER: 1523

Purchase Requisition

TO: SeQuoiA Analytical
680 Chesapeake Dr.
Redwood, City, CA 94063

SHIP TO:

BILL TO: LAIDLAW Environmental Services
5605 Flatiron Pkwy
Boulder, CO 80301

P.O. DATE	DELIVERY DATE	SHIP VIA	F.O.B.	TERMS	TAX INFORMATION
7-11-98			☐ Shipping Point ☐ Destination		☐ Taxable ☒ Tax Exemp

CHARGE CENTER	CHARGE ACCOUNT	AFE NUMBER	P O CAPITAL AMOUNT	CAPITAL	REQUISITIONER
46199	5043-500		-	☐ New ☐ Change	

ITEM	QUANTITY	UNIT	PART NO.	DESCRIPTION	UNIT PRICE	TOTAL AMOUNT
	5			BTEX Analysis (10 day turnaround)	70	350.00
	5			TPH Analysis (10day turnaround)	70	350.00

Requested By: Lisa Hennessy Date: 7-11-98

Approved By: Mark Date: 7/13/98

Approved By: Date:

TAX	—
SHIPPING	—
TOTAL	700.0

585-0705-585005 (8/93)

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

INVOICE FOR ANALYTICAL SERVICES

ACCOUNTS PAYABLE
LAIDLAW
5665 FLATIRON PKWY
BOULDER CO 80301

Invoice Number: 51867
Invoice Date: Jun 29, 1998
P.O. Number: 96120-844
Client Code: 1826
Report Number: 8051966
Project Manager: MB

Qty	Description of Service	Unit Price	Amount
	PROJECT: OAKLAND FREIGHT AREA		
	REPORTED TO: LISA HENNESEY		
	DATE SAMPLES RECEIVED 5/22		
5	TPPH w/ BTEX (Purgeable), 10 day	70.00	350.00
5	TEPH (Extractable), 10 day	70.00	350.00

It is hereby certified that as detailed on this invoice, services were rendered and/or [illegible] were received.

[illegible] PO # 1523
CC 792
[illegible] 5043-500
PROJECT # 96199
☐ SALES TAX ☐ USE TAX ☒ NON-TAXABLE
APPROVED Mark Delay DATE 7/13/98
BILL TO # 96199
COMMENTS:

Invoice Total: $ 700.00

Please remit to: Sequoia Analytical, 680 Chesapeake Drive, Redwood City CA 94063. Payment is due 30 days from invoice terms. Overdue balances are subject to 1.5% interest per month. Questions regarding this invoice should be directed to your Project Manager. Federal Tax ID #93-074-7241.

CHAIN OF CUSTODY

819 S[illegible] Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600 FAX (916) 921-0100
1404 N. Wiget Lane • Walnut Creek, CA 94598 • (510) 988-9600 FAX (510) 988-9673

Company Name: LAIDLAW ENVIRONMENTAL
Address: 5665 FLATIRON PKWY
City: BOULDER State: Co. Zip Code: 80301
Telephone: (303) 938-5500 FAX #: (303) 938-5520
Report To: LISA HENNESEY Sampler: JOE FRANZEN

Project Name: OAKLAND FREIGHT AREA
Billing Address (if different):
P.O. #: 96120-844
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 GW

Analyses Requested: 8015 TPH diesel; 8015 TPH-Gasoline; 8020 BTEX

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Sequoia's Sample #	8015 TPH diesel	8015 TPH-Gasoline	8020 BTEX	Comments
1. OKU3-W2	5/22/98 0958	H_2O	1	1L AMBER		X			
2. ↓	↓		2	VOA	8051966		X	X	AC
3. OKU3-W3	1100		1	1L AMBER		X			
4. ↓	↓		2	VOA	8051967		X	X	
5. APL/UP-W2	1150		1	1L AMBER		X			
6. ↓	↓		2	VOA	8051968		X	X	
7. APL/UP-W1	1240		1	1L AMBER		X			
8. ↓	↓		2	VOA	8051969		X	X	added per Lisa H 5/26/98
9. OKU3-100	0958		1	1L AMBER		X			
10. ↓	↓	✓	2	VOA	8051970		X	X	

Relinquished By: Joe Franzen	Date: 5/22/98	Time: 1655	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab: J Burns	Date: 5/22	Time: 16:55

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

White - Sequoia Yellow - [illegible]