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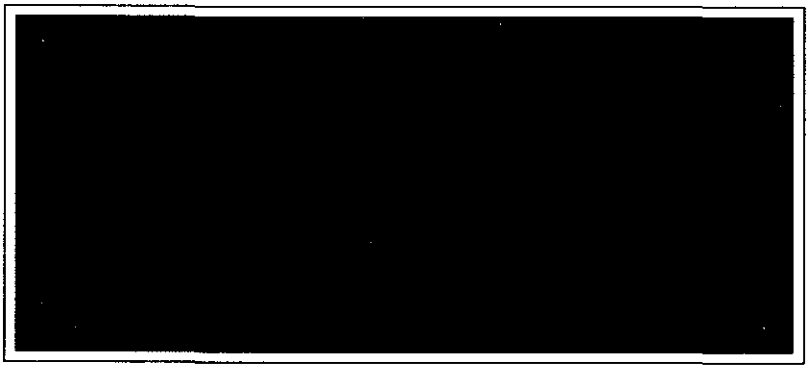

gw sampled 11-12-96

LAIDLAW ENVIRONMENTAL SERVICES

SEMI-ANNUAL MONITORING REPORT
HYDROCARBON RECOVERY SYSTEM
UNION PACIFIC RAILROAD YARD
OAKLAND, CALIFORNIA
JULY 1996 TO NOVEMBER 1996

12-20-96

Prepared for
Union Pacific Railroad
by

USPCI, a Laidlaw Company
Consulting Services
5665 Flatiron Parkway
Boulder, Colorado 80301
Project Number 96199
December 20, 1996

UNION PACIFIC RAILROAD COMPANY

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File: Oakland, Ca.
Environmental

December 23, 1996

96 DEC 31 PM 1:09
ENVIRONMENTAL PROTECTION

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 (July 1996 to November 1996) 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 Patterson

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

CC: Ms. Jennifer Eberle
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
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Ms. Jami Matanky
American President Line
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Jeff Asay - Law - Los Angeles
Lanny Schmid - Room 930
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SEMI-ANNUAL MONITORING REPORT
HYDROCARBON RECOVERY SYSTEM
UNION PACIFIC RAILROAD YARD
OAKLAND, CALIFORNIA
JULY 1996 TO NOVEMBER 1996

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

for submittal to:
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Alameda County
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Prepared by:
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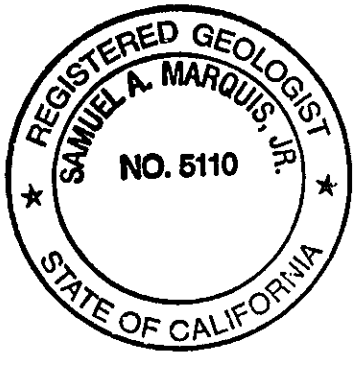
5665 Flatiron Parkway
Boulder, Colorado 80301

Teresa Van
Environmental Scientist



Sam Marquis, R.G. 5110
Project Hydrogeologist

December 20, 1996

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1. INTRODUCTION

This report was prepared by USPCI, a Laidlaw company (Laidlaw) for Union Pacific Railroad (UPRR) in accordance with the East Bay Municipal Utility District (EBMUD) permit number 502-51231 and covers the period of July 1, 1996 to November 30, 1996. 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 located at the fueling area of the UPRR Oakland trailer-on-flat-car (TOFC) railyard at 1717 Middle Harbor Road in Oakland, California. The objective of the monitoring program is to evaluate the distribution and movement of petroleum hydrocarbons in groundwater and the effectiveness of the hydrocarbon recovery system.

This report also contains quarterly groundwater monitoring information requested in a letter from 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 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. Background information about the site was presented in the report, *Hydrocarbon Investigation and Remediation Design*, dated June 10, 1991. The results of the hydrocarbon investigation and a conceptual design of the system were also presented in this report. 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 a letter from UPRR dated March 22, 1993 to the EBMUD, which represented the permit renewal application.

3. CURRENT ACTIVITIES

The current activities at the site consist of sampling and maintenance of the system and conducting a groundwater monitoring program. Descriptions of these activities follow.

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 stream 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 and midfluent of the water stream through the carbon vessels. The influent samples are analyzed for TPH-D and 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.

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

Fluid levels 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 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 was 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.

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 three 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 three recovery wells and the water treatment facility are indicated on Figure 2.

4.1 System Operation

During the operating period of July 1, 1996 to November 30, 1996, the groundwater recovery and treatment system treated approximately 520,000 gallons of groundwater. Since start-up on May 12, 1992, until November 25, 1996, the system has recovered approximately 9,400 gallons of diesel. Recovery well operation was normal throughout this operational period with only minor down time for required periodic maintenance. Combined pumping rates for the three well recovery system averaged approximately two gallons per minute for the semi-annual period. Copies of the field logs for the hydrocarbon recovery system have been included as Appendix A.

4.2 Analytical Results

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

Analytical results from the influent water stream to the carbon units indicate that all BTEX concentrations were below the method detection limits (MDLs) of 0.0005 milligrams per liter (mg/l) for benzene, toluene, and ethylbenzene and 0.001 or 0.002 mg/l for xylenes during the July 17 and October 17 sampling events. Influent TPH-D concentrations ranged from 9.7 mg/l to 14 mg/l during the months of July through October 1996.

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 0.001 or 0.002 mg/l for xylenes during

the July 17 and October 17, 1996 sampling events. The effluent TPH-D concentrations were 0.12 mg/l for the July 1996 sampling event and below the MDL of 0.05 mg/l for the October 1996 sampling event. The detection of TPH-D in the discharge is most likely due to the routine backwashing procedures that were performed on the carbon canisters during the week that sampling was performed.

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 or 0.002 mg/l for xylenes during the months of July through October 1996. From the samples collected on November 25, 1996, benzene, toluene, and xylenes were detected at concentrations of 0.023, 0.0037, and 0.031 mg/l, respectively.

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 replaced with fresh activated carbon on May 6, 1996, as noted in the table. Estimates and analytical results (Table 3) indicate that breakthrough occurred in the lead vessel in November 1996. The lead vessel is scheduled for regeneration during December 1996. The sample calculations presented 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 about the fluid levels and sampling results for the November 1996 sampling event. Fluid-level information and an evaluation of changes in the potentiometric surfaces for the July and September 1996 monitoring events were included in the *Third Quarter 1996 Monitoring Report*, and submitted to ACDEH on October 30, 1996. Historical fluid levels and groundwater sampling results are presented in Tables 5 and 6, respectively.

5.1 Fluid Level Measurements

Corrected groundwater elevations decreased in twelve of the fourteen monitoring wells and piezometers between September and November, 1996. The average change in corrected groundwater elevations was a decrease of approximately 0.24 feet. The largest decrease was 0.49 feet in monitoring well OMW-4. Monitoring well OMW-6 and piezometer OP-1 exhibited groundwater elevation increases of 0.79 and 0.25 feet, respectively.

Fluid levels measured during the November 1996 sampling event were used to generate the potentiometric surface map presented in Figure 2. Groundwater depressions created by the recovery wells (ORW-1, ORW-2, and ORW-3) are evident on the potentiometric surface map. The contours lines show an increased hydraulic gradient or convergent flow towards each individual recovery well. The increased flow towards the recovery well network indicates that groundwater and diesel within the area of influence of the wells tend to be recovered from the portion of the site where diesel is present. Groundwater flow outside the influence of the recovery wells has historically been to the south towards the Oakland Estuary.

The presence of diesel was observed in monitoring wells OMW-4, OMW-5, OMW-7, OMW-9, and OMW-10 and piezometers OP-2, OP-3, and OP-4 during the November 1996 sampling event. With the exception of OMW-5, this is consistent with previous fluid level measurements. A trace amount of diesel was detected in monitoring well OMW-5 for the first time since gauging began in 1992. The largest change in measurable diesel thickness was an increase of 2.09 feet in monitoring well OMW-9. Piezometer OP-1 has not contained measurable amounts of diesel since the November 1995 sampling event. Figure 3 illustrates the diesel thickness across the site as measured in monitoring wells and piezometers during the November 1996 sampling event.

Monthly fluid-level measurement results from the diesel spill wells (DS-1, DS-2, and DS-3) indicate that diesel has not been observed since installation in November of 1995.

5.2 Groundwater Sampling

Groundwater samples were collected on November 12, 1996, from monitoring wells OMW-1, OMW-2, OMW-3, OMW-6, and OMW-8. Monitoring wells OMW-4, OMW-5, OMW-7, OMW-9, and OMW-10 were not sampled due to the presence of diesel in the wells.

The sampling results indicated that BTEX concentrations in all monitoring wells were below the MDL of 0.0005 mg/l for this semi-annual sampling event. These results were consistent with previous sampling data. TPH-D concentrations ranged from 0.050 mg/l in monitoring well OMW-1 to 3.4 mg/l in monitoring well OMW-2. TPH-D concentrations were consistent with the May 1996 sampling event with one exception. OMW-5 was not sampled during this event because of the

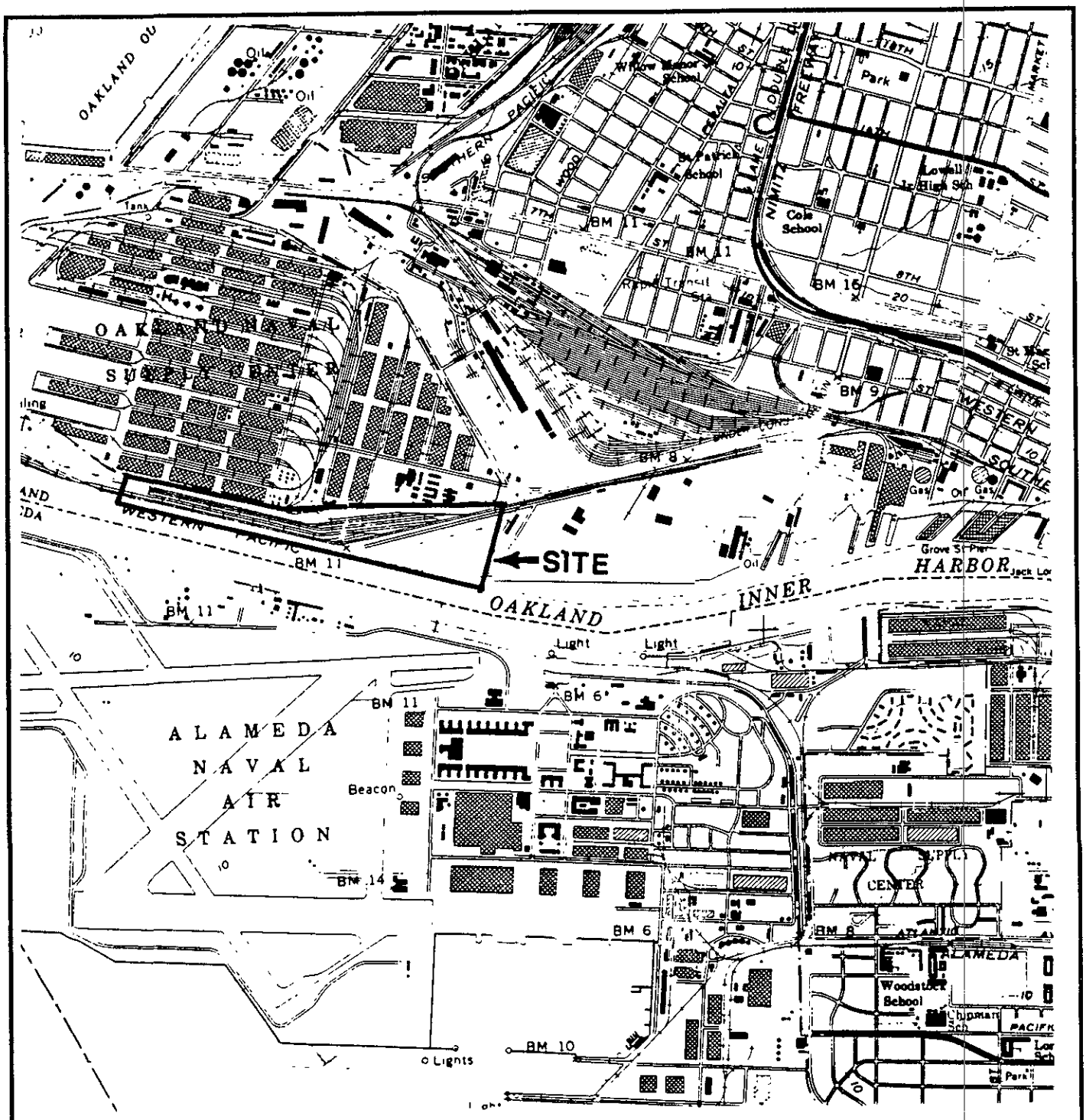
presence of diesel in the purge water. Laboratory analytical reports from the November 1996 sampling events are included in Appendix B. Sampling and well stabilization forms are included as Appendix C.

6. CONCLUSIONS

The following conclusions are drawn from the system and groundwater monitoring data collected from June 28, 1996 to November 25, 1996.

- Water discharge from the system did not exceed the EBMUD discharge limits during the monitoring period.
- The potentiometric surface indicates groundwater depression in the locations of the recovery wells.
- The potentiometric surface in the area of the recovery wells is consistent with previous monitoring events.
- Fluid level measurements in the area of the recovery system indicate that drawdown is occurring in the vicinity of each recovery well and that the diesel plume is being controlled.
- The system has removed 9,400 gallons of diesel since start-up in May 1992.
- The system has removed diesel consistently and effectively over its operational life.

FIGURES



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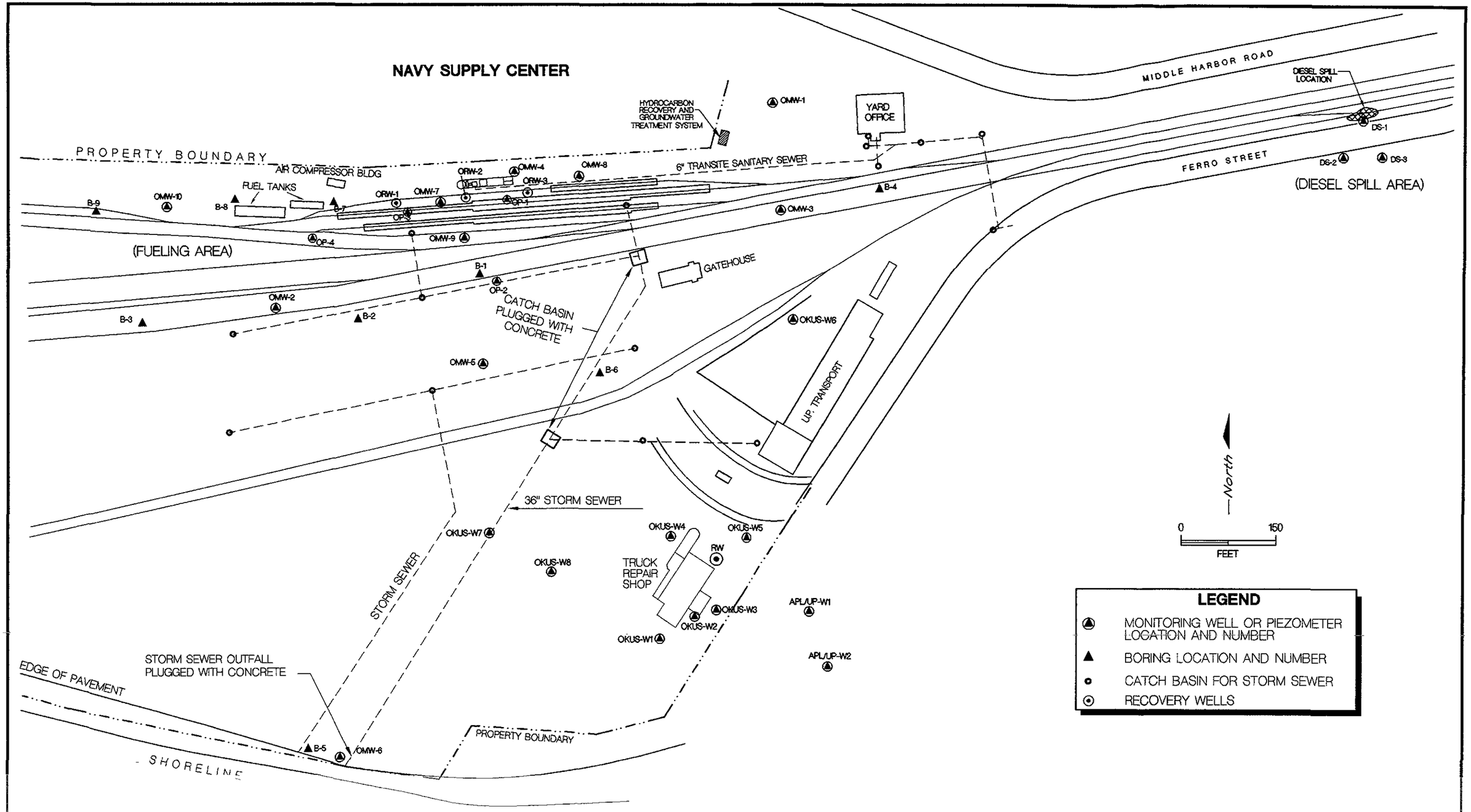
UPRR TOFC RAILYARD - OAKLAND, CALIFORNIA

FIGURE 1
SITE LOCATION MAP

SCALE	DATE
1" = 2000'	10/29/96



LEGEND

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

	BY	DATE
DRAWN	CJW	12/11/96
CHECKED		
APPROVED		
APPROVED		
APPROVED		

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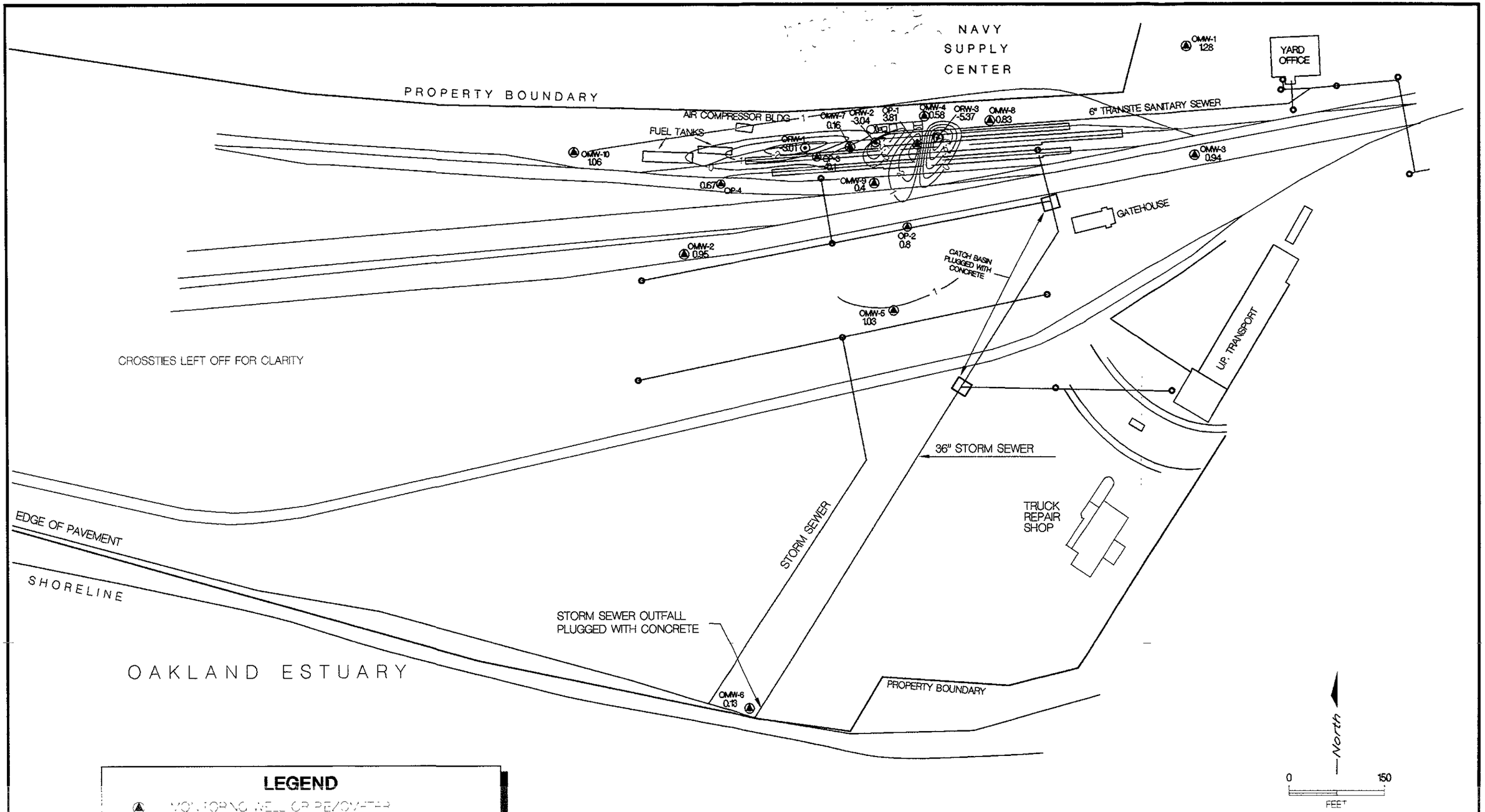
A BAKER COMPANY

UPRR TOFC RAILYARD - OAKLAND CALIFORNIA

FIGURE 2
SITE VICINITY MAP

SCALE 1" = 150'

DWG NO 96199-75



BY	DATE
DRAWN CJJ	12/17/96
CHECKED	
APPROVED	
APPROVED	
APPROVED	

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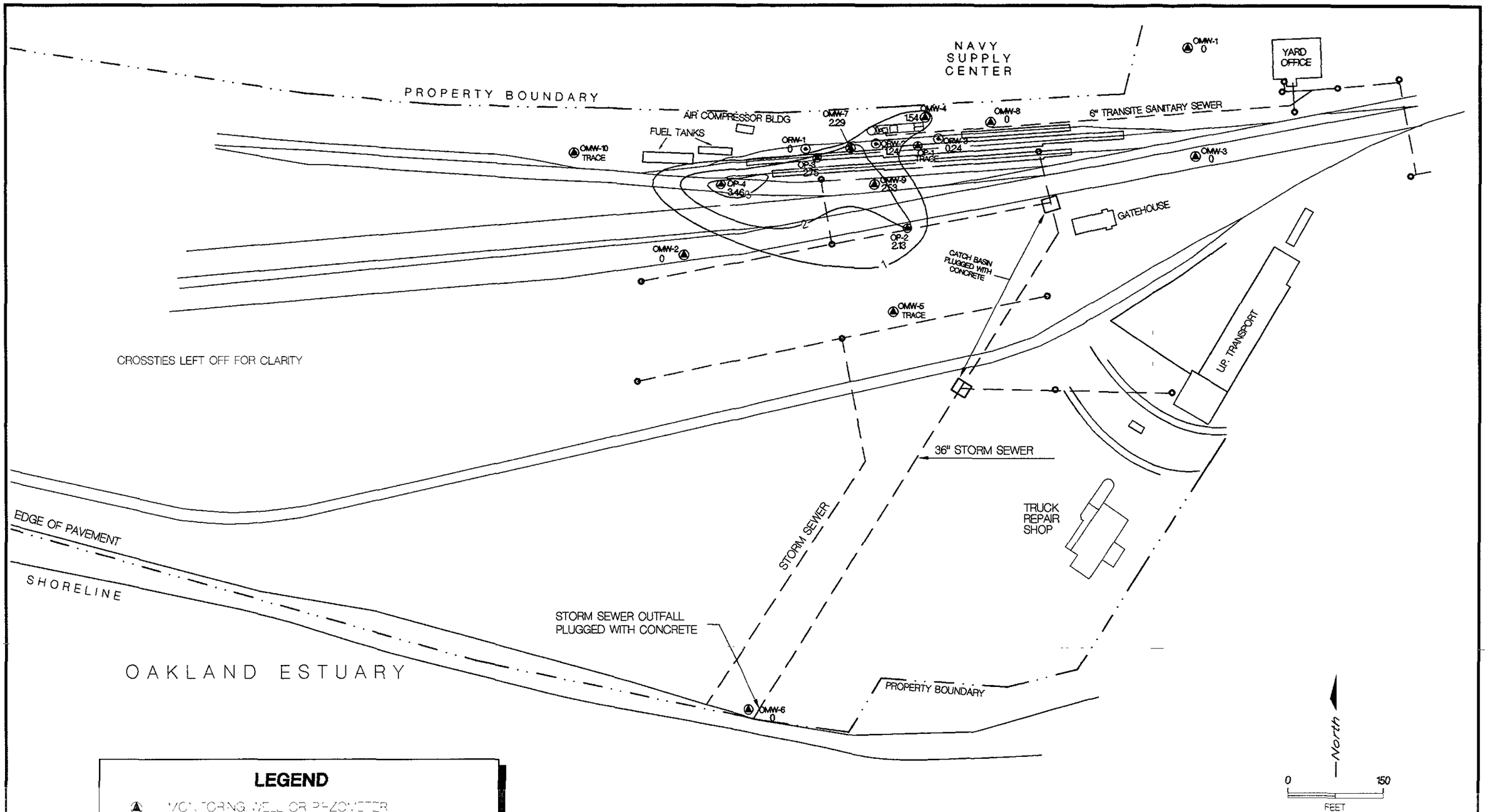
UPRR TOFC RAILYARD - OAKLAND CALIFORNIA

FIGURE 3
WATER LEVEL MEASURED IN MONITORING WELLS
NOVEMBER 1996

SCALE 1" = 150'

DWG NO 96199-76



LEGEND

- ▲ MONITORING WELL OR PIEZOMETER LOCATION AND NUMBER
- ○ CATCH BASIN FOR STORM SEWER
- ⊙ RECOVERY WELLS
- PRODUCT THICKNESS IN FT (EXCLUDING ORW's)

BY	DATE
DRAWN CJJ	12/11/96
CHECKED	
APPROVED	
APPROVED	
APPROVED	

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UPRR TOFC RAILYARD - OAKLAND CALIFORNIA

FIGURE 4
DIESEL THICKNESS MEASURED IN MONITORING WELLS
NOVEMBER 1996

SCALE 1" = 150'

DWG NO 96199-77

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)
05/12/92	0.023	0.022	0.029	0.200	7
05/19/92	<0.002	0.007	0.003	0.064	59
05/27/92	<0.005	<0.005	0.006	0.059	61
06/02/92	<0.005	<0.005	<0.005	0.025	100
07/07/92	<0.005	<0.005	0.005	0.026	200
08/11/92	0.0091	<0.003	0.013	0.051	6.1
09/25/92	0.0085	<0.003	0.0055	0.024	17
11/16/92	<0.050	<0.050	<0.050	<0.050	100
12/04/92	0.0042	<0.001	<0.001	0.009	8.7
02/02/93	0.0083	<0.001	<0.001	0.0012	6.9
03/30/93	0.0095	0.0015	0.0087	0.030	44
04/30/93	0.0007	0.0012	0.001	0.0069	14
05/27/93	0.0054	0.019	0.0092	0.040	120
06/30/93	<0.0003	<0.0003	<0.0003	<0.0009	1.2
07/28/93	0.014	0.0006	0.0054	0.025	2.2
08/31/93	0.012	0.0007	0.0041	0.023	3.2
09/30/93	0.011	0.0007	0.013	0.035	20
10/28/93	0.010	0.0006	0.0098	0.026	6.1
11/30/93	0.0092	<0.0005	0.0012	0.013	31
12/28/93	0.011	<0.0005	0.0041	0.016	10
01/31/94	<0.0005	<0.0005	<0.0005	<0.0005	3.3
02/25/94	0.013	0.0013	0.0077	0.021	9.3
03/30/94	0.012	<0.0005	0.0027	0.018	2.7
05/03/94	0.0044	0.0018	0.0097	0.028	67
06/01/94	0.0065	<0.0005	<0.0005	0.0094	3.5
07/29/94	0.0091	<0.0005	0.0043	0.017	1.4
08/31/94	NA	NA	NA	NA	2.1
09/27/94	NA	NA	NA	NA	5.9
10/27/94	0.011	0.0031	0.0095	0.018	5.5
11/16/94	NA	NA	NA	NA	39
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

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

F:\SHARE\CONSULT\OAKFA\TAB1.WK1

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)*
EDMUD 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

* – Discharge limits updated on July 1, 1996.
N/A – Not Applicable

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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)
08/11/92	<0.0005	<0.0005	<0.0005	<0.0005
09/14/92	<0.003	<0.003	<0.003	<0.003
11/06/92	<0.0005	<0.001	<0.0005	<0.0005
12/04/92	<0.003	<0.003	<0.003	<0.003
12/18/92	<0.005	<0.005	<0.005	<0.005
01/20/93	0.0012	0.0005	<0.0005	0.0015
02/02/93	0.00077	<0.0005	<0.0005	<0.0005
02/16/93	0.0043	<0.0005	0.0012	0.0038
03/30/93	<0.0005	<0.0005	<0.0005	<0.0005
04/22/93	<0.0005	<0.0005	<0.0005	<0.0005
04/30/93	<0.0003	<0.0003	<0.0003	<0.0009
05/27/93	<0.003	<0.003	<0.003	<0.009
06/14/93	0.0004	0.0004	0.0004	0.0023
06/30/93	<0.0003	<0.0003	<0.0003	<0.0009
07/13/93	0.0007	0.0004	<0.0003	<0.0009
07/28/93	<0.0003	<0.0003	<0.0003	<0.0009
08/31/93	<0.0003	<0.0003	<0.0003	<0.0009
09/30/93	<0.0003	<0.0003	<0.0003	<0.0009
10/28/93	<0.0003	<0.0003	<0.0003	<0.0009
11/30/93	0.0006	<0.0005	<0.0005	<0.0005
12/28/93	0.0017	<0.0005	<0.0005	0.0007
01/31/94	0.0001	<0.0005	<0.0005	0.0005
02/25/94	<0.0005	<0.0005	<0.0005	<0.0005
03/30/94	<0.0005	<0.0005	<0.0005	<0.0005
05/03/94	<0.0005	<0.0005	0.0013	0.0033
06/01/94	<0.0005	<0.0005	<0.0005	<0.0005
07/29/94	0.0008	<0.0005	<0.0005	0.0006
08/31/94	0.0017	<0.0005	<0.0005	<0.0005
09/27/94	0.0010	<0.0005	<0.0005	<0.0005
10/27/94	0.0012	0.00050	<0.0005	0.00090
11/16/94	<0.0005	<0.0005	<0.0005	<0.0005
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

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
05/07/92	11:35 PM	2020	1.74	1.74	45 *	8	8	531663	213	Dec-92
05/12/92	08:30 AM	12980	1.74	1.74	45	41	49	520703	208	Dec-92
05/19/92	01:30 PM	24990	1.16	1.55	59	50	98	387036	174	Nov-92
05/27/92	10:50 AM	45350	1.79	1.61	61	89	187	356823	154	Oct-92
06/02/92	03:00 PM	73150	3.13	1.91	100	144	331	200426	73	Aug-92
07/07/92	05:35 PM	166500	1.85	1.90	200	661	992	60539	22	Jul-92
08/11/92	11:56 AM	232370	1.32	1.32	6.1	0 +	0	1771651	935	Mar-95
09/25/92	09:55 AM	388390	2.41	1.86	17	333	333	529708	197	Apr-93
11/16/92	09:55 AM	484380	1.28	1.67	100	729	1062	50663	21	Dec-92
12/04/92	09:55 AM	518160	1.30	1.58	8.7	206	1268	454391	200	Jun-93
02/02/93	02:30 PM	673180	1.79	1.62	6.9	796	2064	-50298	-22	Jan-93
03/10/93	03:00 PM	741070	1.31	1.31	30 *	0 +	0	400262	212	Oct-93
03/30/93	09:00 AM	743950	0.10	1.61	44	18	18	270484	117	Jul-93
04/30/93	04:00 PM	755900	0.27	1.51	14	58	76	825055	379	May-94
05/27/93	01:40 PM	854610	2.55	1.58	120	855	931	53482	23	Jun-93
06/30/93	07:30 AM	1007200	3.14	1.68	1.2	1063	1994	27899	12	Jul-93
07/21/93	07:30 AM	1094630	2.89	2.89	2.2 *	0 +	0	2183247	524	Dec-94
07/28/93	08:30 AM	1125630	3.06	2.97	2.2	28	28	2152247	503	Dec-94
08/31/93	01:55 PM	1256910	2.66	2.87	3.2	138	167	1375740	333	Jul-94
09/30/93	04:00 PM	1333050	1.76	2.59	20	219	386	193850	52	Nov-93
10/28/93	05:50 PM	1411050	1.93	2.46	6.1	219	605	549390	155	Apr-94
11/30/93	08:00 PM	1475300	1.35	2.27	31	288	893	85757	26	Dec-93
12/28/93	12:00 PM	1526880	1.29	2.13	10	229	1122	210802	69	Mar-94
01/31/94	03:00 PM	1584340	1.17	2.01	3.3	233	1356	469026	162	Jul-94
02/07/94	12:00 PM	1595300	1.11	1.11	8.0 *	0 +	0	1500982	942	Sep-96
02/25/94	04:00 PM	1658010	2.40	1.75	9.3	90	90	1232840	489	Jun-95
03/30/94	11:00 AM	1785000	2.69	2.06	2.7	141	231	3932895	1323	Nov-97
05/03/94	05:00 PM	1841190	1.14	1.83	67	204	435	140249	53	Jun-94
06/01/94	04:00 PM	1909040	1.63	1.79	3.5	205	639	2333885	904	Nov-96
07/29/94	07:30 PM	2029010	1.43	1.73	1.4	306	946	4522185	1813	Jul-99
08/31/94	07:00 PM	2113920	1.79	1.74	2.1	190	1135	2471828	986	May-97
09/27/94	11:00 AM	2175320	1.60	1.72	5.9	128	1263	749848	302	Jul-95
10/28/94	12:00 PM	2254600	1.77	1.73	5.5	155	1418	635573	255	Jul-95
11/16/94	03:30 PM	2269370	0.54	1.61	39	36	1453	84163	36	Dec-94
11/23/94	11:00 AM	2276880	0.77	0.77	16 *	0 +	0	750491	681	Oct-96
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

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

+ – 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	04/09/91	8.79		5.54	3.25		3.25
	06/19/91			6.89	1.90		1.90
	05/11/92			6.34	2.45		2.45
	06/09/92			6.91	1.88		1.88
	07/07/92			7.21	1.58		1.58
	08/11/92			7.55	1.24		1.24
	09/04/92			7.82	0.97		0.97
	10/13/92			7.96	0.83		0.83
	11/12/92			7.64	1.15		1.15
	12/17/92			6.64	2.15		2.15
	03/18/93			5.98	2.81		2.81
	05/14/93			6.39	2.40		2.40
	07/13/93			7.12	1.67		1.67
	09/30/93			7.84	0.95		0.95
	11/10/93			8.08	0.71		0.71
	01/24/94			7.54	1.25		1.25
	03/23/94			6.69	2.10		2.10
	05/02/94			6.61	2.18		2.18
	07/29/94			7.32	1.47		1.47
	09/26/94			7.67	1.12		1.12
	11/15/94			3.67	5.12		5.12
	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
OMW-2	04/09/91	5.88		2.10	3.78		3.78
	06/19/91			3.59	2.29		2.29
	05/11/92			3.22	2.66		2.66
	06/09/92			3.97	1.91		1.91
	07/07/92			4.21	1.67		1.67
	08/11/92			4.46	1.42		1.42
	09/04/92			4.77	1.11		1.11
	10/13/92			4.96	0.92		0.92
	11/12/92			4.08	1.80		1.80
	12/17/92			1.70	4.18		4.18
	03/18/93			1.94	3.94		3.94
	05/14/93			3.29	2.59		2.59
	07/13/93			4.28	1.60		1.60
	09/30/93			4.99	0.89		0.89
	11/10/93			5.23	0.65		0.65
	01/24/94			3.30	2.58		2.58
	03/23/94			3.55	2.33		2.33
	05/02/94			4.95	0.93		0.93
	07/29/94			4.49	1.39		1.39
	09/26/94			4.92	0.96		0.96
	11/16/94			1.03	4.85		4.85
	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

HC recovery system startup →

TABLE 5 (cont.)
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	04/09/91	7.16		3.93	3.23		3.23
	06/19/91			5.33	1.83		1.83
	05/11/92			5.92	1.24		1.24
	06/09/92			5.48	1.68		1.68
	07/07/92			5.78	1.38		1.38
	08/11/92			6.09	1.07		1.07
	09/04/92			6.33	0.83		0.83
	10/13/92			6.55	0.61		0.61
	11/12/92			6.16	1.00		1.00
	12/17/92			5.15	2.01		2.01
	03/18/93			2.58	4.58		4.58
	05/14/93			4.91	2.25		2.25
	07/13/93			5.70	1.46		1.46
	09/30/93			6.43	0.73		0.73
	11/10/93			6.92	0.24		0.24
	01/24/94			3.50	3.66		3.66
	03/23/94			5.90	1.26		1.26
	05/02/94			5.84	1.32		1.32
	07/29/94			5.98	1.18		1.18
	09/26/94			6.32	0.84		0.84
	11/15/94			2.36	4.80		4.80
	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
OMW-4	04/09/91	7.41	3.79	6.23	1.18	2.44	3.23
	06/19/91		4.44	8.68	−1.27	4.24	2.29
	05/11/92		NOT GAUGED				
	06/09/92		5.88	9.81	−2.40	3.93	0.90
	07/07/92		6.00	9.88	−2.47	3.88	0.79
	08/11/92		6.13	8.23	−0.82	2.10	0.94
	09/04/92		6.78	8.37	−0.96	1.59	0.38
	10/13/92**			6.58	0.83		0.83
	11/12/92		5.74	7.33	0.08	1.59	1.42
	12/17/92		5.77	7.28	0.13	1.51	1.40
	03/18/93		3.82	5.73	1.68	1.91	3.28
	05/14/93		5.76	8.45	−1.04	2.69	1.22
	07/13/93		5.94	7.78	−0.37	1.84	1.18
	09/30/93		6.85	8.17	−0.76	1.32	0.35
	11/10/93		7.03	7.59	−0.18	0.56	0.29
	01/24/94		6.15	6.76	0.65	0.61	1.16
	03/23/94		6.09	6.80	0.61	0.71	1.21
	05/02/94		5.25	5.54	1.87	0.29	2.11
	07/29/94		6.40	7.15	0.26	0.75	0.89
	09/26/94		6.31	6.93	0.48	0.62	1.00
	11/16/94		4.30	5.05	2.36	0.75	2.99
	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

TABLE 5 (cont.)
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-5	04/09/91	7.62		4.64	2.98		2.98
	06/19/91			5.35	2.27		2.27
	05/11/92			5.18	2.44		2.44
	06/09/92			5.85	1.77		1.77
	07/07/92			6.02	1.60		1.60
	08/11/92			6.18	1.44		1.44
	09/04/92			6.59	1.03		1.03
	10/13/92			6.54	1.08		1.08
	11/12/92			6.23	1.39		1.39
	12/17/92			5.23	2.39		2.39
	03/18/93			3.33	4.29		4.29
	05/14/93			5.06	2.56		2.56
	07/13/93			5.96	1.66		1.66
	09/30/93			6.70	0.92		0.92
	11/10/93			5.92	1.70		1.70
	01/24/94		NOT GAUGED				
	03/23/94			5.74	1.88		1.88
	05/02/94			5.71	1.91		1.91
	07/29/94			6.27	1.35		1.35
	09/26/94			6.56	1.06		1.06
	11/16/94			5.31	2.31		2.31
	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
OMW-6	04/09/91	5.78		7.60	-1.82		-1.82
	06/19/91			6.98	-1.20		-1.20
	05/11/92			7.41	-1.63		-1.63
	06/09/92			7.18	-1.40		-1.40
	07/07/92			6.61	-0.83		-0.83
	08/11/92			7.14	-1.36		-1.36
	09/04/92			6.58	-0.80		-0.80
	10/13/92**			6.16	-0.38		-0.38
	11/12/92			6.91	-1.13		-1.13
	12/17/92			6.16	-0.38		-0.38
	03/18/93			7.31	-1.53		-1.53
	05/14/93			6.59	-0.81		-0.81
	07/13/93			6.58	-0.80		-0.80
	09/30/93			5.49	0.29		0.29
	11/10/93			5.08	0.70		0.70
	01/24/94			5.40	0.38		0.38
	03/23/94			6.90	-1.12		-1.12
	05/02/94			7.44	-1.66		-1.66
	07/29/94			5.65	0.13		0.13
	09/26/94			6.88	-1.10		-1.10
	11/16/94			5.35	0.43		0.43
	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
	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

TABLE 5 (cont.)
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-7	04/09/91	7.03	3.26	7.48	-0.45	4.22	3.09
	06/19/91		4.13	7.66	-0.63	3.53	2.34
	05/11/92		3.70	7.32	-0.29	3.62	2.75
	06/09/92		5.79	7.78	-0.75	1.99	0.92
	07/07/92		5.98	7.88	-0.85	1.90	0.75
	08/11/92		6.01	9.22	-2.19	3.21	0.51
	09/04/92		6.53	8.92	-1.89	2.39	0.12
	10/13/92		5.97	8.00	-0.97	2.03	0.74
	11/12/92		5.29	8.69	-1.66	3.40	1.20
	12/17/92		5.60	8.66	-1.63	3.06	0.94
	03/18/93		3.93	7.97	-0.94	4.04	2.45
	05/14/93		5.34	8.21	-1.18	2.87	1.23
	07/13/93		5.95	7.49	-0.46	1.54	0.83
	09/30/93		6.65	9.75	-2.72	3.10	-0.12
	11/10/93		6.75	9.12	-2.09	2.37	-0.10
	01/24/94		6.00	7.87	-0.84	1.87	0.73
	03/23/94		5.79	8.56	-1.53	2.77	0.80
	05/02/94		4.79	6.64	0.39	1.85	1.94
	07/29/94		6.15	8.46	-1.43	2.31	0.51
	09/26/94		6.14	7.11	-0.08	0.97	0.73
	11/16/94		4.23	4.63	2.40	0.40	2.74
	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
OMW-8	04/09/91	7.52		4.25	3.27		3.27
	06/19/91			5.27	2.25		2.25
	05/11/92			5.05	2.47		2.47
	06/09/92			6.25	1.27		1.27
	07/07/92			6.33	1.19		1.19
	08/11/92			6.48	1.04		1.04
	09/04/92			7.00	0.52		0.52
	10/13/92			6.23	1.29		1.29
	11/12/92			6.34	1.18		1.18
	12/17/92			6.10	1.42		1.42
	03/18/93			4.51	3.01		3.01
	05/14/93			5.78	1.74		1.74
	07/13/93			6.26	1.26		1.26
	09/30/93			7.06	0.46		0.46
	11/10/93			7.12	0.40		0.40
	01/24/94			6.58	0.94		0.94
	03/23/94			6.15	1.37		1.37
	05/02/94			6.06	1.46		1.46
	07/29/94			6.47	1.05		1.05
	09/26/94			6.50	1.02		1.02
	11/15/94			4.74	2.78		2.78
	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

Startup

TABLE 5 (cont.)
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	05/11/92	6.64	3.41	7.65	-1.01	4.24	2.55
	06/09/92		5.09	8.17	-1.53	3.08	1.06
	07/07/92		5.28	8.42	-1.78	3.14	0.86
	08/11/92		5.29	9.45	-2.81	4.16	0.68
	09/04/92		5.70	9.56	-2.92	3.86	0.32
	10/13/92		5.70	6.88	-0.24	1.18	0.75
	11/12/92		5.23	6.44	0.20	1.21	1.22
	12/17/92		5.08	6.40	0.24	1.32	1.35
	03/18/93		3.01	6.69	-0.05	3.68	3.04
	05/14/93		4.38	10.37	-3.73	5.99	1.30
	07/13/93		5.57	6.79	-0.15	1.22	0.87
	09/30/93		5.86	9.81	-3.17	3.95	0.15
	11/10/93		6.06	9.61	-2.97	3.55	0.01
	01/24/94		5.41	7.71	-1.07	2.30	0.86
	03/23/94		4.91	9.10	-2.46	4.19	1.06
	05/02/94		4.52	4.54	2.10	0.02	2.12
	07/29/94		5.46	8.40	-1.76	2.94	0.71
	09/26/94		5.74	6.39	0.25	0.65	0.80
	11/16/94		4.91	4.95	1.69	0.04	1.72
	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
OMW-10	05/11/92	7.56		4.76	2.80		2.80
	06/09/92			5.42	2.14		2.14
	07/07/92			5.58	1.98		1.98
	08/11/92			5.83	1.73		1.73
	09/04/92			6.18	1.38		1.38
	10/13/92**			5.30	2.26		2.26
	11/12/92			5.41	2.15		2.15
	12/17/92			4.20	3.36		3.36
	03/18/93		3.93	4.00	3.56	0.07	3.62
	05/14/93		4.83	4.92	2.64	0.09	2.72
	07/13/93		5.64	5.67	1.89	0.03	1.92
	09/30/93		6.36	6.38	1.18	0.02	1.20
	11/10/93			6.55	1.01		1.01
	01/24/94			5.55	2.01		2.01
	03/23/94			4.81	2.75		2.75
	05/02/94			5.06	2.50		2.50
	07/29/94			6.94	0.62		0.62
	09/26/94			6.36	1.20		1.20
	11/15/94			4.01	3.55		3.55
	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

TABLE 5 (cont.)
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	06/19/91	6.59	3.91	9.36	-2.77	5.45	1.81
	05/11/92		NOT GAUGED				
	06/09/92		NOT GAUGED				
	07/07/92		NOT GAUGED				
	08/11/92			8.39	-1.80		-1.80
	09/04/92			8.35	-1.76		-1.76
	10/13/92		6.95	8.15	-1.56	1.20	-0.55
	11/12/92		NOT GAUGED				
	12/17/92		8.30	8.35	-1.76	0.05	-1.72
	03/18/93		3.60	7.39	-0.80	3.79	2.38
	05/14/93			8.63	-2.04		-2.04
	07/13/93			8.60	-2.01		-2.01
	09/30/93		NOT GAUGED				
	11/10/93		NOT GAUGED				
	01/24/94		NOT GAUGED				
	03/23/94		NOT GAUGED				
	05/02/94		NOT GAUGED				
	07/29/94		NOT GAUGED				
	09/26/94		NOT GAUGED				
	11/15/94		NOT GAUGED				
	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
ORW-2	06/19/91	6.79	4.36	4.38	2.41	0.02	2.43
	05/11/92		3.55	6.34	0.45	2.79	2.79
	06/09/92		NOT GAUGED				
	07/07/92		NOT GAUGED				
	08/11/92			9.30	-2.51		-2.51
	09/04/92			9.31	-2.52		-2.52
	10/13/92		8.20	9.20	-2.41	1.00	-1.57
	11/12/92		NOT GAUGED				
	12/17/92			9.45	-2.66		-2.66
	03/18/93		2.94	7.48	-0.69	4.54	3.12
	05/14/93			8.21	-1.42		-1.42
	07/13/93		9.30	9.41	-2.62	0.11	-2.53
	09/30/93		NOT GAUGED				
	11/10/93		NOT GAUGED				
	01/24/94		NOT GAUGED				
	03/23/94		NOT GAUGED				
	05/02/94		NOT GAUGED				
	07/29/94		NOT GAUGED				
	09/26/94		NOT GAUGED				
	11/15/94		NOT GAUGED				
	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

TABLE 5 (cont.)
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	06/19/91	6.30	4.07	4.10	2.20	0.03	2.23
	05/11/92		3.24	5.31	0.99	2.07	2.73
	06/09/92		NOT GAUGED				
	07/07/92		NOT GAUGED				
	08/11/92			8.90	-2.60		-2.60
	09/04/92			8.75	-2.45		-2.45
	10/13/92			8.59	-2.29		-2.29
	11/12/92		NOT GAUGED				
	12/17/92			8.35	-2.05		-2.05
	03/18/93		2.90	5.71	0.59	2.81	2.95
	05/14/93			8.16	-1.86		-1.86
	07/13/93		9.08	9.46	-3.16	0.38	-2.84
	09/30/93		NOT GAUGED				
	11/10/93		NOT GAUGED				
	01/24/94		NOT GAUGED				
	03/23/94		NOT GAUGED				
	05/02/94		NOT GAUGED				
	07/29/94		NOT GAUGED				
	09/26/94		NOT GAUGED				
	11/15/94		NOT GAUGED				
	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
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
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
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

TABLE 5 (cont.)
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	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

* Corrected water level elevation assumes product density of 0.84 g/cm3
** Gauging data for these may have been switched.
M.S.L. = Mean Sea Level

TABLE 6
Analytical Results
Groundwater Monitoring Wells
Union Pacific Railroad
Oakland Fueling Area

Well Number	Date Sampled	Total Petroleum Hydrocarbons (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
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
OMW-3	05/11/92	2.3	.0003J	0.0013	.0003J	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
OMW-5	05/11/92	2.1	<0.0005	.0004J	<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 **********				

TABLE 6
Analytical Results
Groundwater Monitoring Wells
Union Pacific Railroad
Oakland Fueling Area

Well Number	Date Sampled	Total Petroleum Hydrocarbons (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
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
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 **********				
	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 **********				
	05/17/95	****** NOT SAMPLED – Well Contained Product **********				
	11/30/95	****** NOT SAMPLED – Well Contained Product **********				
	05/29/96	****** NOT SAMPLED – Well Contained Product **********				
	11/12/96	****** NOT SAMPLED – Well Contained Product **********				

NOTES J = Estimated value below reporting limit.
Due to the presence of product, recovery wells ORW-1, ORW-2, ORW-3, and monitoring wells OMW-4, OMW-7, and OMW-9, are not sampled.
* 0.00062 mg/L was detected in the Trip Blank.

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
11/25/96	9400	4.0	VOLUME ESTIMATED FROM GAUGE

APPENDIX A

FIELD LOGS
GROUNDWATER RECOVERY
AND TREATMENT SYSTEM

GROUNDWATER TREATMENT SYSTEM FIELD LOG
OAKLAND FUELING AREA
UNION PACIFIC RAILROAD

Date	Time	Volume		Flow Rate	Filter Pressure		Oil Level	Comments
		Signet (gallons)	Neptune (gallons)	Thru Carbon (gal/min)	Inlet (psig)	Outlet (psig)	In Tank (inches)	(Maintenance, Adjustments, and Observations)
11/1/96	1415	1493270	4694400	16.3	9	8.5	23"	
11/5/96	1520	1507580	4709300	15.1	9	8.0	23"	
11/8/96	1430	1517560	4719700	17.7	10	9	23"	
11/13/96	1515	1535170	4738100	17.9	10	9	23"	
11/15/96	1545	1542430	4745700	23.7	9	9	24"	
11/18/96	0730	1551940	4755500	19.0	10.0	8.5	>24"	
11/21/96	1530	1564940	4769100	18.5	10	9	26"	
11/25/96	1000	1576940	4781700	22.0	10	9	27	Gauged wells. Sampled Inf./mid/Effl.

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GROUNDWATER TREATMENT SYSTEM FIELD LOG
OAKLAND FUELING AREA
UNION PACIFIC RAILROAD

Date	Time	Volume		Flow Rate	Filter Pressure		Oil Level	Comments
		Signet (gallons)	Neptune (gallons)	Thru Carbon (gal/min)	Inlet (psig)	Outlet (psig)	In Tank (inches)	(Maintenance, Adjustments, and Observations)
10/1/96	0745	1396600	4592300	23.2	10	9	20"	ORW-1 operating poorly
10/4/96	0730	1403830	4600000	24.1	9	9	20"	ORW-1 repaired
10/8/96	0745	1417520	4614400	21.8	8.5	8	20"	ORW-1 again operating poorly / repaired
10/11/96	1630	1429590	4627200	21.2	9	7.5	21"	
10/14/96	1515	1438640	4636700	21.5	9	8.5	< 22"	
10/17/96	1415	1447180	4645700	24.8	9	8.5	< 22"	Sampled system (inf/mid/eff). Gauged wells.
10/22/96	0745	1462510	4661900	21.6	9.5	8.5	22"	Broken H_2O line
10/24/96	0900	1469750	4669500	20.3	10	9.5	22"	Alert # 4
10/28/96	1500	1480050	4680400	20.1	9.	8.5	23"	Alert # 4

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GROUNDWATER TREATMENT SYSTEM FIELD LOG
OAKLAND FUELING AREA
UNION PACIFIC RAILROAD

Date	Time	Volume		Flow Rate	Filter Pressure		Oil Level	Comments
		Signet (gallons)	Neptune (gallons)	Thru Carbon (gal/min)	Inlet (psig)	Outlet (psig)	In Tank (inches)	(Maintenance, Adjustments, and Observations)
9/5/96	0700	1337390	4529000	20.1	10	9	<17"	
9/13/96	1200	1353290	4546200	21.0	10	10	<19"	
9/16/96	1000	1362570	4556200	24.3	9.5	9.5	19"	Sample Inf/Mid. Gauge all wells.
9/19/96	1500	1376170	4564300	23.7	9.5	9.5	20"	
9/24/96	1130	1379200	4573800	22.1	10	9	20"	
9/27/96	1530	1386950	4582100	20.1	10	9	20"	

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GROUNDWATER TREATMENT SYSTEM FIELD LOG
OAKLAND FUELING AREA
UNION PACIFIC RAILROAD

Date	Time	Volume		Flow Rate	Filter Pressure		Oil Level	Comments
		Signet (gallons)	Neptune (gallons)	Thru Carbon (gal/min)	Inlet (psig)	Outlet (psig)	In Tank (inches)	(Maintenance, Adjustments, and Observations)
8/1/96	0730	1254700	4403700	22.9	9.5	9.0	~~0~~	Major maint. See logbook.
8/2/96	1500	1257800	4409800	8.2 → 25.8	11 → 9	4 → 9	~~0~~	Alert #3 (clogged filters). ▲ → OK.
8/5/96	0815	1260440	4421200	23.9	9.5	9.0	<12"	
8/9/96	1400	1267320	4440000	10.9	10.5	4.5	<12"	Gauged MWs @ diesel spill and motor freight areas.
8/13/96	0730	1277970	4451400	15.7	9.0	6.0	12"	
8/16/96	1500	1291810	446600	24.9	9.0	8.5	13"	
8/19/96	0700	1303270	4478300	25.5	9.0	8.5	13"	Collected H_2O samples (inf. and mid.)
8/27/96	0630	1318350	4508700	18.4	9.0	8.5	15"	
8/28/96	0730	1321680	4511900	14.2	10.0	5.5	<16"	Develop RW-1. Begin controller reloc.
8/30/96	1100	1323810	4514600	12.0	10.0	5.0	16"	Complete controller relocation & test syst.

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GROUNDWATER TREATMENT SYSTEM FIELD LOG
OAKLAND FUELING AREA
UNION PACIFIC RAILROAD

Date	Time	Volume		Flow Rate Thru Carbon	Filter Pressure		Oil Level In Tank	Comments (Maintenance, Adjustments, and Observations)
		Signet (gallons)	Neptune (gallons)	(gal/min)	Inlet (psig)	Outlet (psig)	(inches)	
7/8/96	0630	1150170	4293300	24.7	8.5	8.5	<43 → 0	Everyone pumps 750 gal. from RT.
7/12/96	0800	1170540	4314900	17.1	9.5	6.5	0	
7/15/96	0800	1183750	4328900	19.3	9.5	7.5	0	
7/18/96	0730	1197390	4343300	22.9	10	9	0	
7/23/96	1500	1218700	4366100	19.6	10.5	8.0	0	Collected inf/mid/eff water samples.
7/25/96	0730	1226050	4373900	24.5	9.5	9.0	0	Checked skimmer RT. Less than 5 gal.
7/29/96	0800	1244290	4392600	24.8	9.0	9.0	0	Gauged DTW/DTP all wells.

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APPENDIX B

ANALYTICAL RESULTS

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
2323 Fifth Street. Berkeley, CA 94710. Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Burns & McDonnell
P.O.Box 281647
San Francisco, CA 94128

Date: 06-DEC-96
Lab Job Number: 127565
Project ID: N/A
Location: Union Pacific

Reviewed by: Dennis Morse

Reviewed by:

Curtis & Tompkins, Ltd.

BTXE

Client: Burns & McDonnell
Location: Union Pacific

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
127565-002	MIDFLUENT	31230	11/25/96	12/04/96	12/04/96	

Matrix: Water

Analyte	Units	127565-002
Dilu Fac:		1
Benzene	ug/L	23
Toluene	ug/L	3.7
Ethylbenzene	ug/L	<0.5
m,p-Xylenes	ug/L	16
o-Xylene	ug/L	15
Surrogate		
Trifluorotoluene	%REC	108
Bromobenzene	%REC	125

Curtis & Tompkins, Ltd.

TPH-Ext. Ext. Hydrocarbons

Client: Burns & McDonnell
Location: Union Pacific

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
127565-001	INFLUENT	31117	11/25/96	11/25/96	11/27/96	

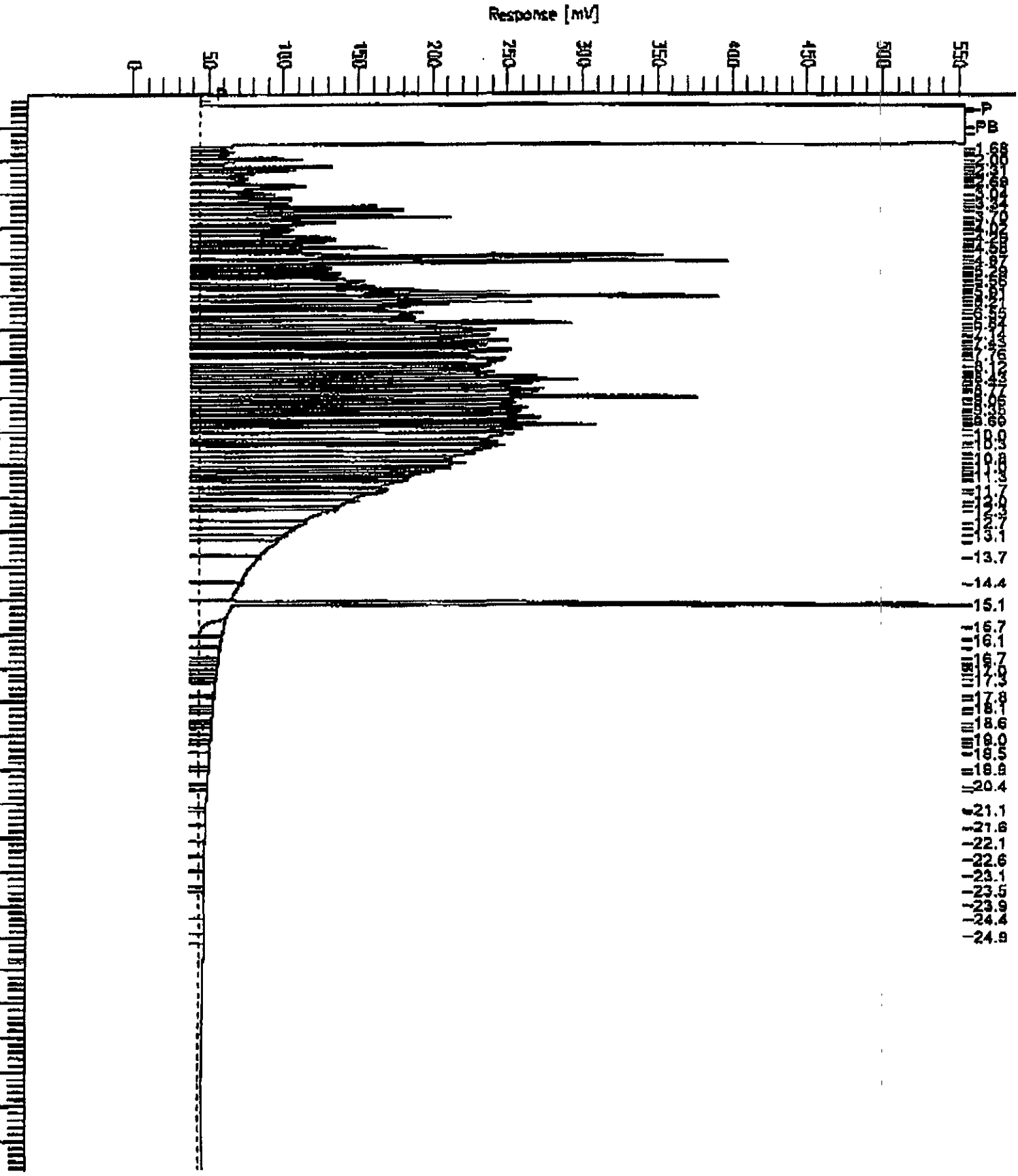
Matrix: Water

Analyte	Units	127565-001
Diln Fac:		1
Diesel C12-C22	ug/L	13000
Surrogate		
Hexacosane	%REC	112

GC15 Channel B TEH

Sample Name : 127565-001,31117
FileName : G:\GC15\CHB\331R022.RAW
Method : 6332TEH.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: +7 mV

Sample #: 31117 Page 1 of 1
Date : 12/2/96 10:59 AM
Time of Injection: 11/27/96 08:38 AM
Low Point : -7.20 mV High Point : 553.95 mV
Plot Scale: 561.2 mV



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

Laboratory: Curtis & Tompkins
Address: 2323 5th Street
City/State/Zip: Berkeley CA 94710
Attention: Scott Kellstedt Telephone: 510-486-0900
Project Number: Project Name: UNPAC
Site, Group, or SWMU Name: Union Pacific

Document Control No.: 112596
Lab. Reference No. or Episode No.: OH 127565

Sample Number		Sample Event		Sample Depth (in feet)		Sample Collected		Sample Type: Matrix					Number of Containers	Analysis: TPH-d, BTEX	Remarks
Sample Point	Sample Designator	Round	Year	From	To	Date	Time	Liquid	Solid	Gas	Composite	Grab			
Influent	GW					11-25-96	1022	X					1	X	
Effluent	GW					11-25-96	1025	X					2	X	

STD TAT

Sampler (signature): Jamison Cross
Sampler (signature):

Special Instructions:

Relinquished By:	Date/Time	Relinquished By:	Date/Time
1. Jamison Cross (signature)	11/25/96 1635	(signature)	11/25/96 1730
Relinquished By:	Date/Time	Relinquished By:	Date/Time
2. (signature)		(signature)	

Condition of Shipping Container: Good ☐ Fair ☐ Poor ☐
Ice Present in Container: Yes ☐ No ☐
Comments:

061998 Form WCI-DPI

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 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

USPCI / Laidlaw
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: UP Fueling Area
Sample Matrix: Water
Analysis Method: EPA 5030/8015 Mod./8020
First Sample #: 611-0812

Sampled: Nov 12, 1996
Received: Nov 13, 1996
Reported: Dec 4, 1996

QC Batch Number:	GC112696 802009A	GC112696 802009A	GC112696 802009A	GC112696 802009A	GC112696 802009A	GC112696 802009A

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 611-0812 OMW-6	Sample I.D. 611-0813 OMW-2	Sample I.D. 611-0814 OMW-8	Sample I.D. 611-0815 OMW-18	Sample I.D. 611-0816 OMW-3	Sample I.D. 611-0817 OMW-1
Purgeable Hydrocarbons	50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
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.	N.D.
Chromatogram Pattern:		--	--	--	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	11/26/96	11/26/96	11/26/96	11/26/96	11/26/96	11/26/96
Instrument Identification:	HP-9	HP-9	HP-9	HP-9	HP-9	HP-9
Surrogate Recovery, %: (QC Limits = 70-130%)	94	93	92	93	93	91

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

Melissa A. Brewer
Client Services Representative

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

USPCI / Laidlaw
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: UP Fueling Area
Sample Matrix: Water
Analysis Method: EPA 5030/8015 Mod./8020
First Sample #: 611-0818

Sampled: Nov 12, 1996
Received: Nov 13, 1996
Reported: Dec 4, 1996

QC Batch Number: GC112696 GC112696
802009A 802009A

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 611-0818 Trip Blank	Sample I.D. Method Blank
Purgeable Hydrocarbons	50	N.D.	N.D.
Benzene	0.50	N.D.	N.D.
Toluene	0.50	N.D.	N.D.
Ethyl Benzene	0.50	N.D.	N.D.
Total Xylenes	0.50	N.D.	N.D.
Chromatogram Pattern:		--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0
Date Analyzed:	11/26/96	11/26/96
Instrument Identification:	HP-9	HP-9
Surrogate Recovery, %: (QC Limits = 70-130%)	92	102

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
Client Services Representative

6110812.UUU <2>

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

USPCI / Laidlaw
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: UP Fueling Area
Sample Matrix: Water
Analysis Method: EPA 3510/8015 Mod.
First Sample #: 611-0812

Sampled: Nov 12, 1996
Received: Nov 13, 1996
Reported: Dec 4, 1996

QC Batch Number:	SP111996 8015EXA	SP111996 8015EXA	SP111996 8015EXA	SP111996 8015EXA	SP111996 8015EXA	SP111996 8015EXA

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 611-0812 OMW-6	Sample I.D. 611-0813 OMW-2	Sample I.D. 611-0814 OMW-8	Sample I.D. 611-0815 OMW-18	Sample I.D. 611-0816 OMW-3	Sample I.D. 611-0817 OMW-1
Extractable Hydrocarbons	50	1,900	3,400	1,300	1,400	3,100	N.D.
Chromatogram Pattern:		Diesel	Diesel & Unidentified Hydrocarbons >C20	Diesel	Diesel	Diesel & Unidentified Hydrocarbons >C20	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Extracted:	11/19/96	11/19/96	11/19/96	11/19/96	11/19/96	11/19/96
Date Analyzed:	11/21/96	11/21/96	11/21/96	11/21/96	11/21/96	11/21/96
Instrument Identification:	HP-3A	HP-3B	HP-3B	HP-3B	HP-3B	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

6110812.UUU <3>

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 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

USPCI / Laidlaw
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: UP Fueling Area
Sample Matrix: Water
Analysis Method: EPA 3510/8015 Mod.
First Sample #: Method Blank

Sampled: --
Received: Nov 13, 1996
Reported: Dec 4, 1996

QC Batch Number: SP111996

8015EXA

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. Method Blank
Extractable Hydrocarbons	50	N.D.
Chromatogram Pattern:		--

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Extracted:	11/19/96
Date Analyzed:	11/21/96
Instrument Identification:	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

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

USPCI / Laidlaw
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: UP Fueling Area
Matrix: Liquid

QC Sample Group: 6110812-818

Reported: Dec 4, 1996

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Diesel
QC Batch#:	GC112696	GC112696	GC112696	GC112696	SP111996
Analy. Method:	802009A EPA 8020	802009A EPA 8020	802009A EPA 8020	802009A EPA 8020	8015EXA EPA 8015
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 3510
Analyst:	K. Nill	K. Nill	K. Nill	K. Nill	D. Sharma
MS/MSD #:	6110812	6110812	6110812	6110812	6110812
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	1900 µg/L
Prepared Date:	11/26/96	11/26/96	11/26/96	11/26/96	11/19/96
Analyzed Date:	11/26/96	11/26/96	11/26/96	11/26/96	11/21/96
Instrument I.D.#:	HP-9	HP-9	HP-9	HP-9	HP-3A
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	300 µg/L
Result:	22	23	22	75	1500
MS % Recovery:	110	115	110	125	-
Dup. Result:	22	23	22	75	1900
MSD % Recov.:	110	115	110	125	-
RPD:	0.0	0.0	0.0	0.0	24
RPD Limit:	0-25	0-25	0-25	0-25	0-50
LCS #:	9LCS112696	9LCS112696	9LCS112696	9LCS112696	LCS111996
Prepared Date:	11/26/96	11/26/96	11/26/96	11/26/96	11/19/96
Analyzed Date:	11/26/96	11/26/96	11/26/96	11/26/96	11/21/96
Instrument I.D.#:	HP-9	HP-9	HP-9	HP-9	HP-3A
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	300 µg/L
LCS Result:	22	23	22	74	240
LCS % Recov.:	110	115	110	123	80
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

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

USPCI / Laidlaw
5665 Flatiron Pkwy
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: UP Fueling Area
Lab Number: 6110812 thru -0818

Received: Nov 13, 1996
Reported: Dec 4, 1996

LABORATORY NARRATIVE

EPA 8015 Mod./3510: Total Extractable Petroleum Hydrocarbons Quality Control

Q.C. Batch #: SP1119968015EXA
Date Analyzed: November 21, 1996

Results for the Matrix Spike and Matrix Spike Duplicate were less than and equal to the result of the spiked sample. This appears to be due to matrix interference. The batch was validated using the LCS result.

All other quality control measures were within criteria.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Client Services Representative

[redacted] SEQUOIA ANALYTICAL [redacted]
CHAIN OF CUSTODY

☐ 680 Chesapeake Drive • Redwood City, CA 94063 • (415) 364-9600 • FAX (415) 364-9233
[redacted] ☐ [redacted] Strik[redacted]Ave., [redacted] 8 • [redacted] CA [redacted] • [redacted] 921[redacted] F[redacted] 916)[redacted]-010[redacted]
☒ 404 N. Wiget Lane • Walnut Creek, CA 94598 • (510) 988-9600 FAX (510) 988-9673

Company Name: USPCI / LAIDLAW	Project Name: [illegible]
Address: 5665 FLATIRON PKWY	Billing Address (if different): UP FUELING AREA
City: BOULDER State: CO Zip Code: 80301	→ SAME
Telephone: 303-938-5500 FAX #: 303-938-5520	P.O. #:
Report To: DENTON MAULDIN Sampler: MARK MCCORMICK	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

	Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Sequoia's Sample #	8020 BTEX	MOD 8015 TPH-DIESEL							Comments
1.	OMW-6	11/12/96 1415	AQU	3	VOA	6110812 A-F	X								
2.	"	"	"	3	1L AMBER			X							USE FOR MS/MSD
3.	OMW-2	1500	"	3	VOA	6110813 A-D	X								
4.	"	"	"	1	1L AMBER			X							
5.	OMW-8	1540	"	3	VOA	6110814 A-D	X								
6.	"	"	"	1	1L AMBER			X							
7.	OMW-18	1550	"	3	VOA	6110815 A-D	X								
8.	"	"	"	1	1L AMBER			X							
9.	OMW-3	1615	"	3	VOA	6110816 A-D	X								
10.	"	"	"	1	1L AMBER			X							

Relinquished By: Mark McCormick (signature)	Date: 11/13/96	Time: 1430	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab: (signature)	Date: 11/13/96	Time: 1430

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

SEQUOIA ANALYTICAL
CHAIN OF CUSTODY

☐ 680 Chesapeake Drive • Redwood City, CA 94063 • (415) 364-9600 FAX (415) 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: USA CI / LAIDLAW	Project Name: [redacted]
Address: 5665 FLATIRON PKWY	Billing Address (if different): UP FUELING AREA
City: BOULDER State: CO Zip Code: 80301	= SAME
Telephone: 303-938-5500 FAX #: 303-938-5520	P.O. #:
Report To: DENTON MAULDIN Sampler: MARK MCCORMICK	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: 8020 BTEX; MBR 8015 TPH-DIESEL

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Sequoia's Sample #									Comments
1. OMW-1	11/12/96 1700	AQU	3	VOA		X			6110817		A-D			
2. "	" "	"	1	1L AMBER			X							
3. TRIP BLANK	—	—	1	VOA		X			6110818					
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Pink - Client
Yellow - Sequoia
White - Sequoia

Relinquished By:	Date: 11/13/96	Time: 1430	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab:	Date: 11/13/96	Time: 1430

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

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

Burns & McDonnell
P.O.Box 281647
San Francisco, CA 94128

Date: 31-OCT-96
Lab Job Number: 127169
Project ID: N/A
Location: UNPAC

Reviewed by: Damara Moore

Reviewed by:

BTXE

Client: Burns & McDonnell
Location: UNPAC

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
127169-001	EFFLUENT	30494	10/17/96	10/23/96	10/23/96	
127169-002	MIDFLUENT	30494	10/17/96	10/23/96	10/23/96	
127169-003	INFLUENT	30494	10/17/96	10/23/96	10/23/96	

Matrix: Water

Analyte	Units	127169-001	127169-002	127169-003
Diln Fac:		1	1	1
Benzene	ug/L	<0.5	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5
m,p-Xylenes	ug/L	<0.5	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5
Surrogate				
Trifluorotoluene	%REC	108	106	105
Bromobenzene	%REC	111	108	111

Curtis & Tompkins, Ltd.

Lab #: 127169 BATCH QC REPORT

BTXE	
Client: Burns & McDonnell	Analysis Method: EPA 8020
Location: UNPAC	Prep Method: EPA 5030

METHOD BLANK	
Matrix: Water	Prep Date: 10/22/96
Batch#: 30494	Analysis Date: 10/22/96
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC33048

Analyte	Result
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
m,p-Xylenes	<0.5
o-Xylene	<0.5

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	103	58-130
Bromobenzene	102	62-131

Curtis & Tompkins, Ltd.

Lab #: 127169 BATCH QC REPORT

BTXE	
Client: Burns & McDonnell	Analysis Method: EPA 8020
Location: UNPAC	Prep Method: EPA 5030
LABORATORY CONTROL SAMPLE	
Matrix: Water	Prep Date: 10/22/96
Batch#: 30494	Analysis Date: 10/22/96
Units: ug/L	
Diln Fac: 1	

LCS Lab ID: QC33050

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	18.8	20	94	80-120
Toluene	20.6	20	103	80-120
Ethylbenzene	20.4	20	102	80-120
m,p-Xylenes	42.1	40	105	80-120
o-Xylene	20.9	20	105	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	101	58-130
Bromobenzene	101	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 5 outside limits

Curtis & Tompkins, Ltd.

Lab #: 127169 BATCH QC REPORT

BTXE

Client: Burns & McDonnell
Location: UNPAC
Analysis Method: EPA 8020
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 127184-003
Matrix: Water
Batch#: 30494
Units: ug/L
Diln Fac: 1
Sample Date: 10/15/96
Received Date: 10/18/96
Prep Date: 10/23/96
Analysis Date: 10/23/96

MS Lab ID: QC33051

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	20	<0.5	20.3	102	75-125
Toluene	20	<0.5	22.1	111	75-125
Ethylbenzene	20	<0.5	22	110	75-125
m,p-Xylenes	40	<0.5	44.9	112	75-125
o-Xylene	20	<0.5	22.6	113	75-125

Surrogate	%Rec	Limits
Trifluorotoluene	106	58-130
Bromobenzene	108	62-131

MSD Lab ID: QC33052

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	20	20.3	102	75-125	0	20
Toluene	20	22	110	75-125	1	20
Ethylbenzene	20	21.7	109	75-125	1	20
m,p-Xylenes	40	44.3	111	75-125	1	20
o-Xylene	20	22.5	113	75-125	0	20

Surrogate	%Rec	Limits
Trifluorotoluene	107	58-130
Bromobenzene	109	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

TEH-Tot Ext Hydrocarbons

Client: Burns & McDonnell
Location: UNPAC

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
127169-001	EFFLUENT	30558	10/17/96	10/24/96	10/29/96	
127169-003	INFLUENT	30558	10/17/96	10/24/96	10/29/96	

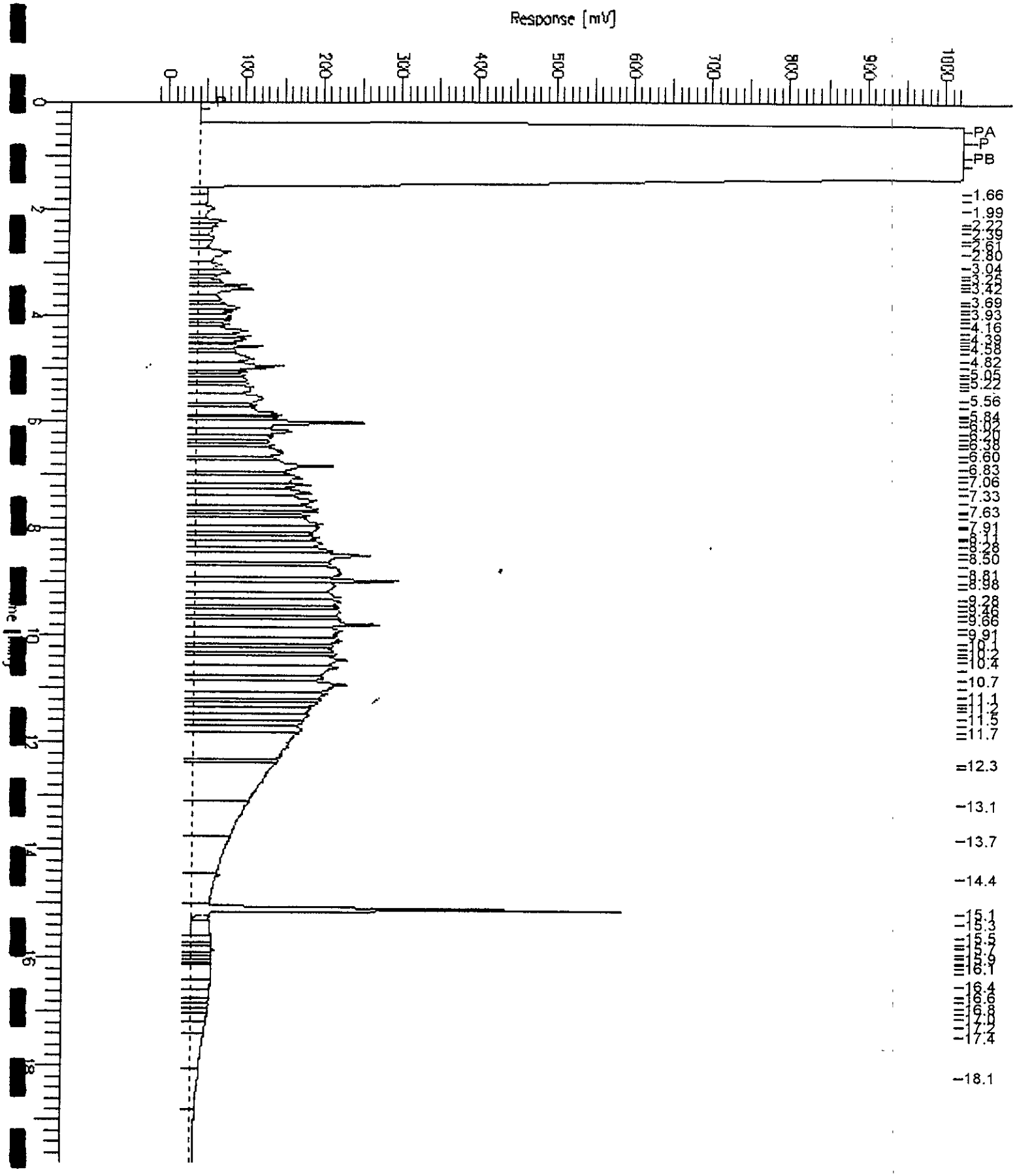
Matrix: Water

Analyte ..	Units	127169-001	127169-003
Diln Fac:		1	1
Diesel C12-C22	ug/L	<50	11000
Surrogate			
Hexacosane	%REC	96	97

GC15 Channel B TEH

Sample Name : 127169-003
FileName : G:\GC15\CHB\303B005.RAW
Method : B303TEH.MTH
Start Time : 0.00 min End Time : 19.80 min
Scale Factor: 0.0 Plot Offset: -11 mV

Sample #: 30558
Date : 10/30/96 10:07 AM
Time of Injection: 10/29/96 07:26 PM
Low Point : -11.36 mV High Point : 1024.00 mV
Plot Scale: 1035.4 mV



Curtis & Tompkins, Ltd.

Lab #: 127169 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons			
Client:	Burns & McDonnell	Analysis Method:	CA LUFT (EPA 8015M)
Location:	UNPAC	Prep Method:	EPA 3520
METHOD BLANK			
Matrix:	Water	Prep Date:	10/24/96
Batch#:	30558	Analysis Date:	10/28/96
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC33286

Analyte	Result	
Diesel C12-C22	<50	
Surrogate	%Rec	Recovery Limits
Hexacosane	92	60-140

Curtis & Tompkins, Ltd.

Lab #: 127169 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons	
Client: Burns & McDonnell	Analysis Method: CA LUFT (EPA 8015M)
Location: UNPAC	Prep Method: EPA 3520

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix:	Water	Prep Date:	10/24/96
Batch#:	30558	Analysis Date:	10/28/96
Units:	ug/L		
Diln Fac:	1		

BS Lab ID: QC33287

Analyte	Spike Added	BS	%Rec #	Limits
Diesel C12-C22	2475	2004	81	60-140
Surrogate	**%Rec**	**Limits**		
Hexacosane	95	60-140		

BSD Lab ID: QC33288

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel C12-C22	2475	1786	72	60-140	11	35
Surrogate	**%Rec**	**Limits**				
Hexacosane	87	60-140				

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

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

Laboratory: Curtis + Tompkins
Address: 2323 5th Street
City/State/Zip: Berkeley CA 94
Telephone: 510-486-0900

Attention: Scott Kellstedt

Document Control No.: 101796
Lab. Reference No. or Episode No.:

Project Number:
Project Name: UNPAC
Site, Group, or SWMU Name: Union Pacific

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				
Effluent	GW					10-17-96	1445	X					3	X	X	
Midfluent	GW					10-17-96	1450	X					2		X	
Influent	GW					10-17-96	1455	X					3	X	X	
																Standard TAT

Sampler (signature): Jamison Cooley
Sampler (signature):

Special Instructions:

Relinquished By:	Date/Time	Relinquished By:	Date/Time
1. (signature):		(signature):	
Relinquished By:	Date/Time	Relinquished By:	Date/Time
2. (signature):		(signature):	

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

10/16/96

061996 Form WCI-OP1

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

Burns & McDonnell
P.O.Box 281647
San Francisco, CA 94128

Date: 30-SEP-96
Lab Job Number: 126848
Project ID: 96-071-1
Location: UP/OAK

Reviewed by: Damara Moore

Reviewed by:

TEH-Tot Ext Hydrocarbons

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
126848-001	INFLUENT	29916	09/16/96	09/18/96	09/20/96	

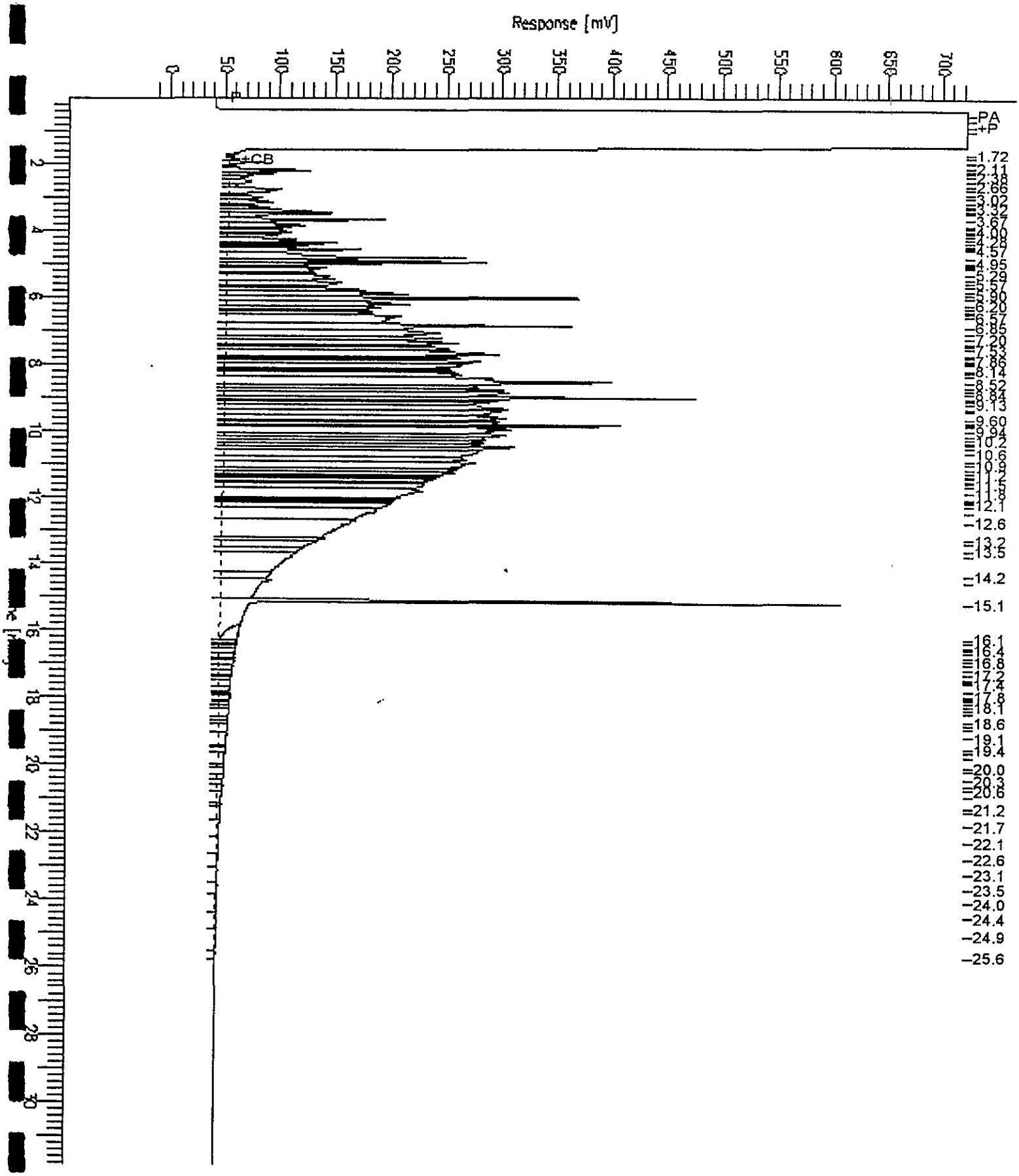
Matrix: Water

Analyte Diln Fac:	Units	126848-001 1
Diesel C12-C22	ug/L	14000
Surrogate		
Hexacosane	%REC	93

GC15 Channel A TEH

Sample Name : W,126848-001
FileName : G:\GC15\CHB\264B013.RAW
Method : 241TEH.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: -11 mV

Sample #: 29916 Page 1 of 1
Date : 9/22/96 09:46 AM
Time of Injection: 9/20/96 07:08 PM
Low Point : -10.97 mV High Point : 721.67 mV
Plot Scale: 732.6 mV



Curtis & Tompkins, Ltd.

Lab #: 126848 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons			
Client:	Burns & McDonnell	Analysis Method:	CA LUFT (EPA 8015M)
Project#:	96-071-1	Prep Method:	EPA 3520
Location:	UP/OAK		

METHOD BLANK			
Matrix:	Water	Prep Date:	09/18/96
Batch#:	29916	Analysis Date:	09/19/96
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC30834

Analyte	Result	
Diesel C12-C22	<50	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	97	60-140

Curtis & Tompkins, Ltd.

Lab #: 126848 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons	
Client: Burns & McDonnell	Analysis Method: CA LUFT (EPA 8015M)
Project#: 96-071-1	Prep Method: EPA 3520
Location: UP/OAK	

LABORATORY CONTROL SAMPLE	
Matrix: Water	Prep Date: 09/18/96
Batch#: 29916	Analysis Date: 09/19/96
Units: ug/L	
Diln Fac: 1	

LCS Lab ID: QC30835

Analyte	Result	Spike Added	%Rec #	Limits
Diesel C12-C22	1958	2475	79	60-140
Surrogate	**%Rec**	**Limits**		
Hexacosane	97	60-140		

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

Curtis & Tompkins, Ltd.

Lab #: 126848 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 126841-003
Matrix: Water
Batch#: 29916
Units: ug/L
Diln Fac: 1

Sample Date: 09/11/96
Received Date: 09/12/96
Prep Date: 09/18/96
Analysis Date: 09/19/96

MS Lab ID: QC30836

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel C12-C22	2475	49.19	1997	79	60-140
Surrogate	%Rec	Limits			
Hexacosane	100	60-140			

MSD Lab ID: QC30837

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel C12-C22	2475	1908	75	60-140	5	25
Surrogate	%Rec	Limits				
Hexacosane	95	60-140				

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

BTXE

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
126848-002	MIDFLUENT	29989	09/16/96	09/25/96	09/25/96	

Matrix: Water

Analyte	Units	126848-002
Diln Fac:		1
Benzene	ug/L	<0.5
Toluene	ug/L	<0.5
Ethylbenzene	ug/L	<0.5
m,p-Xylenes	ug/L	<0.5
o-Xylene	ug/L	<0.5
Surrogate		
Trifluorotoluene	%REC	96
Bromobenzene	%REC	96

Curtis & Tompkins, Ltd.

Lab #: 126848 BATCH QC REPORT

BTXE	
Client: Burns & McDonnell	Analysis Method: EPA 8020
Project#: 96-071-1	Prep Method: EPA 5030
Location: UP/OAK	

METHOD BLANK	
Matrix: Water	Prep Date: 09/25/96
Batch#: 29989	Analysis Date: 09/25/96
Units: ug/L	
Diln Fac: 1	

MB Lab ID: QC31142

Analyte	Result
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
m,p-Xylenes	<0.5
o-Xylene	<0.5

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	94	58-130
Bromobenzene	90	62-131

Curtis & Tompkins, Ltd.

Lab #: 126848 BATCH QC REPORT

BTXE	
Client: Burns & McDonnell	Analysis Method: EPA 8020
Project#: 96-071-1	Prep Method: EPA 5030
Location: UP/OAK	

LABORATORY CONTROL SAMPLE	
Matrix: Water	Prep Date: 09/25/96
Batch#: 29989	Analysis Date: 09/25/96
Units: ug/L	
Diln Fac: 1	

LCS Lab ID: QC31141

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	19.42	20	97	80-120
Toluene	20.58	20	103	80-120
Ethylbenzene	20.94	20	105	80-120
m,p-Xylenes	40.88	40	102	80-120
o-Xylene	22.97	20	115	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	95	58-130
Bromobenzene	95	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 5 outside limits

Curtis & Tompkins, Ltd.

Lab #: 126848 BATCH QC REPORT

BTXE

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: EPA 8020
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 126933-002
Matrix: Water
Batch#: 29989
Units: ug/L
Diln Fac: 1

Sample Date: 09/18/96
Received Date: 09/24/96
Prep Date: 09/26/96
Analysis Date: 09/26/96

MS Lab ID: QC31143

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	20	<0.5	18.9	95	75-125
Toluene	20	<0.5	20.2	101	75-125
Ethylbenzene	20	<0.5	19.9	100	75-125
m,p-Xylenes	40	<0.5	38.7	97	75-125
o-Xylene	20	<0.5	22.3	112	75-125

Surrogate	%Rec	Limits
Trifluorotoluene	98	58-130
Bromobenzene	103	62-131

MSD Lab ID: QC31144

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	20	17.3	87	75-125	9	20
Toluene	20	18.4	92	75-125	9	20
Ethylbenzene	20	17.8	89	75-125	11	20
m,p-Xylenes	40	35.1	88	75-125	10	20
o-Xylene	20	20.4	102	75-125	9	20

Surrogate	%Rec	Limits
Trifluorotoluene	98	58-130
Bromobenzene	100	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

120344

Request for Chemical Analysis and Chain of Custody Record

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

Attention: SCOTT KELLSTEDT

Laboratory CURTIS & TOMPKINS
Address 2323 FIFTH ST.
City/State/Zip BERKELEY, CA
Telephone 486-0900

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

Project Number: 96-071-1
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: TPH-d (8015M)	Analysis: BTEX (8020)	Remarks
Sample Point	Sample Designator	Round	Year	From	To	Date	Time	Liquid	Solid	Gas	Composite	Grab				
INFLUENT						9/16/96		X					1	X		
MIDFLUENT						"		X					4		X	

Standard TAT

Phone (415) 876-5600

Special Instructions: Fax results to Scott Kellstedt (415) 876-3639

Sampler (signature): S. Kellstedt

Sampler (signature):

Relinquished By:	Date/Time	Relinquished By:	Date/Time
1. (signature):	9/16/96 1535	(signature):	
2. (signature):	Date/Time	(signature): D. Moore	9/16 3:35pm

Condition of Shipping Container: Good ☐ Fair ☐ Poor ☐
Ice Present in Container: Yes ☐ No ☐
Comments:

061996 Form WCI-OP1

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

Burns & McDonnell
P.O.Box 281647
San Francisco, CA 94128

Date: 30-AUG-96
Lab Job Number: 126586
Project ID: 96-071-1
Location: UP/OAK

Reviewed by: Damara Moore

Reviewed by:

Curtis & Tompkins, Ltd.

Laboratory Number: **126586**
Client: **Burns & McDonnell**
Project#: **96-071-1**
Location: **UP/OAK**

Sample Date: **08/19/96**
Receipt Date: **08/19/96**

CASE NARRATIVE

This hardcopy data package contains sample results and batch QC for two samples received from the above referenced project on August 19, 1996. All samples were received cold and intact.

The chain-of-custody specified sample MIDFLUENT (126586-002) was to be analyzed for BTXE. The three voa's received had "HCl" labels on them to indicate they were preserved. This would set the hold for the samples at 14 days after sampling, or September 2, 1996. However, the pH of the sample was 7, as determined at the time of the BTXE analysis. This indicates the samples were not preserved and consequently they were analyzed on August 26, one day past hold.

No other problems were encountered with this data set.

TEH-Tot Ext Hydrocarbons

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
126586-001	INFLUENT	29269	08/19/96	08/20/96	08/29/96	

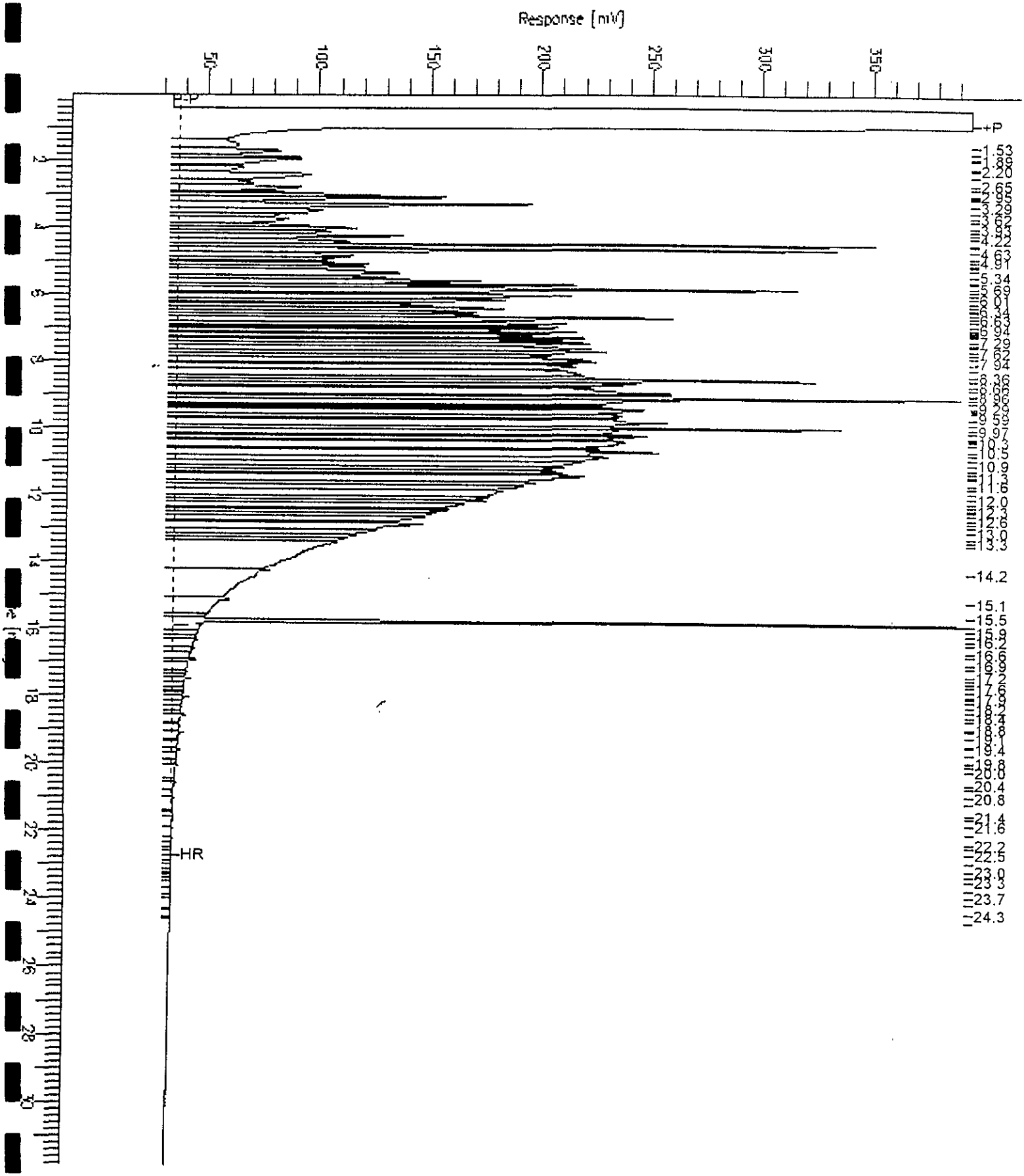
Matrix: Water

Analyte Diln Fac:	Units	126586-001 1
Diesel C12-C22	ug/L	14000
Surrogate		
Hexacosane	%REC	87

Chromatogram

Sample Name : 126586-001,29269
FileName : G:\GC13\CHA\241A026.RAW
Method : ATEH0808.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor : 0.0 Plot Offset: 29 mV

Sample #: 500:2.5 Page 1 of 1
Date : 8/29/96 12:19 PM
Time of Injection: 8/29/96 11:04 AM
Low Point : 29.26 mV High Point : 395.45 mV
Plot Scale: 366.2 mV



Curtis & Tompkins, Ltd.

Lab #: 126586 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

METHOD BLANK

Matrix: Water
Batch#: 29269
Units: ug/L
Diln Fac: 1

Prep Date: 08/20/96
Analysis Date: 08/23/96

MB Lab ID: QC28501

Analyte	Result	
Diesel C12-C22	<50	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	84	60-140

Curtis & Tompkins, Ltd

Lab #: 126586 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 29269
Units: ug/L
Diln Fac: 1

Prep Date: 08/20/96
Analysis Date: 08/23/96

LCS Lab ID: QC28502

Analyte	Result	Spike Added	%Rec #	Limits
Diesel C12-C22	1658	2475	67	60-140
Surrogate	%Rec	Limits		
Hexacosane	89	60-140		

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 1 outside limits

Curtis & Tompkins, Ltd.

Lab #: 126586 BATCH QC REPORT

TEH-Tot Ext Hydrocarbons

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: CA LUFT (EPA 8015M)
Prep Method: EPA 3520

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 126509-002
Matrix: Water
Batch#: 29269
Units: ug/L
Diln Fac: 1

Sample Date: 08/09/96
Received Date: 08/10/96
Prep Date: 08/20/96
Analysis Date: 08/23/96

MS Lab ID: QC28503

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel C12-C22	2475	120.1	1942	74	60-140
Surrogate	%Rec	Limits			
Hexacosane	89	60-140			

MSD Lab ID: QC28504

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel C12-C22	2475	1892	72	60-140	3	25
Surrogate	%Rec	Limits				
Hexacosane	83	60-140				

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

BTXE

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: EPA 8020
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
126586-002	MIDFLUENT	29377	08/19/96	08/26/96	08/26/96	

Matrix: Water

Analyte	Units	126586-002
Diln Fac:		1
Benzene	ug/L	<0.5
Toluene	ug/L	<0.5
Ethylbenzene	ug/L	<0.5
m,p-Xylenes	ug/L	<0.5
o-Xylene	ug/L	<0.5
Surrogate		
Trifluorotoluene	%REC	101
Bromobenzene	%REC	92

Lab #: 126586

BATCH QC REPORT

Curtis & Tompkins, Ltd.

BTXE

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: EPA 8020
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 29377
Units: ug/L
Diln Fac: 1

Prep Date: 08/26/96
Analysis Date: 08/26/96

MB Lab ID: QC28900

Analyte	Result
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
m,p-Xylenes	<0.5
o-Xylene	<0.5

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	101	58-130
Bromobenzene	89	62-131

Curtis & Tompkins, Ltd.

Lab #: 126586

BATCH QC REPORT

BTXE	
Client: Burns & McDonnell	Analysis Method: EPA 8020
Project#: 96-071-1	Prep Method: EPA 5030
Location: UP/OAK	

LABORATORY CONTROL SAMPLE	
Matrix: Water	Prep Date: 08/26/96
Batch#: 29377	Analysis Date: 08/26/96
Units: ug/L	
Diln Fac: 1	

LCS Lab ID: QC28899

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	22.2	20	111	80-120
Toluene	20	20	100	80-120
Ethylbenzene	18.9	20	95	80-120
m,p-Xylenes	46.1	40	115	80-120
o-Xylene	20.5	20	103	80-120

Surrogate	%Rec	Limits
Trifluorotoluene	102	58-130
Bromobenzene	93	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 5 outside limits

Curtis & Tompkins, Ltd.

Lab #: 126586 BATCH QC REPORT

BTXE

Client: Burns & McDonnell
Project#: 96-071-1
Location: UP/OAK

Analysis Method: EPA 8020
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: MIDFLUENT
Lab ID: 126586-002
Matrix: Water
Batch#: 29377
Units: ug/L
Diln Fac: 1

Sample Date: 08/19/96
Received Date: 08/19/96
Prep Date: 08/26/96
Analysis Date: 08/26/96

MS Lab ID: QC28901

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	20	<0.5	22.6	113	75-125
Toluene	20	<0.5	20.9	105	75-125
Ethylbenzene	20	<0.5	19.7	99	75-125
m,p-Xylenes	40	<0.5	48.1	120	75-125
o-Xylene	20	<0.5	21.6	108	75-125

Surrogate	%Rec	Limits
Trifluorotoluene	102	58-130
Bromobenzene	95	62-131

MSD Lab ID: QC28902

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	20	22.6	113	75-125	0	20
Toluene	20	20.9	105	75-125	0	20
Ethylbenzene	20	19.5	98	75-125	1	20
m,p-Xylenes	40	47.6	120	75-125	1	20
o-Xylene	20	21.3	107	75-125	1	20

Surrogate	%Rec	Limits
Trifluorotoluene	104	58-130
Bromobenzene	97	62-131

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

12058

Request for Chemical Analysis and Chain of Custody Record

Burns & McDonnell
Waste Consultants, Inc.
~~10881 Lowell Avenue, Suite 200~~ SAN
~~Overland Park, Kansas 66210~~ FRANCISCO
~~Tel: (816) 333-8787~~
~~Fax: (816) 822-3463~~

Attention: SCOTT KELLSTEDT

Laboratory: CURTIS & TOMPKINS
Address:
City/State/Zip: BERKELEY, CA
Telephone: (415) 876-5261

Document Control No.:

Lab. Reference No. or Episode No.:

Project Number: 96-071-1
Project Name: UP/OAK

Site, Group, or SWMU Name:

Analysis: TPH (diesel) by 8015M; BTEX by 8020

Sample Point	Sample Designator	Round	Year	Depth From	Depth To	Date	Time	Liquid	Solid	Gas	Composite	Grab	Number of Containers	TPH (diesel) by 8015M	BTEX by 8020	Remarks
-1	INFLUENT		'96			8/19/96	0800	X				X	1	X		STANDARD TAT
-2	MIDFLUENT		'96			8/19/96	0750	X				X	3		X	

~~B~~ Report + Invoice
Scott Kellstedt
Burns + McDonnell
P.O. Box 281647
SAN FRANCISCO, CA 94128

Sampler (signature): S. Kellstedt

Sampler (signature):

Special Instructions:

Relinquished By: 1. S. Kellstedt (signature) — Date/Time: 8/19/96

Received By: (signature) — Date/Time:

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

Received By: D. Moore (signature) 8/19 — Date/Time: 9:55

Condition of Shipping Container: Good ☐ Fair ☐ Poor ☐

Ice Present in Container: Yes ☐ No ☐

Comments:

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

BURNS & MCDONNELL
500 YGNACIO VALLEY RD.
SUITE #250
WALNUT CREEK, CA 94596

ATTN: SCOTT KELLSTEDT
CLIENT PROJ. ID: 96-071-1
CLIENT PROJ. NAME: UNPAK/OAK

REPORT DATE: 07/26/96

DATE(S) SAMPLED: 07/17/96

DATE RECEIVED: 07/18/96

AEN WORK ORDER: 9607210

PROJECT SUMMARY:

On July 18, 1996, this laboratory received 3 water sample(s).

Client requested sample(s) be analyzed for chemical parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein
Laboratory Director

BURNS & MCDONNELL

SAMPLE ID: EFFLUENT
AEN LAB NO: 9607210-01
AEN WORK ORDER: 9607210
CLIENT PROJ. ID: 96-071-1

DATE SAMPLED: 07/17/96
DATE RECEIVED: 07/18/96
REPORT DATE: 07/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	07/19/96
Toluene	108-88-3	ND	0.5	ug/L	07/19/96
Ethylbenzene	100-41-4	ND	0.5	ug/L	07/19/96
Xylenes, Total	1330-20-7	ND	2	ug/L	07/19/96
#Extraction for TPH	EPA 3510	-		Extrn Date	07/19/96
TPH as Diesel	GC-FID	0.12 *	0.05	mg/L	07/19/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

BURNS & MCDONNELL

SAMPLE ID: MIDFLUENT
AEN LAB NO: 9607210-02
AEN WORK ORDER: 9607210
CLIENT PROJ. ID: 96-071-1

DATE SAMPLED: 07/17/96
DATE RECEIVED: 07/18/96
REPORT DATE: 07/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	07/19/96
Toluene	108-88-3	ND	0.5	ug/L	07/19/96
Ethylbenzene	100-41-4	ND	0.5	ug/L	07/19/96
Xylenes, Total	1330-20-7	ND	2	ug/L	07/19/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

BURNS & MCDONNELL

SAMPLE ID: INFLUENT
AEN LAB NO: 9607210-03
AEN WORK ORDER: 9607210
CLIENT PROJ. ID: 96-071-1

DATE SAMPLED: 07/17/96
DATE RECEIVED: 07/18/96
REPORT DATE: 07/26/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	07/23/96
Toluene	108-88-3	ND	0.5	ug/L	07/23/96
Ethylbenzene	100-41-4	ND	0.5	ug/L	07/23/96
Xylenes, Total	1330-20-7	ND	2	ug/L	07/23/96
#Extraction for TPH	EPA 3510	-		Extrn Date	07/19/96
TPH as Diesel	GC-FID	9.7 *	0.05	mg/L	07/20/96

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9607210

CLIENT PROJECT ID: 96-071-1

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9607210
DATE EXTRACTED: 07/19/96
INSTRUMENT: A
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
07/19/96	EFFLUENT	01	82
07/20/96	INFLUENT	03	96
QC Limits:			65-125

DATE EXTRACTED: 07/12/96
DATE ANALYZED: 07/16/96
SAMPLE SPIKED: 9606277-04
INSTRUMENT: A

Matrix Spike Recovery Summary

Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Diesel	4.00	86	5	60-110	15

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

QUALITY CONTROL DATA

METHOD: EPA 8020 GCFID

AEN JOB NO: 9607210
INSTRUMENT: F
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
07/19/96	EFFLUENT	01	87
07/19/96	MIDFLUENT	02	90
07/23/96	INFLUENT	03	94
QC Limits:			70-130

DATE ANALYZED: 07/19/96
SAMPLE SPIKED: LCS
INSTRUMENT: F

Laboratory Control Sample Recovery

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	20.2	96	7	60-120	20
Toluene	65.2	114	<1	60-120	20

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

*** END OF REPORT ***

9607210

Request for Chemical Analysis and Chain of Custody Record

Burns & McDonnell
Waste Consultants, Inc. WALNUT CREEK
~~10881 Lowell Avenue, Suite 200~~
~~Overland Park, Kansas 66210~~
Tel: ~~(816) 888-8787~~ (510) 926-6422
Fax: ~~(816) 822-3463~~ (510) 926-6494

Attention: SCOTT KELLSTEDT

Laboratory: AEN
Address:
City/State/Zip: PLEASANT HILL, CA
Telephone:

Document Control No.:

Lab. Reference No. or Episode No.:

Project Number: 96-071-1
Project Name: UNPAC/OAK

Site, Group, or SWMU Name:

Sample Point	Sample Designator	Round	Year	Depth From	Depth To	Date	Time	Liquid	Solid	Gas	Composite	Grab	Number of Containers	TPH (diesel) 8015M	BTEX 8020				Remarks
EFFLUENT		July	'96			7/17	0730	X				X	3	X	X				
MIDFLUENT		"	"			"	0740	X				X	2		X				
INFLUENT		"	"			"	0750	X				X	3	X	X				

Sampler (signature): S. Kellstedt
Sampler (signature):

Special Instructions: STD TAT

Relinquished By: 1. S. Kellstedt (signature) — Date/Time: 7/17/96 11:00
Received By: Ronald C. Jensen (signature) — Date/Time: 7/18/96 ~~7/17/96~~ 11:00

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

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

APPENDIX C

SAMPLING AND WELL STABILIZATION FORMS

USPCI SAMPLING AND WELL STABILIZATION FORM

USPCI Project Name: **UP Fueling Area, Oakland TOFC** | USPCI Project Number: **96199-01**

Measuring Point (MP) Location: **TOC** | **Well No. OMW-1**

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

Casing Diameter: **2** Inches | Sampling Date: **11/12/96**

Depth To Ground Water (Below MP): **7.50** Feet | Sample ID No. **OMW-1**

Method Of Well Development: | Time: **1700** ☐AM, ☐PM

☐ Tap ☐ Submersible Pump ☐ Bladder Pump | Riser Elevation (MP):

■ Bailer ☐ Centrifugal Pump ☐ Other | Top of Screen Elevation:

Sampling Collection Method: | Sample Appearance:

☐ 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 Feet Below MP | Decontamination Performed: **Probe**

Tubing Type (if Used):

Tubing Used for: ☐ Sample Collection ☐ Well Development/Field Tests | Samples Collected: **TPH D, BTEX**

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)
1640	Begin Well					
1643	7.4	1400	19.6		0.75	
1647	7.2	1300	19.5		1.50 Well bailed dry	
1700	Sample Well					

At Least Well Bore Volumes Were Evacuated Before Sampling | Discharge Rate = GPM x 0.00223 = cfs

Comments: **Well bailed dry (<1/2 bailer) after 2 volumes**

Recharge rate poor

[Comments may continue on back]

Form Completed By: | Witnessed By:

USPCI SAMPLING AND WELL STABILIZATION FORM

USPCI Project Name: **UP Fueling Area, Oakland TOFC**	USPCI Project Number: **96199-01**
Measuring Point (MP) Location: **TOC**	**Well No. OMW-2**
Well Depth: (Below MP): **9.76** Feet	
Casing Diameter: **2** Inches	Sampling Date: **11/12/96**
Depth To Ground Water (Below MP): **4.92** Feet	Sample ID No. **OMW-2**
Method Of Well Development:	Time: **1500** ☐AM, ☐PM
☐ Tap ☐ Submersible Pump ☐ Bladder Pump	Riser Elevation (MP):
■ Bailer ☐ Centrifugal Pump ☐ Other	Top of Screen Elevation:
Sampling Collection Method:	Sample Appearance: **Clear, v. slightly turbid**
☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample	Odor: **Light**
■ Bailer Type: ○ Teflon ○ Stainless Steel	Sampling Problems (if any):
○ ABS Plastic ○ PVC ● HDPE	
Pump Intake Or Bailer Set At Feet Below MP	Decontamination Performed: **Probe**
Tubing Type (if Used):	
Tubing Used for: ☐ Sample Collection ☐ Well Development/Field Tests	Samples Collected: **TPH D, BTEX**

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	Begin Well					
1443	6.7	700	19.3		0.75	
1445	6.8	600	19.2		1.50	
1450	6.9	700	19.1		2.50	
1500	Sample Well					

At Least Well Bore Volumes Were Evacuated Before Sampling Discharge Rate = GPM x 0.00223 = cfs

Comments: **Well dry (<1 bailer) after 2 volumes**

Pull ½ bailer ea for final volume

[Comments may continue on back]

Form Completed By: Witnessed By:

USPCI SAMPLING AND WELL STABILIZATION FORM

USPCI Project Name: **UP Fueling Area, Oakland TOFC** | USPCI Project Number: **96199-01**

Measuring Point (MP) Location: **TOC**

Well No. OMW-3

Well Depth: (Below MP): **12.26** Feet

Casing Diameter: **2** Inches | Sampling Date: **11/12/96**

Depth To Ground Water (Below MP): **6.25** Feet | Sample ID No. **OMW-3**

Method Of Well Development; | Time: **1615** ☐AM, ☐PM

☐ Tap ☐ Submersible Pump ☐ Bladder Pump | Riser Elevation (MP):

■ Bailer ☐ Centrifugal Pump ☐ Other | Top of Screen Elevation:

Sampling Collection Method; | Sample Appearance: **Lightly turbid gray orange**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample | Odor: **Light**

■ Bailer Type: ○ Teflon ○ Stainless Steel | Sampling Problems (if any):

○ ABS Plastic ○ PVC ● HDPE

Pump Intake Or Bailer Set At Feet Below MP | Decontamination Performed: **Probe**

Tubing Type (if Used):

Tubing Used for: ☐ Sample Collection ☐ Well Development/Field Tests | Samples Collected: **TPH D, BTEX**

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)
1556	Begin Well					
1601	6.8	3200	19.4		1.0	
1605	6.8	3300	19.3		1.5	
1615	Sample Well					

At Least Well Bore Volumes Were Evacuated Before Sampling | Discharge Rate = GPM x 0.00223 = cfs

Comments: **Well bailed dry (<1/2 bailer) after 1-1/2 volumes**

Very slow recharge

[Comments may continue on back]

Form Completed By: | Witnessed By:

USPCI SAMPLING AND WELL STABILIZATION FORM

USPCI Project Name: **UP Fueling Area, Oakland TOFC** | USPCI Project Number: **96199-01**

Measuring Point (MP) Location: **TOC**

Well No. OMW-5

Well Depth: (Below MP): **11.27** Feet

Casing Diameter: **2** Inches | Sampling Date: **11/12/96**

Depth To Ground Water (Below MP): **6** Feet | Sample ID No. **OMW-5**

Method Of Well Development: | Time: ☐AM, ☐PM

☐ Tap ☐ Submersible Pump ☐ Bladder Pump | Riser Elevation (MP):

■ Bailer ☐ Centrifugal Pump ☐ Other | Top of Screen Elevation:

Sampling Collection Method: | Sample Appearance:

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample | Odor:

■ Bailer Type: ○ Teflon ○ Stainless Steel | Sampling Problems (if any): **Product in purge water**

○ ABS Plastic ○ PVC ● HDPE

Pump Intake Or Bailer Set At Feet Below MP | Decontamination Performed: **Probe**

Tubing Type (if Used):

Tubing Used for: ☐ Sample Collection ☐ Well Development/Field Tests | Samples Collected: **TPH D, BTEX**

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)
1331	Begin Well					
1338	6.6	2000	20.1		0.75	
1338	6.7	2100	20.1		1.00	
	Not sampled					

At Least Well Bore Volumes Were Evacuated Before Sampling | Discharge Rate = GPM x 0.00223 = cfs

Comments:

[Comments may continue on back]

Form Completed By: | Witnessed By:

USPCI SAMPLING AND WELL STABILIZATION FORM

USPCI Project Name: **UP Fueling Area, Oakland TOFC**

USPCI Project Number: **96199-01**

Measuring Point (MP) Location: **TOC**

Well No. OMW-6

Well Depth: (Below MP): **11.81** Feet

Casing Diameter: **2** Inches

Sampling Date: **11/12/96**

Depth To Ground Water (Below MP): **5.59** Feet

Sample ID No. **OMW-6**

Method Of Well Development:

Time: **1415** ☐AM, ☐PM

☐ Tap ☐ Submersible Pump ☐ Bladder Pump

Riser Elevation (MP):

■ Bailer ☐ Centrifugal Pump ☐ Other

Top of Screen Elevation:

Sampling Collection Method:

Sample Appearance: **Lightly turbid gray water, black flecks**

☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample

Odor: **Light**

■ Bailer Type: ○ Teflon ○ Stainless Steel

Sampling Problems (if any):

○ ABS Plastic ○ PVC ● HDPE

Pump Intake Or Bailer Set At Feet Below MP

Decontamination Performed: **Probe**

Tubing Type (if Used):

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

Samples Collected: **TPH D, BTEX**

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)
1348	Begin Well	- dropped bailer, fish out				
1359	6.8	3600	19.7		1.0	
1402	6.9	3900	19.7		2.0	
1405	6.9	3800	19.5		3.0	
1415	Sample Well					

At Least Well Bore Volumes Were Evacuated Before Sampling

Discharge Rate = GPM x 0.00223 = cfs

Comments: **TPH-D x 3 for MS/MSD**

[Comments may continue on back]

Form Completed By:

Witnessed By:

USPCI SAMPLING AND WELL STABILIZATION FORM

USPCI Project Name: **UP Fueling Area, Oakland TOFC**	USPCI Project Number: **96199-01**
Measuring Point (MP) Location: **TOC**	**Well No. OMW-8**
Well Depth: (Below MP): **10.59** Feet	
Casing Diameter: **2** Inches	Sampling Date: **11/12/96**
Depth To Ground Water (Below MP): **6.65** Feet	Sample ID No. **OMW-8**
Method Of Well Development:	Time: **1540** ☐AM, ☐PM
☐ Tap ☐ Submersible Pump ☐ Bladder Pump	Riser Elevation (MP):
■ Bailer ☐ Centrifugal Pump ☐ Other	Top of Screen Elevation:
Sampling Collection Method:	Sample Appearance: **Clear, v. slightly turbid, orange**
☐ Tap ☐ Submersible Pump ☐ Bladder Pump Sample	Odor: **Slight**
■ Bailer Type: ○ Teflon ○ Stainless Steel	Sampling Problems (if any):
○ ABS Plastic ○ PVC ● HDPE	
Pump Intake Or Bailer Set At Feet Below MP	Decontamination Performed: **Probe**
Tubing Type (if Used):	
Tubing Used for: ☐ Sample Collection ☐ Well Development/Field Tests	Samples Collected: **TPH D, BTEX**

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)
1522	Begin Well					
1526	6.7	2600	18.9		0.75	
1528	6.6	2800	19.1		1.50	
1530	6.6	2900	19.0		2.25	
1540	Sample Well					

At Least Well Bore Volumes Were Evacuated Before Sampling Discharge Rate = GPM x 0.00223 = cfs

Comments: **Dupe = OMW-18 at 1550**

[Comments may continue on back]

Form Completed By: Witnessed By: