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SEMI-ANNUAL MONITORING REPORT
HYDROCARBON RECOVERY SYSTEM
UNION PACIFIC RAILROAD YARD
OAKLAND, CALIFORNIA
JULY TO DECEMBER, 1994

Prepared for
Union Pacific Railroad
by

USPCI
Remedial Services
5665 Flatiron Parkway
Boulder, Colorado 80301
Project Number 96199
December 20, 1994

UNION PACIFIC RAILROAD COMPANY

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File: Oakland, Ca.
Environmental

December 23, 1994

Mr. Safa Toma
East Bay Municipal Utility District
Source Control Division, Mail Slot 702
Post Office Box 24055
Oakland, Ca. 94623-1056

Dear Mr. Toma:

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 to December 1994) Monitoring Report" for our Hydrocarbon Recovery System in Oakland.

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

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

Yours truly,

Harry P. Patterson

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

CC: Ms. Jennifer Eberle
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CONTENTS

1. INTRODUCTION

In accordance to the East Bay Municipal Utility District (EBMUD) permit number 502-51231, this report was prepared by USPCI to provide semi-annual monitoring information pertaining to the hydrocarbon recovery and treatment system, and the groundwater monitoring wells located at the fueling area of the Union Pacific Railroad (UPRR) Oakland Trailer on Flat Car (TOFC) rail yard at 1717 Middle Harbor Road in Oakland, California. This report also contains quarterly information requested in the Alameda County Department of Environmental Health letter dated September 21, 1994 except capture zone maps and groundwater modeling results. This excluded information was previously provided in the "Third Quarter 1994 Monitoring Report," dated October 28, 1994. Background information about the site was presented in the report, "**Hydrocarbon Investigation and Remedial Design**," dated June 10, 1991. The results of the hydrocarbon investigation and a conceptual design of the hydrocarbon recovery and treatment system were also presented in the June 10, 1991 report. The system design was outlined in the, "**Preliminary Design Report**," dated September 5, 1991. As-built information for the groundwater recovery and treatment system has been presented in the "**Hydrocarbon Recovery System, As-Built Construction Report**," dated July 20, 1992. Any process changes in the hydrocarbon recovery and treatment system were presented in the letter from UPRR dated March 22, 1993, which represented the permit renewal document.

2. GROUNDWATER RECOVERY AND TREATMENT SYSTEM MONITORING

The recovery of floating non aqueous-phase liquid hydrocarbons as diesel (diesel) is accomplished by depressing the groundwater table with total fluids pumps and creating a cone of depression surrounding the recovery wells. The recovered groundwater is treated and discharged to the EBMUD sanitary sewer. 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 location of the three recovery wells and the water treatment facility are indicated on Figure 1.

2.1 SYSTEM OPERATION

During the operating period of July 1 to December 5, 1994, the groundwater recovery and treatment system treated approximately 340,000 gallons of groundwater. Since start-up on May 12, 1992 until December 5, 1994, the system has recovered approximately 5,560 gallons of diesel. Copies of the field log for the Hydrocarbon Recovery System have been included as Appendix A.

2.2 SYSTEM SAMPLING

On July 29 and October 28, 1994, water samples were collected from sampling ports located before, between, and after the granular activated carbon vessels. The samples were analyzed for total petroleum hydrocarbons as diesel (TPHd) using EPA method 8015 modified, and EPA method 8020 for benzene, toluene, ethylbenzene, and xylenes (BTEX). The samples collected on July 29, 1994, from the effluent of the second carbon vessel were also analyzed for phenolic compounds (EPA 8040), total metals (EPA SW-846 6010), cyanide (EPA 335.2), and oil and grease (EPA 5520).

On August 31, September 27, and November 6, 1994, water samples were collected from the sampling ports located before and between the granular activated carbon vessels. The water samples, collected from between the two granular activated carbon vessels, were used to monitor the breakthrough of organics on the first of two vessels. The samples collected before the granular activated carbon vessels were analyzed for TPHd. The samples collected between the carbon vessels were analyzed for BTEX. All analytical results are included as Appendix B without the quality assurance information (can be provided upon request).

2.3 ANALYTICAL RESULTS

Analytical results of BTEX and TPHd from the influent to the activated carbon system are indicated 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 the between carbon results has been included as Table 3.

2.3.1 INFLUENT WATER STREAM TO CARBON UNITS

Influent benzene concentrations of the water stream to the carbon units ranged from 0.0091 to 0.011 milligrams per liter (mg/L). Influent toluene concentrations ranged from below the detection limit of 0.0005 to 0.0031 mg/L. Ethylbenzene ranged from 0.0043 to 0.0095 mg/L. Xylenes ranged from 0.017 to 0.018 mg/L. Influent TPHd concentrations ranged from 1.4 to 39 mg/L.

2.3.2 EFFLUENT WATER STREAM FROM CARBON UNITS

Analytical results indicate that benzene, toluene, and ethylbenzene concentrations were below the method detection limit of 0.0005 mg/L for all the sampling events. Xylene concentrations ranged from below the method detection limit of 0.0005 to 0.0007 mg/L. All TPHd concentrations were below the method detection limit of 0.050 mg/L. The effluent was below the discharge limits in all cases. The discharge limits for BTEX are included in Table 2 with a summary of the analytical results. Analytical results indicated that phenolic compounds, cyanide, and oil and grease concentrations were below the method detection limits. The analytical results for arsenic reported a

concentration of 0.021 mg/L. The results for iron reported a concentration of 2.2 mg/L and 0.4 mg/L for the initial analysis and retest, respectively. All other metals were reported below the method detection limits.

2.3.3 WATER STREAM BETWEEN CARBON UNITS

BTEX results ranged from below the method detection limit of 0.0005 to 0.0017 mg/L for benzene in the sample collected on August 31, 1994. During the November 16, 1994 sampling event, all analytes indicated concentrations below the method detection limit of 0.0005 mg/L. The low concentrations may have been due to low influent concentrations during the November 16, 1994, sampling event. The carbon in the lead vessel was changed out on November 23, 1994. The second vessel became the lead carbon vessel during the change out.

2.4 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 estimate in Table 4 indicates that breakthrough should occur in January 1996. As discussed above, future sampling results will confirm the breakthrough of the lead vessel. Sample calculations, that are represented in Table 4, were presented with the "**Hydrocarbon Recovery System Quarterly Monitoring Report, Second Quarter, 1992**".

3. GROUNDWATER MONITORING

Fourth Quarter well gauging was performed on the ten monitoring wells at the TOFC railyard on November 15 and 16, 1994. A site map including monitoring well locations is illustrated by Figure 1. A potentiometric surface map for November 1994 is included as Figure 2. The potentiometric surface indicates a site-wide groundwater gradient to the southeast. Recent and historical fluid levels are presented in Table 5.

You mean SW

Pumping rates for the three well recovery system have continued to average between two and three gallons per minute. Pumping rates have remained relatively constant since system start-up in May 1992. System performance records are included in Appendix A.

Results of the November 1994 well gauging events indicated the presence of light non-aqueous phase liquids (LNAPLs) in monitoring wells OMW-4, OMW-7, and OMW-9. The presence of LNAPLs in these monitoring wells is consistent with previous gauging events. A product sheen was present in OMW-10. Product has been detected in OMW-10 in previous gauging events. Figure 3 illustrates the LNAPL thickness as measured in monitoring wells during the November 1994. Water level and product thickness measurements do not indicate that the LNAPL plume has migrated down-gradient.

Groundwater samples were collected during the fourth quarter sampling event on November 15 and 16, 1994. Monitoring wells OMW-1, OMW-2, OMW-3, OMW-5, OMW-6, and OMW-8 were sampled on these dates. OMW-4, OMW-7, OMW-9, and OMW-10 were not sampled due to the indication of product in the wells. Groundwater samples were analyzed for Total Petroleum Hydrocarbons (TPH) by Method 8015 Modified and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by Method 8020. Monitoring wells OMW-2, OMW-3, OMW-5, OMW-6, and OMW-8 indicated dissolved concentrations of TPH. Monitoring well OMW-5 indicated dissolved concentrations of BTEX. Analytical results for groundwater sampling are presented in Table 6 and Appendix B without the quality assurance information (can be provided upon request). A dissolved hydrocarbon concentration map is included in Figure 4 to illustrate the distribution of dissolved hydrocarbon compounds in groundwater at the site.

4. CONCLUSIONS

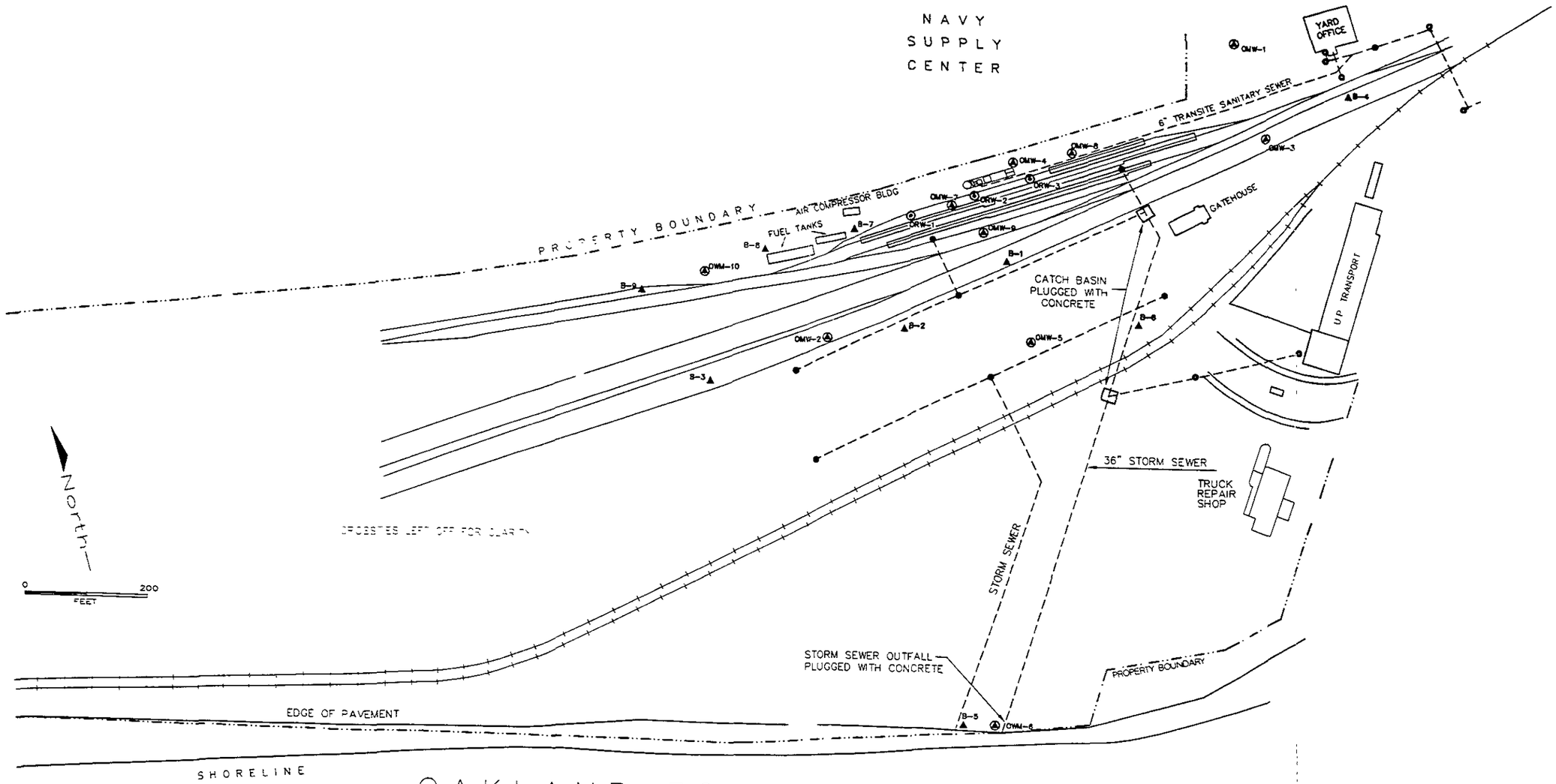
The following conclusions are made from the information collected since July 1, 1994:

- Water discharge from the Hydrocarbon Recovery System did not exceed the EBMUD discharge limits during the second semi-annual period of 1994.

- The monitoring well water level information for the fourth quarter of 1994 indicates a site-wide groundwater gradient to the southeast, which is consistent with previous monitoring events.

- Monitoring well water level measurements do not suggest that the LNAPL plume has migrated.

FIGURES



LEGEND

- MONITORING WELL LOCATION AND NUMBER
- BORING LOCATION AND NUMBER
- CATCH BASIN FOR STORM DRAIN
- RECOVERY WELLS

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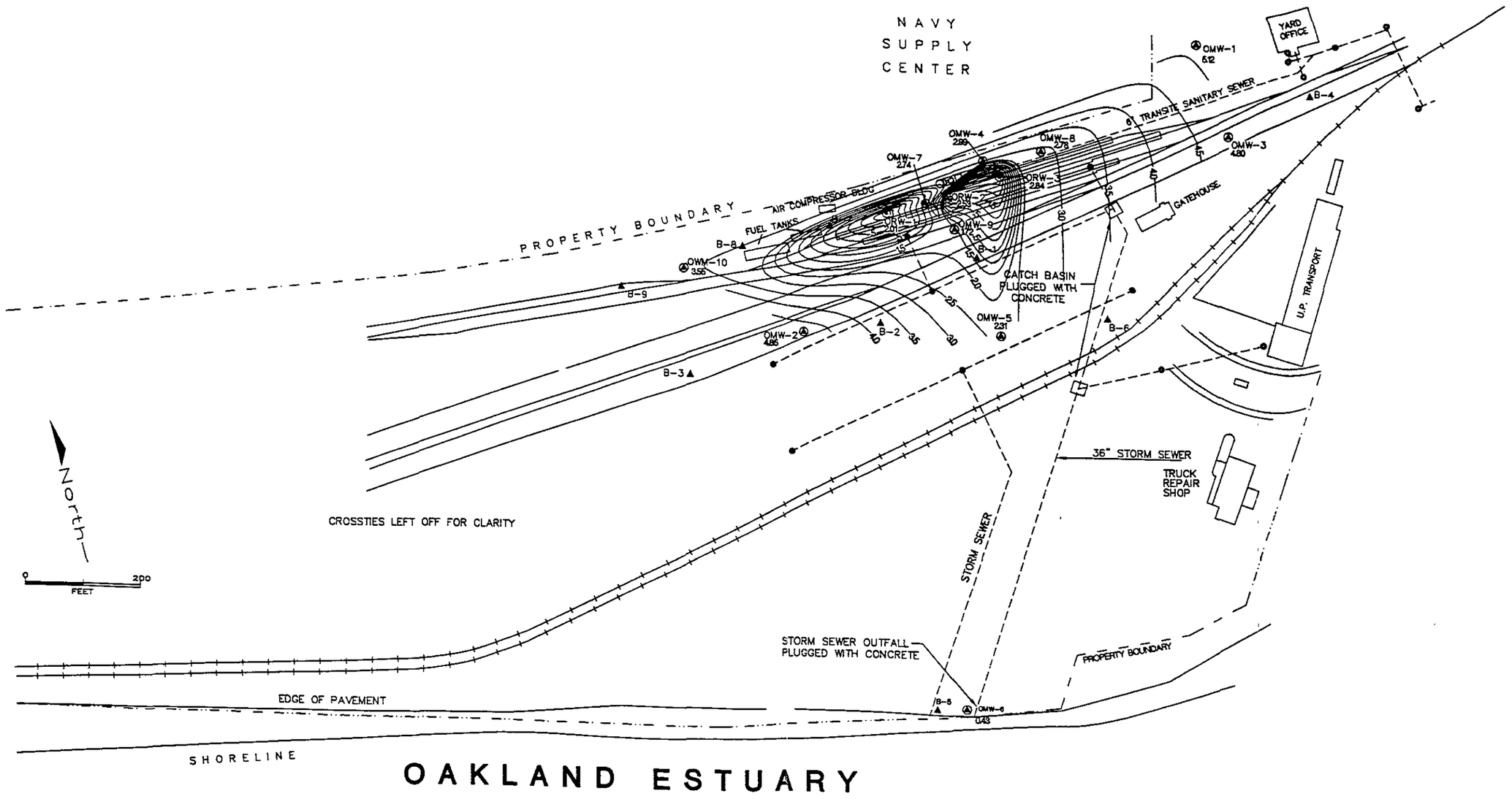
FIGURE 1
SITE MAP

SCALE | DATE | DWG No.



LEGEND

- MONITORING WELL LOCATION AND NUMBER
- BORING LOCATION AND NUMBER
- CATCH BASIN FOR STORM SEWER
- GROUNDWATER ELEVATION CONTOUR IN FEET (MSL)

	BY	DATE
DRAWN	WRB	12/16/94
DESIGNED		
APPROVED		
APPROVED		
APPROVED		

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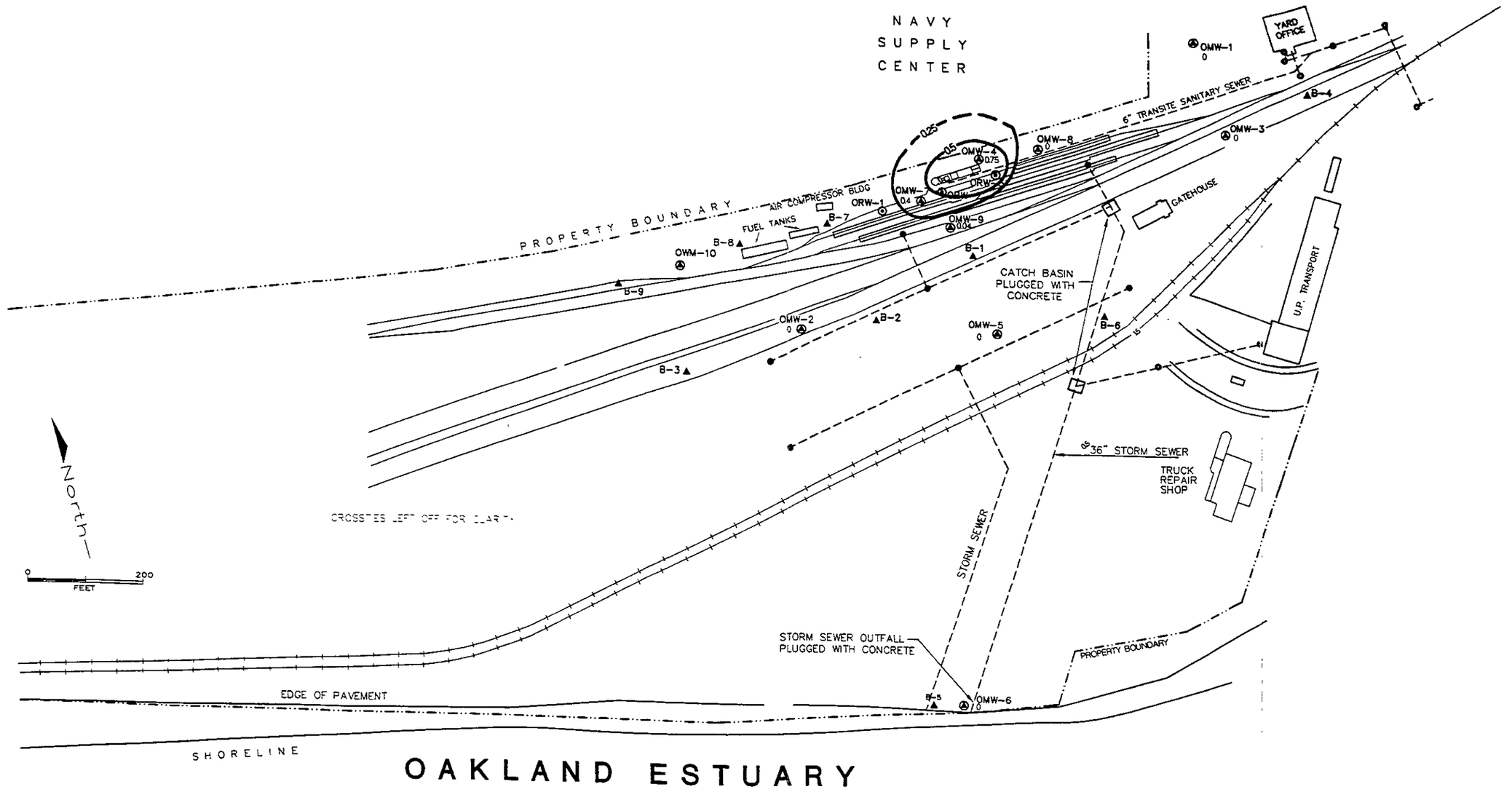
FIGURE 2
POTENTIOMETRIC SURFACE MAP NOVEMBER, 1994

SCALE	DATE	DWG NO
1" = 200'	12/16/94	96199-46



LEGEND

- MONITORING WELL LOCATION AND NUMBER
- BORING LOCATION AND NUMBER
- CATCH BASIN FOR STORM SEWER
- RECOVERY WELLS
- 99 FREE PRODUCT THICKNESS IN FEET
- PRODUCT THICKNESS CONTOUR IN FEET

BY	DATE
DRAWN WRB	12/16/94
DESIGN	
CHECKED	
APPROVED	
APPROVED	

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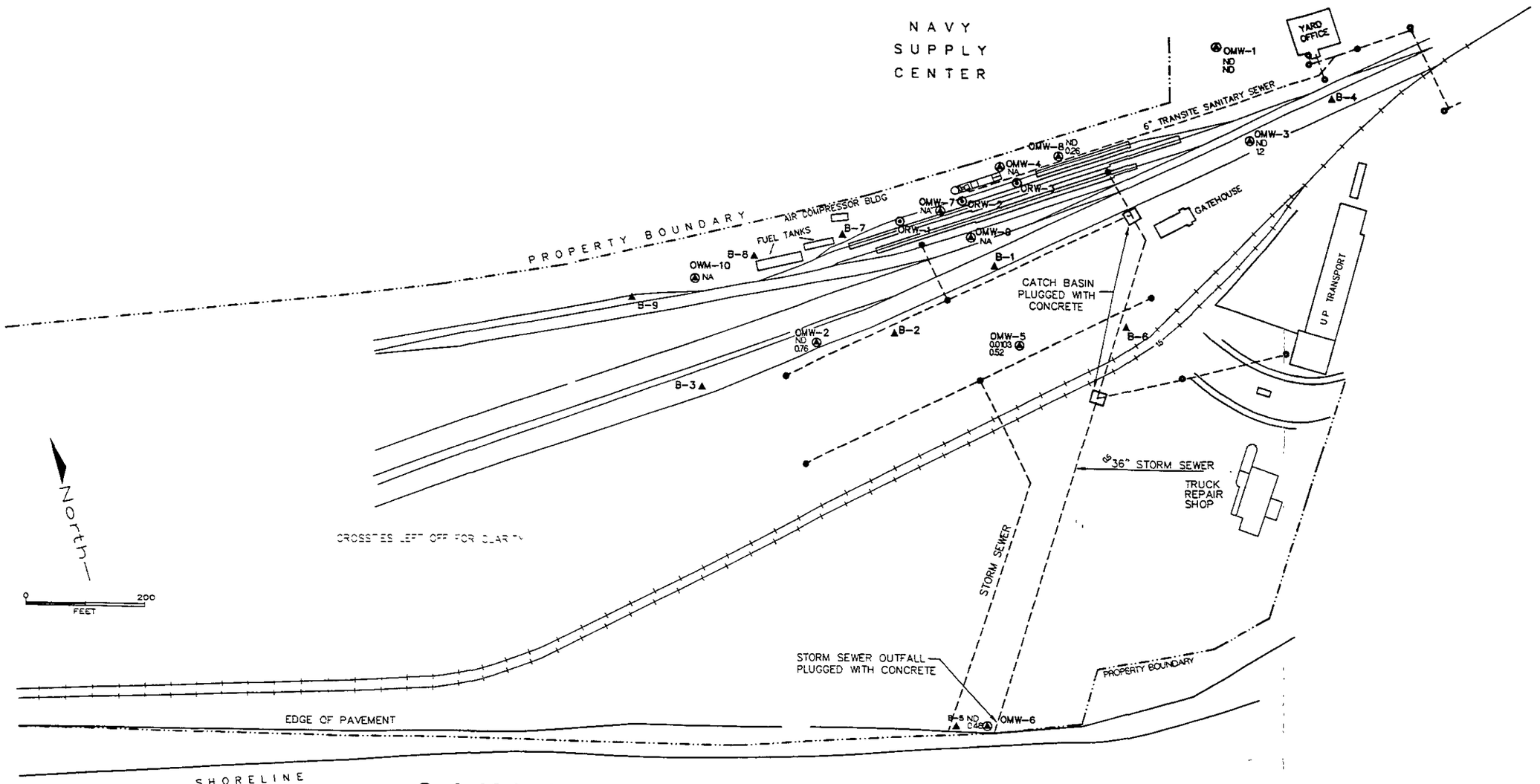
FIGURE 3
LNAPL THICKNESS MEASURED IN MONITORING WELLS
NOVEMBER 1994

SCALE	DATE	DWG NO.
1" = 200'	12/16/94	96'99-45



LEGEND

- MONITORING WELL LOCATION AND NUMBER
- BORING LOCATION AND NUMBER
- CATCH BASIN FOR STORM SEWER
- RECOVERY WELLS
- NON-DETECT <0.0005 mg/L FOR BTEX
- NON-DETECT <0.05 mg/L FOR TPH
- NOT ANALYZED

OMW-3 — MONITORING WELL IDENTIFICATION
5 — BTEX CONCENTRATION
— TPH CONCENTRATION

BY	DATE
WRB	12/16/94
DM	12/19/94
DM	12/22/94

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FIGURE 4
DISSOLVED BTEX AND TPH IN MONITORING WELLS, NOVEMBER 1994

SCALE	DATE	DWG NO.
1" = 200'	12/16/94	96199-44

TABLES

TABLE 1

Analytical Results
Influent Water Stream to Carbon Units
Hydrocarbon Treatment System
Oakland TOFC

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	45
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

NA -- Not Analyzed

oak\tab1

TABLE 2

Analytical Results
Effluent Water Stream from Carbon Units
Hydrocarbon Treatment System
Oakland TOFC

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

* – Discharge limits updated on May 4, 1994.
N/A – Not Applicable

TABLE 3

Analytical Results
Water Stream Between Carbon Units
Hydrocarbon Treatment System
Oakland TOFC

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

TABLE 4 (cont)

Hydrocarbon Treatment System
Granular Activated Carbon Usage
Oakland TOFC

Date	Time	Volume (gallons)	Periodic Flowrate (gpm)	Average Flowrate (gpm)	Influent Conc-TPH (mg/l)	Carbon Used (pounds)	Spent Carbon Estimate (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

TABLE 4 (cont)

Hydrocarbon Treatment System
Granular Activated Carbon Usage
Oakland TOFC

Date	Time	Volume (gallons)	Periodic Flowrate (gpm)	Average Flowrate (gpm)	Influent Conc–TPH (mg/l)	Carbon Used (pounds)	Spent Carbon Estimate (pounds)	Remaining Pumpable (gallons)	Remaining Pumpable (days)	Projected Breakthru Date
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	450295	408	Jan–96

* – Concentration estimate
+ – Changed carbon vessel on this date.

TABLE 5

Water Level Data
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
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
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

TABLE 5

Water Level Data
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-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 available
	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
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			NA	7.62		7.62
	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
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

TABLE 5

Water Level Data
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
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
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

TABLE 5

Water Level Data
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-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
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				
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				

TABLE 5

Water Level Data
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				

* 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
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
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	1.80	<0.0003	0.0005	<0.0003	<0.0009
	05/02/94	1.80	<0.0005	0.0023	<0.0005	0.00089
	11/15/94	1.20	<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
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
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

TABLE 6 (cont.)

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-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**********				

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.

APPENDIX A

FIELD LOGS
GROUNDWATER RECOVERY
AND TREATMENT SYSTEM

PROJECT # 96199

RES JOB # 4117

GROUNDWATER TREATMENT SYSTEM FIELD LOG

UNION PACIFIC RAILROAD - OAKLAND TOFC
1717 MIDDLE HARBOR ROAD

DATE	TIME	FLOW RATE	TOTALIZER SIGNET : NEPTUNE	PRODUCT LEVEL	FILTER PRESS. INLET	FILTER PRESS. OUTLET	COMMENTS MAINTENANCE, ADJUSTMENTS	CHLORINE FREE:TOTAL	pH	HARDNESS as $CaCO_3$
[D-M-Y]	[24:00]	[GPM]	[GALLONS:GALLONS]	[INCHES]	[PSIG]	[PSIG]	NOTES, OBSERVATIONS	[PPM]:[PPM]	[pH]	[PPM]
5-DEC-94	2:85pm	14.6	227648 2653300	<12	7.0	5.5	CHECKED SYSTEM & WELLS, SHUT OFF #2+3 FOR 12/6 REPAIRS	NO CHECK	—	—
23-NOV-94	11:15 AM	12.7	227251 2149300 : 2149300	<12	10.5	9.5	CHANGED OUT CARBON, REPLACED BAG FILTERS	NOT CHECK	—	—
18-NOV-94	10:58 ~~09:54~~	16.3	~~214936~~ 227048 : 2147168	<12	10.0	10.0	SYSTEM READINGS AFTER CHANGING BAG FILTERS	NOT CHECK	—	—
18-NOV-94	09:30	4.7	227035:2147065	<12	11.0	6.0	SYSTEM READINGS PRIOR TO CHANGING BAG FILTERS	NOT CHECK	—	—
16-NOV-94	15:05	3.9	226937:2145880	<12	11.5	6.0	COLLECTED "MONTHLY" WATER SAMPLES.	NOT CHECK	—	—
14-NOV-94	16:42	7.7	226855:2144927	<12	11.0	7.0	INSPECTED SOLAR SIPPER & G.W. TREATMENT SYSTEM	NOT CHECK	—	—
7-NOV-94	08:50	9.2	226497:2140775	<12"	10.0	8.0	INSPECTED SOLAR SIPPER AND GROUNDWATER TREAT SYSTEM	<0.4:<0.4	—	—
28-OCT-94	09:56	5.5	225460:2128994	0.0	11.0	6.0	COLLECTED "QUARTERLY" GROUNDWATER SAMPLES	>>3.0:>>3.0	—	—
27-OCT-94	15:27	5.8	225355:2127803	0.0	11.0	6.0		1.0 : 1.5	—	—
10-OCT-94	18:43	13.6	221722:2095975	0.0	10.0	8.0	RESPONDED TO CALL FROM UPRR THAT SOLAR SIPPER WAS LEAKING TURNED SIPPER OFF AND CLEANED-UP	NOT CHECK	—	—
4-OCT-94	11:23	10.0	219889:2065185	0.0	10.0	7.0	INSTALLED DRUM OF CHLORINE AND TURNED-ON METERING PUMP	NOT CHECK	—	—
28-SEPT-94	12:04	8.5	217958:2042520	0.0	10.0	6.0	FLUSHED PUMP DISCHARGE LINE, ADJUSTED PUMPS	<0.4:<0.4	—	—

MAIL COPIES MONTHLY TO: USPCI: 5665 FLATIRON PARKWAY: BOULDER, COLORADO 80301: ATTENTION MR. DENTON MAULDIN

PROJECT # 96199

RES JOB # 4117

GROUNDWATER TREATMENT SYSTEM FIELD LOG

UNION PACIFIC RAILROAD - OAKLAND TOFC
1717 MIDDLE HARBOR ROAD

OFFICE COPY

DATE	TIME	FLOW RATE	TOTALIZER SIGNET : NEPTUNE	PRODUCT LEVEL	FILTER INLET	PRESS. OUTLET	COMMENTS MAINTENANCE, ADJUSTMENTS	CHLORINE FREE:TOTAL	pH	HARDNESS as $CaCO_3$
[D-M-Y]	[24:00]	[GPM]	[GALLONS:GALLONS]	[INCHES]	[PSIG]	[PSIG]	NOTES, OBSERVATIONS	[PPM]:[PPM]	[pH]	[PPM]
28-SEPT-94	12:04	8.5	217958:2042520	0.0	10.0	6.0	FLUSHED PUMP DISCHARGE LINE. ADJUSTED PUMPS	<0.4:<0.4	—	—
27-SEPT-94		—	—	—	—	—	DETERMINED REASON FOR ALERT CONDITION & SYSTEM ON LINE AGAIN.	—	—	—
26-SEPT-94		OFF	—	—	—	—	MEASURED WELLS. ALERT CONDITION 4	—	—	—
23-SEPT-94	09:00	9.3 / 10.0	217532:2037537	0.0	11.0	7.0	SHIPPED 645 GALLONS DIESEL AND SKIMMED BIOMASS FROM OIL SEPARATOR	1.0/1.5	—	—
16-SEPT-94	18:10	15.1 / 16	215533:2014175	36.0	10.0	9.0	REPROGRAMMED DIALER PHONE NUMBER #1	NOT CHECK	—	—
WED. 7-SEPT-94	15:00	7.8	212558:1980720	36.0	10.0	6.0	RESET ALERT CONDITION 3 SYSTEM WAS ON LINE	0.0/0.6	—	—
1-SEPT-94	11:08	9.6	211700:1971472	31.5	10.0	6.0	INSTALLED A FULL DRUM OF CHLORINE	NOT CHECK	—	—
31-AUG-94	19:12	10.2 / 11.0	211392:1968287	31.0	11.0	6.0	COLLECTED WATER SAMPLES FROM INFLUENT AND MIDFLUENT	NOT CHECK	—	—
31-AUG-94	19:02	0.0	211392:1968287	31.0	11.0	11.0	TRANSFER PUMP WAS TURNED ON BUT NO FLOW	NOT CHECK	—	—
29-AUG-94	15:12	10.2	210519:1958900	26.5	10.5	6.0	ADJUSTED GROUNDWATER PUMPS	NOT CHECK	—	—
27-AUG-94	12:30	10.3 / 10	210432:1958000	26.5	10.0	6.0	REPROGRAMMED DIALER PHONE NUMBERS #1 AND #2.	NOT CHECK	—	—
27-AUG-94	12:21	5.6	210427:1957900	26.5	10.0	11.0	SKIMMED BIOMASS FROM FINAL AREA OF OIL/WATER SEPARATOR.	NOT CHECK	—	—
24-AUG-94	07:47	10.6 / 12	209607:1949287	26	11.0	6.0	REPROGRAMMED THE #1 PHONE DIALER TO A. JENSENS PASER No.	NOT CHECK	—	—
19-AUG-94	09:06	10.4 / 12	208775:1940209	19	11.0	6.0	SKIMMED BIOMASS FROM OUTFALL OF OIL/WATER SEPARATOR	NOT CHECK	—	—
4-AUG-94	09:18	0.0	204699:1895555	19	0.0	0.0	SKIMMED FLOATING, BIOGROWTH FROM FINAL AREA OF O/W SEP.	NOT CHECK	—	—
29-JUL-94	19:30	8.3	202901:1874900	18	10.0	6.0	ANNUAL SAMPLE; MEASURE AND BAIL; CHECK UPME	NOT CHECK	—	—

MAIL COPIES MONTHLY TO: USPCI: 5665 FLATIRON PARKWAY: BOULDER, COLORADO 80301: ATTENTION MR. DENTON MAULDIN

PROJECT # 96199 **RES JOB # 4117**

GROUNDWATER TREATMENT SYSTEM FIELD LOG

UNION PACIFIC RAILROAD - OAKLAND TOFC
1717 MIDDLE HARBOR ROAD

OFFICE COPY

DATE	TIME	FLOW RATE	TOTALIZER SIGNET : NEPTUNE	PRODUCT LEVEL	FILTER PRESS. INLET	FILTER PRESS. OUTLET	COMMENTS MAINTENANCE, ADJUSTMENTS	CHLORINE FREE:TOTAL	pH	HARDNESS as $CaCO_3$
[D-M-Y]	[24:00]	[GPM]	[GALLONS:GALLONS]	[INCHES]	[PSIG]	[PSIG]	NOTES, OBSERVATIONS	[PPM]:[PPM]	[pH]	[PPM]
23JUL94	21:42	OFF	201294:1857900	16"	OFF	OFF	REMOVED RES# FROM DIALER #2; RESPOND TO A.C. SHUTDOWN	—		
15 JULY 94	11:00	0.0 / 20.0	198361:1825040	14"	12.5 / 9.0	12.5 / 9.0	NO FLOW, CHANGED BAGS, STILL NO FLOW, BACKWASH #1, NO FLOW-TOTALIZER PLUGGED	—		
14JULY94	18:57	0.0	198278:1824382	14"	12.5	11.0	NO FLOW, BAG FILTERS PROBABLY PLUGGED.	—		
5 JULY 94	11:00	8A	19515/:1787345	12"	11.0	4.5	COND. 4 OVER WEEKEND, CORRECTION 3 WHEN ARRIVED BAGS NOT CHANGED.	1.5:3.0	AFTER ADDING 6 TABLETS	
1 JULY 94	10:00	0.0 / 20.0	193807:1771485	UNDER 12"	10.0	9.0	NO FLOW, BAGS PLUGGED	6.0:0.6		
28 JUNE 94	10:00	OFF / 19.0	192979:1757910	0.0	10.0	9.0	WONT SEE PRODUCT UNTIL 12" ACCUMULATES; CHANGED BOTH BAGS	0.0:0.6		
27 Jun 94	10:00	0.5 / 11.0	192693:1753175	45.0 / 0.0	10.0	8.0	Shipped Fuel / Changed Bags	0.0 :0.0		790 gallons Fuel shipped
23 Jun-94	14:00	off	1 X : X	38.5	X	X	Pulled #1+3 bags leaked bladder	0.0 :0.0	Holly Pattison on Site	
20-JUN-94	08:35	OFF	192549; 1733900	38.5	OFF	OFF	CLEAN UP, HAUL TRASH, NEW SUN	BAGS		
07-JUN-94	13:10	16.1	192157: 1701100	39	10	6	NEW BAG IN L.H. ONLY	0.0:0.0		
06-JUN-94	09:40	18.3	191907: 1696500	39	9.5	9.0	NEW 10 Au BAGS	—		
01-JUN-94	16:30	OFF		39	OFF	OFF	SAMPLE C D E	—		
26-MAY-94	13:30	6.4	190806: 167820	39.0	10.0	4.5	NEED MORE CHLORINE	0.0 0.0		
17-MAY-94	15:40	11.4	187403: 1638500	38+	9	7	USPCI CALLOUT Re POWER OFF ALL UP ON ARRIVAL	3.0 : ~~0~~		
13-MAY-94	12:39		185539: 1615920	38.5	10.0	7.5	ALL LOOKS VERY GOOD	0.6 : 1.0		
12-MY-94	15:23	14	18516/: 1611330	38	9.0	8.0	BACKWASHED 1ST CAMSTER	0.6 : 1.0		

MAIL COPIES MONTHLY TO: USPCI: 5665 FLATIRON PARKWAY: BOULDER, COLORADO 80301: ATTENTION MR. DENTON MAULDIN

APPENDIX B

ANALYTICAL RESULTS

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Riedel Environmental Services, Inc.

Attn: MIKE SULKA

Project 4117
Reported 08/06/94

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
92249- 1	STATION C INF	07/29/94	08/04/94	Water
92249- 2	STATION D MID	07/29/94	08/04/94	Water
92249- 3	STATION E EFF	07/29/94	08/12/94	Water

RESULTS OF ANALYSIS

Laboratory Number:	92249- 1	92249- 2	92249- 3
Benzene:	9.1	0.8	ND<0.5
Toluene:	ND<0.5	ND<0.5	ND<0.5
Ethyl Benzene:	4.3	ND<0.5	ND<0.5
Total Xylenes:	17	0.6	0.7
Diesel:	1400	NA	ND<50
Oil and Grease:	NA	NA	NA
PH:	NA	NA	5.7

Concentration:

Certified Laboratories
825 Arnold Dr., Suite 114 • Martinez, California 94553 • (510) 313-0850 / fax (510) 229-1526

Riedel Environmental Services, Inc.

Attn: MIKE SULKA

Project 4117
Reported 09-August-1994

TOTAL OIL & GREASE METHOD 5520.

Laboratory Number	Sample Identification	Matrix
92249- 3	STATION E EFF	Water

RESULTS OF ANALYSIS

Laboratory Number: 92249- 3

Oil and Grease:	ND<5000
Concentration:	ug/L

Certified Laboratories
825 Arnold Dr., Suite 114 • Martinez, California 94553 • (510) 313-0850 / fax (510) 229-1526

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Riedel Environmental Services, Inc.
Attn: MIKE SULKA

Reported 06-August-1994

Analysis for Total Metals

Laboratory Number	Sample Identification	Matrix
92249- 3	STATION E EFF	Water

RESULTS OF ANALYSIS

Laboratory Number: 92249- 3

Arsenic	(Sb):	0.021
Cadmium	(Cd):	ND<0.01
Chromium	(Cr):	ND<0.05
Copper	(Cu):	ND<0.05
Iron	(Fe):	2.2
Lead	(Pb):	ND<0.1
Mercury	(Hg):	
Nickel	(Ni):	ND<0.05
Silver	(Ag):	ND<0.05
Zinc	(Zn):	ND<0.05

Concentration: mg/L

Certified Laboratories
825 Arnold Dr., Suite 114 • Martinez, California 94553 • (510) 313-0850 / fax (510) 229-1526

Analytical Results
for
Superior Precision Analytical Laboratory
Client Reference: 92249
Clayton Project No. 94080.31

Sample Identification:	STATIME EFF	Date Sampled:	--
Lab Number:	9408031-01A	Date Received:	08/02/94
Sample Matrix/Media:	WATER	Date Extracted:	08/04/94
Extraction Method:	EPA 3510	Date Analyzed:	08/13/94
Method Reference:	EPA 8040	Analyst:	ASC

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
Phenols			
4-Chloro-3-methylphenol	59-50-7	ND	5
2-Chlorophenol	95-57-8	ND	5
2,4-Dichlorophenol	120-83-2	ND	5
2,4-Dimethylphenol	105-67-9	ND	5
2,4-Dinitrophenol	51-28-5	ND	10
2-Methyl-4,6-dinitrophenol	534-52-1	ND	10
2-Nitrophenol	88-75-5	ND	5
4-Nitrophenol	100-02-7	ND	10
Pentachlorophenol	87-86-5	ND	10
Phenol	108-95-2	ND	5
2,4,6-Trichlorophenol	88-06-2	ND	5
Surrogates		Recovery (%)	QC Limits (%)
2-Fluorophenol	367-12-4	41	21 - 100
2,4,6-Tribromophenol	118-79-6	76	10 - 123

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Superior Precision Analytical Laboratory
Client Reference: 92249
Clayton Project No. 94080.31

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9408031-02A	Date Received:	--
Sample Matrix/Media:	WATER	Date Extracted:	08/04/94
Extraction Method:	EPA 3510	Date Analyzed:	08/12/94
Method Reference:	EPA 8040	Analyst:	ASC

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
Phenols			
4-Chloro-3-methylphenol	59-50-7	ND	5
2-Chlorophenol	95-57-8	ND	5
2,4-Dichlorophenol	120-83-2	ND	5
2,4-Dimethylphenol	105-67-9	ND	5
2,4-Dinitrophenol	51-28-5	ND	10
2-Methyl-4,6-dinitrophenol	534-52-1	ND	10
2-Nitrophenol	88-75-5	ND	5
4-Nitrophenol	100-02-7	ND	10
Pentachlorophenol	87-86-5	ND	10
Phenol	108-95-2	ND	5
2,4,6-Trichlorophenol	88-06-2	ND	5
Surrogates		Recovery (%)	QC Limits (%)
2-Fluorophenol	367-12-4	66	21 - 100
2,4,6-Tribromophenol	118-79-6	91	10 - 123

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Superior Precision Analytical Laboratory
Client Reference: 92249
Clayton Project No. 94080.31

Sample Identification: See Below
Lab Number: 9408031
Sample Matrix/Media: WATER
Method Reference: EPA 335.2

Date Received: 08/02/94
Date Analyzed: 08/16/94

Lab Number	Sample Identification	Date Sampled	Cyanide, total (mg/L)	Method Detection Limit (mg/L)
-01	STATIME EFF	--	<0.01	0.01
-02	METHOD BLANK	--	<0.01	0.01

ND: Not detected at or above limit of detection
--: Information not available or not applicable

[redacted] 9224[redacted] [redacted] ALS [redacted] AS [redacted] STE [redacted] ST [redacted] FAXED TO [redacted] MIKE VERONA [redacted] BY [redacted] MIKE SULKO [redacted] [redacted]

ALSO: LIST MAY BE WITH KATTIE HILL AS FAXED FROM JOHN LIECHTI FOR PRICE QUOTE PREPARATION

RIEDEL ENVIRONMENTAL SERVICES, INC
4138 Lakeside Drive, Richmond, California 94806
Phone: (510) 222-7810 Fax: (510) 222-6868

Chain of Custody Request for Analysis

Laboratory: SUPERIOR
Contact: MIKE / [illegible]
Phone: 2 C9 1512
Date: 29-JUL-94
Page: 1 Of: 1

PROJECT INFORMATION

Project Manager: SULKA
Fax Results to: JENSEN At: 2226868
Also to: ______ At: ______
Send Report to: JENSEN
Sample Team (print): ART JENSEN MIKE SULKA
(signatures): [signature]
Project Name: UPRR
ROC.
Project #: 4117
P.O.#: ______
Turn Around Time: 10 Day (5 Day) 48 Hr. 24 Hr. Other ADRC

ANALYSES

Sample ID	Lab ID	Date	Time	Matrix	Preserv.	TPH – Gasoline (EPA 5030, 8015)	TPH – Diesel (EPA 3510/3550, 8015)	TEPH – Kerosene, Diesel, Motor Oil (EPA 3510/3550, 8015)	Purgeable Aromatics (BTEX) (EPA 602, 8020)	Purgeable Halocarbons (EPA 601, 8010)	Volatile Organics (EPA 624, 8240, 524.2)	SemiVolatile Organics (EPA 625/627, 8270, 525)	Total Oil & Grease (EPA 5520, B+F, E+F)	Total Recoverable Petroleum Hydrocarbons (EPA 418.1)	PHENOLIC COMPOUNDS EPA 9040	Metals: Cd, Cr, Pb, Zn, Ni Total or Soluble	CAM Metals (17) Total or Soluble	Lead (Pb) Total, Soluble, or Organic	Extraction TCLP or STLC (Wet)	pH [SU] OK TO EXCEED HOLD TIME	METALS AS LISTED	CN ADDED PER ART JENSEN 8/1/94 M.K.		Number of Containers
STATION 'C' INFLUENT		29 JUL 1994	17:30	W	YES		X		X															
STATION 'D' MIDFLUENT		29-JUL 1994	17:30	W	YES				X															
STATION 'E' EFFLUENT		29-JUL 1994	17:30	W	YES		X		X				X		X					X	X	X		
													WITH H_2SO_4		NOT PRESERVED					UNPRESERVED VOA	WITH HNO_3			

Comments:
VOA's without headspace
Samples preserved
Appropriate containers
Samples received...
N/A

SPECIAL INSTRUCTIONS:

SAMPLE RECEIPT
Total No. Containers ____
Head Space Y N
Rec'd Good Cond/Cold Y N
Conforms to Record Y N

COMMENTS:

RELINQUISHED BY (Sampler): [signature] 21:20
(Signature) (Time)
MIKE SULKA 29-JUL-94
(Printed Name) (Date)
RIEDEL ENVIRONMENTAL
(Company)

RELINQUISHED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (Laboratory): Val Dzamba
(Signature) (Time) 2128
(Printed Name) (Date) 7/29/94
(Company)

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Attn: ART JENSEN

Project 4117
Reported 13-September-1994

DIESEL by EPA Method 8015 Modified.

Laboratory Number	Sample Identification	Matrix
92486- 1	STATION C" INFLUENT	Water

RESULTS OF ANALYSIS

Laboratory Number: 92486- 1

Diesel:	2100
Concentration:	ug/L

Certified Laboratories
1555 Burke St., Unit 1 ▪ San Francisco, California 94124 ▪ (415) 647-2081 / fax (415) 821-7123

Attn: ART JENSEN

Project 4117
Reported 09-September-1994

ANALYSIS FOR BENZENE, TOLUENE, ETHYLBENZENE, & XYLENES

Laboratory Number	Sample Identification	Matrix
92486- 2	STATION D" MIDFLUENT	Water

RESULTS OF ANALYSIS

Laboratory Number: 92486- 2

Benzene:	1.7
Toluene:	ND<0.5
Ethyl Benzene:	ND<0.5
Total Xylenes:	ND<0.5
Concentration:	ug/L

-- Surrogate % Recoveries --
Trifluorotoluene (SS): 107

Certified Laboratories
1555 Burke St, Unit 1 • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

92486.

RIEDEL ENVIRONMENTAL SERVICES, INC
4138 Lakeside Drive, Richmond, California 94806
Phone: (510) 222-7810 Fax: (510) 222-6868

Chain of Custody Request for Analysis

Laboratory: SUPERIOR PRECISION Date: 8/31/94
Contact: MIKE VERONA Page: 1
Phone: (510) 313-0857 Of: 1

PROJECT INFORMATION

Project Manager: JOHN LIECHTI
Fax Results to: JOHN L. At: 222-6868
Also to: ART JENSEN At: 222-6868
Send Report to: ART JENSEN
Sample Team (print): ART JENSEN
(signatures): Art Jensen
Project Name: UPRR TOFC OAKLAND
Project #: 4117
P.O. #: 32006
Turn Around Time: 10 Day (5 Day) 48 Hr. 24 Hr. Other

ANALYSES / CONTAINERS

Sample ID	Lab ID	Date	Time	Matrix	Preserv.	TPH – Gasoline (EPA 5030, 8015)	TPH – Diesel (EPA 3510/3550, 8015)	TEPH – Kerosene, Diesel, Motor Oil (EPA 3510/3550, 8015)	Purgeable Aromatics BTEX (EPA 602, 8020)	Purgeable Halocarbons (EPA 601, 8010)	Volatile Organics (EPA 624, 8240, 524.2)	SemiVolatile Organics (EPA 625/627, 8270, 525)	Total Oil & Grease (EPA 5520, B+F, E+F)	Total Recoverable Petroleum Hydrocarbons (EPA 418.1)		Metals: Cd, Cr, Pb, Zn, Ni Total or Soluble	CAM Metals (17) Total or Soluble	Lead (Pb) Total, Soluble, or Organic	Extraction TCLP or STLC (Wet)					Number of Containers
STATION "C" INFLUENT		8/31/94	1934	WATER	4°C		✓																	2
STATION "D" MIDFLUENT		8/31/94	1934	WATER	HCL				✓															4

v4.9

Please Initial: NH
Samples Stored in ice. [initials]
Appropriate containers ✓
Samples preserved ✓
VOA's without headspace NA NH ✓
Comments:

SPECIAL INSTRUCTIONS:

SAMPLE RECEIPT
Total No. Containers
Head Space Y N
Rec'd Good Cond/Cold Y N
Conforms to Record Y N

COMMENTS:

RELINQUISHED BY (Sampler): (Signature) Art Jensen (Time) ; (Printed Name) ART JENSEN (Date) 9/1/94 ; (Company) RIEDEL ENVIRONMENTAL SERVICES, INC.

RELINQUISHED BY: (Signature) Michael Dubois (Time) 1:15 ; (Printed Name) Michael Dubois (Date) 9/1/94 ; (Company) ACCO

RELINQUISHED BY: (Signature) (Time) ; (Printed Name) (Date) ; (Company)

RECEIVED BY: (Signature) Michael Dubois (Time) 10:40 ; (Printed Name) Michael DUBOIS (Date) 9/1/94 ; (Company) ACCO

RECEIVED BY: (Signature) (Time) ; (Printed Name) (Date) ; (Company)

RECEIVED BY (Laboratory): (Signature) Nicki Heath (Time) 11:10 ; (Printed Name) NICKI HEATH (Date) 9/1/94 ; (Company) Superior

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Riedel Environmental Services, Inc.
Attn: ART JENSEN

Reported 04-October-1994

TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Laboratory Number	Sample Identification	Matrix
92669- 1	STATION "C" INFLUENT	Water

RESULTS OF ANALYSIS

Laboratory Number: 92669- 1

Diesel:	5900
Concentration:	ug/L

-- Surrogate % Recoveries --
Tetracosane Recovery: 126

Argon Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Riedel Environmental Services, Inc.
Attn: ART JENSEN

Reported 05-October-1994

ANALYSIS FOR BENZENE, TOLUENE, ETHYLBENZENE, & XYLENES

Laboratory Number	Sample Identification	Matrix
92669- 2	STATION "D" MIDFLUENT	Water

RESULTS OF ANALYSIS

Laboratory Number: 92669- 2

Benzene:	1.0
Toluene:	ND<0.5
Ethyl Benzene:	ND<0.5
Total Xylenes:	ND<0.5
Concentration:	ug/L

-- Surrogate % Recoveries --
Trifluorotoluene (SS): 127

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

RIEDEL ENVIRONMENTAL SERVICES, INC
4138 Lakeside Drive, Richmond, California 94806
Phone: (510) 222-7810 Fax: (510) 222-6868

Chain of Custody Request for Analysis

Laboratory: SUPERIOR PRECISION Date: 9/27/94
Contact: MIKE VERONA Page: 1
Phone: (510) 313-0857 Of: 1

PROJECT INFORMATION

Project Manager: JOHN LIECHTI
Fax Results to: JOHN At: (510) 222-6868
Also to: ART JENSEN At: "
Send Report to: ART JENSEN
Sample Team (print): ART JENSEN
(signatures): Art B Jensen
Turn Around Time: 10 Day (5 Day) 48 Hr. 24 Hr. Other

Project Name: UPRR TOFC OAKLAND, CA
Project #: 4117
P.O.#: 32007

Sample ID	Lab ID	Date	Time	Matrix	Preserv.	TPH – Gasoline (EPA 5030, 8015)	TPH – Diesel (EPA 3510/3550, 8015)	TEPH – Kerosene, Diesel, Motor Oil (EPA 3510/3550, 8015)	Purgeable Aromatics BTEX (EPA 602, 8020)	Purgeable Halocarbons (EPA 601, 8010)	Volatile Organics (EPA 624, 8240, 524.2)	SemiVolatile Organics (EPA 625/627, 8270, 525)	Total Oil & Grease (EPA 5520, B+F, E+F)	Total Recoverable Petroleum Hydrocarbons (EPA 418.1)		Metals: Cd, Cr, Pb, Zn, Ni Total or Soluble	CAM Metals (17) Total or Soluble	Lead (Pb) Total, Soluble, or Organic	Extraction TCLP or STLC (Wet)			1 LITER AMBER GLASS	40 ML. VOA GLASS	Number of Containers
STATION "C" INFLUENT		9/27/94	1514	WATER	4°C		✓															1		1
STATION "D" MIDFLUENT		9/27/94	1514	WATER	HCL & 4°C				✓														3	3

Please Initial: 9
Samples Stored in Ice: Yes
Appropriate containers: Yes
Samples [illegible]
VOA's w[illegible] Headspace
Comments:
6°C

SPECIAL INSTRUCTIONS:

SAMPLE RECEIPT

Total No. Containers
Head Space Y N
Rec'd Good Cond/Cold Y N
Conforms to Record Y N

COMMENTS:

RELINQUISHED BY (Sampler):
Art Jensen (Signature) (Time)
ART JENSEN 9/28/94 (Printed Name) (Date)
RIEDEL ENVIRONMENTAL SERVICES, INC. (Company)

RECEIVED BY:
Michael Dubois 10 Am (Signature) (Time)
Michael DUBOIS 9/28/94 (Printed Name) (Date)
AERO (Company)

RELINQUISHED BY:
Michael Dubois 10 Am (Signature) (Time)
Michael DUBOIS 9/28/94 (Printed Name) (Date)
AERO (Company)

RECEIVED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (Laboratory):
[illegible] 10:45 (Signature) (Time)
(Printed Name) 9/28/94 (Date)
(Company)

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Riedel Environmental Services, Inc.
Attn: JOHN LIECHTI

Reported 04-November-1994

ANALYSIS FOR BENZENE, TOLUENE, ETHYLBENZENE, & XYLENES

Laboratory Number	Sample Identification	Matrix
92915- 1	STATION C INFLUENT	Water
92915- 2	STATION D MIDFLUENT	Water
92915- 3	STATION E EFFLUENT	Water

RESULTS OF ANALYSIS

Laboratory Number:	92915- 1	92915- 2	92915- 3
Benzene:	11	1.2	ND<0.5
Toluene:	3.1	0.5	ND<0.5
Ethyl Benzene:	9.5	ND<0.5	ND<0.5
Total Xylenes:	18	0.9	0.6
Concentration:	ug/L	ug/L	ug/L
-- Surrogate % Recoveries --			
Trifluorotoluene (SS):	135	125	114

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-2429

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Riedel Environmental Services, Inc.
Attn: JOHN LIECHTI

Project # 4117
Reported 03-November-1994

TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Laboratory Number	Sample Identification	Matrix
92915- 1	STATION C INFLUENT	Water
92915- 3	STATION E EFFLUENT	Water

RESULTS OF ANALYSIS

Laboratory Number:	92915- 1	92915- 3
Diesel:	5500	ND<50
Concentration:	ug/L	ug/L
-- Surrogate % Recoveries --		
Tetracosane Recovery:	121	112

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-4429

RIED 72915

RIEDEL ENVIRONMENTAL SERVICES, INC
4138 Lakeside Drive, Richmond, California 94806
Phone: (510) 222-7810 Fax: (510) 222-6868

Chain of Custody Request for Analysis

Laboratory: SUPERIOR PRECISION
Contact: MIKE VERONA
Phone: (510) 313-0857
Date: 10/28/94
Page: 1 Of: 1

PROJECT INFORMATION

Project Manager: JOHN LIECHTI
Project Name: UPRR
Fax Results to: ART JENSEN At: (510) 222-6868
Also to: ______ At: ______
Project #: 4117
Send Report to: ART JENSEN
P.O. #: 32009
Sample Team (print): ART JENSEN
(signatures): Art Jensen
Turn Around Time: 10 Day (5 Day) 48 Hr. 24 Hr. Other ______

ANALYSES

Sample ID	Lab ID	Date	Time	Matrix	Preserv.	TPH – Gasoline w/ BTEX (EPA 5030, 8015/602, 8020)	TPH – Diesel (EPA 3510/3550, 8015)	TEPH – Kerosene, Diesel, Motor Oil (EPA 3510/3550, 8015)	Purgeable Aromatics BTEX (EPA 602, 8020)	Purgeable Halocarbons (EPA 601, 8010)	Volatile Organics (EPA 624, 8240, 524.2)	SemiVolatile Organics (EPA 625/627, 8270, 525)	Total Oil & Grease (EPA 5520, B+F, E+F)	Total Recoverable Petroleum Hydrocarbons (EPA 418.1)		Metals: Cd, Cr, Pb, Zn, Ni Total or Soluble	CAM Metals (17) Total or Soluble	Lead (Pb) Total, Soluble, or Organic	Extraction TCLP or STLC (Wet)			CONTAINERS: ONE LITER AMBER GLASS	40 ML CLEAR GLASS VOA	Number of Containers (TOTAL)
STATION "C" INFLUENT		10/27/94 AND 10/28/94	1620; 0935	WATER	HCL; 4°C		✓		✓													1	2	3
STATION "D" MIDFLUENT		10/28/94	0939	WATER	HCL; 4°C				✓														2	2
STATION "E" EFFLUENT		10/28/94	0947	WATER	HCL; 4°C		✓		✓													1	2	3

...Initial: PJ 4.0°C
Samples Stored in ice ✓
Appropriate containers ✓
Samples preserved ✓
VOA's without headspace
Comments:

SPECIAL INSTRUCTIONS:

SAMPLE RECEIPT
Total No. Containers ____
Head Space Y N
Rec'd Good Cond/Cold Y N
Conforms to Record Y N

RELINQUISHED BY (Sampler):
(Signature) Art Jensen (Time)
(Printed Name) ART JENSEN (Date) 10/28/94
(Company) RIEDEL ENVIRONMENTAL SERVICES

RELINQUISHED BY:
(Signature) Michael Dubois (Time) 1pm
(Printed Name) Michael Dubois (Date) 10/28
(Company) AERO

RELINQUISHED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY:
(Signature) Michael Dubois (Time) 1:00pm
(Printed Name) Michael Dubois (Date) 10/28
(Company) AERO

RECEIVED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (Laboratory):
(Signature) Flanjuly (Time) 1:30
(Printed Name) (Date) 10-28-94
(Company)

COMMENTS:
THE SAMPLES COLLECTED IN THE VOAs CONTAINED HCL (PRESERVATIVE).

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Iedel Environmental Services, Inc.
Attn: John Liechti

Project 4117
Reported on November 28, 1994

Total Petroleum Hydrocarbons as Diesel
by EPA SW-846 Method 8015M
Diesel Range quantitated as all compounds from C10 to C25

LAB ID	Sample ID	Matrix	Moisture
80086-01	STATION "C" INFLUENT	Water	-

RESULTS OF ANALYSIS

Compound	80086-01 Conc. RL ug/L
Diesel	39000 50

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke,St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S Cloverdale St . Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

edel Environmental Services, Inc.
n:

Project 4117
Reported on November 29, 1994

Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

AB ID	Sample ID	Matrix	Moisture
80086-02	STATION "D" INFLUENT	Water	-

R E S U L T S O F A N A L Y S I S

Compound	80086-02 Conc. ug/L	RL
Gasoline_Range	ND	50
nzene	ND	0.5
luene	ND	0.5
Ethyl Benzene	ND	0.5
tal Xylenes	ND	0.5
>> Surrogate Recoveries (%) <<		
rifluorotoluene (SS)	124	

Certified Laboratories

825 Arnold Dr . Suite 114
Martinez, California 94553
229-1512 / fax (510) 229-152

1555 Burke St . Unit I
San Francisco, California 94124
(415) 647-208 / fax (415) 821-7123

309 S Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Project 4117
Reported on November 29, 1994

Attn: John Liechti

Volatile Aromatic Hydrocarbons by EPA SW-846 Method 5030/8020

LAB ID	Sample ID	Matrix	Moisture
80086-02	STATION "D" MIDFLUENT	Water	-

R E S U L T S O F A N A L Y S I S

Compound	80086-02 Conc. ug/L	RL
Benzene	ND	0.5
Toluene	ND	0.5
Ethyl Benzene	ND	0.5
Xylenes	ND	0.5
Surrogate Recoveries (%) <<		
Trifluorotoluene (SS)	124	

Certified Laboratories

325 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 321-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8427

Job # 80086

RIEDEL ENVIRONMENTAL SERVICES, INC
4138 Lakeside Drive, Richmond, California 94806
Phone: (510) 222-7810 Fax: (510) 222-6868

Chain of Custody Request for Analysis

Laboratory: SUPERIOR PRECISION
Contact: MIKE VERONA
Phone: (510) 313-0857
Date: 11/16/94
Page: 1
Of: 1

PROJECT INFORMATION

Project Manager: JOHN LIECHTI
Fax Results to: JOHN L. At: (510) 222-6868
Also to: ______ At: ______
Send Report to: JOHN LIECHTI
Sample Team (print): ART JENSEN
(signatures): Art Jensen
Turn Around Time: 10 Day (5 Day) 48 Hr. 24 Hr. Other ______

Project Name: UPRR.
Project #: 4117
P.O.#: 32012

Sample ID	Lab ID	Date	Time	Matrix	Preserv.	TPH – Gasoline (EPA 5030, 8015)	TPH – Diesel (EPA 3510/3550, 8015)	TEPH – Kerosene, Diesel, Motor Oil (EPA 3510/3550, 8015)	Purgeable Aromatics BTEX (EPA 602, 8020)	Purgeable Halocarbons (EPA 601, 8010)	Volatile Organics (EPA 624, 8240, 524.2)	SemiVolatile Organics (EPA 625/627, 8270, 525)	Total Oil & Grease (EPA 5520, B+F, E+F)	Total Recoverable Petroleum Hydrocarbons (EPA 418.1)		Metals: Cd, Cr, Pb, Zn, Ni Total or Soluble	CAM Metals (17) Total or Soluble	Lead (Pb) Total, Soluble, or Organic	Extraction TCLP or STLC (Wet)			1L AMBER GLASS BOTTLE	40ML CLEAR GLASS VOAS	Number of Containers
STATION "C" INFLUENT		11/16/94	1500	WATER	4°C		✓															1		1
STATION "D" MIDFLUENT		11/16/94	1500	WATER	HCL, 4°C				✓														2	2

SPECIAL INSTRUCTIONS:

SAMPLE RECEIPT
Total No. Containers ___
Head Space Y N
Rec'd Good Cond/Cold Y N
Conforms to Record Y N

COMMENTS:

RELINQUISHED BY (Sampler):
(Signature) Art Jensen (Time)
(Printed Name) ART JENSEN (Date) 11/16/94
(Company) RIEDEL ENVIRONMENTAL SERVICES, INC.

RECEIVED BY:
(Signature) Don Dellend #730 (Time) 10:45 am
(Printed Name) (Date) 11-18-94
(Company) AERO DELIVERY

RELINQUISHED BY:
(Signature) Don Dellend (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY:
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (Laboratory):
(Signature) (Time)
(Printed Name) D. VERONA (Date) 11/18/94
(Company) SPL MPT 11:10 AM

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

U.S.P.C.I.
5665 Flat Iron Parkway
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: 96199, UPRR-TOFC Oakland
Sample Matrix: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 411-0776

Sampled: Nov 15-16, 1994
Received: Nov 16, 1994
Reported: Dec 2, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 411-0776 OMW-1	Sample I.D. 411-0777 OMW-3	Sample I.D. 411-0778 OMW-8	Sample I.D. 411-0779 OMW-DUP	Sample I.D. 411-0780 OMW-2	Sample I.D. 411-0781 OMW-5
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.	1.2
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	1.4
Total Xylenes	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	7.7
Chromatogram Pattern:		--	--	--	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed	11/21/94	11/22/94	11/21/94	11/22/94	11/21/94	11/21/94
Instrument Identification:	HP-5	HP-4	HP-5	HP-4	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	97	88	96	88	93	97

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

Karen L. Enstrom
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

U.S.P.C.I.
5665 Flat Iron Parkway
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: 96199, UPRR-TOFC Oakland
Sample Matrix: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 411-0782

Sampled: Nov 16, 1994
Received: Nov 16, 1994
Reported: Dec 2, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 411-0782 OMW-6
Purgeable Hydrocarbons	50	81
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Total Xylenes	0.50	N.D.
Chromatogram Pattern:		Discrete Peak

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Analyzed:	11/21/94
Instrument Identification:	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	97

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

Karen L. Enstrom
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite B, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

U.S.P.C.I.
5665 Flat Iron Parkway
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: 96199, UPRR-TOFC Oakland
Sample Matrix: Water
Analysis Method: EPA 3510/8015
First Sample #: 411-0776

Sampled: Nov 15-16, 1994
Received: Nov 16, 1994
Reported: Dec 2, 1994

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 411-0776 OMW-1	Sample I.D. 411-0777 OMW-3	Sample I.D. 411-0778 OMW-8	Sample I.D. 411-0779 OMW-DUP	Sample I.D. 411-0780 OMW-2	Sample I.D. 411-0781 OMW-5
Extractable Hydrocarbons	50	N.D.	1,200	260	690	260	520
Chromatogram Pattern:		--	Diesel and Unidentified Hydrocarbons >C20	Diesel and Unidentified Hydrocarbons >C16	Unidentified Hydrocarbons >C20	Diesel and Unidentified Hydrocarbons >C16	Diesel and Unidentified Hydrocarbons >C20

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Extracted:	11/22/94	11/22/94	11/22/94	11/22/94	11/23/94	11/23/94
Date Analyzed:	12/1/94	12/1/94	12/1/94	12/1/94	12/1/94	12/1/94
Instrument Identification:	HP-3B	HP-3B	HP-3B	HP-3B	HP-3A	HP-3B

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

SEQUOIA ANALYTICAL, #1271

Karen L. Enstrom
Project Manager

4110776.USP <3>

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

U.S.P.C.I.
5665 Flat Iron Parkway
Boulder, CO 80301
Attention: Denton Mauldin

Client Project ID: 96199, UPRR-TOFC Oakland
Sample Matrix: Water
Analysis Method: EPA 3510/8015
First Sample #: 411-0782

Sampled: Nov 16, 1994
Received: Nov 16, 1994
Reported: Dec 2, 1994

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 411-0782 OMW-6
Extractable Hydrocarbons	50	460
Chromatogram Pattern:		Diesel and Unidentified Hydrocarbons >C20

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Extracted:	11/23/94
Date Analyzed:	11/30/94
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

Karen L. Enstrom
Project Manager

USPCI
A Subsidiary of Union Pacific Corporation

Ship To: USPCI Remedial Services
24125 Aldine Westfield
Spring, TX 77373
(713) 350-7240

N[redacted]01[redacted]4

REPORT TO

CONTACT: Dennis N[redacted]
COMPANY: USPCI
ADDRESS: 7 5665 Flatiron Pkwy
CITY: Boulder ST. CO ZIP 80301
PHONE: 303-938-5539 FAX 303-938-5520

BILL TO

CONTACT: Same[redacted]
COMPANY:
ADDRESS:
CITY: ST. ZIP
PHONE: PO #

CHAIN OF CUSTODY RECORD

PROJ. NO. 96199
PROJECT NAME UPRR-TOFC OAKLAND
SAMPLERS (SIGNATURE) [signatures]

STANDARD TURNAROUND X
RUSH TURNAROUND (specify required date)

1 of 2

CUSTOMER SAMPLE I.D.	DATE	TIME	MATRIX	# CONTAINERS	BTEX 8020	TPHMO 8015	LABORATORY SAMPLE I.D.	REMARKS
OMW-1	11-15-94	1520	H_2O	2	X		4110776	A-C
OMW-1	↓	1520	↓	1		X		
OMW-3	↓	1650	↓	2	X		4110777	A-C
OMW-3	↓	1650	↓	1		X		
OMW-8	↓	1545	↓	2	X		4110778	A-C
OMW-8	↓	1545	↓	1		X		
OMW-DUP	↓	1200	↓	2	X		4110779	A-C
OMW-DUP	↓	1200	↓	1		X		
OMW-2	11-16-94	0855	↓	2	X		4110780	A-C
OMW-2	↓	0855	↓	1		X		
OMW-5	↓	0820	↓	2	X		4110781	A-C
OMW-5	↓	0820	↓	1		X		

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME	COURIER
[signature]	11-16-94 15:06			
RELINQUISHED BY	DATE / TIME	RECEIVED BY: RD Kelley	DATE / TIME: 11/16/94	AIRBILL NO. 3:06 pm

USPCI
A Subsidiary of Union Pacific Corporation

Ship To: USPCI Remedial Services
24125 Aldine Westfield
Spring, TX 77373
(713) 350-7240

REPORT TO
[redacted]ONTA[redacted]
COMPANY USPCI
ADDRESS 5665 Flatiron Pkwy
CITY Boulder ST CO ZIP 80301
PHONE 303-938-5539 FAX 303-938-5520

BILL TO
CO[redacted]CT [redacted]
COMPANY
ADDRESS
CITY ST ZIP
PHONE PO #

CHAIN OF CUSTODY RECORD

PROJ. NO. 96199
PROJECT NAME UPRR - TOFC Oakland
SAMPLERS (SIGNATURE) [signature] [signature]

STANDARD TURNAROUND X
RUSH TURNAROUND (specify required date)
2 of 2

CUSTOMER SAMPLE I.D.	DATE	TIME	MATRIX	# CONTAINERS	(G) TPH 8020	TPH-D 8015										LABORATORY SAMPLE I.D.	REMARKS
DMW-6	11-16-94	0955	H_2O	2	X											4110782	A-C
DM-6	11-16-94	0955	H_2O	1		X											

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME	COURIER
[signature]	11-16-94 15:06			
RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME	AIRBILL NO.
		RA Kelley	11/16/94	3:06 pm