

**FOURTH QUARTER 1996  
MONITORING REPORT**

**UNION PACIFIC MOTOR FREIGHT  
FACILITY  
OAKLAND, CALIFORNIA**

**USPCI/LAIDLAW PROJECT No.  
792919-844**

**PREPARED FOR:**

**UNION PACIFIC RAILROAD  
ENVIRONMENTAL MANAGEMENT  
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**Prepared by:**

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**January 29, 1997**

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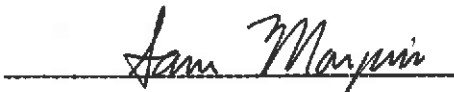
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## 1.0 INTRODUCTION

USPCI, a Laidlaw Company (Laidlaw) prepared this document on behalf of Union Pacific Railroad (UPRR) as part of the groundwater monitoring and reporting program at the Union Pacific Motor Freight (UPMF) facility at 1750 Ferro Street in Oakland, California (Figure 1). The report was prepared in response to an April 29, 1993 Alameda County Department of Environmental Health, Hazardous Materials Division (ACDEH) request for UPRR to begin a quarterly monitoring program at the UPMF facility.

The quarterly monitoring program consists of the collection of fluid-level measurements in the groundwater monitoring wells and an analysis of dissolved contaminants in groundwater. The monitoring program is directed towards an understanding of the groundwater gradient and the changes in the concentration of dissolved petroleum hydrocarbons at the site. Field and analytical data from this program are compiled in this report. This report includes a discussion of the background information about the site, field and analytical results, and conclusions and recommendations.

## 2.0 BACKGROUND INFORMATION

The following subsections present information about the site history and investigative procedures.

### 2.1 SITE HISTORY

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

Five underground storage tanks (USTs) were removed from the UPMF site between 1987 and 1990. As a result of the tank removal activities, a site assessment was performed in two phases to define the extent of petroleum hydrocarbons in the soil and groundwater (Laidlaw, 1993). All petroleum hydrocarbons found at the site have been identified as either used motor oil or "bunker C." For brevity, the light non-aqueous phase of these hydrocarbons are referred to as "product."

The refueling portion of the TOFC yard, approximately 700 feet northwest and upgradient of the UPMF site, is currently undergoing groundwater remediation for recovery of non-aqueous phase liquid as diesel. (The refueling area is a separate project and is not the subject of this report.) The extent of contamination at the refueling area was defined during previous investigations (Laidlaw, 1993). On the basis of these investigations and subsequent monitoring, petroleum hydrocarbons from the refueling area do not extend to the UPMF facility.

## 2.2 INVESTIGATIVE PROCEDURES

UPRR has subcontracted Burns and McDonnell Waste Consultants, Inc. to perform a portion of the fieldwork associated with the project. Laidlaw and the UPRR subcontractor followed the standard operating procedures previously supplied to and approved by the ACDEH (Laidlaw, 1994). The quarterly monitoring activities consist of the following:

- Measuring-fluid levels in all of the motor freight facility groundwater monitoring wells;
- Purging and sampling groundwater monitoring wells where product is not observed;
- Analyzing groundwater samples for petroleum hydrocarbons and constituents;
- Removing product from the recovery well (RW) and monitoring the performance of the product skimmer; and
- Determining the local hydraulic gradient based on the groundwater level measurements.

All samples were analyzed for: total petroleum hydrocarbons as diesel (TPH-D) by EPA Method 8015 Modified; total petroleum hydrocarbons as gasoline (TPH-G) by EPA Method 8015 Modified; and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020.

Fluid-level measurements are collected from the recovery well RW and monitoring wells OKUS-W5 and OKUS-W6 on a monthly basis. These measurements are collected to assess the temporal variations in the thickness of product. Fluid-level measurements are collected from the remaining monitoring wells on a quarterly basis.

### 3.0 FIELD INVESTIGATION RESULTS

The following subsections present the findings from activities completed during the monitoring event.

#### 3.1 FLUID-LEVEL MEASUREMENTS

Fluid-levels were measured on November 12, 1996 and are compiled into Table 1. The data were used to produce the groundwater elevation map presented as Figure 3. A decrease in groundwater elevations relative to the previous monitoring events (first, second, and third quarters 1996) was noted in all of the monitoring wells gauged at the site. Since 1995, groundwater elevations have been highest during the first quarter of each year. These elevations typically decrease during the second, third, and fourth quarters.

Monitoring well APL/UP-W1 was not gauged or sampled during the event because stacked container trailers were placed directly upon the well head. Laidlaw personnel did not observe any visible damage to the well. Monitoring well OKUS-W4 was not gauged or sampled because of visible damage to the well head. Abandonment of well OKUS-W4 is pending approval by the ACDEH.

#### 3.2 GROUNDWATER GRADIENT

The groundwater gradient at the site averaged approximately ~~0.006 feet per foot~~ (45 feet per mile) and the observed groundwater flow direction ~~was to the south~~. The groundwater gradient and flow direction were consistent with gradients and flow directions observed during previous monitoring events. The lack of product observed during the collection of fluid-level measurements in groundwater monitoring wells indicates that product has not migrated downgradient.

#### 3.3 ANALYTICAL RESULTS

Analytical results for all monitoring wells sampled during the fourth quarter 1996 monitoring event were compiled into Table 2. Samples were collected from monitoring wells OKUS-W1, OKUS-W2, OKUS-W3, OKUS-W7, OKUS-W8, and APL/UP-W2.

Monitoring well OKUS-W1 did not contain dissolved BTEX concentrations above the method detection limit (MDL) of 0.50 micrograms per liter ( $\mu\text{g/l}$ ). The sample collected from monitoring well OKUS-W2 contained dissolved BTEX. Benzene and toluene were detected in the sample collected from monitoring well OKUS-W3. The sample collected from monitoring wells OKUS-W7 contained only dissolved benzene and the sample from OKUS-W8 contained only dissolved xylenes. The downgradient well APL/UP-W2 contained detectable concentrations of BEX.

Benzene concentrations ranged from below the MDL in OKUS-W1 and OKUS-W8 to 220  $\mu\text{g/l}$  in OKUS-W3. Toluene ranged from below the MDL in OKUS-W1, OKUS-W7, OKUS-W8, and APL/UP-W2 to 60  $\mu\text{g/l}$  in OKUS-W3. Ethylbenzene ranged from below the MDL in OKUS-W1, OKUS-W3, OKUS-W7, and OKUS-W8 to 130  $\mu\text{g/l}$  in OKUS-W2. Xylenes ranged from below the MDL in OKUS-W1, OKUS-W3, and OKUS-W7 to 64  $\mu\text{g/l}$  in OKUS-W2. Total BTEX concentrations ranged from below the MDL of 0.50  $\mu\text{g/l}$  (OKUS-W1) to 390  $\mu\text{g/l}$  (OKUS-W2).

Dissolved TPH-G, indicative of gasoline, was detected in the samples collected from monitoring wells OKUS-W2, OKUS-W3, OKUS-W7, OKUS-W8, and APL/UP-W2. Monitoring well OKUS-W1 did not contain detectable levels of TPH-G contamination. The TPH-G concentrations ranged from below the MDL of 50  $\mu\text{g/l}$  (OKUS-W1) to 7,400  $\mu\text{g/l}$  (OKUS-W3).

Dissolved TPH-D concentrations indicating diesel fuel, were detected in the samples collected from all monitoring wells sampled during the during the fourth quarter 1996 monitoring event. TPH-D concentrations ranged from 180  $\mu\text{g/l}$  (OKUS-W1) to 4,700  $\mu\text{g/l}$  (OKUS-W3).

Groundwater analytical results for the wells at the site are presented in Table 2. The dissolved BTEX plume in the groundwater is presented in Figure 4. Analytical reports and chain of custody forms are included in Appendix B.

### 3.4 NON-AQUEOUS PHASE LIQUID

Fluid-level measurement data indicated that monitoring wells OKUS-W5 and OKUS-W6 continued to contain "bunker C" type product. An accurate determination of product thicknesses in OKUS-W5 and OKUS-W6 was not possible due to the high viscosity of the product and difficulty in measuring product thickness.

Although no product/water interface was detected in recovery well RW during the fourth quarter sampling event, Laidlaw personnel detected product on the gauging probe indicating the presence of product in the well. Burns and McDonnell field personnel reported an observable product thickness for the month of December. During the fourth quarter of 1996, the product skimmer system recovered approximately 1.5 gallons of product.

Burns and McDonnell personnel were not able to measure the depth to product in monitoring wells OKUS-W5 and OKUS-W6 during September and December 1996 because of the viscosity of the product in the wells.

## 4.0 CONCLUSIONS

On the basis of the information in the previous sections, Laidlaw concludes that:

- The groundwater flow to the east with an average gradient of 0.0086 foot per foot (45 feet per mile) is consistent with previous monitoring events.
- The dissolved BTEX and TPH concentrations are consistent with historical concentrations in groundwater.
- The product observed in wells OKUS-W5, OKUS-W6, and RW, does not appear to have migrated downgradient.

## 5.0 REFERENCES

Laidlaw, 1993. "Phase II Site Assessment Report," Union Pacific Railroad, October, 1993.

Laidlaw, 1994. "Fourth Quarter 1993, Monitoring Event," Union Pacific Railroad, May 1994.



**TABLE 1  
FLUID LEVEL MEASUREMENT DATA  
UNION PACIFIC RAILROAD  
OAKLAND MOTOR FREIGHT FACILITY**

WELL NO.	ELEV.* TOC	DATE	DEPTH TO PRODUCT	PRODUCT THICKNESS	DEPTH TO WATER	WATER ELEV.	CORR'D ELEV.
OKUS-W1	9.17	08/09/95	N/A	NP	8.18	0.99	0.99
	9.17	11/29/95	N/A	NP	8.78	0.39	0.39
	9.17	02/27/96	N/A	NP	7.58	1.59	1.59
	9.17	05/29/96	N/A	NP	7.80	1.37	1.37
	9.17	08/27/96	N/A	NP	8.34	0.83	0.83
	9.17	11/12/96	N/A	NP	8.71	0.46	0.46
OKUS-W2	9.71	08/09/95	N/A	NP	9.09	0.62	0.62
	9.71	11/29/95	N/A	NP	9.89	0.02	0.02
	9.71	02/27/96	N/A	NP	8.49	1.22	1.22
	9.71	05/29/96	N/A	NP	8.72	0.99	0.99
	9.71	08/27/96	N/A	NP	9.24	0.47	0.47
	9.71	11/12/96	N/A	NP	9.63	0.08	0.08
OKUS-W3	9.80	08/09/95	N/A	NP	9.41	0.39	0.39
	9.80	11/29/95	N/A	NP	9.97	-0.17	-0.17
	9.80	02/27/96	N/A	NP	8.73	1.07	1.07
	9.80	05/29/96	N/A	NP	8.94	0.86	0.86
	9.80	08/27/96	N/A	NP	9.52	0.28	0.28
	9.80	11/12/96	N/A	NP	9.90	-0.10	-0.10
OKUS-W4	7.35	08/09/95	N/A	NP	6.10	1.25	1.25
	7.35	11/29/95	N/A	NP	6.70	0.65	0.65
	N/A	02/27/96	N/A	NP	WELL INACCESSABLE		
	N/A	05/29/96	N/A	NP	WELL DESTROYED		
	N/A	08/27/96	N/A	NP	WELL DESTROYED		
	N/A	11/12/96	N/A	NP	WELL DESTROYED		
OKUS-W5	9.25	08/09/95	N/A	Trace	9.75	-0.50	-0.50
	9.25	09/07/95	N/A	Trace	9.56	-0.31	-0.31
	9.25	10/18/95	9.82	P	---	---	---
	9.25	11/10/95	9.97	P	---	---	---
	9.25	12/15/95	9.60	P	---	---	---
	9.25	01/10/96	9.58	P	---	---	---
	9.25	02/16/96	9.06	P	---	---	---
	9.25	03/25/96	8.99	P	---	---	---
	9.25	04/18/96	9.22	P	---	---	---
	9.25	05/29/96	9.06	P	---	---	---
	9.25	06/13/96	9.11	P	---	---	---
	9.25	07/25/96	9.11	P	---	---	---
	9.25	08/27/96	9.44	P	---	---	---
	9.25	09/16/96	N/A	---	---	---	---
9.25	10/17/96	9.65	P	---	---	---	
9.25	11/12/96	9.87	P	---	---	---	
OKUS-W6	7.02	08/09/95	5.65	P	---	---	---
	7.02	09/07/95	5.98	P	---	---	---
	7.02	10/18/95	6.38	P	---	---	---
	7.02	11/10/95	6.52	P	---	---	---
	7.02	12/15/95	5.47	P	---	---	---
	7.02	01/10/96	5.58	P	---	---	---
	7.02	02/16/96	4.70	P	---	---	---
	7.02	03/25/96	4.72	P	---	---	---
	7.02	04/18/96	5.19	P	---	---	---
	7.02	05/29/96	5.02	P	---	---	---
	7.02	06/13/96	4.99	P	---	---	---
	7.02	07/25/96	5.23	P	---	---	---
	7.02	08/27/96	5.82	P	---	---	---
	7.02	09/16/96	N/A	---	---	---	---
	7.02	10/17/96	6.50	P	---	---	---
	7.02	11/12/96	6.27	P	---	---	---

**TABLE 1  
FLUID LEVEL MEASUREMENT DATA  
UNION PACIFIC RAILROAD  
OAKLAND MOTOR FREIGHT FACILITY**

WELL NO.	ELEV.* TOC	DATE	DEPTH TO PRODUCT	PRODUCT THICKNESS	DEPTH TO WATER	WATER ELEV.	CORR'D ELEV.
OKUS-W7	6.91	08/09/95	N/A	NP	5.53	1.38	1.38
	6.91	11/29/95	N/A	NP	6.09	0.82	0.82
	6.91	02/27/96	N/A	NP	4.96	1.93	1.93
	6.91	05/29/96	N/A	NP	5.08	1.83	1.83
	6.91	08/27/96	N/A	NP	5.68	1.23	1.23
	6.91	11/12/96	N/A	NP	5.99	0.92	0.92
OKUS-W8	6.75	08/09/95	N/A	NP	5.32	1.43	1.43
	6.75	11/29/95	N/A	NP	5.95	0.80	0.80
	6.75	02/27/96	N/A	NP	4.84	1.91	1.91
	6.75	05/29/96	N/A	NP	4.93	1.82	1.82
	6.75	08/27/96	N/A	NP	5.52	1.23	1.23
	6.75	11/12/96	N/A	NP	5.89	0.86	0.86
APL/UP-W1	8.12	08/09/95	N/A	NP	10.01	-1.89	-1.89
	8.12	11/29/95	N/A	NP	10.29	-2.17	-2.17
	8.12	02/27/96	N/A	NP	WELL INACCESSABLE		
	8.12	05/29/96	N/A	NP	WELL INACCESSABLE		
	8.12	08/27/96	N/A	NP	WELL INACCESSABLE		
	8.12	11/12/96	N/A	NP	WELL INACCESSABLE		
APL/UP-W2	7.31	08/09/95	N/A	NP	9.42	-2.11	-2.11
	7.31	11/29/95	N/A	NP	9.41	-2.10	-2.10
	7.31	02/27/96	N/A	NP	8.69	-1.58	-1.58
	7.31	05/29/96	N/A	NP	9.68	-2.37	-2.37
	7.31	08/27/96	N/A	NP	9.53	-2.22	-2.22
	7.31	11/12/96	N/A	NP	9.60	-2.29	-2.29
RW	--	08/09/95	9.07	0.03	9.10	--	--
	--	09/07/95	9.18	0.01	9.19	--	--
	--	10/18/95	9.41	0.02	9.43	--	--
	--	11/10/95	9.58	--	N/A	--	--
	--	12/15/95	9.46	0.12	9.58	--	--
	--	01/10/96	9.24	0.04	9.28	--	--
	--	02/16/96	N/A	--	8.73	--	--
	--	03/25/96	N/A	--	8.50	--	--
	--	04/18/96	N/A	--	8.70	--	--
	--	05/29/96	N/A	--	8.68	--	--
	--	06/13/96	N/A	--	8.68	--	--
	--	07/25/96	N/A	--	9.09	--	--
	--	08/27/96	N/A	--	9.18	--	--
	--	09/16/96	N/A	--	9.33	--	--
--	10/17/96	N/A	--	9.50	--	--	
--	11/12/96	N/A	--	9.59	--	--	
--	12/16/96	9.12	0.10	9.22	--	--	

\* All well casings measured to mean sea level (MSL).

-- Information not available or inaccurate.

P - Product (bunker C) was encountered but the oil/water interface could not be found.

N/A Non Applicable

NP - No Product

**TABLE 2  
ANALYTICAL RESULTS – GROUNDWATER MONITORING WELLS  
UNION PACIFIC RAILROAD  
OAKLAND MOTOR FREIGHT FACILITY**

SAMPLE LOCATION	SAMPLE ID	DATE SAMPLED	TPH/D (ug/l)	TPH/G (ug/l)	B (ug/l)	T (ug/l)	E (ug/l)	X (ug/l)	BTEX (ug/l)	As (mg/l)
OKUS-W1	OKUS-W1	01/14/93	ND	410	20	4	220	ND	240	ND
		05/12/93	120	ND	ND	ND	ND	ND	ND	ND
		08/25/93	100	ND	ND	ND	ND	ND	ND	ND
		11/11/93	160	91	1.1	0.88	21	1.6	24	ND
		02/08/94	92	<50	<0.50	<0.50	<0.50	<0.50	ND	<0.10
		05/03/94	61	<50	<0.50	<0.50	<0.50	<0.50	ND	<0.10
		08/24/94	86	<50	<0.50	<0.50	<0.50	<0.50	ND	<0.10
		11/16/94	51	<50	<0.50	<0.50	<0.50	<0.50	ND	NA
		02/22/95	120	<50	<0.50	<0.50	<0.50	<0.50	ND	NA
		06/22/95	<50	<50	<0.50	<0.50	<0.50	<0.50	ND	NA
		08/09/95	<50	<50	<0.50	<0.50	<0.50	<0.50	ND	0.04
		11/29/95	480	<50	<0.50	<0.50	<0.50	<0.50	ND	<0.0050
		02/27/96	330	<50	<0.50	<0.50	<0.50	<0.50	ND	NA
05/30/96	320	<50	<0.50	<0.50	<0.50	<0.50	ND	NA		
08/27/96	440	<50	<0.50	<0.50	<0.50	<0.50	ND	<0.10		
11/13/96	180	<50	<0.50	<0.50	<0.50	<0.50	ND	NA		
OKUS-W2	OKUS-W2	01/14/93	5400	14000	480	92	8500	ND	9100	0.036
		05/12/93	2800	8800	220	47	4600	100	5000	0.093
		08/25/93	6500	22000	420	92	10000	210	11000	0.089
		11/11/93	7700	24000	540	150	13000	280	14000	ND
		02/08/94	2300	4900	150	29	3000	78	3300	<0.10
		05/03/94	2600	17000	300	<0.50	5800	220	6300	<0.10
		08/24/94	8200	11000	320	67	7500	250	8100	<0.10
		11/16/94	5500	10000	290	79	130	160	660	NA
		02/22/95	2000	5500	100	18	1600	66	1800	NA
		06/22/95	3200	13000	260	62	<0.50	110	430	NA
		08/09/95	2900	4800	160	28	<0.50	200	390	0.92
		11/29/95	5600	7100	240	34	<0.50	58	330	0.049
		02/27/96	2400	5300	200	42	3400	160	3800	NA
05/30/96	1900	7000	210	<0.50	<0.50	180	390	NA		
08/27/96	3100	6700	240	65	170	180	660	0.17		
11/12/96	2900	6000	160	34	130	64	390	NA		
OKUS-W3	OKUS-W3	01/14/93	4200	4900	230	42	2600	44	2900	NA
		05/12/93	4400	4600	290	60	3500	72	3900	0.14
		08/25/93	2700	9400	280	55	4300	41	4700	0.08
		11/11/93	5000	9500	390	110	5100	130	5700	0.14
		02/08/94	4400	17000	420	78	9900	160	10000	0.12
		05/03/94	3000	14000	310	61	6400	210	7000	0.14
		08/24/94	4500	10000	350	78	7300	170	7900	<0.10
		11/16/94	4700	9100	260	64	95	<0.50	420	NA
		02/22/95	2400	7400	250	51	4400	150	4900	NA
		06/22/95	3300	8100	250	53	<0.50	76	380	NA
		08/09/95	3100	5200	200	39	<0.50	140	380	1.6
		11/29/95	4500	5300	220	42	<0.50	44	310	0.18
		02/27/96	4000	7900	330	75	6400	240	7000	NA
05/30/96	2300	8900	200	<0.50	<0.50	61	260	NA		
08/27/96	2700	3100	170	37	64	36	310	0.20		
11/12/96	4700	7400	220	60	<0.50	<0.50	280	NA		
OKUS-W4	OKUS-W4	01/15/93	5400	8900	300	ND	4500	ND	4800	NA
		05/12/93	2900	6000	320	110	4600	230	5300	0.16
		08/26/93	2200	6700	350	72	4800	130	5400	0.098
		11/11/93	2400	5500	250	53	4600	140	5000	0.13
		02/07/94	2700	9100	250	<0.50	4900	150	5300	<0.10
		05/03/94	2300	6500	240	34	4200	140	4600	0.12
		08/24/94	2900	5200	200	41	3600	190	4000	0.11
		11/16/94	2800	5500	320	52	<0.50	120	490	NA
		02/22/95	2000	4300	250	47	2900	160	3400	NA
		06/22/95	2700	4900	280	38	5200	140	5700	NA
		08/09/95	2900	5300	270	54	<0.50	210	530	1.3
		11/29/95	3100	4500	200	41	<0.50	46	290	0.14
		02/27/96	WELL INACCESSABLE – NOT SAMPLED							
05/30/96	WELL INACCESSABLE – NOT SAMPLED									
08/27/96	WELL INACCESSABLE – NOT SAMPLED									
11/12/96	WELL INACCESSABLE – NOT SAMPLED									

**TABLE 2  
ANALYTICAL RESULTS - GROUNDWATER MONITORING WELLS  
UNION PACIFIC RAILROAD  
OAKLAND MOTOR FREIGHT FACILITY**

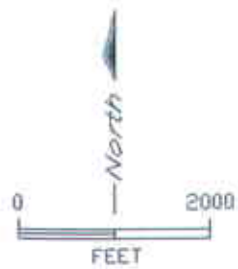
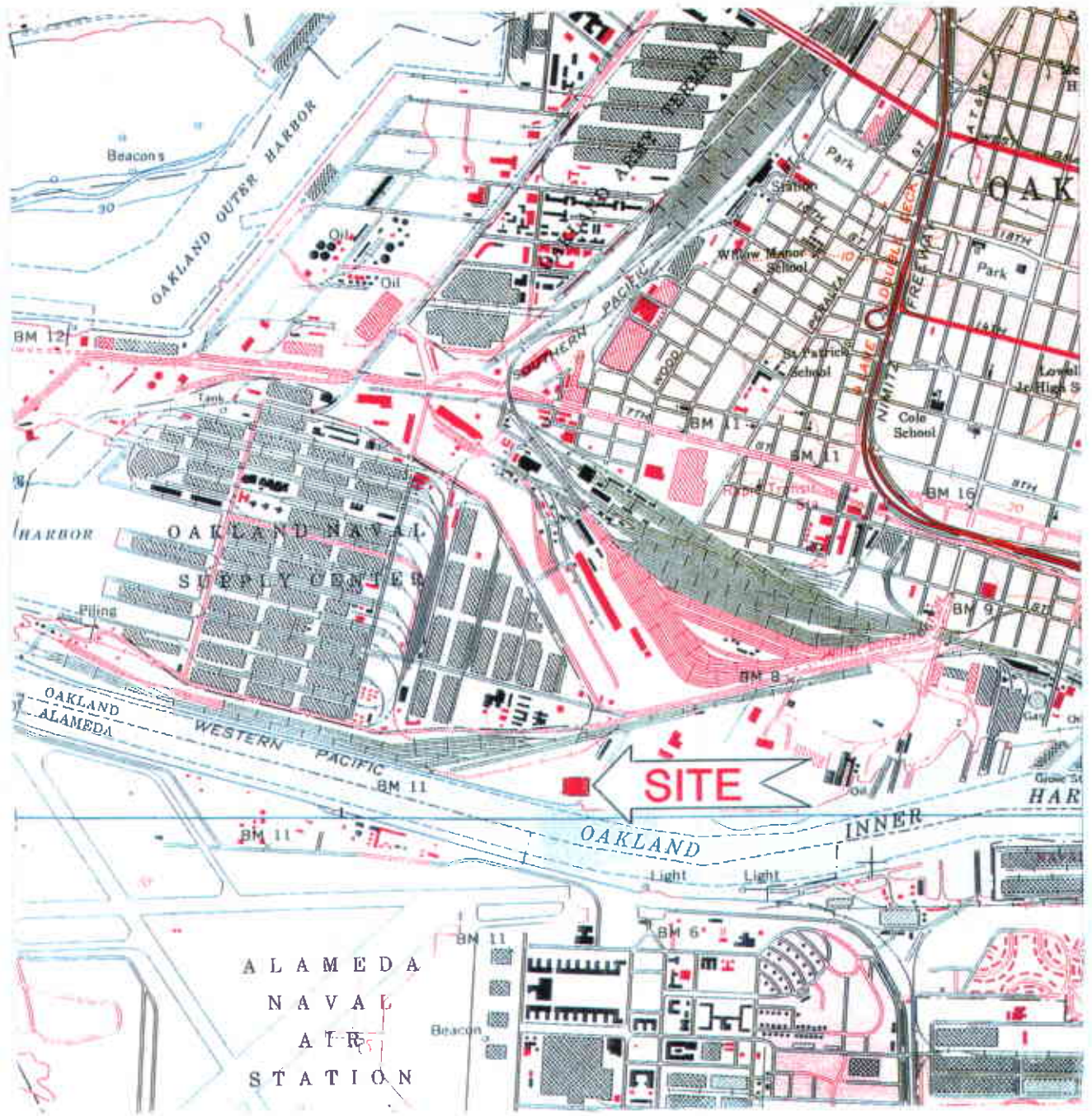
SAMPLE LOCATION	SAMPLE ID	DATE SAMPLED	TPH/D (ug/l)	TPH/G (ug/l)	B (ug/l)	T (ug/l)	E (ug/l)	X (ug/l)	BTEX (ug/l)	As (mg/l)	
OKUS-W5	OKUS-W5	01/15/93	2900	550	53	11	180	20	260	NA	
		05/12/93	2100	550	81	14	250	37	380	0.56	
		08/25/93	PRODUCT IN WELL - NOT SAMPLED								
		11/11/93	1600	590	14	3.1	54	6.2	77	0.53	
		02/07/94	1900	760	54	9.4	220	24	310	0.55	
		05/03/94	2000	820	57	9.5	240	27	330	0.38	
		08/24/94	1700	910	55	14	8.5	18	96	0.45	
		05/30/96	PRODUCT IN WELL - THE WELL HAS NOT BEEN SAMPLED SINCE 1994								
		08/27/96	PRODUCT IN WELL - THE WELL HAS NOT BEEN SAMPLED SINCE 1994								
		11/12/96	PRODUCT IN WELL - THE WELL HAS NOT BEEN SAMPLED SINCE 1994								
OKUS-W6	OKUS-W6	07/16/93	BRK	ND	2.5	ND	ND	ND	2.5	0.004	
		08/25/93	590	ND	2.6	ND	4.9	1.3	8.8	0.013	
		11/12/93	610	ND	3.6	ND	3.7	1.3	8.6	ND	
		05/30/96	PRODUCT IN WELL - THE WELL HAS NOT BEEN SAMPLED SINCE 1993								
		08/27/96	PRODUCT IN WELL - THE WELL HAS NOT BEEN SAMPLED SINCE 1993								
11/12/96	PRODUCT IN WELL - THE WELL HAS NOT BEEN SAMPLED SINCE 1993										
OKUS-W7	OKUS-W7	07/16/93	ND	ND	2.1	ND	ND	ND	2.1	0.009	
		08/25/93	930	56	2.9	ND	1.2	ND	4.1	ND	
		11/12/93	1100	ND	ND	ND	ND	ND	ND	ND	
		02/07/94	1100	ND	0.7	<0.50	<0.50	<0.50	0.7	<0.10	
		05/03/94	1300	<50	<0.50	<0.50	<0.50	<0.50	ND	<0.10	
		08/24/94	910	<50	2.5	0.54	<0.50	<0.50	3.0	<0.10	
		11/16/94	820	<50	0.62	<0.50	<0.50	<0.50	0.6	NA	
		02/22/95	830	<50	0.54	<0.50	<0.50	<0.50	0.5	NA	
		06/22/95	850	<50	2.4	<0.50	0.52	<0.50	2.9	NA	
		08/09/95	640	71	4.2	<0.50	1.2	1.2	6.6	0.074	
		11/29/95	1300	64	4.3	<0.50	1.3	0.51	6.1	0.0095	
		02/27/96	2800	<50	1.5	<0.50	0.54	<0.50	2.0	NA	
		05/30/96	1900	60	2	<0.50	0.54	<0.50	2.0	NA	
08/27/96	1700	70	2.3	<0.50	<0.50	<0.50	2.3	<0.10			
11/12/96	1400	86	4.1	<0.50	<0.50	<0.50	4.1	NA			
OKUS-W8	OKUS-W8	07/16/93	ND	ND	ND	ND	ND	ND	ND	0.012	
		08/27/93	1100	120	1.3	ND	ND	0.85	2.2	ND	
		11/11/93	1300	190	3.5	1.3	46	4.9	55.7	ND	
		02/07/94	1000	120	0.9	<0.50	<0.50	<0.50	0.9	<0.10	
		05/03/94	780	79	0.99	<0.50	<0.50	<0.50	1.0	<0.10	
		08/24/94	700	100	1.4	<0.50	<0.50	<0.50	1.4	<0.10	
		11/16/94	830	110	0.77	<0.50	<0.50	<0.50	0.8	NA	
		02/22/95	370	150	0.96	<0.50	<0.50	1.2	2.2	NA	
		06/22/95	870	76	0.92	<0.50	<0.50	<0.50	0.9	NA	
		08/09/95	1100	90	1.1	<0.50	<0.50	1.3	2.4	0.078	
		11/29/95	2400	100	0.73	<0.50	<0.50	0.91	1.6	<0.0050	
		02/27/96	1900	80	<0.50	<0.50	<0.50	1.3	1.3	NA	
		05/30/96	2200	210	<0.50	<0.50	<0.50	0.7	0.7	NA	
08/27/96	2100	150	0.64	<0.50	<0.50	<0.50	0.64	<0.10			
11/12/96	1600	170	<0.50	<0.50	<0.50	1.1	1.1	NA			
APL/UP-W1	APL/UP-W1	07/16/93	700	300	25.4	1.7	ND	3.0	30	0.011	
		08/26/93	810	720	47	1.3	360	14.0	420	0.013	
		11/11/93	530	560	26	ND	220	11.0	260	ND	
		02/07/94	660	620	25	<0.50	180	10	220	<0.10	
		05/03/94	590	680	48	2.9	260	9.8	320	<0.10	
		08/24/94	420	830	48	4.8	12	3.2	68	<0.10	
		11/15/94	480	470	36	3.6	9.6	12	61	NA	
		02/22/95	510	470	33	2.8	170	9	210	NA	
		06/22/95	320	180	12	0.82	3.5	2.4	19	NA	
		08/09/95	160	69	4.2	<0.50	<0.50	2.3	7	<0.0050	
		11/29/95	920	170	7.4	0.58	86	3.5	78	0.018	
		02/27/96	WELL INACCESSIBLE - NOT SAMPLED								
		05/30/96	WELL INACCESSIBLE - NOT SAMPLED								
08/27/96	WELL INACCESSIBLE - NOT SAMPLED										
11/12/96	WELL INACCESSIBLE - NOT SAMPLED										

**TABLE 2  
ANALYTICAL RESULTS - GROUNDWATER MONITORING WELLS  
UNION PACIFIC RAILROAD  
OAKLAND MOTOR FREIGHT FACILITY**

SAMPLE LOCATION	SAMPLE ID	DATE SAMPLED	TPH/D (ug/l)	TPH/G (ug/l)	B (ug/l)	T (ug/l)	E (ug/l)	X (ug/l)	BTEX (ug/l)	As (mg/l)
APL/UP-W2	APL/UP-W2	07/16/93	ND	ND	8.0	ND	ND	ND	8	0.018
"	"	08/26/93	240	94	ND	ND	35	2.4	37	0.023
"	"	11/11/93	190	110	5.0	ND	38	2.6	46	ND
"	"	02/07/94	270	120	6.6	<0.50	38	1.8	46	<0.10
"	"	05/03/94	100	<50	<0.50	<0.50	<0.50	<0.50	ND	<0.10
"	"	08/24/94	330	220	13.0	0.77	3.5	3.1	20	<0.10
"	"	11/15/94	320	190	11.0	<0.50	63.0	5.4	79	NA
"	"	02/22/95	550	320	19.0	<0.50	100	9.5	130	NA
"	"	06/22/95	300	170	10.0	62	2.2	2.3	76	NA
"	"	08/09/95	180	62	3.5	<0.50	<0.50	2.3	5.8	0.22
"	"	11/29/95	690	110	7.2	<0.50	49	2.3	59	0.019
"	"	02/27/96	480	100	5.3	<0.50	33	2.9	41	NA
"	"	05/30/96	280	<50	1.9	<0.50	<0.50	1.2	3.1	NA
"	"	08/27/96	320	<50	1.1	<0.50	1.0	<0.50	2.1	<0.10
"	"	11/12/96	470	85	3.2	<0.50	1.7	0.62	5.5	NA
<b>DUPLICATES</b>										
OKUS-W5	OKUS-W6	01/15/93	2800	510	50	10	170	19	250	NA
OKUS-W1	OKUS-W6	05/12/93	140	ND	ND	ND	ND	ND	ND	ND
APL/UP-W1	QA/QC-1	07/16/93	ND	0.21	22.4	ND	ND	2.4	25	0.012
OKUS-W4	OKUS-W9	08/26/93	2700	6200	340	78	4500	100	5000	0.10
OKUS-W8	OKUS-W9	11/11/93	1300	120	1.3	ND	4	1.4	7	2.40
OKUS-W3	QA/QC-1	02/08/94	2900	15000	280	64	5800	<0.50	6100	0.12
OKUS-W4	OKUS-QC1	05/03/94	2500	5400	300	41	5200	130	5700	0.12
OKUS-W8	OKUS-QC1	08/24/94	950	92	1.6	<0.50	<0.50	<0.50	2	<0.10
APL/UP-W2	OKUS-QC1	11/16/94	310	190	10	<0.50	62	4.7	77	NA
APL/UP-W2	APL-W12	02/22/95	490	360	20	<0.50	110	6.7	140	NA
APL/UP-W2	APL-W12	08/09/95	180	71	3.4	<0.50	<0.50	2.2	6	0.20
APL/UP-W1	APL-W11	11/29/95	1100	170	7.5	0.57	66	4.4	79	0.02
OKUS-W1	OKUS-W11	02/27/96	330	<50	<0.50	<0.50	<0.50	<0.50	ND	NA
OKUS-W1	OKUS-W11	05/30/96	570	<50	<0.50	<0.50	<0.50	<0.50	ND	NA
OKUS-W1	OKUS-W11	08/27/96	330	<50	<0.50	<0.50	<0.50	<0.50	ND	<0.10
OKUS-W2	OKUS-W12	11/12/96	3000	11000	210	55	26	89	380	NA
<b>TRIP BLANKS</b>										
UPMF	OAK-FB 1	07/16/93	NA	NA	ND	ND	ND	ND	ND	NA
UPMF	OAK-TB 2	07/16/93	NA	NA	ND	ND	ND	ND	ND	NA
UPMF	TB-1	08/27/93	NA	NA	ND	ND	ND	ND	ND	NA
UPMF	TB-2	08/27/93	NA	NA	ND	ND	ND	ND	ND	NA
UPMF	TB-1	11/12/93	NA	NA	ND	ND	ND	ND	ND	NA
UPMF	TB-1	08/24/94	NA	NA	ND	ND	ND	ND	ND	NA
UPMF	TB-1	11/16/94	NA	NA	NA	NA	NA	NA	NA	NA
UPMF	TB-1	02/22/95	NA	ND	ND	ND	ND	ND	ND	NA
UPMF	TB-1	06/22/95	NA	ND	ND	ND	ND	ND	ND	NA
UPMF	TB-1	08/09/95	NA	ND	ND	ND	ND	ND	ND	NA
UPMF	TRIP BLANK	11/29/95	NA	ND	ND	ND	ND	ND	ND	NA
UPMF	TRIP BLANK	02/27/96	NA	ND	ND	ND	ND	ND	ND	NA
UPMF	TRIP BLANK	05/29/96	NA	ND	ND	ND	ND	ND	ND	NA
UPMF	TRIP BLANK	08/27/96	NA	ND	ND	ND	ND	ND	ND	NA
UPMF	TRIP BLANK	11/12/96	NA	ND	ND	ND	ND	ND	ND	NA

ND - Not Detected  
 NA - Not Analyzed  
 BRK - Bottle broken during shipment  
 TPH - Total Petroleum Hydrocarbons  
 mg/L - milligram per liter

ug/L - microgram per liter  
 TPH/D - analyzed using EPA Method 8015 Mod.  
 TPH/G - analyzed using EPA Method 8015 Mod.  
 BTEX - analyzed using EPA Method 8020  
 As - analyzed using EPA Method 7060



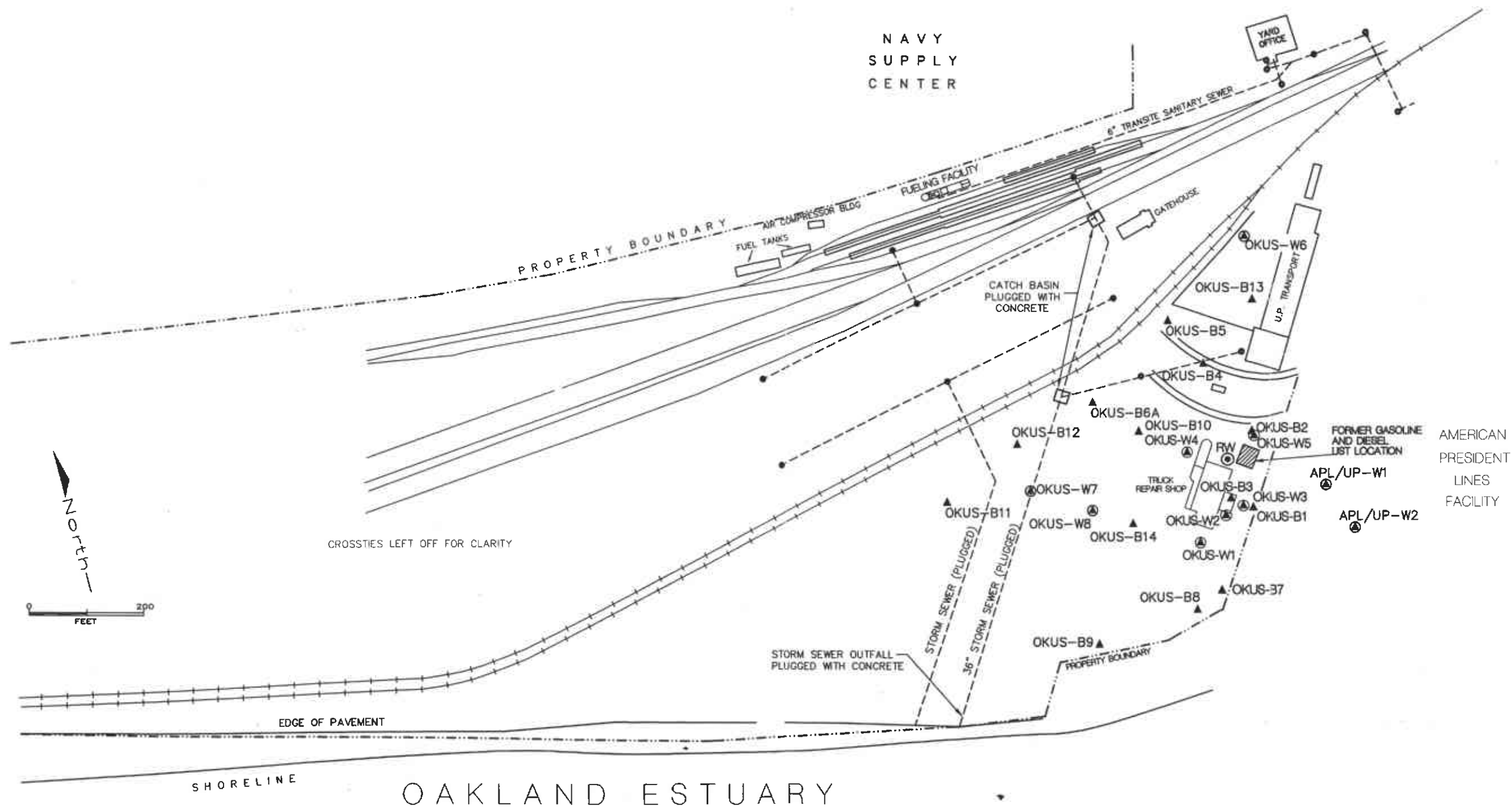
**USPCI**  
A LAIDLAW COMPANY

UP MOTOR FREIGHT FACILITY-OAKLAND, CA

FIGURE 1  
SITE LOCATION MAP

SCALE: 1" = 2000'      DATE: 6/27/96

LOCMAP



**LEGEND**

- ⊙ OKUS-W1 MONITORING WELL LOCATION AND NUMBER
- ▲ OKUS-B1 BORING LOCATION AND NUMBER
- CATCH BASIN FOR STORM SEWER
- ⊙ RW RECOVERY WELL

BY	DATE
DRAWN WRB	7/18/95
CHECKED	
APPROVED	
APPROVED	

**USPCI**  
A LAIDLAW COMPANY

UPRR TOFC RAILYARD UPMF REPAIR SHOP, OAKLAND, CALIFORNIA		
<b>FIGURE 2 SITE VICINITY MAP</b>		
SCALE 1"=200'	DATE 9/93	DWG. NO. 96120-556

NAVY  
SUPPLY  
CENTER

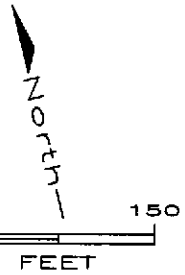
6" TRANSITE SANITARY SEWER

GATEHOUSE

CATCH BASIN  
PLUGGED WITH  
CONCRETE

UP TRANSPORT

AMERICAN  
PRESIDENT  
LINES  
FACILITY



STORM SEWER OUTFALL  
PLUGGED WITH CONCRETE

STORM SEWER (PLUGGED)

36" STORM SEWER (PLUGGED)

PROPERTY BOUNDARY

GROUNDWATER  
FLOW DIRECTION

**LEGEND**

- OKUS-W1 ▲ 0.39 MONITOR WELL LOCATION AND NUMBER WITH GROUNDWATER ELEVATION
- RECOVERY WELL
- CATCH BASIN FOR STORM SEWER
- 0 — GROUNDWATER ELEVATION CONTOUR (FEET RELATIVE TO MEAN SEA LEVEL)
- NA NOT AVAILABLE

**USPCI**  
A **LAIDLAW** COMPANY

UPMF REPAIR SHOP-OAKLAND, CALIFORNIA

**FIGURE 3**  
**GROUNDWATER ELEVATION MAP (11/96)**

SCALE 1" = 150'

APPROVED/DATE 1/17/97

96120-898



NAVY  
SUPPLY  
CENTER

6" TRANSITE SANITARY SEWER

GATEHOUSE

CATCH BASIN  
PLUGGED WITH  
CONCRETE

OKUS-W6  
NA

UP. TRANSPORT

AMERICAN  
PRESIDENT  
LINE'S  
FACILITY

OKUS-W5  
NA

OKUS-W4  
NA

RW  
NA

APL/UP-W1  
NA

OKUS-W7  
4.1

OKUS-W8  
11

OKUS-W3  
280

OKUS-W2  
390

APL/UP-W2  
5.5

OKUS-W1  
ND

STORM SEWER OUTFALL  
PLUGGED WITH CONCRETE

STORM SEWER (PLUGGED)

36" STORM SEWER (PLUGGED)

PROPERTY BOUNDARY

North

0 150  
FEET

**LEGEND**

OKUS-W8



4.0

MONITOR WELL LOCATION AND NUMBER WITH  
TOTAL DISSOLVED BTEX CONCENTRATION  $\mu\text{g/L}$

RW



RECOVERY WELL



CATCH BASIN FOR STORM SEWER

100



TOTAL BTEX DISTRIBUTION CONTOUR: DASHED  
WHERE INFERRED

ND

NOT DETECTED

NA

NOT ANALYZED

NOTE: ALL ANALYTICAL RESULTS IN  $\mu\text{g/L}$

96120-887

**USPCI**

A LAIDLAW COMPANY

UPMF REPAIR SHOP-OAKLAND, CALIFORNIA

FIGURE 4  
DISSOLVED PHASE BTEX DISTRIBUTION (12/96)

SCALE 1" = 150'

APPROVED/DATE 1/17/97

**APPENDIX A**

**FLUID-LEVEL MEASUREMENTS AND SAMPLE  
COLLECTION LOGS**



**USPCI SAMPLING AND WELL STABILIZATION FORM**

USPCI Project Name: <b>UPMF Oakland</b>			USPCI Project Number: <b>96120-844</b>			
Measuring Point (MP) Location <b>Top of casing</b>			<b>Well No. OKUS-W1</b>			
Well Depth: (Below MP): <b>18.70 Feet</b>						
Casing diameter: <b>2 Inches</b>			Sampling Date: <b>11/13/96</b>			
Depth To Ground Water (Below MP): <b>8.71 Feet</b>			Sample ID No. <b>OKUS-W1</b>			
<b>Method Of Well Development:</b>			Time: <b>11:40</b>			
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump			Riser Elevation (MP): <b>9.17 Feet</b>			
<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Centrifugal Pump <input type="checkbox"/> Other			Top of Screen Elevation: <b>6.85 Feet</b>			
<b>Sampling Collection Method:</b>			Sample Appearance: <b>Clear</b>			
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump    Sample			Odor: <b>Light - moderate</b>			
<input checked="" type="checkbox"/> Bailer <u>Type:</u> <input type="radio"/> Teflon <input type="radio"/> Stainless Steel			Sampling Problems (if any):			
<input type="radio"/> ABS Plastic <input type="radio"/> PVC <input checked="" type="radio"/> HDPE plastic disposable						
Pump Intake Or Bailer Set At _____ Feet Below MP			Decontamination Performed: <b>Probe</b>			
Tubing Type (if Used):						
Tubing Used for: <input type="checkbox"/> Sample Collection <input type="checkbox"/> Well Development/Field Tests			Samples Collected: <b>TPH-Gasoline, TPH-Diesel, 8020 BTEX</b>			

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)
11:15	Begin well					
11:23	7.3	1200	19.2		1.75	
11:27	7.4	1400	19.2		3.50	
11:30	7.4	1300	19.2		5.25	
11:40	Sample well					

At Least 3 Well Bore Volumes Were Evacuated Before Sampling      Discharge Rate =      GPM x 0.00223 =      cfs

Comments:  $(18.70 - 8.71) * 0.16 = 1.598$  or about 1.75 gallons per volume

[Comments may continue on back]

Form Completed By: **Mark McCormick**      Witnessed By: \_\_\_\_\_

## USPCI SAMPLING AND WELL STABLIZATION FORM

USPCI Project Name: UPMF Oakland		USPCI Project Number: 96120-844	
Measuring Point (MP) Location Top of casing		<b>Well No. OKUS-W2</b>	
Well Depth: (Below MP): 22.34 Feet			
Casing diameter: 2 Inches		Sampling Date: 11/13/96	
Depth To Ground Water (Below MP): 9.62 Feet		Sample ID No. OKUS-W2	
<b>Method Of Well Development:</b>		Time: 12:15	
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump		Riser Elevation (MP): 9.71 Feet	
<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Centrifugal Pump <input type="checkbox"/> Other		Top of Screen Elevation: 7.05 Feet	
<b>Sampling Collection Method:</b>		Sample Appearance: Very lightly turbid	
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump Sample		Odor: Moderate - strong	
<b>Bailer Type:</b> <input type="radio"/> Teflon <input type="radio"/> Stainless Steel		Sampling Problems (if any):	
<input type="radio"/> ABS Plastic <input type="radio"/> PVC <input checked="" type="radio"/> HDPE plastic disposable			
Pump Intake Or Bailer Set At _____ Feet Below MP		Decontamination Performed: Probe	
Tubing Type (if Used):			
Tubing Used for: <input type="checkbox"/> Sample Collection <input type="checkbox"/> Well Development/Field Tests		Samples Collected: TPH-Gasoline, TPH-Diesel, 8020 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)
11:50	Begin well					
11:55	6.9	3600	20.0		2.25	
12:00	6.9	3900	19.9		4.25	
12:05	6.9	3900	19.8		6.25	
12:15	Sample well					

At Least 3 Well Bore Volumes Were Evacuated Before Sampling      Discharge Rate =      GPM x 0.00223 =      cfs

Comments:  $(22.34 - 9.62) * 0.16 = 2.035$  or about 2.00 to 2.25 gallons per volume

Duplicate sample labelled OKUS-W12 was taken at 12:20

[Comments may continue on back]

Form Completed By: Mark McCormick      Witnessed By: \_\_\_\_\_



**USPCI SAMPLING AND WELL STABILIZATION FORM**

USPCI Project Name: <b>UPMF Oakland</b>			USPCI Project Number: <b>96120-844</b>			
Measuring Point (MP) Location <b>Top of casing</b>			<b>Well No. OKUS-W4</b>			
Well Depth: (Below MP): <b>20.69 Feet</b>						
Casing diameter: <b>2 Inches</b>			Sampling Date: <b>N/A</b>			
Depth To Ground Water (Below MP): <b>Not measured (see comments below)</b>			Sample ID No. <b>OKUS-W4</b>			
<b>Method Of Well Development:</b>			Time: <b>N/A</b>			
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump			Riser Elevation (MP): <b>7.11 Feet</b>			
<input type="checkbox"/> Bailer <input type="checkbox"/> Centrifugal Pump <input type="checkbox"/> Other			Top of Screen Elevation: <b>2.11 Feet</b>			
<b>Sampling Collection Method:</b>			Sample Appearance: <b>N/A</b>			
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump    Sample			Odor: <b>N/A</b>			
<input type="checkbox"/> Bailer <u>Type:</u> <input type="radio"/> Teflon <input type="radio"/> Stainless Steel			Sampling Problems (if any): <b>Well inaccessible</b>			
<input type="radio"/> ABS Plastic <input type="radio"/> PVC <input type="radio"/> HDPE plastic disposable						
Pump Intake Or Bailer Set At _____ Feet Below MP			Decontamination Performed:			
Tubing Type (if Used):						
Tubing Used for: <input type="checkbox"/> Sample Collection <input type="checkbox"/> Well Development/Field Tests			Samples Collected: <b>None</b>			

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)
WELL NOT	SAMPLED					

At Least 3 Well Bore Volumes Were Evacuated Before Sampling      Discharge Rate =      GPM x 0.00223 =      cfs

Comments: **The well head is no longer accessible due to severe damage by UPMF heavy equipment and the subsequent repaving of the area.**

[Comments may continue on back]

Form Completed By: **Mark McCormick**      Witnessed By: \_\_\_\_\_







**USPCI SAMPLING AND WELL STABILIZATION FORM**

USPCI Project Name: UPMF Oakland			USPCI Project Number: 96120-844			
Measuring Point (MP) Location Top of casing			<b>Well No. OKUS-W7</b>			
Well Depth: (Below MP): 19.88 Feet						
Casing diameter: 2 Inches			Sampling Date: 11/13/96			
Depth To Ground Water (Below MP): 6.00 Feet			Sample ID No. OKUS-W7			
<b>Method Of Well Development:</b>			Time: 10:30			
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump			Riser Elevation (MP): 7.4 Feet			
<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Centrifugal Pump <input type="checkbox"/> Other			Top of Screen Elevation: 2.4 Feet			
<b>Sampling Collection Method:</b>			Sample Appearance: Clear			
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump    Sample			Odor: Light			
<input checked="" type="checkbox"/> Bailer <u>Type:</u> <input type="radio"/> Teflon <input type="radio"/> Stainless Steel			Sampling Problems (if any):			
<input type="radio"/> ABS Plastic <input type="radio"/> PVC <input checked="" type="radio"/> HDPE plastic disposable						
Pump Intake Or Bailer Set At _____ Feet Below MP			Decontamination Performed: Probe			
Tubing Type (if Used):						
Tubing Used for: <input type="checkbox"/> Sample Collection <input type="checkbox"/> Well Development/Field Tests			Samples Collected: TPH-Gasoline, TPH-Diesel, 8020 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)
10:07	Begin well					
10:13	7.0	2100	19.5		2.25	
10:17	6.9	2100	19.3		4.50	
10:22	7.0	2100	19.3		6.75	
10:30	Sample well					

At Least 3 Well Bore Volumes Were Evacuated Before Sampling      Discharge Rate =      GPM x 0.00223 =      cfs

Comments: (19.88 - 6.00) \* 0.16 = 2.221 or about 2.25 gallons per volume

TPH-Diesel sample X 3 for MS/MSD

[Comments may continue on back]

Form Completed By: Mark McCormick      Witnessed By:

**USPCI SAMPLING AND WELL STABILIZATION FORM**

USPCI Project Name: UPMF Oakland		USPCI Project Number: 96120-844	
Measuring Point (MP) Location Top of casing		<b>Well No. OKUS-W8</b>	
Well Depth: (Below MP): 14.80 Feet			
Casing diameter: 2 Inches		Sampling Date: 11/13/96	
Depth To Ground Water (Below MP): 5.90 Feet		Sample ID No. OKUS-W8	
<b>Method Of Well Development:</b>		Time: 11:05	
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump		Riser Elevation (MP): 7.11 Feet	
<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Centrifugal Pump <input type="checkbox"/> Other		Top of Screen Elevation: 2.11 Feet	
<b>Sampling Collection Method:</b>		Sample Appearance: Very slightly turbid, yellow	
<input type="checkbox"/> Tap <input type="checkbox"/> Submersible Pump <input type="checkbox"/> Bladder Pump Sample		Odor: Light	
<input checked="" type="checkbox"/> Bailer <u>Type:</u> <input type="radio"/> Teflon <input type="radio"/> Stainless Steel		Sampling Problems (if any):	
<input type="radio"/> ABS Plastic <input type="radio"/> PVC <input checked="" type="radio"/> HDPE plastic disposable			
Pump Intake Or Bailer Set At _____ Feet Below MP		Decontamination Performed: Probe	
Tubing Type (if Used):			
Tubing Used for: <input type="checkbox"/> Sample Collection <input type="checkbox"/> Well Development/Field Tests		Samples Collected: TPH-Gasoline, TPH-Diesel, 8020 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)
10:45	Begin well					
10:50	6.8	3800	19.8		1.5	
10:53	6.8	3700	19.5		3.0	
10:57	6.9	3700	19.4		4.5	
11:05	Sample well					

At Least 3 Well Bore Volumes Were Evacuated Before Sampling      Discharge Rate =      GPM x 0.00223 =      cfs

Comments: (14.80 - 5.90) \* 0.16 = 1.424 or about 1.5 gallons per volume

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[Comments may continue on back]

Form Completed By: Mark McCormick      Witnessed By: \_\_\_\_\_





**APPENDIX B**  
**ANALYTICAL REPORTS**



# Sequoia Analytical

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819 Striker Avenue, Suite 8

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Sacramento, CA 95834

(415) 364-9600  
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U.S.P.C.I. / Laidlaw 5665 Flatiron Pkwy Boulder, CO 80301 Attention: Denton Mauldin	Client Project ID: UP Motor Freight Sample Matrix: Water Analysis Method: EPA 5030/8015 Mod./8020 First Sample #: 611-0840	Sampled: Nov 13, 1996 Received: Nov 13, 1996 Reported: Nov 26, 1996
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QC Batch Number: GC112296 GC112296 GC112296 GC112296 GC112296 GC112296 GC112296

802005A 802005A 802005A 802005A 802005A 802005A 802005A

## TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 611-0840 APL/UP-W2	Sample I.D. 611-0841 OKUS-W7	Sample I.D. 611-0842 OKUS-W8	Sample I.D. 611-0843 OKUS-W1	Sample I.D. 611-0844 OKUS-W2	Sample I.D. 611-0845 OKUS-W12
Purgeable Hydrocarbons	50	85	86	170	N.D.	6,000	11,000
Benzene	0.50	3.2	4.1	N.D.	N.D.	160	210
Toluene	0.50	N.D.	N.D.	N.D.	N.D.	34	55
Ethyl Benzene	0.50	1.7	N.D.	N.D.	N.D.	130	26
Total Xylenes	0.50	0.62	N.D.	1.1	N.D.	64	89

Chromatogram Pattern:	Discrete Peaks	Gasoline & Unidentified Hydrocarbons > C8	Gasoline & Unidentified Hydrocarbons > C8	--	Discrete Peaks > Gasoline	Discrete Peaks > Gasoline
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### Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	2.0	1.0	50	50
Date Analyzed:	11/22/96	11/22/96	11/22/96	11/22/96	11/22/96	11/22/96
Instrument Identification:	HP-5	HP-5	HP-5	HP-5	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	80	81	84	96	88	81

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

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U.S.P.C.I. / Laidlaw  
5665 Flatiron Pkwy  
Boulder, CO 80301  
Attention: Denton Mauldin

Client Project ID: UP Motor Freight  
Sample Matrix: Water  
Analysis Method: EPA 5030/8015 Mod./8020  
First Sample #: 611-0846

Sampled: Nov 13, 1996  
Received: Nov 13, 1996  
Reported: Nov 26, 1996

QC Batch Number: GC112296 GC112296  
802005A 802005A

**TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION**

Analyte	Reporting Limit µg/L	Sample I.D. 611-0846 OKUS-W3	Sample I.D. Method Blank
Purgeable Hydrocarbons	50	7,400	N.D.
Benzene	0.50	220	N.D.
Toluene	0.50	60	N.D.
Ethyl Benzene	0.50	N.D.	N.D.
Total Xylenes	0.50	N.D.	N.D.

Chromatogram Pattern: Discrete Peaks > Gasoline --

**Quality Control Data**

Report Limit Multiplication Factor:	100	1.0
Date Analyzed:	11/22/96	11/22/96
Instrument Identification:	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	85	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







U.S.P.C.I. / Laidlaw 5665 Flatiron Pkwy Boulder, CO 80301 Attention: Denton Mauldin	Client Project ID: UP Motor Freight Sample Matrix: Water Analysis Method: EPA 3510/8015 Mod. First Sample #: 611-0840	Sampled: Nov 13, 1996 Received: Nov 13, 1996 Reported: Nov 26, 1996
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QC Batch Number:	SP112096	SP112096	SP112096	SP112096	SP112096	SP112096
	8015EXA	8015EXA	8015EXA	8015EXA	8015EXA	8015EXA

**TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS**

Analyte	Reporting Limit µg/L	Sample I.D. 611-0840 APL/UP-W2	Sample I.D. 611-0841 OKUS-W7	Sample I.D. 611-0842 OKUS-W8	Sample I.D. 611-0843 OKUS-W1	Sample I.D. 611-0844 OKUS-W2	Sample I.D. 611-0845 OKUS-W12
Extractable Hydrocarbons	50	470	1,400	1,600	180	2,900	3,000
Chromatogram Pattern:		Diesel & Unidentified Hydrocarbons > C20	Diesel & Unidentified Hydrocarbons > C20	Diesel & Unidentified Hydrocarbons > C20	Diesel & Unidentified Hydrocarbons > C20	Diesel & Unidentified Hydrocarbons < C15 > C20	Diesel & Unidentified Hydrocarbons < C15 > C20

**Quality Control Data**

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Extracted:	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96	11/20/96
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*

Melissa A. Brewer  
Client Services Representative





U.S.P.C.I. / Laidlaw  
5665 Flatiron Pkwy  
Boulder, CO 80301  
Attention: Denton Mauldin

Client Project ID: UP Motor Freight  
Sample Matrix: Water  
Analysis Method: EPA 3510/8015 Mod.  
First Sample #: 611-0846

Sampled: Nov 13, 1996  
Received: Nov 13, 1996  
Reported: Nov 26, 1996

QC Batch Number: SP112096 SP112096

8015EXA 8015EXA

**TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS**

Analyte	Reporting Limit µg/L	Sample I.D. 611-0846 OKUS-W3	Sample I.D. Method Blank
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Extractable Hydrocarbons	50	4,700	N.D.
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Chromatogram Pattern: Diesel & Unidentified Hydrocarbons < C15

**Quality Control Data**

Report Limit Multiplication Factor:	10	1.0
Date Extracted:	11/20/96	11/20/96
Date Analyzed:	11/22/96	11/21/96
Instrument Identification:	HP-3A	HP-3B

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

SEQUOIA ANALYTICAL, #1271

*Melissa A. Brewer*

Melissa A. Brewer  
Client Services Representative





U.S.P.C.I. / Laidlaw  
 5665 Flatiron Pkwy  
 Boulder, CO 80301  
 Attention: Denton Mauldin

Client Project ID: UP Motor Freight  
 Matrix: Liquid

QC Sample Group: 6110840-846

Reported: Nov 27, 1996

**QUALITY CONTROL DATA REPORT**

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Diesel
QC Batch#:	GC112296 802005A	GC112296 802005A	GC112296 802005A	GC112296 802005A	SP112096 8015EXA
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 3510
Analyst:	D. Newcomb	D. Newcomb	D. Newcomb	D. Newcomb	D. Sharma
MS/MSD #:	6110841	6110841	6110841	6110841	6110841
Sample Conc.:	4.1 µg/L	N.D.	N.D.	N.D.	1400 µg/L
Prepared Date:	11/22/96	11/22/96	11/22/96	11/22/96	11/20/96
Analyzed Date:	11/22/96	11/22/96	11/22/96	11/22/96	11/21/96
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5	HP-3B
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	300 µg/L
Result:	20	18	18	57	840
MS % Recovery:	80	90	90	95	-
Dup. Result:	20	18	19	57	970
MSD % Recov.:	80	90	95	95	-
RPD:	0.0	0.0	5.4	0.0	14
RPD Limit:	0-25	0-25	0-25	0-25	0-50

LCS #:	5LCS112296	5LCS112296	5LCS112296	5LCS112296	LCS112096
Prepared Date:	11/22/96	11/22/96	11/22/96	11/22/96	11/20/96
Analyzed Date:	11/22/96	11/22/96	11/22/96	11/22/96	11/21/96
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5	HP-3B
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	300 µg/L
LCS Result:	17	17	18	55	290
LCS % Recov.:	85	85	90	92	97

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130	60-140
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Please Note:  
 The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.  
 \*\* MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SEQUOIA ANALYTICAL, #1271  
*Melissa A. Brewer*  
 Melissa A. Brewer  
 Client Services Representative





U.S.P.C.I. / Laidlaw  
5665 Flatiron Pkwy  
Boulder, CO 80301

Client Project ID: UP Motor Freight

Received: Nov 13, 1996

Attention: Denton Mauldin

Lab Number: 6110840-846

Reported: Nov 27, 1996

## LABORATORY NARRATIVE

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

Q.C. Batch #: SP1120968015EXA  
Date Analyzed: November 21, 1996

Results for the Matrix Spike and Matrix Spike Duplicate were less than 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

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