5/17/91

UNION PACIFIC RAILROAD
ENVIRONMENTAL MANAGEMENT GROUP

1416 DODGE STREET (ROOM 930)
OMAHA, NEBRASKA 68179

FACSIMILE COVER SHEET

PAGE 1 OF 2 INCLUDING COVER

DATE & TIME 5/20 11:00

PLEASE ROUTE TO: Ray Balcon

MESSAGE:

FROM: Darry Patterson

ALTERNATE TELEPHONE NUMBER

"IT IS THE POLICY OF THE UNION PACIFIC RAILROAD TO CONTINUE TO PROTECT AND ENHANCE THE ENVIRONMENT THROUGHOUT THE TERRITORY IN WHICH IT OPERATES CONSISTENT WITH ITS CONTINUING OBLIGATION TO PROVIDE A QUALITY TRANSPORTATION SERVICE." *MIKE WALSH, Chairman, Union Pacific Railroad*

UNION PACIFIC RAILROAD COMPANY

W E (BILL) WIMMER
ASSISTANT VICE PRESIDENT
ENVIRONMENTAL MANAGEMENT

MAILING ADDRESS
ROOM 930
1416 DODGE STREET
OMAHA NEBRASKA 68179

May 17, 1991

Environmental: CA, Oakland

Mr. Ray Balcon
California Regional Water
Quality Control Board
San Francisco Bay Region
1111 Jackson St., Room 6040
Oakland, CA 94607

Dear Mr. Balcon:

Reference my February 14th letter concerning releases of oil into the estuary at Oakland February 4, and 7, 1991, and your request for additional information concerning a spill.

My inquiries of our Oakland employees has revealed no spills in the Oakland Yard immediately preceding the February 4th release. It is our opinion that an accumulation of oil drippage from locomotives and the rainfall event of February 4th resulted in the release. In part the release was aided by a storm sewer which was rusted through, thus allowing subsurface contaminates to enter it.

Mr. Harry Patterson of my staff, will be in the bay area next week and will be contacting you to discuss preliminary results of our investigation into the extent of contamination.

Should you have further questions, please contact Harry Patterson at 402-271-4078.

Yours truly,

W. E. WIMMER
AVP Environmental Management

UNION PACIFIC RAILROAD
ENVIRONMENTAL MANAGEMENT GROUP

1416 DODGE STREET (ROOM 930)
OMAHA, NEBRASKA 68179

FACILIMILE COVER SHEET

PAGE 1 OF 3 INCLUDING COVER

DATE & TIME 2/15 1:40

PLEASE ROUTE TO: Ray Balcom

MESSAGE: orig is being mailed today

FROM: Mary Patterson

ALTERNATE TELEPHONE NUMBER _____

"IT IS THE POLICY OF THE UNION PACIFIC RAILROAD TO CONTINUE TO PROTECT AND ENHANCE THE ENVIRONMENT THROUGHOUT THE TERRITORY IN WHICH IT OPERATES CONSISTENT WITH ITS CONTINUING OBLIGATION TO PROVIDE A QUALITY TRANSPORTATION SERVICE." *MIKE WALSH, Chairman, Union Pacific Railroad*

UNION PACIFIC RAILROAD COMPANY

W. E. (BILL) WIMMER
ASSISTANT VICE PRESIDENT
ENVIRONMENTAL MANAGEMENT

MAILING ADDRESS
ROOM 930
1416 DODGE STREET
OMAHA, NEBRASKA 68179

February 14, 1991

Environmental Protection
CA, Oakland

Mr. Ray Balcon
California Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson St., Room 6040
Oakland, CA 94607

Dear Mr. Balcon:

This letter is in response to your February 8, 1991, conversation with Curt Hull of USPCI and Harry Patterson, of my staff, concerning Union Pacific Railroad's Oakland Yard pollution incidents of February 4, and 7, 1991. The original incident was observed by the Coast Guard as possibly the result of overland flow while the second was caused by storm sewer cleanout operations. The Union Pacific Railroad took several immediate actions to contain and cleanup the releases as well as to prevent additional release to the Oakland Estuary.

The Union Pacific Railroad contracted O. H. Materials (OHM) to provide emergency response containment activities. OHM placed oil absorbent booms in the estuary around the outfall of storm sewers.

Upon receipt of the Coast Guard's initial notice, Mr. Alan Jensen, Manager Environmental Field Operations-Western Region, mobilized to the site on February 4, 1991. Initial observations revealed diesel product in two catch basins that feed a storm sewer that empties into the estuary. This source along with possible overflow of the drip pans during the storm event of the previous week, appeared to have caused the original release. After tracing the storm drain, placing booms at the outfall, and blocking inflows that showed no diesel, an attempt to cleanout the storm sewer was made. This resulted in the second release as it revealed a second outfall to the estuary which had been hidden by boulders at the low tideline. Containment booms were immediately moved to contain and recover this release. Once the release was contained, another attempt was made to locate the storm sewers in the yard area. Inquires were made with the City of Oakland, the Port of Oakland, the Navy, and UPRR files concerning maps of buried utility or sewer lines. Additional excavation was performed at the upstream side (north) of the refueling area to attempt to locate the storm sewer, and at the estuary above the outfall to locate the storm sewer. The storm sewer ends somewhere under the fueling area as it could not be located along the northern property line.

The following actions have been taken to prevent further release to the Oakland Estuary. Inflow and outflow lines in the two catch basins that held diesel were pumped out, plugged with sandbags and concrete, and the catch basins were filled with concrete. The storm sewer at the edge of the estuary was pumped out and plugged with sandbags and concrete. Additionally, the drip pan return lines will be cleaned out and the fuel supply lines were checked for leaks Tuesday, February 12 1991. No other underground utility lines or sewer have been identified in the release area. All excavated soils have been stockpiled on visqueen pending proper disposal.

USPCI is currently preparing an investigation workplan for UPRR and RWQCB review. The objective of which will be to determine the nature and extent of soil, free phase, and dissolved product plumes at the Oakland Yard fueling facility. The work plan is expected to be available and in your office by February 28, 1991.

If you have any questions concerning this matter, please contact Harry Patterson at (402) 271-4078.

Yours truly,

W E Wimmer

W. E. WIMMER by MES
AVP Environmental Management

BayKeeper

RB

February 22, 1991

TO: Regional Water Quality Control Board

FROM: Michael Herz

RE: 4 February 1991 BayKeeper Patrol & Diesel Spill

While patrolling the Oakland Estuary on 4 Feb 91, en route to Schnitzer Steel the BayKeeper and BayKeeper volunteers Dr. H.V.S. Peeke, Angela Nardo & Lance Morgan detected what appeared to be a relatively fresh (iridescent) diesel spill on top of an older, weathered (grey) spill. Although we could detect no source, the spill covered an area approximately 1000 to 1500 feet long by 75 feet wide, the heaviest concentration appeared to be close to shore near the east end of the APL container loading facility (Berth 60), adjacent to the Union Pacific yard. Detection of an actual source was complicated by the fact that the entire shoreline was riprapped with large boulders.

A cellular phone report of the incident was made to the Coast Guard Marine Envirnomental Response Office (Petty Officer Davis and Ensign Farrell) who indicated that they believed the spill has come from a truck which has overturned on 1 Feb 91. However, since there had been no rain within the preceding 24 hours and because the spill looked fresh, we believed that the spill which we observed was new and unrelated to the 1 Feb 91 incident.

Michael Herz
BayKeeper & Executive Director

John Payne
Witnessed

2/25/91
Date

a project of the San Francisco Bay-Delta Preservation Association

Building A Fort Mason
San Francisco
CA 94123 1382

Telephone: 415 567 4401
Facsimile: 415 567 9715
Hotline: 1 800 KEEPBAY

RB

On the morning of 1 February 1991, I was on patrol with BayKeeper volunteers George Birner and George Reed. As we were proceeding up the Oakland-Alameda Estuary we entered a large diesel slick.

We first noticed the slick near the American President Lines Facility. At the time we noticed the slick the tide was flooding and the slick extended up the estuary to the Mariner Square area. It was determined that the source of the spill was coming from the vicinity of the west end of the A.P.L. pier. In this area the sheen had vivid colors, and a strong smell, indicating that it was fresh.

Kurt E. Lootens
February 26, 1990

a project of the San Francisco Bay-Delta Preservation Association

Building A Fort Mason
San Francisco
CA 94123 1382

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Facsimile. 415 567 9715
Hotline: 1 800 KEEPBAY

HYDROCARBON INVESTIGATION AND REMEDIAL DESIGN AT UNION PACIFIC RAILROAD'S OAKLAND, CALIFORNIA TOFC YARD

May 20, 1991

Prepared For
Union Pacific Railroad
By
USPCI
Job Number 96199

DRAFT

EXECUTIVE SUMMARY

Union Pacific Railroad's Oakland TOFC (Trailer On Freight Car) Railyard is an active railyard with refueling capabilities located adjacent to the Oakland Estuary. During February, 1991 two incidents were recorded in which diesel oil reached the estuary via storm sewers presumably originating from the refueling area within the railyard. USPCI initiated an investigation of the site designed to recover information necessary to design a remedial system optimally suited for this site.

During the coarse of the investigation it was determined that;

- Groundwater is shallow (2-6 feet below the ground) with a gradient which slopes toward the estuary.
- Hydrocarbon contaminated soil is limited to the area of the fueling rack and fuel storage tanks.
- The projected 1 ppm TPH boundary is presently several hundred feet upgradient of the estuary.

Based on the above summarized findings USPCI recommends additional field activities prior to final design of a remedial system. Data collected during that final round includes the distance and magnitude of tidal effects on the groundwater and associated gradient, further delineation of the contaminant plume through the installation of two additional monitoring wells, and aquifer testing through the use of slug tests to determine aquifer characteristics.

1.0 INTRODUCTION

This report, prepared by USPCI, was completed at the request of Union Pacific Railroad, (UPRR) on their Oakland, California TOFC (Trailer On Freight Car) Yard. The activities described in this report were completed in accordance with the work plan submitted to UPRR by USPCI on March 2, 1990. The workplan was designed to evaluate the extent and distribution of petroleum hydrocarbon contamination, while providing an assessment of the shallow aquifer characteristics. The investigation concentrated on the locomotive fueling facility located in the northern portion of the site. The collection and analysis of this data is required for the optimal design of remedial action plan.

The Oakland TOFC Yard is located at 1717 Middle Harbor Road in Oakland California. UPRR operations at this facility consist of loading and unloading over-the-road trailers on flatcars for rail transport. The facility also includes a small re-fueling rack for diesel locomotives. The site is bounded on the south and west by the Oakland Estuary and on the north by the Navy Supply Center (see Figure 1).

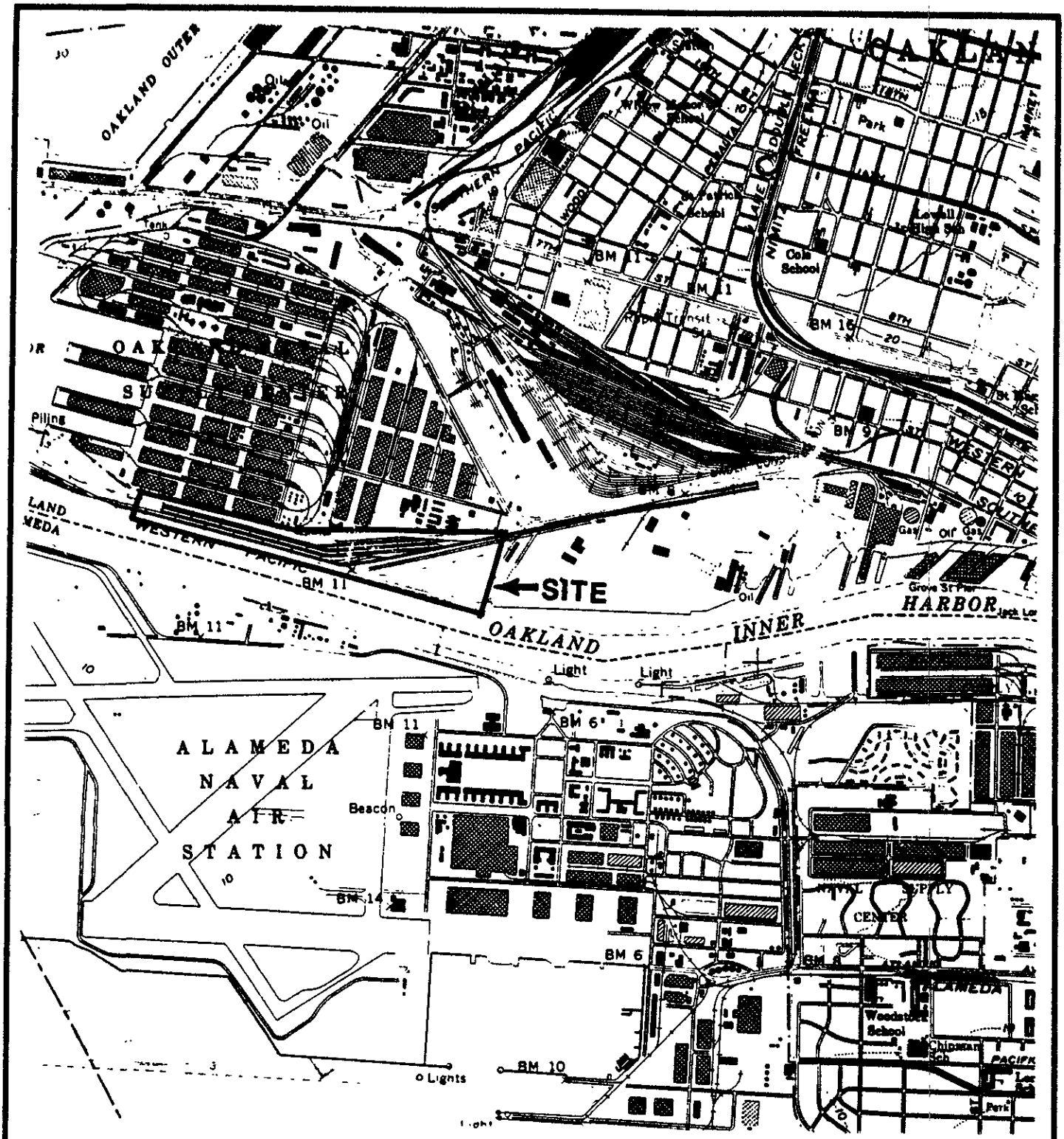


FIGURE 1

USPCI
A Subsidiary of Union Pacific Corporation

OAKLAND WEST, CA

USGS 7 1/2 MINUTE QUAD
1959 PHOTOREVISED 1980

SCALE: 1"=2400' | APPROVED/DATE

The hydrocarbon investigation involved the completion of 17 soil borings, eight of which were completed as shallow monitoring wells. The subsurface investigation was concentrated in the area of the re-fueling racks located adjacent to the Navy Supply Center (See Figure 2). Through the collection and analysis of soil and water samples from the soil borings and monitoring wells, free phase and dissolved hydrocarbon plumes were identified and partially delineated beneath the site.

2.0 SITE HISTORY

This investigation was requested after two incidents on February 4, and 7, 1991 at the Oakland Yard. The original incident was observed by the U.S.Coast Guard as possibly the result of overland flow while the second was caused by storm sewer cleanout operations. Both incidents resulted in releases of diesel/oil to the estuary. The UPRR took immediate actions to contain and cleanup the releases as well as to prevent addition releases to the Oakland Estuary.

Initial observations at site revealed diesel product in two catch basins feeding a storm sewer that empties into the estuary at point of the release. This source along with possible overland flow from the drip pans (spill containment devices in the refueling area) during a storm event of the previous week, appeared to have caused the original release. The storm sewers were eventually cleaned out and the sewer that was the source of the release was plugged with concrete at the two catch basins and at its outfall to the estuary. The upstream end of this sewer was traced to the refueling rack and ends beneath the refueling area.

3.0 SITE INVESTIGATION

Since the suspected source of the diesel fuel release to the estuary is the locomotive refueling facility, USPCI recommended the following tasks be completed in the area of the re-fueling facility to begin the data collection necessary to design and implement a remedial system.

- Drilling of 17 soil borings to delineate the extent of hydrocarbon contamination in the subsurface. This included the screening of soils encountered for organic vapors with an organic vapor monitor (OVM).
- Installation of 8 groundwater monitoring wells in selected boring locations.

- Collection of soil and groundwater samples from all borings and wells as appropriate. Analysis of all samples by a certified laboratory for Total Petroleum Hydrocarbons (TPH) and Benzene, Toluene, Xylene, Ethylbenzene (BTXE) employing EPA methods 8015 and 8020. Results of analysis are provided in Tables 1 and 2, and in Attachment B.

- Review, interpretation and presentation of data collected in an interim report (presented here).

4.0 SITE HYDROLOGY

Groundwater was typically encountered during drilling at depths ranging from 3 to 7 feet below the ground surface (BGS). Groundwater generally appears to be unconfined, with little difference between the depths at which water was first encountered during drilling and the subsequent static water level recorded in the monitoring well. Groundwater was observed near or below the contact between the poorly sorted sandy bay material and the fill or asphalt sub-grade. Local groundwater gradient dips gently south towards the estuary. Table 3 contains measured water level elevations, and a groundwater potentiometric surface map is presented as Figure 3.

The UPRR Oakland Railyard is immediately adjacent to the Oakland Estuary, which is located in the northern portion of the San Francisco Bay. The close proximity of the Estuary to the site suggests a direct hydraulic connection between the Estuary and the groundwater underlying the site. Thus tidal influences are expected for wells located close to the estuary. The distance inland and the magnitude of the tidal influences will be investigated prior to implementation of a remedial system involving groundwater depression. Previous work in the Bay Area suggests that tidal influences are only detectable in very close proximity to the bay.

5.0 SITE GEOLOGY

The stratigraphy underlying the site consists of a fill cap of variable thickness and composition, overlying a sequence of naturally deposited bay sediments. The cap generally consists of either asphalt with a sandy sub-grade fill (1 to 3.5 ft thick), or railroad ballast with a clastic fill sub-grade (2.5 to 4.5 ft thick). In some instances an additional fill layer can be distinguished between the surficial fill layer and the natural sediments. This unit was distinguished by the presence of brick fragments as in Boring 4. The water table was observed in several of the borings in the lower reaches of this unit.

TABLE 1 (CONTINUED)
ANALYTICAL RESULTS OF SOIL SAMPLES
FROM SOIL BORINGS AT OAKLAND TOFC YARD
April 4–8, 1991 (Collection Date)

BORING #	MATRIX DEPTH	TPH	B	T	X	E
B-1	SOIL 3.5'	ND	NA	NA	NA	NA
B-2	SOIL 6'	ND	NA	NA	NA	NA
B-3	SOIL 5.5'	ND	NA	NA	NA	NA
B-4	SOIL 6'	ND	NA	NA	NA	NA
	SOIL 9'	ND	NA	NA	NA	NA
B-5	SOIL 4.5'	ND	NA	NA	NA	NA
B-6	SOIL 3.5'	ND	NA	NA	NA	NA
B-7	SOIL 3.5'	8,900	0.095	.390	.530	2.700
B-8	SOIL 4'	13,000	.280	.720	1.400	6.200
B-9	SOIL 5'	ND	NA	NA	NA	NA

Detection Limits TPH (EPA Method 8015) 0.05 mg/l
BTXE (EPA Method 8020) 0.0003 mg/l

ND = Below the Limit of Detection
NA = Not Analized

TABLE 1

ANALYTICAL RESULTS OF SOIL SAMPLES FROM SOIL BORINGS AT OAKLAND TOFC YARD

April 4–8, 1991 (Collection Date)

BORING #	MATRIX DEPTH	TPH	B	T	X	E
OMW–1	SOIL 5.5'	ND	NA	NA	NA	NA
	SOIL 7'	ND	NA	NA	NA	NA
	SOIL 11'	ND	NA	NA	NA	NA
OMW–2	SOIL 5.5'	4100	.008	.026	.048	.310
	SOIL 11'	1400	NA	NA	NA	NA
OMW–3	SOIL 3'	4500	NA	NA	NA	NA
	SOIL 6'	780	NA	NA	NA	NA
	SOIL 11'	195	NA	NA	NA	NA
OMW–4	SOIL 3'	9600	ND	.310	.860	5.300
	SOIL 6'	ND	NA	NA	NA	NA
	SOIL 11'	ND	NA	NA	NA	NA
OMW–5	SOIL 5.5'	19	NA	NA	NA	NA
	SOIL 8'	ND	NA	NA	NA	NA
OMW–6	SOIL 11'	ND	.0033	.005	ND	ND
	SOIL 14.5'	6+	NA	NA	NA	NA
OMW–7	SOIL 3.5'	5600	.086	.150	.290	1.400
	SOIL 6'	860	.025	.019	.025	.075
	SOIL 11'	360	NA	NA	NA	NA
OMW–8	SOIL 5.5'	ND	ND	.004	.004	.011
	SOIL 11'	ND	NA	NA	NA	NA

Detection Limits TPH (EPA Method 8015) 0.05 mg/l
BTXE (EPA Method 8020) 0.0003 mg/l

ND = Below the Limit of Detection
NA = Not Analized

TABLE 2

ANALYTICAL RESULTS OF WATER SAMPLES FROM MONITORING WELLS AT OAKLAND TOFC YARD

April 8, 1991 (Collection Date)

WELL #	SAMPLE	TPH	B	T	X	E
		mg/l	----------	mg/l	----------	
OMW-1	WATER	0.06	ND	ND	ND	ND
OMW-2	WATER	3.2	ND	ND	.0012	.0067
OMW-3	WATER	1.4	.0004	.0005	.0056	.026
OMW-4	WATER	FREE PRODUCT		WELL NOT SAMPLED		
OMW-5	WATER	ND	ND	ND	ND	ND
OMW-6	WATER	0.08	ND	.0004	ND	.0005
OMW-7	WATER	FREE PRODUCT		WELL NOT SAMPLED		
OMW-8	WATER	0.05	ND	ND	ND	ND

Detection Limits: TPH (EPA Method 8015) 0.05 mg/l
BTXE (EPA Method 8020) .0003 mg/l

The natural bay sediments underlying the fill appear to be laterally continuous and fairly homogeneous. Layers of different lithology were distinguished on the basis of silt content and degree of sorting. Lithologies range from silty sand of variable grain size to fairly clean sand of a uniform grain size. These sands extend from the fill contact, usually 4 to 5 feet BGS, to a depth of 12 to >15 feet. This unit, the uppermost unit of the natural bay sediments, is completely saturated with groundwater. A basal silty unit was encountered in two of the monitoring well borings (OMW-2, and OMW-3) any may indicate the presence of a lower aquitard.

5.0 DISCUSSION OF RESULTS

5.1 SOIL RESULTS

Soil samples were collected and analyzed from each soil boring and monitoring well installed on site. These samples were analyzed for TPH and BTXE using EPA methods 8015 and 8020. Analysis were completed by Superior Analytical Laboratories of Martinez, California.

Hydrocarbon concentrations in the soil ranged from a high of 13,000 ppm TPH (B-8) in the vicinity of the re-fueling facility, to low concentrations below the limits of detection for soil samples from the outlying areas of the site. The hydrocarbon contamination of soil is concentrated in the immediate vicinity of the re-fueling rack and fuel storage tanks located to the west of the racks (OMW-7,4,3,2 and B-7,8). The refueling rack and associated storage tanks is presently considered the source of the hydrocarbon contamination.

Contamination of soil extends the entire length of the fueling rack and fuel storage tanks, and to the south approximately 200 feet (OMW-2, 3, 7). Hydrocarbon Impacted soils underlie the active rails in the vicinity of the fueling facility. The contamination of soil below the water table is a result of the southerly migrating free diesel on top of the water table being smeared into the formation as the water table fluctuates. The greater the product thickness and the greater the water table fluctuation, the thicker the zone of hydrocarbon impact. The lithologic units affected by the contamination along the northern edge of the fueling rack area include the fill unit and the natural bay sediments down to a depth of approximately 4.5 feet (OMW-4). This depth roughly corresponds to the depth of groundwater in this area. The flow of groundwater to the south is presumably preventing the spread of the contaminant to the north. An up-gradient well located on adjacent Naval Supply Center property would confirm or refute this assumption.

As seen in soil samples from OMW-2, a TPH concentration of 1,400 ppm was measured at a depth of 11 feet below the ground surface (9 feet below present day water level). This depth is

TABLE 3

WELL GUAGING DATA
UNION PACIFIC RAILYARD
OAKLAND, CALIFORNIA
APRIL, 1991

WELL NO.	DATE	WELL HEA ELEVATIOI	DEPTH TO PRODUC	DEPTH TO WATER	PRODUCT LEVEL ELEV.	WATER LEVEL ELEV.	PRODUCT THICKNES	CORRECTED GROU WATER SURFACE *
OMW-1	4/9/91	8.79		5.54		3.25		3.25
OMW-2	4/9/91	5.88		2.10		3.78		3.78
OMW-3	4/9/91	7.16		3.93		3.23		3.23
OMW-4	4/9/91	7.41	3.79	6.23	3.62	1.18	2.44	3.23
OMW-5	4/9/91	7.62		4.64		2.98		2.98
OMW-6	4/9/91	5.78		7.60		-1.82		-1.82
OMW-7	4/9/91	7.03	3.26	7.48	3.77	-0.45	4.22	3.09
OMW-8	4/9/91	7.52		4.25		3.27		3.27

* CORRECTED GROUNDWATER SURFACE ASSUMES A DIESEL DENSITY OF 0.84 g/cm3

probably indicative of historical fluctuations in the groundwater table. An accurate assessment of the anticipated fluctuations, natural and otherwise, is required for design of a groundwater remediation system.

In boring B-8 a total BTXE value of 9 ppm was recorded. Although this level does not cause immediate concern, it is generally higher then BTXE levels associated with diesel releases. This suggests the possibility of an additional source of a contaminant which has higher BTXE values than normally occurs in diesel fuel. Results of soil analysis are in Table 1, and the laboratory data sheets are in Attachment B.

5.2 GROUNDWATER RESULTS

Groundwater samples were collected and analyzed for TPH and BTXE from the eight wells located on site. The analysis were completed by Superior Analytical Laboratories of Martinez, California, using EPA method 8015 and 8020. Sampling procedures are presented in detail in the field methods section located in Attachment C. Results of groundwater analysis are presented in Table 2, laboratory data sheets are in Attachment B.

Results of water analysis confirm the low solubility of diesel fuel with concentrations ranging from 3.2 mg/l TPH to levels below the limit of detection (0.05 mg/l). The distribution of groundwater contamination is shown in Figure 4. The extent of groundwater contamination shown of Figure 4 suggests the rate of migration of diesel fuel in these sediments is fairly low. Measurements of conductivity taken during sampling of groundwater may indicate brackish water quality. In all but one well the conductivity measuring device recorded its' maximum reading, indicating conductivities greater than 1,990 umho/cm.

6.0 CONCLUSIONS

Data collected and analyzed to date has provided the following insights into the geohydrology and contaminant distribution below the site.

- The contaminant in groundwater and soil is primarily diesel fuel.
- Groundwater is encountered at an elevation of 0 to 4 feet above mean sea level, with the hydraulic gradient sloping toward the south.
- Free product contamination is limited to the area immediately surrounding the train re-fueling rack.

- Dissolved product contamination has migrated slightly to the south and west of the fueling facility, but is not in danger of reaching the estuary for some time.

- Product source area is thought to be solely the refueling facility.

- The release of diesel to the estuary observed by the Coast Guard was due to the storm sewer and not due to diesel which migrated from the fueling rack to the estuary via normal geohydraulic transmission.

Collection of additional information on the total dissolved solids in the groundwater is necessary prior to establishing suitable target clean-up levels for the site. With additional delineation and water quality information, the desirability of a risk assessment can be evaluated and discussed with the Western Region Water Quality Control Board. Establishment of target clean-up levels prior to remediation design is preferred.

7.0 RECOMMENDATIONS

The following recommendations are made to provide for the collection of additional data necessary for remedial system design.

- Install two additional monitoring wells, one up-gradient on Navy property, and one to the immediate west of the fuel storage tanks.

- Completion of a tidal influence test to determine the distance-magnitude relationship of the tidal influence.

- Completion of slug tests to accurately assess the aquifer characteristics which will influence remedial design.

- Sample and analyze water from OMW-6, OMW-5, and OMW-1 for total dissolved solids to determine background water quality.

- Determination and completion of risk assessment requirements.

- Design of a remedial plan involving active remediation of the subsurface contamination.

APPENDIX A

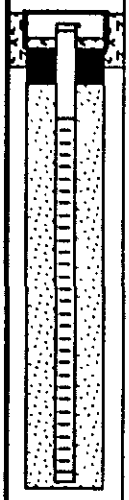
BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

U.S POLLUTION CONTROL INC.
Remedial Services

LOG

BORING NO. OMW-1
WELL NO. OMW-1

CLIENT: UP RAILROAD			JOB NUMBER: 96199
PROJECT: OAKLAND, UPRR YARD		LOCATION: OAKLAND, CALIFORNIA	
DRILLED BY: PC EXPLORATION	DRILLER: BRAD		METHOD: 4-1/4" HSA
DATE START: 4/4/91	DATE COMP: 4/4/91	SURF. EL:8.79 MSL	TD: 13.5 BGS
LOGGED BY: KV ROSE	APPROVED BY:		DEPTH TO WATER: 5.0 FT.

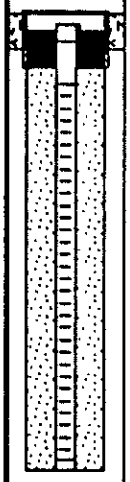
WELL COMP	DPT	DESCRIPTION	GRAPHIC LOG USCS CODE		ODOR	SAMPLE NUMBER	SAMPLE ANAL
	0	0.0 to 0.7 ASPHALT		AF			
		0.7 TO 4.5 ASPHALT SUB-GRADE FILL, DAMP, SLIGHT ODOR. RED CHERT GRAVEL AT 3.5'		AF	2.5	OMW1-2	TPH=ND
	5	4.5 to 13.5 GREY, MEDIUM TO COARSE SAND, WITH SOME GRAVEL AND FINE SAND, WET, NO ODOR. TRACE CLAY AND SHELLS			1.5	OMW1-5.5	TPH=ND
					0	OMW1-7	TPH=ND
	10			SW			
					0	OMW1-11	
	15	BORING COMPLETED ON APRIL 4, 1991					
		********** MONITOR WELL STATISTICS **********					
	20	TOC EL: 8.79 MSL FT GS EL: 9.01 MSL FT BLANK CASING: .3 TO 3.0 FT SCREEN CASING: 3.0 TO 13.0 FT BOTTOM CAP: 13.0 TO 13.3 FT SAND PACK: 2.0 TO 13.5 FT 2.5 SACKS 8X12 BENTONITE SEAL: 2.0 TO 1.0 FT 0.5 BUCK 3/8" CONCRETE SEAL: 0.0 TO 1.0 FT 1.0 SACKS CMIX FLUSH MOUNT: 0 TO 1.2 FT					
	25						
	30						
	35						
	40						

U.S POLLUTION CONTROL INC.
Remedial Services

LOG

BORING NO. OMW-2
WELL NO. OMW-2

CLIENT: UP RAILROAD			JOB NUMBER: 96199
PROJECT: OAKLAND, UPRR YARD		LOCATION: OAKLAND, CALIFORNIA	
DRILLED BY: PC EXPLORATION	DRILLER: BRAD		METHOD: 4-1/4" HSA
DATE START: 4/4/91	DATE COMP: 4/4/91	SURF. EL:5.88 MSL	TD: 13.0 BGS
LOGGED BY: KV ROSE	APPROVED BY:		DEPTH TO WATER: 3.5 FT.

WELL COMP	DPT	DESCRIPTION	GRAPHIC LOG USCS CODE	ODOR	SAMPLE NUMBER	SAMPLE ANAL
	0	0.0 to 1.0 RR BALLAST, GREY SANDY PEA GRAVEL, NO STAINING	AF			
	5	1.0 TO 11.5 GREY, FINE TO COARSE SAND AND GRAVEL, VERY MOIST, STRONG ODOR (2') TRACE SHELLS. AT 8' AS ABOVE, WET, SLIGHT ODOR, SHEEN.	SP	18	OMW2-5.5	4,100
	10			7.0	OMW2-11	1,400
		11.5 TO 13 FINE SANDY CLAY AND SILT, DARK GREY, TRACE SHELLS, BAY MUD, SLIGHT H2S ODOR.	ML			
	15	BORING COMPLETED ON APRIL 4, 1991				
		********** MONITOR WELL STATISTICS **********				
	20	TOC EL: 5.88 MSL FT GS EL: 6.10 MSL FT BLANK CASING: .3 TO 2.0 FT SCREEN CASING: 2.0 TO 12.0 FT BOTTOM CAP: 12.0 TO 12.3 FT SAND PACK: 2.0 TO 12.5 FT 2.5 SACKS 8X12 BENTONITE SEAL: 1.5 TO 0.5 FT 0.5 BUCK 3/8" CONCRETE SEAL: 0.0 TO 0.5 FT 1.0 SACKS CMIX FLUSH MOUNT: 0 TO 1.2 FT				
	25					
	30					
	35					
	40					

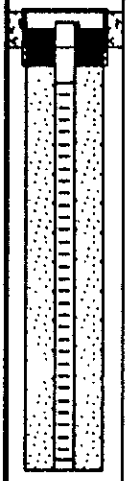
U.S POLLUTION CONTROL INC.
Remedial Services

LOG

BORING NO. OMW-3

WELL NO. OMW-3

CLIENT: UP RAILROAD			JOB NUMBER: 98199
PROJECT: OAKLAND, UPRR YARD		LOCATION: OAKLAND, CALIFORNIA	
DRILLED BY: PC EXPLORATION	DRILLER: BRAD		METHOD: 4-1/4" HSA
DATE START: 4/5/91	DATE COMP: 4/5/91	SURF. EL:7.16 MSL	TD: 13.0 BGS
LOGGED BY: KV ROSE	APPROVED BY:		DEPTH TO WATER: 4.5 FT.

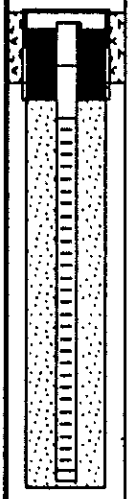
WELL COMP	DPT	DESCRIPTION	GRAPHIC LOG USCS CODE	ODOR	SAMPLE NUMBER	SAMPLE ANAL
	0	0.0 to 4.5 RR BALLAST, GREY TO BROWN SANDY GRAVEL, STAINED, DRY, BECOMES ODIFEROUS AT 4', WET WITH STRONG ODOR AT 4.5'.	AF	81	OMW3-3.0	4,500
	5	4.5 TO 11.5 GREY, FINE TO MEDIUM SAND WITH MINOR GRAVEL AND COARSE SAND. SLIGHT ODOR, SATURATED.	SW	55	OMW3-8	780
	10	AT 9' AS ABOVE, WET, VERY SLIGHT ODOR.		88	OMW2-11	195
		11.5 TO 13 FINE GRAINED SILTY SAND, GREY, BAY MUD.	SM			
	15	BORING COMPLETED ON APRIL 5, 1991				
		********** MONITOR WELL STATISTICS ********** TOC EL: 7.16 MSL FT GS EL: 7.36 MSL FT BLANK CASING: .3 TO 2.0 FT SCREEN CASING: 2.0 TO 12.0 FT BOTTOM CAP: 12.0 TO 12.3 FT SAND PACK: 2.0 TO 12.5 FT 2.5 SACKS 8X12 BENTONITE SEAL: 1.5 TO 0.5 FT 0.5 BUCK 3/8" CONCRETE SEAL: 0.0 TO 0.5 FT LO SACKS CMIX FLUSH MOUNT: 0 TO 1.2 FT				
	20					
	25					
	30					
	35					
	40					

U.S POLLUTION CONTROL INC.
Remedial Services

LOG

BORING NO. OMW-4
WELL NO. OMW-4

CLIENT: UP RAILROAD			JOB NUMBER: 96199
PROJECT: OAKLAND, UPRR YARD		LOCATION: OAKLAND, CALIFORNIA	
DRILLED BY: PC EXPLORATION	DRILLER: BRAD		METHOD: 4-1/4" HSA
DATE START: 4/8/91	DATE COMP: 4/8/91	SURF. EL:7.41 MSL	TD: 13.5 BGS
LOGGED BY: KV ROSE	APPROVED BY:		DEPTH TO WATER: 4.6 FT.

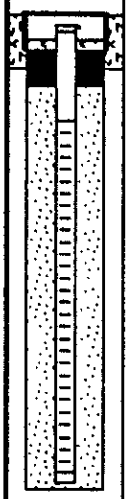
WELL COMP	DPT	DESCRIPTION	GRAPHIC LOG USCS CODE	ODOR	SAMPLE NUMBER	SAMPLE ANAL
	0	0.0 to 0.7 ASPHALT	AF			
		ASPHALT SUB-GRADE, GREY TO BROWN SANDY GRAVEL, MOIST, ODOR.	AF	7	OMW4-3.0	9,800
	5	AT 1.5' BECOMES GREENISH-GREY, WITH STRONG ODOR.		4	OMW4-6	TPH-ND
		4.0 TO 13.0 GREY, FINE TO MEDIUM SAND WITH MINOR GRAVEL AND COARSE SAND. SLIGHT ODOR, SATURATED, TRACE SHELLS.	SW			
	10	AT 11' AS ABOVE, WET, VERY SLIGHT ODOR.		1	OMW4-11	TPH-ND
	15	BORING COMPLETED ON APRIL 8, 1991				
		********** MONITOR WELL STATISTICS **********				
	20	TOC EL: 7.41 MSL FT GS EL: 7.57 MSL FT BLANK CASING: .3 TO 3.0 FT SCREEN CASING: 3.0 TO 13.0 FT BOTTOM CAP: 13.0 TO 13.3 FT SAND PACK: 2.0 TO 13.5 FT 2.5 SACKS 8X12 BENTONITE SEAL: 2.0 TO 0.5 FT 0.5 BUCK 3/8" CONCRETE SEAL: 0.0 TO 0.5 FT 1.0 SACKS CMIX FLUSH MOUNT: 0 TO 1.2 FT				
	25					
	30					
	35					
	40					

U.S POLLUTION CONTROL INC.
Remedial Services

LOG

BORING NO. OMW-5
WELL NO. OMW-5

CLIENT: UP RAILROAD			JOB NUMBER: 90199
PROJECT: OAKLAND, UPRR YARD		LOCATION: OAKLAND, CALIFORNIA	
DRILLED BY: PC EXPLORATION	DRILLER: BRAD		METHOD: 4-1/4" HSA
DATE START: 4/4/91	DATE COMP: 4/4/91	SURF. EL:7.62 MSL	TD: 13.5 BGS
LOGGED BY: KV ROSE	APPROVED BY:		DEPTH TO WATER: 7.0 FT.

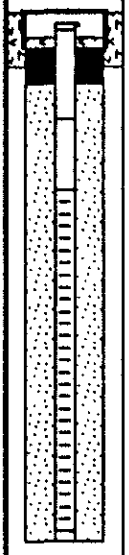
WELL COMP	DPT	DESCRIPTION	GRAPHIC LOG USCS CODE		ODOR	SAMPLE NUMBER	SAMPLE ANAL
	0	0.0 to 0.7 ASPHALT		AF AF			
	5	0.7 TO 1.5 ASPHALT SUB-GRADE FILL, DAMP, SLIGHT ODOR. GREY SANDY GRAVEL. 1.5 to 13.0 GREY, MEDIUM TO COARSE SAND, WITH SOME GRAVEL AND FINE SAND, WET AT 7'. TRACE CLAY AND SHELLS, NO ODOR.		SW	0	OMW5-5.5	19
	10	SAND BECOMES FINER, NO ODOR.			0	OMW5-8	TPH=ND
	15	BORING COMPLETED ON APRIL 4, 1991					
	20	********** MONITOR WELL STATISTICS ********** TOC EL: 7.82 MSL FT GS EL: 7.87 MSL FT BLANK CASING: .3 TO 3.0 FT SCREEN CASING: 3.0 TO 13.0 FT BOTTOM CAP: 13.0 TO 13.3 FT SAND PACK: 2.0 TO 13.5 FT 2.5 SACKS 8X12 BENTONITE SEAL: 2.0 TO 1.0 FT 0.5 BUCK 3/8" CONCRETE SEAL: 0.0 TO 1.0 FT 1.0 SACKS CMIX FLUSH MOUNT: 0 TO 1.2 FT					
	25						
	30						
	35						
	40						

U.S. POLLUTION CONTROL INC.
Remedial Services

LOG

BORING NO. OMW-6
WELL NO. OMW-6

CLIENT: UP RAILROAD			JOB NUMBER: 98199
PROJECT: OAKLAND, UPRR YARD		LOCATION: OAKLAND, CALIFORNIA	
DRILLED BY: PC EXPLORATION	DRILLER: BRAD		METHOD: 4-1/4" HSA
DATE START: 4/4/91	DATE COMP: 4/4/91	SURF. EL:5.78 MSL	TD: 15.0 BGS
LOGGED BY: KV ROSE	APPROVED BY:		DEPTH TO WATER: 7.0 FT.

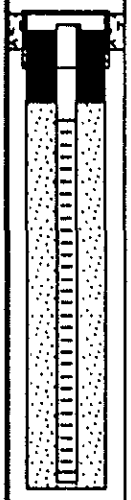
WELL COMP	DPT	DESCRIPTION	GRAPHIC LOG USCS CODE		ODOR	SAMPLE NUMBER	SAMPLE ANAL
	0	0.0 to 0.7 ASPHALT		AF			
				AF			
		0.7 TO 1.5 ASPHALT SUB-GRADE FILL, DAMP, SLIGHT ODOR. BROWN COARSE SANDY GRAVEL, TRACE FINES, NO ODOR, DAMP.		GM	0 0		
	5	2.5 to 5.5 BROWN TO GREY GRAVELY SAND TO SANDY GRAVEL. WOOD DEBRIS AT 3', DAMP, NO ODOR.			0		
		5.5 TO 15 GREY TO DARK GREY SILTY FINE GRAINED SAND, MINOR COARSE TO MEDIUM GRAINED SAND, WET, TRACE SHELLS, WOOD DEBRIS, NO ODOR. BAY MUD.			0		
	10			SW	0	OMW6-11	TPH-ND
	15				0	OMW6-145	6
	20	BORING COMPLETED ON APRIL 4, 1991					
	25	********** MONITOR WELL STATISTICS **********					
		TOC EL: 5.78 MSL FT GS EL: 5.88 MSL FT BLANK CASING: .3 TO 4.5 FT SCREEN CASING: 4.5 TO 14.5 FT BOTTOM CAP: 14.5 TO 14.8 FT SAND PACK: 3.5 TO 15.0 FT 2.5 SACKS 8X12 BENTONITE SEAL: 3.5 TO 2.0 FT 0.5 BUCK 3/8" CONCRETE SEAL: 0.0 TO 2.0 FT 1.0 SACKS CMIX FLUSH MOUNT: 0 TO 1.2 FT					
	30						
	35						
	40						

U.S POLLUTION CONTROL INC.
Remedial Services

LOG

BORING NO. OMW-7
WELL NO. OMW-7

CLIENT: UP RAILROAD			JOB NUMBER: 96199
PROJECT: OAKLAND, UPRR YARD		LOCATION: OAKLAND, CALIFORNIA	
DRILLED BY: PC EXPLORATION	DRILLER: BRAD		METHOD: 4-1/4" HSA
DATE START: 4/4/91	DATE COMP: 4/4/91	SURF. EL:7.03 MSL	TD: 13.5 BGS
LOGGED BY: KV ROSE	APPROVED BY:		DEPTH TO WATER: 4.5 FT.

WELL COMP	DPT	DESCRIPTION	GRAPHIC LOG USCS CODE	ODOR	SAMPLE NUMBER	SAMPLE ANAL
	0	0.0 to 2.5 RR BALLAST, GREY LIMESTONE GRAVEL, NO STAINING	AF			
	5	2.5 TO 5.5 GREY TO DARK GREENISH GREY, FINE TO COARSE SAND VERY MOIST, STRONG DIESEL ODOR STARTING AT 3', FREE PRODUCT AT 4.5'TO 5'.	GM	28	OMW7-3.5	5,600
		5.5 TO 13.5 FINE TO MEDIUM SAND, GREY, MINOR COARSE SAND, TRACE GRAVEL AND SHELLS, DIESEL ODOR STRONG AT 6', BECOMMING SLIGHT AT 12', SATURATED.	SW	67	OMW7-6	860
	10			8.0	OMW2-11	360
	15	BORING COMPLETED ON APRIL 4, 1991				
		********** MONITOR WELL STATISTICS **********				
	20	TOC EL: 7.03 MSL FT GS EL: 7.20 MSL FT BLANK CASING: .3 TO 3.0 FT SCREEN CASING: 3.0 TO 13.0 FT BOTTOM CAP: 13.0 TO 13.3 FT SAND PACK: 3.0 TO 13.5 FT 2.5 SACKS 8X12 BENTONITE SEAL: 2.5 TO 1.0 FT 0.5 BUCK 3/8" CONCRETE SEAL: 0.0 TO 1.0 FT 1.0 SACKS CMIX FLUSH MOUNT: 0 TO 1.2 FT				
	25					
	30					
	35					
	40					

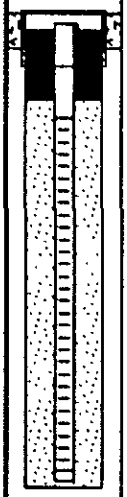
U.S. POLLUTION CONTROL INC.
Remedial Services

LOG

BORING NO. OMW-8

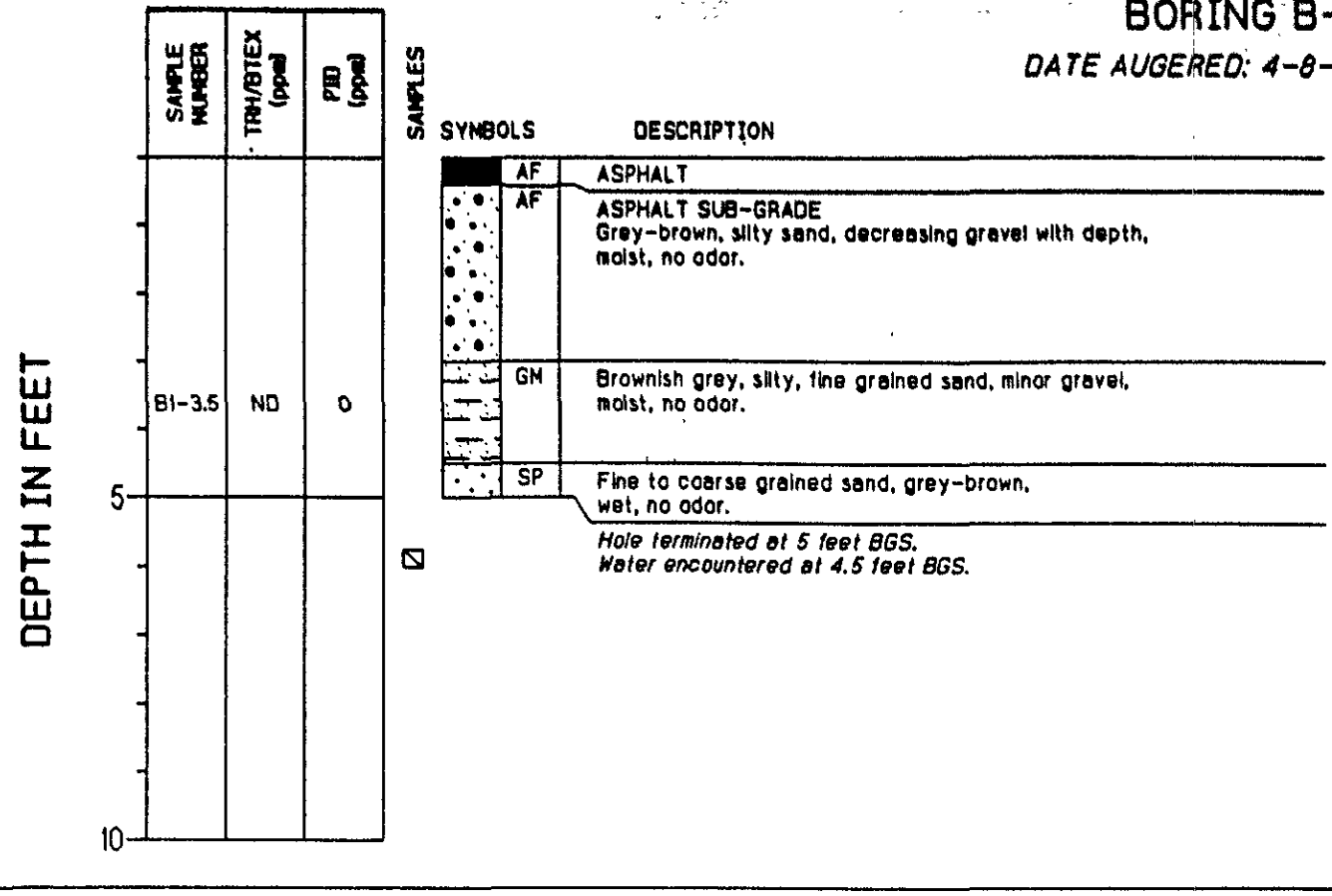
WELL NO. OMW-8

CLIENT: UP RAILROAD			JOB NUMBER: 98199
PROJECT: OAKLAND, UPRR YARD		LOCATION: OAKLAND, CALIFORNIA	
DRILLED BY: PC EXPLORATION	DRILLER: BRAD		METHOD: 4-1/4" HSA
DATE START: 4/4/91	DATE COMP: 4/4/91	SURF. EL:7.62 MSL	TD: 13.5 BGS
LOGGED BY: KV ROSE	APPROVED BY:		DEPTH TO WATER: 5.5 FT.

WELL COMP	DPT	DESCRIPTION	GRAPHIC LOG USCS CODE	ODOR	SAMPLE NUMBER	SAMPLE ANAL
	0	0.0 to 1.5 RR BALLAST, GREY LIMESTONE GRAVEL, NO STAINING	AF GM			
	5	1.5 TO 3.0 BROWN SILTY SAND, SOME GRAVEL, TRACE CLAY. MOIST, STRONG DIESEL ODOR STARTING AT 2.5'. BECOMES STAINED DARKER GREY ALSO AT 2.5'.			OMW8-5.5	TPH-ND
		3.0 TO 13.5 FINE TO MEDIUM SAND, GREY, MINOR COARSE SAND, TRACE GRAVEL AND SHELLS, DIESEL ODOR MODERATE AT 3.5', BECOMMING FAINT AT 10', SATURATED.	SW			
	10				OMW8-11	TPH-ND
	15	BORING COMPLETED ON APRIL 4, 1991				
		********** MONITOR WELL STATISTICS **********				
	20	TOC EL: 7.52 MSL FT GS EL: 7.89 MSL FT BLANK CASING: .3 TO 3.0 FT SCREEN CASING: 3.0 TO 13.0 FT BOTTOM CAP: 13.0 TO 13.3 FT SAND PACK: 3.0 TO 13.5 FT 2.5 SACKS 8X12 BENTONITE SEAL: 2.5 TO 1.0 FT 0.5 BUCK 3/8" CONCRETE SEAL: 0.0 TO 1.0 FT 1.0 SACKS CMIX FLUSH MOUNT: 0 TO 1.2 FT				
	25					
	30					
	35					
	40					

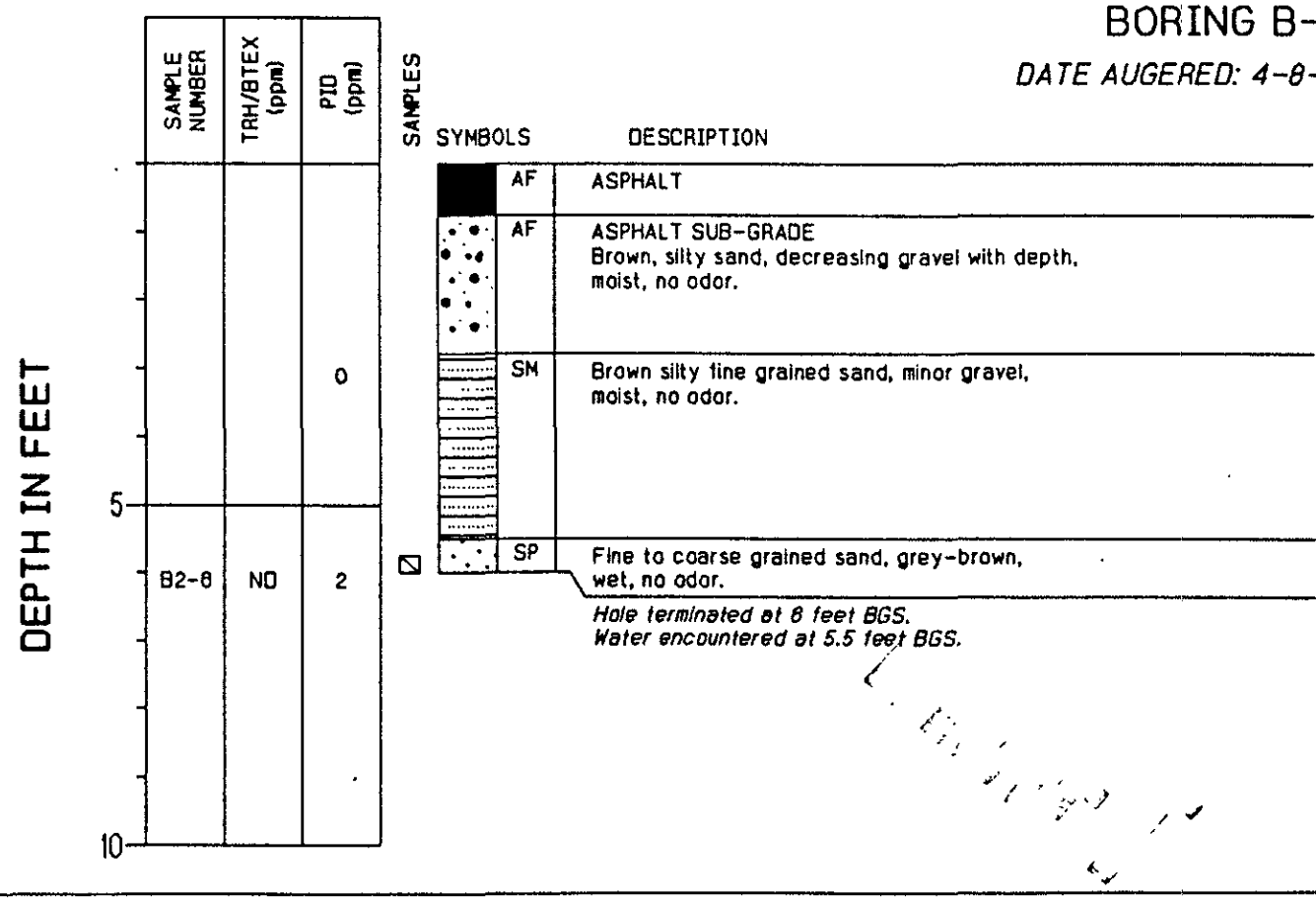
BORING B-1

DATE AUGERED: 4-8-91



BORING B-2

DATE AUGERED: 4-8-91



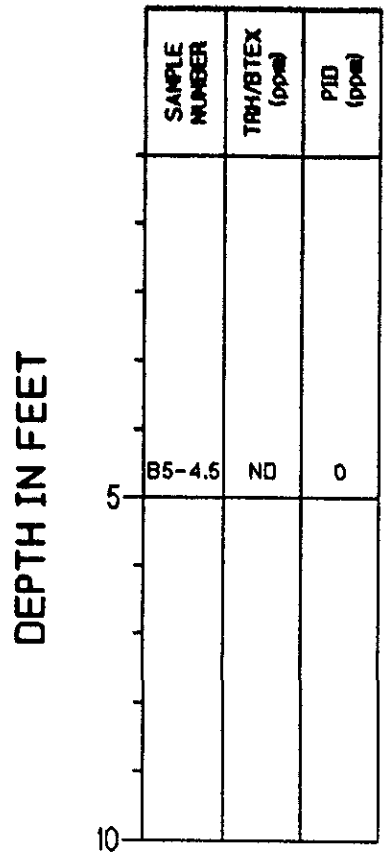
USPCI
REMEDIAL SERVICES
A Subsidiary of Union Pacific Corporation

LOG OF HOLES B-1 AND OAK-B2
Oakland TOFC
OAKLAND, CALIFORNIA

TEST PIT REPORT

BORING B-5

DATE AUGERED: 4-8-91

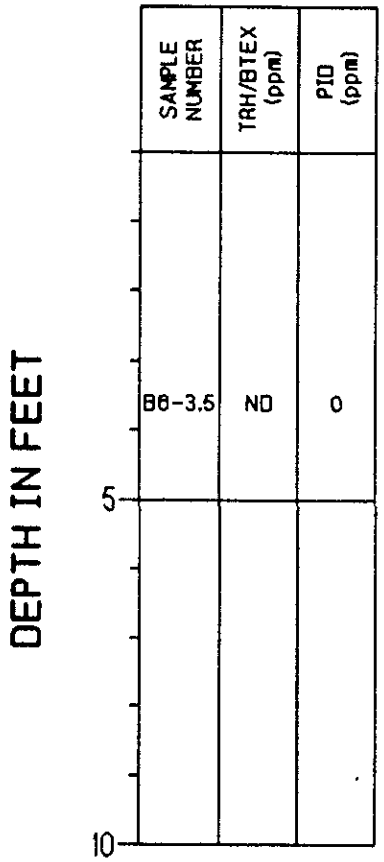


SYMBOLS		DESCRIPTION
	AF	ASPHALT
	AF	ASPHALT SUB-GRADE Brown, silty sand, decreasing gravel with depth, moist, no odor.
	SM	Brown silty fine grained sand, minor gravel, moist, no odor.

Hole terminated at 5.5 feet BGS.
Water encountered at 4.5 feet BGS.

BORING B-6

DATE AUGERED: 4-8-91



SYMBOLS		DESCRIPTION
	AF	ASPHALT
	AF	ASPHALT SUB-GRADE Grey-brown, silty sand, decreasing gravel with depth, moist, no odor.
	SP	Fine to coarse grained sand, grey-brown, wet, no odor, trace organics.

Hole terminated at 6 feet BGS.
Water encountered at 4.5 feet BGS.

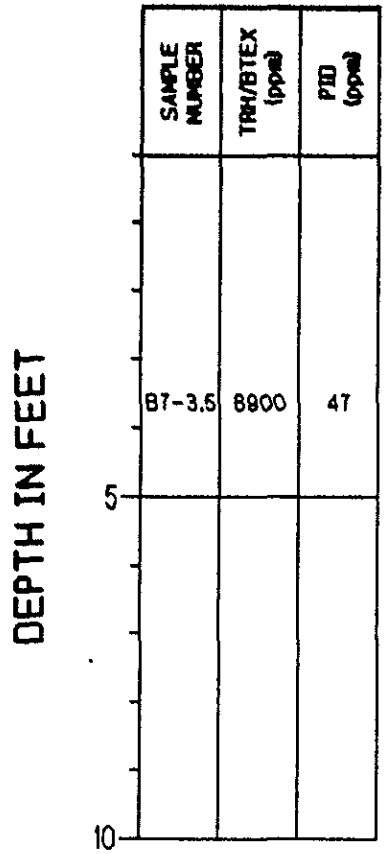
USPCI
REMEDIAL SERVICES
A Subsidiary of Union Pacific Corporation

LOG OF HOLES B-5 AND OAK-B6
Oakland TOFC
OAKLAND, CALIFORNIA

TEST PIT REPORT

BORING B-7

DATE AUGERED: 4-8-91



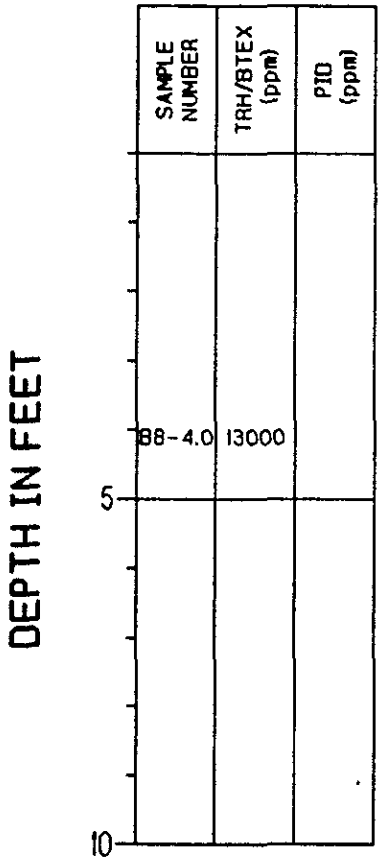
SAMPLES

SYMBOLS		DESCRIPTION
	AF	ASPHALT
	AF	ASPHALT SUB-GRADE Grey-brown, silty sand, decreasing gravel with depth, moist, no odor.
	SP	Fine to coarse grained sand, grey-brown, wet, no odor.

Hole terminated at 5 feet BGS.
Water encountered at 4.3 feet BGS.

BORING B-8

DATE AUGERED: 4-8-91



SAMPLES

SYMBOLS		DESCRIPTION
	AF	ASPHALT
	AF	ASPHALT SUB-GRADE Grey-brown, silty sand, decreasing gravel with depth, moist, hydrocarbon stained, strong diesel odor, visible free product.
	GM	Brownish grey, silty, fine grained sand, minor gravel, moist, slight odor.
	SP	Fine to coarse grained sand, grey-brown, wet, no odor.

Hole terminated at 5 feet BGS.
Water encountered at 4.0 feet BGS.

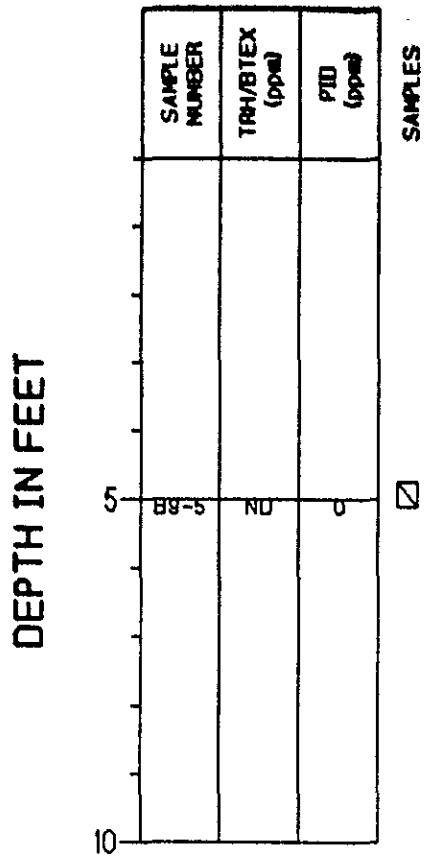
USPCI
REMEDIAL SERVICES
A Subsidiary of Union Pacific Corporation

LOG OF HOLES B-7 AND OAK-B8
Oakland TOFC
OAKLAND, CALIFORNIA

TEST PIT REPORT

BORING B-9

DATE AUGERED: 4-8-91



SYMBOLS		DESCRIPTION
	AF	ASPHALT
	AF	ASPHALT SUB-GRADE Brown, silty sand, decreasing gravel with depth, moist, no odor.
	SM	Brown silty fine grained sand, minor gravel, moist, no odor.
	SP	Fine to coarse grained sand, grey-brown, wet, no odor.

Hole terminated at 6 feet BGS.
Water encountered at 5.5 feet BGS.

USPCI *REMEDIAL SERVICES* A Subsidiary of Union Pacific Corporation	LOG OF HOLE B-9 Oakland TOFC OAKLAND, CALIFORNIA	TEST PIT REPORT

APPENDIX B

LABORATORY DATA SHEETS AND CHAIN OF COUSTODY

SUPERIOR ANALYTICAL LABORATORIES, INC.

825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512

DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 82823
CLIENT: USPCI
CLIENT JOB NO.: 96199

DATE RECEIVED: 04/08/91
DATE REPORTED: 04/17/91

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 8015

LAB #	Sample Identification	Concentration (mg/L) Diesel Range
30	OMW-1,2A	0.06*
32	OMW-2,2A	3.2
34	OMW-3,2A	1.4
36	OMW-5,2A	ND<0.05
37	OMW-8,2A	0.05*

mg/L - parts per million (ppm)
not Typical diesel pattern present.

Method Detection Limit for Diesel in Water: 0.05 mg/L

QAQC Summary:

Daily Standard run at 200mg/L: RPD Diesel = 10
MS/MSD Average Recovery = 111%: Duplicate RPD = 3

Richard Srna, Ph.D.

Laboratory Manager

SUPERIOR ANALYTICAL LABORATORIES, INC.
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 82866
CLIENT: USPCI
CLIENT JOB NO.: 96199

DATE RECEIVED: 04/12/91
DATE REPORTED: 04/19/91

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 8015

LAB #	Sample Identification	Concentration (mg/L) Diesel Range
1	omw-6	0.08

mg/L - parts per million (ppm)

Method Detection Limit for Diesel in Water: 0.05 mg/L

QAQC Summary:

Daily Standard run at 200mg/L: RPD Gasoline = NA
RPD Diesel = 10
MS/MSD Average Recovery = 107%: Duplicate RPD = 12

Richard Srna, Ph.D.

Laboratory Manager

^Z

SUPERIOR ANALYTICAL LABORATORIES, INC.
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 82866
CLIENT: USPCI
CLIENT JOB NO.: 96199

DATE RECEIVED: 04/12/91
DATE REPORTED: 04/19/91

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L) Benzene	Toluene	Ethyl Benzene	Xylenes
1	omw-6	ND<0.3	0.4	ND<0.3	0.5

ug/L - parts per billion (ppb)

Method Detection Limit in Water: 0.3 ug/L

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery =89 %: Duplicate RPD = <8

Richard Srna, Ph.D.

Laboratory Manager

SUPERIOR ANALYTICAL LABORATORIES, INC.
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 82823 DATE RECEIVED: 04/08/91
CLIENT: USPCI DATE REPORTED: 04/17/91
CLIENT JOB NO.: 96199

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 8015

LAB #	Sample Identification	Concentration (mg/Kg) Diesel Range
1	OMW-1,1A,5.5'	ND<10
2	OMW-1,2A,7'	ND<10
3	OMW-1,3A,11'	ND<10
4	OMW-2,1A,5.5'	4100
5	OMW-2,2A,11'	1400
6	OMW-3,1A,3'	4500
7	OMW-3,2A,6'	780
8	OMW-4,1A,3'	9600
9	OMW-4,2A,6'	ND<10
10	OMW-5,1A,5.5'	19
11	OMW-5,2A,8'	ND<10
12	OMW-6,1A,11'	ND<10
13	OMW-6,2A,14.5'	6*
14	OMW-7,1A,3.5'	5600
15	OMW-7,2A,6'	860
16	B-1,1A,3.5'	ND<10
17	B-2,1A,6'	ND<10
18	B-3,1A,5.5'	ND<10
19	B-4,1A,6'	ND<10
20	B-4,2A,9'	ND<10
21	B-5,1A,4.5'	ND<10
22	B-6,1A,3.5'	ND<10
23	B-7,1A,3.5'	8900
24	B-8,1A,4'	13000
25	B-9,1A,5'	ND<10
26	OMW-3,3A,11'	195
27	OMW-4,3A,11'	ND<10
28	OMW-8,1A,5.5'	ND<10
39	OMW-7,3A,11'	360
40	OMW-8,2A,11'	ND<10

Method Detection Limit for Gasoline and Diesel in Soil: 10 mg/Kg

QAQC Summary:
Daily Standard run at 200mg/L: RPD Gasoline = 18
RPD Diesel = 1
MS/MSD Average Recovery = 114%: Duplicate RPD = 5
* not typical diesel pattern present.

Richard Srna, Ph.D.
Laboratory Manager

OUTSTANDING QUALITY AND SERVICE

SUPERIOR ANALYTICAL LABORATORIES, INC.
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 82823
CLIENT: USPCI
CLIENT JOB NO.: 96199

DATE RECEIVED: 04/08/91
DATE REPORTED: 04/17/91

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/kg)(ug/L) Benzene	Toluene	Ethyl Benzene	Xylenes
4	OMW-2,1A,5.5'	8	26	48	310
8	OMW-4,1A,3'	ND<150	310	860	5300
12	OMW-6,1A,11'	3.3	5	ND<3	ND<3
14	OMW-7,1A,3.5'	86	150	290	1400
15	OMW-7,2A,6'	25	19	25	75
23	B-7,1A,3.5'	95	390	530	2700
24	B-8,1A,4'	280	720	1400	6200
28	OMW-8,1A,5.5'	ND<3	4	4	11
29	OMW-1,1AB *	ND<0.3	ND<0.3	ND<0.3	ND<0.3
31	OMW-2,1AB *	ND<0.3	ND<0.3	1.2	6.7
33	OMW-3,1AB *	0.4	0.5	5.6	26
35	OMW-5,1AB *	ND<0.3	ND<0.3	ND<0.3	ND<0.3
38	OMW-8,1AB *	ND<0.3	ND<0.3	ND<0.3	ND<0.3

* ug/L - parts per billion (ppb)

ug/kg - parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/Kg
Method Detection Limit in Water: 0.3 ug/L

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 91%: Duplicate RPD = <2

Richard Srna, Ph.D.

Laboratory Manager

OUTSTANDING QUALITY AND SERVICE

U.S. POLLUTION CONTROL, INC.

5080 Paloma Parkway
Boulder, Colorado 80301
(303) 938-2888

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
96199	UPRR - Oakland TOFC Yard

SAMPLERS: (Signature)

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH (8015 mod)	BTEX (8020)						REMARKS
OMW-1	4/4/91	0945			OMW-1, 1A, 5.5'	1	X							
OMW-1	4/4/91	0955			OMW-1, 2A, 7'	1	X							
OMW-1	4/4/91	1000			OMW-1, 3A, 11'	1	X							
OMW-2	4/5/91	0800			OMW-2, 1A, 5.5'	1	X	X						
OMW-2	4/5/91	0810			OMW-2, 2A, 11'	1	X							
OMW-3	4/5/91	1010			OMW-3, 1A, 2'	1	X							Note: OMW-3, 3A, 11' on next COC
OMW-3	4/5/91	1020			OMW-3, 2A, 6'	1	X							
OMW-4	4/8/91	0830			OMW-4, 1A, 3'	1	X	X						Note: OMW-4, 3A, 11' on next COC
OMW-4	4/8/91	0840			OMW-4, 2A, 6'	1	X							
OMW-5	4/4/91	1695			OMW-5, 1A, 5.5	1	X							
OMW-5	4/4/91	1700			OMW-5, 2A, 8'	1	X							
OMW-6	4/5/91	1330			OMW-6, 1A, 11'	1	X	X						
OMW-6	4/5/91	1350			OMW-6, 2A, 14.5'	1	X							
OMW-7	4/4/91	1208			OMW-7, 1A, 3.5	1	X	X						
OMW-7	4/4/91	1215			OMW-7, 2A, 6	1	X	X						

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	4/8/91				
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks	

Distribution: Original Accompanies Shipment, First Copy to Coordinator Field Files, Second Copy to Representative of Inspected Facility

Split Samples: ☐ Accepted ☐ Declined _____ Signature

U.S. POLLUTION CONTROL, INC.

5888 Pearson Parkway
Boulder, Colorado 80301
(303) 530-5888

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
96199	Oakland TOFC

SAMPLERS: *(Signature)*

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH (8015)	BTEX (8020)						REMARKS
B-1	4/3/91	0930			B-1, 1A, 3.5'	1	X							
B-2		1020			B-2, 1A, 6'		X							
B-3		1115			B-3, 1A, 5.5'		X							
B-4		1145			B-4, 1A, 6'		X							
B-4		1200			B-4, 2A, 9'		X							
B-5		1300			B-5, 1A, 4.5		X							
B-6		1330			B-6, 1A, 3.5		X							
B-7		1400			B-7, 1A, 3.5		X	X						
B-8		1420			B-8, 1A, 4'		X	X						
B-9	4/3/91	1500			B-9, 1A, 5'		X							
OMW-3	4/5/91	1030			OMW-3, 3A, 11'	1	X							
OMW-4	4/5/91	0850			OMW-4, 3A, 11'	1	X							
OMW-8	4/4/91	1400			OMW-8, 1A, 5.5'	1	X	X						

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
	4/8/91				
Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date/Time	Received for Laboratory by: *(Signature)*	Date/Time	Remarks	

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Split Samples: ☐ Accepted ☐ Declined _____ Signature

U.S. POLLUTION CONTROL, INC.

5686 Peterson Parkway Boulder, Colorado 80301 (303) 938-5500

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
96199	Oakland TOFC Yard

SAMPLERS: *(Signature)* [signature]

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH (8015)	BTEX (8020)				REMARKS
omw-1	4/7/98	1850			omw-1, 1AB	2		X				
omw-1		1855			omw-1, 2A	1	X					
omw-2		1930			omw-2, 1AB	2		X				
omw-2		1935			omw-2, 2A	1	X					
omw-3		1830			omw-3, 1AB	2		X				
omw-3		1835			omw-3, 2A	1	X					
omw-5		1800			omw-5, 1AB	2		X				
omw-5	4/7/98	1805			omw-5, 2A	1	X					

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
[signature]	4/8/98	[signature]			

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date/Time	Received for Laboratory by: *(Signature)*	Date/Time	Remarks

Distribution: Original Accompanies Shipment, First Copy to Coordinator Field Files, Second Copy to Representative of Inspected Facility

Split Samples: ☐ Accepted ☐ Declined ______ Signature

U.S. POLLUTION CONTROL, INC.

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
96199	Oakland TOFC Yard

SAMPLERS: *(Signature)* K Rose

STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH (8015)	BTEX (8020)				REMARKS
omw-6	4/9/91	1405			omw-6, 1A,B (H2O)	2		X				
omw-6	4/9/91	1400			omw-6, 2A (H2O)	1	X					
omw-8	4/7/91	1910			omw-8, 1A,B (H2O)	2		X				Note: Delivered 4/8/91
omw-8	4/7/91	1915			omw-8, 2A (H2O)	1	X					" "
omw-7	4/4/91	1230			omw-7, 3A, 11' (Soil)	1	X					" "
omw-8	4/4/91	1410			omw-8, 2A, 11' (Soil)	1	X					" "

For Questions Call Ken Rose
(303) 938 5562

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
K Rose	4/12/91 1430				
Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date/Time	Received for Laboratory by: *(Signature)*	Date/Time	Remarks

Distribution: Original Accompanies Shipment. First Copy to Coordinator Field Files. Second Copy to Representative of Inspected Facility

Split Samples ☐ Accepted ☐ Declined _______ Signature

APPENDIX C

FIELD METHODS

FIELD METHODS

Drilling and Soil Sampling

All borings were advanced under the technical supervision of a USPCI geologist or hydrogeologist. The on-site geologist was present at all times during drilling to: 1) technically supervise the drilling subcontractor; 2) maintain a continuous log of materials penetrated by the borehole; 3) obtain and document soil samples; 4) test soil samples, drill cuttings, and atmospheric conditions with an organic vapor analyzer (OVA); and 5) oversee implementation of USPCI's Health and Safety Plan.

Soil borings were completed using a truck-mounted drilling rig equipped with 8-inch and 10-inch diameter hollow-stem augers. This drilling method was performed without the introduction of drilling fluids and allowed for the collection of relatively undisturbed soil samples through the hollow stem of the auger.

During drilling, soil samples were obtained using a split spoon sampler lowered through the hollow stem of the auger and advanced along with the auger to the desired depth. This method allowed for monitoring of soils penetrated during drilling. After retrieving the sampler, soils were screened in the field for organic vapor emissions using an Organic Vapor Analyzer (OVA). The OVA was also used to monitor organic vapor emissions from drill cuttings during drilling. Organic vapor measurements were recorded on the boring logs.

Soil samples collected for possible chemical analysis were placed in 8-ounce glass sample jars. The sample jars were equipped with teflon lined lids and were supplied by the analytical laboratory. Labels were attached to each sample and will include the following information: 1) boring number; 2) sample number; 3) date and time; 4) collectors name; 5) owner; and 6) location. Appropriately sealed and labeled samples were stored in ice chests cooled with dry or blue ice. Chain of custody records were maintained during the sampling program and transmitted to the laboratory with the samples. Samples were delivered to the laboratory by direct delivery or overnight courier, whichever is most convenient.

Prior to initiating each boring, the downhole equipment, including auger sections and sampling equipment, was thoroughly steam cleaned. The core barrel sampling equipment was either steam cleaned or carefully washed in a dilute trisodium phosphate (TSP) solution and rinsed in de-ionized water before retrieving each sample.

Monitoring Well Installation and Sampling

Eight of the soil borings were completed as groundwater monitoring wells. The monitoring well locations are displayed on Figure 2.

The monitoring wells were completed to a depth of 13 to 15 feet. Wells were installed through the hollow stem of the auger. All wells were constructed from threaded, 2-inch schedule 40 PVC casing. Factory slotted 0.010 inch well screen was installed from a depth of approximately 3 feet below ground surface to total depth. The upper 3 feet of the monitoring well was completed with blank casing.

The annular space between the well screen and borehole was filled with pre-washed silica sand to a position approximately one foot above the top of the well screen to form a filter pack. A bentonite seal was then placed above the filter pack. The remainder of the borehole was then back-filled to the ground surface with a cement-bentonite slurry. A locking cap and protective cover was installed over the well head and finished slightly above grade to limit ponding of water around the well head.

The wells were developed using the surge and bail technique. Measurements of the Ph and conductivity of the produced water was taken at regular intervals during development, and development proceeded until these parameters stabilize and produced water is relatively free of sediment.

GROUNDWATER SAMPLING

During sampling of monitor wells for water quality, extreme care was taken to prevent cross contamination between wells or introduction of surface contamination into the well environment. All sampling equipment was decontaminated before use on each well, or should be disposable equipment certified as clean by the supplier.

Prior to sampling the monitoring wells, 3 to 5 well casing volumes of water were purged from each well. This helped assure that the water sample is representative of groundwater in the formation and not stagnant water which has been in contact with the well casing for several months. Wells were bailed using disposable polyethylene bailers. Clean nylon line (not previously used) was employed to lower the bailer down the well. The individual purging the well wore new latex gloves and clean Tyvex coveralls when purging the well. Care was taken to avoid agitating water in the well or allowing the bailer to contact contaminated materials at the surface (asphalt pavement, surface soil etc).

While purging the well, pH and conductivity readings were taken at least every third bailer full of fluid removed using a calibrated meter. Calibration of pH and Conductivity meters were undertaken daily prior to sampling. Samples for laboratory analysis were collected within 2 hours of purging the well.

As with purging, a clean pair of disposable latex gloves was worn during the groundwater sampling events. The bailer was attached to clean nylon cord and lowered slowly into the well to acquire the groundwater sample. Agitation of groundwater in the well was avoided. The bailer was retrieved the contents emptied into appropriate sample containers while minimizing agitation of the sample and contact between the sample and the atmosphere. The sample container was sealed immediately and labeled with all pertinent information prior to placement in an ice chest cooled with blue ice. Chain of custody recordes were completed and accompanied samples to the laboratory.