Texaco Refining
and Marketing Inc

108 Cutting Boulevard
Richmond CA 94804

December 26, 1991

Mr. Paul Smith
Alameda County Environmental
Health Department
80 Swan Way, Room 200
Oakland, CA 94621

Dear Mr. Smith:

Enclosed is a copy of our Quarterly Technical Report dated December 16, 1991 for our former Texaco Service Station located at 2225 Telegraph Avenue in Oakland, California. This report covers the third quarter of 1991.

Please call me at (510) 236-1770 if you have any questions.

Best Regards,

R.R. Zielinski
Area Supervisor

RRZ:pap

Enclosure

cc: Mr. Tom Callaghan
California Regional Water
Quality Control Board
San Francisco Bay Area Region
2101 Webster Street, Ste. 500
Oakland, CA 94612

pr: MPP

HP

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DISTRIBUTION

4 copies: Texaco Refining and Marketing Inc.
108 Cutting Boulevard
Richmond, California 94804
Attention: Mr. R. R. Zielinski

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QUALITY CONTROL REVIEWER

Stephen J. Osborne
Principal Engineer

A Report Prepared for

Texaco Refining and Marketing Inc.
10 Universal City Plaza
Universal City, California 91608

QUARTERLY TECHNICAL REPORT
THIRD QUARTER OF 1991
FORMER TEXACO STATION
2225 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

HLA Job No. 2251,162.03
December 16, 1991
1991 Report No. 3

by

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INTRODUCTION

This quarterly technical report (QTR) presents the results of site investigation and remediation activities conducted by Harding Lawson Associates (HLA) at a service station site formerly owned by Texaco Refining and Marketing Inc. The station, at 2225 Telegraph Avenue, Oakland, California (see Plate 1), is currently owned and operated by Exxon Company U.S.A. This QTR summarizes HLA's work at the site, ongoing since May 1988, and presents results of the recent quarter's work.

SITE DESCRIPTION

The site is on the southwest corner of the intersection of Telegraph and West Grand Avenues (Plate 2). The surrounding area contains commercial/retail businesses, including a Chevron service station immediately across Telegraph Avenue and an abandoned Beacon service station northeast of the site. Adjacent to the site on the south is the First Baptist Church of Oakland. There is an apartment building, currently occupied, immediately west of the site.

Surface elevation at the site is approximately 20 feet above mean sea level. The land surface slopes gently southeast, toward Lake Merritt and the Oakland/Alameda Inner Harbor, an area of former tidal flats that has been filled. This area has been extensively developed, and surface runoff is mainly controlled by the municipal storm sewer system.

As shown on Plate 3, structures at the service station include a building, three fuel pump islands, one underground waste oil tank, and three underground fuel storage tanks. Leaded and unleaded gasoline are dispensed from these tanks; automotive repair services are also provided.

HYDROGEOLOGIC SETTING

The East Bay Plain has been divided into seven groundwater subareas, defined by the California Department of Water Resources (DWR) on the basis of hydrologic and geologic conditions. This site lies within the Oakland Upland and Alluvial Plain subarea. Most groundwater used in the East Bay Plain is for agricultural or industrial, rather than domestic, purposes. The majority of domestic water is supplied by the East Bay Municipal Utility District (EBMUD) from surface sources.

The groundwater aquifers at the site are primarily contained with the Alameda and Temescal Formations; these permeable formations have an aggregate thickness of more than 1,100 feet. According to maps of the area the Temescal Formation, an alluvial fan deposit, is present locally at the surface. Approximately 1,000 feet west of the site is an outcrop of the Merritt Sand. Direction of regional groundwater flow is south-southwest, toward San Francisco Bay.

Subsurface materials at the site, down to the maximum explored depth of 20 feet, generally consist of stiff, silty clay

underlain by a dense layer of silty sand that ranges from 3 to 8 feet in thickness. According to slug test results, the hydraulic conductivity of the shallow, saturated sand aquifer beneath the site ranges from 1.2 to 5.9 feet per day (Table 1).

Static groundwater levels are encountered at approximately 13 feet below grade; water level measurements and survey data are presented in Table 2. The estimated direction of the groundwater gradient, prior to groundwater extraction at the site, was to the southwest, as shown on Plate 4.

SUMMARY OF PREVIOUS INVESTIGATIONS

Previous Reports

Since May 1988, HLA has investigated soil and groundwater conditions at this site. To date, results of the investigation and remedial planning have been presented in the following reports:

1.	Sensitive Receptor Study	May 24, 1988
2.	Subsurface Investigation	July 20, 1988
3.	Environmental Assessment	June 22, 1989
4.	Groundwater Remediation Plan	November 30, 1989

Field Investigation

Boring locations are shown on Plate 3. Because of restricted subsurface access on Telegraph and West Grand Avenues, no off-site exploration was conducted north or east of the site.

These restrictions were imposed by the City of Oakland and the Bay Area Rapid Transit District (BART), whose tunnel is in this area (see Plate 2).

During previous investigations, the following tasks were completed:

- Conducted a soil-gas survey on site and in city streets near the site. Probe locations are shown on Plate 3 and soil-gas survey results are presented in Table 3.
- Drilled and sampled seven shallow soil borings (B-1 through B-7); locations are shown on Plate 3.
- Drilled, constructed, developed, and sampled six on-site monitoring wells (MW-6A through MW-6F) and three off-site wells (MW-6G through MW-6I); locations are shown on Plate 5. Two of these wells, MW-6C and MW-6D, were subsequently converted to groundwater extraction wells.
- Ordered chemical analyses on soil and water samples to determine concentrations of petroleum hydrocarbons; results of soil and water analyses are presented in Tables 4 and 5, respectively.
- Conducted slug tests in MW-6D, MW-6E, and MW-6H to estimate hydraulic conductivity and transmissivity values for the shallow aquifer; slug test results are presented in Table 1.

Vadose-zone Soil Condition

No significant concentrations of petroleum hydrocarbons have been found in shallow vadose-zone soils. However, the fuel constituents benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH) as gasoline have been detected in soils from 12 to 13.5 feet below the ground surface; this depth is within the capillary fringe zone. TPH as gasoline

concentrations exceeded 100 parts per million (ppm) in some of the soil samples (Table 4).

Groundwater Condition

Free floating product (gasoline) has been observed on the groundwater in two recovery wells. As shown on Plate 5, hydrocarbon-bearing groundwater is present in the vicinity of the underground tanks and pump islands.

Groundwater analyses from seven monitoring wells and one recovery well indicated that **groundwater contains levels of TPH as gasoline ranging from 540 to 3,800 parts per billion (ppb). As of August 1991, the lateral limits of the plume are delineated by MW-6A, MW-6E, MW-6G, and MW-6I;** samples from these wells show no detectable hydrocarbons (detection limit for TPH = 50 ppb). Upgradient plume definition is incomplete because of the restricted subsurface access, mentioned above, which is imposed by the City of Oakland and BART.

SUMMARY OF REMEDIAL ACTIVITIES

The following tasks were completed during installation and start-up of the remedial system:

- Redrilled two monitoring wells and converted them to recovery wells (RW-2 and RW-3 replaced MW-6D and MW-6C, respectively). Drilled and installed RW-1 in the location of B-3. Locations are shown on Plate 3.
- **Installed groundwater extraction and collection system.**
- **Fabricated and installed skid-mounted groundwater treatment system.**

- Obtained a Wastewater Discharge Permit from the EBMUD to discharge treated effluent water directly to the Sanitary Sewer.
- Extracted, treated, and discharged approximately 134,500 gallons of groundwater between the fourth quarter 1990 and the end of the second quarter 1991.
- Sampled water from influent, effluent, and midstream in accordance with permit requirements.

WORK PERFORMED DURING THE THIRD QUARTER OF 1991

- Extracted, treated, and discharged approximately 75,000 gallons of groundwater to the sanitary sewer (210,000 gallons cumulative since startup).
- Added a fourth carbon cannister in series to the remediation system.
- Sampled water from influent, effluent, and midstream for carbon breakthrough and performed chemical analysis as specified in EBMUD Wastewater Discharge Permit No. 001-00007 (see Table 6).
- Prepared and submitted EBMUD status reports as required by the EBMUD wastewater discharge permit.
- **Measured free product thickness in recovery wells RW-1 and RW-2. Removed free product from RW-1 and RW-2 on a weekly basis (Table 7).**
- **Checked RW-3 for free product on a monthly basis.**
- Measured water levels in monitoring wells and updated the potentiometric map accordingly (see Table 2 and Plate 6).
- **Conducted quarterly groundwater sampling in seven monitoring wells and one recovery well, chemical analyses results are summarized in Table 5 and laboratory reports are attached in the Appendix.**

During the third quarter 1991, a fourth carbon cannister was added to the remediation system with approval from EBMUD. Water samples were collected from midstream sampling points to check

for potential breakthrough of hydrocarbons downstream of the carbon cannisters. In addition, influent and effluent samples were collected on a monthly basis and analyzed for BTEX and TPH as gasoline. Analytical results from the samples taken during the third quarter are presented in Table 6.

Free product was discovered in recovery well RW-2 during early August. The gasoline has a much fresher appearance than that previously recovered from RW-1. Product was bailed from RW-1 and RW-2 on a weekly schedule during the remainder of the third quarter, recovering a total of approximately 22 gallons from RW-1 and 10 gallons from RW-2 for the quarter (Table 7).

Water levels were measured in monitoring wells and recovery wells three times during the quarter (Table 2). The water level data collected on September 11, 1991 are presented on Plate 6, a contour map of the potentiometric surface. Plate 4 is a map of the potentiometric surface based on data collected in October 1990, before startup of the groundwater extraction system. A comparison of the October 1990 and May 1991 data indicates that the extraction of groundwater has resulted in a cone of depression in the water table over much of the site.

Groundwater samples were collected from seven monitoring wells and one recovery well during the third quarter. Samples were analyzed for BTEX and TPH as gasoline. Results of those analyses are presented in Table 5.

WORK PLANNED FOR THE FOURTH QUARTER OF 1991

- Monitor carbon canisters for breakthrough as required by the EBMUD wastewater discharge permit.
- Prepare EBMUD quarterly status reports as required by the EBMUD wastewater discharge permit.
- Check water levels in recovery wells and monitoring wells in order to observe effects of pumping on local groundwater gradient. Measure free product thickness in RW-1 and RW-2. Check for free product in RW-3.
- Remove free product from RW-1 and RW-2 on a weekly basis.
- Sample groundwater from all monitoring wells and recovery wells, excluding wells which may contain free product. Analyze samples for BTEX and TPH as gasoline.
- Observe operations to be conducted by Exxon during tank ~~and line removal.~~ Remove and replace recovery well RW-3, if necessary.

LIST OF TABLES

LIST OF ILLUSTRATIONS

Table 1. Slug Test Results
2225 Telegraph Avenue
Oakland, California

Well Number	Most Permeable Stratum Adjacent to Well Screen: Lithology	Classification	Thickness (feet)	Estimated Hydraulic Conductivity (feet/day)
MW-6D	sand	confined	2	5.9
MW-6E	sand, fine-grained	confined	2.5	1.2
MW-6H	sand, medium-grained	unconfined	6	4.8

Table 2. Water Level Measurements and Survey Data
2225 Telegraph Avenue
Oakland, California

Well No.	Date	Top of Casing Elevation[1] (feet)	Depth to Groundwater (feet)	Groundwater Surface Elevation[2] (feet)	Incremental Water Elevation Change[3] (feet)	Total Water Elevation Change Since 12/15/88[4] (feet)
MW-6A	12/15/88	98.99	13.77	85.22	--	--
	10/03/89		13.40	85.59	+0.37	+0.37
	05/11/90		12.87	86.12	+0.53	+0.90
	10/16/90		13.27	85.72	-0.40	+0.50
	12/06/90		13.28	85.71	-0.01	+0.49
	01/14/91		--	--	--	--
	02/08/91		12.49	86.50	+0.79	+1.28
	04/02/91		--	--	--	--
	05/07/91		11.94	87.05	+0.55	+1.83
	05/31/91		--	--	--	-- Blocked
	06/26/91		12.87	86.12	-0.93	+0.90
	08/05/91		13.44	85.55	-0.57	+0.33
	08/14/91		13.47	85.52	-0.03	+0.30
	09/11/91		13.48	85.51	-0.01	+0.29
MW-6B	12/15/88	98.81	13.01	85.80	--	--
	10/03/89		12.94	85.87	+0.07	+0.07
	04/30/90		12.53	86.28	+0.41	+0.48
	10/16/90		12.73	86.08	-0.20	+0.28
	12/06/90		12.74	86.07	-0.01	+0.27
	01/14/91		12.57	86.24	+0.17	+0.44
	02/08/91		12.16	86.65	+0.41	+0.85
	04/02/91		11.50	87.31	+0.66	+1.51
	05/07/91		12.02	86.79	-0.52	+0.99
	05/31/91		12.40	86.41	-0.38	+0.61
	06/26/91		12.69	86.12	-0.29	+0.32
	08/05/91		12.95	85.86	-0.26	+0.06
	08/14/91		12.93	85.88	+0.02	+0.08
	09/11/91		13.01	85.80	-0.08	0.0
MW-6C	12/15/88	99.89	14.41	85.48	--	--
	10/03/89		14.10	85.79	+0.31	+0.31
	04/30/90		13.81	86.68	+0.29	+0.60
(RW-3)	10/16/90	98.97[5]	13.29	85.68	-0.40	+0.20
	01/14/91		14.50	84.47	-1.21	-1.01
	02/08/91		12.54	86.43	+1.96	+0.95
	04/02/91		11.39	87.58	+1.15	+2.10
	05/07/91		12.47	86.50	-1.08	+1.02
	05/31/91		16.31	82.66	-3.84	-2.82
	06/26/91		15.50	83.47	+0.81	-2.01
	08/05/91		13.69	85.28	+1.81	-0.20
	08/13/91		13.67	85.30	+0.02	-0.18
	09/11/91		13.77	85.20	-0.10	-0.28

Table 2. continued

Well No.	Date	Top of Casing Elevation[1] (feet)	Depth to Groundwater (feet)	Groundwater Surface Elevation[2] (feet)	Incremental Water Elevation Change[3] (feet)	Total Water Elevation Change Since 12/15/88[4] (feet)
MW-6D	12/15/88	98.78	13.53	85.25	--	--
	10/03/89		13.44	85.34	+0.09	+0.09
	04/30/90		13.19	85.59	+0.25	+0.34
(RW-2)	10/16/90	98.11[5]	12.77	85.34	-0.25	+0.09
	01/14/91		--	--	--	--
	02/08/91		13.11	85.00	-0.34	-0.25
	04/02/91		11.70	86.41	+1.41	+1.16
	05/07/91		14.09	84.02	-2.39	-1.23
	05/31/91		16.01	82.10	-1.92	-3.15
	06/26/91		14.60	83.51	+1.41	-1.74
	08/05/91		14.00	84.11	+0.60	-1.14
	08/13/91		21.30	76.81	-7.30	-8.44
	09/11/91		19.97	78.14	+1.33	-7.11
MW-6E	12/15/88	98.99	13.84	85.15	--	--
	10/03/89		13.70	85.29	+0.14	+0.14
	04/30/90		13.43	85.56	+0.27	+0.41
	10/16/90		13.77	85.22	-0.34	+0.07
	12/06/90		13.95	85.04	-0.18	-0.11
	01/14/91		13.95	85.04	0.0	-0.11
	02/08/91		13.20	85.79	+0.75	+0.64
	04/02/91		12.28	86.71	+0.92	+1.56
	05/07/91		13.48	85.51	-1.20	+0.36
	05/31/91		14.09	84.90	-0.61	-0.25
	06/26/91		12.54	86.45	+1.55	+1.31
	08/05/91		14.39	84.60	-1.85	-0.55
	08/14/91		14.18	84.81	+0.21	-0.34
	09/11/91		14.73	84.26	-0.55	-0.89
MW-6F	12/15/88	99.91	14.73	85.18	--	--
	10/03/89		14.48	85.43	+0.25	+0.25
	04/30/90		14.14	85.77	+0.34	+0.59
	10/16/90		14.77	85.14	-0.63	-0.04
	12/06/90		14.81	85.10	-0.04	-0.08
	01/14/91		14.73	85.18	+0.08	0.0
	02/08/91		13.73	86.18	+1.00	+1.00
	04/02/91		12.38	87.53	+1.35	+2.35
	05/07/91		13.67	86.24	-1.29	+1.06
	05/31/91		14.43	85.48	-0.76	+0.30
	06/26/91		14.81	85.10	-0.38	-0.08
	08/05/91		14.96	84.95	-0.15	-0.23
	08/14/91		14.87	85.04	+0.09	-0.14
	09/11/91		15.11	84.80	-0.24	-0.38

Table 2. continued

Well No.	Date	Top of Casing Elevation[1] (feet)	Depth to Groundwater (feet)	Groundwater Surface Elevation[2] (feet)	Incremental Water Elevation Change[3] (feet)	Total Water Elevation Change Since 12/15/88[4] (feet)
MW-6G	12/15/88	99.16	12.39	86.77	--	--
	10/03/89		12.22	86.94	+0.17	+0.17
	04/30/90		11.73	87.43	+0.49	+0.66
	10/16/90		12.28	86.88	-0.55	+0.11
	12/06/90		12.27	86.89	+0.01	+0.12
	01/14/91		12.14	87.02	+0.13	+0.25
	02/08/91		11.44	87.72	+0.70	+0.95
	04/02/91		10.03	89.13	+1.41	+2.36
	05/07/91		11.00	88.16	-0.97	+1.39
	05/31/91		11.75	87.41	-0.75	+0.64
	06/26/91		12.91	86.25	-1.16	-0.52
	08/05/91		12.43	86.73	+0.48	-0.04
	08/14/91		12.43	86.73	0.0	-0.04
	09/11/91		12.48	86.68	-0.05	-0.09
MW-6H	12/15/88	97.93	12.39	85.54	--	--
	10/03/89		12.36	85.57	+0.03	+0.03
	04/30/90		12.10	85.83	+0.26	+0.29
	10/16/90		12.18	85.75	-0.08	+0.21
	12/06/90		12.29	85.64	-0.11	+0.10
	01/14/91		12.22	85.71	+0.07	+0.17
	02/08/91		11.93	86.00	+0.29	+0.46
	04/02/91		11.59	86.34	+0.34	+0.80
	05/07/91		12.24	85.69	-0.65	+0.15
	05/31/91		12.22	85.71	+0.02	+0.17
	06/26/91		14.34	83.59	-2.12	-1.95
	08/05/91		12.62	85.31	-1.72	-0.23
	08/14/91		12.43	85.50	+0.19	-0.04
	09/11/91		12.83	85.10	-0.40	-0.44
MW-6I	12/15/88	97.60	12.82	84.78	--	--
	10/03/89		12.83	84.77	-0.01	-0.01
	04/30/90		12.66	84.94	+0.17	+0.16
	10/16/90		12.71	84.89	-0.05	+0.11
	12/06/90		12.75	84.85	0.04	+0.07
	01/14/91		12.55	85.05	+0.20	+0.27
	02/08/91		12.32	85.28	+0.23	+0.50
	04/02/91		12.22	85.38	+0.10	+0.60
	05/07/91		12.61	84.99	-0.39	+0.21
	05/31/91		12.82	84.78	-0.21	0.0
	06/26/91		12.93	84.67	-0.11	-0.11
	08/05/91		13.01	84.59	-0.08	-0.19
	08/14/91		12.98	84.62	+0.03	-0.16
	09/11/91		13.11	84.49	-0.13	-0.29

Table 2. continued

Well No.	Date	Top of Casing Elevation[1] (feet)	Depth to Groundwater (feet)	Groundwater Surface Elevation[2] (feet)	Incremental Water Elevation Change[3] (feet)	Total Water Elevation Change Since 12/15/88[4] (feet)
RW-1	10/16/90	97.89	12.24	85.65	--	--
	01/14/91		12.80	85.09	-0.56	--
	02/08/91		12.53	85.36	+0.27	--
	04/02/91		--	--	--	--
	05/07/91		--	--	--	--
	05/31/91		12.86	85.03	-0.33	--
	08/05/91		13.19	84.70	-0.33	--
	08/13/91		14.05	83.84	-0.86	--
	09/11/91		15.96	81.93	-1.91	--

Notes:

1 Elevation relative to HLA temporary benchmark located at the western end of the dispenser island nearest West Grand Avenue, with an arbitrary elevation of 100.0 feet (see Plate 3).

2 Groundwater surface elevation = top of casing elevation - depth to water

3 Incremental groundwater elevation change = groundwater elevation - previous groundwater elevation

4 Total groundwater elevation change = groundwater elevation - groundwater elevation on 12/15/88

5 Top of casing elevation changed when monitoring wells were converted into recovery wells.

-- Water levels not measured/values not applicable.

Table 3. Results of Soil-gas Survey
2225 Telegraph Avenue
Oakland, California

Conducted on September 19, 1988
Concentrations in micrograms per liter (µg/L)

Sample	Depth (feet)	Benzene	Ethyl-benzene	Toluene	Xylenes	Total Petroleum Hydrocarbons
Air	N/A	<0.7	<0.8	<0.8	<0.8	<0.7
SG-01	--	--	--	--	--	--
SG-02	5.0	<0.7	<0.8	<0.8	<0.8	<0.7
SG-03	12.0	10	4	<0.8	2,800	6,100
SG-04	13.0	<0.7	<0.8	<0.8	140	780
WS-05*	12.0	<75	<76	<77	<77	<75
SG-06	13.0	<0.7	<0.8	<0.8	<0.8	<0.7
SG-07	--	--	--	--	--	--
Air	N/A	<0.7	<0.8	<0.8	<0.8	<0.7

-- - Not able to obtain sample
N/A - Not applicable
Air - Ambient air sample
* - WS-05 was a sample of groundwater

Table 4. Results of Soil Chemical Analyses
2225 Telegraph Avenue
Oakland, California

Concentrations in milligrams per kilogram (mg/kg)

Sample Number	Depth (feet)	Benzene [1]	Ethyl-benzene [2]	Toluene [3]	Xylenes [3]	TPH as Gasoline [4]
B-1	8.0	0.05	ND	ND	ND	ND
B-1	13.0	ND (5)	10 (10)	16 (10)	41 (10)	2,000 (1,000)
B-2	7.0	ND	ND	ND	ND	ND
B-2	13.5	ND	ND	ND	ND	ND
B-3	7.0	0.06	ND	ND	ND	ND
B-3	13.5	40 (25)	84 (50)	390 (50)	370 (50)	11,000 (5,000)
B-4	13.5	ND	ND	ND	ND	ND
B-5	5.5	ND	ND	ND	ND	ND
B-5	9.5	ND	ND	ND	ND	ND
B-5	12.5	ND	ND	ND	ND	ND
B-6	6.0	ND	ND	ND	ND	ND
B-6	9.5	ND	ND	ND	ND	ND
B-6	12.0	40 (5)	40 (20)	110 (10)	450 (10)	3,000 (1,000)
B-7	6.0	0.64	0.4	0.9	3.4	24
B-7	9.5	0.5	ND	0.7	1.0	ND
B-7	12.0	20 (5)	20 (20)	72 (10)	190 (10)	1,400 (1,000)
MW-6E	13.0	ND	ND	ND	ND	ND
MW-6F	13.0	ND	ND	ND	ND	ND
MW-6G	13.5	ND	ND	ND	ND	5.2
MW-6H	13.5	11 (0.5)	8.8 (2)	3.2 (1)	19 (1)	1,000 (495)
MW-6I	13.5	ND	ND	ND	ND	ND

ND = Not detected.

1 Detection limit 0.05 mg/kg except as noted in parentheses.
2 Detection limit 0.2 mg/kg except as noted in parentheses.
3 Detection limit 0.1 mg/kg except as noted in parentheses.
4 Detection limit 10 mg/kg except as noted in parentheses.

Table 5. Results of Groundwater Chemical Analyses
2225 Telegraph Avenue
Oakland, California

Harding Lawson Associates

Concentrations in micrograms per liter (µg/L)

EPA TEST METHOD 602

Well Number	Date Sampled	Benzene[1]	Ethylbenzene[2]	Toluene[3]	Xylenes[3]	TPH[4] (as gasoline)
MW-6A	06/24/88	ND	ND	ND	ND	-
	10/20/88	1	ND	ND	ND	
	09/07/89	2	ND	ND	ND	ND
	05/11/90	150	ND (0.25)	6.2	13	ND (500)
	05/07/91	700	67	64	74	2,700
	08/14/91	3.6	ND (0.5)	ND (0.5)	ND (0.5)	ND
MW-6B	06/24/88	ND	ND	ND	5	-
	10/20/88	4	ND	3	ND	-
	09/07/89	70 (2.5)	60 (3)	8 (3)	160 (4)	2,700 (25)
	04/30/90	45 (5)	20 (5)	6 (5)	22 (5)	168
	05/07/91	240	310	42	660	3,300
	08/14/91	9.1	85	ND (5)	150	980
MW-6C	06/24/88	7,400	170	7	2,300	-
	10/20/88	9,500 (50)	170 (2)	65 (100)	850 (1)	-
	09/07/89	7,900 (25)	350 (25)	430 (25)	1,100 (38)	18,000 (2,500)
	04/30/90	6,100 (250)	1,000 (250)	1,500 (250)	2,700 (250)	30,000 (25,000)
(RW-3)	05/07/91	4,200	220	640	670	5,800
	08/14/91	2,300	49	330	360	3,800
MW-6D	07/11/88	220 (5)	ND (20)	27 (10)	ND (10)	-
	10/20/88	710 (5)	22 (20)	74 (10)	110 (10)	-
	09/07/89	600 (12.5)	58 (13)	26 (13)	31 (19)	2,200 (1,250)
	04/30/90	800 (50)	310 (50)	150 (50)	280 (50)	3,600 (500)
(RW-2)	(05/07/91)	(3,200)	150	480	780	(11,000)
MW-6E	10/20/88	1	ND	ND	3	
	09/07/89	3	ND	ND	ND	220
	04/30/90	57 (5)	ND (5)	ND (5)	53 (5)	250)
	05/07/91	32	2.2	1.0	1.4	160
	08/14/91	0.9	ND (0.5)	ND (0.5)	ND (0.5)	ND
MW-6F	10/25/88	ND	ND	ND	2	
	09/07/89	ND	ND	ND	ND	ND
	04/30/90	ND	ND	ND	ND	ND
	05/07/91	ND	ND (0.5)	ND (0.5)	ND (0.5)	ND
	08/14/91	ND	ND (0.5)	ND (0.5)	ND (0.5)	ND
MW-6G	12/07/88	ND	ND	ND	ND	-
	09/07/89	ND	ND	ND	ND	ND
	04/30/90	ND	ND	ND	ND	ND
	05/07/91	ND	ND (0.5)	ND (0.5)	ND (0.5)	ND
	08/14/91	ND	ND (0.5)	ND (0.5)	ND (0.5)	ND

Table 5. Results of Groundwater Chemical Analyses
(continued)

Harding Lawson Associates

Well Number	Date Sampled	Benzene[1]	Ethylbenzene[2]	Toluene[3]	Xylenes[3]	TPH[4] (as gasoline)
MW-6H	12/07/88	1,200 (25)	110 (20)	320 (10)	220 (10)	-
	09/07/89	480 (10)	16 (10)	ND (10)	ND (15)	660 (500)
	04/30/90	700 (50)	31 (5)	39 (5)	50 (5)	630 (500)
	05/07/91	95	15	14	21	570
	08/14/91	52	11	9.9	18	540
MW-6I	12/07/88	ND	ND	ND	ND	-
	09/07/89	ND	ND	ND	ND	ND
	04/30/90	ND	ND	ND	ND	ND
	05/07/91	ND	ND (0.5)	ND (0.5)	ND (0.5)	ND
	08/14/91	ND	ND (0.5)	ND (0.5)	ND (0.5)	ND

ND = Not detected.
Detection limits given in parentheses, where applicable. If not:

1. Detection limit = 0.5
2. Detection limit = 2
3. Detection limit = 1
4. Detection limit = 50

Table 6. Results of Chemical Analyses, Groundwater Treatment System
- Periodic Sampling
2225 Telegraph Avenue, Oakland, California

Harding Lawson Associates

Sampling Date	Sample	TPH (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	CODF (ppb)	TSS (ppb)	Tempera-ture (°C)	pH	Conduc-tivity (umhos/cm)	Flow Meter (gallons)
EBMUD Requirements		NS	3	31	5	42	Fee	Fee	NS	NS	NS	
07/03/91	EFF-16	ND	ND	ND	ND	ND	--	--	--	--	--	141,900
	BT-2-30	560	32	2.9	3.8	19	--	--	--	--	--	
07/10/91	BT-2-31	ND	ND	ND	ND	ND	--	--	--	--	--	148,880
07/17/91	EFF-17	70	ND	ND	0.9	0.8	--	--	--	--	--	156,230
08/05/91	INF-18	12,000	3,600	3,100	33	1,300	--	--	--	--	--	173,850
	EFF-18	ND	ND	ND	ND	ND	--	--	--	--	--	
08/13/91	EFF-19	ND	ND	ND	ND	ND	--	--	--	--	--	179,430
	BT-3-1	ND	ND	ND	ND	ND	--	--	--	--	--	
08/22/91	BT-3-2	ND	ND	ND	ND	ND	--	--	--	--	--	--
09/04/91	BT-3-3	ND	ND	ND	ND	ND	--	--	--	--	--	194,540
	INF-20	9,900	2,900	1,300	ND	1,400	--	--	--	--	--	
	EFF-20	ND	ND	ND	ND	ND	--	--	--	--	--	
09/11/91	BT-3-4	ND	ND	ND	ND	ND	--	--	--	--	--	--
09/18/91	BT-3-5	ND	ND	ND	ND	ND	--	--	--	--	--	--
09/25/91	BT-3-6	ND	ND	ND	ND	ND	--	--	--	--	--	--
Detection Limit		50	0.5	0.5	0.5	0.5	20,000	1,000	--	--	1.0	

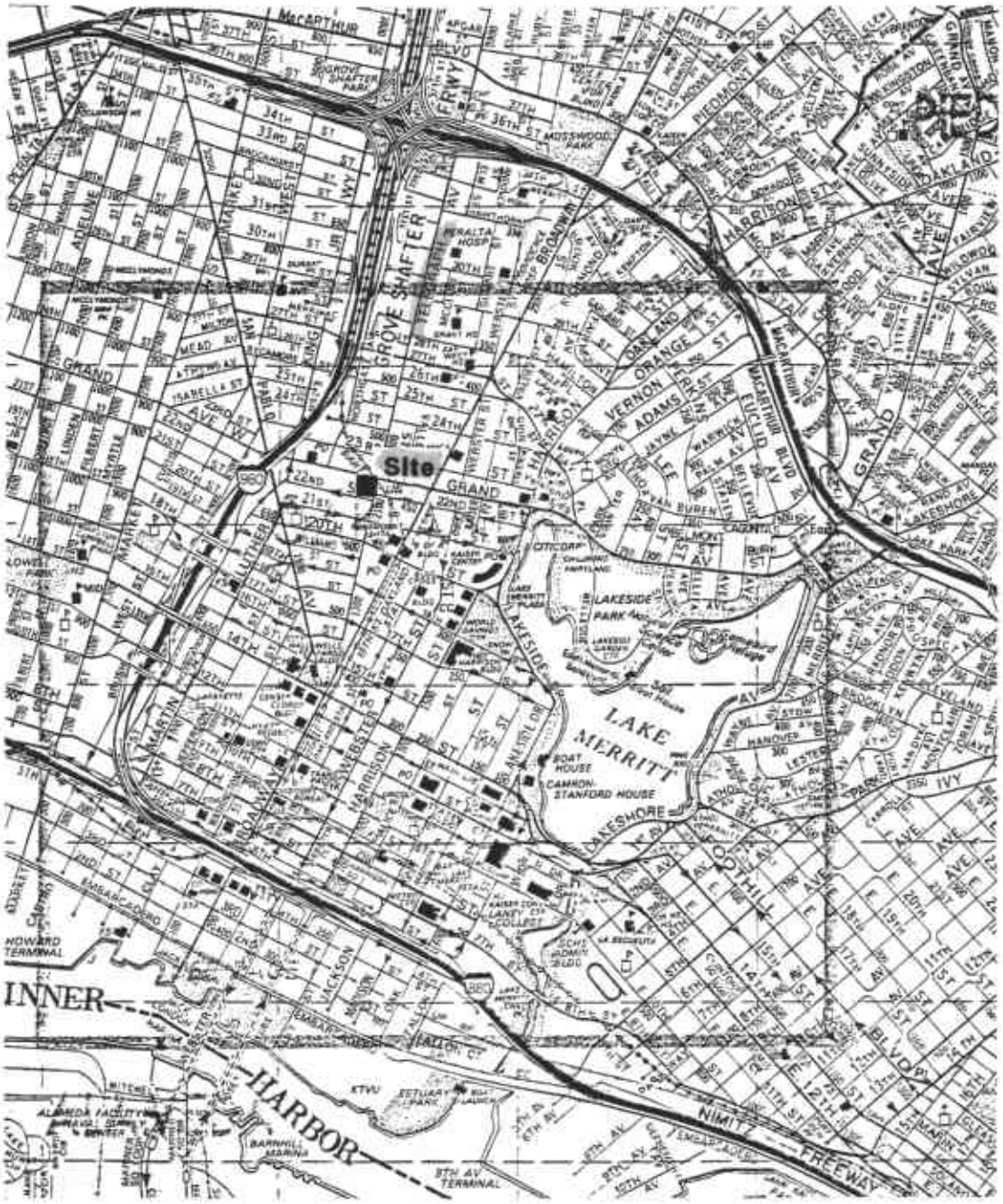
-- = Not tested
ND = Not detected above laboratory detection limit
NS = Not specified
Fee = Used to determine discharge fee
ppb = Parts per billion (µg/l)
TPH = Total petroleum hydrocarbons as gasoline (EPA 8015 modified)
CODF = Chemical oxygen demand, filtered (SMWWA 5540D)
TSS = Total suspended solids (SMWWA 5220D)

Table 7. Free Product Thickness in Groundwater Extraction Wells and Recovered Volumes*

Date	Free Product Thickness in RW-1 (feet)	Approximate Volume Recovered from RW-1 (gallons)	Free Product Thickness in RW-2 (feet)	Approximate Volume Recovered from RW-2 (gallons)
1st QTR Cumulative	0.30 - 2.5	4.80	0	0
2nd QTR 1991 Cumulative	0.02 - 1.46	8.04	0	0
07/10/91	2.06	2.00	--	--
07/17/91	1.75	1.50	--	--
07/22/91	1.75	1.56	--	--
07/29/91	2.16	2.14	--	--
08/05/91	--	1.98	--	--
08/13/91	1.7	2.19	4.5	4.70
08/14/91	--	--	0.16	--
08/22/91	1.92	1.64	0.86	0.61
08/24/91	0.72	0.79	0.47	0.24
08/26/91	0.27	0.13	0.59	0.32
08/28/91	0.40	0.28	0.23	0.21
08/30/91	0.34	0.22	0.30	0.11
09/06/91	2.19	1.89	1.78	1.56
09/11/91	2.30	2.08	1.84	1.26
09/18/91	1.50	1.12	1.00	0.62
09/25/91	2.73	2.57	1.23	0.86
3rd QTR Cumulative	0.27-2.73	22.09	0.23-4.5	10.49

* Free product recovered using a graduated lucite bailer
-- Free product thickness not measured/free product not recovered

105649



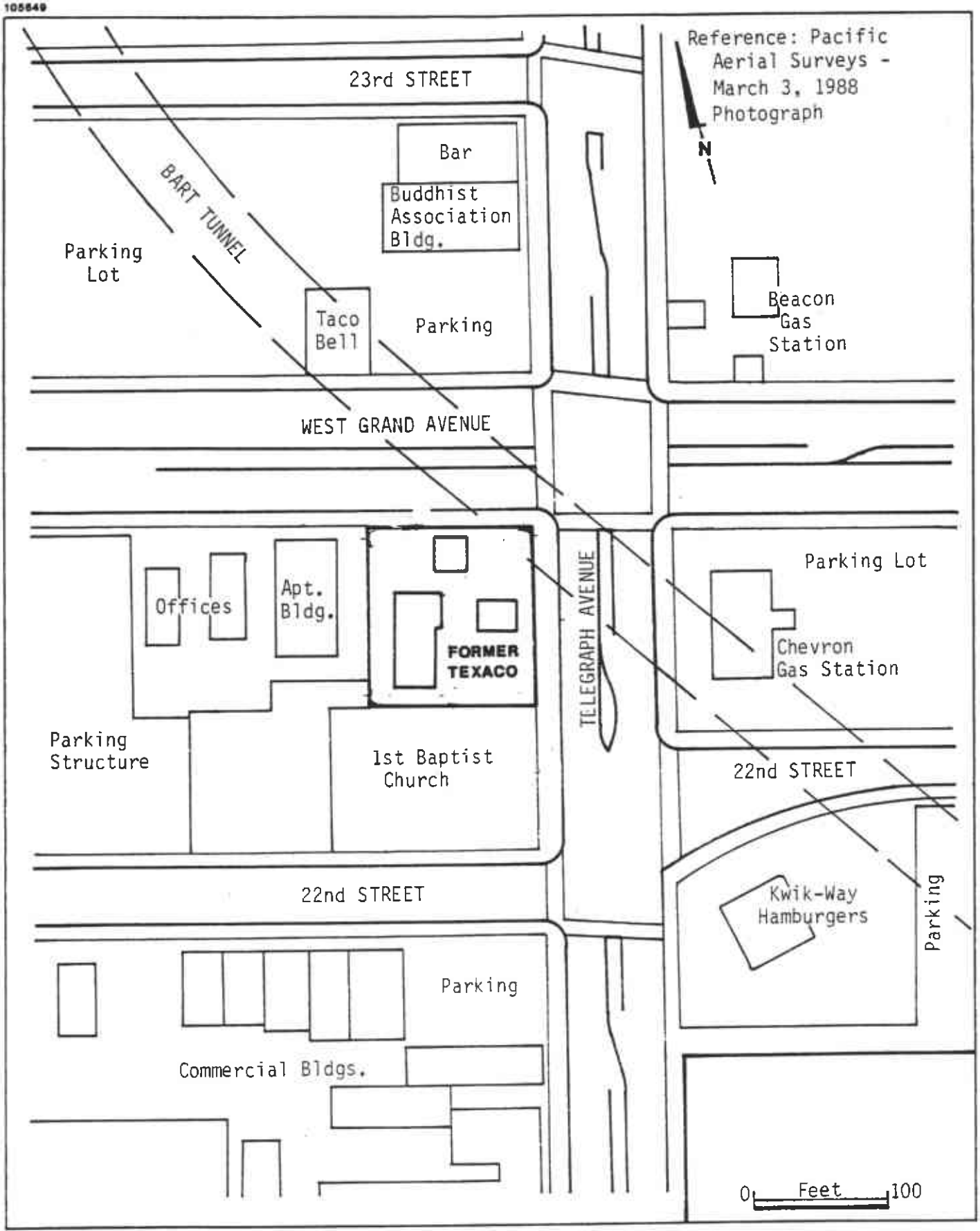
Harding Lawson Associates
Engineers and Geoscientists

Site Location Map
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,111.03		2/89		

105649

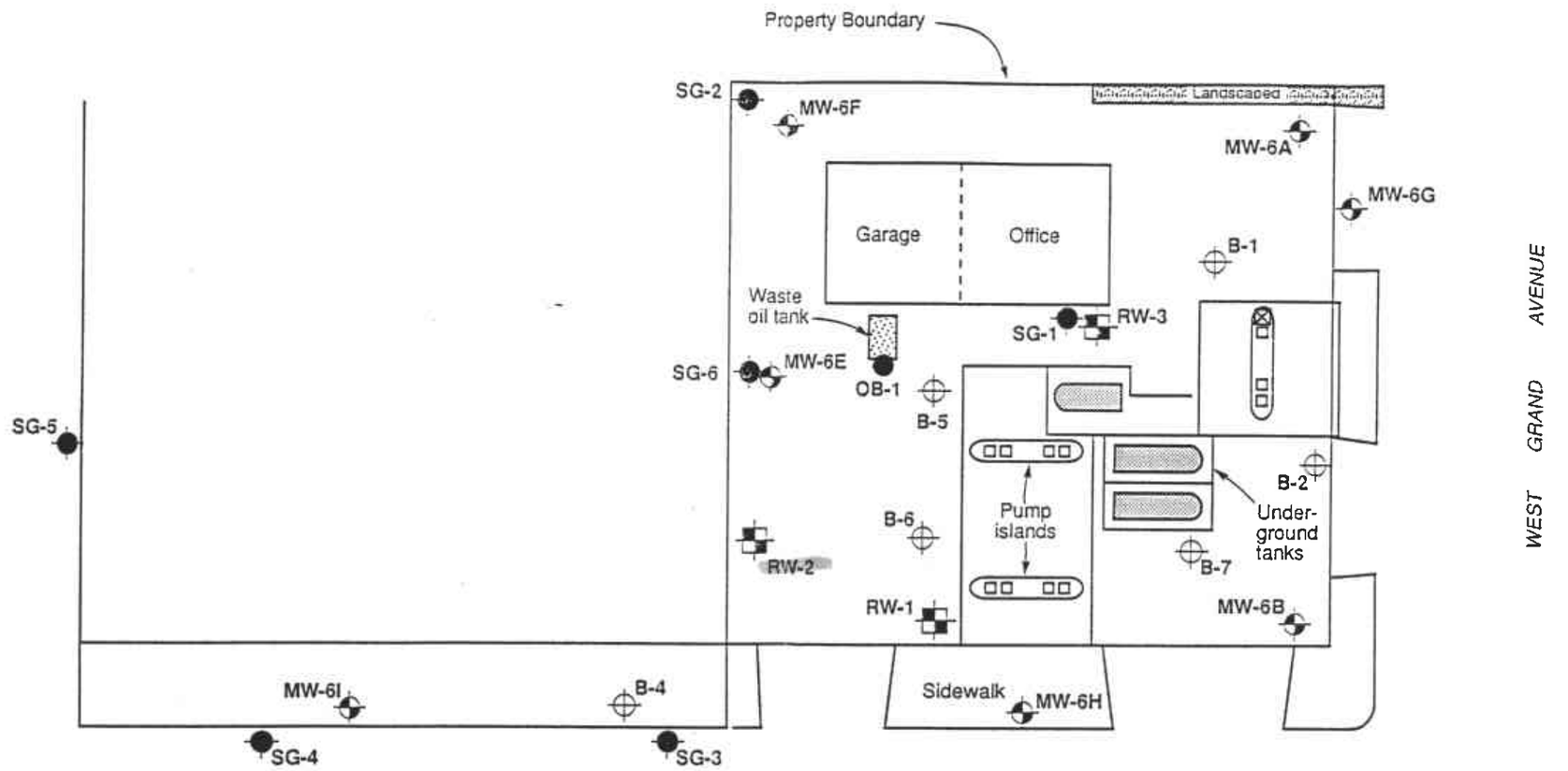


Harding Lawson Associates
Engineers and Geoscientists

Vicinity Plan
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,146.03		2/91		



NOTE:-

RW–1 Previously B–3
RW–2 Previously MW–6D
RW–3 Previously MW–6C

EXPLANATION

- Monitoring well
- Recovery well
- Soil-gas probe location
- Observation well
- Soil boring location
- Benchmark (HLA datum; elevation = 100 feet)

N

0 30 60

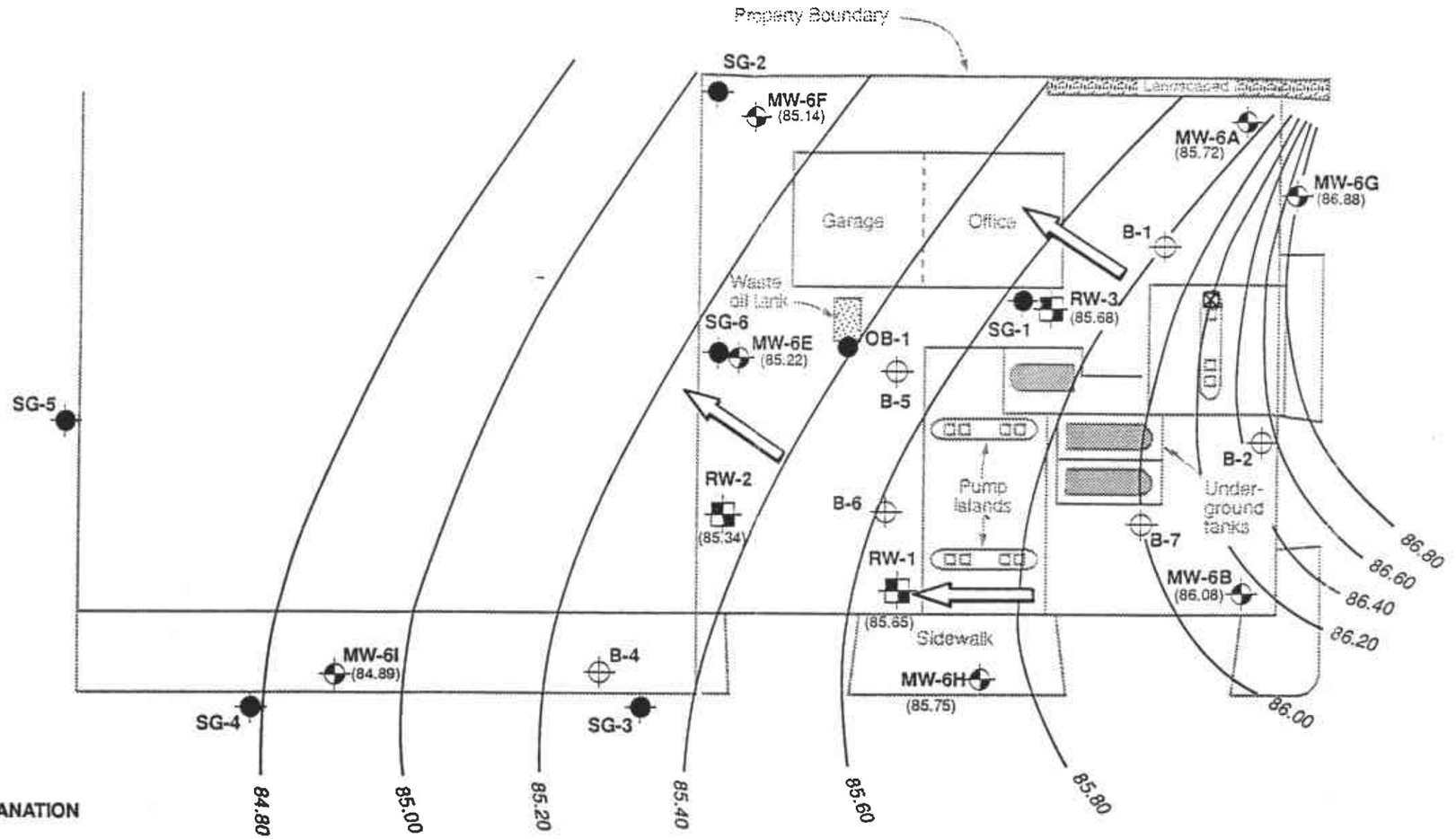
SCALE IN FEET

Harding Lawson Associates
Engineering and Environmental Services

Site Plan
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RHC	2251,146.03	JSH	1/91	02/22/91



EXPLANATION

- Monitoring well
- Recovery well
- Soil-gas probe location
- Observation well
- Soil boring location
- Benchmark (HLA datum; elevation = 100 feet)
- (85.36) Relative groundwater elevation on 2/8/91
- Contour interval 0.20 feet
- Direction of groundwater flow

NOTE: RW-1 previously B-3
RW-2 previously MW-6D
RW-3 previously MW-6C

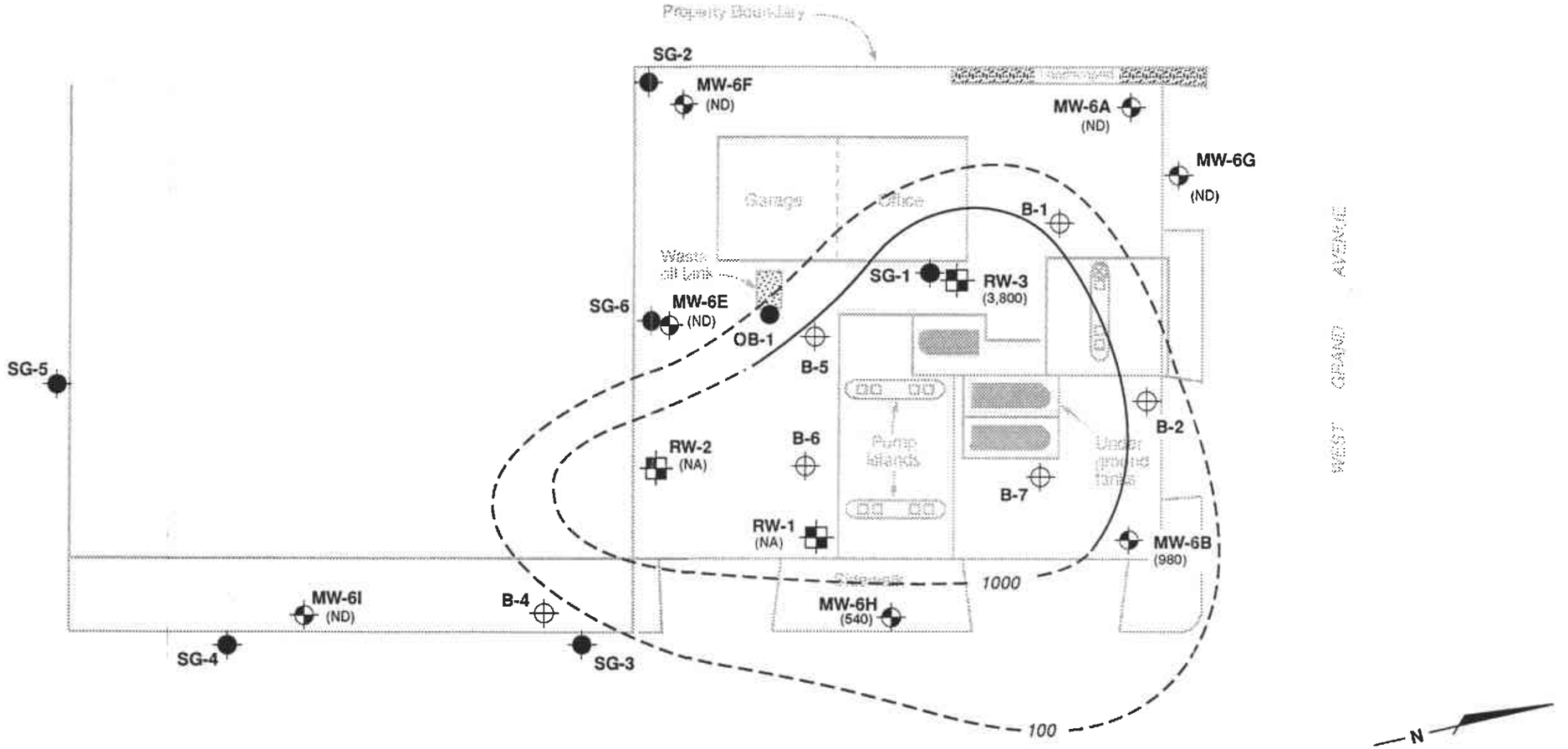
HLA

Harding Lawson Associates
Engineering and
Environmental Services

Potentiometric Surface 10/16/90
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RHC	2251,162.03	JSH	05/31/91	



EXPLANATION

- Monitoring well
- Recovery well
- Soil-gas probe location
- Observation well
- Soil boring location
- Benchmark (HLA datum; elevation = 100 feet)

(250) TPH as gasoline concentrations in groundwater (ppb) on 8/14/91

ND Concentrations below detection limit of 50 ppb

NA Groundwater not analyzed on 8/14/91

Logarithmic contour interval

Direction of groundwater flow

NOTE: RW-1 previously B-3
RW-2 previously MW-6D
RW-3 previously MW-6C

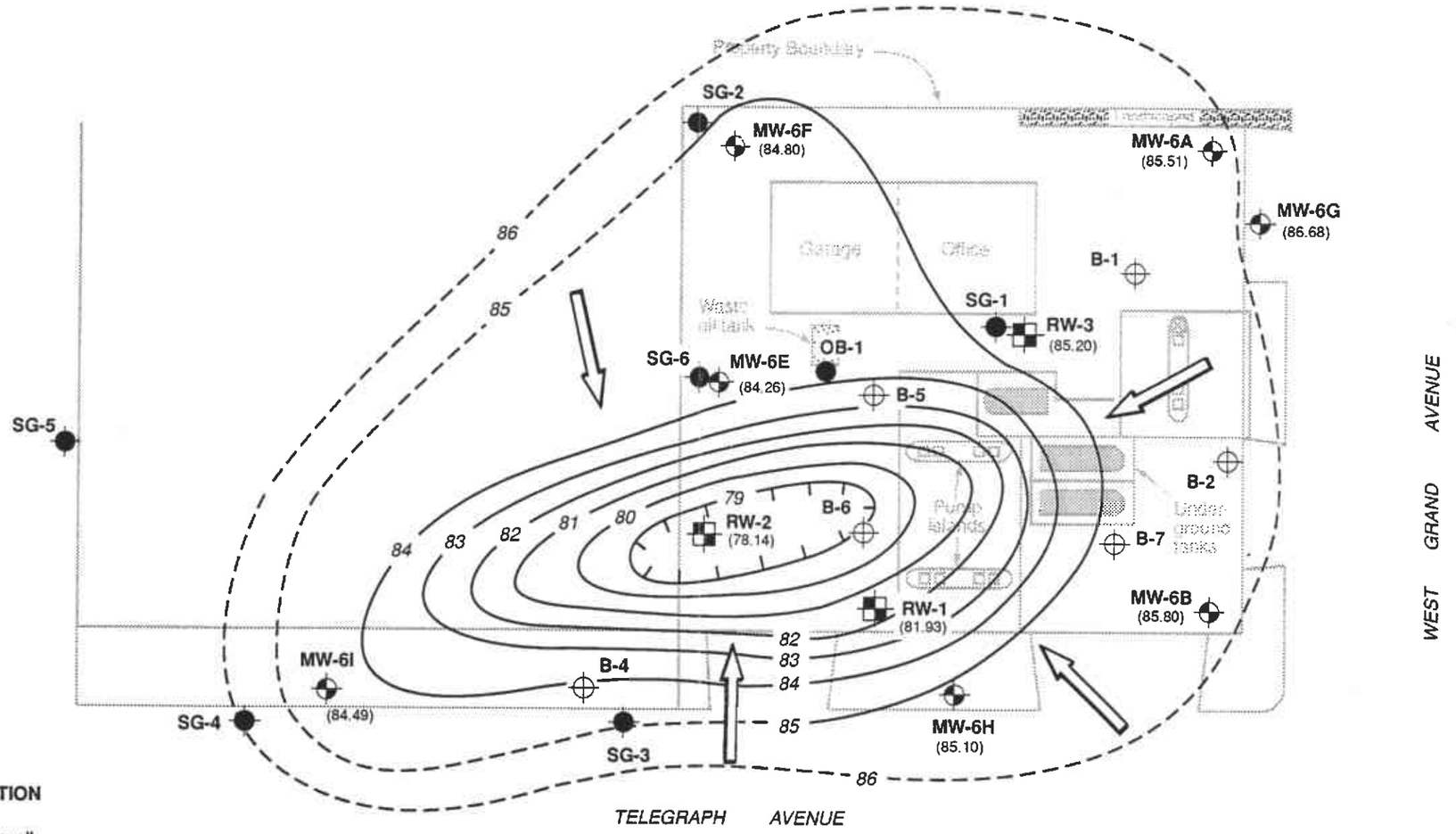
0 30 60
SCALE IN FEET

Harding Lawson Associates
Engineering and Environmental Services

TPH (gasoline) Concentrations in Groundwater 8/14/91
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE **5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RHC	2251,162.03		12/16/91	



EXPLANATION

- Monitoring well
- Recovery well
- Soil-gas probe location
- Observation well
- Soil boring location
- Benchmark (HLA datum; elevation = 100 feet)
- (82.10) Relative groundwater elevation on 9/11/91
- Contour interval 1.0 foot
- Direction of groundwater flow

NOTE: RW-1 previously B-3
RW-2 previously MW-6D
RW-3 previously MW-6C

N

0 30 60
SCALE IN FEET

Harding Lawson Associates
Engineering and Environmental Services

Potentiometric Surface Map 9/11/91
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE 6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RHC	2251,162.03	JSH	12/02/91	

APPENDIX

RESULTS OF LABORATORY ANALYSES ON QUARTERLY GROUNDWATER SAMPLES

NATIONAL
ENVIRONMENTAL
TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

HARDING ASSOC.

SEP 4 1991

Jeanna Hudson
Harding Lawson Associates
1355 Willow Way, Ste. 109
Concord, CA 94520

Date: 08-29-91
NET Client Acct No: 10.01
NET Pacific Log No: 9257
Received: 08-15-91 0800

Client Reference Information

Texaco, 6 Oakland, Job: 2251,162.03

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

JS:rct
Enclosure(s)

NET Pacific, Inc.

Client No: 10.01 Date: 08-29-91
Client Name: Harding Lawson Associates
NET Log No: 9257 Page: 2

Ref: Texaco, 6 Oakland, Job: 2251,162.03

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results MW-6A 08-14-91 94703	MW-6B 08-14-91 94704	Units
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (WATER)			--	--	
DILUTION FACTOR *			1	10	
DATE ANALYZED			08-20-91	08-19-91	
METHOD GC FID/5030			--	--	
as Gasoline		0.05	ND	0.98	mg/L
METHOD 602			--	--	
DILUTION FACTOR *			1	10	
DATE ANALYZED			08-20-91	08-19-91	
Benzene		0.5	3.6	9.1	ug/L
Ethylbenzene		0.5	ND	85	ug/L
Toluene		0.5	ND	ND	ug/L
Xylenes, total		0.5	ND	150	ug/L

NET Pacific, Inc.

Client No: 10.01 Date: 08-29-91
®Client Name: Harding Lawson Associates
NET Log No: 9257 Page: 3

Ref: Texaco, 6 Oakland, Job: 2251,162.03

			Descriptor, Lab No. and Results		
			MW-6E 08-14-91	MW-6F 08-14-91	
Parameter	Method	Reporting Limit	94705	94706	Units
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (WATER)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			08-19-91	08-19-91	
METHOD GC FID/5030			--	--	
as Gasoline		0.05	ND	ND	mg/L
METHOD 602			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			08-19-91	08-19-91	
Benzene		0.5	0.9	ND	ug/L
Ethylbenzene		0.5	ND	ND	ug/L
Toluene		0.5	ND	ND	ug/L
Xylenes, total		0.5	ND	ND	ug/L

NET Pacific, Inc.

Client No: 10.01 Date: 08-29-91
Client Name: Harding Lawson Associates
NET Log No: 9257 Page: 4

Ref: Texaco, 6 Oakland, Job: 2251,162.03

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results MW-6G 08-14-91 94707	MW-6H 08-14-91 94708	Units
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (WATER)			--	--	
DILUTION FACTOR *			1	5	
DATE ANALYZED			08-19-91	08-20-91	
METHOD GC FID/5030			--	--	
as Gasoline		0.05	ND	0.54	mg/L
METHOD 602			--	--	
DILUTION FACTOR *			1	5	
DATE ANALYZED			08-19-91	08-20-91	
Benzene		0.5	ND	52	ug/L
Ethylbenzene		0.5	ND	11	ug/L
Toluene		0.5	ND	9.9	ug/L
Xylenes, total		0.5	ND	18	ug/L

NET Pacific, Inc.

Client No: 10.01 Date: 08-29-91
Client Name: Harding Lawson Associates
NET Log No: 9257 Page: 5

Ref: Texaco, 6 Oakland, Job: 2251,162.03

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results MW-6I 08-14-91 94709	RW-3 08-14-91 94710	Units
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (WATER)			--	--	
DILUTION FACTOR *			1	10	
DATE ANALYZED			08-19-91	08-20-91	
METHOD GC FID/5030			--	--	
as Gasoline		0.05	ND	3.8	mg/L
METHOD 602			--	--	
DILUTION FACTOR *			1	10	
DATE ANALYZED			08-19-91	08-20-91	
Benzene		0.5	ND	2,300	ug/L
Ethylbenzene		0.5	ND	49	ug/L
Toluene		0.5	ND	330	ug/L
Xylenes, total		0.5	ND	360	ug/L

Ref: Texaco, 6 Oakland, Job: 2251,162.03

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Gasoline	0.05	mg/L	82	ND	104	96	8.0
Benzene	0.5	ug/L	78	ND	108	109	4.7
Toluene	0.5	ug/L	84	ND	103	105	1.9
Gasoline	0.05	mg/L	94	ND	104	100	3.9
Benzene	0.5	ug/L	103	ND	112	136	19
Toluene	0.5	ug/L	111	ND	106	106	< 1
Benzene	0.5	ug/L	107	ND	119	97	20

COMMENT: Blank Results were ND on other analytes tested.

NET Pacific, Inc

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, California 94520
415/687-9660
Telecopy: 415/687-9673

CHAIN OF CUSTODY FORM

Lab: NET 9257

Samplers: Steve Hanson

Job Number: 225,162.03

Name/Location: TEXACO #6 OAKLAND

Project Manager: Jeanna Hudson

Recorder: Steven B. Hansen (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	HCl	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	ANALYSIS REQUESTED: EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH	BTEX	TPH as gas
1 3	X							3	M	W	- 6 A	9	10	8	14	STANDARD TURNAROUND							X	X
2 3	X							3	M	W	- 6 B												X	X
2 3	X							3	M	W	- 6 E												X	X
2 3	X							3	M	W	- 6 F												X	X
2 3	X							3	M	W	- 6 G												X	X
2 3	X							3	M	W	- 6 H												X	X
2 3	X							3	M	W	- 6 I					CUSTODY SEALED 8/14/91 @ 19:00 J.W. Intact JS							X	X
2 3	X							3	R	W	- 3												X	X

LAB NUMBER: Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Steven B. Hansen	RECEIVED BY: (Signature) Jeff Winkler	DATE/TIME 8/14/91 14:30
RELINQUISHED BY: (Signature) Jeff Winkler 8/14 19:00	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) Via NCS — DATE/TIME	RECEIVED FOR LAB BY: (Signature) J Schwartz	DATE/TIME 8/15/91 0800
METHOD OF SHIPMENT		

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

6533