Texaco Refining
and Marketing Inc

108 Cutting Boulevard
Richmond CA 94804

91 MAY -9 AM 10:51

May 7, 1991

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

Dear Mr. Callaghan:

Enclosed is a copy of our Quarterly Technical Report dated March 6, 1991 for our former Texaco Service Station located at 2200 East 12th Street in Oakland, California. This report covers the period from October through December, 1990.

Please call me at (415) 236-1770 if you have any questions.

Very truly yours,

R.R. Zielinski
Environmental Supervisor

Enclosure

cc: Mr. Rafat Shahid
Alameda County Environmental
Health Department
80 Swan Way, Room 200
Oakland, CA 94621

pr: KD

KEG

2200EAST12.TC

A Report Prepared for

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

QUARTERLY TECHNICAL REPORT
FOURTH QUARTER OF 1990
FORMER TEXACO STATION
2200 EAST 12TH STREET
OAKLAND, CALIFORNIA

HLA Job No. 2251,112.03
March 6, 1991
1990 Report No. 4

by

Marlene K. Watson
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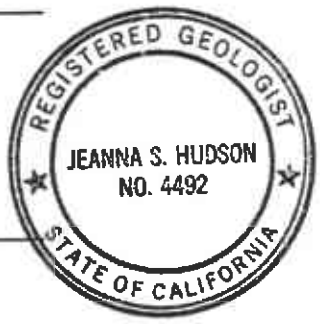
Project Engineer

Jeanna S. Hudson
Registered Geologist



Harding Lawson Associates
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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 2200 East 12th Street, 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 southeast corner of the intersection of East 12th Street and 22nd Avenue; the surrounding area is occupied by commercial/retail businesses, including a Shell Oil Company (Shell) service station immediately across 22nd Avenue (Plate 2). The site is bordered on the west by East 12th Street, on the north by 22nd Avenue, and on the east by a building occupied by a mattress manufacturer. Adjacent to the site on the south is a parcel owned by M.C.B. Industries and currently used for automobile storage.

The topography is relatively flat, sloping gently southwest toward East 12th Street and the Brooklyn Basin Tidal Canal. The site's surface is approximately 20 feet above Mean Sea Level, and drainage is toward East 12th Street. This area has been

extensively developed, and surface runoff is mainly controlled by the municipal storm sewer system.

At the station, leaded and unleaded gasoline are dispensed and automotive repair services are provided. Structures include a building, three fuel pump islands, one underground waste oil tank, and three underground fuel storage tanks (see Site Plan, Plate 3).

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 areal differences (i.e., faults and geologic conditions). The site lies within the Oakland Upland and Alluvial Plain subarea. The groundwater reservoir is made up of the Alameda and Temescal Formations, along with the Merritt Sand, with an aggregate thickness of more than 1,100 feet. Regionally, groundwater flows west-southwest, toward San Francisco Bay.

Most uses of groundwater in the East Bay Plain are related to irrigation or industrial needs; the majority of domestic water is supplied by the East Bay Municipal Utility District (EBMUD) from surface sources.

Soils at the site to the maximum depth explored (20 feet) generally consist of unconsolidated, stiff, sandy clay (CL), interbedded with occasional silty sand and gravel lenses. During

HLA's investigation, groundwater was initially encountered between 11 and 13 feet below grade and stabilized in the wells at approximately 6.5 feet below grade.

The tops of well casings were surveyed relative to an arbitrary datum with an assumed elevation of 100.0 feet. The HLA datum is located at the western end of the dispenser island nearest the underground storage tanks (see Plate 3). Water level measurements and survey data are presented in Table 1. The general direction of groundwater flow is to the west-northwest, with a gradient of about 0.004 foot per foot, as shown on the Groundwater Surface Map, Plate 4. Estimates of the hydraulic conductivity of the slightly confined shallow soils range from 0.4 to 0.5 foot per day.

SUMMARY OF PREVIOUS WORK

Previous Reports

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

1.	Sensitive Receptor Study	May 24, 1988
2.	Subsurface Investigation	July 20, 1988
3.	Environmental Assessment	September 19, 1989
4.	Soil and Groundwater Remediation Plan	May 11, 1990

Previous Field Operations

During previous quarters, HLA completed the following field operations:

- Conducted a soil-gas survey on site and in city streets near the site. Probe locations are shown on Plate 5 and soil-gas survey results are presented in Table 2.
- Drilled and sampled 20 shallow soil borings (B-1 through B-20); locations are shown on Plate 3.
- Drilled, constructed, developed, and sampled five on-site monitoring wells (MW-9A through MW-9E) and three off-site wells (MW-9F through MW-9H); locations are shown on Plate 3.
- Ordered chemical analyses on soil and water samples to determine concentrations of petroleum hydrocarbons; results of analyses are presented in Tables 3 and 4, respectively.
- Conducted slug tests in MW-9B and MW-9E to estimate hydraulic conductivity and transmissivity values for the shallow aquifer; slug test results are presented in Table 5.
- Replaced Emco-Wheaton traffic boxes in public right-of-way with Phoenix Iron Works Model P-2001 traffic boxes, as specified by the City of Oakland.

SUMMARY OF PREVIOUS FINDINGS

Vadose-zone Soil Condition

The area where detectable concentrations of petroleum products were found in vadose-zone soils and soil gas is near the pump islands on the west side of the station. Soil samples were collected from 11 borings (MW-9E, SB-4, and SB-12 through SB-20) to delineate the extent of hydrocarbons in the vadose zone around the pump island. Results of chemical analyses on soil samples from these borings are presented in Table 3.

Only two samples contained total petroleum hydrocarbons (TPH) at concentrations exceeding 100 parts per million (ppm). These samples were from borings MW-9E and SB-4, on the west and east sides, respectively, of the pump island. The soil sample from a depth of 5.5 feet in MW-9E represents the only significant hydrocarbon concentration (1,900 ppm TPH). We concluded that MW-9E and SB-4 are in two isolated occurrences of vadose-zone soil with TPH concentrations above 100 ppm. Correspondingly high concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) and TPH were detected in soil-gas samples from Probe Locations SG-01 and SG-03.

Groundwater Condition

Shallow groundwater in the site vicinity contains detectable quantities of BTEX and TPH as gasoline, as shown in Table 4. The extent of organic hydrocarbons in the groundwater is well delineated and the plume (as delineated by October 1989 measurements) appears to be extending downgradient, toward utility lines in East 12th Street and 22nd Avenue. The bottom of the storm drain in East 12th Street is approximately 8.5 feet below grade, approximately 2 feet below the water table.

The lateral limits of the plume are delineated by MW-9A, MW-9C, MW-9D, MW-9F, MW-9G and MW-9H; samples from these wells show no detectable hydrocarbon concentrations. Samples from MW-9B and MW-9E exhibited benzene concentrations in groundwater (27 and 4 parts per billion [ppb], respectively) that exceed Maximum

Contaminant Levels (MCLs). No other constituent analyzed in these two samples exceeds the MCLs or Drinking Water Action Levels (DWALs).*

WORK PERFORMED DURING THE FOURTH QUARTER OF 1990

Remediation was implemented, as proposed in the "Groundwater Remediation Plan" dated May 11, 1990. Remedial action consisted of the excavation of hydrocarbon-bearing soils from the vadose zone in an attempt to prevent additional hydrocarbons from entering the groundwater. The ground surface was recapped to seal off additional exposure of the soils to hydrocarbons.

The following tasks were performed during the Fourth Quarter of 1990:

1. Conducted chemical analysis of groundwater samples from all monitoring wells, prior to excavation, to determine baseline groundwater conditions.

2. Excavated soil with hydrocarbon concentrations at and above 100 ppm from an area, approximately 12 by 23 feet, between the sidewalk and the canopy covering the western pump islands (Plate 3). The depth of excavation was approximately 7 feet. Confirmation soil samples, S-1 through S-8, were taken from the walls and bottom of the excavation to confirm that hydrocarbon concentrations in the remaining soils were below 100 ppm (Table 6). Confirmation Sample S-5 at a depth of five feet contained hydrocarbon concentrations in

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* The California Department of Health Services issued an action list for chemical contaminants of drinking water. Acceptable drinking water concentrations are specified for four gasoline constituents: benzene, toluene, ethylbenzene, and xylenes (BTEX). MCLs are drinking water standards enforced by law under California Code of Regulations, Title 22. DWALs are recommended levels, but are not enforced by law.

excess of 100 ppm. Samples S-7 and S-8 confirmed that hydrocarbon concentrations were less than 100 ppm at a depth of seven feet.

3. Placed properly compacted clean backfill material in the excavated area and installed pavement. A summary of compaction testing results are presented on Table 7.

4. Abandoned MW-9E (located inside excavation boundaries) in accordance with Alameda County Groundwater Protection Ordinance Permit 90658. Drilled and installed new monitoring well, MW-9I, in approximately the same location after backfilling the excavation. Soil and water chemical analysis results from MW-9I are shown on Table 3 and Table 4, respectively. The log of the boring and monitoring well completion details for MW-9I are shown on Plates 6 and 7 respectively. A Soil Classification Chart and Key to Test Data is shown on Plate 8.

5. Stockpiled and covered excavated soils in a working area south of the station garage (see Plate 3).

6. Systematically spread the soils three feet thick over the space available behind the station office and garage (Plate 3), in compliance with Bay Area Air Quality Management District Regulation 8, Rule 40, and agitated the soil with mechanical equipment periodically until hydrocarbon concentrations dropped below 100 ppm.

7. Disposed of treated (aerated) soil at the Redwood landfill in Novato once acceptable levels of hydrocarbons were attained (less than 100 ppm).

The work described above conforms to the May 11, 1990 Work Plan.

ANTICIPATED ACTIVITIES FOR THE FIRST QUARTER OF 1991

HLA plans to implement the quarterly monitoring program by purging and sampling each of the eight monitoring wells on- and off-site. The groundwater samples will be analyzed for BTEX and

TPH as gasoline. Chemical test results will be presented in the first quarter 1991 Quarterly Technical Report.

LIST OF TABLES

LIST OF ILLUSTRATIONS

APPENDIX

Table 1. Water Level Measurements and Survey Data
2200 East 12th Street
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 10/12/89[4] (feet)
MW-9A	10/12/89	100.07	7.25	92.82	--	--
	09/20/90		--	--	--	--
	10/19/90		7.23	92.84	+0.02	+0.02
MW-9B	10/12/89	98.41	6.14	92.27	--	--
	09/20/90		6.28	92.13	-0.14	-0.14
	10/19/90		6.21	92.20	+0.07	-0.07
MW-9C	10/12/89	99.73	6.99	92.74	--	--
	09/20/90		--	--	--	--
	10/19/90		6.96	92.77	+0.03	+0.03
MW-9D	10/12/89	101.46	8.40	93.06	--	--
	09/20/90		8.47	92.99	-0.07	-0.07
	10/19/90		8.43	93.03	+0.04	-0.03
MW-9E	10/12/89	98.41	5.70	92.71	--	--
	09/20/90		5.84	92.57	-0.14	-0.14
	10/19/90		5.78	92.63	+0.06	-0.08
MW-9F	10/12/89	96.96	6.07	90.89	--	--
	09/20/90		5.97	90.99	+0.10	+0.10
	10/19/90		5.94	91.02	+0.03	+0.13
MW-9G	10/12/89	98.51	6.01	92.50	--	--
	09/20/90		6.03	92.48	-0.02	-0.02
	10/19/90		5.92	92.59	+0.11	+0.09
MW-9H	10/12/89	97.14	8.35	88.79	--	--
	09/20/90		8.25	88.89	+0.10	+0.10
	10/19/90		8.17	88.97	+0.08	0.18
MW-9I	11/15/90	98.66	6.01	92.65	--	--

Notes:

1 Elevation relative to HLA temporary benchmark located at the western corner of the dispenser island nearest the underground storage tanks, 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 10/12/89.

Table 2. Results of Soil-gas Survey
2200 East 12th Street
Oakland, California

Conducted on September 20, 1988
Concentrations in micrograms per liter (μg/L)

Sample	Depth (ft)	Benzene	Ethyl-benzene	Toluene	Xylenes	Total Petroleum Hydrocarbons
Air	N/A	<0.8	<0.8	<0.7	<0.8	<0.8
SG-01	5.0	320,000	620	1	2,200	700,000
WS-02	5.0	12,000	<80	<73	<80	25,000
SG-03	4.0	32,000	<8	<28,000	800	96,000
SG-04	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
MW-9A	6.0	<76	<80	<73	<80	<76
SG-05	2.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-06	--	--	--	--	--	--
SG-07	--	--	--	--	--	--
SG-08	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-09	6.0	<0.8	<0.8	<0.7	<0.8	<0.8
WS-10	6.0	<76	<80	<73	<80	<76
SG-11	4.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-12	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-13	5.0	<0.8	<0.8	<0.7	<0.8	23
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

Table 3. Results of Soil Analyses from Soil Borings
2200 East 12th Street
Oakland, California

Concentrations in milligrams per kilogram (mg/kg)

Sample Number	Depth (ft)	Benzene[1]	Ethyl-benzene[2]	Toluene[3]	Xylenes[3]	TPH as Gasoline[4]	TPH as Diesel[4]
SB-1	4.8	0.30	ND	0.2	ND	ND	NT
B-9-1	5.0	ND	ND	ND	ND	ND	NT
B-9-1	9.0	ND	ND	ND	ND	ND	NT
B-9-1	12.0	ND	ND	ND	ND	ND	NT
B-9-2	5.0	ND	ND	ND	ND	ND	NT
B-9-2	9.0	ND	ND	ND	ND	ND	NT
B-9-2	10.5	ND	ND	ND	ND	ND	NT
B-9-2	13.0	ND	ND	ND	ND	ND	NT
SB-4	4.0	1.0	2.3	0.9	5.8	160	NT
SB-4	9.0	ND	ND	ND	ND	ND	NT
SB-5	4.0	0.33	ND	ND	ND	ND	NT
SB-5	9.0	ND	ND	ND	ND	ND	NT
SB-6	5.0	ND	ND	ND	ND	ND	NT
SB-6	5.5	ND	ND	ND	ND	ND	NT
SB-7	4.0	ND	ND	ND	ND	ND	NT
SB-7	8.5	ND	ND	ND	ND	ND	NT
SB-8	5.5	0.43	ND	ND	ND	ND	NT
SB-8	9.0	ND	ND	ND	ND	ND	NT
SB-9	4.0	ND	ND	ND	ND	ND	NT
SB-9	9.0	ND	0.4	ND	1.1	39	NT
SB10-1	5.0	ND	ND	ND	ND	ND	NT
SB10-2	10.0	ND	ND	ND	ND	ND	NT
SB11-1	5.0	ND	ND	0.1	ND	ND	NT
SB11-2	10.0	ND	ND	ND	ND	ND	NT
SB-12	3.5	0.09	0.07	0.2	0.09	11 (1)	NT
SB-13	4.0	ND	ND	0.1	ND	1.7 (1)	NT
SB-14	4.5	ND	ND	ND	ND	3.5 (1)	NT
SB-15	3.5	0.07	ND	ND	ND	6.3 (1)	NT
SB-16	4.5	0.21	0.08	ND	ND	9.0 (1)	NT
SB-17	5.0	0.093 (.01)	0.139 (.01)	0.043 (.01)	ND (.01)	42 (2)	NT
SB-18	5.0	ND (.01)	0.021 (.01)	0.245 (.01)	0.015 (.01)	5 (2)	NT
SB-19	5.0	ND (.01)	0.022 (.01)	0.078 (.01)	ND (.01)	6 (2)	NT
SB-20	5.0	0.035 (.01)	0.017 (.01)	0.038 (.01)	ND (.01)	7 (2)	NT
MW-9D	6.0	ND	ND	ND	ND	ND	NT
MW-9D	10.5	ND	ND	ND	ND	ND	NT
MW-9E	5.5	ND	18	ND	ND	1,900	NT
MW-9E	9.0	ND	ND	ND	ND	ND	NT
MW-9G	4.0	ND	ND	0.2	ND	ND	NT
MW-9I	15.0	ND	ND (0.05)	ND (0.05)	ND (0.05)	ND (1)	ND

ND = Not detected. NT = Not tested.
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 4. Results of Groundwater Analyses
2200 East 12th Street
Oakland, California

Concentrations in micrograms per liter (µg/L)

Well Number	Date Sampled	EPA TEST METHOD 602 Benzene	Ethyl-benzene	Toluene	Xylenes	TPH as (Gasoline)
MW-9A	06/13/88	ND	ND	ND	ND	NT
	10/24/88	ND	ND	ND	ND	NT
	10/13/89	ND	ND[1]	ND[1]	ND[2]	NT
	10/19/90	ND	ND[1]	ND[1]	ND[1]	ND
MW-9B	06/13/88	350	66	7.8	160	NT
	10/24/88	84	3.1	ND	3.2	NT
	10/13/89	4.1	ND[1]	ND[1]	ND[2]	NT
	10/19/90	27	2.3[1]	ND[1]	ND[1]	62
MW-9C	06/13/88	ND	ND	ND	ND	NT
	10/28/88	ND	ND	ND	ND	NT
	10/13/89	ND	ND[1]	ND[1]	ND[2]	NT
	10/19/90	ND	ND[1]	ND[1]	ND[1]	ND
MW-9D	10/24/88	ND	ND	ND	ND	NT
	10/13/89	ND	ND[1]	ND[1]	ND[2]	NT
	10/19/90	ND	ND[1]	ND[1]	ND[1]	ND
MW-9E	10/24/88	1.3	ND	ND	ND	NT
	10/13/89	15	2.1[1]	ND[1]	ND[2]	NT
	10/19/90	4.0	0.9[1]	ND[1]	ND[1]	ND
MW-9F	12/06/88	ND	ND	ND	ND	NT
	10/13/89	ND	ND[1]	ND[1]	ND[2]	NT
	10/19/90	ND	ND[1]	ND[1]	ND[1]	ND
MW-9G	12/06/88	0.8	ND	ND	ND	NT
	10/13/89	ND	ND[1]	ND[1]	ND[2]	NT
	10/19/90	ND	ND[1]	ND[1]	ND[1]	ND
MW-9H	12/06/88	ND	ND	ND	ND	NT
	10/13/89	ND	ND[1]	ND[1]	ND[2]	NT
	10/19/90	ND	ND[1]	ND[1]	ND[1]	ND
MW-9I	11/15/90	4.0	1.1[1]	1.2[1]	2.2[1]	55
Detection limits		0.5	2.0	1.0	1.0	50

ND = Not detected NT = Not Tested
1 Detection limit = 0.5
2 Detection limit = 3.0

Table 5. Slug Test Results
2200 East 12th Street
Oakland, California

Well Number	Lithology of Tested Zone	Thickness of Zone (feet)	Estimated Hydraulic Conductivity of Zone (feet/day)
MW-9B	Clayey sand	2.5	0.42
MW-9E	Sandy clay with gravel	13.0	0.52

Table 6. Results of Soil Analysis from Excavation Boundaries
2200 East 12th Street
Oakland, California

Concentrations in milligrams per kilogram (mg/kg)

Sample Number	Depth (ft)	Benzene[1]	Ethyl-benzene[1]	Toluene[1]	Xylenes[1]	TPH as Gasoline[2]	TPH as Diesel[2]
S-1	5	0.66	0.77	0.038	0.076	9.5	1.4
S-2	5	0.32	1.5	0.15	0.17	40	6.1
S-3	6	0.49	0.15	0.028	0.16	2.3	ND
S-4	5	1.2	1.7	0.056	0.052	16	1.3
S-5	5	2.8	12	1.5	ND	290	22
S-6	6	0.28	0.52	0.028	0.21	7.7	10
S-7	7	0.30	0.68	0.070	0.36	17	1.4
S-8	7	0.068	0.20	0.19	0.27	52	2.2

ND = Not detected.
1. Detection Limit 0.0050 mg/kg.
2. Detection Limit 1.0 mg/kg.

Table 7. Summary of Field Density Test Data
2200 East 12th Street
Oakland, California

FIELD DENSITY TEST SUMMARY

HLA JOB NO. 2251,112.03

Date	Test No.	Test Location	Depth.* Elev. (ft)	Moisture Content (%)	Dry Density (pcf)	Max.Dry Density (pcf)	Degree of Compaction (%)	Remarks
10/26/90	1	Excavation	- 4.0	8.0	122	143	85	Fail
10/26/90	2	Excavation	- 4.0	7.9	129	143	90	Retest #1
10/26/90	3	Excavation	- 3.0	7.7	134	143	94	
10/26/90	4	Excavation	- 2.0	6.9	130	143	91	
10/26/90	5	Excavation	- 1.5	7.7	131	143	92	
10/29/90	6	Excavation, South end	- 1.0	8.6	122	134	91	
10/29/90	7	Excavation, North end	- 1.7	10.8	123	134	92	
10/30/90	8	Excavation, South end	- 0.3	5.8	114	134	85	Fail
10/30/90	9	Excavation, center	- 0.3	7.8	122	134	91	Fail
10/30/90	10	Excavation, center	- 0.3	6.9	127	134	95	Retest #8, #9

* Depth is referenced to finished grade

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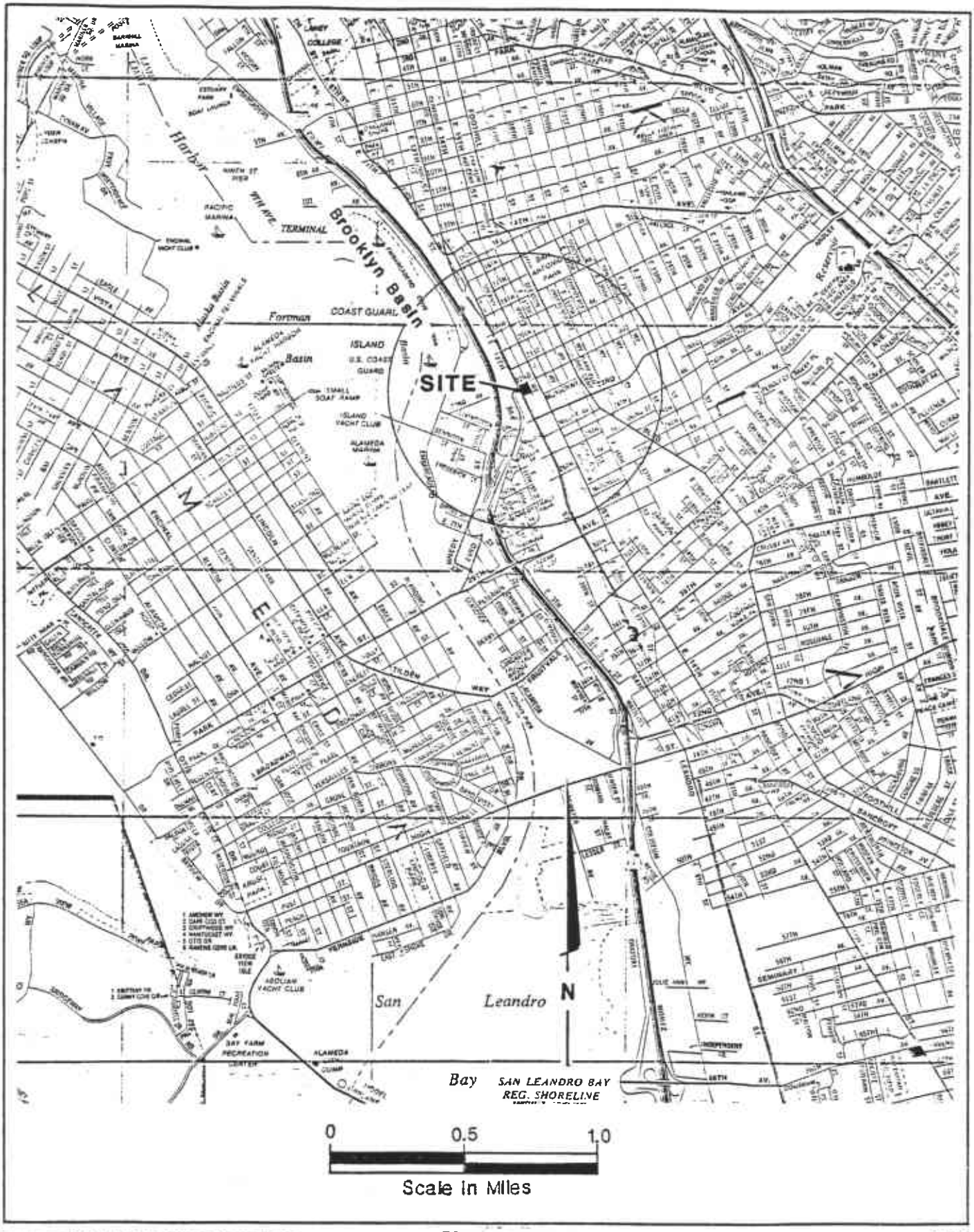
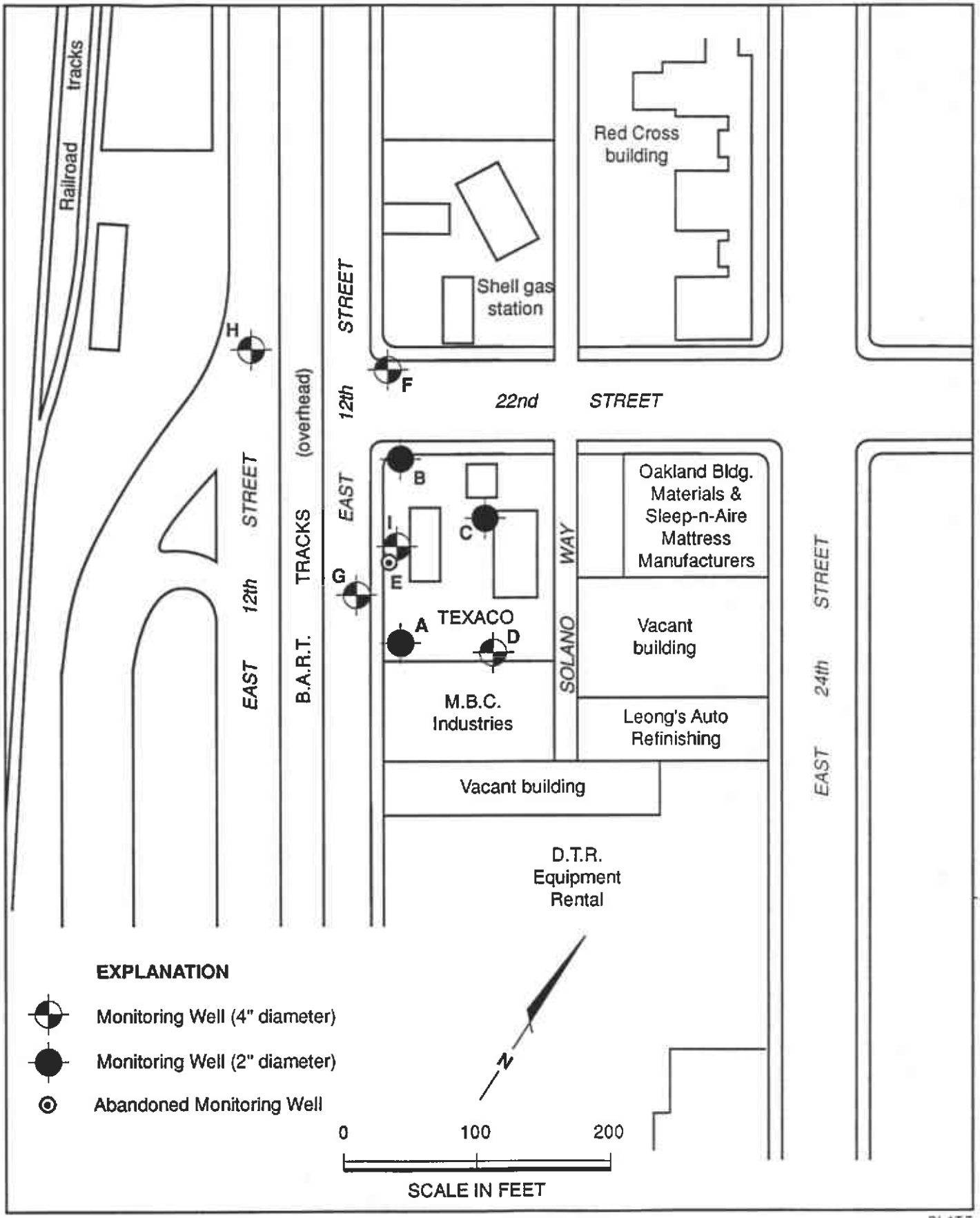


Harding Lawson Associates
Engineers and Geoscientists

Site Location
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	2251,112,03		6/89		

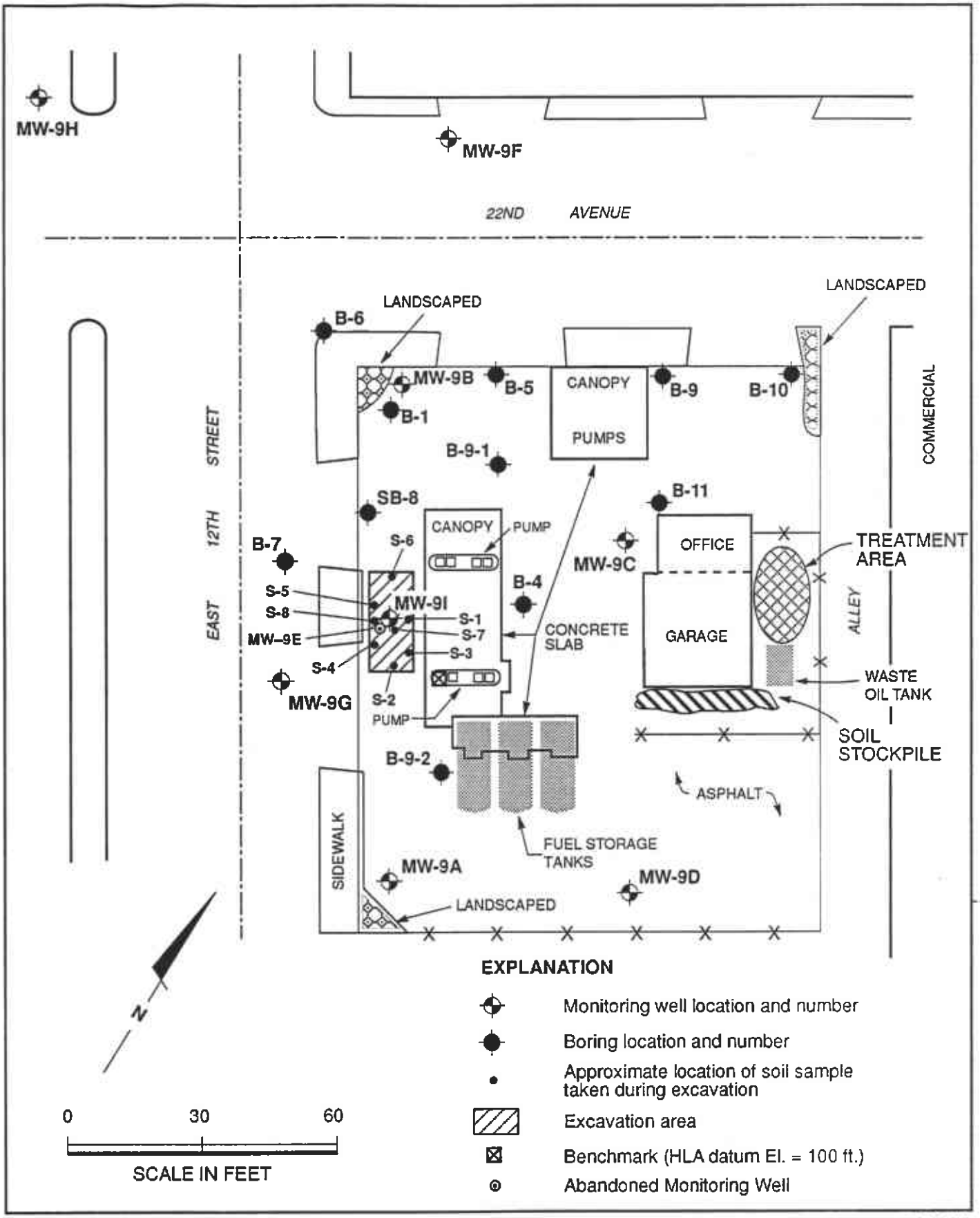


Harding Lawson Associates
Engineering and Environmental Services

Vicinity Plan
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE
2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RHC	2251,112.03	MKW	1/91	02/25/91

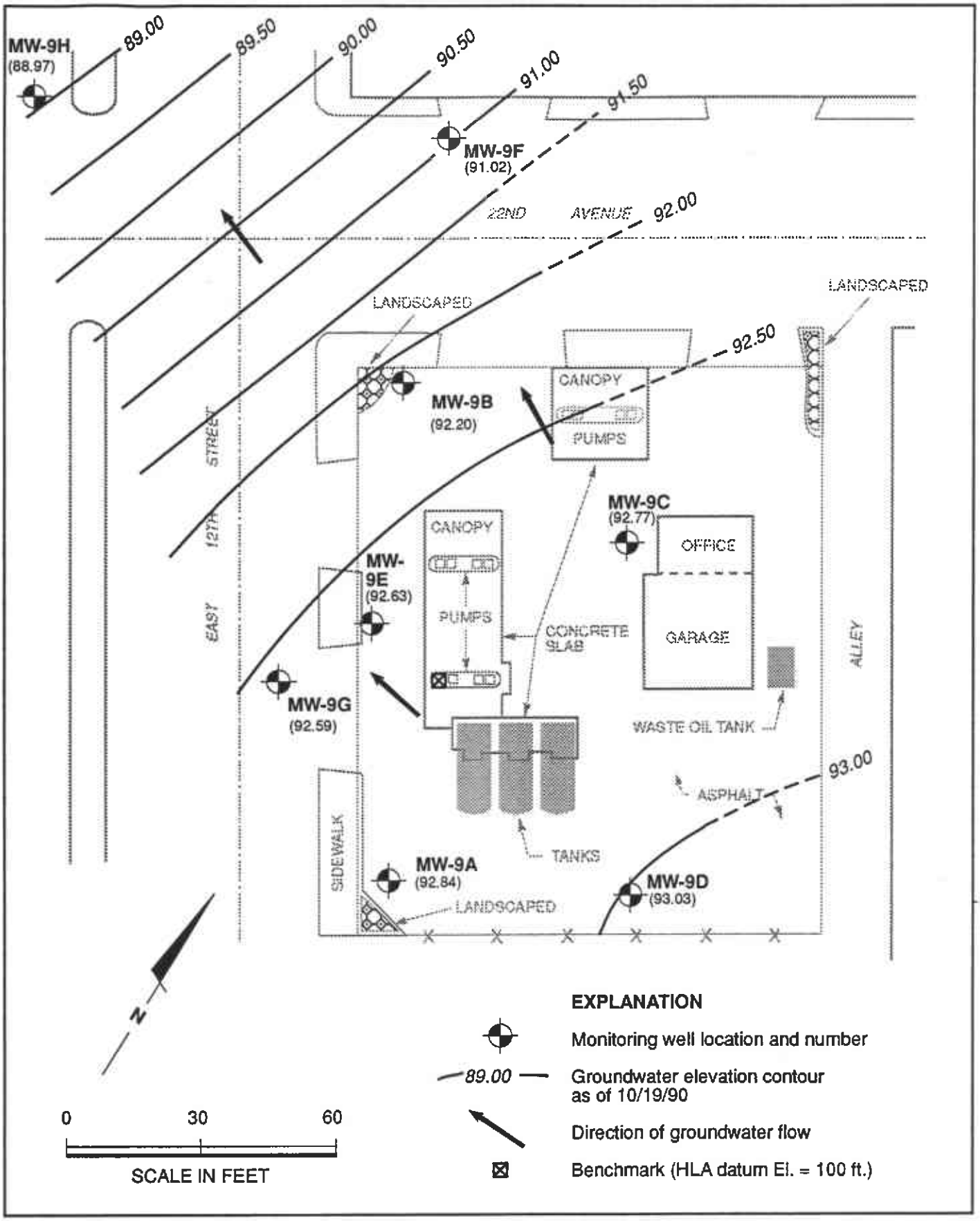


Harding Lawson Associates
Engineering and Environmental Services

Site Plan
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE
3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
EH/RHC	2251,112.03	MKW	1/21/91	2/25/91



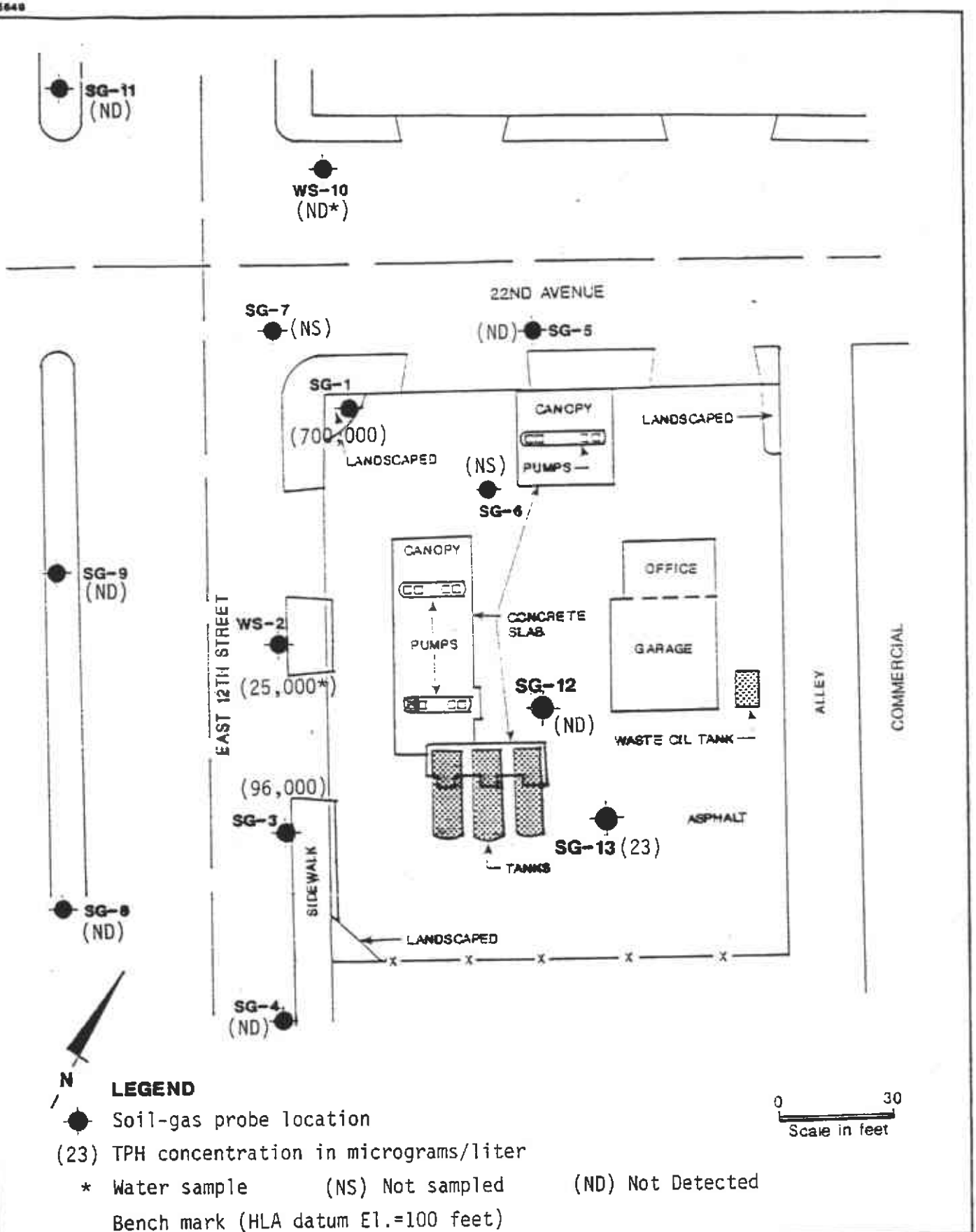
Harding Lawson Associates
Engineering and Environmental Services

Groundwater Surface Map
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
EH/RHC	2251,112.03	MKW	10/90	02/25/91

105648



LEGEND

Soil-gas probe location

(23) TPH concentration in micrograms/liter

* Water sample (NS) Not sampled (ND) Not Detected

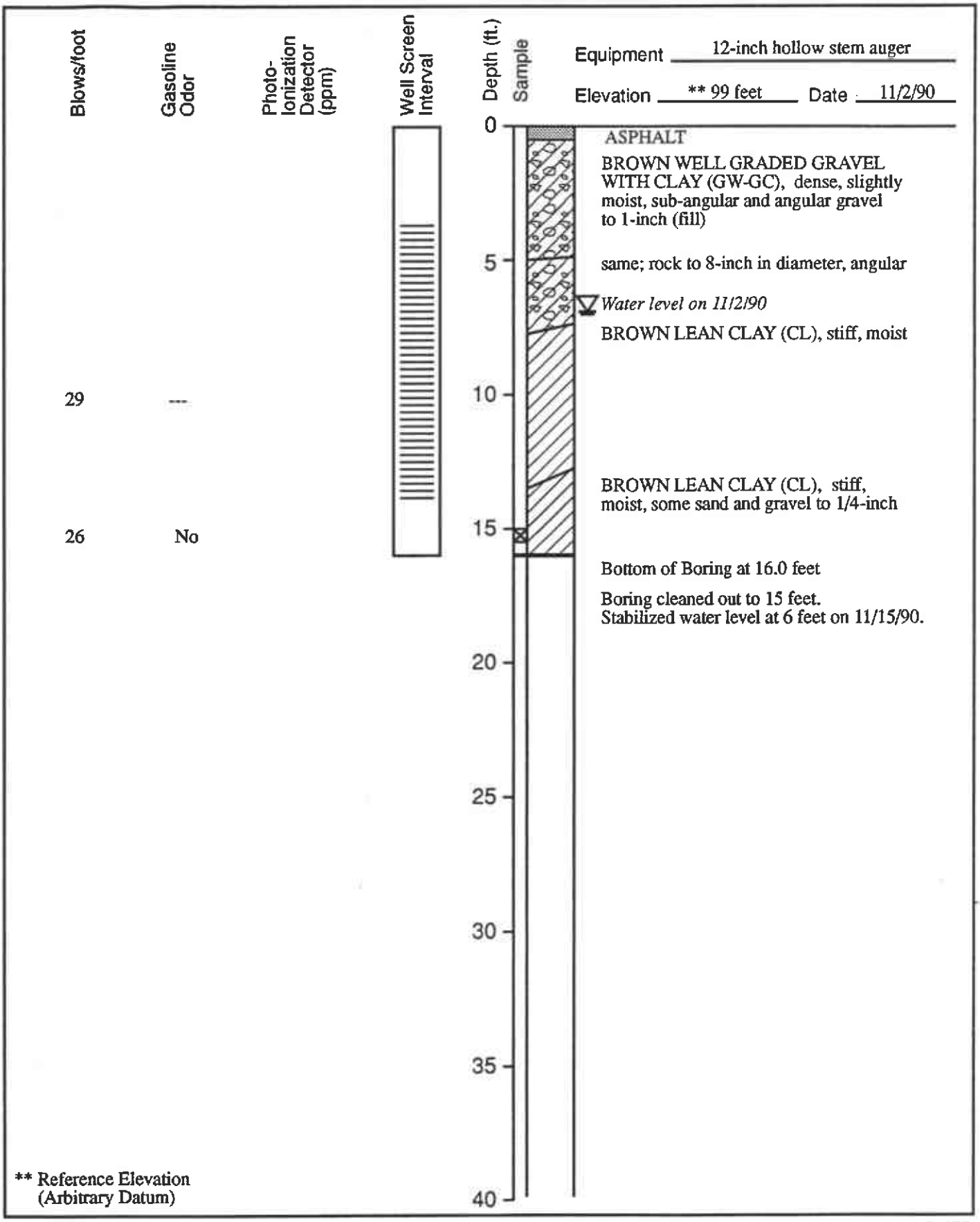
Bench mark (HLA datum El.=100 feet)

Harding Lawson Associates
Engineers and Geoscientists

Soil-gas Probe Locations
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE
5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,112.03	G	6/89		



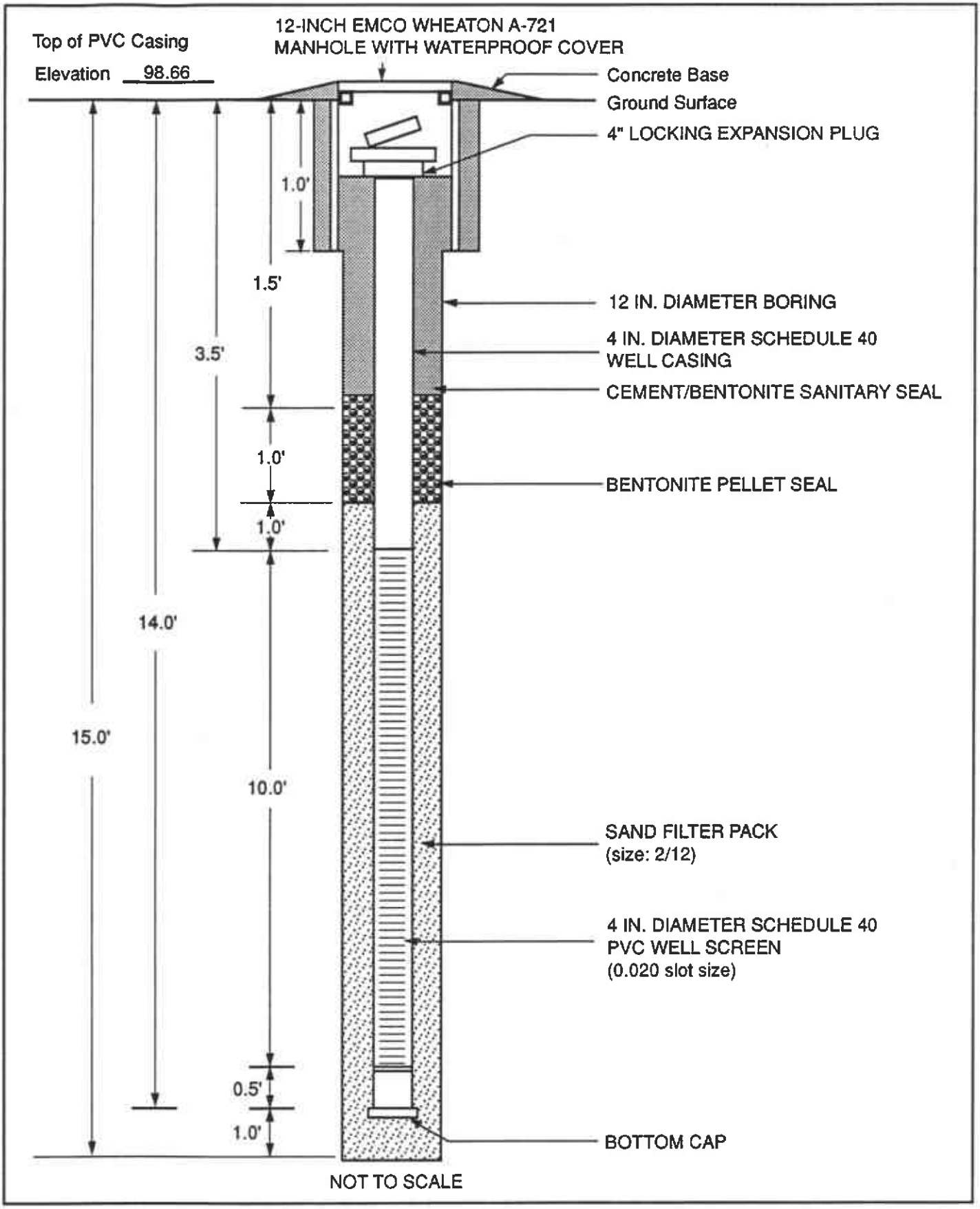
** Reference Elevation (Arbitrary Datum)

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring MW-9I
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RHC	2251,112.03	MKW	11/90	02/25/91



Harding Lawson Associates
Engineering and
Environmental Services

Monitoring Well Completion Detail MW-9I
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
RHC	2251,112.03	MKW	1/91	S. Patel	02/25/91

UNIFIED SOIL CLASSIFICATION - ASTM D2487-85

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN No. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVEL WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN No. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN No. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

KEY TO TEST DATA

M(80)	-	Moisture Content (%)
DD(105)	-	Dry Density(pcf)
Perm	-	Permeability
Consol	-	Consolidation
LL	-	Liquid Limit (%)
PI	-	Plasticity Index (%)
G_s	-	Specific Gravity
MA	-	Particle Size Analysis
OC	-	Organic Content
■	-	"Undisturbed" Sample
⊠	-	Bulk or Classification Sample

Confining Pressure
Shear Strength (psf)

TxUU 3200 (2600)	-	Unconsolidated Undrained Triaxial Shear
(FM) or (S)	-	(field moisture or saturated)
TxCU 3200 (2600)	-	Consolidated Undrained Triaxial Shear
(P)	-	(with or without pore pressure measurement)
TxCD 3200 (2600)	-	Consolidated Drained Triaxial Shear
SSCU 3200 (2600)	-	Simple Shear Consolidated Undrained
(P)	-	(with or without pore pressure measurement)
SSCD 3200 (2600)	-	Simple Shear Consolidated Drained
DSCD 2700 (2000)	-	Consolidated Drained Direct Shear
UC 470	-	Unconfined Compression
LVS 700	-	Laboratory Vane Shear

Harding Lawson Associates
Engineering and Environmental Services

Soil Classification Chart and Key to Test Data
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RHC	2251,112.03	MKW	1/91	02/25/91

APPENDIX

LABORATORY TEST RESULTS (FOURTH QUARTER)

CHEMWEST
ANALYTICAL LABORATORIES, INC.

November 17, 1990

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520

Attention: Mr. Mike Sides

Subject: Report of Data - Case Number 6951

Dear Mr. Sides:

The technical staff at CHEMWEST is pleased to provide our report for the analysis you requested: BTEX - EPA Method 602; and Total Petroleum Hydrocarbons (gasoline) - DHS Method, Luft Field Manual.

Eight water samples for Project Texaco #9, Project Number 2251, 112.03 were received October 22, 1990 in good condition. It should be noted that the method blank analyzed on October 31, 1990 contained a small amount of benzene contamination. The sample associated with it MW9B contained benzene at a level ten times greater than what is in the blank and the sample was rerun to confirming this finding. Results of the analyses analysis, along with the analytical methodology and appropriate reporting limits,are presented on the following page(s).

Thank you for choosing CHEMWEST Laboratories. Should you have questions concerning this data report or the analytical methods employed, please do not hesitate to contact Debbie Pearce your Customer/Technical Service Representative. We hope that you will consider CHEMWEST Laboratories for your future analytical support and service requirements.

Sincerely,

Robert T. Hart
Data Control Manager

RTH:kc

cc: File

600W North Market Boulevard • Sacramento, CA 95834 • Phone (916) 923-0840 • FAX (916) 923-1938

A Subsidiary of CompuChem Corporation

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: Method Blank
Date(s)/Time Analyzed: 10/31/90 1604
Date/Time Sampled: NA

CHEMWEST I.D.: MB
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	2.3	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	84%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: JBH

Date Reported:
11/16/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: Method Blank
Date(s)/Time Analyzed: 11/1/90 1401
Date/Time Sampled: NA

CHEMWEST I.D.: MB
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	BRL	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	81%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: JBH

Date Reported:
11/16/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW9A
Date(s)/Time Analyzed: 11/01/90 0852
Date/Time Sampled: NA

CHEMWEST I.D.: 6951-1
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	BRL	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	72%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: SBA

Date Reported:
11/17/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW9B
Date(s)/Time Analyzed: 10/31/90 0112
Date/Time Sampled: NA

CHEMWEST I.D.: 6951-2
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	27	0.5
Toluene	BRL	0.5
Ethyl Benzene	2.3	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	62	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	70%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: JBH

Date Reported:
11/17/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW9C
Date(s)/Time Analyzed: 11/01/90 0506
Date/Time Sampled: NA

CHEMWEST I.D.: 6951-3
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	BRL	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	93%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: JBK

Date Reported:
11/17/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW9D
Date(s)/Time Analyzed: 11/01/90 0540
Date/Time Sampled: NA

CHEMWEST I.D.: 6951-4
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	BRL	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	101%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: [signature]

Date Reported:
11/17/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW9E
Date(s)/Time Analyzed: 11/01/90 0936
Date/Time Sampled: NA

CHEMWEST I.D.: 6951-5
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	4.0	0.5
Toluene	BRL	0.5
Ethyl Benzene	0.9	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	83%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: JBH

Date Reported:
11/17/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW9F
Date(s)/Time Analyzed: 11/01/90 0648
Date/Time Sampled: NA

CHEMWEST I.D.: 6951-6
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	BRL	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	95%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: JBH

Date Reported:
11/17/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW9G
Date(s)/Time Analyzed: 11/01/90 1020
Date/Time Sampled: NA

CHEMWEST I.D.: 6951-7
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	BRL	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	76%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: JSH

Date Reported:
11/17/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW9H
Date(s)/Time Analyzed: 11/01/90 0756
Date/Time Sampled: NA

CHEMWEST I.D.: 6951-8
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	BRL	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	99%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.
(1): Total of P-, M-, and O- Xylenes.

Approved by: SBH

Date Reported:
11/17/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES, INC.
600W North Market Blvd.
Sacramento, California 95834
(916) 923-0840 FAX (916) 923-1938

CLIENT

Order No. 06951
Date Rec'd. 10-22-90 15:10
Compl. Date
Section ICEL C SIED

CLIENT: Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA
94520

Project Name: Texaco #9
Project No. 2251,112.03
P.O. NO.
Contact Mike Sides
Phone (415) 687-9660

ANALYSIS: Eight water samples rec'd under chain of custody in 40 ml voa vials (16) to be analyzed for BTEX TPH as Gas.

	Sample Id	Date	Analysis	Matrix	Container
6951-1A,B	MW 9A	10-19-90	BTEX TPH-G	water	2-40 ml voa vials
-2A,B	MW 9B		same as above		
-3A,B	MW 9C				
-4A,B	MW 9D				
-5A,B	MW 9E				
-6A,B	MW 9F				
-7A,B	MW 9G				
-8A,B	MW 9H				

GC
S.G. SUSAN GILBERT

CHEM WEST COURIER

SAMPLE WILL BE HELD 30 DAYS UNLESS LONGER TIME IS ARRANGED

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

CHAIN OF CUSTODY FORM

Lab: Chem-West

Samplers: STEVEN HANSEN

Job Number: Texaco #9

Name/Location: 2251.112.03

Project Manager: Mike Sides

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
23	X							2	MW	-	9A	90	10	19		
23	X							2	MW	-	9B					
23	X							2	MW	-	9C					
23	X							2	MW	-	9D					
23	X							2	MW	-	9E					
23	X							2	MW	-	9F					
23	X							2	MW	-	9G					
23	X							2	MW	-	9H	90	10	19		

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH	BTEX TPH as GAS
						X
						X
						X
						X
						X
						X
						X
						X

SAMPLES REC'D IN GOOD CONDITION
NO LEAKAGE OR BREAKAGE - No Bubbles

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Steven B. Hansen	RECEIVED BY: (Signature) GARY BIASE Gary Biase	DATE/TIME 10-22-90 | 11:40
RELINQUISHED BY: (Signature) GARY BIASE Gary Biase	RECEIVED BY: (Signature)	DATE/TIME 10-22-90 | 15:10
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature) SUSAN GILBERT Susan Gilbert	DATE/TIME 10/22/90 | 15:10
METHOD OF SHIPMENT CHEM WEST COURIER		CHEMWEST LAB

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

6533

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates	Client Project ID:	#2251,112.03/Texaco - 12th St.	Sampled: Oct 24, 1990
1355 Willow Way, Suite 109	Matrix Descript:	Soil	Received: Oct 25, 1990
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Analyzed: Oct 29, 1990
Attention: Dan Henninger	First Sample #:	010-0599	Reported: Nov 7, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
010-0599	S-1	9.5	0.66	0.038	0.77	0.076
010-0601	S-3	2.3	0.[illegible]	0.025	0.18	0.16
010-0602	S-4	16	1.2	0.056	1.7	0.052
010-0603	S-5	290	2.8	1.5	12	N.D.
010-0605	S-7	17	0.30	0.070	0.68	0.36
Detection Limits:		**1.0**	**0.0050**	**0.0050**	**0.0050**	**0.0[illegible]**

Low to Medium Boiling P[illegible]ydrocarbons are quantitated ag[illegible]gasoline standa[illegible]
Analytes reported as N[illegible] present above the stated [illegible]detection.

SEQUOIA ANALYTICAL

Julia R. [illegible]alerstein
Project M[illegible]

100599.HAO

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520
Attention: Dan Henninger

Client Project ID: #2251,112.03/Texaco - 12th St.

QC Sample Group: 0100599,601-603,605

Reported: Nov 7, 1990

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020
Analyst:	E. Hamilton	E. Hamilton	E. Hamilton	E. Hamilton
Reporting Units:	µg/kg	µg/kg	µg/kg	µg/kg
Date Analyzed:	Oct 29, 1990	Oct 29, 1990	Oct 29, 1990	Oct 29, 1990
QC Sample #:	010-0680	010-0680	010-0680	010-0680
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.40	0.40	0.40	1.2
Conc. Matrix Spike:	0.40	0.40	0.41	1.3
Matrix Spike % Recovery:	100	100	100	110
Conc. Matrix Spike Dup.:	0.39	0.39	0.39	1.2
Matrix Spike Duplicate % Recovery:	98	98	98	100
Relative % Difference:	2.5	2.5	5.0	8.0

SEQUOIA ANALYTICAL

Jon Malerstein
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S. + Conc. of M.S.D.}) / 2} \times 100$

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates	Client Project ID:	#2251,112.03/Texaco - 12th St.	Sampled: Oct 24, 1990
1355 Willow Way, Suite 109	Matrix Descript:	Soil	Received: Oct 25, 1990
Concord, CA 94520	Analysis Method:	EPA 3550/8015	Extracted: Nov 5, 1990
Attention: Dan Henninger	First Sample #:	010-0599	Analyzed: 11/6-11/7/90
			Reported: Nov 7, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
010-0599	S-1	1.4
010-0601	S-3	N.D.
010-0602	S-4	1.3
010-0603	S-6	22
010-0605	S-7	1.4

Detection Limits:	**1.0**

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

Please Note:
The above ... as do not appear to contain diesel.

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520
Attention: Dan Henninger

Client Project ID: #2251,112.03/Texaco - 12th St.

QC Sample Group: 0100599,601-603,605

Reported: Nov 7, 1990

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel
Method:	EPA 8015
Analyst:	K. Lee
Reporting Units:	mg/kg
Date Analyzed:	Nov 6, 1990
QC Sample #:	Matrix Blank
Sample Conc.:	N.D.
Spike Conc. Added:	300
Conc. Matrix Spike:	270
Matrix Spike % Recovery:	90
Conc. Matrix Spike Dup.:	290
Matrix Spike Duplicate % Recovery:	97
Relative % Difference:	7.1

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

$$\text{\% Recovery:} \quad \frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

$$\text{Relative \% Difference:} \quad \frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S. + Conc. of M.S.D.}) / 2} \times 100$$

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates	Client Project ID:	2251,112.03/Texaco - 12th St.	Sampled: Oct 24, 1990
1355 Willow Way, Suite 109	Matrix Descript:	Soil	Received: Oct 24, 1990
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Analyzed: Oct 24, 1990
Attention: Dan Henninger	First Sample #:	010-0600	Reported: Oct 25, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
010-0600	S-2	40	0.32	0.15	1.5	0.17
010-0604	S-6	7.7	0.28	0.028	0.52	0.21
Detection Limits:		**1.0**	**0.0050**	**0.0050**	**0.0050**	**0.0050**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520
Attention: Dan Henninger

Client Project ID: 2251.112.03/Texaco - 12th St.

QC Sample Group: 100600-604

Reported: Oct 25, 1990

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020
Analyst:	J. Fontecha	J. Fontecha	J. Fontecha	J. Fontecha
Reporting Units:	ppm	ppm	ppm	ppm
Date Analyzed:	Oct 24, 1990	Oct 24, 1990	Oct 24, 1990	Oct 24, 1990
QC Sample #:	010-0570	010-0570	010-0570	010-0570
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.40	0.40	0.40	1.2
Conc. Matrix Spike:	0.38	0.41	0.39	1.2
Matrix Spike % Recovery:	95	100	98	100
Conc. Matrix Spike Dup.:	0.37	0.40	0.38	1.1
Matrix Spike Duplicate % Recovery:	92	100	95	92
Relative % Difference:	2.6	2.5	2.6	8.6

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

$$\% \text{ Recovery:} \quad \frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

$$\text{Relative \% Difference:} \quad \frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S. + Conc. of M.S.D.}) / 2} \times 100$$

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates	Client Project ID:	2251,112.03/Texaco - 12th St.	Sampled: Oct 24, 1990
1355 Willow Way, Suite 109	Matrix Descript:	Soil	Received: Oct 24, 1990
Concord, CA 94520	Analysis Method:	EPA 3550/8015	Extracted: Oct 24, 1990
Attention: Dan Henninger	First Sample #:	010-0600	Analyzed: Oct 24, 1990
			Reported: Oct 25, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
010-0600	S-2	6.1
010-0604	S-6	10

Detection Limits:	1.0

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

Please Note:
The above samples do not appear to contain diesel.

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520
Attention: Dan Henninger

Client Project ID: 2251,112.03/Texaco - 12th St.

QC Sample Group: 100600-604

Reported: Oct 25, 1990

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel
Method:	EPA 8015
Analyst:	K. Lee
Reporting Units:	mg/kg
Date Analyzed:	Oct 24, 1990
QC Sample #:	Matrix Blank
Sample Conc.:	N.D.
Spike Conc. Added:	300
Conc. Matrix Spike:	290
Matrix Spike % Recovery:	97
Conc. Matrix Spike Dup.:	290
Matrix Spike Duplicate % Recovery:	97
Relative % Difference:	0

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S. + Conc. of M.S.D.}) / 2} \times 100$

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

CHAIN OF CUSTODY FORM

Lab: SEQUOIA

Samplers: MIKE BRINK

Job Number: 2251.112.03

Name/Location: TEXACO 12th St.

Project Manager: DAN HENNINGER

Recorder: [signature] (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	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	TPH-GAS BTXE	TPH-DIESEL
49			X		1			S-	1		9	0	1	0	S-2 + S-6 → 24 hr TURN						X	X	0100
			X		1			S-	2	X												X	X	
			X		1			S-	3													X	X	
			X		1			S-	4													X	X	
			X		1			S-	5													X	X	
			X		1			S-	6	X												X	X	
			X		1			S-	7						ALL OTHERS NORMAL TURN							X	X	

LAB NUMBER: Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
					8 X ~~24~~ hr TURN

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME 10-25
METHOD OF SHIPMENT		

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

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates	Client Project ID:	#2251,142.25/Texaco-12th St.	Sampled:	Oct 25, 1990
1355 Willow Way, Suite 109	Sample Descript.:	Soil,SO8	Received:	Oct 26, 1990
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Oct 30, 1990
Attention: D. Henninger	Lab Number:	010-0695	Reported:	Nov 6, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Low to Medium Boiling Point Hydrocarbons	1.0	52
Benzene	0.0050	0.068
Toluene	0.0050	0.19
Ethyl Benzene	0.0050	0.20
Xylenes	0.0050	0.27

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520
Attention: D. Henninger

Client Project ID: #2251,142.25/Texaco-12th St.

QC Sample Group: 010-0695

Reported: Nov 6, 1990

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020
Analyst:	E. Hamilton	E. Hamilton	E. Hamilton	E. Hamilton
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 30, 1990	Oct 30, 1990	Oct 30, 1990	Oct 30, 1990
QC Sample #:	010-0749	010-0749	010-0749	010-0749
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60
Conc. Matrix Spike:	21	20	19	53
Matrix Spike % Recovery:	110	100	95	88
Conc. Matrix Spike Dup.:	21	22	22	65
Matrix Spike Duplicate % Recovery:	110	110	110	110
Relative % Difference:	0	9.5	15	20

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

$$\text{\% Recovery:} \quad \frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

$$\text{Relative \% Difference:} \quad \frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{\text{(Conc. of M.S. + Conc. of M.S.D.) / 2}} \times 100$$

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates	Client Project ID:	#2251,142.25/Texaco-12th St.	Sampled:	Oct 25, 1990
1355 Willow Way, Suite 109	Matrix Descript:	Soil	Received:	Oct 26, 1990
Concord, CA 94520	Analysis Method:	EPA 3550/8015	Extracted:	Nov 2, 1990
Attention: D. Henninger	First Sample #:	010-0695	Analyzed:	Nov 5, 1990
			Reported:	Nov 6, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
010-0695	SO/ 6	2.2

Detection Limits:	1.0

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520
Attention: D. Henninger

Client Project ID: #2251,142.25/Texaco-12th St.

QC Sample Group: 010-0695

Reported: Nov 6, 1990

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel
Method:	EPA 8015
Analyst:	K. Lee
Reporting Units:	mg/kg
Date Analyzed:	Nov 5, 1990
QC Sample #:	Matrix Blank
Sample Conc.:	N.D.
Spike Conc. Added:	300
Conc. Matrix Spike:	240
Matrix Spike % Recovery:	80
Conc. Matrix Spike Dup.:	190
Matrix Spike Duplicate % Recovery:	63
Relative % Difference:	23

SEQUOIA ANALYTICAL

Julia R. Malerstein
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{\text{(Conc. of M.S. + Conc. of M.S.D.) / 2}} \times 100$

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

CHAIN OF CUSTODY FORM

Lab: Sequoia

Samplers: DTH

Job Number: 2251 142.25

Name/Location: Texaco 12th street

Project Manager: D. Henninger

Recorder: Dan Henninger (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	Ice	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	TPH Gas'd	TPH Class'd	BTEX
4/9			✓					✓			508		10	25	1700	0100695						✓	✓	✓

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME 10/26 13:45
METHOD OF SHIPMENT		

Laboratory Copy Project Office Copy Field or Office Copy

6533

CHEMWEST
ANALYTICAL LABORATORIES, INC.

November 19, 1990

HARDING ASSOC.

NOV 21 1990

Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA 94520

Attention: Mike Sides

Subject: Report of Data - Case Number 7048

Dear Mr. Sides:

The technical staff at CHEMWEST is pleased to provide our report for the analyses you requested: BTEX - EPA Method 8020; and Total Petroleum Hydrocarbons (gasoline) - DHS Method, LUFT Field Manual. TPH Extn/GC-FID - DHS Method; LUFT Field Manual.

One soil sample for Project Texaco #9, Project Number 2251,112.03 was received November 5, 1990 in good condition. Results of the analyses, along with the analytical methodology and appropriate reporting limits, are presented on the following pages.

Thank you for choosing CHEMWEST Laboratories. Should you have questions concerning this data report or the analytical methods employed, please do not hesitate to contact Debbie Pearce your Customer/Technical Service Representative. We hope that you will consider CHEMWEST Laboratories for your future analytical support and service requirements.

Sincerely,

Robert T. Hart
Data Control Manager

/RTH

cc: File

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: Method Blank
Date Extracted : 11/06/90
Date/Time Analyzed: 11/13/90 1342
Date/Time Sampled: 11/02/90 NA

CHEMWEST I.D.: MB
Matrix : Soil
Dilution Factor: 1:1

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	BRL	0.05
Toluene	BRL	0.05
Ethyl Benzene	BRL	0.05
p-Xylene	BRL	0.05
m-Xylene	BRL	0.05
o-Xylene	BRL	0.05
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	1

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	101%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of P-, M-, and O- Xylenes.

Approved by: JV

Date Reported:
11/19/90

REV4.1.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW-9I
Date Extracted : 11/06/90
Date/Time Analyzed: 11/13/90 2043
Date/Time Sampled: 11/02/90 NA

CHEMWEST I.D.: 7048-1
Matrix : Soil
Dilution Factor: 1:1

Compound	Amount Detected (mg/Kg)	RL (mg/Kg)
Benzene	BRL	0.05
Toluene	BRL	0.05
Ethyl Benzene	BRL	0.05
p-Xylene	BRL	0.05
m-Xylene	BRL	0.05
o-Xylene	BRL	0.05
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	1

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	107%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.

(1): Total of P-, M-, and O- Xylenes.

Approved by: _____

Date Reported:
11/19/90

REV4.1.90

CHEMWEST ANALYTICAL LABORATORIES
TOTAL PETROLEUM HYDROCARBONS - EXTRACTABLE

Date Extracted : 11/06/90
Dilution Factor: 1:1

Case : 7048
Matrix: Soil

Reporting Units: mg/Kg

Client ID	CHEMWEST ID	Diesel Result	RL	Other Hydrocarbon Mixture Result	RL
MW-9I	7048-1	BRL	10	BRL	10

Client ID	CHEMWEST ID	Date/Time Sampled		Date/Time Analyzed	
MW-9I	7048-1	11/02/90	NA	11/15/90	1530

BRL: Below Reporting Limit.
RL: Reporting Limit.

Approved by: _____

Date Reported:
11/19/90

REV4:1.90

CHEMWEST ANALYTICAL LABORATORIES, INC.
600W North Market Blvd.
Sacramento, California 95834
(916) 923-0840 FAX (916) 923-1938

CLIENT

Order No. 07048
Date Rec'd. 11-5-90 @ 16:45
Compl. Date
Section JOEL C. BIRD

CLIENT: HardingLawson Associates
1355 Willow Way, Suite 109
Concord, CA
94520

Project Name: Texaco #9
Project No. 2251,112.03
P.O. NO.
Contact Mike Sides
Phone (415) 687-9660

ANALYSIS: One soil sample rec'd under chain of custody in 6 inch metal core tube (1) to be analyzed for BTXE, TPH Gas & Diesel.

Sample Id	Depth	Date	Analysis	Matrix	Container
7048 MW9I	15.0	11-2-90	BTXE, TPHG&D	Soil	1-6" coretube

R2
S.G. SUSAN GILBERT

95 NOV 06 AM 9:51

CHEM WEST COURIER

SAMPLE WILL BE HELD 30 DAYS UNLESS LONGER TIME IS ARRANGED

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

CHAIN OF CUSTODY FORM

Lab: CHEM WEST

Samplers: MIKE BRINK

Job Number: 225,112.03

Name/Location: TEXACO #9

Project Manager: MIKE SIDES

Recorder: (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	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	BTXE	TPH-GAS	TPH-DIESEL
SO			X		1			MW	9	I15	90	11	02		NORMAL TURN AROUND TIME							X	X	X

SAMPLES REC'D IN GOOD CONDITION
NO LEAKAGE OR BREAKAGE

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature) GARY BIASE	DATE/TIME 11-5-90 10:25
RELINQUISHED BY: (Signature) GARY BIASE	RECEIVED BY: (Signature)	DATE/TIME 11-5-90 16:45
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature) SUSAN GILBERT	DATE/TIME 11/5/90 16:45
METHOD OF SHIPMENT CHEM WEST COURIER		CHEMWEST LAB

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

6500

CHEMWEST
ANALYTICAL LABORATORIES, INC.

HARDING ASSOC.
DEC 10 1990

December 6, 1990

Harding Lawson Associates
1355 Willow Way Suite 109
Concord, CA 94520

Attention: Mr. Randy Stone

Subject: Report of Data - Case Number 7155

Dear Mr. Stone:

The technical staff at CHEMWEST is pleased to provide our report for the analysis you requested: BTEX - EPA Method 602; and Total Petroleum Hydrocarbons (gasoline) - DHS Method. LUFT field Manual.

One water sample for Project Texaco - 12th St., Project Number 2251.11203 was received November 19, 1990 in good condition. Results of the analysis, along with the analytical methodology and appropriate reporting limits, are presented on the following page(s).

Thank you for choosing CHEMWEST Laboratories. Should you have questions concerning this data report or the analytical methods employed, please do not hesitate to contact Debbie Pearce your Customer/Technical Service Representative. We hope that you will consider CHEMWEST Laboratories for your future analytical support and service requirements.

Sincerely,

Kirk J. Pocan
GC Lab Manager

KJP:kc

cc: File

600W North Market Boulevard • Sacramento, CA 95834 • Phone (916) 923-0840 • FAX (916) 923-1938

A Subsidiary of CompuChem Corporation

ANALYTICAL METHODOLOGY

BTEX (Benzene, Toluene, Ethyl Benzene, and Xylenes) by Purge & Trap and GC-PID

WATER - Method 602 or 8020

A 5 ml sample volume, or 5 ml of a suitable dilution, is purged on a suitable purge and trap system with helium. The purged sample is analyzed on a Gas Chromatograph equipped with a Photoionization Detector (PID). A packed column is used to separate the compounds.

SOIL - Method 8020

A 10 gram, or other appropriate aliquot of soil, is weighed into a clean VOA vial. Soils received in brass core tubes are sampled by discarding 2-5 centimeters of soil from each end of the tubes (this is done to reduce the possibility of analyzing a portion of soil that has been exposed to sampling technique contamination). Equal aliquots of soil are then removed from each end of the tube and combined in the VOA vial. Soil in jars or bags is aliquoted using a similar technique, which discards exposed sample surfaces. A 10 ml, or other appropriate volume of methanol, is added to the soil and the soil is shaken with the solvent. 100 ul of the extract, or a reduced aliquot or volume of a suitable dilution, is injected into 5 ml of laboratory blank water and analyzed by the same technique used for water samples.

ANALYTICAL METHODOLOGY

Total Petroleum Hydrocarbons by Purge & Trap and GC-FID

WATER - DHS Method - Luft Field Manual

A 5 ml sample volume, or 5 ml of a suitable dilution, is purged on a suitable purge and trap system with helium. The purged sample is analyzed on a Gas Chromatograph equipped with a Flame Ionization Detector (FID). A packed column is used to separate the compounds.

SOIL - DHS Method - Luft Field Manual

A 10 gram, or other appropriate aliquot of soil, is weighed into a clean VOA vial. Soils received in brass core tubes are sampled by discarding 2-5 centimeters of soil from each end of the tubes (this is done to reduce the possibility of analyzing a portion of soil that has been exposed to sampling technique contamination). Equal aliquots of soil are then removed from each end of the tube and combined in the VOA vial. Soil in jars or bags is aliquoted using a similar technique, which discards exposed sample surfaces. A 10 ml, or other appropriate volume of methanol, is added to the soil and the soil is shaken with the solvent. 100 ul of the extract, or a reduced aliquot or volume of a suitable dilution, is injected into 5 ml of laboratory blank water and analyzed by the same technique used for water samples.

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: Method Blank
Date(s)/Time Analyzed: 11/28/90 0140
Date/Time Sampled: NA

CHEMWEST I.D.: MB
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	BRL	0.5
Toluene	BRL	0.5
Ethyl Benzene	BRL	0.5
Para-Xylene	BRL	0.5
Meta-Xylene	BRL	0.5
Ortho-Xylene	BRL	0.5
Total-Xylenes (1)	BRL	NA
Total Petroleum Hydrocarbon (Purgeable)	BRL	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	100%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.

(1): Total of P-, M-, and O- Xylenes.

Approved by: _____

Date Reported:
12/06/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES
BENZENE, TOLUENE, ETHYL BENZENE, XYLENES
AND TOTAL PETROLEUM HYDROCARBONS - PURGEABLE

Client I.D.: MW-9I
Date(s)/Time Analyzed: 11/28/90 0223
Date/Time Sampled: 11/15/90 NA

CHEMWEST I.D.: 7155
Matrix : Water
Dilution Factor: 1:1

Compound	Amount Detected (ug/L)	RL (ug/L)
Benzene	4.0	0.5
Toluene	1.2	0.5
Ethyl Benzene	1.1	0.5
Para-Xylene	0.6	0.5
Meta-Xylene	0.6	0.5
Ortho-Xylene	1.0	0.5
Total-Xylenes (1)	2.2	NA
Total Petroleum Hydrocarbon (Purgeable)	55	50

Surrogate	% Recovery	Acceptance Window
Bromofluorobenzene	110%	50-150%

BRL: Below Reporting Limit.
RL: Reporting Limit.
NA: Not Applicable.

(1): Total of P-, M-, and O- Xylenes.

Approved by: _____

Date Reported:
12/06/90

REV5:9.90

CHEMWEST ANALYTICAL LABORATORIES, INC.
600W North Market Blvd.
Sacramento, California 95834
(916) 923-0840 FAX (916) 923-1938

CLIENT

Order No. 07155
Date Rec'd. 11-19-90 @ 17:50
Compl. Date
Section JOEL C BIRD

CLIENT: Harding Lawson Associates
1355 Willow Way, Suite 109
Concord, CA
94520

Project Name: Texaco - 12th St.
Project No. 2251.112.03
P.O. NO.
Contact
Phone (415) 687-9660

ANALYSIS: One water sample rec'd under chain of custody in 40 ml voa vials (2) to be analyzed for TPH as Gas BTEX

	Sample Id	Date	Analysis	Matrix	Container
7155 A,B	MW9I	11-15-90	TPH-Gas BTEx	water	40 ml voa vials

GC

DO 61 06 AON 61

S.G. SUSAN GILBERT

CHEM WEST COURIER

SAMPLE WILL BE HELD 30 DAYS UNLESS LONGER TIME IS ARRANGED

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

CHAIN OF CUSTODY FORM

Lab: Chemwest

Samplers: Steve Hansen

Job Number: 2251,112.03

Name/Location: Texaco - 12th St.

Project Manager: M. Watson

Recorder: Steve 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	X TPH as gas BTEX
2 3	X							2	MW	+	9 I	9 0	1 1	1 5		STANDARD TURN-AROUND							

SAMPLES REC'D IN GOOD CONDITION
NO LEAKAGE OR BREAKAGE - No Bubbles

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Steve Hansen	RECEIVED BY: (Signature) GARY BIASE Gary Biase	DATE/TIME 11-19-90 | 11:10
RELINQUISHED BY: (Signature) Gary Biase GARY BIASE	RECEIVED BY: (Signature)	DATE/TIME 11-19-90 17:50
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature) SUSAN GILBERT Susan Gilbert	DATE/TIME 11/19/90 | 17:50

METHOD OF SHIPMENT: CHEM WEST COURIER

CHEMWEST LAB

Laboratory Copy Project Office Copy Field or Office Copy
Ye F

DISTRIBUTION

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

MKW/JSH/mlw 031387B/R42

QUALITY CONTROL REVIEWER

Donald B. Bray for
Stephen J. Osborne
Principal Engineer