



Texaco Refining
and Marketing Inc

108 Cutting Boulevard
Richmond CA 94804

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October 4, 1991

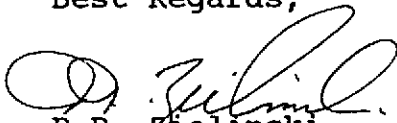
Mr. Tom Callaghan
California Regional Water
Quality Control Board
San Francisco Bay Area Region
2101 Webster Street, Ste. 500
Oakland, CA 94612

Dear Mr. Callaghan:

Enclosed is a copy of our Quarterly Technical Report dated September 9, 1991 for our former Texaco Service Station located at 500 Grand Avenue in Oakland, California. This report covers the period from April through June, 1991.

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

Best Regards,



R.R. Zielinski
Area Supervisor

RRZ:pap

Enclosure

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

pr: *KBP*

KEG

500GA.TC


A Report Prepared for

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

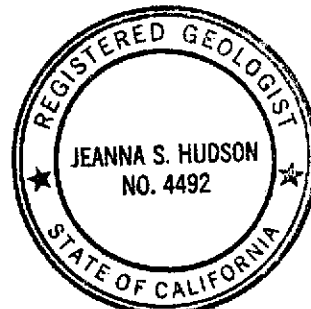
QUARTERLY TECHNICAL REPORT
SECOND QUARTER OF 1991
FORMER TEXACO STATION NO. 6248800235
500 GRAND AVENUE
OAKLAND, CALIFORNIA

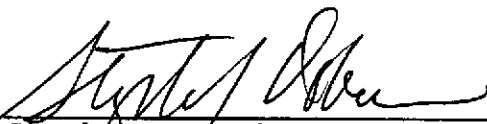
HLA Job No. 2251,169.03
September 9, 1991
1991 Report No. 2

by



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INTRODUCTION

This Quarterly Technical Report (QTR) presents the results of investigation activities by Harding Lawson Associates (HLA) during the second quarter of 1991 at the former site of Texaco service station No. 6248800235, 500 Grand Avenue, Oakland, California (Plate 1). This site is currently operated by Exxon Company U.S.A. (Exxon). This report summarizes previous work at the site, presents second quarter activities, and describes planned activities for the third quarter of 1991.

SUMMARY OF PREVIOUS WORK

Texaco Refining and Marketing Inc. retained HLA to conduct a sensitive receptor survey at the subject location in May 1988. In June 1988, Texaco Refining and Marketing Inc. requested that HLA proceed with a subsurface investigation to evaluate whether hydrocarbons had affected shallow soil or groundwater. By the end of the first quarter of 1991, HLA had completed the following tasks in the site investigation:

- Conducted a soil-gas survey consisting of 18 soil-gas probe locations on or near the site (survey performed by Tracer Research Corporation).
- Installed and developed four 2-inch-diameter groundwater monitoring wells (MW-8A, MW-8B, MW-8C, and MW-8D) and six 4-inch-diameter monitoring wells (MW-8E, MW-8F, MW-8G, MW-8H, MW-8I, and MW-8J). Locations are shown on Plate 2.
- Obtained groundwater samples from each well on a quarterly basis and analyzed them for benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total

petroleum hydrocarbons (TPH) as gasoline and as diesel fuel.

- Gauged water levels and estimated the direction of groundwater flow.
- Performed slug tests in MW-8C and MW-8E to estimate hydraulic conductivity.
- Drilled and sampled 15 soil borings to delineate the extent of hydrocarbons in the vadose zone (Plate 2).
- Analyzed soil samples for BTEX and TPH as gasoline.
- Analyzed soil samples from B-6, B-7, B-8, B-9, B-10, B-11, B-12, B-13, B-14, and B-8K for TPH as diesel fuel.
- Analyzed soil sample from B-13 for halogenated volatile organics, semivolatile organics, oil and grease, and selected metals.
- Pumped and disposed of 5,000 gallons of water from the tank backfill as an interim remedial measure.
- Submitted an Environmental Assessment Report, dated September 22, 1989, to Texaco.
- Issued an Interim Remedial Plan, dated December 7, 1990, in lieu of a Third Quarter Technical Report.
- Excavated the clay sewer pipes and contaminated soil from an abandoned utility trench near the former waste oil tank location. Analyzed soil and water for hydrocarbons.

RESULTS OF PREVIOUS WORK

The results of the soil-gas survey indicated petroleum hydrocarbon vapors in the unsaturated zone near the underground storage tanks and dispenser islands. Analyses of water samples from the four observation wells in the storage tank backfill showed the presence of dissolved petroleum hydrocarbons in groundwater adjacent to the underground tanks.

Soil samples and drill cuttings indicate that the subsurface materials at the site consist of clay and minor amounts of interbedded clayey sand. Analysis of slug test data obtained from MW-3C and MW-3E indicate a hydraulic conductivity of 0.02 to 0.03 foot/day. Groundwater would be expected to move through the soils relatively slowly.

Local groundwater flow is to the south and southeast, toward Lake Merritt (Plate 3). Historical water-level data from monitoring wells across the site show that, in most wells, the water table has fluctuated 2.5 to 3.0 feet since early 1988. Water levels in MW-8A fluctuated as much as 8 feet; those data are suspect and were not used in contouring the potentiometric groundwater surface.

Results of Soil Analyses

Samples from 15 soil borings and seven monitoring well locations were chemically analyzed to evaluate the horizontal and vertical extent of petroleum hydrocarbons in the subsurface. The analytical data are summarized in Tables 1 and 2. A contour map showing concentrations of TPH as gasoline in the vadose-zone soil is presented on Plate 4. For this map, the vadose zone was defined by comparing sample depths to static water levels at the time of sampling.

Plate 4 depicts a vadose-zone hydrocarbon plume that apparently originates near the underground tanks and extends off site to MW-8J. Significant concentrations of TPH as gasoline are

also found in the area of the dispenser islands. The highest concentration, 2900 parts per million (ppm), was found in a soil sample collected at a depth of 1.5 foot in B-11. In general, BTEX concentrations in the soil are either below detection limits or very low.

The results of soil analyses for TPH as diesel fuel indicate concentrations ranging from nondetectable to 460 ppm (B-9); most of the soil samples with detectable concentrations contained less than 100 ppm TPH as diesel fuel.

One soil sample collected at 2.5 feet below grade in B-13 was analyzed for semi-volatile organic compounds, halogenated volatile organics, total oil and grease, and selected metals. A summary of the analytical results are presented in Table 2.

Results of Groundwater Analyses

Table 3 presents the results of groundwater analyses obtained since 1988. Groundwater from monitoring wells MW-8E, MW-8H, MW-8I, and MW-8J, and observation wells OB-3 and OB-4 contained benzene in concentrations that exceed the Department of Health Services Drinking Water Action Levels (DWALs). In groundwater samples from wells MW-8A, MW-8B, and MW-8C, BTEX concentrations have typically been either nondetectable or below the DWALs.

A contour map showing benzene concentrations in groundwater is presented on Plate 5; Plate 6 is a contour map showing concentrations of TPH as gasoline. These maps suggest that

hydrocarbons in groundwater may have originated near the dispenser islands. Water from monitoring well MW-8E, cross-gradient and down-gradient of the dispenser islands, has the highest concentrations of BTEX, TPH as gasoline, and TPH as diesel fuel.

TPH as gasoline was detected in groundwater downgradient of MW-8E in samples from MW-8H, MW-8I, and MW-8J. Samples from MW-8F and MW-8G typically contained nondetectable concentrations of BTEX and TPH as gasoline. However, TPH as diesel fuel and "heavy" hydrocarbons, above the range of diesel fuel, have been detected in groundwater from these downgradient locations since the second quarter 1990.

In the third quarter 1990, workers installing overflow containment devices on the underground storage tanks discovered floating hydrocarbons around the waste oil tank. Exxon removed this tank in September 1990. Waste oil and water were pumped from the tank backfill and disposed of by Exxon. Tank backfill material and affected soil were also excavated and disposed of by Exxon. Two clay sewer lines, apparently containing petroleum hydrocarbon products, were discovered adjacent to the tank pit during the excavation process. Texaco excavated the clay lines and contaminated soil from the surrounding utility trench during the first quarter of 1991.

ACCOMPLISHMENTS DURING SECOND QUARTER OF 1991

During the second quarter of 1991, HLA accomplished the following tasks at the 500 Grand Avenue site:

- Purged and sampled four on-site monitoring wells, and five off-site monitoring wells. Water samples were analyzed for BTEX, TPH as gasoline, TPH as diesel fuel, and TPH as motor oil.
- Measured water levels monthly in nine monitoring wells (Table 4).

Groundwater Sampling

HLA continued to monitor water levels and groundwater quality at the subject location during the second quarter of 1991. Each well was purged while monitoring temperature, conductivity, and pH of the water. The water samples were collected and transported, under chain-of-custody, to NET Pacific, Inc. in Santa Rosa, California. The water samples were analyzed for BTEX, TPH as gasoline, TPH as diesel fuel, and TPH as motor oil.

Results of Analyses

Table 3 and Plates 5 and 6 summarize results of the second quarter groundwater analyses. Benzene concentrations exceeded the DWAL (1.0 parts per billion [ppb]) in groundwater from MW-8E, MW-8H, MW-8I, MW-8B, MW-8C, MW-8F, and MW-8J. Groundwater from monitoring wells MW-8E and MW-8I contained the highest concentrations of benzene, 19,000 ppb and 1,600 ppb, respectively. Of the remaining wells which contained benzene in the groundwater, concentrations were below 20 ppb. TPH as

gasoline was detected in groundwater from monitoring wells MW-8C, MW-8E, MW-8I, and MW-8J. Concentrations ranged from 300 ppb in MW-8J to 50,000 ppb in MW-8E.

TPH as gasoline and/or as diesel fuel were detected in groundwater from seven of the nine monitoring wells sampled. There are no records of diesel fuel being sold at the site in the past. Some of the heavier hydrocarbons detected may therefore result from the presence of aged gasoline, or from hydrocarbons originating in the area of the former waste oil tank. Laboratory reports, included in the Appendix, indicate that the positive result for TPH as diesel fuel analysis is "an unknown hydrocarbon which consists of a singular large peak and lighter hydrocarbons".

In general, benzene and TPH concentrations were higher during the second quarter than in recent quarterly groundwater samples. Water levels indicate that the water table was relatively shallow in April, likely as a result of heavy rains during March. The higher concentrations of hydrocarbons in groundwater during this quarter probably resulted from the remobilization of residual hydrocarbons which were formerly suspended in the capillary fringe portion of the vadose zone.

Plate 3 is the most recent contour map of the potentiometric groundwater surface, based on water levels measured on April 23, 1991. No significant changes in groundwater flow direction are apparent.

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LABORATORY RESULTS OF GROUNDWATER ANALYSES

Table 1. Results of Soil Sample Analyses
(concentrations in mg/kg [ppm])

Boring/ Well Number	Sample Depth (feet)	Benzene	Toluene	Ethyl- benzene	Xylenes	TPH as Gasoline	TPH as Diesel	TPH Other**
B-1	6.5	ND	ND	ND	ND	12	NA	
B-3	4.0	ND	ND	ND	5	520	NA	
B-4	3.5	ND	1	3.5	13	510	NA	
B-5	5.5	ND	ND	ND	ND	<10	NA	
B-5	10.5	ND	ND	ND	ND	ND	NA	
B-5	16.0	ND	ND	ND	ND	ND	NA	
B-6	2.0	ND	0.08	ND	ND	1.0	<100*	<100*
B-6	4.5	ND	0.09	ND	ND	ND	<10	<10
B-7	3.0	ND	6.7	5.1	50	580	<100*	<100*
B-8	2.0	0.05	ND	ND	0.34	3.4	<10	<10
B-9	2.5	0.05	0.32	0.81	6.4	100	460	<100*
B-8K	1.5	ND	ND	ND	ND	2.1		ND
	3.0	ND	0.05	ND	ND	6.6		ND
	5.5	ND	ND	0.08	0.05	84		20
B-10	1.5	0.28	ND	0.20	0.18	8.4		ND
	2.5	0.09	ND	ND	ND	ND		ND
	5.5	ND	ND	ND	ND	ND		ND
	8.5	ND	ND	ND	ND	ND		ND
B-11	1.5	ND	ND	5.4	1.6	2,900		30
	2.5	ND	ND	0.31	0.12	62		11
	5.5	ND	ND	0.06	ND	17		ND
	8.5	ND	ND	ND	ND	ND		ND
B-12	1.0	0.22	0.11	0.18	0.42	13		ND
	2.5	ND	ND	0.19	0.83	49		ND
	4.5	ND	ND	1.27	0.67	1,200		94
	6.0	ND	0.06	ND	ND	ND		ND
B-13	1.5	ND	ND	ND	ND	ND	ND	ND
	2.5	ND	ND	1.7	5.4	130	ND	1,000
	3.5	ND	0.06	0.06	0.30	26	ND	250
B-14	1.5	ND	ND	ND	ND	4.8	ND	85
	3.5	ND	ND	ND	ND	2.3	ND	62
MW-8D	1.3	ND	0.40	ND	0.50	10	NA	
MW-8E	5.5	0.82	6.5	5.5	26	750	NA	
MW-8F	11.0	ND	ND	ND	ND	ND	NA	
MW-8G	6.0	ND	ND	ND	ND	ND	NA	
MW-8H	1.5	ND	0.07	ND	ND	ND		ND
	3.0	ND	0.24	ND	ND	2.6		ND
	5.5	ND	ND	0.30	0.83	550		66
	10.5	ND	ND	ND	ND	ND		ND
MW-8I	1.5	0.10	ND	ND	ND	3.0		ND
	3.5	0.06	ND	ND	0.02	ND		ND
	5.5	ND	ND	2.7	9.2	280		ND
	10.5	ND	ND	ND	ND	ND		ND
MW-8J	1.5	0.18	0.09	0.06	0.05	24		ND
	3.0	0.08	0.14	0.04	ND	13		33
	5.5	ND	ND	25	9.2	2,100		83
	10.5	ND	0.02	ND	ND	8		ND

ND = Not detected

NA = Not analyzed

* Laboratory increased reporting limits because of matrix interference.

** "Heavy" petroleum hydrocarbons such as waste oil, mineral spirits, jet fuel, or fuel oil.

Table 2. Summary of Chemical Analyses
Soil Sample B-13 (2.5 feet deep)

Semivolatile Organics; EPA Test Method 8270

- Analyses for 55 semivolatile organic compounds
- Results were below reporting limit on all except:

Naphthalene	0.90 ppm
2 Methyl-naphthalene	1.40 ppm
Bis (2-ethylhexyl) phthalate	0.26 ppm

Halogenated Volatile Organics; EPA Test Method 8010

- Analyses for 29 compounds
- Results were below reporting limits on all except:

Trichloroethane	0.06 ppm
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Total Oil and Grease (IR); EPA Test Method 413.2	5600 ppm
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Selected heavy metals - EPA Test Method 6010

Cadmium	Below reporting limit
Chromium	36 ppm
Lead	Below reporting limit
Zinc	41 ppm

Table 3. Results of Groundwater Analyses
Concentrations in µg/l (ppb)

Well	Date Sampled	Benzene	Toluene	Ethyl- benzene	Xylenes	TPH as Gasoline	TPH as Diesel	TPH Other**
MW-8A	06/14/88	<0.5*	1.5	<2	6.6	--	--	--
	10/28/88	<0.5	<1	<2	<1	--	--	--
	09/28/89	<0.5	<0.5	<0.5	<3	<50	--	--
	11/29/89	<0.5	1.0	<0.5	<0.5	<50	1,200	<50
	01/24/90	<0.5	<0.5	<0.5	<0.5	<100	--	2,800
	04/26/90	<0.5	<0.5	<0.5	<0.5	<2,500	<50	890
	07/26/90	6.0	<0.5	<0.5	<0.5	<50	<50	<50
	10/18/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	01/08/91	<0.3	<0.3	<0.3	<0.3	<30	<50	130***
	04/23/91	<0.5	<0.5	<0.5	<0.5	<50	<50	<500
MW-8B	06/14/88	<0.5	<1	<2	<1	--	--	--
	10/21/88	<0.5	<1	<2	3.1	--	--	--
	09/28/89	<0.5	<0.5	<0.5	<3	<50	--	--
	11/29/89	<0.5	<0.5	<0.5	<0.5	<50	<50	380
	01/24/90	<0.5	<0.5	<0.5	<0.5	<100	--	350
	04/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	110
	07/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	10/18/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	01/08/91	<0.3	<0.3	<0.3	<0.3	<30	<50	180***
	04/23/91	8.4	2.5	<0.5	5.1	<50	<50	<500
MW-8C	06/14/88	5.3	3.5	2.6	13.0	--	--	--
	10/21/88	<0.5	<1	<2	<1	--	--	--
	09/28/89	<0.5	<0.5	<0.5	<3.0	<50	--	--
	11/29/89	<0.5	<0.5	<0.5	<0.5	<50	<50	190
	01/24/90	0.9	<0.5	<0.5	<0.5	<100	--	480
	04/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	160
	07/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	10/18/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	01/08/91	<0.3	<0.3	<0.3	<0.3	<30	76	110***
	04/23/91	12	25	3.7	19	800	<50	<500
MW-8E	10/25/88	1,400	510	2.9	420	--	--	--
	09/28/89	5,600	3,100	<500	<3,000	22,000	--	--
	11/29/89	4,900	2,600	<250	1,490	15,000	6,800	<50
	01/24/90	10,100	3,340	540	1,790	36,000	--	4,900
	04/26/90	11,000	5,700	840	2,900	48,000	1,400	<50
	07/26/90	15,000	6,200	520	4,700	56,000	<50	<50
	10/18/90	1,500	1,300	170	1,800	15,000	620	<50
	01/08/91	14,000	5,400	860	1,700	51,000	17,000	520***
04/23/91	19,000	6,100	750	4,100	50,000	4,800	<500	

Table 3 (continued)

<u>Well</u>	<u>Date Sampled</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl- benzene</u>	<u>Xylenes</u>	<u>TPH as Gasoline</u>	<u>TPH as Diesel</u>	<u>TPH Other**</u>
MW-8F	04/14/89	<0.5	<1	<2	<1	--	--	--
	09/28/89	<0.5	<0.5	<0.5	<3	<50	--	--
	11/29/89	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	01/24/90	<0.5	<0.5	<0.5	<0.5	<100	--	<300
	04/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	110
	07/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	10/18/90	<0.5	<0.5	<0.5	<0.5	<50	360	<50
	01/08/91	<0.3	<0.3	<0.3	<0.3	<30	380	620***
	04/23/91	5.9	3.1	<0.5	2.7	<50	1,400	3,200
MW-8G	04/14/89	<0.5	<1	<2	<1	--	--	--
	09/28/89	<0.5	<0.5	<0.5	<3	<50	--	--
	11/29/89	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	01/24/90	<0.5	<0.5	<0.5	<0.5	<100	--	650
	04/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	120
	07/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	10/18/90	<0.5	<0.5	<0.5	<0.5	<50	460	<50
	01/08/91	<0.3	<0.3	<0.3	<0.3	<30	220	260***
	04/23/91	0.9	0.9	<0.5	<0.5	<50	1,100	<500
MW-8H	01/24/90	14.8	14.8	10.8	38.8	460	--	<300
	04/26/90	67	19	43	64	830	<50	820
	07/26/90	45	1.3	12	8.2	190	<50	<50
	10/18/90	17	2.5	14	8.5	300	<50	<50
	01/08/91	12	2.2	6.4	4.0	320	180	89***
	04/23/91	1.5	<0.5	<0.5	<0.5	<50	730	<500
MW-8I	01/24/90	116	2.9	13	30.5	580	--	440
	04/26/90	2,400	100	230	350	4,400	<50	1,400
	07/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	10/18/90	92	4.1	37	21	530	<50	<50
	01/08/91	500	4.3	36	26	1,300	710	210***
	04/23/91	1,600	17	100	86	1,500	1,100	900
MW-8J	01/24/90	2.7	<0.5	1	2.6	<100	--	<300
	04/26/90	28	7.7	19	24	160	<50	320
	07/26/90	<0.5	<0.5	<0.5	<0.5	<50	<50	<50
	10/18/90	8.3	<0.5	2.6	1.5	<50	<50	<50
	01/08/91	0.41	<0.3	<0.3	0.52	71	<50	69***
	04/23/91	16	2.2	9.3	4.6	300	550	<500

Table 3 (continued)

<u>Well</u>	<u>Date Sampled</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl- benzene</u>	<u>Xylenes</u>	<u>TPH as Gasoline</u>	<u>TPH as Diesel</u>	<u>TPH Other**</u>
OB-3	11/06/89	420	8	6	64	4,000	--	--
	04/26/90	160	19	5	8.6	1,000	3,200	<50
	07/26/90	<0.5	<0.5	<0.5	0.9	68	1,200	<50
	10/18/90	260	69	35	490	3,200	2,100	<50
	01/08/91	--	--	--	--	--	--	--
	04/23/91	--	--	--	--	--	--	--
OB-4	11/06/89	500	11	10	24	4,000	--	--
	04/26/90	360	10	10	18	460	3,900	<50
	07/26/90	23	3.7	1.6	5.9	200	1,600	<50
	10/18/90	600	540	83	840	4,300	330	<50
	01/08/91	--	--	--	--	--	--	--
	04/23/91	--	--	--	--	--	--	--
DWAL			1.0	680	100	1,750		

DWAL = Drinking water action levels, State of California Department of Health Services (April, 1989).

* <0.5 indicates that concentrations are below the reporting limit of 0.5 $\mu\text{g}/\text{l}$.

** "Heavy" petroleum hydrocarbons such as waste oil, mineral spirits, jet fuel, or fuel oil.

*** TPH as motor oil analyses; analyst did not feel that motor oil was indicated on the chromatogram.

(07/26/90) Sample not analyzed for BTEX and TPH as gasoline within 14-day holding time

-- = Samples not collected/not analyzed for compound

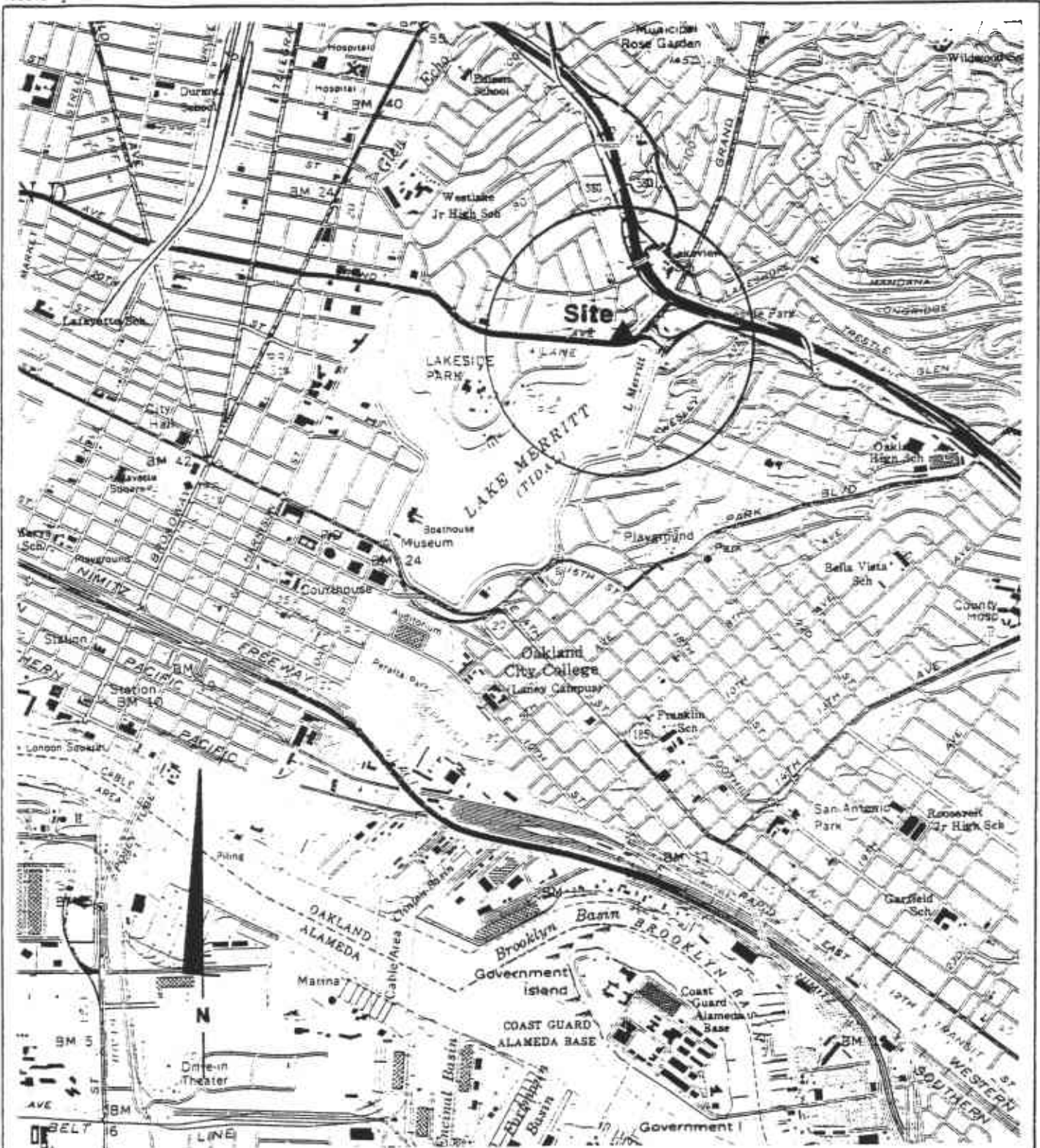
Table 4. Historical Record of Depth to Groundwater

<u>Well</u>	<u>MW-8A</u>	<u>MW-8B</u>	<u>MW-8C</u>	<u>MW-8E</u>	<u>MW-8F</u>	<u>MW-8G</u>	<u>MW-8H</u>	<u>MW-8I</u>	<u>MW-8J</u>
<u>Top of Casing Elev.</u>	99.72	101.11	98.41	99.38	97.94	97.24	98.90	98.27	97.69
<u>Date</u>									
JUL 24, 90 GW ELEV	97.31	100.62	90.98	96.06	88.74	87.54	95.14	92.05	91.21
AUG 24, 90 GW ELEV	94.74	100.60	90.30	95.90	87.13	86.08	92.14	91.93	93.89
SEPT 25, 90 GW ELEV	95.24	100.56	91.05	95.94	87.25	BLOCKED	95.10	91.90	91.01
OCT 18, 90 GW ELEV	96.11	100.55	90.92	95.86	86.89	85.62	95.07	91.85	90.96
NOV 28, 90 GW ELEV	89.69	100.54	88.60	96.00	87.02	85.57	94.94	92.16	91.01
JAN 08, 91 GW ELEV	93.63	100.57	90.81	95.90	87.98	86.44	94.91	92.10	91.30
FEB 02, 91 GW ELEV	96.98	100.58	91.56	95.93	87.93	86.56	94.89	91.96	91.67
MAR 29, 91 GW ELEV	97.40	100.85	91.94	96.10	89.35	BLOCKED	95.20	92.12	91.98
APR 23, 91 GW ELEV	97.41	100.80	91.74	96.36	89.09	87.80	92.87	91.98	93.88
JUN 10, 91 GW ELEV	94.94	100.69	88.53	96.30	88.36	86.95	95.22	92.16	91.52
JUN 28, 91 GW ELEV	97.19	100.70	91.05	96.13	88.46	86.94	95.07	91.97	91.38

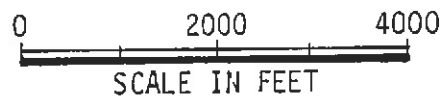
All measurements are in feet

TOC = Top of casing elevation relative to arbitrary datum of 100 feet

GW Elev = Groundwater elevation relative to arbitrary datum



Ref: USGS, 7.5 Minute
 Topographic Map, Oakland
 West, California, Photo
 revised 1980.



Harding Lawson Associates
 Engineers and Geoscientists







Regional Map
 Former Texaco Service Station
 500 Grand Avenue
 Oakland, California

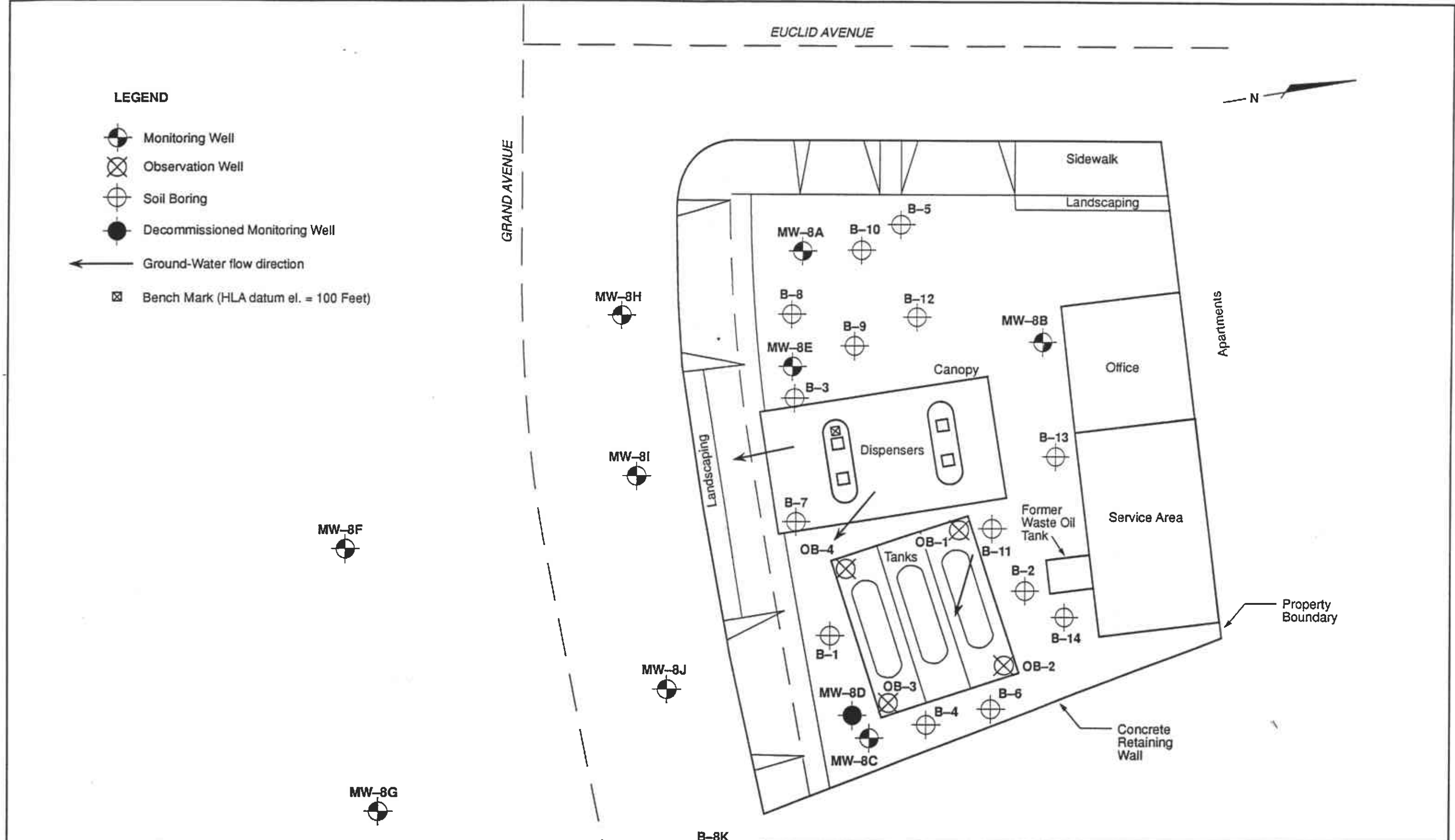
PLATE

1

DRAWN YC	JOB NUMBER 2251,114.03	APPROVED <i>AK</i>	DATE 5/89	REVISED	DATE
-------------	---------------------------	-----------------------	--------------	---------	------

LEGEND

-  Monitoring Well
-  Observation Well
-  Soil Boring
-  Decommissioned Monitoring Well
-  Ground-Water flow direction
-  Bench Mark (HLA datum el. = 100 Feet)









Harding Lawson Associates
 Engineering and Environmental Services

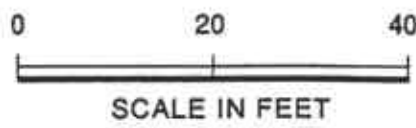
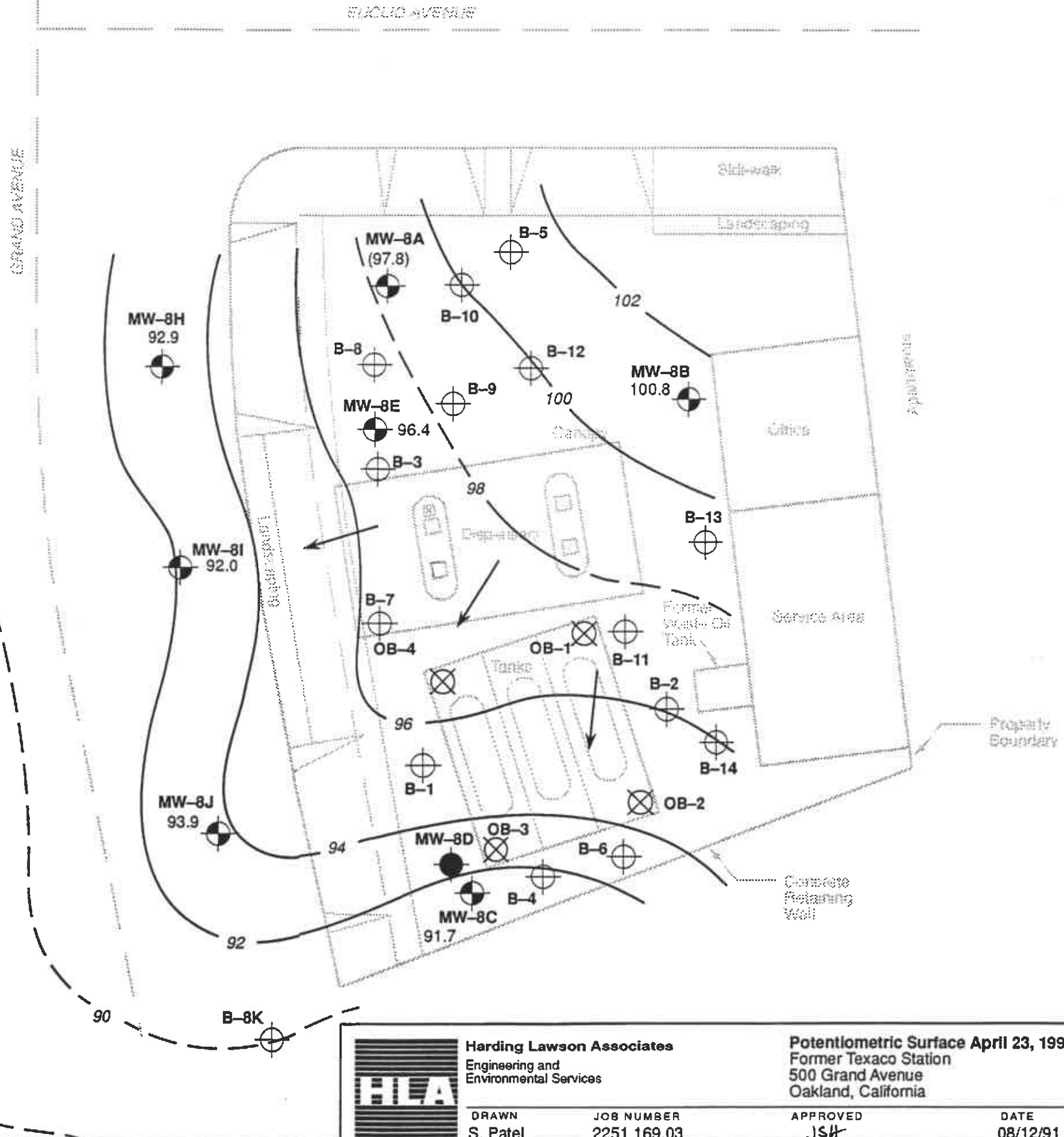
DRAWN: S. Patel
 JOB NUMBER: 2251,114.03

Site Plan
 Former Texaco Station
 500 Grand Avenue
 Oakland, California

APPROVED: JSH
 DATE: 11/09/90
 REVISED DATE:

EXPLANATION

-  Monitoring well
-  Observation well
-  Soil boring
-  Decommissioned monitoring well
-  Ground-water flow direction
-  Bench mark (HLA datum el. = 100 feet)
- 92.9 Water level relative to HLA datum, 4/23/91
- 96 - Contour of potentiometric surface, contour interval 2.0 feet
- (97.8) Suspect data point not used for contouring



Harding Lawson Associates
 Engineering and
 Environmental Services

Potentiometric Surface April 23, 1991
 Former Texaco Station
 500 Grand Avenue
 Oakland, California

PLATE
3

DRAWN S. Patel JOB NUMBER 2251.169.03

APPROVED JSH

DATE 08/12/91

REVISED DATE

EUCLID AVENUE

GRAND AVENUE

EXPLANATION

-  Monitoring Well
-  Observation Well
-  Soil Boring
-  Decommissioned Monitoring Well

← Ground-Water flow direction

⊠ Bench Mark (HLA datum el. = 100 Feet)

(280) TPH as gasoline concentration in ppm in soil

NA Not analyzed

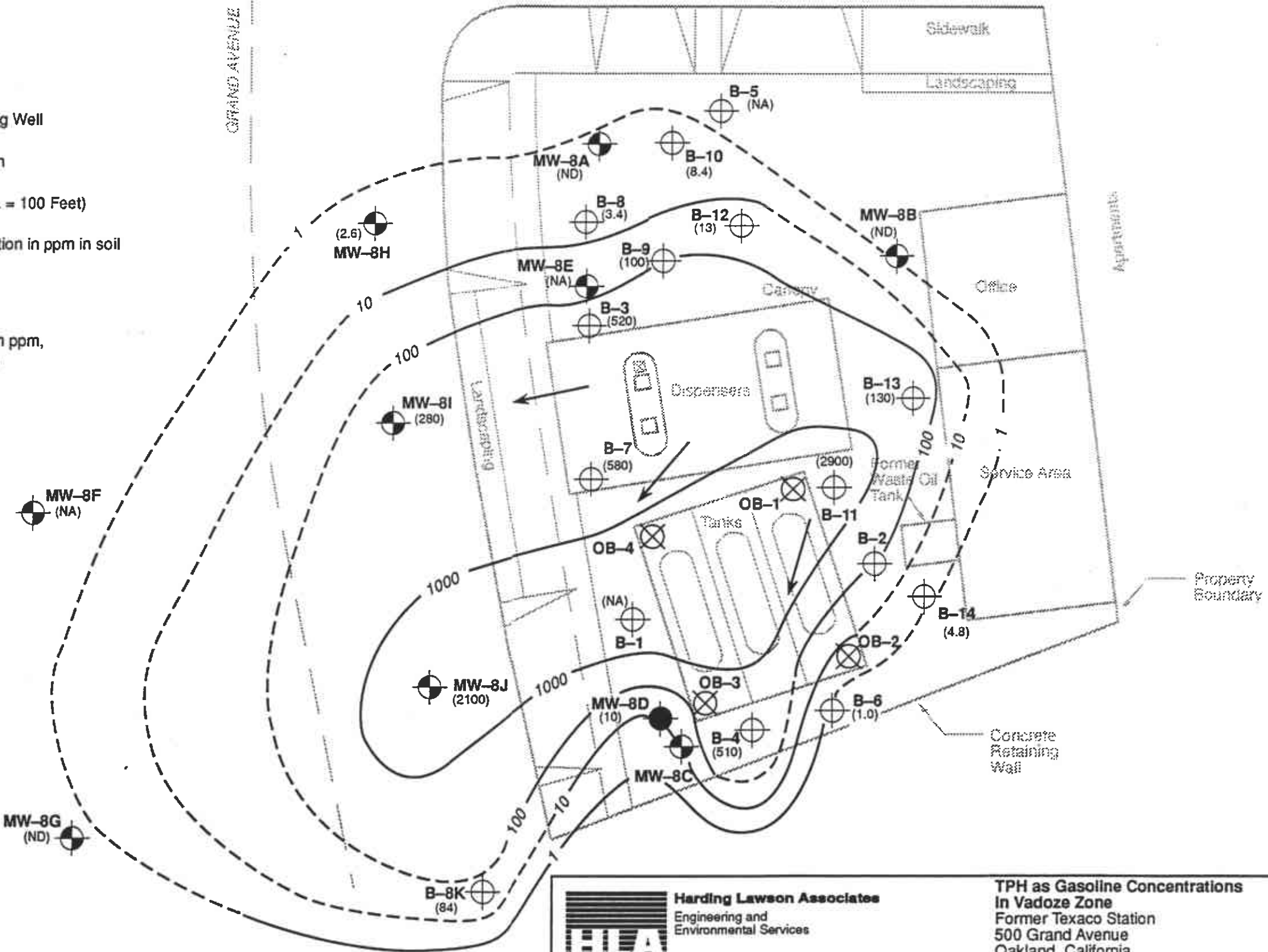
ND Not detectable

— Contour of concentrations in ppm, logarithmic contour interval, dashed where uncertain



0 20 40

SCALE IN FEET



Harding Lawson Associates
Engineering and Environmental Services

DRAWN SP/RHC JOB NUMBER 2251,114.03

**TPH as Gasoline Concentrations
in Vadoze Zone
Former Texaco Station
500 Grand Avenue
Oakland, California**

APPROVED JSH










DATE 11/09/90

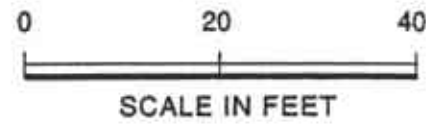
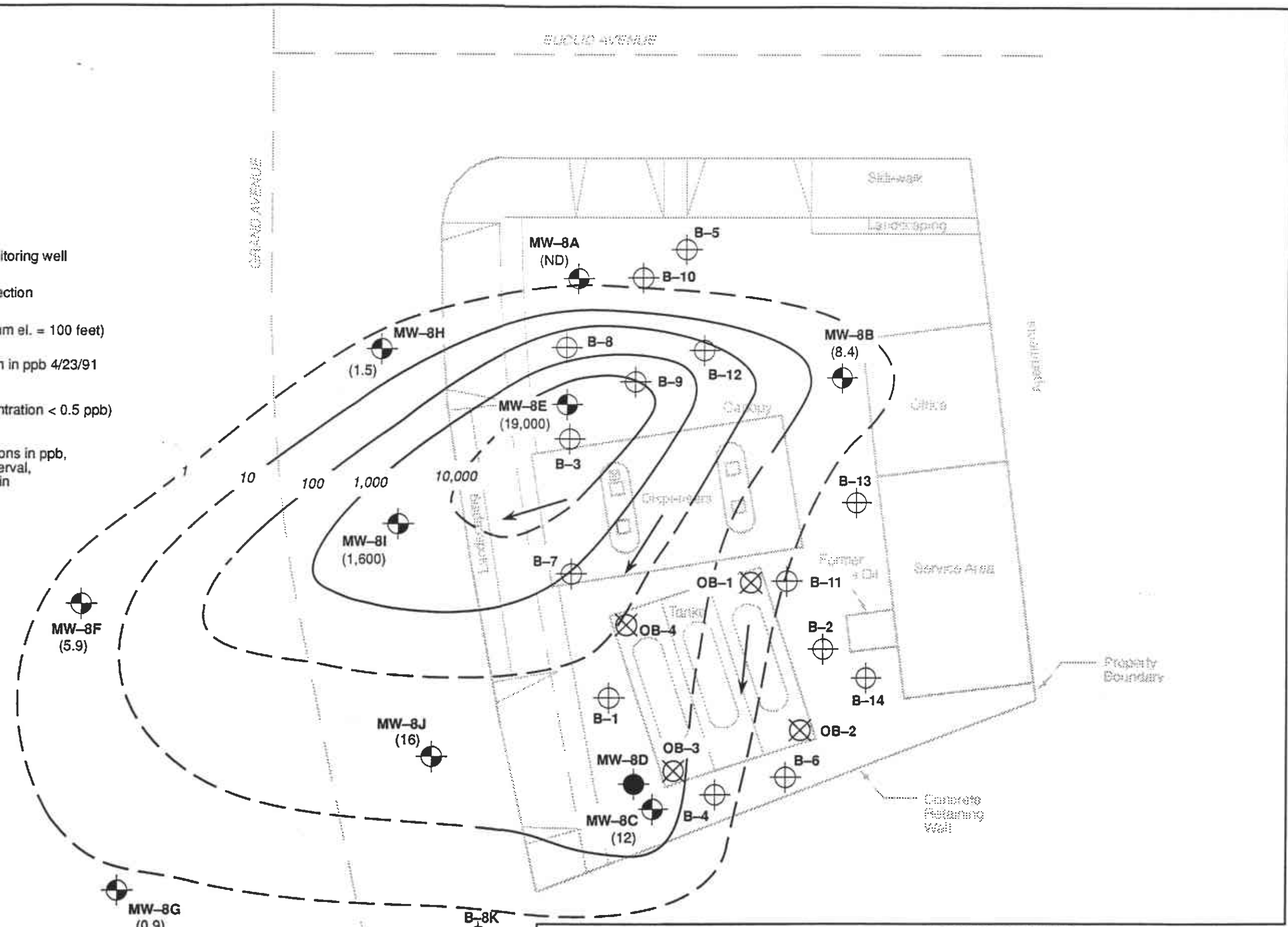
REVISED DATE 5/10/91

PLATE

4

EXPLANATION

-  Monitoring well
-  Observation well
-  Soil boring
-  Decommissioned monitoring well
-  Ground-water flow direction
-  Bench mark (HLA datum el. = 100 feet)
-  (5.9) Benzene concentration in ppb 4/23/91
-  ND Not detectable (concentration < 0.5 ppb)
-  10 Contour of concentrations in ppb, logarithmic contour interval, dashed where uncertain



Harding Lawson Associates
Engineering and
Environmental Services

DRAWN S. Patel
JOB NUMBER 2251,169.03







**Benzene Concentrations
in Groundwater**
Former Texaco Station
500 Grand Avenue
Oakland, California

APPROVED JSH

DATE 08/12/91

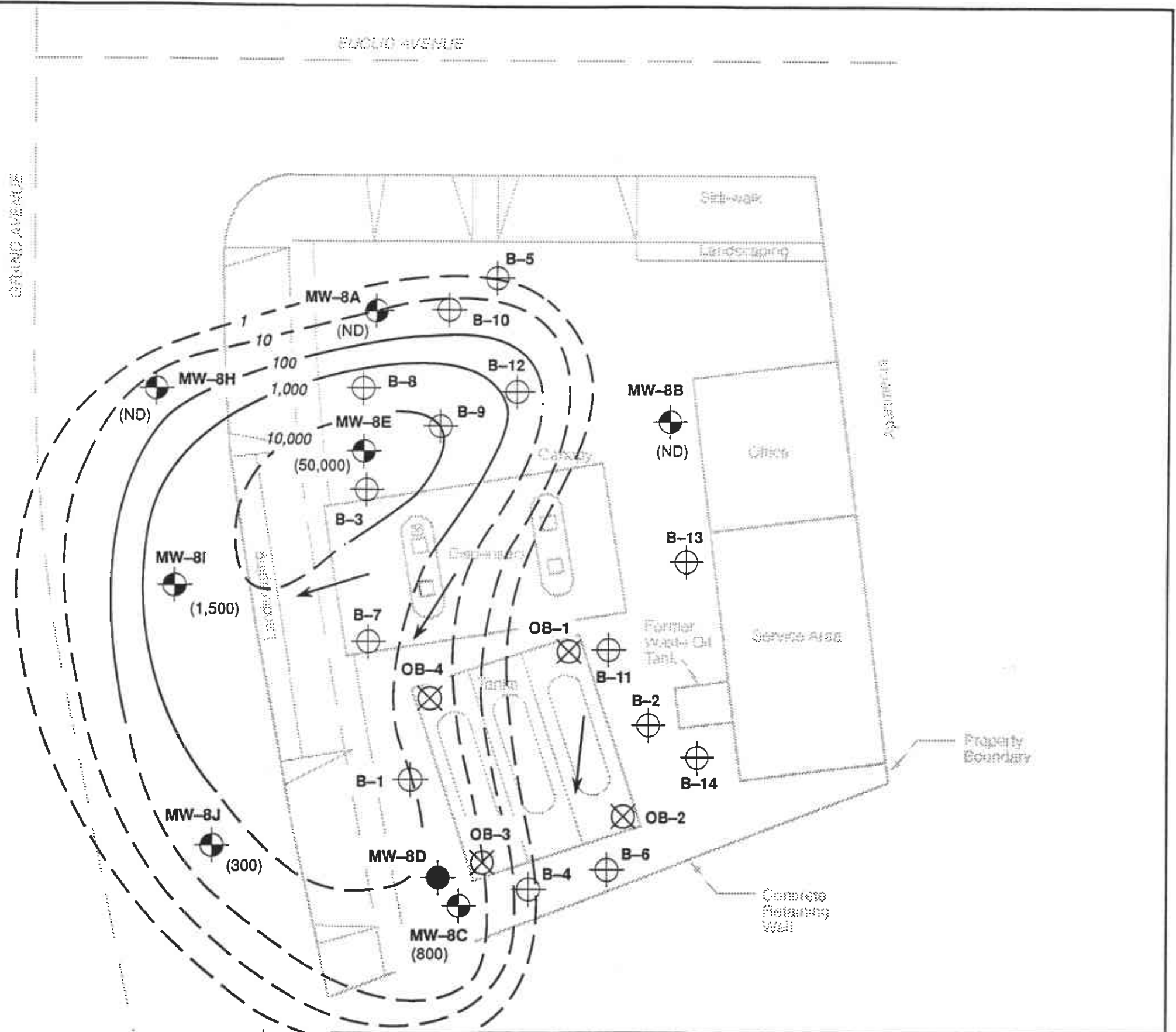
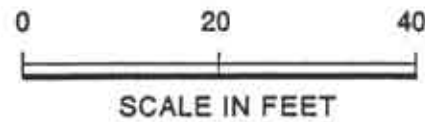
REVISED DATE

EXPLANATION

-  Monitoring well
-  Observation well
-  Soil boring
-  Decommissioned monitoring well
-  Ground-water flow direction
-  Bench mark (HLA datum el. = 100 feet)
- (300)** TPH as gasoline concentration in ppb 4/23/91
- ND** Not detectable (concentration < 50 ppb)
- 10** Contour of concentrations in ppb, logarithmic contour interval, dashed where uncertain

MW-8F
(ND)

MW-8G
(ND)



Harding Lawson Associates
Engineering and
Environmental Services

DRAWN S. Patel
JOB NUMBER 2251,169.03

**TPH as Gasoline Concentrations
in Groundwater
Former Texaco Station
500 Grand Avenue
Oakland, California**

APPROVED
JSH

DATE 08/12/91

REVISED DATE

APPENDIX
LABORATORY RESULTS OF GROUNDWATER ANALYSES



NATIONAL ENVIRONMENTAL TESTING, INC.

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

HARDING ASSOC. JSH MAY 17 1991

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

Date: 05-08-91 NET Client Acct. No: 10.01 NET Pacific Log No: 7156 Received: 04-25-91 0800

REVISED 05-16-91

Client Reference Information

Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

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:

[Signature] Jules Skamarack Laboratory Manager

Enclosure(s)



NET Pacific, Inc.

Client Acct: 10.01
Client Name: Harding Lawson Associates
NET Log No: 7156

Date: 05-08-91
Page: 2

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8A 04-23-91
LAB Job No: (-83397)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	ND	mg/L
METHOD 602				
DILUTION FACTOR *				
DATE ANALYZED				
Benzene		0.5	ND	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L



Client Acct: 10.01
 Client Name: Harding Lawson Associates
 NET Log No: 7156

Date: 05-08-91
 Page: 3

NET Pacific, Inc.

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8B 04-23-91
 LAB Job No: (-83398)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
			1	
DATE ANALYZED				
			05-01-91	
METHOD GC FID/5030				
as Gasoline				
		0.05	ND	mg/L
METHOD 602				
DILUTION FACTOR *				
			1	
DATE ANALYZED				
			05-01-91	
Benzene				
		0.5	8.4	ug/L
Ethylbenzene				
		0.5	ND	ug/L
Toluene				
		0.5	2.5	ug/L
Xylenes, total				
		0.5	5.1	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
			1	
DATE EXTRACTED				
			04-30-91	
DATE ANALYZED				
			05-02-91	
METHOD GC FID/3510				
as Diesel				
		0.05	ND	mg/L
as Motor Oil				
		0.5	ND	mg/L

NET

NET Pacific, Inc.

Client Acct: 10.01
Client Name: Harding Lawson Associates
NET Log No: 7156Date: 05-08-91
Page: 4

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8C 04-23-91
LAB Job No: (-83399)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	0.8	mg/L
METHOD 602				
DILUTION FACTOR *				
DATE ANALYZED				
Benzene		0.5	12	ug/L
Ethylbenzene		0.5	3.7	ug/L
Toluene		0.5	25	ug/L
Xylenes, total		0.5	19	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel		0.05	ND	mg/L
as Motor Oil		0.5	ND	mg/L



NET Pacific, Inc.

Client Acct: 10.01
Client Name: Harding Lawson Associates
NET Log No: 7156

Date: 05-08-91
Page: 5

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8E 04-23-91
LAB Job No: (-83400)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	50	mg/L
METHOD 602				
DILUTION FACTOR *				
DATE ANALYZED				
Benzene		0.5	19,000	ug/L
Ethylbenzene		0.5	750	ug/L
Toluene		0.5	6,100	ug/L
Xylenes, total		0.5	4,100	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel		0.05	4.8	mg/L
as Motor Oil		0.5	ND	mg/L

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis is an unknown hydrocarbon which consists of a singular large peak and lighter hydrocarbons.



NET Pacific, Inc.

Client Acct: 10.01
Client Name: Harding Lawson Associates
NET Log No: 7156

Date: 05-08-91
Page: 6

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8F 04-23-91
LAB Job No: (-83401**)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	ND	mg/L
METHOD 602				
DILUTION FACTOR *				
DATE ANALYZED				
Benzene		0.5	5.9	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	3.1	ug/L
Xylenes, total		0.5	2.7	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel		0.05	1.4	mg/L
as Motor Oil		0.5	3.2	mg/L

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis is an unknown hydrocarbon which consists of a singular large peak.



NET Pacific, Inc.

Client Acct: 10.01
Client Name: Harding Lawson Associates
NET Log No: 7156

Date: 05-08-91
Page: 7

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8G 04-23-91
LAB Job No: (-83402**)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
			1	
DATE ANALYZED				
			05-01-91	
METHOD GC FID/5030				
as Gasoline		0.05	ND	mg/L
METHOD 602				
DILUTION FACTOR *				
			1	
DATE ANALYZED				
			05-01-91	
Benzene		0.5	0.9	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	0.9	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
			5	
DATE EXTRACTED				
			04-30-91	
DATE ANALYZED				
			05-02-91	
METHOD GC FID/3510				
as Diesel		0.05	1.1	mg/L
as Motor Oil		0.5	ND	mg/L

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis is an unknown hydrocarbon which consists of a singular large peak.



Client Acct: 10.01
 Client Name: Harding Lawson Associates
 NET Log No: 7156

Date: 05-08-91
 Page: 8

NET Pacific, Inc.

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8H 04-23-91
 LAB Job No: (-83403**)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	ND	mg/L
METHOD 602				
DILUTION FACTOR *				
DATE ANALYZED				
Benzene		0.5	1.5	ug/L
Ethylbenzene		0.5	ND	ug/L
Toluene		0.5	ND	ug/L
Xylenes, total		0.5	ND	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel		0.05	0.73	mg/L
as Motor Oil		0.5	ND	mg/L

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis is an unknown hydrocarbon which consists of a singular large peak.



NET Pacific, Inc.

Client Acct: 10.01
Client Name: Harding Lawson Associates
NET Log No: 7156

Date: 05-08-91
Page: 9

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8I 04-23-91
LAB Job No: (-83404**)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	1.5	mg/L
METHOD 602				
DILUTION FACTOR *				
DATE ANALYZED				
Benzene		0.5	1,600	ug/L
Ethylbenzene		0.5	100	ug/L
Toluene		0.5	17	ug/L
Xylenes, total		0.5	86	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel		0.05	1.1	mg/L
as Motor Oil		0.5	0.9	mg/L

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis is an unknown hydrocarbon which consists of a singular large peak and lighter hydrocarbons.



NET Pacific, Inc.

Client Acct: 10.01
Client Name: Harding Lawson Associates
NET Log No: 7156

Date: 05-08-91
Page: 10

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

SAMPLE DESCRIPTION: MW-8J 04-23-91
LAB Job No: (-83405**)

Parameter	Method	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS				
VOLATILE (WATER)				
DILUTION FACTOR *				
DATE ANALYZED				
METHOD GC FID/5030				
as Gasoline		0.05	0.3	mg/L
METHOD 602				
DILUTION FACTOR *				
DATE ANALYZED				
Benzene		0.5	16	ug/L
Ethylbenzene		0.5	9.3	ug/L
Toluene		0.5	2.2	ug/L
Xylenes, total		0.5	4.6	ug/L
PETROLEUM HYDROCARBONS				
EXTRACTABLE (WATER)				
DILUTION FACTOR *				
DATE EXTRACTED				
DATE ANALYZED				
METHOD GC FID/3510				
as Diesel		0.05	0.55	mg/L
as Motor Oil		0.5	ND	mg/L

** Note: The positive result for the PETROLEUM HYDROCARBONS as Diesel analysis is an unknown hydrocarbon which consists of a singular large peak.



Client Acct: 10.01
Client Name: Harding Lawson Associates
NET Log No: 7156

Date: 05-08-91
Page: 11

NET Pacific, Inc.

Ref: Texaco, 500 Grand Avenue, Oakland; Job: 2251,081.03

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Diesel	0.05	mg/L	94	ND	94	92	1.1
Motor Oil	0.5	mg/L	91	ND	N/A	N/A	N/A
Gasoline	0.05	mg/L	99	ND	93	99	6.2
Benzene	0.5	ug/L	105	ND	94	129	30
Toluene	0.5	ug/L	116	ND	95	97	2.0
Gasoline	0.05	mg/L	99	ND	98	89	9.6
Benzene	0.5	ug/L	105	ND	92	80	14
Toluene	0.5	ug/L	116	ND	98	89	9.6
Gasoline	0.05	mg/L	97	ND	97	96	1.0
Benzene	0.5	ug/L	94	ND	99	100	1.0
Toluene	0.5	ug/L	107	ND	101	97	2.7

COMMENT: Blank Results were ND on other analytes tested.

NET

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, wet-weight basis (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, $100 \text{ [Value 1 - Value 2]}/\text{mean value}$.
- SNA : Standard not available.
- ug/Kg (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (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, 16th Edition, APHA, 1985.



Harding Lawson Associates

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

CHAIN OF CUSTODY FORM

Lab: NET

Job Number: 2251, 081.03

Samplers: DPM, MAC

Name/Location: Texaco Grand

Project Manager: J. Hudson

Recorder: *[Signature]*
 (Signature Required)

ANALYSIS REQUESTED	
EPA 601/8010	
EPA 602/8020	
EPA 624/8240	
EPA 625/8270	
ICP METALS	
EPA 8015M/TPH	
TPH GAS EX	
TPH DISSEI	

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES	
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	HCl/NOA	Yr	Wk	Seq	Yr	Mo	Dy		Time
23	X	X			3				MW	-8G		11	04	23		500 Grand Ave Newark PA
	X	X			3				MW	-8G						
	X	X			3				MN	-8H						
	X	X			3				MW	-8H						
	X	X			3				MW	-8I						
	X	X			3				MW	-8I						
	X	X			3				MW	-8J						

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

CHAIN OF CUSTODY RECORD			
RELINQUISHED BY: (Signature) <i>[Signature]</i>	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE/TIME 4/24/01 2:16	
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
METHOD OF SHIPMENT			



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

CHAIN OF CUSTODY FORM

Lab: NET

Job Number: 2251,081.03
 Name/Location: Texaco Grand
 Project Manager: J. Hudson

Samplers: DPM, MAC
 Recorder: [Signature]
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres. H ₂ SO ₄	HNO ₃	HC/VOA	Yr	Wk	Seq	Yr	Mo	Dy	Time
ZB	X				3			mW	-8A		7/1	04	23	
	X							mW	-8A					
	X				3			mW	-8B					
	X							mW	-8B					
	X				3			mW	-8C					
	X							mW	-8C					
	X				3			mW	-8E					
	X							mW	-8E					
	X				3			mW	-8F					
	X							mW	-8F					

STATION DESCRIPTION/NOTES
500 Grand Ave
Oakland, CA

ANALYSIS REQUESTED										
EPA 601/8010										
EPA 602/8020										
EPA 624/8240										
EPA 625/8270										
ICP METALS										
EPA 8015M/TPH										
ETEX TPHs										
TPH 1/100										

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

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>[Signature]</u>	RECEIVED BY: (Signature) <u>[Signature]</u>	DATE/TIME <u>4/24/18 2:16</u>
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)
METHOD OF SHIPMENT		

DISTRIBUTION

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

Attention: Mr. R. R. Zielinski

JSH/SJO/pkp 032540P/R48

QUALITY CONTROL REVIEWER


Herb W. Steffe
Project Geologist