



TEXACO REFINING AND MARKETING INC.
100 CUTTING BOULEVARD
RICHMOND CA 94804

June 14, 1989

Ms. Jan Lamer
Alameda County Environmental Health Department
Hazardous Materials Division
470 27th Street, Room 300
Oakland, California 94612

Dear Ms. Lamer,

Transmitted herewith is a copy of the quarterly technical report for the former Texaco Service Station located at 500 Grand Avenue in Oakland, California.

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

Yours very truly,


R.R. ZIELINSKI
Field Environmental
Supervisor

RRZ:kn

Enclosure

cc: Ms. Leslie Ferguson
San Francisco Bay Regional Water Quality Control Board
1111 Jackson Street, Room 6000
Oakland, California 94607

RR

ALAMEDA COUNTY
DEPT. OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS

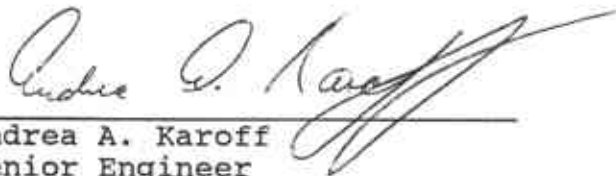
A Report Prepared for


Texaco Refining and Marketing Inc.
100 Cutting Boulevard
Richmond, California 94804

QUARTERLY TECHNICAL REPORT
FIRST QUARTER OF 1989
FORMER TEXACO STATION NO. 6248800235
500 GRAND AVENUE
OAKLAND, CALIFORNIA

HLA Job No. 2251,081.03

by


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May 31, 1989

INTRODUCTION

This quarterly technical report (QTR) presents the results of site investigation activities conducted by Harding Lawson Associates (HLA) at former Texaco service station No. 62488000235, located at 500 Grand Avenue in Oakland, California (Plate 1). HLA's site investigation activities have been ongoing since May, 1988. The following information is presented in the QTR:

- Site description
- Subsurface conditions
- Summary of previous work
- Work performed during the first quarter of 1989
- Discussion of results

SITE DESCRIPTION

The station is located on the northeast corner of Grand and Euclid Avenues in Oakland approximately 200 feet north of Merritt (Plate 1). Immediately north of the station are apartments and single family homes. To the east are commercial buildings. Grand and Euclid Avenues form the southern and western borders respectively. Grand Avenue in the immediate vicinity of the site is generally zoned commercial with the exception of the city park on the south side of Grand bordering Lake Merritt. Euclid Avenue is zoned residential.

The overall topography of the area consists of rolling hills that generally slope towards Lake Merritt. Lake Merritt drains to the southwest into the Oakland Inner Harbor. The site itself is level, having been cut into the natural slope of the land. Site elevation is approximately 20 feet above Mean Sea Level based upon the 1980 photo-revised USGS 7.5 minute Oakland East quadrangle map.

The site (see Plate 2) is an operating service station with two fuel dispensing (pump) islands, three service bays, an office, three 10,000 gallon underground fuel storage tanks and one 500 gallon underground waste oil tank. Both leaded and unleaded gasolines are dispensed at the site. Automotive maintenance and repair activities are also conducted on the site.

SUBSURFACE CONDITIONS

The station is located approximately 1.5 miles east of the Oakland Inner Harbor in the Alameda Bay Plain ground-water basin*. Shallow soils logged during the field investigation generally consisted of 3.5 to 11 feet of stiff black, gray and brown clays and silty clays underlain by a two to four foot layer of moist, stiff, brown clayey sands. The clayey sand layer was underlain by a minimum of four feet of hard, white or brown clay.

Free-flowing ground water was not encountered during the field investigation. The source of the shallow ground water

* California Department of Water Resources, "Ground-Water Basins in California," Bulletin 118-80, 1980.

being monitored appears to be the two to four foot layer of brown clayey sands described above. Static water levels vary from one to seven feet below the surface depending upon the location of the well. Table 1 summarizes water level data collected to date. On the basis of a potentiometric map generated using October 1988 data, the direction of ground-water flow is inferred to be to the south with a gradient of 0.133 feet/foot.

SUMMARY OF PREVIOUS WORK

Preliminary Subsurface Investigation

In June 1988, HLA conducted a preliminary subsurface investigation of the site. This work included drilling five borings; constructing 2-inch-diameter PVC monitoring wells in four of the borings (MW-8A through MW-8D); developing and sampling water from the wells; and analyzing ground-water samples for dissolved benzene, toluene, ethylbenzene and total xylenes (BTEX). Results of the chemical analyses are discussed later in this report.

The total depth of the wells varied between 5 and 25 feet below grade. MW-8A was screened between 10 and 15 feet below grade, MW-8B between 15 and 20 feet and MW-8C between 14 and 24 feet. MW-8D was installed to observe a perched water zone noted during field activities. This well was screened between 1/2 and 5 feet below grade. All wells were screened with 0.02-inch machine slotted PVC screen.

Soil-gas Survey

On September 21 and 28, 1988, a soil-gas survey was conducted on site and in city streets near the site. The survey was conducted by Tracer Research Corporation (Tracer) under HLA's direction and supervision. Soil-gas probes were driven at a ~~total of 16 locations~~. Analysis of the soil-gas samples was conducted on site using a ~~Ventron 5500 gas chromatograph~~ coupled with a Spectra Physics SP4270 computing integrator. The probes, consisting of 7-foot lengths of 3/4-inch-diameter steel pipe fitted with detachable drive points, were hydraulically driven to depths between 2 and 6 feet below grade where soil-gas samples were obtained. Samples were analyzed for the following constituents:

- Total hydrocarbons
- Benzene
- Toluene
- Ethylbenzene
- Total Xylenes

Results of the analyses are summarized in Table 2 and on Plate 3. As shown on Plate 3, measurable concentrations of total hydrocarbons were detected in ~~samples obtained from~~ probe locations 1,2,4,5,12,13,15, and 16. Probes ~~1,9,13,15 and~~ 16 were generally ~~down-gradient of the underground fuel storage tanks~~. Probe ~~13 was down-gradient of the pump islands~~. Probes 4 and 5 were located along the western edge of the property, cross-gradient to either the pump islands or underground storage tanks.

The remaining probes showed no hydrocarbon levels above the analytical detection limits.

In addition to the soil-gas probes, Tracer also performed analyses on ground-water samples obtained from each of the four observation wells (OB) located adjacent to the underground fuel tanks. The results of these analyses (Table 2) indicated the presence of petroleum hydrocarbons dissolved in ground water in the area immediately around the tanks.

On-site Borings

In October 1988, HLA drilled four shallow soil borings (B-1 through B-4). B-1, B-2 and B-4 were located in the vicinity of the underground fuel tanks (Plate 2) to evaluate concentrations of gasoline hydrocarbons in the vadose (unsaturated) zone. B-1 and B-4 were drilled and sampled to a depth of approximately 16 feet. B-2 was only drilled to a depth of 8 feet. B-3 was located southwest (downgradient) of the pump islands and their associated piping. The depth of this boring was 16.5 feet. A fifth boring located 5 feet west of B-3 was drilled to a depth of 20 feet. MW-8E, a 4-inch-diameter Schedule 80 PVC ground-water monitoring well, was constructed in this boring.

During drilling, soil samples were collected and screened with a photoionization detector (PID) for the presence of certain organic vapors. Samples with the highest PID readings were sealed and preserved for chemical analyses. Ground water was encountered at 3 feet in B-2. Driven soil samples were not collected shallower than 3 feet. Therefore, no samples from B-2

were submitted for chemical analysis. Following development of MW-8E, a ground-water sample was obtained with a clean stainless steel bailer and preserved in volatile organic analysis (VOA) vials for chemical testing. MW-8A, MW-8B and MW-8C were also resampled at this time. A water sample could not be obtained from [REDACTED] water.

All samples were transported under chain-of-custody procedures to Chem West Analytical Laboratories, Inc. (Chem West) in Sacramento. Soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline and for BTEX (Table 3); water samples were tested for BTEX content (Table 4).

WORK PERFORMED DURING THE FIRST QUARTER OF 1989

On-site Soil Borings

During March 1989, one additional shallow boring was drilled to evaluate the area along the western boundary of the property. This area had previously been identified in the soil-gas survey as having a detectable concentration of total hydrocarbons. Soil samples were screened for the presence of volatile organics in the field during drilling using a photoionization detector. Soil samples with the highest readings were preserved and transported to Chem West for determination of TPH as gasoline and BTEX concentrations (Table 3).

On-site Monitoring Wells

MW-8D was abandoned in March 1989 in accordance with a permit from the Alameda County Flood Control and Water Conservation District, Zone 7. The well had originally been installed to monitor a perched water zone observed during the preliminary subsurface investigation. This perched zone produced so little water that MW-8D could not be properly developed or sampled. Accordingly, the casing was removed and the remaining borehole grouted to its full depth.

Off-site Monitoring Wells

To evaluate the lateral extent of dissolved fuel hydrocarbons in the shallow ground water, HLA constructed two off-site monitoring wells (4-inch-diameter Schedule 80 PVC) in March 1989. The locations of off-site wells MW-8F and MW-8G are shown on Plate 2. Both wells are approximately 15 feet deep. MW-8F is screened between 9 and 15 feet. MW-8G is screened between 5 and 15 feet. Upon completion of construction activities, both wells were developed and sampled. Soil and ground-water samples were transported under chain-of-custody to Chem West Laboratory for chemical analysis. Soil samples were analyzed for BTEX and TPH as gasoline (Table 3), while water samples were analyzed for BTEX (Table 4).

DISCUSSION OF RESULTS

Results of analyses on soil samples from B-1, B-3, B-4, and MW-8D indicate the presence of gasoline hydrocarbons in vadose zone soils between depths of 1 and 7 feet. In the immediate vicinity of the underground tanks, concentrations of TPH as gasoline varied from 10 to 510 mg/kg in soil samples collected from B-1, B-4 and MW-8D. Downgradient of the pump islands, TPH concentrations in the sample from B-3 was 520 mg/kg. No detectable concentrations of gasoline hydrocarbons were found in the soil sample from B-5, MW-8F or MW-8G.

We believe that gasoline hydrocarbons on site have spread from one or both sources mentioned below. Because the water table surface under the site varies between 1 and 7.5 feet, the gasoline hydrocarbons have migrated in the vadose soils largely through the combination of a fluctuating water table surface and capillary action.

Results of analyses performed on ground-water samples indicate that there may be two possible sources of gasoline hydrocarbons on the site. The first source may be associated with the underground fuel storage tanks. As discussed earlier, concentrations of BTEX and total hydrocarbons were detected in water samples obtained from the observation wells by Tracer and analyzed during the soil-gas survey performed in October 1988. The water sample obtained from MW-8C within that same time period, however, had no detectable concentrations of BTEX.

A second source of gasoline hydrocarbons may be the pump [REDACTED]. In October 1988, analysis of the ground-water sample obtained from MW-8E showed concentrations of BTEX. Because this area is cross-gradient of the underground tanks, the most likely source would be the pump islands and their associated piping.

Neither MW-8F nor MW-8G, the two downgradient off-site wells, had water with detectable concentrations of BTEX.

Table 1. Summary of Water Level Data

<u>Well</u>	<u>Top of Casing Elevation* (feet)</u>	<u>Depth to Ground Water (feet)</u>	
		<u>07/14/88</u>	<u>10/21/88</u>
MW-8A	99.72	2.92	3.32
MW-8B	101.11	1.91	1.04
MW-8C	98.41	7.43	7.46
MW-8E	99.38	--	5.02

* HLA datum

Table 2. Summary of Soil-gas Analyses
 (Concentrations [REDACTED] → ug/l *rep. for TRACER Report*
Setuago

Sample	Depth (ft)	Date	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Hydrocarbons
SG-01	3	09/21	<0.8	<0.8	<0.9	<0.9	<0.8
SG-01	6	09/21	0.4	0.4	<0.2	0.4	2
SG-02	3	09/21	320	280	120	23	1,400
SG-04	4	09/21	86,000	40,000	26,000	3,300	360,000
SG-05	2	09/21	42,000	8,600	86	86	54,000
SG-06	4	09/21	<0.8	<0.8	<0.9	<0.9	<0.8
SG-08	5	09/28	<0.4	<0.4	<0.5	<0.4	<0.4
SG-09	4	09/28	<0.4	<0.4	<0.5	<0.4	<0.4
SG-10	4	09/28	<0.4	<0.4	<0.5	<0.4	<0.4
SG-11	3.5	09/28	<0.4	<0.4	<0.5	<0.4	<0.4
SG-12	4	09/28	38,000	16,000	180	170	250,000
SG-13	3	09/28	<0.4	<0.4	<0.5	<0.4	<0.4
SG-14	4	09/28	<0.4	<0.4	<0.5	<0.4	<0.4
SG-15	3	09/28	300,000	90,000	27,000	22,000	1,400,000
SG-16	4	09/28	120	63	14	14	420
SG-17	4	09/28	<0.4	<0.4	<0.5	<0.4	<0.4
SG-18	4	09/28	<8	<7	<9	<9	<8
OB-1		09/21	7,700	1,400	260	<9	14,000
OB-2		09/21	5,600	320	180	<9	5,800
OB-3		09/21	5,600	3,000	120	<9	32,000
OB-4		09/21	3,600	780	61	<9	5,400

SG - Soil gas sample

OB - Observation well sample

Table 3. Results of Chemical Tests on Soil Samples
(reported as mg/kg [ppm])

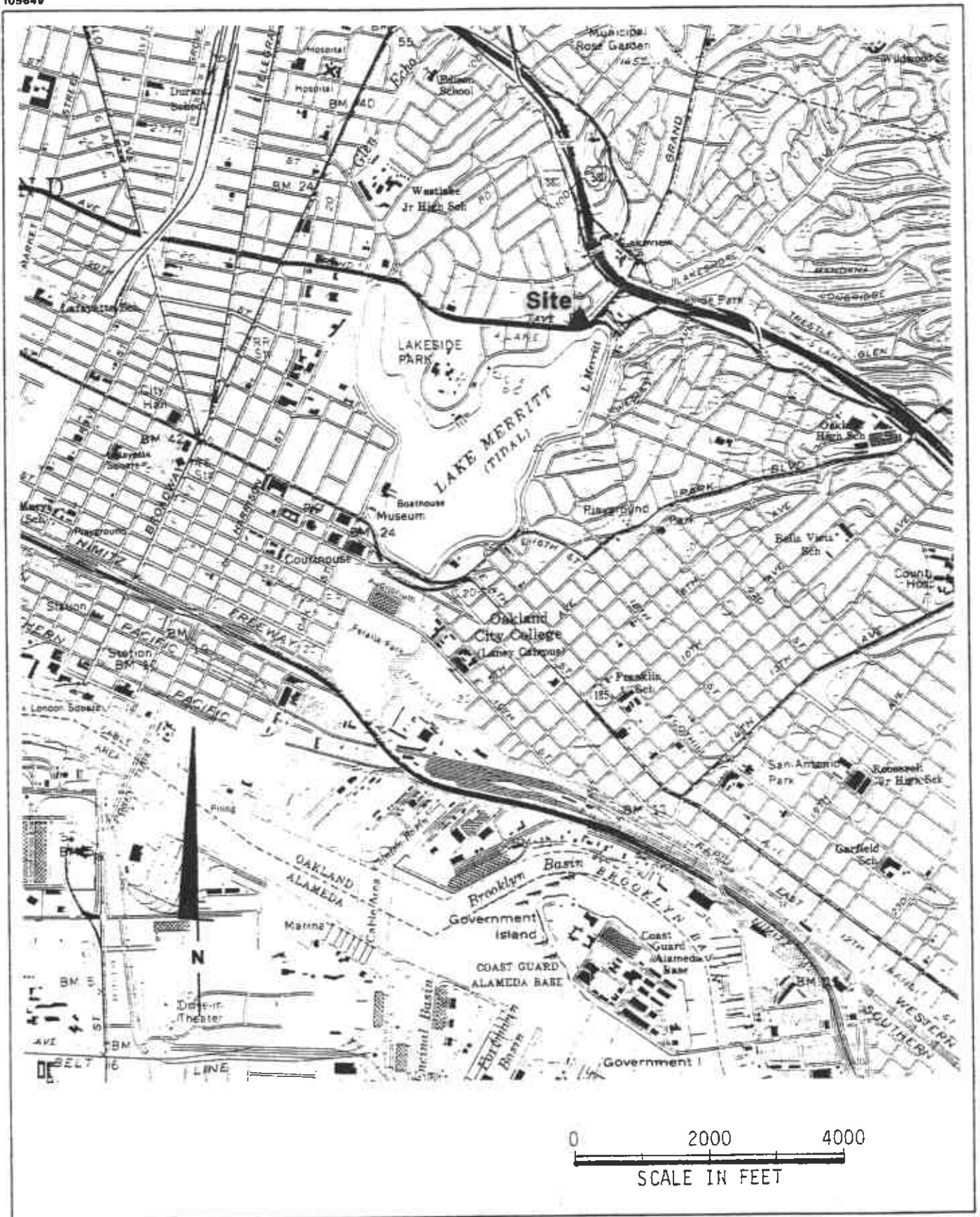
<u>Boring/ Well Number</u>	<u>Depth (feet)</u>	<u>TPH (gasoline)</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl- benzene</u>	<u>Xylenes</u>
B-1	6.5	12	<0.05	<0.1	<0.2	<0.1
B-3	4.0	520	<1	<2	<4	5
B-4	3.5	510	<0.5	1	3.5	13
B-5	5.5	<10	<0.05	<0.1	<0.2	<0.1
B-5	10.5	<10	<0.05	<0.1	<0.2	<0.1
B-5	16	<10	<0.05	<0.1	<0.2	<0.1
MW-8D	1.3	10	<0.05	0.40	<0.20	0.50
MW-8E	5.5	750	0.82	6.5	5.5	26
MW-8F	11	<10	<0.5	<0.1	<0.2	<0.1
MW-8G	6	<10	<0.5	<0.1	<0.2	<0.1

Table 4. Results of Chemical Tests on Ground-water Samples
(reported as ug/L [ppb])

<u>Monitoring Well</u>	<u>Date Sampled</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl-benzene</u>	<u>Xylenes</u>
8-A	06/14/88	<0.5	<2	1.5	6.6
	10/28/88	<0.5	<1	<2	<1
8-B	06/14/88	<0.5	<2	<1	<1
	10/21/88	<0.5	<1	<2	3.1
8-C	06/14/88	5.3	2.6	3.5	13
	10/21/88	<0.5	<1	<2	<1
8-E	10/25/88	1,400	510	2.9	420
8-F	04/14/89	<0.5	<1	<2	<1
8-G	04/14/89	<0.5	<1	<2	<1

LIST OF ILLUSTRATIONS

Plate	1	Vicinity Map
Plate	2	Site Plan
Plate	3	Distribution of Total Hydrocarbons in the Vadose Zone



Harding Lawson Associates
Engineers and Geoscientists

Vicinity Map

Former Texaco Service Station
500 Grand Avenue
Oakland, California

PLATE

1

DRAWN
YC

JOB NUMBER
2251,081.03

APPROVED
AK

DATE
5/89

REVISED

DATE

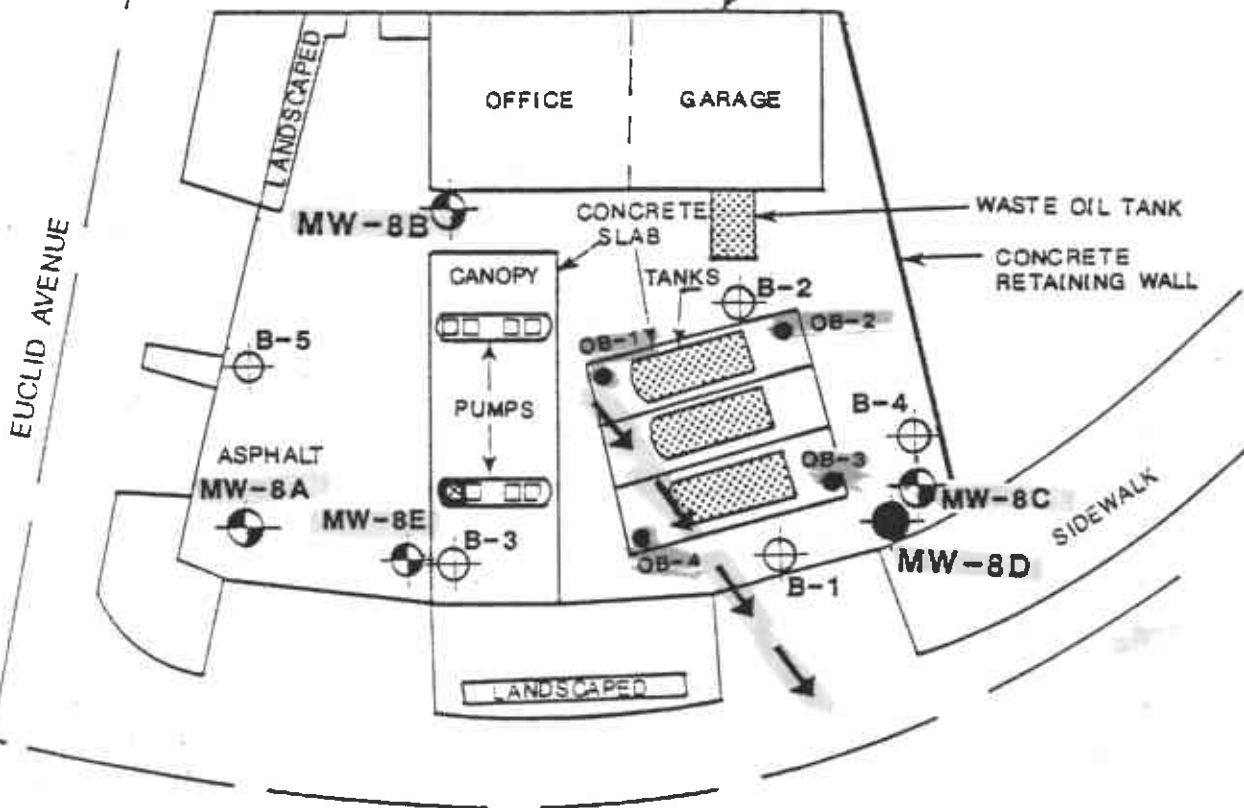
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SCALE IN FEET

N

APARTMENTS

PROPERTY BOUNDARY



LEGEND



Monitoring Well



Observation Well



Ground-water Flow Direction



Boring Well



Abandoned Monitoring Well



Bench Mark (HLA Datum El.=100 feet)

GRAND AVENUE

MW-8F

MW-8G



Harding Lawson Associates
Engineers and Geoscientists

Site Plan
Former Texaco Service Station
500 Grand Avenue
Oakland, California

PLATE

2

DRAWN
YC

JOB NUMBER
2251,081.03

APPROVED
AK

DATE
5/89

REVISED

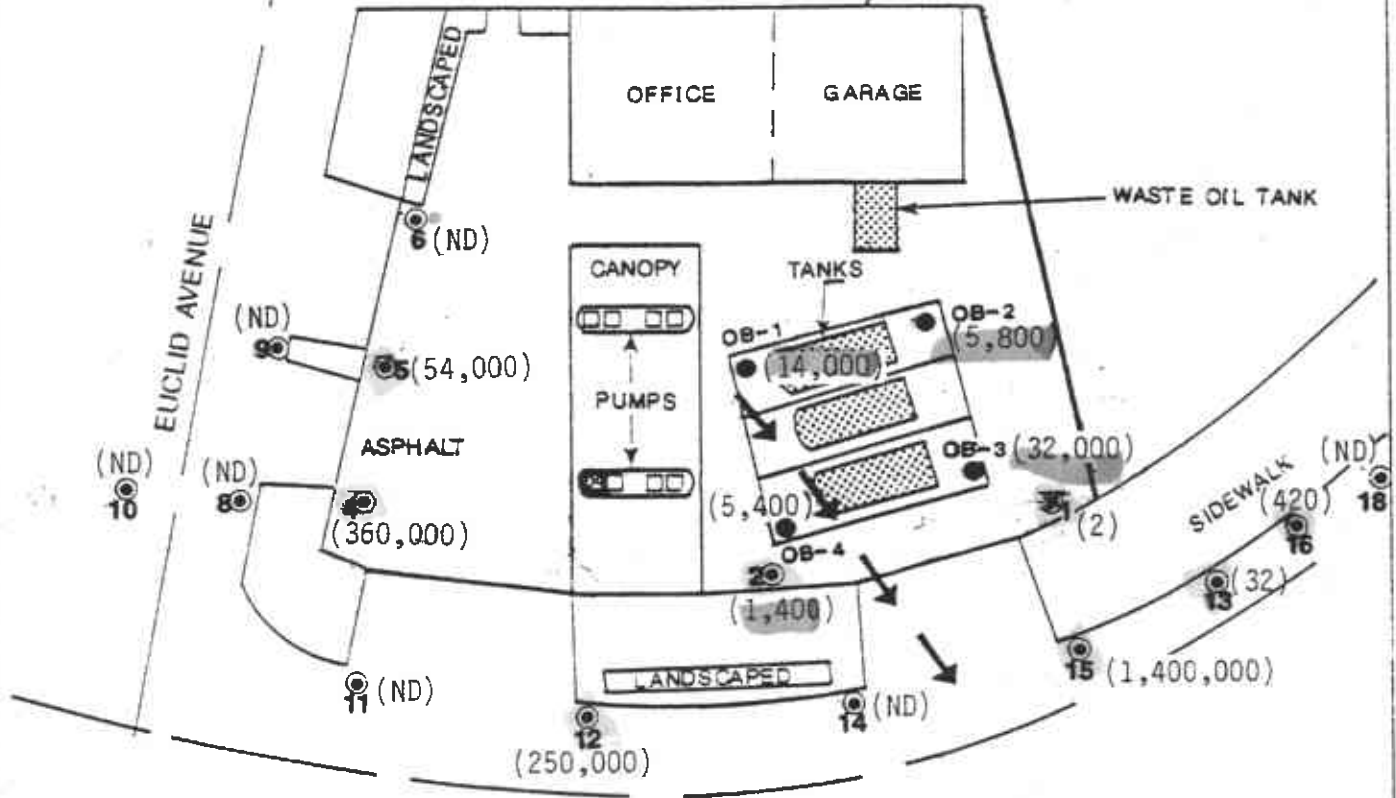
DATE

0 30
SCALE IN FEET

N

APARTMENTS

PROPERTY BOUNDARY



LEGEND

OB-1 ● Observation Well and Number

← Ground-water Flow Direction

●12 Soil-gas Probe Location and Number
(250,000) (total hydrocarbon concentration ug/l)

GRAND AVENUE

(ND)
17 ●



Harding Lawson Associates
Engineers and Geoscientists

**Distribution of Total Hydrocarbons
In Vadose Zone**

500 Grand Avenue
Oakland, California

PLATE
3

DRAWN
YC

JOB NUMBER
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DATE
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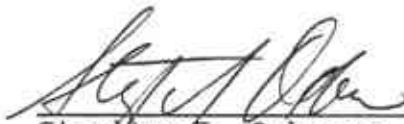
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Attention: Mr. R.R. Zielinski

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QUALITY CONTROL REVIEWER



Stephen J. Osborne
Civil Engineer