BP OIL

BP Oil Company
2868 Prospect Park Drive, Suite 360
Rancho Cordova, California 95670-6020
(916) 631-0733

April 29, 1991

Ms. Susan Hugo
Alameda County Environmental Health Services
80 Swan Way, Suite 200
Oakland, CA 94621

RE: BP OIL FACILITY #11127
5425 MARTIN LUTHER KING, JR. WAY
OAKLAND, CALIFORNIA

Dear Ms. Hugo,

Attached is the Subsurface Investigation Report prepared by Weiss Associates for the above referenced site.

Impacted soil was not encountered in any of five soil samples collected during the investigation.

Slightly elevated concentrations of contaminants were found in water samples from MW-1 and MW-2.

Due to the low levels encountered we have initiated a program to monitor the ground water at this site. (See attached recommendations by Weiss Associates.)

Please call me at 916/631-6919 if you have questions regarding this submission.

Respectfully,

Peter J. DeSantis
Environmental Resource Management

PJD:lk

cc: Lester Feldman - Regional Water Quality Control Board
D. Noe - Mobil Oil Corporation
J. Rocco - BP Oil, Cleveland
Site File

WEISS ASSOCIATES

SUBSURFACE INVESTIGATION

at

BP Service Station #11127
5425 Martin Luther King, Jr. Way
Oakland, California

prepared by

Weiss Associates
5500 Shellmound Street
Emeryville, California 94608

John W. Duey
Staff Geologist

Weiss Associates' work at BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California was conducted under my supervision. To the best of my knowledge, the data contained herein are true and accurate and satisfy the specified scope of work for this project.

REGISTERED GEOLOGIST
JOSEPH P. THEISEN
No. 4981
STATE OF CALIFORNIA

2/28/91

Joseph P. Theisen — Date
Senior Project Hydrogeologist
Registered Geologist No. 4981

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WEISS ASSOCIATES
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5500 Shellmound Street, Emeryville, CA 94608

SUBSURFACE INVESTIGATION

at

BP Service Station #11127
5425 Martin Luther King, Jr. Way
Oakland, California

prepared for

BP Oil Company
2868 Prospect Park Drive, Suite 360
Rancho Cordova, California 95670-6020
WA Job #22-499-00

February 28, 1991

SUMMARY

On October 18, 1990, Weiss Associates (WA) drilled two soil borings and installed ground water monitoring wells in the borings for a subsurface investigation at BP Service Station #11127 in Oakland, California. The borings were each drilled to a depth of approximately 32 ft. No hydrocarbons or other organic compounds were detected in any of five soil samples from the borings. Ground water was first encountered at 11 to 13 ft below grade, and stabilized at about 11 ft below grade in both borings.

The soil borings were completed as ground water monitoring wells MW-1 and MW-2. Shallow ground water at the BP site flows northwestward, according to data from these two wells and two wells installed immediately adjacent to the BP site for an investigation at an adjacent Chevron service station. A water sample from well MW-1, installed in boring BH-B, contained benzene at 2 ppb, slightly above the California Department of Health Services Maximum Contaminant Level (DHS MCL) for drinking water. No other organic compounds were detected in this well. Total petroleum hydrocarbons as gasoline (TPH-G) at 88 ppb and TPH as diesel (TPH-D) at 170 ppb were detected in water samples from well MW-2, adjacent to the underground waste oil tank. 1,2-Dichloroethane (1,2-DCA) was detected at 2 ppb in this well, slightly above the DHS MCL for drinking water.

A well survey identified six water wells within one-quarter mile of the BP station, all of which are ground water monitoring wells located on or adjacent to the Chevron service station north of the BP site. A ground water monitoring report prepared for the Chevron station indicates that shallow ground water flowed south-southwestward at the Chevron station in March 1990. The Chevron station and a former auto repair shop northeast of the site are possible sources of organic compounds in ground water in the site vicinity.

1 INTRODUCTION

This report presents the results of a subsurface investigation conducted by Weiss Associates (WA) at BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California (Figure 1). The objective of the investigation was to determine whether hydrocarbons are in ground water or soil beneath the site.

1.1 SCOPE OF WORK

The scope of work for the investigation was to:

- Prepare a site-specific health and safety plan;
- Research the site history and hydrogeologic setting;
- Survey adjacent properties and businesses and the location and use of water wells in the site vicinity;
- Locate underground utilities in the site vicinity, and survey utility vaults with a portable photoionization detector (PID) and a combustible gas meter (CGM);
- Drill two soil borings and collect soil samples for subsurface hydrogeologic description, and possible chemical analysis;
- Analyze selected soil samples for total petroleum hydrocarbons as gasoline (TPH-G), and for benzene, ethylbenzene, toluene and xylenes (BETX). In addition, analyze soil samples collected near the underground waste oil tank for TPH as diesel (TPH-D), total oil and grease (TOG), and halogenated volatile organic compounds (HVOCs). ;
- Complete the borings as 4-inch diameter ground water monitoring wells;
- Develop the wells, collect ground water samples and analyze them for TPH-G and BETX. In addition, analyze water samples collected near the underground waste oil tank for TPH-D, TOG and HVOCs;
- Survey the top-of-casing elevations of the wells referenced to mean sea level (msl), and with data from nearby offsite wells, determine the ground water gradient; and
- Report the results.

This report describes each of these tasks and presents the results of the investigation.

1.2 BACKGROUND

BP Service Station #11127 is located at the intersection of Martin Luther King, Jr. Way and 55th Street in Oakland, California (Figure 1). BP Oil Company acquired the service station from Mobil Oil Corporation on May 1, 1989. The station currently dispenses regular leaded, unleaded and super unleaded gasoline from three underground storage tanks located immediately north of the station building. An underground waste oil tank is located on the south side of the site immediately east of the station building.

On September 11, 1990, BP Oil Company reported an underground storage tank unauthorized release to the Alameda County Health Care Services Agency (ACHCS) (BP, 1990). The report indicates that there were two unauthorized releases at the site, both while it was operating as a Mobil service station. In 1986, waste oil was apparently released, and in 1987, an unknown substance was apparently released, according to reports supplied by Mobil Oil. In August 1990, the ACHCS requested that BP Oil complete a preliminary site assessment to determine the extent of the released compounds in soil and ground water beneath the site (ACHCS, 1990).

1.3 AREA PROPERTY AND BUSINESS SURVEY

Land uses in the area are commercial and residential, as shown on Figure 2. A Chevron service station with a documented hydrocarbon release to the subsurface is at the northwest corner of the Martin Luther King, Jr. Way/55th Street intersection, about 80 ft north of the BP site. A former body shop is about 300 ft northeast of the BP site on Martin Luther King, Jr. Way. No other properties that may contain underground storage tanks were identified within about 500 ft of the BP station.

1.4 AREA WELL SURVEY

WA conducted an area well survey to locate and identify water wells in the site vicinity. WA examined records of the following agencies to obtain the information:

- California Department of Water Resources, Central District office in Sacramento, (DWR),
- Alameda County Flood Control and Water Conservation District - Zone 7 in Pleasanton (Zone 7), and
- California Regional Water Quality Control Board - San Francisco Bay Region in Oakland (RWQCB)

In addition, WA interviewed personnel from Geraghty and Miller, Inc., the consulting firm conducting the subsurface investigation at the adjacent Chevron service station.

Four ground water monitoring wells are presently located at the Chevron service station north of the BP station. Two ground water monitoring wells in 55th Street adjacent to the BP site were also installed for the Chevron investigation. According to the DWR and Zone 7 records, no other ground water wells are within one-quarter mile of the BP station. The Chevron well locations are shown on Figure 3.

1.5 GEOGRAPHIC AND HYDROGEOLOGIC SETTING

BP Service Station #11127 lies about 85 ft above msl, on an alluvial plain gently sloping toward San Francisco Bay, 1.5 miles southwest of the site. the north-northwest trending Berkeley Hills are about 1.25 miles east of the BP station. Surface water drainage in the site vicinity is controlled by municipal storm drains.

Quaternary alluvial deposits of the Temescal Formation underlie the site. The alluvium consists of interbedded clayey gravel, sandy silt and various sand-silt-clay mixtures. The Temescal is about 25 ft thick in the site vicinity, and is underlain by silty or sandy clay of the Quaternary Alameda Formation (Radbruch, 1957). Three soil borings drilled in 1983, to 21 ft below grade at the adjacent Chevron station, were reportedly logged as clay or silty clay from

the surface to the total boring depths (G&M, 1990). The site lies about 1.25 miles west of the active, northwest-trending right-lateral Hayward Fault Zone of the San Andreas Fault System.

The soils encountered in shallow borings at the adjacent Chevron station are logged as low-permeability clays. However, the Temescal Formation alluvium is generally of moderate permeability, while the underlying Alameda Formation clay is generally low permeability (Radbruch, 1957). On March 25, 1990, the ground water gradient was estimated to be south-southwestward at the Chevron station. Ground water elevations were about 72 ft above msl at that time, and were at about the same elevation in December 1983 (G&M, 1990).

Analytic results for water samples from the Chevron monitoring wells indicate hydrocarbons are in ground water below the Chevron facility. A sample collected from well CHMW-1 on March 12, 1990 contained 50,000 ppb of TPH-G and 3,000 ppb of benzene. The hydrocarbons are probably from a confirmed hydrocarbon release at the Chevron station (G&M, 1990).

1.6 UNDERGROUND UTILITY SURVEY

On November 1, 1990, WA personnel surveyed all accessible utility vaults and maintenance holes in the site vicinity for combustible gases and organic vapors. Some maintenance holes in the roadways were inaccessible due to traffic. However, WA was able to sample six utility vaults under the sidewalks paralleling Martin Luther King, Jr. Way and 55th Street immediately north and east of the site.

A CGM was used to measure combustible gases in the utilities as a percent of the lower explosive limit (LEL). A PID was used to measure organic vapors in parts per million by volume (ppmv). Figure 3 shows the approximate locations of the utility vaults that were surveyed. No organic vapors above ambient concentrations or combustible gases were detected in any of the vaults.

2 SUBSURFACE INVESTIGATION

On October 18, 1990, Soils Exploration Services of Vacaville, California drilled soil borings BH-A and BH-B (Figure 3), using a CME 55 hollow-stem auger drill rig, and installed monitoring wells MW-1 and MW-2 in these borings. The drilling was directed by WA geologist Robert Kitay, under the supervision of Joseph P. Theisen, Registered Geologist. Zone 7 issued Ground Water Protection Ordinance Permit No. 90625 for the investigation.

The objective of the drilling and well installation was to determine whether hydrocarbons or other compounds are in soil or ground water beneath the BP site, and to determine the ground water flow direction and gradient at the site. Only two wells were installed for this investigation, since two wells in 55th street installed for the Chevron investigation were used to determine the ground water flow direction.

Prior to performing any field work, WA prepared a site safety plan that addressed all potential hazards related to the field activities, and outlined preventive measures and procedures to protect site workers.

2.1 SOIL BORINGS

The monitoring wells were drilled and installed to determine soil and ground water quality and the ground water gradient at the site. Based on the south-southwestward ground water flow direction at the Chevron site, and on the Underground Storage Tank Unauthorized Release Report completed by BP, borings BH-A and BH-B were located immediately southwest of the underground fuel storage tanks and the underground waste oil tank, respectively, downgradient of these potential hydrocarbon sources.

Soil samples were collected at least every 5 ft for hydrogeologic description and possible chemical analysis. Samples were collected with a split-barrel sampler lined with steam-cleaned brass tubes. Drilling equipment was steam-cleaned prior to use and sampling equipment was washed with Alconox detergent and rinsed between samples to prevent cross-contamination. Upon removal from the sampler, one sample tube was immediately sealed with aluminum foil, plastic caps and duct tape, and labeled and refrigerated for delivery under chain of custody

to Superior Analytical Laboratories (SAL) of San Francisco and Martinez, a State-certified laboratory. Boring logs are presented in Appendix A. Copies of the chain of custody documents are included in Appendix B.

Soil borings BH-A and BH-B penetrated about 32 ft below grade. Generally, interbedded silt, sand and gravel of moderate to very high estimated permeability were encountered in each boring to about 28 ft depth. A low-permeability clayey silt was encountered in boring BH-A from about 9 ft below grade to about 18 ft below grade. A very low permeability clay at least four ft thick was encountered from about 28 ft below grade, and the borings were terminated in this clay layer. The bottom of the boring was backfilled with bentonite pellets to the upper clay contact, to preserve the integrity of the clay.

2.2 ANALYTIC RESULTS FOR SOIL

Soil samples were surveyed in the field with a PID to qualitatively determine whether volatile hydrocarbons were present. The PID is used for qualitative assessment only, because the correlation between the volume measurement of the PID and mass measurement of an analytical test is not well defined, and because field measurement procedures are less precise than laboratory procedures. PID readings are shown on the boring logs in Appendix A.

Based on field observations and the PID measurements, five soil samples were selected for chemical analysis. All samples were analyzed for TPH-G by Modified EPA Method 8015, gas chromatography (GC) with flame ionization detection (FID), and for BETX by EPA Method 8020, GC with photoionization detection (PID). In addition, the two soil samples from boring BH-B were analyzed for TPH-D by EPA Method 8015, GC/FID with solvent extraction, for TOG by American Public Health Association (APHA) Standard Method 5520F, gravimetry, and for HVOCs by EPA Method 8010, GC with halide-specific detection (HSD). No organic compounds were detected in any of the five soil samples. Analytic results for soil are presented in Table 1, and the analytic reports are included in Appendix B.

2.3 WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Since standing ground water was measured in the borings at about 11 to 13 ft below grade while drilling, borings BH-A and BH-B were completed as ground water monitoring wells MW-1 and MW-2, respectively. Well MW-1 was screened from the top of the clay layer at 28 ft depth, up to the base of the clayey silt at 18 ft depth. Well MW-2 was screened from just above the clay at 27 ft depth, up to 7 ft depth, 4 ft into the unsaturated zone. The well MW-1 screen did not extend into the unsaturated zone to avoid compromising the integrity of the low-permeability silt layer from 9 ft to 18 ft depth.

The monitoring wells were constructed with 4-inch diameter, 0.020-inch slotted, flush-threaded PVC well screen and blank casing. Number 3 Monterey sand was placed between the casing and borehole wall, from the bottom of the well to about 2 ft above the well screen. Approximately 2 ft of bentonite pellets separate the sand pack from a sanitary surface seal of Portland cement with 5 percent bentonite powder in each well. Both wells were completed at grade with traffic-rated watertight vaults.

On October 23, 1990, WA environmental technician Robert Hoffman developed monitoring wells MW-1 and MW-2 using airlift evacuation and surge block agitation. The estimated yield for well MW-1 during airlift evacuation was less than 0.4 gallons per minute (gpm). About 30 gallons of ground water were evacuated from well MW-1 during development. The estimated yield for well MW-2 was about 3 gpm, and about 115 gallons of ground water was evacuated.

Ground water samples were collected from both wells on October 24, 1990. Ground water was purged from the wells prior to sampling with steam-cleaned PVC bailers. Well MW-1 was evacuated dry after purging 22 gal of water, and was sampled after recovering for about two hours. Four well-volumes, about 45 gal, were purged from well MW-2. The samples were decanted from steam-cleaned Teflon bailers into the following containers:

- 40-ml glass vials with Teflon septa and hydrochloric acid preservative for TPH-G and BETX analysis,
- 40-ml glass vials with Teflon septa and no preservative for HVOC analysis, and
- 1000-ml glass bottles with sulfuric acid preservative for TPH-D and TOG analysis.

A bailer blank was collected from one Teflon bailer to verify that sampling equipment did not contaminate the samples. A travel blank accompanied the samples and was analyzed to check for possible contamination of the samples during transport or storage. All samples were labeled and refrigerated for transport under chain of custody to SAL for analysis. Copies of the chain of custody documents are presented in Appendix C.

2.4 ANALYTIC RESULTS FOR GROUND WATER

All water samples were analyzed for TPH-G by Modified EPA Method 8015 and for BETX by EPA Method 8020. In addition, the samples from well MW-2 were sampled for TPH-D by Modified EPA Method 8015, for TOG by APHA Method 503E, and for HVOCs by EPA Method 8010. Analytic results for ground water are presented in Table 2 and ground water analytic reports are included in Appendix C.

Benzene was detected at a concentration of 2 ppb in the ground water sample from well MW-1, which is slightly above the 1 ppb California Department of Health Services Maximum Contaminant Level (DHS MCL) for drinking water. No other organic compounds were detected in well MW-1.

TPH-G and TPH-D at 88 ppb and 170 ppb were detected in the sample from well MW-2, adjacent to the underground waste oil tank. The chromatograph for the TPH-D analysis indicated that the diesel-range hydrocarbons were from gasoline and not diesel fuel. BETX concentrations ranged from 0.3 ppb (toluene) to 110 ppb (xylenes), though no concentrations exceeded the DHS MCL. 1,2-dichloroethane (1,2-DCA) (synonym: ethylene dichloride) was detected at 2 ppb, slightly above the 0.5 ppb DHS MCL. No TOG was detected in well MW-2.

2.5 GROUND WATER GRADIENT

On November 21, 1990, John E. Koch, licensed land surveyor of Oakland (California State License No. LS4811), surveyed the top-of-casing elevations for the two BP wells, and with Chevron's permission, the two Chevron wells in 55th Street adjacent to the BP station. The datum elevation for the survey was City of Oakland Bench Mark No. 1967, located on the curb at the southwest corner of Martin Luther King, Jr. Way and 55th Street.

Ground water elevations are presented in Table 3. Ground water elevation contours for November 19, 1990, plotted on Figure 4, indicate a northwestward ground water flow direction with a gradient ranging from about 0.004 ft/ft to 0.01 ft/ft.

Table 3. Ground Water Elevation Data, BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
MW-1	11/19/90	82.35	10.85	71.50
MW-2	11/19/90	83.49	11.84	71.65
CHMW-5*	11/19/90	81.94	10.68	71.26
CHMW-6*	11/19/90	80.59	9.75	70.84

*Water level measured with permission of Chevron USA

2.6 SOIL AND GROUND WATER DISPOSAL

Soil cuttings were temporarily stored on site, bermed and covered with plastic sheeting pending analytic results. SAL composited and analyzed two soil samples, one from each boring, for TPH-G by EPA Method 8015, BETX by EPA Method 8020, total lead by EPA Method 7420, and total organic lead by the DHS method. Analytic reports and chain-of-custody documents for the composite analyses are included in Appendix B.

One composite soil sample contained TPH-G at 2 ppm, and both composite samples contained toluene and xylenes at less than 0.01 ppm. No organic or inorganic lead was detected in either sample. Therefore, the soil was acceptable for disposal as Class III waste. WA understands that the disposal is to be arranged by BP. All ground water generated during the investigation was temporarily stored on site in DOT-rated steel drums pending analytic results, for appropriate disposal arranged by BP.

3 CONCLUSIONS

No hydrocarbons or other organic compounds were detected in any of five analyzed soil samples from the two borings drilled for the subsurface investigation.

The ground water sample from well MW-1 contained benzene at 2.0 ppb, slightly above the 1 ppb DHS MCL for drinking water. The ground water sample from well MW-2 contained 1,2-DCA at 2 ppb, slightly above the 0.5 ppb DHS MCL. TPH-G and TPH-D, at 88 ppb and 170 ppb, were also detected in the sample from well MW-2.

Ground water elevation data indicate that ground water flows northwestward at the BP site. Six ground water monitoring wells installed for a subsurface investigation at a Chevron service station are located north of the site. Data from three of these wells indicate that ground water flowed south-southwestward beneath the Chevron site in March 1990.

The Chevron service station north of the BP site and a former auto repair shop northeast of the site are other possible sources of organic compounds to ground water in the site vicinity.

REFERENCES CITED

Alameda County Health Care Services Agency (ACHCS), 1990, letter from ACHCS Hazardous Materials Specialist Susan Hugo to William J. Hollis of BP Oil Co. requesting a preliminary site assessment at 5425 Martin Luther King Way, Oakland, California, August 29, 1990, 2 pp. with 1 attachment.

BP Oil Company (BP), 1990, Underground Storage Tank Unauthorized Release (Leak)/ Contamination Site Report, form report submitted to the Alameda County Health Care Services Agency, September 11, 1990, 1 p.

Geraghty & Miller, Inc. (G&M), 1990, letter to John Randall of Chevron USA, Inc. reporting results of ground water sampling activities at Chevron Service Station #9-1583, 5509 Martin Luther King Way, Oakland, California, April 2, 1990, 3 pp with 4 tables, 1 figure and 1 attachment.

Radbruch, Dorothy H., 1957, Areal and Engineering Geology of the Oakland West Quadrangle, California, Miscellaneous Geologic Investigations Map I-239, U.S. Geological Survey, Washington, D.C., 1957, 1 plate.

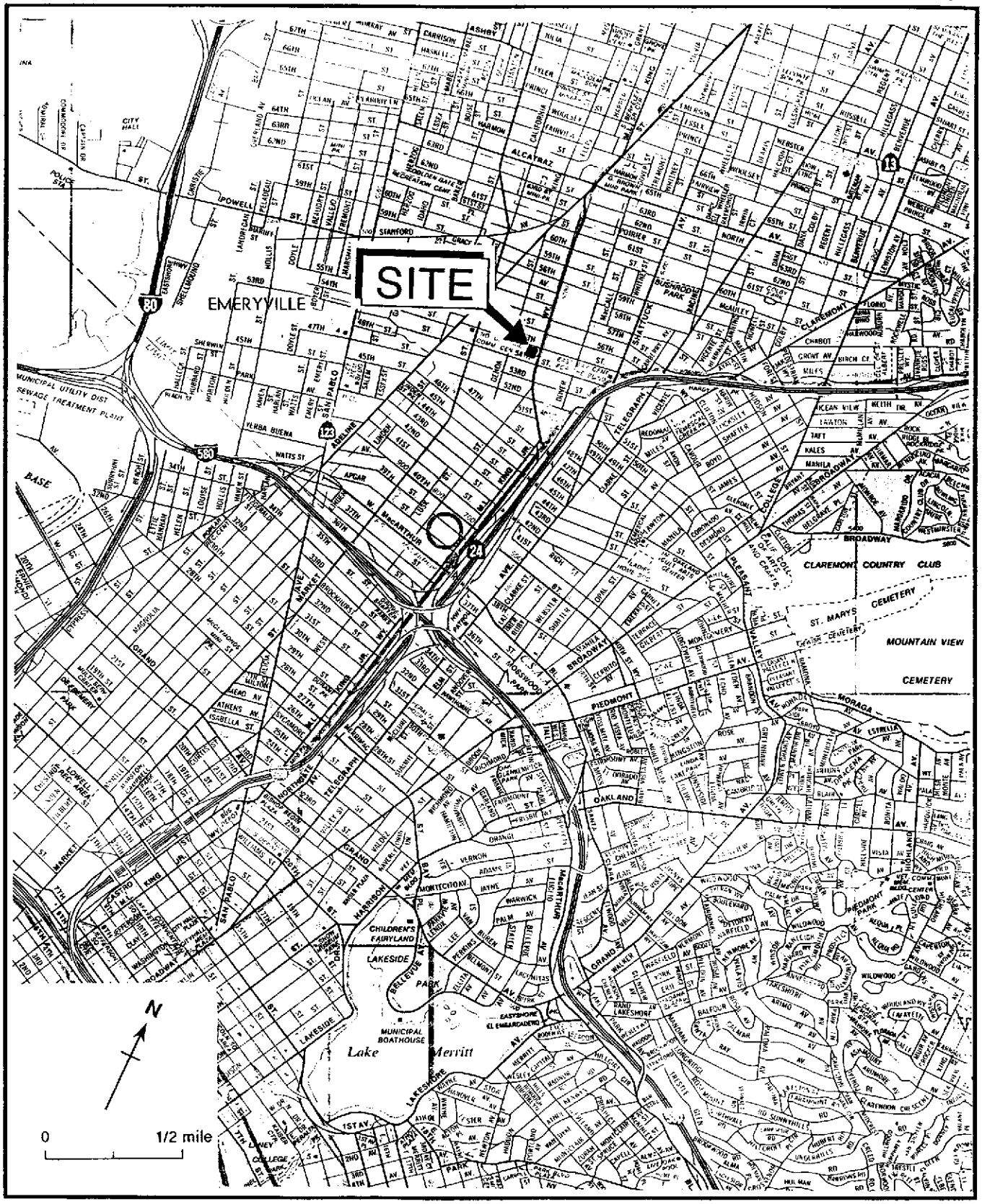


Figure 1. Site Location Map, BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California

12/13/90

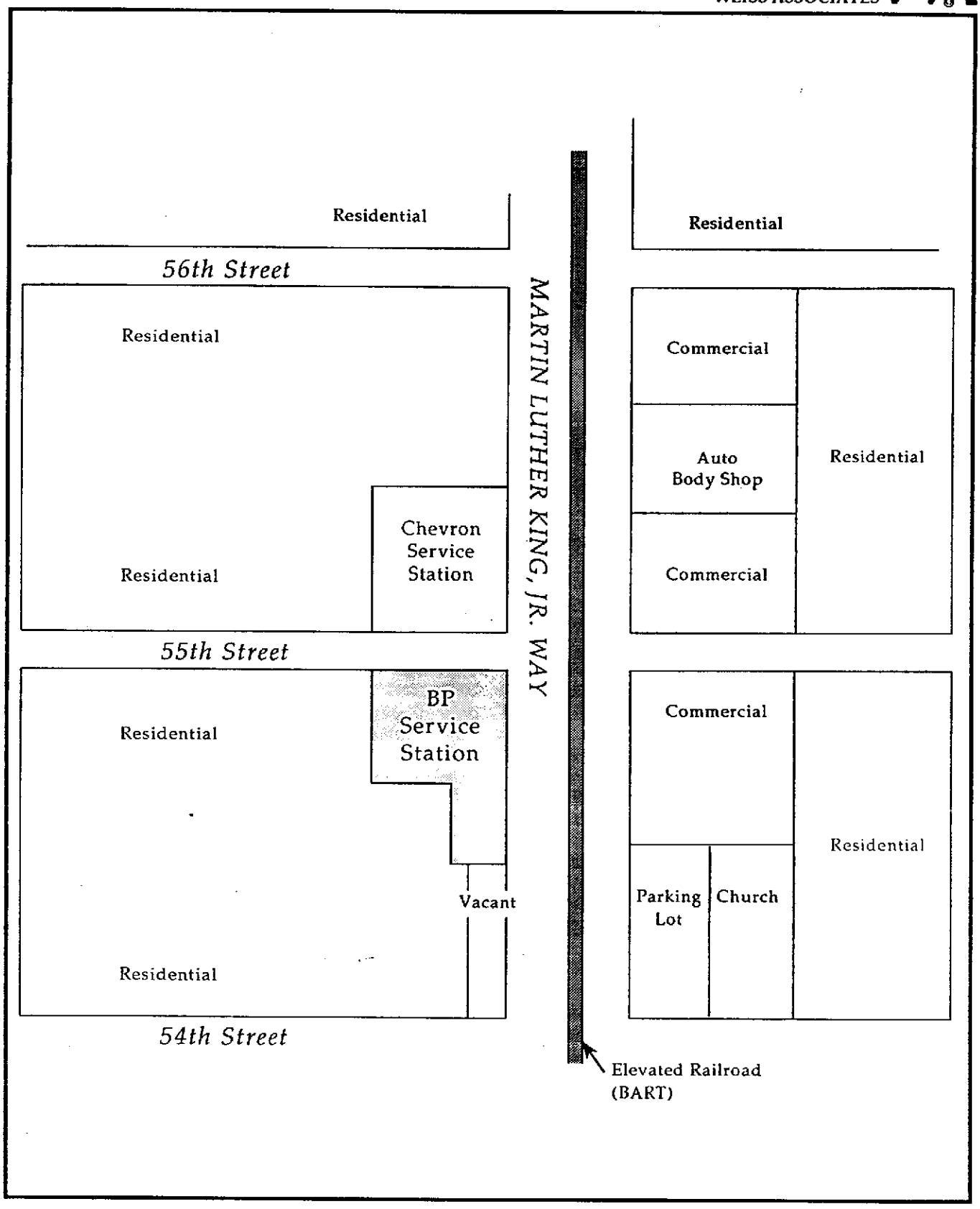


Figure 2. Properties and Businesses in the Vicinity of BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California

12/13/90

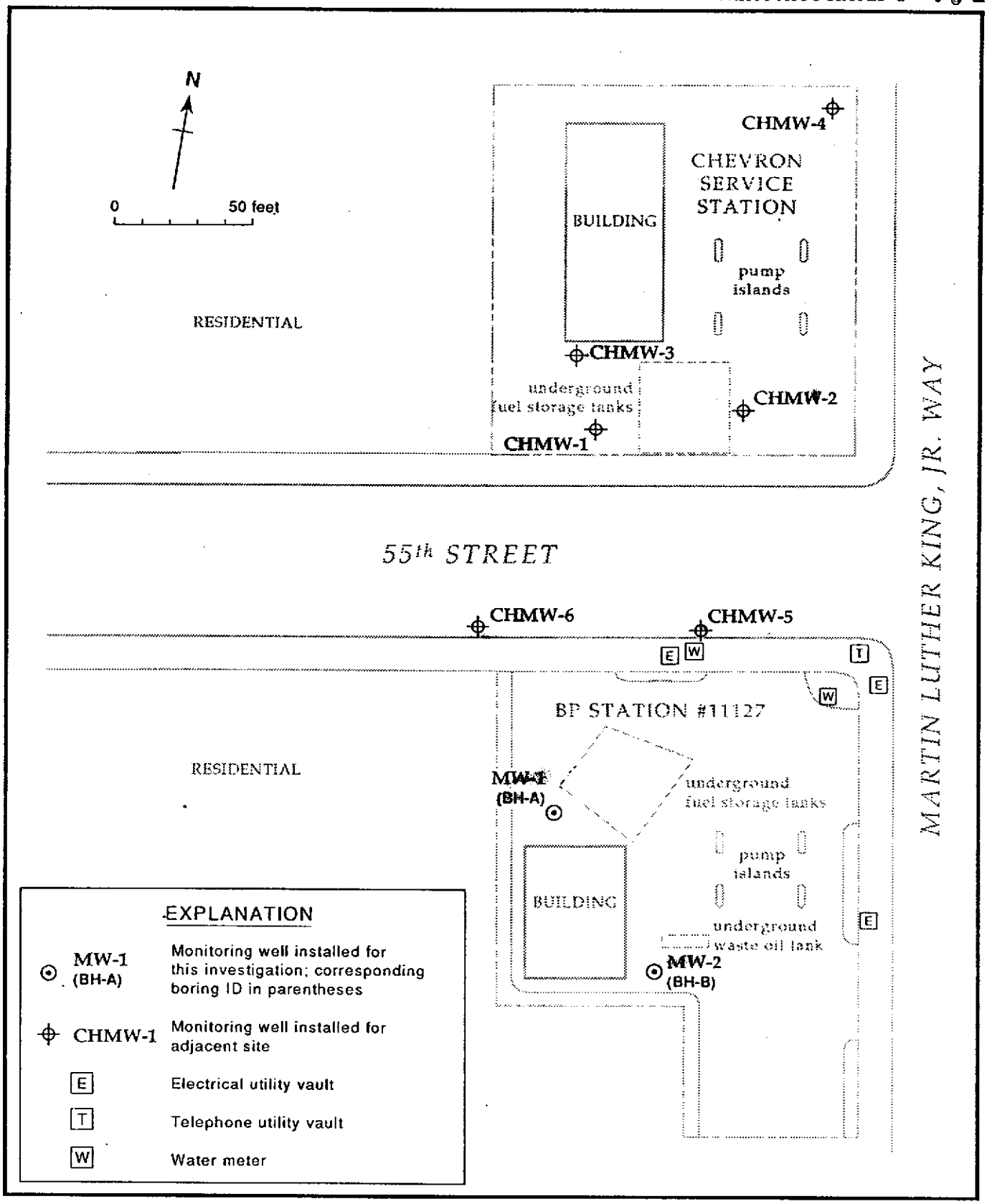


Figure 3. Monitoring Well and Utility Vault Location Map - BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California

TABLE 1. Analytic Results for Soil - BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California

Sample ID	Depth (ft)	Date Sampled	Analytic Laboratory	Analytic Method	Sat/ Unsat	TPH-G	TPH-D	B	E	T	X	HVOCs	TOG
						<----------parts per million (mg/kg)---------->							
BH-A	6.0	10/18/90	SAL	8015/8020	Unsat	<1	---	<0.003	<0.003	<0.003	<0.003	---	---
(MW-1)	11.0	10/18/90	SAL	8015/8020	Unsat	<1	---	<0.003	<0.003	<0.003	<0.003	---	---
	12.5	10/18/90	SAL	8015/8020	Sat	<1	---	<0.003	<0.003	<0.003	<0.003	---	---
BH-B	5.0	10/18/90	SAL	8015/8020/8010/5520F	Unsat	<1	<10	<0.003	<0.003	<0.003	<0.003	ND	<20
(MW-2)	10.0	10/18/90	SAL	8015/8020/8010/5520F	Unsat	<1	<10	<0.003	<0.003	<0.003	<0.003	ND	<20

Abbreviations:

Sat/Unsat = Saturated or Unsaturated
TPH-G = Total Petroleum Hydrocarbons as Gasoline
TPH-D = Total Petroleum Hydrocarbons as Diesel
B = Benzene
E = Ethylbenzene
T = Toluene
X = Xylenes
HVOCs = Halogenated Volatile Organic Compounds
TOG = Total Oil and Grease
<n = Not detected at a detection limit of n ppm
--- = Not analyzed
ND = Not detected at detection limits ranging from 0.005 ppm to 0.01 ppm

Analytic Laboratory:

SAL = Superior Analytical Laboratory, Inc., San Francisco and Martinez, California

Analytic Method:

8015 = Modified EPA Method 8015 for TPH-G and TPH-D
8020 = EPA Method 8020 for BETX
8010 = EPA Method 8010 for HVOCs
5520F = APHA Standard Method 5520F for TOG

TABLE 2. Analytic Results for Ground Water - BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California

Sample ID	Date Sampled	Analytical Laboratory	Analytic Method	TPH-G	TPH-D	B	E	T	X	HVOC's	TOG
				<----------parts per billion (µg/ℓ)---------->							
MW-1	10/24/90	SAL	8015/8020	<50	---	2	<0.3	<0.3	<0.3	---	---
MW-2	10/24/90	SAL	8015/8020/8010/503E	88	170[a]	1	28	0.3	110	2[b]	<5,000
Travel Blank	10/24/90	SAL	8015/8020	<50	---	<0.3	<0.3	<0.3	<0.3	---	---
Bailer Blank	10/24/90	SAL	8015/8020	<50	---	<0.3	<0.3	<0.3	<0.3	---	---
DHS MCL				NE	NE	1	620	100[c]	1,750	0.5[d]	NE

Abbreviations:

TPH-G = Total Petroleum Hydrocarbons as Gasoline
TPH-D = Total Petroleum Hydrocarbons as Diesel
B = Benzene
E = Ethylbenzene
T = Toluene
X = Xylenes
HVOC's = Halogenated Volatile Organic Compounds
TOG = Total Oil and Grease
<n = Not detected at detection limit of n ppb
--- = Not analyzed
DHS MCL = Department of Health Services Maximum Contaminant Level for Drinking Water
NE = Not established

[a] Diesel-range hydrocarbons from gasoline, not diesel fuel
[b] 1,2-Dichloroethane (1,2-DCA) detected at 2 ppb; no other HVOC's detected
[c] DHS Recommended Action Level for Drinking Water (no MCL established)
[d] MCL for 1,2-DCA

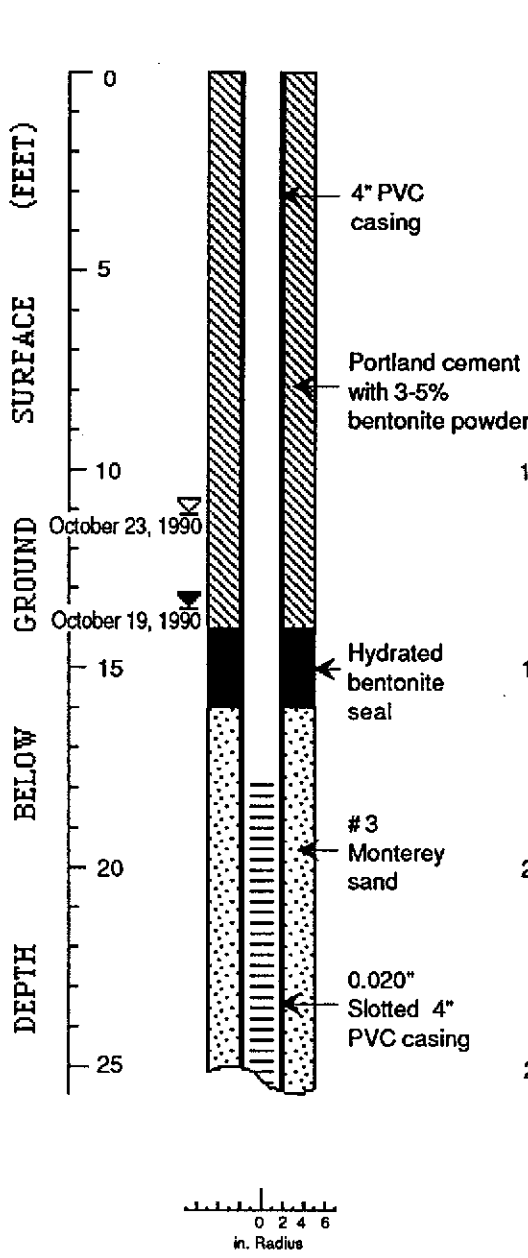
Analytic Laboratory:

SAL = Superior Analytical Laboratory, Inc., San Francisco, California

Analytic Method:

8015 = Modified EPA Method 8015 for TPH-G
8020 = EPA Method 8020 for BETX
8010 = EPA Method 8010 for HVOCs
503E = APHA Standard Method 503E for TOG

WELL MW-1 (BH-A)



PID (ppmv)	GRAPHIC LOG	DESCRIPTION
0		Asphalt (7")
		Sandy GRAVEL (GW); tan; damp; medium dense; 65% gravel to 1.5" diameter; 20% fine to coarse sand; 15% silt; high K; no odor
0		SILT (ML); brown; medium stiff; damp to moist; 90% silt; 5% gravel to 1" diameter; 5% fine to medium sand; low plasticity; moderate K; no odor
0		Gravelly SAND (SW); tan to brown; medium dense; damp to moist; 50% fine to medium sand; 40% gravel to 1" diameter; 10% silt; very high K; no odor
0		Sandy GRAVEL (GW); brown; medium dense; damp to moist; 60% gravel to 1" diameter; 35% fine to medium sand; 5% silt; very high K; no odor Mottled orange and red-brown; very slight hydrocarbon odor at 8'
0		Clayey SILT (MH); green mottled brown; medium stiff; damp; 80% silt; 15% clay; 5% gravel to 1" diameter; high plasticity; very low to low K; slight hydrocarbon odor Wet; slight to moderate hydrocarbon odor at 13.5' Silt increases to 95%; clay decreases to 5%; no gravel; medium plasticity; low to moderate K; no odor at 16'
0		Gravelly SAND (SW); tan to light brown; loose; 50% fine sand; 40% gravel to 0.5" diameter; 10% silt; high K; no odor
0		SILT (ML); tan to light green; medium stiff; 100% silt; low plasticity; moderate K; no odor
0		GRAVEL (GP); brown; very dense; 100% fine gravel; very high K; no odor

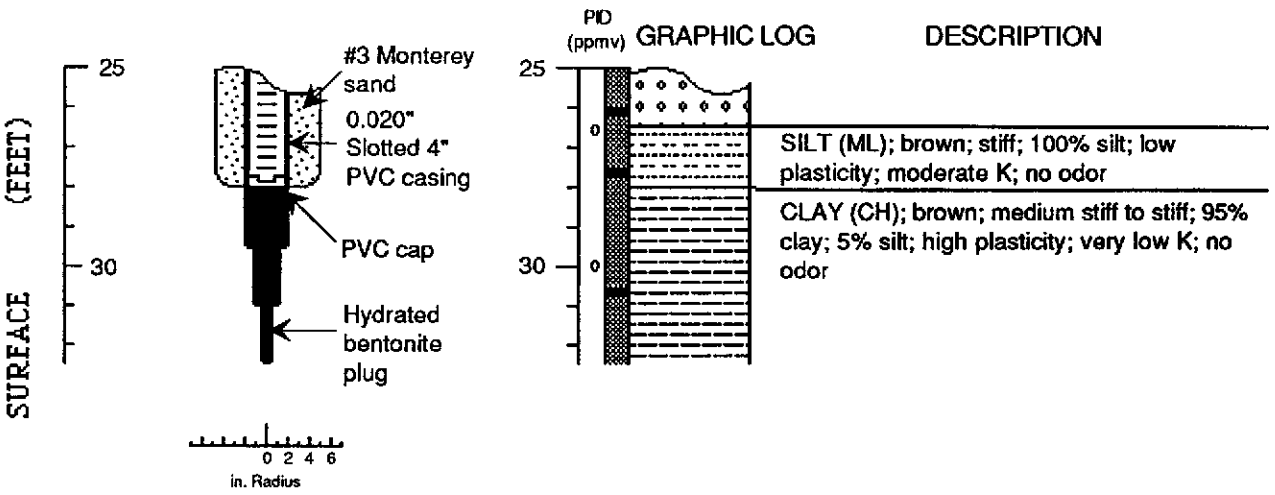
EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

Logged by:	Robert Kitay
Supervisor:	Joseph Theisen; RG 4981
Drilling Company:	Soils Exploration Services, Vacaville, CA
License Number:	C57-582696
Driller:	Rick Carr
Drilling Method:	Hollow stem auger
Date Drilled:	October 18, 1990
Well Head Completion:	4" locking well-plug with traffic-rated vaul
Type of Sampler:	Split barrel (1.5", 2", 2.5" ID)
Ground Surface Elevation:	83.12 feet above mean sea level

Boring Log and Well Construction Details - Well MW-1 (BH-A) BP Service Station #11127 Oakland, California

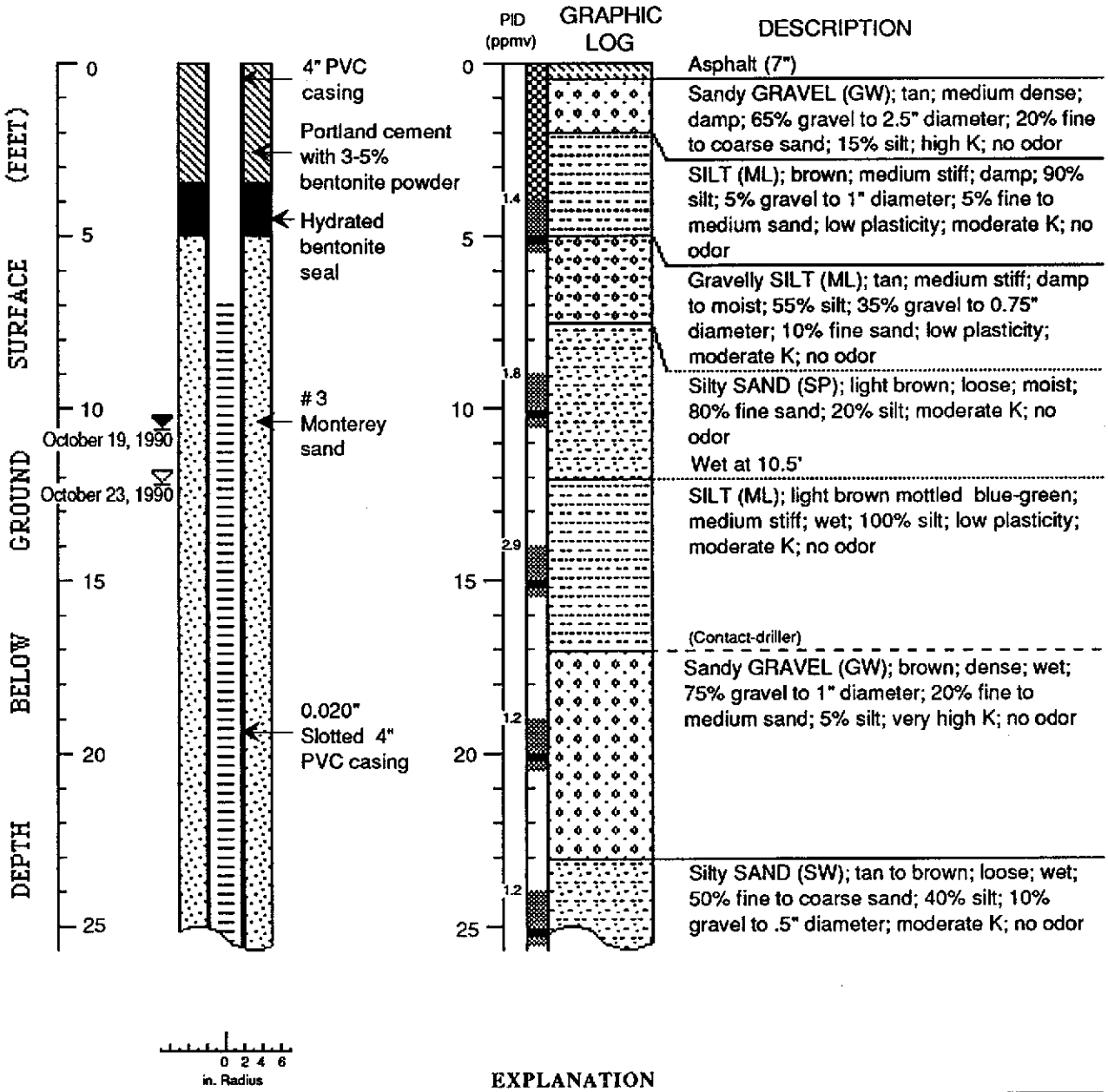
WELL MW-1 (BH-A) (cont.)



Boring Log and Well Construction Details - Well MW-1 (BH-A)

BP Service Station #11127
Oakland, California

WELL MW-2 (BH-B)



EXPLANATION

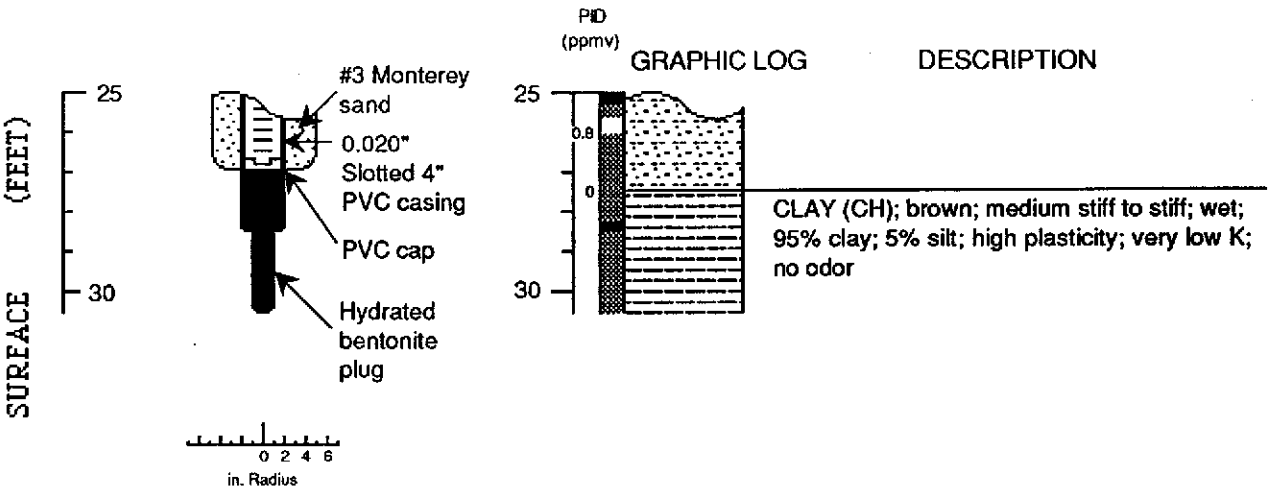
- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

Logged by:	Robert Kitay
Supervisor:	Joseph Theisen; RG 4981
Drilling Company:	Soils Exploration Services, Vacaville, CA
License Number:	C57-582696
Driller:	Rick Carr
Drilling Method:	Hollow stem auger
Date Drilled:	October 18, 1990
Well Head Completion:	4" locking well-plug with traffic-rated vaul
Type of Sampler:	Split barrel (1.5", 2", 2.5" ID)
Ground Surface Elevation:	83.89 feet above mean sea level

Boring Log and Well Construction Details - Well MW-2 (BH-B)

BP Service Station #11127
Oakland, California

WELL MW-2 (BH-B) (cont.)



Boring Log and Well Construction Details - Well MW-2 (BH-B)

BP Service Station #11127
Oakland, California

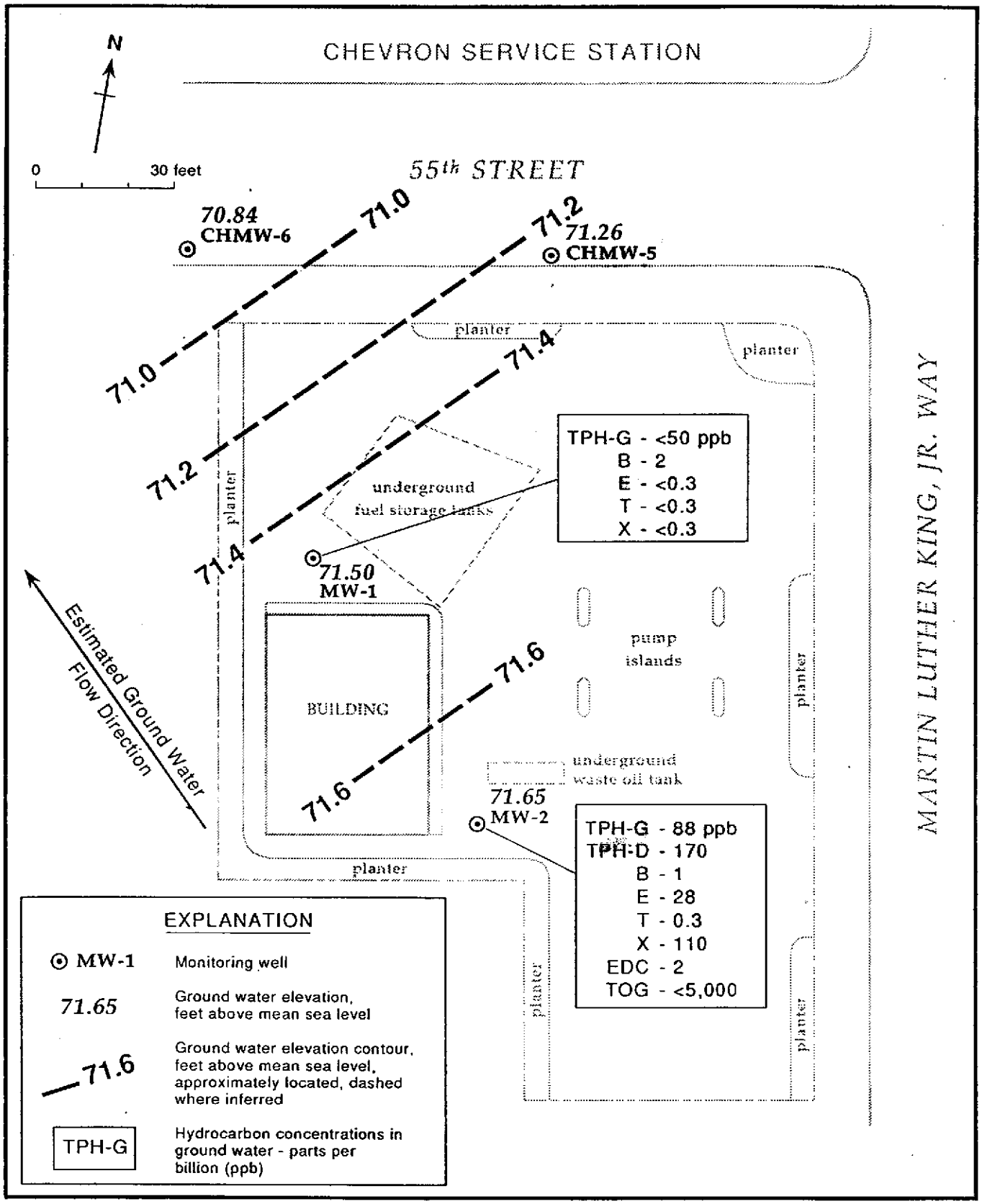


Figure 4. Ground Water Elevation Contours (November 19, 1990) and Hydrocarbon Concentrations (October 24, 1990) - BP Service Station #11127, 5425 Martin Luther King, Jr. Way, Oakland, California

APPENDIX B

ANALYTIC REPORTS FOR SOIL

AND

CHAIN OF CUSTODY DOCUMENTS

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52672-1
CLIENT: Weiss Associates
JOB NO.: 22-499-00

DATE SAMPLED: 10/18/90
DATE RECEIVED: 10/22/90
DATE ANALYZED: 10/25/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: BH-B-5.0

Compound	MDL (ug/kg)	RESULTS(ug/kg)
Chloromethane/Vinyl Chloride	10	ND
Bromomethane/Chloroethane	10	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	5.0	ND
Methylene Chloride	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
1,1-Dichloroethane	5.0	ND
Chloroform	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
1,2-Dichloroethane	5.0	ND
Trichloroethylene	5.0	ND
1,2-Dichloropropane	5.0	ND
Bromodichloromethane	5.0	ND
Cis-1,3-Dichloropropene	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
Tetrachloroethene	5.0	ND
Dibromochloromethane	5.0	ND
Chlorobenzene	5.0	ND
Bromoform	5.0	ND
1,1,2,2-Tetrachloroethane	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 93% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52672-2
CLIENT: Weiss Associates
JOB NO.: 22-499-00

DATE SAMPLED: 10/18/90
DATE RECEIVED: 10/22/90
DATE ANALYZED: 10/25/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: BH-B-10.0

Compound	MDL (ug/kg)	RESULTS(ug/kg)
Chloromethane/Vinyl Chloride	10	ND
Bromomethane/Chloroethane	10	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	5.0	ND
Methylene Chloride	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
1,1-Dichloroethane	5.0	ND
Chloroform	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
1,2-Dichloroethane	5.0	ND
Trichloroethylene	5.0	ND
1,2-Dichloropropane	5.0	ND
Bromodichloromethane	5.0	ND
Cis-1,3-Dichloropropene	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
Tetrachloroethene	5.0	ND
Dibromochloromethane	5.0	ND
Chlorobenzene	5.0	ND
Bromoform	5.0	ND
1,1,2,2-Tetrachloroethane	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 93% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORIES, INC.

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

DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81737
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/22/90
DATE REPORTED: 10/29/90

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

LAB #	Sample Identification	Concentration(ug/Kg) Benzene	Toluene	Ethyl Benzene	Xylenes
1	BH-A 6.0'	ND<3	ND<3	ND<3	ND<3
3	BH-A 11.0'	ND<3	ND<3	ND<3	ND<3
4	BH-A 12.5'	ND<3	ND<3	ND<3	ND<3
12	BH-B 5.0'	ND<3	ND<3	ND<3	ND<3
13	BH-B 10.0'	ND<3	ND<3	ND<3	ND<3
17	BH-A 6.0',16.0',26.0	ND<3	5	ND<3	7
18	BH-B 5.0',15.0',25.0	ND<3	4	ND<3	8

ug//Kg parts per billion (ppb)

Method Detection Limit in Soil: 3 ug/Kg

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 82 %: Duplicate RPD = 6

Richard Srna, Ph.D.

Dorena Srna for

Laboratory Manager

SUPERIOR ANALYTICAL LABORATORIES, INC.

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

DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81737
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/22/90
DATE REPORTED: 10/29/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (mg/Kg) Gasoline Range
1	BH-A 6.0'	ND<1
3	BH-A 11.0'	ND<1
4	BH-A 12.5'	ND<1
12	BH-B 5.0'	ND<1
13	BH-B 10.0'	ND<1
17	BH-A 6.0',16.0',26.0	2
18	BH-B 5.0',15.0',25.0	ND<1

mg/kg - parts per million (ppm)

Method Detection Limit for Gasoline in Soil: 1 mg/Kg

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 9
MS/MSD Average Recovery = 109%: Duplicate RPD = 14

Richard Srna, Ph.D.

Laboratory Manager

OUTSTANDING QUALITY AND SERVICE

SUPERIOR ANALYTICAL LABORATORIES, INC.

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

DOHS #319
DOHS #220

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 81737
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/22/90
DATE REPORTED: 10/30/90

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

LAB #	Sample Identification	Concentration (mg/Kg) Diesel Range
12	BH-B 5.0'	ND<10
13	BH-B 10.0'	ND<10

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

QAQC Summary:

Daily Standard run at 200mg/L: RPD Gasoline = 0
RPD Diesel = 10
MS/MSD Average Recovery = 95%: Duplicate RPD = 4

Richard Srna, Ph.D.

Laboratory Manager

OUTSTANDING QUALITY AND SERVICE

SUPERIOR ANALYTICAL LABORATORIES, INC.

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

DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81737
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/22/90
DATE REPORTED: 10/29/90

ANALYSIS FOR TOTAL OIL AND GREASE
by Standard Method 5520F

LAB #	Sample Identification	Concentration(mg/Kg) Oil & Grease
12	BH-B 5.0'	ND<20
13	BH-B 10.0'	ND<20

mg/kg - parts per million (ppm)

Method Detection Limit for Oil and Grease in Soil: 20mg/Kg

QAQC Summary: Duplicate RPD : 1

Richard Srna, Ph.D.

Dorena Srna

Laboratory Manager

OUTSTANDING QUALITY AND SERVICE

SUPERIOR ANALYTICAL LABORATORIES, INC.

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DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81737
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED:10/22/90
DATE REPORTED:10/30/90

ANALYSIS FOR TOTAL LEAD
by SW-846 Method 7420

LAB #	Sample Identification	Concentration(mg/Kg) Total Lead
17	BH-A 6.0',16.0',26.0	ND<10
18	BH-B 5.0',15.0',25.0	ND<10

mg/kg - parts per million (ppm)

Method Detection Limit for Lead in Soil: 10 mg/Kg

QAQC Summary: MS/MSD Average Recovery : 83%
Duplicate RPD : 0.4

Richard Srna, Ph.D.

Laboratory Manager

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SUPERIOR ANALYTICAL LABORATORIES, INC.

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

DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 81737
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/22/90
DATE REPORTED: 10/29/90

ANALYSIS FOR TOTAL ORGANIC LEAD
by DHS Method (LUFT Manual)

LAB #	Sample Identification	Concentration (mg/Kg)
17	BH-A 6.0',16.0',26.0	ND<2
18	BH-B 5.0',15.0',25.0	ND<2

mg/kg - parts per million (ppm)

Method Detection Limit for Organic Lead in Soil: 2 mg/Kg

QAQC Summary: MS/MSD Average Recovery : 76%
Duplicate RPD : 0

Richard Srna, Ph.D.

Dorena Srna for

Laboratory Manager

OUTSTANDING QUALITY AND SERVICE

J0200241 81737

WEISS ASSOCIATES

938 McClure St., Oakland, CA 94609 415-465-1100

SEND RESULTS TO: Robert Kitay

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

WA Personnel: Be sure to include copy of this form in the field sampling files

Shuttle Inventory Number: ____________

Project ID: 22-499-00

Shipping Seal No. ____________

NOTES TO LAB:
1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks on GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

Sampled by: Robert Kitay

Laboratory Name: Superior Analytical

	No. of Containers	Sample ID	Sampling Date	Container Type[A]	Sample/Analyze/Hold[B]	Turnaround[C]	Analyze For:	Analytic Method/Detection Limit	Comments
1	1	BH-A 6.0'	10-18-90	S/T	Analyze	N	TPH-G/BETX		
2	↓	7.5'	↓	↓	Hold				
3		11.0'			Analyze	N	TPH-G/BETX		
4		12.5'			Analyze	N	TPH-G/BETX		
5		16.0'			Hold				
6		17.5'			Hold				
7		21.0'			Hold				
8		22.5'			Hold				
9		26.0'			Hold				
10		27.5'			Hold				
11		30.5'			Hold				
12		BH-B 5.0'			Analyze	N	TPH-G+D/BETX/HVOCs/TOG		
13		10.0'			Analyze	N	TPH-G+D/BETX/HVOCs/TOG		
14		15.0'			Hold				
15	↓	↓ 25.0'	↓	↓	Hold				
		20.0'			Hold				

1. Robert E. Kitay 10/19/90
Released by (Signature), Date

2. A. J. Burkard 10-19-90
Received by (Signature), Date

Locked and Stored over weekend

3. A. J. Burkard 10-22-90
Released by (Signature), Date

4. J. O'Connell X694
Shipping Carrier, Method, Date

→ 10-22-90 1130AM

5. J. O'Connell X694 10-22-90 1320pm
Released by (Signature), Date

6. [illegible signature] 10-22-90
Received by Lab Personnel, Date, Telephone

x ____________
Seal intact?, Number

A Sample Type Codes: W = Water, S = Soil, O = Other (Specify) Container Type Codes: P = Plastic bottles, G = Glass bottle, T = Brass tube, O = Other (Specifiy)

B Analyze/Hold: A = Analyze; HOLD (spell out) = DO NOT ANALYZE UNLESS NECESSARY OR REQUESTED.

C N = Normal Turnaround, F = 1-Week Turnaround, R = 24-hour Turnaround

J220024 81737

WEISS ASSOCIATES
538 McClure St., Oakland, CA 94609 415-465-1100

SEND RESULTS TO: Robert Kitay

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

WA Personnel: Be sure to include copy of this form in the field sampling files

Shuttle Inventory Number: ______

Project ID: 22-499-00

Shipping Seal No. ______

NOTES TO LAB:
1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks on GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

Sampled by: Robert Kitay   Laboratory Name: Superior Analytical

No. of Containers	Sample ID	Sampling Date	Container Type[A]	Sample/Analyze/Hold[B]	Turnaround[C]	Analyze For:	Analytic Method/Detection Limit	Comments
1	BH-B 28.5'	10-18-90	S/T	Hold	N			

Composite BH-A 6.0', 16.0' and 26.0' and analyze for TPH-G / BETX / and total and organic lead
Composite BH-B 5.0', 15.0' and 25.0' and analyze for TPH-G / BETX / and total and organic lead

1 Robert E. Kitay 10/19/90
Released by (Signature), Date

3 A J Bostard 10-22-90
Released by (Signature), Date

5 J. O'Connell X694 10-22-90 1320 PM
Released by (Signature), Date

2 A J Bostard 10-19-90
Received by (Signature), Date
→ locked and stored over weekend

4 J. O'Connell X694 10-22-90 1130 AM
Shipping Carrier, Method, Date

6 [illegible] 10/22/90
Received by Lab Personnel, Date, Telephone

x ______
Seal intact?, Number

A Sample Type Codes: W = Water, S = Soil, O = Other (Specify) Container Type Codes: P = Plastic bottles, G = Glass bottle, T = Brass tube, O = Other (Specifiy)
B Analyze/Hold: A = Analyze; HOLD (spell out) = DO NOT ANALYZE UNLESS NECESSARY OR REQUESTED.
C N = Normal Turnaround, F = 1-Week Turnaround, R = 24-hour Turnaround

APPENDIX C

ANALYTIC REPORTS FOR GROUND WATER

AND

CHAIN OF CUSTODY DOCUMENTS

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52676
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/24/90
DATE REPORTED: 10/31/90

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (ug/l) Gasoline Range
1	100-1	ND<50
2	100-22	ND<50
3	100-2	88
4	100-21	ND<50

ug/L - parts per billion (ppb)
Minimum Detection Limit for Gasoline in Water: 50ug/L

QAQC Summary:
Daily Standard run at 2mg/L: RPD Gasoline = <15%
MS/MSD Average Recovery = 89%: Duplicate RPD = <1%

Richard Srna, Ph.D.

Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52676
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/24/90
DATE REPORTED: 10/31/90

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

LAB #	Sample Identification	Concentration (ug/l) Diesel Range
3	100-2	170*

ug/L - parts per billion (ppb)

Minimum Detection Limit for Diesel in Water: 50ug/L

QAQC Summary:

Daily Standard run at 200mg/L: RPD Diesel = <15%
MS/MSD Average Recovery = 112%: Duplicate RPD = <1%

* Diesel range hydrocarbons from gasoline contamination. Not diesel fuel.

Richard Srna, Ph.D.

Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52676
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/24/90
DATE REPORTED: 10/31/90

ANALYSIS FOR TOTAL PETROLEUM OIL AND GREASE
by EPA Method 503E

LAB #	Sample Identification	Concentration (mg/l) Total oil & grease
3	100-2	ND<5

mg/L - parts per million (ppm)

Minimum Detection Limit for oil & grease in Water: 5mg/L

QAQC Summary:
MS/MSD average recovery = 74%
Duplicate RPD = 4%

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52676
CLIENT: Weiss Associates
CLIENT JOB NO.: 22-499-00

DATE RECEIVED: 10/24/90
DATE REPORTED: 10/31/90

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

LAB #	Sample Identification	Concentration(ug/l) Benzene	Toluene	Ethyl Benzene	Xylenes
1	100-1	2	ND<0.3	ND<0.3	ND<0.3
2	100-22	ND<0.3	ND<0.3	ND<0.3	ND<0.3
3	100-2	1	0.3	28	110
4	100-21	ND<0.3	ND<0.3	ND<0.3	ND<0.3

ug/L - parts per billion (ppb)

Minimum Detection Limit in Water:0.3ug/L

QAQC Summary:
Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 104% : Duplicate RPD = <4%

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52676-3
CLIENT: Weiss Associates
JOB NO.: 22-499-00

DATE SAMPLED: 10/24/90
DATE RECEIVED: 10/24/90
DATE ANALYZED: 10/31/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 100-2

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	0.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	4.0	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	ND
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	2
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 85% :MS/MSD RPD = <4%

Richard Srna, Ph.D.

Laboratory Director

52674

Please send analytic results
and a copy of the signed chain of custody form to:

JOHN DUEY

Project ID: 22-499-00

WA WEISS ASSOCIATES
5500 Shellmound St., Emeryville, CA 94608
Phone: 415-547-5420 FAX: 415-547-5043

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Lab Personnel:
1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks on GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

Sampled by: RH

Laboratory Name: SAL

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
2	100-1	W/V	10/24/90	40	N	Y	HCL	TPH-G/BETX	EPA 8015/8020	N	
2	100-22	↓	↓	↓	↓	↓	↓	↓	↓	↓	
2	100-2	↓	↓	↓	↓	↓	↓	↓	↓	↓	
2	100-21	↓	↓	↓	↓	↓	↓	↓	↓	↓	
2	100-2	↓	↓	↓	↓	↓	NONE	HALOG. VOCS	EPA 601	↓	
1	100-2	B/G	↓	1 LR	↓	↓	SULFURIC ACID	TPH-DIESEL	8015	↓	
1	100-2	↓	↓	↓	↓	↓	↓	TOG.	EPA 5520		

Please initial: OAN
Samples Stored in ice. yes
Appropriate containers. yes
Samples preserved. yes
VOA's without headspace. yes except liter bottles
Comments:

1 [signature] 10/24/90
Released by (Signature), Date
1 Weiss 15:01
Affiliation

2 A J Pottard 10-24-90 15:01
Received by (Signature), Date
2 Weiss Assoc
Affiliation

3 A J Pottard 102490
Released by (Signature), Date
3 Weiss Assoc. 1550
Affiliation

4 Ken Brown
Shipping Carrier, Method, Date
4 Express IT
Affiliation

5 [signature] 10/24/90
Released by (Signature), Date
5 Express IT 16:27
Affiliation

6 [signature] 10/24/90 16:27
Received by Lab Personnel, Date
Seal intact? yes
6
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

F:\ALL\ADMIN\FORMS\COC.WP2