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Soil and Ground-Water Investigation Report
Harrison Street Garage
1432-1434 Harrison Street
Oakland, California

September 1, 1994
LF 2680.00-43

Prepared for
Mr. Alvin H. Bacharach
Ms. Barbara J. Borsuk
383 Diablo Road, Suite 100
Danville, California 94526



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ENGINEERS, HYDROGEOLOGISTS & APPLIED SCIENTISTS

September 1, 1994

LF 2680.00-43

Mr. Thomas F. Peacock
Supervising Hazardous Materials Specialist
Alameda County Health Care Services Agency
Department of Environmental Health
Division of Hazardous Materials
1131 Harbor Bay Parkway, 2d Floor
Alameda, California 94502

Subject: Soil and Ground-Water Investigation Report, Harrison
Street Garage, 1432-1434 Harrison Street, Oakland,
California

Dear Mr. Peacock:

Enclosed is our report on a soil and ground-water
investigation performed at the Harrison Street Garage site.
The report describes the results of a preliminary grab ground-
water survey, the installation of ~~three ground-water~~
~~monitoring wells,~~ and the analysis of soil and ground-water
samples. If you have any questions, please call either of the
undersigned.

Sincerely,

John Sturman, P.E., R.G.
Senior Geotechnical Engineer

Taylor Bennett
Project Hydrogeologist

Enclosure

cc: Mr. Alvin H. Bacharach/Ms. Barbara J. Borsuk
Mark Borsuk, Esq.
Randall Morrison, Esq., Crosby, Heafey, Roach & May

2680\2680S&GW.INR:CdH

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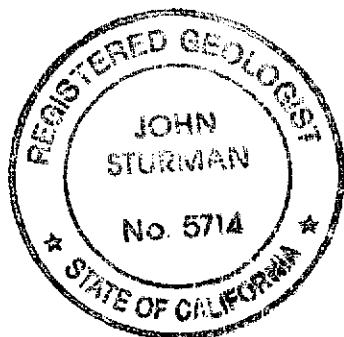
CERTIFICATION

All hydrogeologic and geologic information, conclusions, and recommendations in this report have been prepared under the supervision of and reviewed by a Levine•Fricke California Registered Geologist.



John Sturman, P.E., R.G.
Senior Geotechnical Engineer

1 Sept. 1994
Date



Expires 11/30/95

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September 1, 1994

LF 2680.00-43

SOIL AND GROUND-WATER INVESTIGATION REPORT HARRISON STREET GARAGE 1432-1434 Harrison Street, Oakland, California

1.0 INTRODUCTION

Levine•Fricke, Inc. ("Levine•Fricke") has prepared this report on behalf of Mr. Alvin H. Bacharach and Ms. Barbara J. Borsuk ("the client"), to comply with the requirements set forth in a letter from Mr. Steven Ritchie of the San Francisco Bay Regional Water Quality Control Board, to Mr. Bacharach, Ms. Borsuk, and Mr. Leland Douglas, dated September 22, 1993. This report describes activities related to the investigation of soil and ground-water quality at the Harrison Street Garage at 1432-1434 Harrison Street and 1439-1443 Alice Street in Oakland, California ("the Site"; Figure 1).

The soil and ground-water investigation was performed in accordance with the scope of work outlined in a Levine•Fricke work plan submitted to the Alameda County Health Care Services Agency (ACHCSA) on October 13, 1993 (Levine•Fricke 1993; "the work plan"). A two-phased approach to implementing the work plan was described in a letter dated April 8, 1994, to Mr. Peacock from Mr. Taylor Bennett of Levine•Fricke. The approach was accepted in a letter from Mr. Peacock of the ACHCSA to the client and Mr. Leland Douglas dated April 14, 1994.

This report describes the results of the first phase of the soil and ground-water investigation, which took place on Friday and Saturday, July 29 and 30, and on August 1 and 18, 1994. Soil and ground-water investigations have previously been performed at the Site, during which underground storage tanks (USTs) were removed. This investigation (i.e., the current investigation) consisted of drilling soil borings, collecting, describing, and analyzing soil samples, collecting preliminary grab ground-water survey samples in some locations, and installing shallow monitoring wells and collecting ground-water samples in other locations.

The objective of the investigation described in this report was to further assess the vertical and lateral extent of petroleum hydrocarbons in the vicinity of the former UST locations. The locations for the monitoring wells were selected to provide soil quality and water quality data on the

vicinity of the former UST locations, and preliminary data on the direction and magnitude of ground-water flow at the Site.

This report includes Levine•Fricke's recommendations for the second phase of investigation.

2.0 BACKGROUND

The Site currently is operated as a parking garage. We understand that before 1988, gasoline was stored in underground tanks (USTs) and sold through two dispensers, and that automobile repairs and servicing also were performed at the Site. In addition, two waste oil tanks, three hydraulic lifts, one vault, and one sump reportedly were used during these operations.

Soil quality investigations of the area surrounding the USTs have previously been performed by Subsurface Consultants, Inc. (SCI; 1990), RGA Environmental, Inc. (1992), and Levine•Fricke (1994). Table 1 and Figure 2 summarize the results of soil quality analysis performed during previous investigations, which indicated the presence of hydrocarbons primarily in the gasoline and oil range in soil near the UST locations. The locations of previously drilled soil borings at the Site are shown in Figure 2.

In November and December 1994, four USTs were excavated and removed from the Site under the supervision of Levine•Fricke personnel. The locations of the USTs are shown in Figure 3. Two steel single-walled USTs, each approximately 1,000 gallons in capacity, were located under the sidewalk on Harrison Street, with dispensers nearby; these USTs contained gasoline. Two other steel single-walled USTs, each approximately 1,000 gallons in capacity, were located in the basement of the garage near Alice Street; these USTs contained waste oil. In addition, three hydraulic lifts, one vault, and one sump, with their respective appurtenant piping, were excavated and removed from the Site under the supervision of Levine•Fricke personnel. Finally, a total of approximately 240 cubic yards of hydrocarbon-affected soils were removed from the three areas.

Excavation soil quality samples indicated that hydrocarbons were present in remaining soils in each area. The removal activities are described in a Levine•Fricke tank closure report (Levine•Fricke 1994).

Following the UST removal activities, ground-water monitoring well MW-1 was drilled and completed below the backfill of the gasoline tank excavation under the Harrison Street sidewalk. The installation of that well was also reported in the tank closure report (Levine·Fricke 1994). Well MW-1 was developed and sampled on August 1, 1994, during the investigations described below.

3.0 FIELD ACTIVITIES

Soil borings were drilled at five locations at the Site, and soil samples were collected from all five borings. At three of the borings (GW-1, GW-2, and GW-3), grab ground-water samples were collected; the other two borings were converted into monitoring wells (MW-2 and MW-3) from which ground-water samples were collected, and an existing well (MW-1) also was developed and sampled. The locations of the borings and wells are shown in Figure 3, and boring and well construction logs (including a log for well MW-1) are in Appendix A. Field methods are described in Appendix B.

3.1 Drilling, Soil Sample Collection, and Grab Ground-Water Sampling

The soil borings were drilled using the hollow-stem auger drilling method to approximately 2 to 3 feet below the first water-yielding sediments encountered, to total depths of 22 to 23 feet below the ground surface (bgs). Grab ground-water samples were collected from the open boreholes at locations GW-1, GW-2, and GW-3. See Appendix B for details on the methods used to drill the soil borings and collect the soil and grab ground-water samples. Sampling intervals are shown on the logs in Appendix A.

As shown in Figure 3, one of the three grab ground-water sampling locations (GW-1) was located in Harrison Street in the vicinity of the former gasoline UST locations, and the other two grab ground-water sampling locations (GW-2 and GW-3) were located in Alice Street in the vicinity of the former waste oil UST locations.

3.2 Installation of Ground-Water Monitoring Wells

Shallow ground-water monitoring wells MW-2 and MW-3 were installed to depths ranging from 25 feet to 26.5 feet bgs. As shown in Figure 3, well MW-2 is located in Harrison Street, approximately 35 feet north of the former gasoline UST locations, and well MW-3 is located in Alice Street,

approximately 20 feet west of the former waste oil UST locations.

See Appendix B for details on the methods used to install the wells. Well construction data are presented in Table 2, and lithologic logs and well construction details are in Appendix A.

3.3 Well Surveying and Measurement of Water Levels and Product Thickness

The elevations of the tops of the PVC well casings were surveyed to the nearest 0.01 foot relative to mean sea level datum (msl) by Brian, Kangas, and Foulk as described in Appendix B.

Depth-to-water and petroleum product thickness measurements were collected before well development and sampling were conducted (on August 1 and again on August 18). These measurements are presented in Table 3.

3.4 Well Development and Ground-Water Sampling

Previously installed ground-water monitoring well MW-1 (Levine-Fricke 1994) and newly installed ground-water monitoring wells MW-2 and MW-3 were developed and sampled on August 1. See Appendix B for well development and sampling methods. Water quality sampling information sheets are in Appendix C.

4.0 ANALYSIS METHODS

Laboratory certificates for all soil and ground-water analyses are in Appendix D.

4.1 Soil Sample Analysis

Ten soil samples (one from boring GW-2; two from each of the borings GW-1, GW-3, and MW-3; and three from boring MW-2) were submitted to American Environmental Network for analysis. All 10 samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) using EPA Method 5030 GCFID, and for the aromatic constituents benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020. In addition, the soil samples collected from borings GW-2, GW-3, and MW-3, located in Alice Street, were analyzed for total petroleum hydrocarbons as diesel (TPHd) using EPA Method 3510/3550 and gas chromatography/flame ionization detector (GCFID).

4.2 Grab Ground-Water Survey Sample Analysis

Grab ground-water samples GW-1, GW-2, and GW-3 were submitted to American Environmental Network for analysis of total petroleum hydrocarbons as gasoline (TPHg) using EPA Method 5030 GCFID, and the aromatic fuel constituents benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020.

4.3 Ground-Water Sample Analysis

A ground-water sample collected from well MW-2 was submitted to Friedman & Bruya Laboratories of Seattle, Washington, for a fuel characterization analysis.

Ground-water samples collected from monitoring wells MW-1, MW-2, and MW-3 were submitted to American Environmental Network for analysis of TPHg using EPA Method 5030 GCFID and for BTEX using EPA Method 8020. The samples collected from wells MW-1 and MW-3 underwent additional analyses as follows: The sample collected from well MW-1 was analyzed for organic lead using the California Department of Health Services (DHS) Method. The sample collected from well MW-3 was analyzed for TPHd and total petroleum hydrocarbons as oil (TPHo) using EPA Method 3510/3550 GCFID, and for volatile organic compounds (VOCs) using EPA Method 8010. The duplicate sample from MW-3 also was analyzed for TPHd, TPHo, and organic lead.

5.0 PRODUCT THICKNESS, GROUND-WATER ELEVATIONS, AND GROUND-WATER FLOW DIRECTION

As shown in Table 3, no floating petroleum product was detected in wells MW-1 and MW-3. A noncontinuous hydrocarbon sheen was observed on the ground-water surface in well MW-2, but was not measurable using the oil-water interface probe. Ground-water elevations ranged from 14.26 to 14.71 feet msl in the three wells on August 18. These measurements were used to construct the preliminary ground-water elevation contour map shown in Figure 4.

The water levels measured on August 18 appear to indicate that the direction of ground-water flow is toward the northeast, under an estimated horizontal hydraulic gradient of approximately 0.003 foot per foot (ft/ft) as measured between wells MW-1 and MW-2. Because the wells are located at the two ends of the Site and because the Site is relatively long (with a length of approximately 230 feet from Harrison Street to Alice Street, compared to a width of approximately 75 feet),

the placement of the wells near the former locations of the USTs at the Site only allows a preliminary assessment of the ground-water gradient and flow direction.

6.0 ANALYSIS RESULTS

6.1 Soil Analysis Results

Analytical results for soil samples are shown in Table 1 and in Figure 3. The results indicate that no TPHg, BTEX compounds, or TPHd is present in any of the soil samples above the laboratory detection limits, except for benzene and toluene detected in sample MW-2-15 at concentrations of 0.024 part per million (ppm) and 0.007 ppm, respectively.

6.2 Grab Ground-Water Survey Results

Analytical results for the grab ground-water survey samples are shown in Table 4 and in Figure 5. The results indicated that TPHg and BTEX compounds were not present at detectable concentrations in ground water at locations GW-1, GW-2, or GW-3.

6.3 Ground-Water Sample Results

Analytical results for the ground-water samples are presented in Table 4 and illustrated in Figure 5.

In well MW-1, TPHg was present at 170 ppm, benzene at 35 ppm, toluene at 51 ppm, ethylbenzene at 2.4 ppm, and total xylenes at 13 ppm. No organic lead was detected in sample MW-1.

In well MW-2, TPHg was present at 130 ppm, benzene at 28 ppm, toluene at 35 ppm, ethylbenzene at 3 ppm, and total xylenes at 12 ppm. The fuel characterization analysis of the ground-water sample collected from well MW-2 indicated that the hydrocarbons present in well MW-2 consisted of gasoline.

TPHo was detected in the sample and duplicate from well MW-3 at 0.3 ppm and 0.2 ppm, respectively. The VOC scan of sample MW-3 also indicated that 0.002 ppm tetrachloroethene (PCE) was present. No organic lead was detected in either the sample or the duplicate.

7.0 CONCLUSIONS

On the Alice Street side of the Site, no petroleum hydrocarbons were detected in soil samples collected at locations GW-2, GW-3, or MW-3. The ground-water sample and duplicate from well MW-3 contained 0.3 ppm or less TPHo. These results indicate that soil and ground water at those locations have not been significantly affected by petroleum hydrocarbons.

On the Harrison Street side of the Site, TPHg and BTEX were detected in both ground-water samples (MW-1 and MW-2), and low concentrations of benzene and toluene were detected in a soil sample collected from the boring for well MW-2 (MW-2-15). Additionally, a hydrocarbon sheen was observed in well MW-2. No TPHg or BTEX were detected in grab ground-water sample GW-1, which indicates that the lateral extent of TPHg and BTEX compounds is limited in the area southwest of the former gasoline UST locations.

The presence of a hydrocarbon sheen on the ground water in well MW-2 indicates that ~~free-phase petroleum hydrocarbons are present in the vicinity of that well.~~ The fuel characterization analysis performed by Friedman & Bruya identified the hydrocarbons as ~~gasoline~~, which is consistent with the quantitative analysis results from American Environmental Network. The concentrations of TPHg and BTEX detected in ground-water samples collected from monitoring wells MW-1 and MW-2 (both located in the vicinity of the former gasoline UST locations on Harrison Street) were similar in magnitude, and the sheen observed in well MW-2 indicates that those TPHg and BTEX concentrations may be close to the solubility limits of these compounds in ground water.

8.0 RECOMMENDATIONS

Levine·Fricke recommends that ~~quarterly ground-water~~ monitoring continue for the next three quarters in accordance with the Alameda County Health Care Services directive of March 15, 1994. ~~Additionally, we recommend the completion of the lateral and vertical assessment of soil and ground-water quality at the Site.~~

Specifically, we recommend further evaluation of the local ground-water gradient and flow direction through concurrent measurement of ground-water elevations at wells associated with this Site and wells on the nearby former Chevron site (at the intersection of Harrison Street and 14th Avenue). The

scope of additional subsurface investigation should be defined on the basis of those ground-water elevation measurements and subsequent discussions with the ACHCSA.

We also recommend that, as part of the next sampling event at the wells associated with this Site, EPA Method 8010 analysis be performed on ground-water samples to confirm the presence of PCE in well MW-3 and to assess whether PCE may be pervasive in local ground water.

9.0 FUTURE ACTIVITIES

A concurrent measurement of ground-water elevations at the Site and the nearby former Chevron site is scheduled for the week of September 12, 1994. Based on those results, Levine•Fricke will develop a new ground-water elevation contour map. We plan to submit this map to the ACHCSA by October 1, 1994, with a schedule for quarterly ground-water monitoring.

10.0 REFERENCES

- Levine•Fricke. 1993. Work Plan for Soil and Ground-Water Investigation, Harrison Street Garage Site, 1432-1434 Harrison Street, Oakland, California. October 13.
- . 1994. Tank Closure Report on Removal of Underground Fuel Storage Tanks and Related Structures, Harrison Street Garage, 1432-1434 Harrison Street, Oakland, California. February 22.
- RGA Environmental, Inc. 1992. Preliminary Site Assessment Report, Harrison Garage, 1432-1434 Harrison Street, Oakland, California. April 2.
- Subsurface Consultants, Inc. 1990. Preliminary Subsurface Investigation, 1432 Harrison Street, Oakland, California. October 19.

TABLE 1
SOIL QUALITY RESULTS
HARRISON STREET GARAGE
1432 - 1434 HARRISON STREET, OAKLAND, CALIFORNIA
(all results in parts per million [ppm])

Sample ID	Date Collected	Consultant/ Laboratory	Depth (ft, bgs)	TPHg/ TVHg	Benzene	Toluene	Ethyl- benzene	Xylenes	TPHd	Kerosene	O&G	PCBs	CL-HCs	VOCs	Soluble Pb	Pb	Metals Hg	Ni	Se
Former Waste Oil Tank Area (Basement)																			
B6a9'	17-Sep-90	SCI/C&T	9	NA	<0.005	<0.005	<0.005	<0.005	<10	98	<50	0.009*	ND	NA	0.06	NA	NA	NA	NA
B6a9.5'	17-Sep-90	SCI/C&T	9.5	NA	NA	NA	NA	NA	<10	140	<50	NA	NA	NA	NA	NA	NA	NA	NA
B1-2'	16-Jan-92	RGA/CAL	2	27.3	<0.005	3	0.23	<0.005	55.7	NA	54.2	ND	ND	ND	NA	<2.2	50.7	21.9	15.3
B2-2'	16-Jan-92	RGA/CAL	2	<1	<0.005	0.1	<0.005	<0.005	1.5	NA	<20	ND	ND	ND	NA	<2.2	49.7	16.9	<7.5
B3-2'	16-Jan-92	RGA/CAL	2	1.6	<0.005	1.1	<0.005	<0.005	1.6	NA	<20	ND	ND	ND	NA	<2.2	54.2	33.6	17
B4-2'	16-Jan-92	RGA/CAL	2	1.9	<0.005	0.8	<0.005	<0.005	24.1	NA	54.8	ND	ND	ND	NA	<2.2	66.5	45.6	19.2
B5-2'	16-Jan-92	RGA/CAL	2	<1	<0.005	0.4	<0.005	<0.005	2.5	NA	50.9	ND	ND	ND	NA	<2.2	73	47.2	19.2
B6-2'	16-Jan-92	RGA/CAL	2	<1	<0.005	0.4	<0.005	<0.005	24.3	NA	<20	ND	ND	ND	NA	<2.2	66.7	41.4	16.9
B7-2'	16-Jan-92	RGA/CAL	2	2.6	<0.005	1.6	<0.005	<0.005	6.3	NA	221	ND	ND	(1)	NA	<2.2	74.2	36.3	18.9
B8-2'	16-Jan-92	RGA/CAL	2	<1	<0.005	0.04	<0.005	<0.005	2.9	NA	55.1	ND	ND	ND	NA	<2.2	52.9	30.8	15.3
B9-5'***	22-Jan-92	RGA/CAL	5	2.44	NA	<0.005	NA	NA	11.1	NA	NA	ND	NA	ND	NA	7.53	21.5	59.8	11.6
B10-8'***	22-Jan-92	RGA/CAL	8	<1	NA	<0.005	NA	NA	109	NA	NA	ND	NA	ND	NA	5.63	15.5	34.9	<7.5
E.WALL-8.5B (6)	24-Nov-93	LF/AEN	8.5	820	1.4	7.7	3.9	13	NA	NA	19000	NA	NA	NA	NA	NA	NA	NA	NA
S.WALL-9.5B (7)	24-Nov-93	LF/AEN	9.5	<0.2	0.005	0.022	<0.005	0.02	NA	NA	20	NA	NA	NA	NA	NA	NA	NA	NA
N.WALL-9B (8)	24-Nov-93	LF/AEN	9	<800	<0.05	0.52	1.8	3.4	NA	NA	180	NA	NA	NA	NA	NA	NA	NA	NA
W.WALL-9B	24-Nov-93	LF/AEN	9	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA	NA
N.TANK-10B (9)	24-Nov-93	LF/AEN	10	1300	1.5	2.7	5.9	10	NA	NA	14000	NA	NA	NA	NA	NA	NA	NA	NA
S.TANK-10B (10)	24-Nov-93	LF/AEN	10	<400	<0.2	<0.2	<0.2	<0.2	NA	NA	4800	NA	NA	NA	NA	NA	NA	NA	NA
GW-2-14'	29-Jul-94	LF/AEN	14	<0.2	<0.005	<0.005	<0.005	<0.005	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-3-10'	29-Jul-94	LF/AEN	10	<0.2	<0.005	<0.005	<0.005	<0.005	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-3-15'	29-Jul-94	LF/AEN	15	<0.2	<0.005	<0.005	<0.005	<0.005	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3-10'	30-Jul-94	LF/AEN	10	<0.2	<0.005	<0.005	<0.005	<0.005	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3-15'	30-Jul-94	LF/AEN	15	<0.2	<0.005	<0.005	<0.005	<0.005	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Former Hydraulic Lift Area																			
B4a10'	17-Sep-90	SCI/C&T	10	NA	NA	NA	NA	NA	1700	<100	6300	NA	NA	NA	NA	NA	NA	NA	NA
B5a22.5'	17-Sep-90	SCI/C&T	22.5	110	0.024	0.21	0.069	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B13-5'	21-Jan-92	RGA/CAL	5	83.2	<0.005	0.068	1.23	<0.005	1.63	NA	NA	0.245	NA	ND	NA	17.4	45.4	46.1	21.9
B13-15'	21-Jan-92	RGA/CAL	15	135	NA	0.71	NA	8.85	<1	NA	NA	ND	NA	ND	NA	13.8	35.5	128.4	15.5
B14-5'	21-Jan-92	RGA/CAL	5	<1	<0.005	NA	NA	NA	<1	NA	NA	ND	NA	ND	NA	11.2	28.1	39.4	12.3
B14-15'	21-Jan-92	RGA/CAL	15	2.5	NA	NA	<0.005	NA	17.3	NA	NA	ND	NA	ND	NA	13.2	32.8	376.2	15.3
B15-5'	30-Jan-92	RGA/CAL	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	26.6	29.4	56.6	9.02
B15-15'	30-Jan-92	RGA/CAL	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	16.7	33.2	72.3	15.5
B16-5'	30-Jan-92	RGA/CAL	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	14.3	44.9	60.3	15.2
B16-15'	30-Jan-92	RGA/CAL	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	10.2	34.7	48.4	8.81

TABLE 1
SOIL QUALITY RESULTS
HARRISON STREET GARAGE
1432 - 1434 HARRISON STREET, OAKLAND, CALIFORNIA
(all results in parts per million [ppm])

Sample ID	Date Collected	Consultant/ Laboratory	Depth (ft, bgs)	TPHg/ TVHg	Benzene	Toluene	Ethyl- benzene	Xylenes	TPHd	Kerosene	O&G	PCBs	CL-HCs	VOCs	Soluble Pb	Pb	Metals Hg	Ni	Se
SUMP 5.5H (3)	29-Nov-93	LF/AEN	5.5	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	<10	ND	NA	NA	NA	2	<0.06	50	<2
HOIST-1-8H	29-Nov-93	LF/AEN	8	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA	NA
HOIST 2-9.5WH (2)	29-Nov-93	LF/AEN	9.5	0.3	<0.005	<0.005	<0.005	<0.005	NA	NA	17000	NA	NA	NA	NA	NA	NA	NA	NA
HOIST 2-11.5H	29-Nov-93	LF/AEN	11.5	970	2.9	14	4.2	24	NA	NA	5100	NA	NA	NA	NA	NA	NA	NA	NA
HOIST 2-9EH	29-Nov-93	LF/AEN	9	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA	NA
E. VAULT-6.5H	29-Nov-93	LF/AEN	6.5	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA	NA
N. VAULT-7H (4)	29-Nov-93	LF/AEN	7	4.1	<0.005	<0.005	<0.005	23	NA	NA	1700	NA	NA	NA	NA	NA	NA	NA	NA
VAULT-BASE-9.5H (5)	29-Nov-93	LF/AEN	9.5	380	0.05	0.69	0.22	2	NA	NA	14000	NA	NA	NA	NA	NA	NA	NA	NA
Former Gasoline Tank Area																			
1a20.0'	25-Jul-90	SCI/C&T	20	6300	99	490	110	610	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2a18.5'	25-Jul-90	SCI/C&T	18.5	9300	98	900	190	1100	NA	NA	NA	NA	NA	NA	0.21	NA	NA	NA	NA
B7a13'	21-Sep-90	SCI/C&T	13	<1	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B7a20'	21-Sep-90	SCI/C&T	20	2500	3.5	34	33	130	NA	NA	NA	NA	NA	NA	0.07	NA	NA	NA	NA
B8a22 1/2'	21-Sep-90	SCI/C&T	22.5	1200	2.3	38	18	89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B17-5'	03-Feb-92	RGA/CAL	5	NA	NA	NA	NA	NA	NA	NA	39.1	ND	NA	ND	NA	10.4	3.56	329.2	6.24*
B19-5'	03-Feb-92	RGA/CAL	5	2.5	<0.005	<0.005	<0.005	0.01	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B20-5'	03-Feb-92	RGA/CAL	5	2.1	<0.005	0.03	<0.005	0.01	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B20-15'	03-Feb-92	RGA/CAL	15	2.5	<0.005	0.034	<0.005	<0.005	<1	NA	35.2	ND	NA	NA	NA	10.4	2.48	224.8	<7.5
B21-5'	05-Feb-92	RGA/CAL	5	2.1	<0.005	0.02	<0.005	0.01	16.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B21-10'	05-Feb-92	RGA/CAL	10	1.9	<0.005	0.021	<0.005	0.026	15.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B21-15'	05-Feb-92	RGA/CAL	15	2	<0.005	0.03	<0.005	<0.005	22.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-5'	05-Feb-92	RGA/CAL	5	42.3	<0.005	0.113	<0.005	2.13	670	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B22-10'	05-Feb-92	RGA/CAL	10	1540	0.987	11.7	1.67	2.88	175	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B23-5'	05-Feb-92	RGA/CAL	5	2.5	<0.005	0.027	<0.005	<0.005	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B23-10'	05-Feb-92	RGA/CAL	10	3.3	<0.005	0.034	<0.005	<0.005	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LFSB1-4.0	22-May-93	LF/AEN	4	0.5	<0.005	0.01	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LFSB1-14.0	22-May-93	LF/AEN	14	<0.2	0.020	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LFSB1-24.5	22-May-93	LF/AEN	24.5	8800	210	980	160	750	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LFSB2-9.5	22-May-93	LF/AEN	9.5	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LFSB2-19.5	22-May-93	LF/AEN	19.5	1000	<0.2	9.4	16	68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LFSB2-24.5	22-May-93	LF/AEN	24.5	6100	91	320	120	410	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
S. TANK-8FG	06-Dec-93	LF/AEN	8	1500	0.87	43	34	240	NA	NA	NA	NA	NA	NA	<0.5#	4	NA	NA	NA
S. TANK-8G	06-Dec-93	LF/AEN	8	43	0.006	0.088	0.25	1.8	NA	NA	NA	NA	NA	NA	<0.5#	4	NA	NA	NA
N. TANK-7.5G	06-Dec-93	LF/AEN	7.5	3100	11	190	64	400	NA	NA	NA	NA	NA	NA	1.9#	8	NA	NA	NA
N. TANK-8.5FG	06-Dec-93	LF/AEN	8.5	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	<0.5#	4	NA	NA	NA

TABLE 1
 SOIL QUALITY RESULTS
 HARRISON STREET GARAGE
 1432 - 1434 HARRISON STREET, OAKLAND, CALIFORNIA
 (all results in parts per million (ppm))

Sample ID	Date Collected	Consultant/ Laboratory	Depth (ft, bgs)	TPHg/ TVHg	Benzene	Toluene	Ethyl- benzene	Xylenes	TPHd	Kerosene	O&G	PCBs	CL-HCs	VOCs	Soluble Pb	Pb	Metals Hg	Ni	Se
E.WALL-3G	15-Dec-93	LF/AEN	3	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
S.WALL-3G	15-Dec-93	LF/AEN	3	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N.WALL-3G	16-Dec-93	LF/AEN	3	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W.WALL-3-N	29-Dec-93	LF/AEN	3	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W.WALL-3-S	29-Dec-93	LF/AEN	3	0.5	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PJ-2G	07-Dec-93	LF/AEN	2	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DSP-2G	07-Dec-93	LF/AEN	2	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2-5'	30-Jul-94	LF/AEN	5	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2-9.5'	30-Jul-94	LF/AEN	9.5	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2-15'	30-Jul-94	LF/AEN	15	<0.2	<0.005	0.007	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-1-10'	30-Jul-94	LF/AEN	10	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-1-15'	30-Jul-94	LF/AEN	15	<0.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Data entered by MEK/24 Aug 94 Data proofed by TMB QA/QC by THB

NOTES TO TABLE 1:

- NA = Not analyzed
- ND = Not detected
- * Reported concentration is lower than the detection limit
- ** Samples may have exceeded holding time prior to analysis (except for metals)
- # Concentrations reported are Organic Lead by DHS Method.

Consultants:

SCI = Subsurface Consultants Incorporated, Oakland, California
 RGA = RGA Environmental Consulting, Emeryville, California
 L-F = Levine-Fricke Incorporated, Emeryville, California

Analytical Laboratories:

C&T = Curtis & Tompkins Limited, Berkeley, California
 CAL = Carter Analytical Laboratory, Campbell, California
 AEN = American Environmental Network, Pleasant Hill, California

TABLE 1
SOIL QUALITY RESULTS
HARRISON STREET GARAGE
1432 - 1434 HARRISON STREET, OAKLAND, CALIFORNIA
(all results in parts per million [ppm])

Sample ID	Date Collected	Consultant/ Laboratory	Depth (ft, bgs)	TPHg/ TVHg	Benzene	Toluene	Ethyl- benzene	Xylenes	TPhd	Kerosene	O&G	PCBs	CL-HCs	VOCs	Soluble Pb	Pb	Metals Hg	Ni	Se
-----------	----------------	------------------------	-----------------	------------	---------	---------	----------------	---------	------	----------	-----	------	--------	------	------------	----	-----------	----	----

Analyses/Methods:

TPHg/TVHg = Total Petroleum/Volatile Hydrocarbons as Gasoline. C&T used a DOHS method, CAL did not specify the method used, and AEN used EPA Method 5030 GCFID.
Benzene, Toluene, Ethylbenzene, and Xylenes = C&T and AEN used EPA Method 8020. CAL did not specify the method used.
TPhd = Total Petroleum Hydrocarbons as Diesel. C&T used a DOHS method and CAL did not specify the method used. AEN used EPA Method 3510/3550 GCFID.
Kerosene = C&T used a DOHS method.
O&G = Oil and Grease. C&T used Standard Method 5520 E,F and CAL used EPA Method 413.1 or 413.2.
PCBs = Polychlorinated Biphenyls. The total result is listed in the table. C&T and CAL used EPA Method 8080 for PCBs.
CL-HCs = Chlorinated Hydrocarbons (Halogenated Volatile Organics). C&T and CAL used EPA Method 8010.
VOCs = Volatile Organic Compounds. C&T and CAL used EPA Method 8240.
Soluble Pb = Soluble Lead. C&T used EPA Method 7420.
Pb = Lead. CAL used EPA Method 6010.
Hg = Mercury. CAL used EPA Method 6010.
Ni = Nickel. CAL used EPA Method 6010.
Se = Selenium. CAL used EPA Method 6010.

- (1) Toluene detected at 0.17 ppm.
- (2) Hydrocarbons detected at 17,000 ppm.
- (3) Arsenic detected at 2 ppm, barium at 61 ppm, beryllium at 0.2 ppm, cadmium at 0.1 ppm, cobalt at 8.1 ppm, chromium at 49 ppm, copper at 17 ppm, vanadium at 32 ppm, and zinc at 33 ppm.
- (4) Hydrocarbons detected at 1,500 ppm.
- (5) Hydrocarbons detected at 14,000 ppm.
- (6) Hydrocarbons detected at 17,000 ppm.
- (7) Hydrocarbons detected at 10 ppm.
- (8) Hydrocarbons detected at 170 ppm.
- (9) Hydrocarbons detected at 13,000 ppm.
- (10) Hydrocarbons detected at 4,200 ppm.

The EPA Method 8020 benzene, toluene, ethylbenzene, and xylene results listed in this table were analyzed separately from the VOC EPA 8240 analysis. If benzene, toluene, ethylbenzene, or xylenes were detected by the EPA 8240 analysis, they are listed under the VOC heading.
This table presents soil-quality data obtained from environmental assessments at the Harrison Garage site in Oakland, California. Included is data obtained by SCI, RGA, and Levine-Fricke.

TABLE 2
WELL CONSTRUCTION DATA
HARRISON STREET GARAGE
OAKLAND, CALIFORNIA

Well Number	Well Elevation (feet, msl)	Casing Diameter (inches)	Well Depth (feet, bgs)	Perforated Interval (feet, msl)
MW-1	34.95	4	26.5	19.8 - 9.8
MW-2	35.18	2	26.0	24.4 - 9.4
MW-3	33.97	2	25.0	19.8 - 9.8

Data entered by MEK/24 Aug 94 Data proofed by THB

Elevation data from Brian, Kangas, Foulk, August 1994.

bgs - below ground surface
msl - mean sea level

TABLE 3
 HISTORICAL GROUND-WATER ELEVATIONS AND PRODUCT THICKNESS
 HARRISON STREET GARAGE
 OAKLAND, CALIFORNIA

Well Elevation:	Ground-Water Elevation (feet, msl)			Product Thickness (feet)		
	MW-1	MW-2	MW-3	MW-1	MW-2	MW-3
	34.95	35.18	33.97			

	Date					

01-Aug-94	14.79	14.68	14.31	ND	sheen	ND
18-Aug-94	14.71	14.57	14.26	ND	sheen	ND

Data entered by MEK/24 Aug 94 Data proofed by TMB

msl - mean sea level
 ND - not detected
 NI - not installed

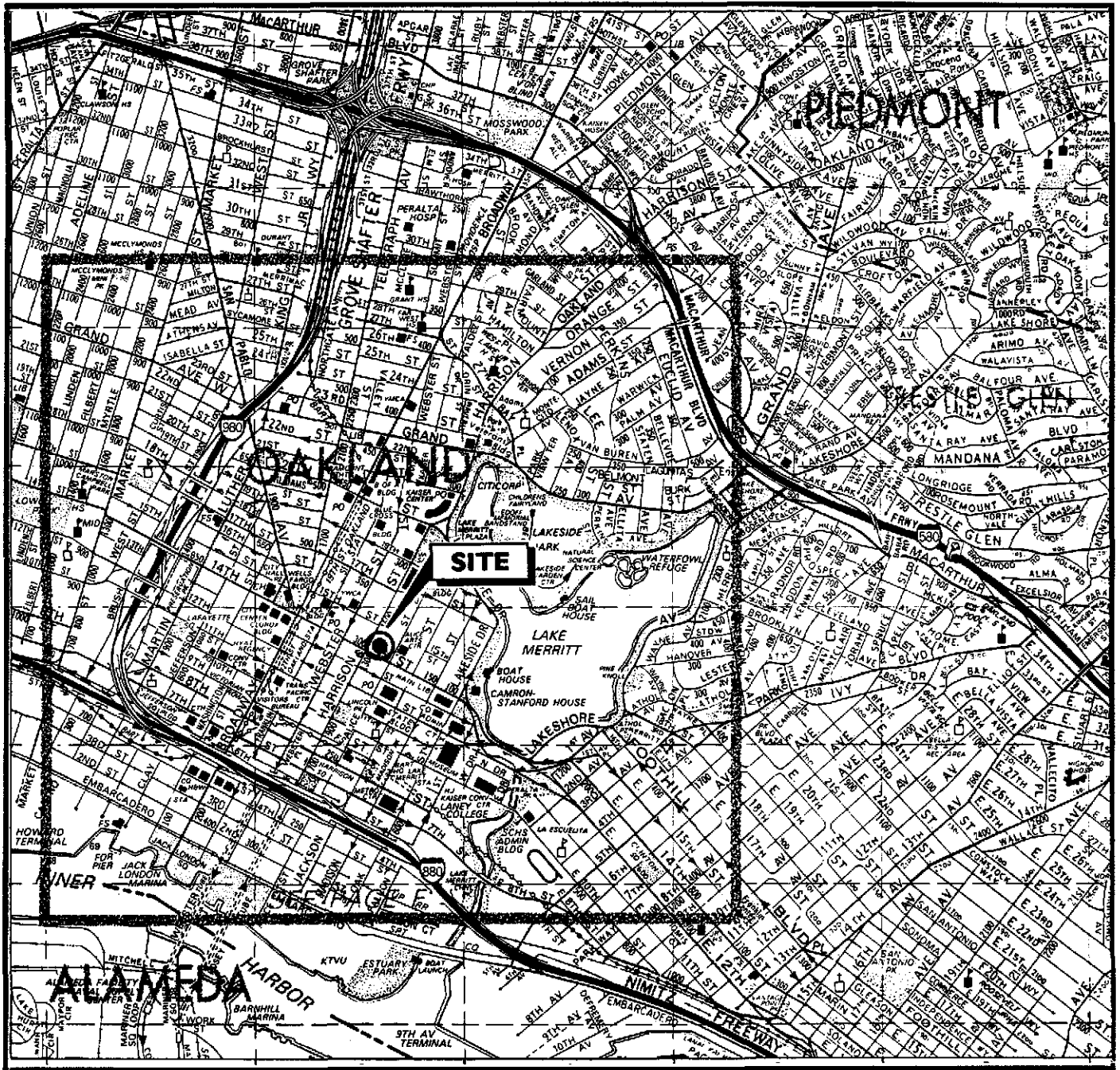
TABLE 4
GROUND-WATER QUALITY RESULTS
HARRISON STREET GARAGE
1432 - 1434 HARRISON STREET, OAKLAND, CALIFORNIA
(all results in parts per million [ppm])

Sample Number	Date Collected	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	TPHd	TPHo	VOCs	Organic Lead
----- Former Waste Oil Tank Area -----										
GW-2 (1)	29-Jul-94	<0.05	<0.0005	<0.0005	<0.0005	<0.002	NA	NA	NA	NA
GW-3 (1)	29-Jul-94	<0.05	<0.0005	<0.0005	<0.0005	<0.002	NA	NA	NA	NA
MW-3	01-Aug-94	<0.05	<0.0005	<0.0005	<0.0005	<0.002	<0.05	0.3	(2)	<0.1
	duplicate	NA	NA	NA	NA	NA	<0.05	0.2	NA	<0.1
----- Former Gasoline Tank Area -----										
GW-1 (1)	30-Jul-94	<0.05	<0.0005	<0.0005	<0.0005	<0.002	NA	NA	NA	NA
MW-1	01-Aug-94	51	51	51	2.4	13	NA	NA	NA	<0.1
MW-2	01-Aug-94	35	35	35	3	12	NA	NA	NA	NA

=====
Data entered by MEK/24 Aug 94 Data proofed by THB QA/QC by THB

TPHd - total petroleum hydrocarbons as diesel by EPA Method 3510/3550 GCFID.
TPHg - total petroleum hydrocarbons as gasoline by EPA Method 5030 GCFID.
TPHo - total petroleum hydrocarbons as oil by EPA Method 3510/3550 GCFID.

(1) Grab ground-water sample collected from the borehole when ground water was first encountered.
(2) 0.002 ppm tetrachloroethene (PCE) detected. All other compounds below minimum detection limit of 0.0005 ppm.



SOURCE: Thomas Bros. map.
Alameda County



Figure 1 : SITE VICINITY MAP

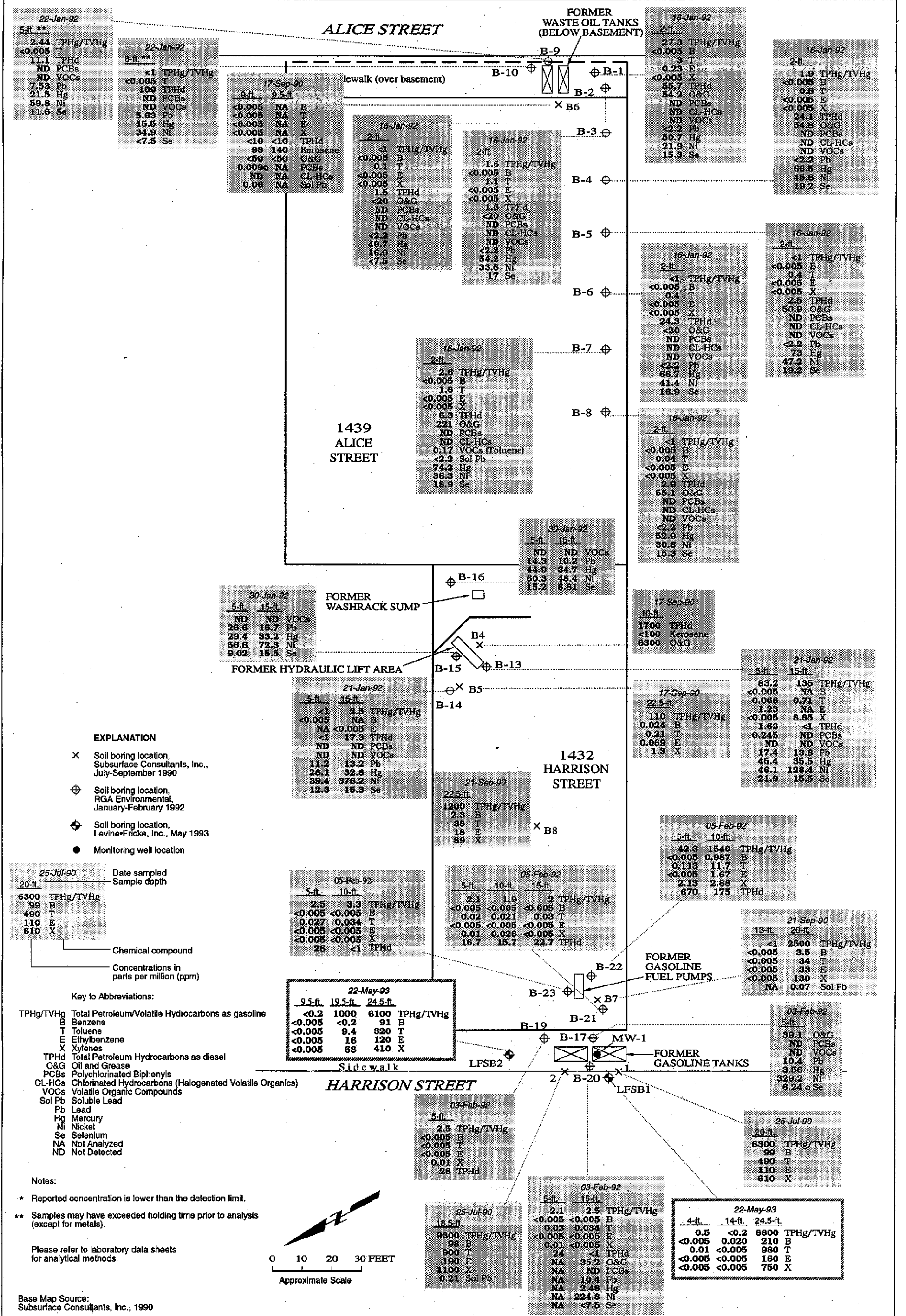


Figure 2 : RESULTS OF SOIL QUALITY ANALYSIS PERFORMED DURING PREVIOUS INVESTIGATIONS AT THE HARRISON STREET GARAGE IN OAKLAND, CALIFORNIA

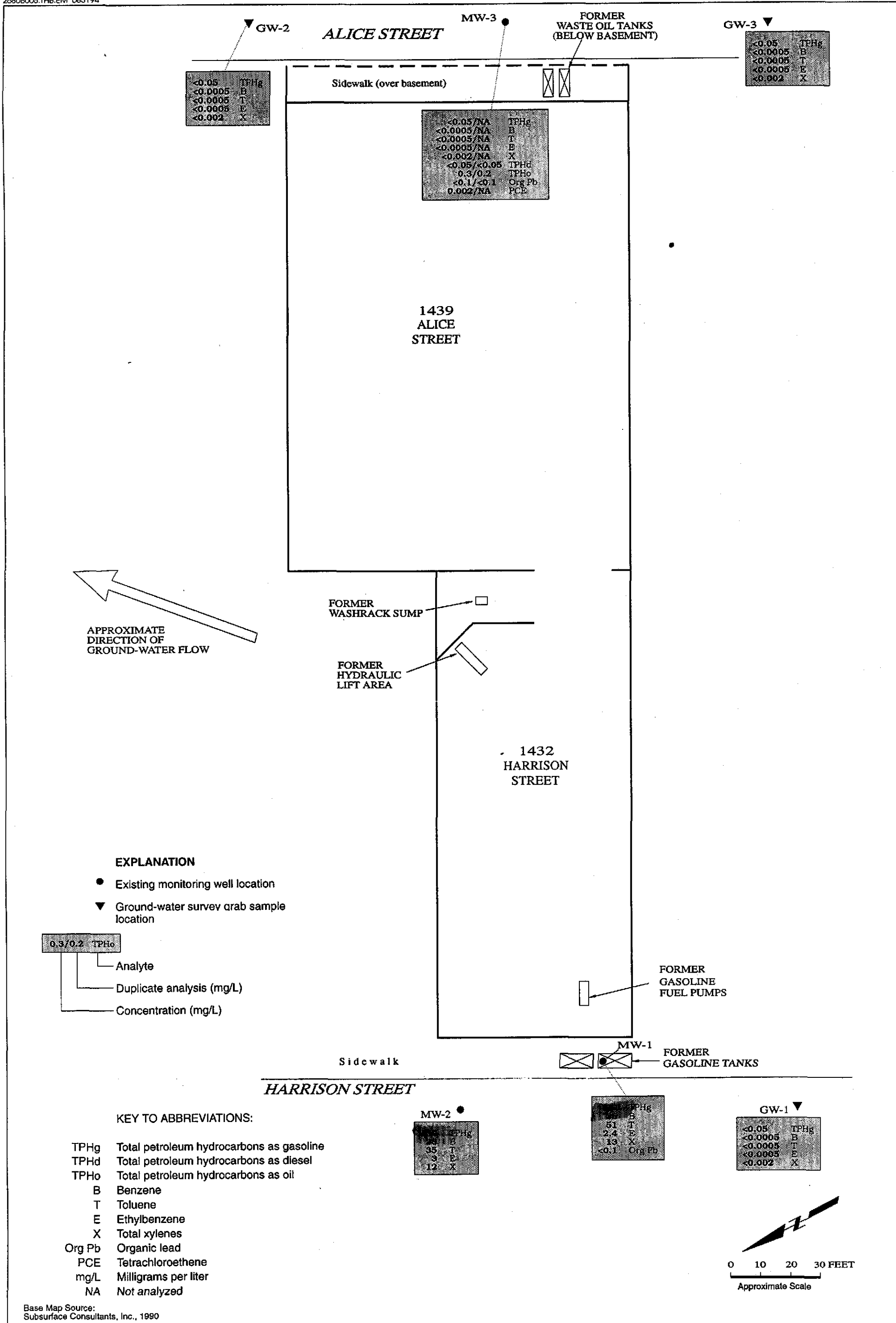


Figure 5 : GROUND-WATER ANALYSIS RESULTS (mg/L) AT THE HARRISON STREET GARAGE IN OAKLAND, CALIFORNIA

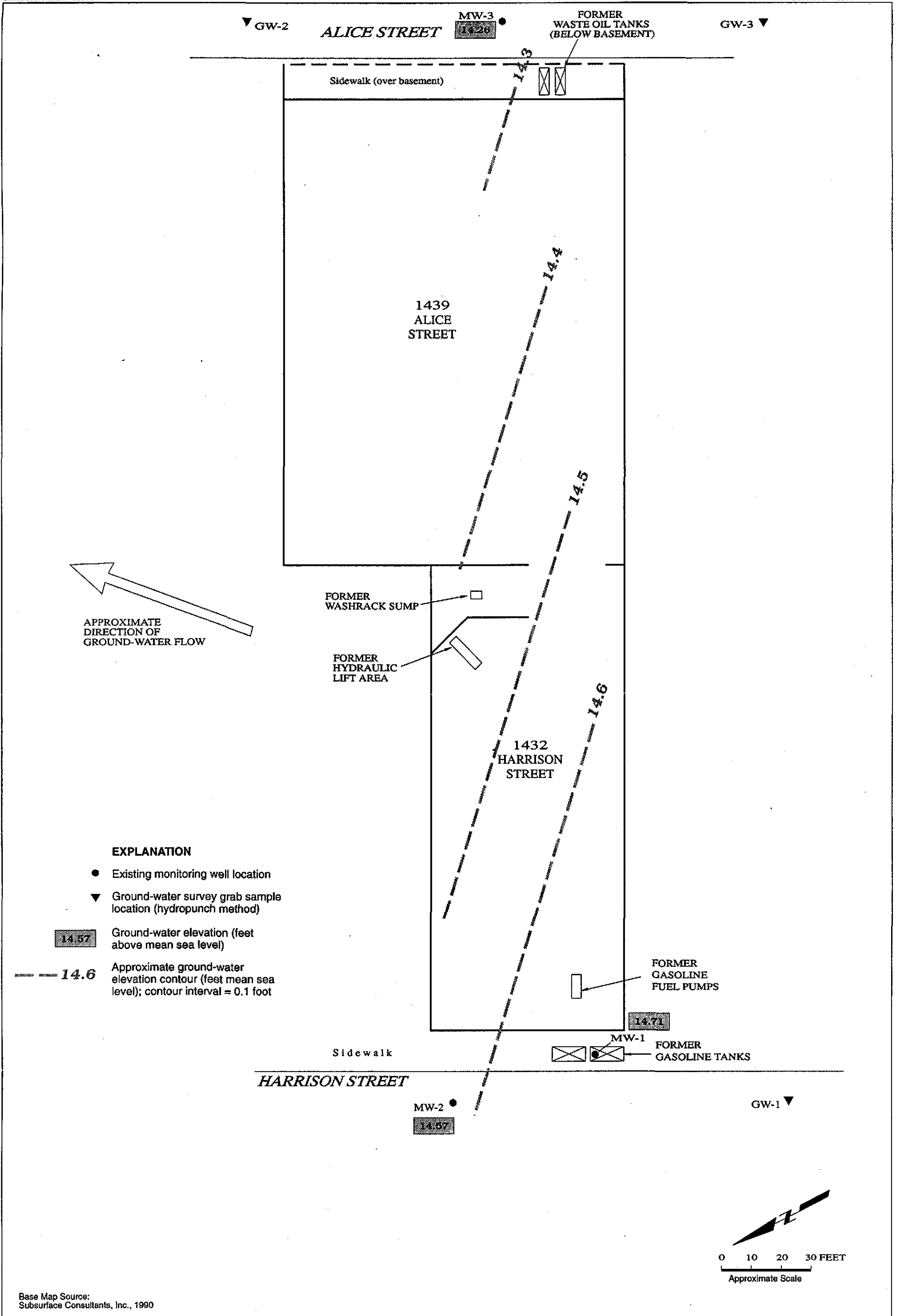


Figure 4 : PRELIMINARY SHALLOW GROUND-WATER ELEVATION CONTOUR MAP (feet, msl) FOR AUGUST 18, 1994 AT THE HARRISON STREET GARAGE, OAKLAND, CALIFORNIA

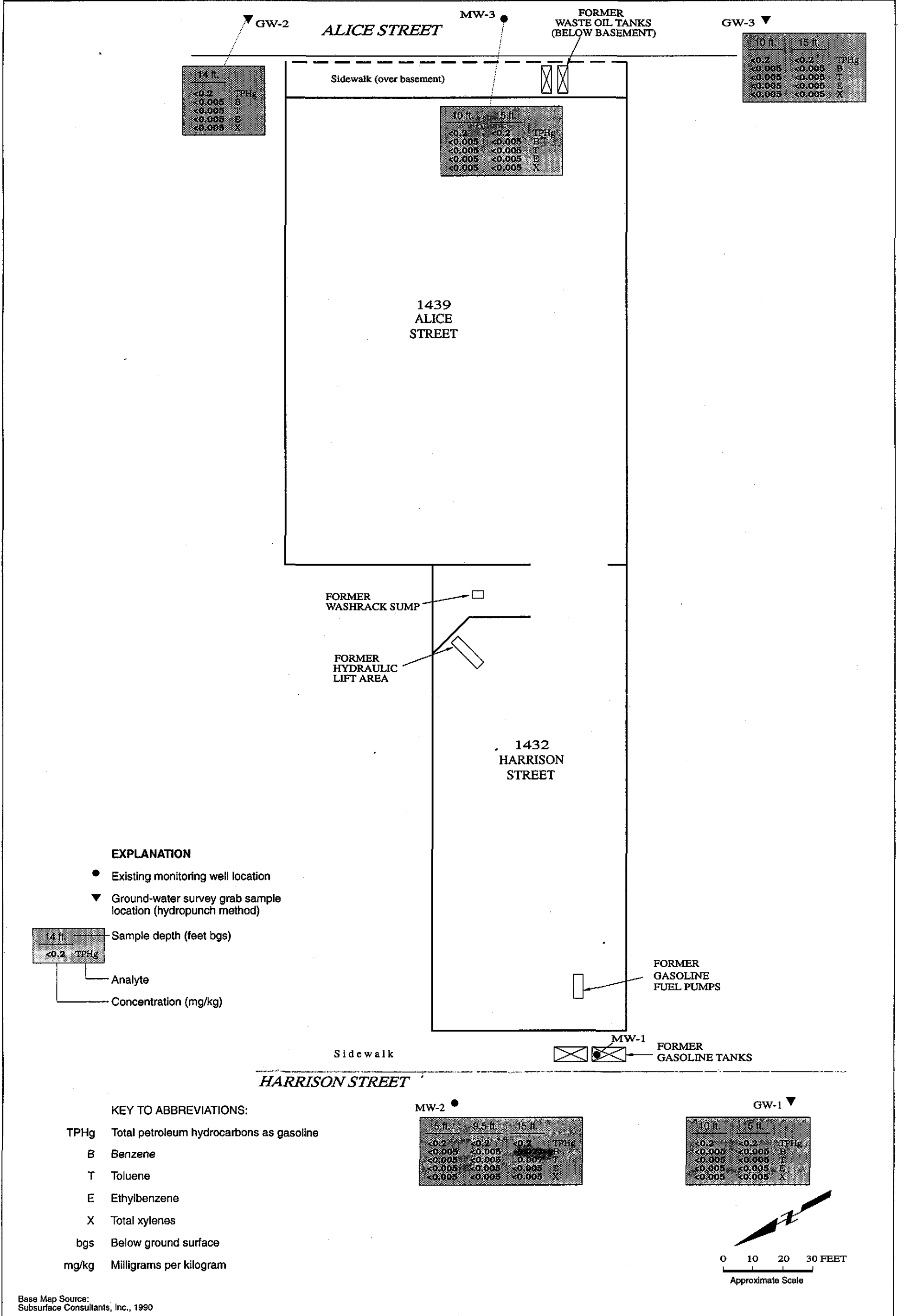


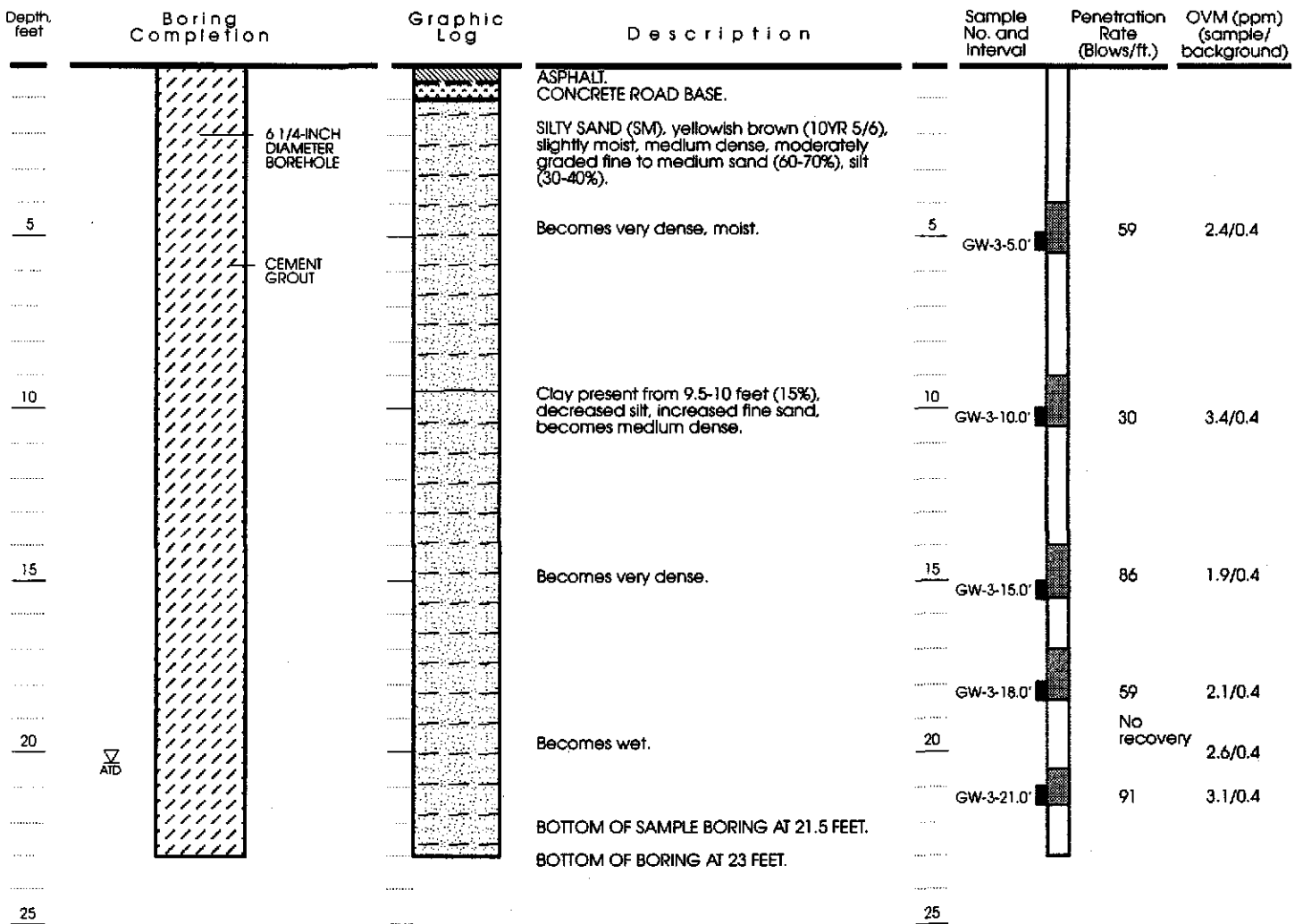
Figure 3 : SOIL AND GROUND-WATER SURVEY SAMPLING LOCATIONS, MONITORING WELLS, AND SOIL ANALYSIS RESULTS (mg/kg) AT THE HARRISON STREET GARAGE IN OAKLAND, CALIFORNIA

APPENDIX A

LITHOLOGIC AND WELL CONSTRUCTION LOGS

LITHOLOGY

SAMPLE DATA



▽
ATD

EXPLANATION

- Clay
- Silt
- Sand
- Gravel

GW-3-5.0' Modified California Sampler
 Sample retained for possible chemical analysis

▽
ATD First water encountered in borehole at time of drilling

OVM Organic vapor meter reading in parts per million (ppm)

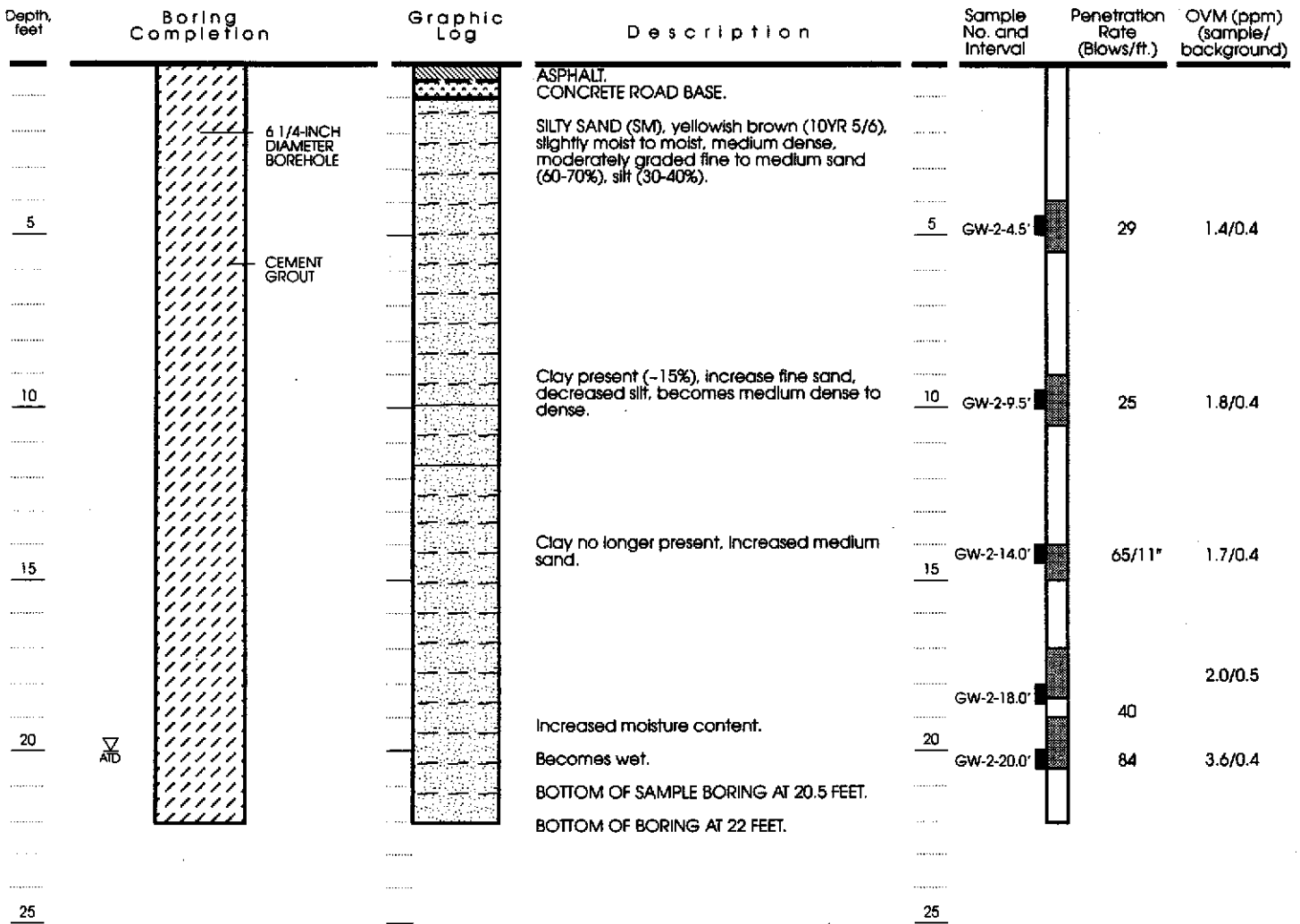
Date boring drilled: July 29, 1994
 Drilling Company: Spectrum
 Driller: John
 Drilling method: Hollow Stem Auger
 Hammer weight: 140 lbs.
 LF Geologist: Tim Limbers

Approved by: *John Shawne RG 5714*

Figure A3 : LITHOLOGY AND SAMPLE DATA FOR SOIL BORING GW-3 (page 1 of 1)





LITHOLOGY





SAMPLE DATA



Date boring drilled: July 29, 1994
 Drilling Company: Spectrum
 Driller: John
 Drilling method: Hollow Stem Auger
 Hammer weight: 140 lbs.
 LF Geologist: Tim Umbers

EXPLANATION

-  Clay
-  Silt
-  Sand
-  Gravel

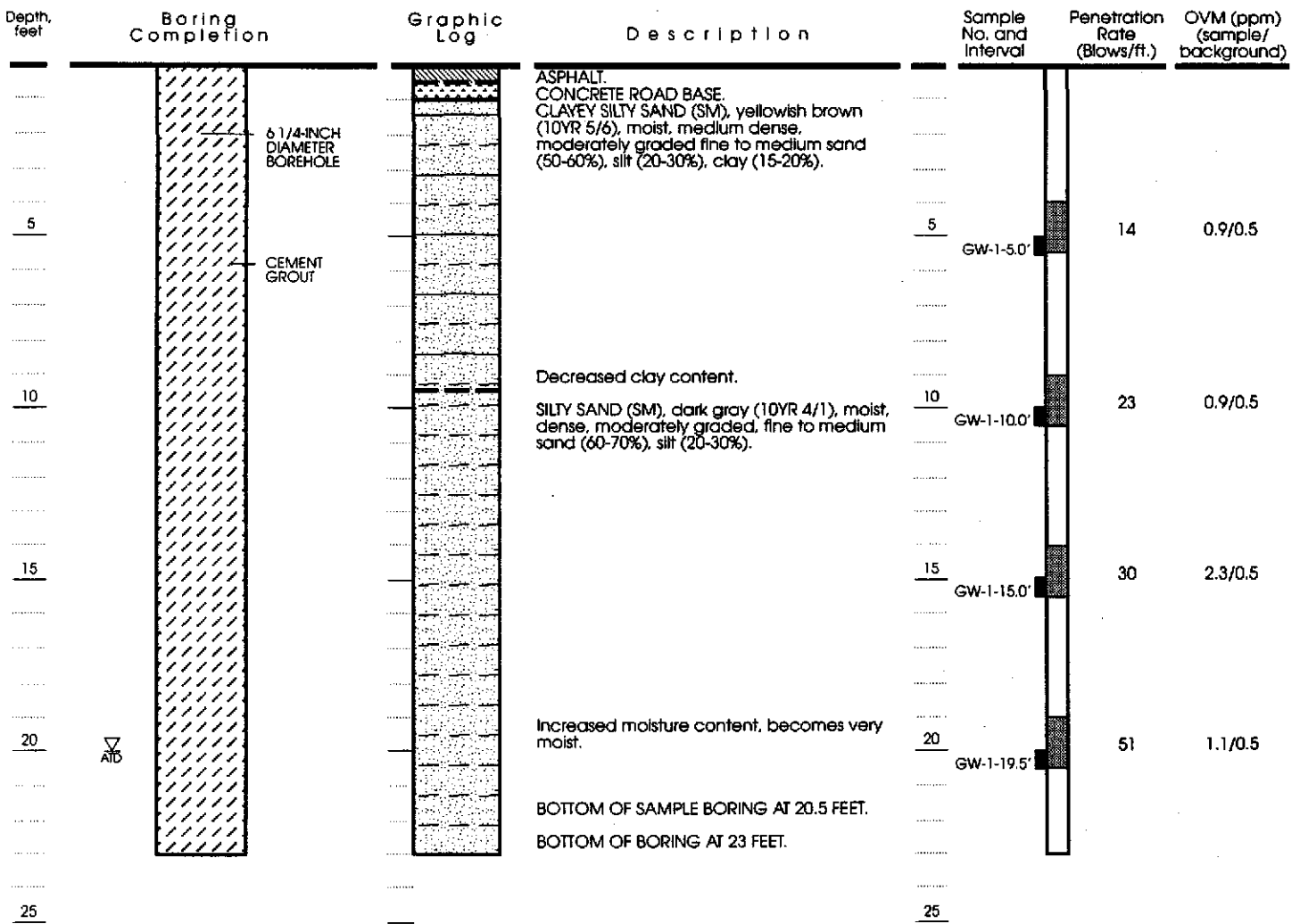
-  Modified California Sampler
-  Sample retained for possible chemical analysis
-  First water encountered in borehole at time of drilling
-  OVM Organic vapor meter reading in (ppm) parts per million (ppm)

Approved by: *John Sturmer* RG 5714

Figure A2 : LITHOLOGY AND SAMPLE DATA FOR SOIL BORING GW-2 (page 1 of 1)

LITHOLOGY

SAMPLE DATA



Date boring drilled: July 30, 1994
 Drilling Company: Spectrum
 Driller: John
 Drilling method: Hollow Stem Auger
 Hammer weight: 140 lbs.
 LF Geologist: Tim Limbers

EXPLANATION

- Clay
- Silt
- Sand
- Gravel

- Modified California Sampler
- Sample retained for possible chemical analysis
- First water encountered in borehole at time of drilling
- OVM Organic vapor meter reading in parts per million (ppm)

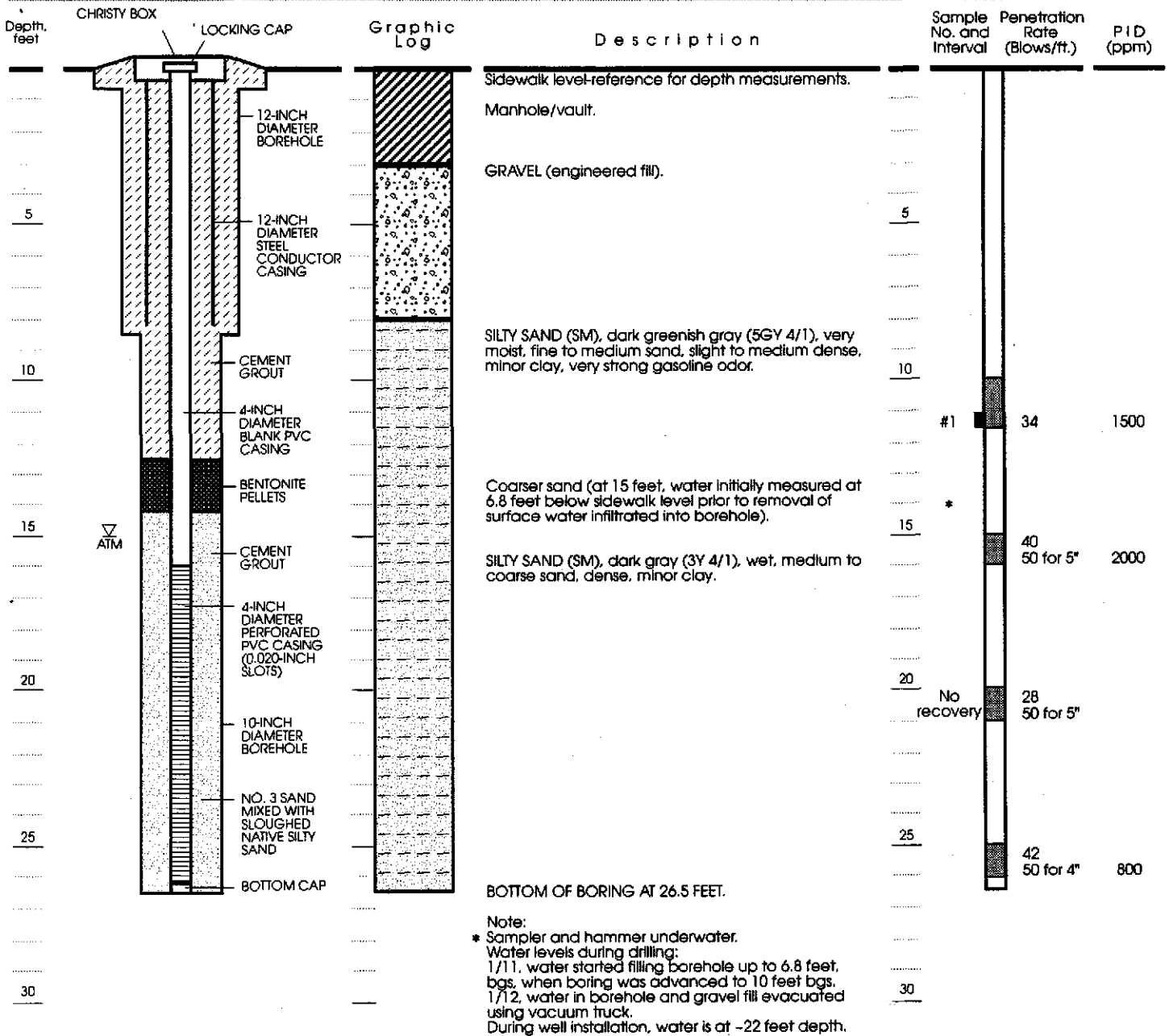
Approved by: *John Sturmer* RG 5714

Figure A1 : LITHOLOGY AND SAMPLE DATA FOR SOIL BORING GW-1 (page 1 of 1)

WELL CONSTRUCTION

LITHOLOGY

SAMPLE DATA



Date well drilled: January 11-12, 1994
 Drilling company: West Hazmat Drilling Corp.
 Driller: Randy
 LF Geologist: Thomas Zakaria

- Clay
- Silt
- Sand
- Gravel
- 2-inch Modified California Sampler
- Sample retained for chemical analysis
- PID (ppm) Microtip (Photoionization detector) reading in parts per million
- First water encountered in borehole at time of drilling
- bgs below ground surface

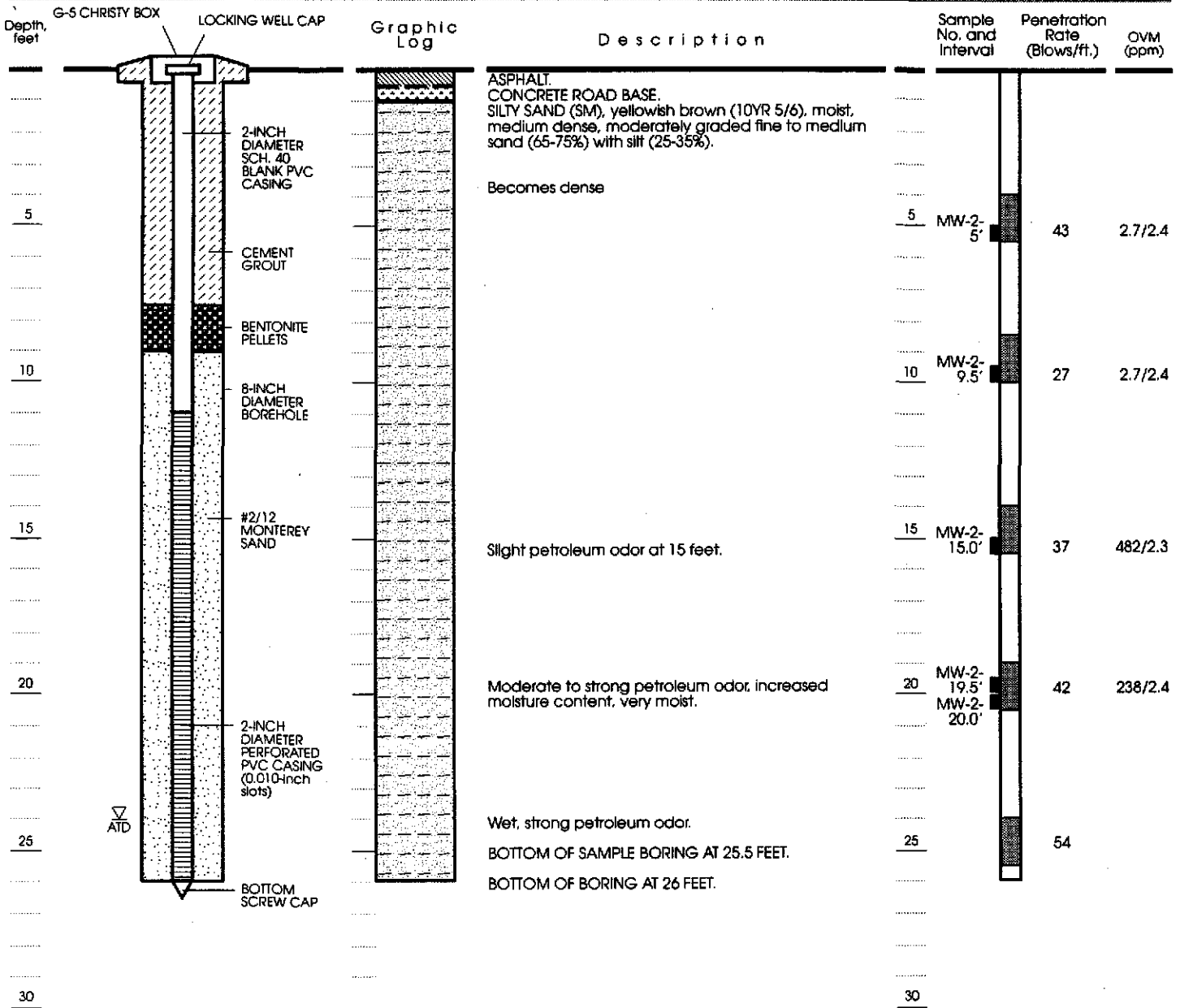
Approved by: *J. Howard R65714*

Figure A4 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL MW-1 (page 1 of 1)

WELL CONSTRUCTION

LITHOLOGY

SAMPLE DATA



Date well drilled: July 30, 1994
 Drilling company: Spectrum
 Driller: John
 Drilling Method: Hollow-Stem Auger
 Hammer weight: 140 lbs.
 LF Geologist: Tim Limbers

EXPLANATION

- Clay
- Silt
- Sand
- Gravel

MW-2-9.5'
 Modified California Sampler
 Sample retained for possible chemical analysis

OVM (ppm)
 Organic vapor meter reading in parts per million

ATD
 First water encountered in borehole at time of drilling

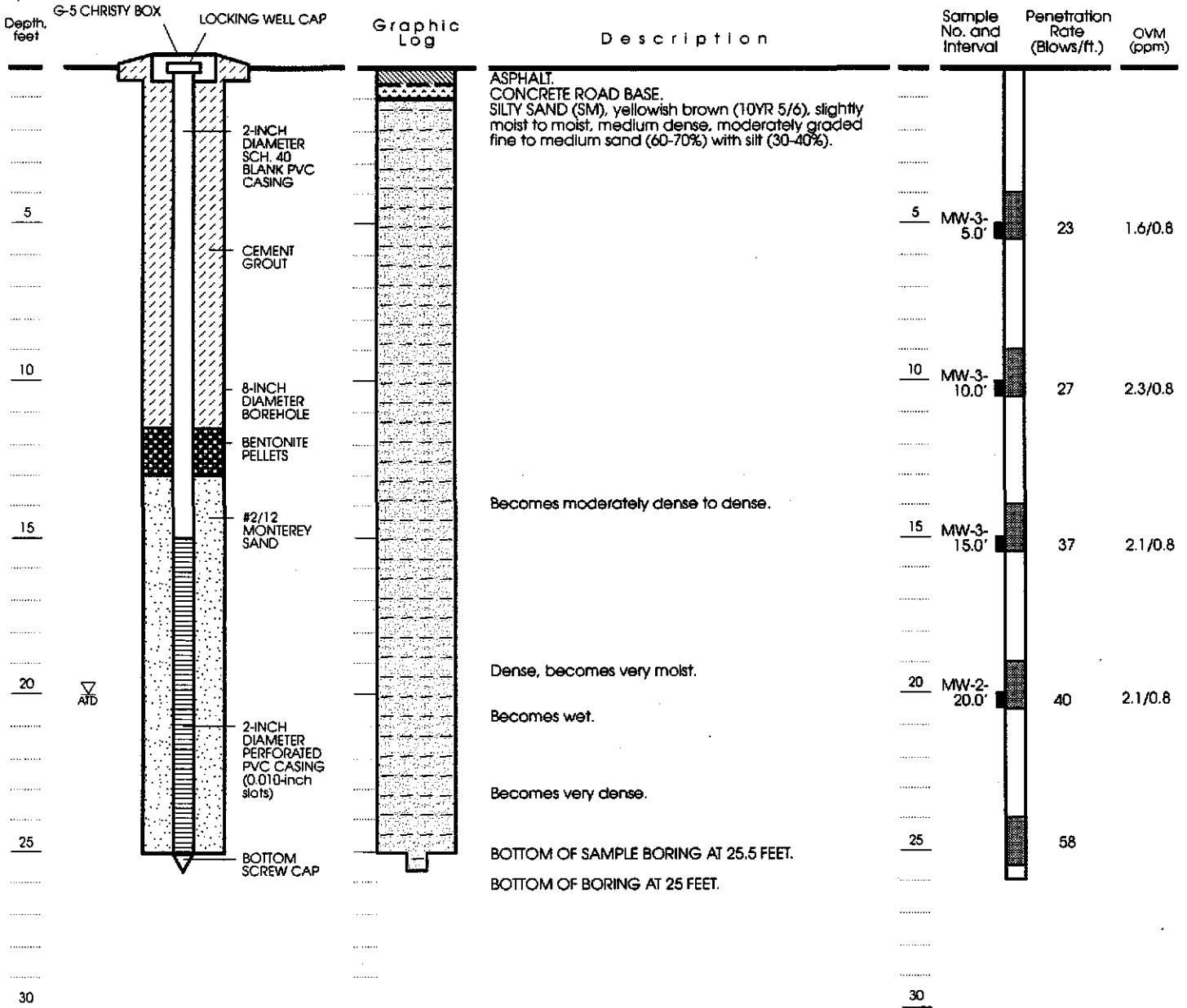
Approved by: *John Stamer R65714*

Figure A5 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL MW-2 (page 1 of 1)

WELL CONSTRUCTION

LITHOLOGY

SAMPLE DATA



Date well drilled: July 30, 1994
 Drilling company: Spectrum
 Driller: John
 Drilling Method: Hollow-Stem Auger
 Hammer weight: 140 lbs.
 LF Geologist: Tim Limbers

- EXPLANATION**
- Clay
 - Silt
 - Sand
 - Gravel

- Modified California Sampler
- Sample retained for possible chemical analysis
- OVM (ppm) Organic vapor meter reading in parts per million
- First water encountered at time of drilling

Approved by: *John Stamer R65714*

Figure A6 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL MW-3 (page 1 of 1)

APPENDIX B
FIELD METHODS

FIELD METHODS

B1.0 INTRODUCTION

All field activities were performed in accordance with the project health and safety plan (RGA Environmental 1992) and the addendum to the health and safety plan (Levine-Fricke 1992) for this Site. Public utility companies that potentially had underground utility lines located near the drilling locations were notified through Underground Service Alert at least 48 hours before drilling began. All drilling locations were also cleared before drilling began by Cruz Brothers, a private utility locating service, using geophysical methods.

Necessary encroachment and excavation permits were obtained from the City of Oakland, and well construction permits were obtained from Alameda County Zone 7 Water Agency, before drilling began.

B2.0 DRILLING AND SOIL SAMPLING METHODS

The five soil borings (GW-1, GW-2, GW-3, MW-2, and MW-3) were drilled by Spectrum Exploration, Inc. ("Spectrum") of Stockton, California, a California C-57 licensed drilling subcontractor, under the observation of a Levine-Fricke geologist. The borings were drilled with 6.25-inch-diameter and 8-inch-diameter hollow-stem augers to depths of approximately 22 to 26.5 feet below ground surface (bgs). Soil samples were collected at approximately 5-foot intervals for lithologic description and possible chemical analysis using a modified California sampler lined with clean brass tubes. The sampler was driven into native soil below the augers using a 140-pound hammer dropped 30 inches at a time until a sample interval of 1.5 feet was achieved, or until refusal. The sampler was washed in a solution of Alconox and tap water, followed by a tap water rinse, before each sample was collected.

A Levine-Fricke geologist described the lithology of each boring (Appendix A) using the Unified Soil Classification System. Soil samples were screened for possible chemical analysis using a portable photoionization detector (PID), which measured volatile hydrocarbons in air emanating from soil cuttings and samples.

After the brass tubes had been removed from the sample barrel, the ends of the tubes were covered with aluminum foil and capped with plastic caps. The tubes were labeled and placed in a chilled ice chest for transportation to the laboratory under standard chain-of-custody protocol.

Soil cuttings generated during drilling were stored on site in sealed 55-gallon drums. A sticker was affixed to the drum with the warning "Caution, Waste Soils, Do Not Handle," the generator's name, the site location, the date, and the boring number. All drilling equipment was steam-cleaned before use in the boreholes before being brought to the Site and at the driller's yard after drilling was completed.

B3.0 GRAB GROUND-WATER SAMPLING METHODS

Grab ground-water samples were collected from borings GW-1, GW-2, and GW-3 on July 29 and 30, 1994. The work plan (Levine·Fricke 1993) specified the use of hydropunch equipment for grab ground-water sampling. Hydropunch equipment consists of a 1-inch-diameter stainless steel casing covering a 3/4-inch-diameter perforated PVC casing. The equipment is driven into undisturbed sediments at the bottom of a borehole. The stainless steel casing is retracted, exposing a section of the perforated PVC casing. After water collects inside the PVC casing, a bailer can be lowered inside the PVC casing to collect a grab ground-water sample.

However, during this investigation, the first attempt to collect a grab ground-water sample was unsuccessful. At location GW-2, the hydropunch equipment was driven to 4 feet below the bottom of the borehole, but no water had entered the hydropunch casing half an hour after it had been put in place. The hydropunch equipment was then removed from the borehole, the boring was drilled an additional 1/2 foot, and the auger was backed out to allow water to collect inside the borehole.

Grab ground-water samples were collected from the open boreholes at each of the three locations by lowering a disposable Teflon bailer into the ground water through the hollow-stem auger using a new nylon rope.

The grab ground-water samples were poured from the bailers into laboratory-supplied containers with Teflon septa. Samples to be analyzed for total petroleum hydrocarbons as gasoline (TPHg) and the aromatic hydrocarbons benzene, toluene, ethylbenzene, and total xylenes (BTEX) were poured into 40-milliliter volatile organic analysis vials (VOAs)

LEVINE-FRICKE

preserved with hydrochloric acid. Samples to be analyzed for total petroleum hydrocarbons as diesel (TPHd) were poured into 1-liter amber bottles preserved with hydrochloric acid. The samples were labeled and placed in a cooler chilled with "blue ice" for transportation to the laboratory under standard chain-of-custody protocol.

B4.0 WELL INSTALLATION METHODS

The soil borings for wells MW-2 and MW-3 were drilled to depths of 26 feet bgs and 25 feet bgs, respectively. The wells were installed in the borings in accordance with State of California Department of Water Resources (DWR) regulations. The depth of each soil boring was determined in the field on the basis of soil conditions and the depths at which ground-water-yielding sediments were encountered.

The borings were 8 inches in diameter and were converted into wells by inserting 2-inch-diameter, flush-threaded, solid and slotted (0.010-inch-wide slots) schedule 40 PVC casing through the hollow-stem augers. The slotted well screen in well MW-2 was installed from approximately 11 to 26 feet bgs. The slotted well screen in well MW-3 was installed from approximately 15 to 25 feet bgs. A filter pack consisting of Number 2/12 graded Monterey sand was placed into the annular space between the hollow-stem auger and the PVC casing, while the augers were slowly withdrawn from the borehole, to prevent bridging of the sand pack. The sand pack in boring MW-2 was installed from approximately 9 feet to 26 feet bgs. The sand pack in boring MW-3 was installed from approximately 13 feet to 25 feet bgs. A layer of bentonite pellets approximately 1.5 feet thick was then placed above the sand, around the solid portion of the casing, to create a seal and prevent cement grout from entering the sand pack. From the top of the bentonite seal to the surface, a cement grout containing approximately 5 percent bentonite was installed to protect the well from surface water intrusion. A locking well cap was placed on the well casing. A traffic-rated well box was set in cement over the well casing to protect the well from unauthorized access.

B5.0 WELL DEVELOPMENT AND SAMPLING METHODS

After the wells had been installed, they were developed to remove fine particles and improve hydraulic communication between the slotted casing and the formation. The wells were developed by purging approximately 5 to 14 well casing volumes

of ground water until the water clarity improved and parameters stabilized. Water-quality parameters (specific conductance, pH, and temperature) were measured and recorded during the purging process. Observations regarding the quantity and clarity of water withdrawn were recorded on water-quality sampling information forms during this process (Appendix C). Ground-water samples were collected after the parameters had stabilized. Sampling equipment was steam cleaned before use. Purged water was collected in DOT-approved 55-gallon drums, which were labeled "Caution, Non-Potable Wastewater, Do Not Handle or Drink," and temporarily stored on site pending disposal.

Following purging, water samples were collected with a clean Teflon bailer, poured into laboratory-supplied, 40-milliliter volatile organic analysis (VOA) vials (for TPHg, BTEX, and volatile organic compound [VOC] analysis), 500-milliliter amber bottles (for organic lead analysis), and 1-liter amber bottles (for TPHd analysis), with hydrochloric acid as a preservative. The VOA containers and 500-milliliter amber bottles were filled to avoid headspace after the containers had been sealed. The sample containers were placed into a chilled cooler for transportation to American Environmental Network of Pleasant Hill, California, a state-certified laboratory, under chain-of-custody protocol. A duplicate sample was also collected from well MW-3 for quality control purposes and submitted for analysis of TPHd, total petroleum hydrocarbons as oil (TPHo), and organic lead. This sample preparation protocol was followed in addition to the quality assurance/quality control procedures that are part of each laboratory's standard program.

B6.0 WELL SURVEYING AND GROUND-WATER ELEVATION AND PRODUCT THICKNESS MEASUREMENTS

The elevations of the tops of the well casings were measured by Brian, Kangas, and Foulk of Walnut Creek, California, a state-licensed well surveyor subcontracted by Levine·Fricke. The elevation was measured to the nearest 0.01 foot and referenced to mean sea level. The depth to ground water and product thickness measurements were collected using an electronic oil-water interface probe. The probe was washed in a solution of Alconox and tap water, followed by a tap water rinse, before use in each well.

B7.0 REFERENCES

Levine·Fricke. 1992. Addendum 1 to the RGA Environmental, Inc., May 8, 1992 Health and Safety Plan for the Harrison Street Garage Tank Closure Project, Oakland, California. August 31.

Levine·Fricke. 1993. Work Plan for Soil and Ground-Water Investigation, Harrison Street Garage Site, 1432-1434 Harrison Street, Oakland, California. October 13.

RGA Environmental, Inc. 1992. Site Safety Plan, Harrison Street Garage Tank Closure Project, Oakland, California. May 8.

APPENDIX C

WATER-QUALITY SAMPLING INFORMATION SHEETS

WATER-QUALITY SAMPLING INFORMATION

Project Name HARRISON ST Project No. 2680.40

Date 8/1/94 Sample No. MW-1

Samplers Name JCK

Sampling Location MW-1 HAND BAIL

Sampling Method CENT TUMP / TEFLON RAILER

Analyses Requested TPH-5 BTEX ORGANIC Pb

Number and Types of Sample Bottles used 2 VOA 2 GL. 500ml

Method of Shipment COVER

WELL
DO NOT
PUMP

25.20
20.16

5.04
.65

2520
3024

3.2760

LOCATION MAP

GROUND WATER

SURFACE WATER

Well No. MW-1 Stream Width _____

Well Diameter (in.) 4 Stream Depth _____

Depth to Water, Static (ft) 20.16 Stream Velocity _____

Water in Well Box YES Rained recently? _____

Well Depth (ft) 25.20 Other _____

Height of Water Column In Well 5.04

Water Volume In Well 3.28

- 2-inch casing = 0.16 gal/ft
- 4-inch casing = 0.65 gal/ft
- 5-inch casing = 1.02 gal/ft
- 6-inch casing = 1.47 gal/ft

TIME	DEPTH TO WATER (feet)	VOLUME WITHDRAWN (gallons)	TEMP (deg. C)	pH (S.U.)	COND (mhos/cm)	OTHER		REMARKS
12:53								START
12:56	24.90	2						OFF
13:00	23.72							
13:08	22.90							START RAINING
13:35	24.10	6.5	18.7	7.23	324			TURBID, GREYISH
13:55	24.12	10.0	19.4	7.33	307			TURBID, SCODOR
15:16	20.70				26			START
16:23		14	19.4	7.33	262			TURBID SCODOR
15:41	24.26	16.5	19.5	7.14	280			TURBID SCODOR
17:25	20.36							
17:30								SAMPLE

Suggested Method for Purging Well _____

WATER-QUALITY SAMPLING INFORMATION

Project Name HARRISON ST GARAGE Project No. 2680.40

Date 8/1/94 Sample No. MW-2

Samplers Name JCK

Sampling Location MW-2

Sampling Method HAND RAIL / TEFLON BAILER

Analyses Requested _____

Number and Types of Sample Bottles used _____

Method of Shipment CARRIED

GROUND WATER

SURFACE WATER

Well No. MW-2 Stream Width _____

Well Diameter (in.) 2 Stream Depth _____

Depth to Water, Static (ft) 20.50 Stream Velocity _____

Water in Well Box _____ Rained recently? _____

Well Depth (ft) 26.00 Other _____

Height of Water Column in Well 5.50

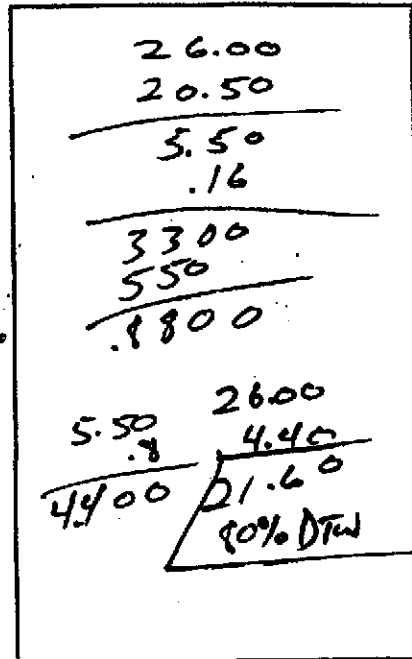
Water Volume in Well .88

2-inch casing = 0.16 gal/ft

4-inch casing = 0.65 gal/ft

5-inch casing = 1.02 gal/ft

6-inch casing = 1.47 gal/ft



LOCATION MAP

TIME	DEPTH TO WATER (feet)	VOLUME WITHDRAWN (gallons)	TEMP (deg. C)	pH (S.U.)	COND (mhos/cm)	OTHER		REMARKS
14:23								START
14:25		2	21.0	7.23	1518			TURBID; ^{SL SHEEN} ODOUR
14:30		4	21.0	7.05	1314			TURBID ^{ODOUR} SHEEN
14:36		6	20.8	7.01	1121			TURBID ^{ODOUR} SHEEN
14:41		8	21.3	6.94	956			" "
14:45		10	20.9	6.91	826			TURBID ^{SL SHEEN}
14:53	23.02	12	20.9	6.91	738			TURBID ^{SL SHEEN} ^{SL ODOUR}
15:15	21.01							SAMPLE

Suggested Method for Purging Well _____

WATER-QUALITY SAMPLING INFORMATION

Project Name HAZZARD S GARAGE Project No. 2680.00.41
 Date 8/1/94 Sample No. MW-3
 Samplers Name JCK
 Sampling Location MW-3
 Sampling Method HAND RAIL / TEFLON BAILER
 Analyses Requested TPH-S BTEX TPH-D, O, + ORGANIC Pb, VOC
 Number and Types of Sample Bottles used _____
 Method of Shipment CARRIER

GROUND WATER	SURFACE WATER
Well No. <u>MW-3</u>	Stream Width _____
Well Diameter (in.) <u>2</u>	Stream Depth _____
Depth to Water, Static (ft) <u>19.66</u>	Stream Velocity _____
Water in Well Box <u>NO</u>	Rained recently? _____
Well Depth (ft) <u>24.10</u>	Other _____
Height of Water Column in Well <u>4.44</u>	2-inch casing = 0.16 gal/ft
Water Volume in Well <u>0.71</u>	4-inch casing = 0.65 gal/ft
	5-inch casing = 1.02 gal/ft
	6-inch casing = 1.47 gal/ft

24.10
 19.66

 4.44
 .16

 2664
 449

 7104

LOCATION MAP

TIME	DEPTH TO WATER (feet)	VOLUME WITHDRAWN (gallons)	TEMP (deg. C)	pH (S.U.)	COND (mhos/cm)	OTHER		REMARKS
15:56								START
16:00		2	19.7	7.15	1268			TURBID; LT BROWN
16:04		4	19.5	6.95	1063			TURBID "
16:10		6	19.5	6.88	877			" "
16:15		8	19.3	6.87	767			TURBID LT BROWN
16:21		10	19.4	6.70	714			TURBID
16:25		12	19.3	6.76	651			↓
16:29		14	19.2	6.70	611			SAMPLE
16:40	19.76							103 DUPLICATES
16:50								(ORGANIC Pb, TPH, TPH)

APPENDIX D

LABORATORY CERTIFICATES FOR ALL SAMPLES

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3012 16th Avenue West
Seattle, WA 98119-2029
FAX: (206) 283-5044

August 12, 1994

Taylor Bennett, Project Leader
Levine-Fricke, Inc.
1900 Powell Street, 12th Floor
Emeryville, CA 94608

Dear Mr. Bennett:

Enclosed are the results from the testing of material submitted on August 8, 1994 from Project 2680.00.42.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,



Kelley Wilt
Chemist

KW/dp

Enclosures

FAX: (510) 652-2246

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: August 12, 1994

Date Received: August 8, 1994

Project: 2680.00.42

Date Samples Extracted: August 10, 1994

**RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE
FOR FINGERPRINT CHARACTERIZATION
BY CAPILLARY GAS CHROMATOGRAPHY
USING A FLAME IONIZATION DETECTOR (FID)
AND ELECTRON CAPTURE DETECTOR (ECD)**

Sample ID

GC Characterization

MW-2

The GC trace using the flame ionization detector (FID) showed the presence of low boiling compounds. The patterns displayed by these peaks are indicative of gasoline.

The low boiling compounds appeared as a ragged pattern of peaks eluting from *n*-C₆ to *n*-C₁₃ showing a maximum near *n*-C₇. The GC/FID trace showed the presence of peaks that appeared to be indicative of augmented levels of toluene, ethylbenzene, the xylenes and C₃-benzenes. These compounds are characteristic of the constituents commonly found in gasoline. The GC/ECD trace showed the possible presence of tetraethyl lead, a common additive to leaded gasolines.

The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis.

1. Client: LEVINE-FRICKE
Address:
Contact: Emeryville, CA
Tel. Contact: Taylor Bennett

3440 Vincent Road, Pleasant Hill, CA 94523
Phone (510) 930-9090
FAX (510) 930-0256

Lab Job Number:
Lab Destination: Friedman & Bruya
Date Samples Shipped:
Lab Contact:
Date Results Required:
Date Report Required:
Client Phone No.: 652 4500
Client FAX No.:

Address Report To:
2. #1

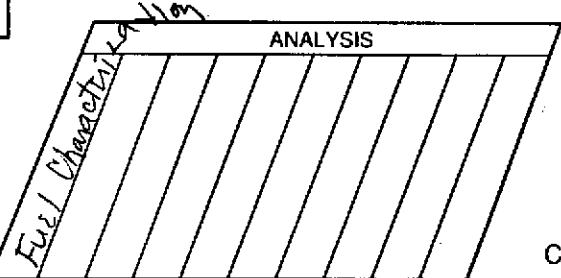
Send Invoice To:
3. #1

Send Report To: 1 or 2 (Circle one)

Client P.O. No.: Client Project I.D. No.: 2680.41

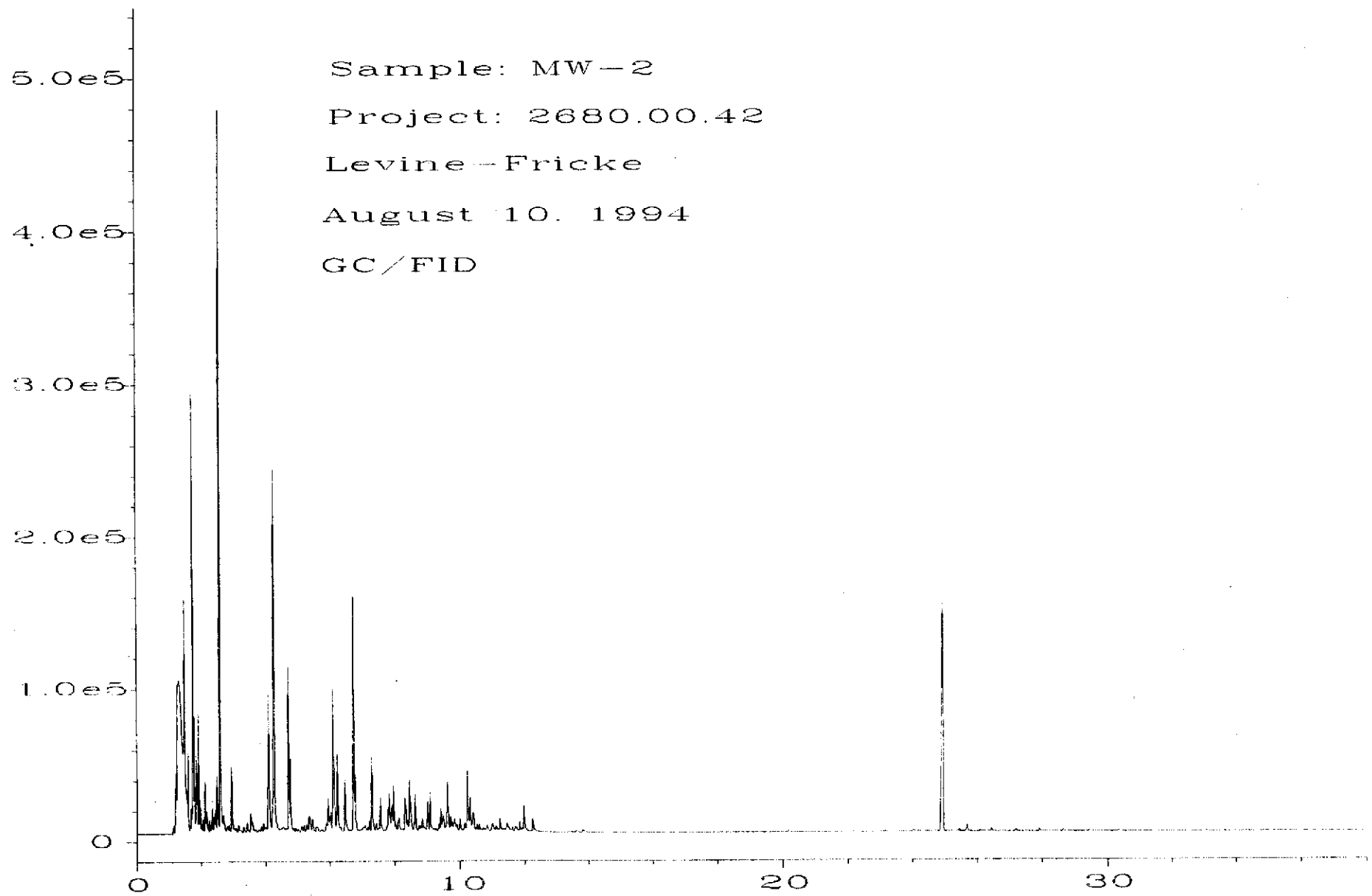
Sample Team Member (s): 2680-00-42

Lab Number	Client Sample Identification	Air Volume	Date/Time Collected	Sample Type*	Pres.	No. of Cont.	Type of Cont.	ANALYSIS										Comments / Hazards						
								1	2	3	4	5	6	7	8	9	10		11	12				
51817	MW-2		8-1-94	7	NCL	100	1	X																

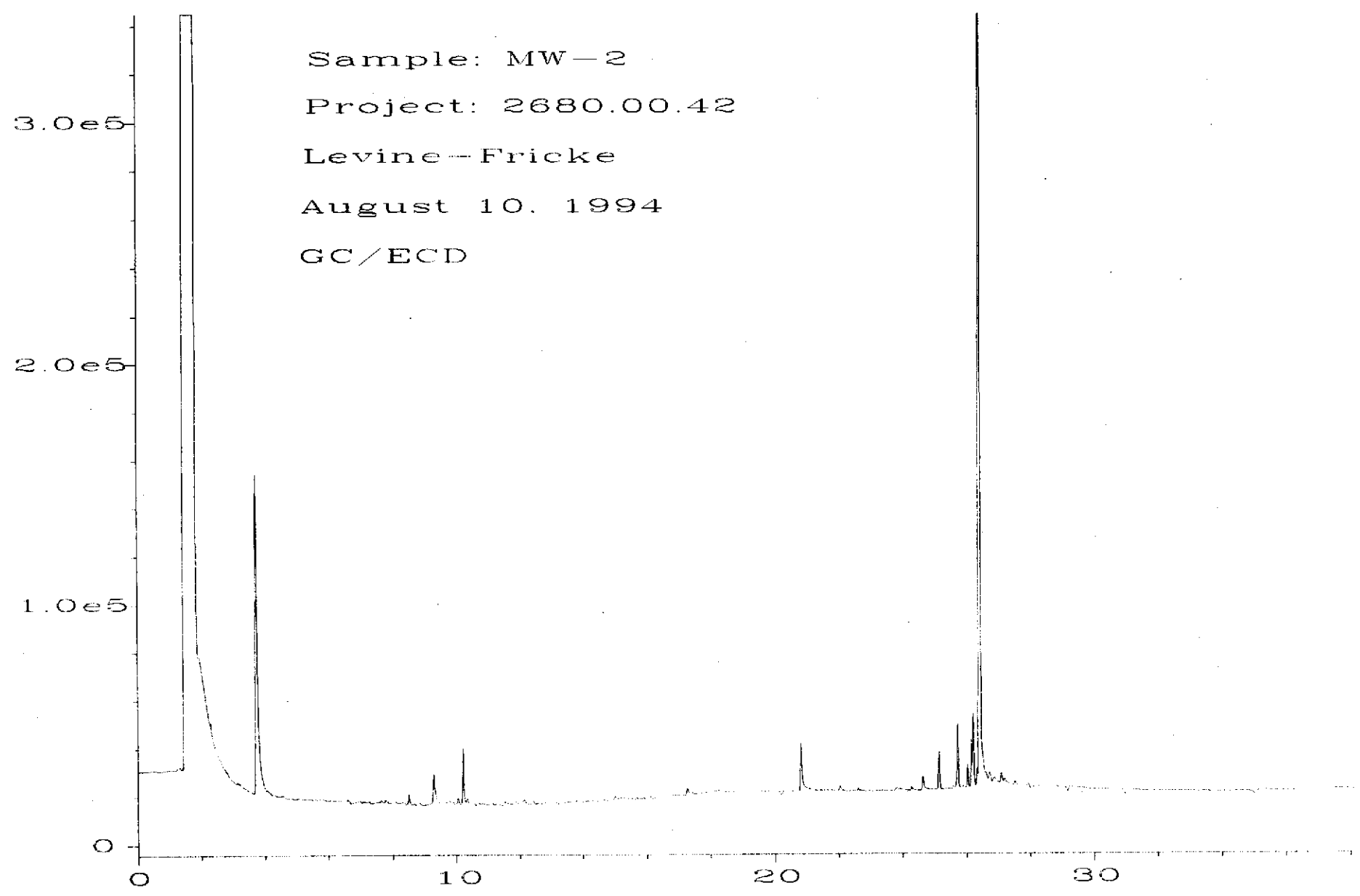


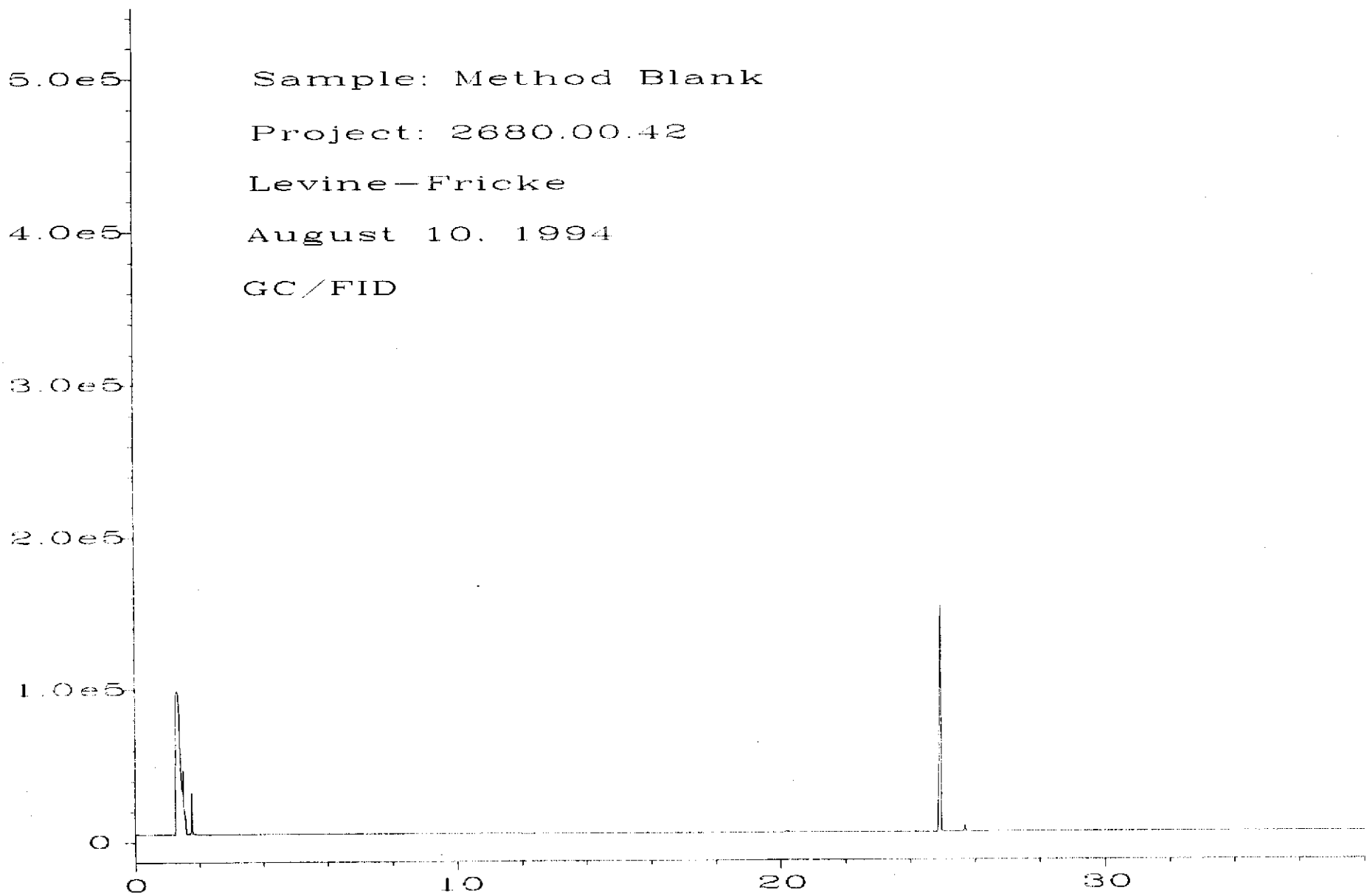
Relinquished by: (Signature) Gina Gillespie	DATE 8-5-94	TIME 1400	Received by: (Signature) Kathy Mills	DATE 8/8/94	TIME 8:10
Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	DATE	TIME
Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	DATE	TIME
Method of Shipment			Lab Comments		

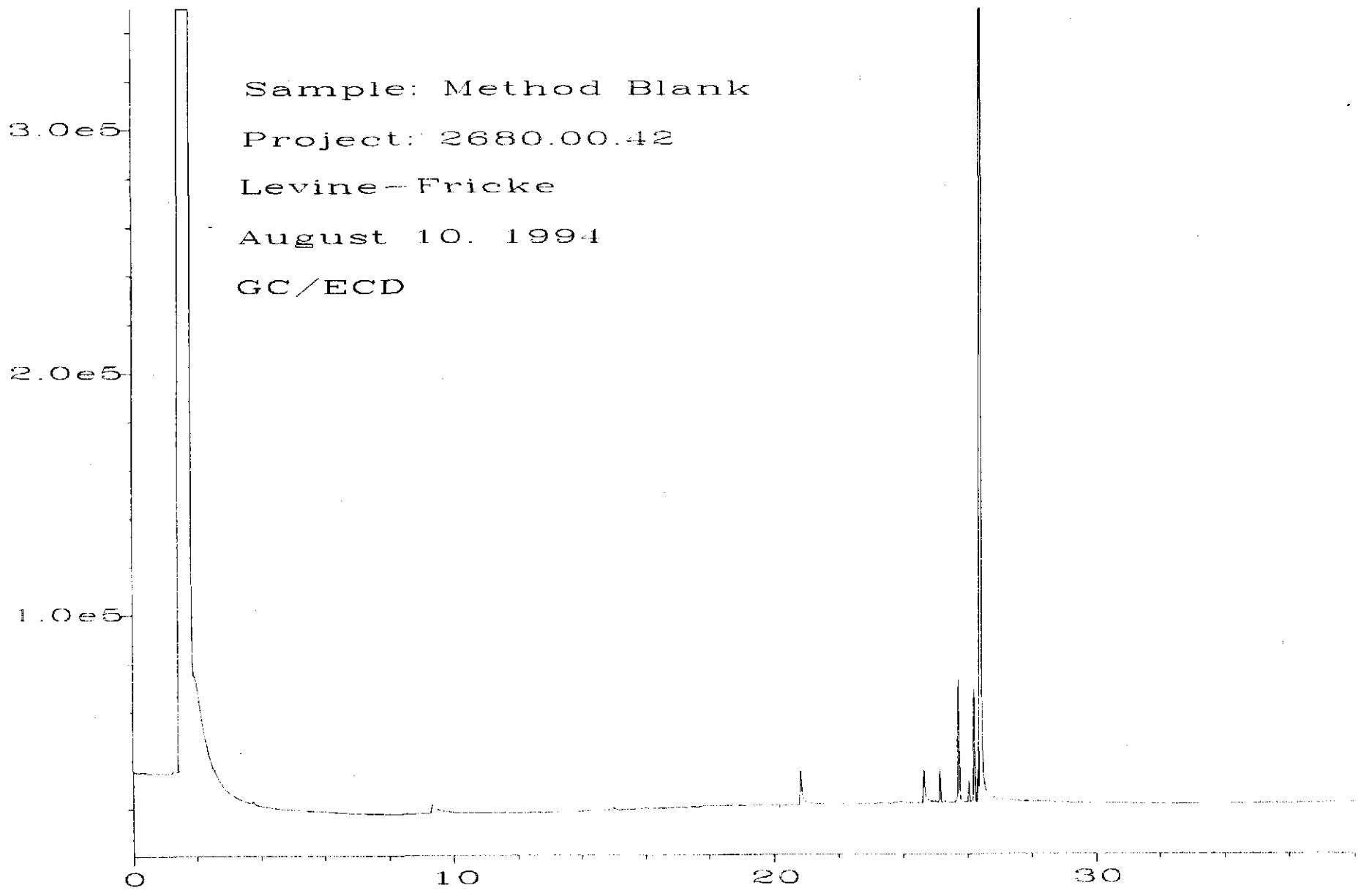
*Sample type (Specify): 1) 37mm 0.8 µm MCEF 2) 25mm 0.8 µm MCEF 3) 25mm 0.4 µm polycarb. filter
4) PVC filter, diam. _____ pore size _____ 5) Charcoal tube 6) Silica gel tube 7) Water 8) Soil 9) Bulk Sample
10) Other _____ 11) Other _____



Sample: MW-2
Project: 2680.00.42
Levine-Fricke
August 10, 1994
GC/ECD







American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

LEVINE-FRICKE
1900 POWELL ST. 12TH FL.
EMERYVILLE, CA 94608

ATTN: TAYLOR BENNETT
CLIENT PROJ. ID: 2680.40
CLIENT PROJ. NAME: HARRISON ST.
C.O.C. NUMBER: 12289

REPORT DATE: 08/15/94

DATE(S) SAMPLED: 07/29/94

DATE RECEIVED: 07/29/94

AEN WORK ORDER: 9407364

PROJECT SUMMARY:

On July 29, 1994, this laboratory received 10 soil sample(s) on hold.

On August 1, 1994, client requested 3 samples be analyzed for organic parameters. Sample identification, methodologies, results and dates analyzed are summarized on the following pages.

Please see quality control report for a summary of QC data pertaining to this project.

If you have any questions, please contact Client Services at (510) 930-9090.


Larry Klein
Laboratory Director

LEVINE - FRICKE

SAMPLE ID: GW-2-14'
 AEN LAB NO: 9407364-03
 AEN WORK ORDER: 9407364
 CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/29/94
 DATE RECEIVED: 07/29/94
 REPORT DATE: 08/15/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/08/94
Toluene	108-88-3	ND	5	ug/kg	08/08/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/08/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/08/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/08/94
#Extraction for TPH	EPA 3550	-		Extrn Date	08/08/94
TPH as Diesel	GC-FID	ND	1	mg/kg	08/09/94

ND = Not detected at or above the reporting limit
 * = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: GW-3-10'
 AEN LAB NO: 9407364-07
 AEN WORK ORDER: 9407364
 CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/29/94
 DATE RECEIVED: 07/29/94
 REPORT DATE: 08/15/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/08/94
Toluene	108-88-3	ND	5	ug/kg	08/08/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/08/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/08/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/08/94
#Extraction for TPH	EPA 3550	-		Extrn Date	08/08/94
TPH as Diesel	GC-FID	ND	1	mg/kg	08/09/94

ND = Not detected at or above the reporting limit

* = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: GW-3-15'
 AEN LAB NO: 9407364-08
 AEN WORK ORDER: 9407364
 CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/29/94
 DATE RECEIVED: 07/29/94
 REPORT DATE: 08/15/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/08/94
Toluene	108-88-3	ND	5	ug/kg	08/08/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/08/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/08/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/08/94
#Extraction for TPH	EPA 3550	-		Extrn Date	08/08/94
TPH as Diesel	GC-FID	ND	1	mg/kg	08/09/94

ND = Not detected at or above the reporting limit

* = Value above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9407364

CLIENT PROJECT ID: 2680.40

Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

The following abbreviations are found throughout the QC report:

- ND = Not Detected at or above the reporting limit
- RPD = Relative Percent Difference
- < = Less Than

QUALITY CONTROL DATA

DATE EXTRACTED: 08/08/94

AEN JOB NO: 9407364

INSTRUMENT: C

SURROGATE STANDARD RECOVERY SUMMARY
 METHOD: EPA 3550 GCFID
 (SOIL MATRIX)

SAMPLE IDENTIFICATION			SURROGATE RECOVERY (PERCENT)
Date Analyzed	Sample Id.	Lab Id.	n-Pentacosane
08/09/94	GW-2-14'	03	101
08/09/94	GW-3-10'	07	96
08/09/94	GW-3-15'	08	110

CURRENT QC LIMITS

<u>ANALYTE</u>	<u>PERCENT RECOVERY</u>
n-Pentacosane	(45-120)

QUALITY CONTROL DATA

DATE EXTRACTED: 08/05/94
 DATE ANALYZED: 08/07/94
 INSTRUMENT: C

AEN JOB NO: 9407364
 SAMPLE SPIKED: 9407350-05

MATRIX SPIKE RECOVERY SUMMARY
 TPH EXTRACTABLE SOIL
 METHOD: EPA 3550 GCFID

ANALYTE	Spike Added (mg/kg)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Diesel	40.1	68	6	44-108	13

METHOD BLANK RESULT

Lab Id.	Extractable Hydrocarbons as Diesel (mg/kg)
080894-METHOD BLANK	ND
Reporting Limit	1

QUALITY CONTROL DATA

INSTRUMENT: H

AEN JOB NO: 9407364

AEN LAB NO: 0808-BLANK

DATE ANALYZED: 08/08/94

BTEX AND HYDROCARBONS
METHOD: EPA 8020, 5030 GCFID
(SOIL MATRIX)

	CAS #	CONCENTRATION (ug/kg)	REPORTING LIMIT (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/kg	0.2 mg/kg

QUALITY CONTROL DATA

AEN JOB NO: 9407364

INSTRUMENT: H

SURROGATE STANDARD RECOVERY SUMMARY
 METHOD: EPA 8020, 5030 GCFID
 (SOIL MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)	
	Sample Id.	Lab Id.	Fluorobenzene	
08/08/94	GW-2-14'	03	98	
08/08/94	GW-3-10'	07	98	
08/08/94	GW-3-15'	08	97	

CURRENT QC LIMITS

<u>ANALYTE</u>	<u>PERCENT RECOVERY</u>
Fluorobenzene	(78-114)

QUALITY CONTROL DATA

DATE ANALYZED: 08/08/94

AEN JOB NO: 9407364

SAMPLE SPIKED: LCS

INSTRUMENT: H

LABORATORY CONTROL SAMPLE
METHOD: EPA 8020, 5030 GCFID
(SOIL MATRIX)

ANALYTE	Spike Added (ug/kg)	Percent Recovery
Benzene	19.6	84
Toluene	72.9	82
Hydrocarbons as Gasoline	1000	82

CURRENT QC LIMITS

<u>Analyte</u>	<u>Percent Recovery</u>
Benzene	(65-122)
Toluene	(67-124)
Gasoline	(60-125)

*** END OF REPORT ***

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

9407364

Project No.: 7680.40 Field Logbook No.: Date: 7/29/94 Serial No.:
 Project Name: Herkyp St, George Project Location: Oakland, CA No: 12289

SAMPLER (Signature): <u>[Signature]</u>					ANALYSES					SAMPLERS: <u>TLL</u>		
SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	ANALYSES				HOLD	RUSH	REMARKS
						EPA 601	EPA 624	TPH* BTEX	TPH (diesel)			
GW-2-4.5'	7/29		01A	1	Soil			X		X		
GW-2-9.5'			02A					X		X		
GW-2-14'			03A					X	✓	X	RD	TPH* BTEX off hold
GW-2-18'			04A					X		X		
GW-2-20'			05A					X		X		
GW-3-5'			06A					X		X		All samples on hold until Monday
GW-3-10'			07A					X	✓	X	RD	Normal Turnaround Time off hold
GW-3-15'			08A					X	✓	X	RD	off hold John Strzeman will let you know which samples to analyze
GW-3-18'			09A					X		X		
GW-3-21'			10A					X		X		
Results to Taylor Bennett												

RELINQUISHED BY: (Signature) <u>[Signature]</u>	DATE <u>7/29/94</u>	TIME <u>16:27</u>	RECEIVED BY: (Signature) <u>[Signature]</u>	DATE <u>7/29/94</u>	TIME <u>16:27</u>
RELINQUISHED BY: (Signature) <u>[Signature]</u>	DATE <u>7/29/94</u>	TIME <u>15:10</u>	RECEIVED BY: (Signature) <u>[Signature]</u>	DATE <u>7/29/94</u>	TIME <u>18:10</u>
RELINQUISHED BY: (Signature) <u>[Signature]</u>	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
METHOD OF SHIPMENT:	DATE	TIME	LAB COMMENTS:		
Sample Collector: LEVINE-FRICKE 1900 Powell Street, 12th Floor Emeryville, California 94608 (510) 652-4500	Analytical Laboratory: A.E.N.				

THB

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

LEVINE-FRICKE
1900 POWELL ST. 12TH FL.
EMERYVILLE, CA 94608

REPORT DATE: 08/16/94

DATE(S) SAMPLED: 07/30/94

DATE RECEIVED: 08/01/94

ATTN: TAYLOR BENNETT
CLIENT PROJ. ID: 2680.40
CLIENT PROJ. NAME: HARRISON ST.
C.O.C. NUMBER: 12275

AEN WORK ORDER: 9408001

PROJECT SUMMARY:

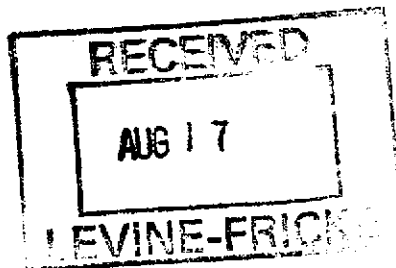
On August 1, 1994, this laboratory received 13 soil sample(s).

Client requested 7 samples be analyzed for organic parameters. 6 samples were placed on hold. Sample identification, methodologies, results and dates analyzed are summarized on the following pages.

Please see quality control report for a summary of QC data pertaining to this project.

If you have any questions, please contact Client Services at (510) 930-9090.


Larry Klein
Laboratory Director



LEVINE-FRICKE

SAMPLE ID: MW-2-9.5'
 AEN LAB NO: 9408001-01
 AEN WORK ORDER: 9408001
 CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
 DATE RECEIVED: 08/01/94
 REPORT DATE: 08/16/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/09/94
Toluene	108-88-3	ND	5	ug/kg	08/09/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/09/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/09/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/09/94

ND = Not detected at or above the reporting limit
 * = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: MW-2-5'
AEN LAB NO: 9408001-02
AEN WORK ORDER: 9408001
CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
DATE RECEIVED: 08/01/94
REPORT DATE: 08/16/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/09/94
Toluene	108-88-3	ND	5	ug/kg	08/09/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/09/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/09/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/09/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: MW-2-15'
AEN LAB NO: 9408001.03
AEN WORK ORDER: 9408001
CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
DATE RECEIVED: 08/01/94
REPORT DATE: 08/16/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	24 *	5	ug/kg	08/09/94
Toluene	108-88-3	7 *	5	ug/kg	08/09/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/09/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/09/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/09/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: GW-1-10'
 AEN LAB NO: 9408001-06
 AEN WORK ORDER: 9408001
 CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
 DATE RECEIVED: 08/01/94
 REPORT DATE: 08/16/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/10/94
Toluene	108-88-3	ND	5	ug/kg	08/10/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/10/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/10/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/10/94

ND = Not detected at or above the reporting limit
 * = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: GW-1-10'
AEN LAB NO: 9408001-06
AEN WORK ORDER: 9408001
CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
DATE RECEIVED: 08/01/94
REPORT DATE: 08/16/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/10/94
Toluene	108-88-3	ND	5	ug/kg	08/10/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/10/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/10/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/10/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: GW-1-15'
 AEN LAB NO: 9408001-07
 AEN WORK ORDER: 9408001
 CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
 DATE RECEIVED: 08/01/94
 REPORT DATE: 08/16/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/10/94
Toluene	108-88-3	ND	5	ug/kg	08/10/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/10/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/10/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/10/94

ND = Not detected at or above the reporting limit
 * = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: MW-3-10'
 AEN LAB NO: 9408001-10
 AEN WORK ORDER: 9408001
 CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
 DATE RECEIVED: 08/01/94
 REPORT DATE: 08/16/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/10/94
Toluene	108-88-3	ND	5	ug/kg	08/10/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/10/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/10/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/10/94
#Extraction for TPH	EPA 3550	-		Extrn Date	08/11/94
TPH as Diesel	GC-FID	ND	1	mg/kg	08/12/94

ND = Not detected at or above the reporting limit
 * = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: MW-3-15'
 AEN LAB NO: 9408001-11
 AEN WORK ORDER: 9408001
 CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
 DATE RECEIVED: 08/01/94
 REPORT DATE: 08/16/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5	ug/kg	08/10/94
Toluene	108-88-3	ND	5	ug/kg	08/10/94
Ethylbenzene	100-41-4	ND	5	ug/kg	08/10/94
Xylenes, Total	1330-20-7	ND	5	ug/kg	08/10/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2	mg/kg	08/10/94
#Extraction for TPH	EPA 3550	-		Extrn Date	08/11/94
TPH as Diesel	GC-FID	ND	1	mg/kg	08/12/94

ND = Not detected at or above the reporting limit

* = Value above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9408001

CLIENT PROJECT ID: 2680.40

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration that can reliably be determined during routine laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix and method dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

AEN JOB NO: 9408001
 DATE EXTRACTED: 08/11/94
 INSTRUMENT: C

SURROGATE STANDARD RECOVERY SUMMARY
 METHOD: EPA 3550 GCFID
 (SOIL MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Sample Id.	Lab Id.	n-Pentacosane
08/12/94	MW-3-10'	10	91
08/12/94	MW-3-15'	11	78

CURRENT QC LIMITS

<u>ANALYTE</u>	<u>PERCENT RECOVERY</u>
n-Pentacosane	(45-120)

QUALITY CONTROL DATA

AEN JOB NO: 9408001
 DATE EXTRACTED: 08/09/94
 DATE ANALYZED: 08/10/94
 SAMPLE SPIKED: 9408064-02
 INSTRUMENT: C

MATRIX SPIKE RECOVERY SUMMARY
 TPH EXTRACTABLE SOIL
 METHOD: EPA 3550 GCFID

ANALYTE	Spike Added (mg/kg)	Average Percent Recovery	RPD
Diesel	40.1	59	24

CURRENT QC LIMITS

Analyte	Percent Recovery	RPD
Diesel	(44-108)	13

Daily method blanks for all associated analytical runs showed no contamination over the reporting limit.

QUALITY CONTROL DATA

AEN JOB NO: 9408001
 INSTRUMENT: E

SURROGATE STANDARD RECOVERY SUMMARY
 METHOD: EPA 8020, 5030 GCFID
 (SOIL MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Client Id.	Lab Id.	Fluorobenzene
08/09/94	MW-2-9.5'	01	100
08/09/94	MW-2-5'	02	100
08/09/94	MW-2-15'	03	101
08/10/94	GW-1-10'	06	101
08/10/94	GW-1-15'	07	100
08/10/94	MW-3-10'	10	101
08/10/94	MW-3-15'	11	101

CURRENT QC LIMITS

<u>ANALYTE</u>	<u>PERCENT RECOVERY</u>
Fluorobenzene	(78-114)

QUALITY CONTROL DATA

AEN JOB NO: 9408001
 DATE ANALYZED: 08/10/94
 SAMPLE SPIKED: 9408001-07
 INSTRUMENT: E

MATRIX SPIKE RECOVERY SUMMARY
 METHOD: EPA 8020, 5030 GCFID
 (SOIL MATRIX)

ANALYTE	Spike Added (ug/kg)	Average Percent Recovery	RPD
Benzene	17.2	106	2
Toluene	62.8	110	3
Hydrocarbons as Gasoline	1000	112	3

CURRENT QC LIMITS

<u>Analyte</u>	<u>Percent Recovery</u>	<u>RPD</u>
Benzene	(81-127)	11
Toluene	(84-121)	14
Gasoline	(66-116)	20

Daily method blanks for all associated analytical runs showed no contamination over the reporting limit.

*** END OF REPORT ***

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

9408001

Project No.: 2680.40 Field Logbook No.: Date: 8/1/94 Serial No.:
 Project Name: Harrison St. Garage Project Location: Oakland CA No: 12275

Sampler (Signature): *Tom Anderson* ANALYSES Samplers: TLL

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	ANALYSES							REMARKS	
						EPA 601	EPA 624	TPH _g + BTEX	TPH _l + BTEX	TPH _l + BTEX	HOLD	RUSH		
MW-2-95'	7/30		01A	1	Soil		X	X	X	X				
MW-2-5'			02A	1			X	X	X	X				TPH _g and BTEX
MW-2-15'			03A	1			X	X	X	X				
MW-2-19.5'			04A	1		RD	X	X	X	X		✓		All Samples on hold until John Sturman notifies you on which samples to analyze
GW-1-5'			05A	1		RD	X	X	X	X		✓		
GW-1-10'			06A	1			X	X	X	X				
GW-1-15'			07A	1			X	X	X	X				Normal Turnaround Time TPH _g + BTEX
GW-1-19.5'			08A	1		RD	X	X	X	X		✓		
MW-3-5'			09A	1		RD	X	X	X	X		✓		
MW-3-10'			10A	1			X	X	X	X		✓		
MW-3-15'			11A	1			X	X	X	X		✓		
MW-3-20'	↓		12A	1	↓	RD	X	X	X	X		✓		
MW-2-20'	7/30		13A	1	Soil	RD	X					✓		Results to Taylor Bennett

RELINQUISHED BY: (Signature) <i>David K...</i>	DATE 8/1/94	TIME 11:00	RECEIVED BY: (Signature) <i>Michael E. Mc...</i>	DATE 8/1/94	TIME 11:00
RELINQUISHED BY: (Signature) <i>Michael E. Mc...</i>	DATE 8/1/94	TIME 11:35	RECEIVED BY: (Signature) <i>Gina Gillespie</i>	DATE 8-1-94	TIME 1135
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
METHOD OF SHIPMENT:	DATE	TIME	LAB COMMENTS:		

Sample Collector: LEVINE-FRICKE
 1900 Powell Street, 12th Floor
 Emeryville, California 94608
 (510) 652-4500

Analytical Laboratory:
 A.E.N.

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

LEVINE-FRICKE
1900 POWELL ST. 12TH FL.
EMERYVILLE, CA 94608

ATTN: TAYLOR BENNETT
CLIENT PROJ. ID: 2680.40
CLIENT PROJ. NAME: HARRISON ST.
C.O.C. NUMBER: 12288

REPORT DATE: 08/15/94

DATE(S) SAMPLED: 07/29/94

DATE RECEIVED: 07/29/94

AEN WORK ORDER: 9407365

PROJECT SUMMARY:

On July 29, 1994, this laboratory received 3 water sample(s).

Client requested 2 samples be analyzed for organic parameters. 1 sample was placed on hold. Sample identification, methodologies, results and dates analyzed are summarized on the following pages.

Please see quality control report for a summary of QC data pertaining to this project.

If you have any questions, please contact Client Services at (510) 930-9090.


Larry Klein
Laboratory Director

AUE

LEVINE-FRICKE

SAMPLE ID: GW-2-GW
AEN LAB NO: 9407365-01
AEN WORK ORDER: 9407365
CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/29/94
DATE RECEIVED: 07/29/94
REPORT DATE: 08/15/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	08/05/94
Toluene	108-88-3	ND	0.5	ug/L	08/05/94
Ethylbenzene	100-41-4	ND	0.5	ug/L	08/05/94
Xylenes, Total	1330-20-7	ND	2	ug/L	08/05/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	08/05/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: GW-3-GW
AEN LAB NO: 9407365-02
AEN WORK ORDER: 9407365
CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/29/94
DATE RECEIVED: 07/29/94
REPORT DATE: 08/15/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	08/05/94
Toluene	108-88-3	ND	0.5	ug/L	08/05/94
Ethylbenzene	100-41-4	ND	0.5	ug/L	08/05/94
Xylenes, Total	1330-20-7	ND	2	ug/L	08/05/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	08/05/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9407365

CLIENT PROJECT ID: 2680.40

Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

The following abbreviations are found throughout the QC report:

- ND = Not Detected at or above the reporting limit
- RPD = Relative Percent Difference
- < = Less Than

QUALITY CONTROL DATA

INSTRUMENT: F

AEN JOB NO: 9407365

AEN LAB NO: 0805-BLANK

DATE ANALYZED: 08/05/94

BTEX AND HYDROCARBONS
 METHOD: EPA 8020, 5030 GCFID
 (WATER MATRIX)

	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/L	0.05 mg/L

QUALITY CONTROL DATA

AEN JOB NO: 9407365

INSTRUMENT: F

SURROGATE STANDARD RECOVERY SUMMARY
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Sample Id.	Lab Id.	Fluorobenzene
08/05/94	GW-2-GW	01	96
08/05/94	GW-3-GW	02	99

CURRENT QC LIMITS

<u>ANALYTE</u>	<u>PERCENT RECOVERY</u>
Fluorobenzene	(70-115)

QUALITY CONTROL DATA

DATE ANALYZED: 08/04/94

AEN JOB NO: 9407365

SAMPLE SPIKED: 9407333-07

INSTRUMENT: F

MATRIX SPIKE RECOVERY SUMMARY
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

ANALYTE	Spike Added (ug/L)	Average Percent Recovery	RPD
Benzene	10.6	102	4
Toluene	40.2	100	4
Hydrocarbons as Gasoline	500	101	4

CURRENT QC LIMITS

<u>Analyte</u>	<u>Percent Recovery</u>	<u>RPD</u>
Benzene	(81-115)	10
Toluene	(85-112)	9
Gasoline	(72-119)	12

*** END OF REPORT ***

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

94063 at

Project No.: 2680.40				Field Logbook No.:				Date: 7/29/94		Serial No.:	
Project Name: Harrison St. Garage				Project Location: Oakland, CA				No: 12288			
Sampler (Signature): <i>Jim Lambert</i>				ANALYSES				Samplers: TLL			
SAMPLES								HOLD RUSH			
SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	EPA 601	EPA 624	TPH _g +BTEX	TPH _{diesel}	TPH _{oil}	REMARKS
GW-2-GW	7/29	11:30	01A-D	4	H ₂ O			X	X	X	EPA Method 8020 for TPH _g +BTEX
GW-3-GW		1445	02A-D	4	H ₂ O			X	X	X	EPA Method 3510/3550 for
GW-3-GW-dp		1545	03A-D	4	H ₂ O			X	X	X	TPH _{diesel} + TPH _{oil}
											* Normal Turnaround Time for TPH _g + BTEX
											TPH _{diesel} / TPH _{oil} samples on <u>HOLD!!</u>
											Results to Taylor Bennett
RELINQUISHED BY: <i>Jim Lambert</i>				DATE: 7/29/94	TIME: 1627	RECEIVED BY: <i>Neil P. ...</i>				DATE: 7/29/94	TIME: 16:37
RELINQUISHED BY: <i>Neil P. ...</i>				DATE: 7/29/94	TIME: 18:10	RECEIVED BY: <i>John L. ...</i>				DATE: 7/29/94	TIME: 18:10
RELINQUISHED BY: (Signature)				DATE	TIME	RECEIVED BY: (Signature)				DATE	TIME
METHOD OF SHIPMENT:				DATE	TIME	LAB COMMENTS:					
Sample Collector: LEVINE-FRICKE 1900 Powell Street, 12th Floor Emeryville, California 94608 (510) 652-4500						Analytical Laboratory: AEN					

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

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LEVINE-FRICKE
1900 POWELL ST. 12TH FL.
EMERYVILLE, CA 94608

REPORT DATE: 08/15/94

DATE(S) SAMPLED: 07/30/94

DATE RECEIVED: 08/01/94

ATTN: TAYLOR BENNETT
CLIENT PROJ. ID: 2680.40
CLIENT PROJ. NAME: HARRISON ST.
C.O.C. NUMBER: 12276

AEN WORK ORDER: 9408002


PROJECT SUMMARY:

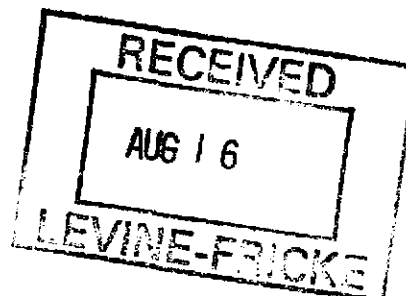
On August 1, 1994, this laboratory received 1 water sample(s).

Client requested samples be analyzed for organic parameters. Sample identification, methodologies, results and dates analyzed are summarized on the following pages.

Please see quality control report for a summary of QC data pertaining to this project.

If you have any questions, please contact Client Services at (510) 930-9090.


Larry Klein
Laboratory Director



LEVINE-FRICKE

SAMPLE ID: GW-1-GW
AEN LAB NO: 9408002-01
AEN WORK ORDER: 9408002
CLIENT PROJ. ID: 2680.40

DATE SAMPLED: 07/30/94
DATE RECEIVED: 08/01/94
REPORT DATE: 08/15/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	08/11/94
Toluene	108-88-3	ND	0.5	ug/L	08/11/94
Ethylbenzene	100-41-4	ND	0.5	ug/L	08/11/94
Xylenes, Total	1330-20-7	ND	2	ug/L	08/11/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	08/11/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9408002

CLIENT PROJECT ID: 2680.40

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration that can reliably be determined during routine laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix and method dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

AEN JOB NO: 9408002
DATE ANALYZED: 08/11/94
INSTRUMENT: F

BTEX AND HYDROCARBONS
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

	CAS #	CONCENTRATION (ug/L)	REPORTING LIMIT (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/L	0.05 mg/L

QUALITY CONTROL DATA

AEN JOB NO: 9408002
INSTRUMENT: F

SURROGATE STANDARD RECOVERY SUMMARY
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Sample Id.	Lab Id.	Fluorobenzene
08/11/94	GW-1-GW	01	96

CURRENT QC LIMITS

<u>ANALYTE</u>	<u>PERCENT RECOVERY</u>
Fluorobenzene	(70-115)

QUALITY CONTROL DATA

AEN JOB NO: 9408002
DATE ANALYZED: 08/11/94
SAMPLE SPIKED: LCS
INSTRUMENT: F

LABORATORY CONTROL SAMPLE
METHOD: EPA 8020, 5030 GCFID
(WATER MATRIX)

Analyte	Spike Added (ug/L)	Percent Recovery
Benzene	8.5	102
Toluene	32.2	97
Hydrocarbons as Gasoline	500	106

CURRENT QC LIMITS

<u>Analyte</u>	<u>Percent Recovery</u>
Benzene	(65-122)
Toluene	(67-124)
Gasoline	(60-125)

*** END OF REPORT ***

LEVINE-FRICKE

SAMPLE ID: MW-1
AEN LAB NO: 9408034-01
AEN WORK ORDER: 9408034
CLIENT PROJ. ID: 2680.41

DATE SAMPLED: 08/01/94
DATE RECEIVED: 08/02/94
REPORT DATE: 08/26/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	35,000 *	0.5	ug/L	08/15/94
Toluene	108-88-3	51,000 *	0.5	ug/L	08/15/94
Ethylbenzene	100-41-4	2,400 *	0.5	ug/L	08/15/94
Xylenes, Total	1330-20-7	13,000 *	2	ug/L	08/15/94
Purgeable HCs as Gasoline	5030/GCFID	170 *	0.05	mg/L	08/15/94
Organo Lead in Water	DOHS-LUFT	ND	0.1	mg/L	08/08/94

ND = Not detected at or above the reporting limit

* = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: MW-2
 AEN LAB NO: 9408034-02
 AEN WORK ORDER: 9408034
 CLIENT PROJ. ID: 2680.41

DATE SAMPLED: 08/01/94
 DATE RECEIVED: 08/02/94
 REPORT DATE: 08/26/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	28,000 *	0.5	ug/L	08/12/94
Toluene	108-88-3	35,000 *	0.5	ug/L	08/12/94
Ethylbenzene	100-41-4	3,000 *	0.5	ug/L	08/12/94
Xylenes, Total	1330-20-7	12,000 *	2	ug/L	08/12/94
Purgeable HCs as Gasoline	5030/GCFID	130 *	0.05	mg/L	08/12/94

ND = Not detected at or above the reporting limit
 * = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: MW-3
 AEN LAB NO: 9408034-03
 AEN WORK ORDER: 9408034
 CLIENT PROJ. ID: 2680.41

DATE SAMPLED: 08/01/94
 DATE RECEIVED: 08/02/94
 REPORT DATE: 08/26/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	08/12/94
Toluene	108-88-3	ND	0.5	ug/L	08/12/94
Ethylbenzene	100-41-4	ND	0.5	ug/L	08/12/94
Xylenes, Total	1330-20-7	ND	2	ug/L	08/12/94
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	08/12/94
#Extraction for TPH	EPA 3510	-		Extrn Date	08/10/94
TPH as Diesel	GC-FID	ND	0.05	mg/L	08/11/94
TPH as Oil	GC-FID	0.3 *	0.2	mg/L	08/11/94
Organo Lead in Water	DOHS-LUFT	ND	0.1	mg/L	08/08/94
EPA 8010 - Water matrix	EPA 8010				
Bromodichloromethane	75-27-4	ND	0.5	ug/L	08/07/94
Bromoform	75-25-2	ND	0.5	ug/L	08/07/94
Bromomethane	74-83-9	ND	0.5	ug/L	08/07/94
Carbon Tetrachloride	56-23-5	ND	0.5	ug/L	08/07/94
Chlorobenzene	108-90-7	ND	0.5	ug/L	08/07/94
Chloroethane	75-00-3	ND	0.5	ug/L	08/07/94
2-Chloroethyl Vinyl Ether	110-75-8	ND	0.5	ug/L	08/07/94
Chloroform	67-66-3	ND	0.5	ug/L	08/07/94
Chloromethane	74-87-3	ND	0.5	ug/L	08/07/94
Dibromochloromethane	124-48-1	ND	0.5	ug/L	08/07/94
1,2-Dichlorobenzene	95-50-1	ND	0.5	ug/L	08/07/94
1,3-Dichlorobenzene	541-73-1	ND	0.5	ug/L	08/07/94
1,4-Dichlorobenzene	106-46-7	ND	0.5	ug/L	08/07/94
Dichlorodifluoromethane	75-71-8	ND	0.5	ug/L	08/07/94
1,1-Dichloroethane	75-34-3	ND	0.5	ug/L	08/07/94
1,2-Dichloroethane	107-06-2	ND	0.5	ug/L	08/07/94
1,1-Dichloroethene	75-35-4	ND	0.5	ug/L	08/07/94
cis-1,2-Dichloroethene	156-59-2	ND	0.5	ug/L	08/07/94
trans-1,2-Dichloroethene	156-60-5	ND	0.5	ug/L	08/07/94
1,2-Dichloropropane	78-87-5	ND	0.5	ug/L	08/07/94
cis-1,3-Dichloropropene	10061-01-5	ND	0.5	ug/L	08/07/94
trans-1,3-Dichloropropene	10061-02-6	ND	0.5	ug/L	08/07/94
Methylene Chloride	75-09-2	ND	0.5	ug/L	08/07/94
1,1,2,2-Tetrachloroethane	79-34-5	ND	0.5	ug/L	08/07/94
Tetrachloroethene	127-18-4	2 *	0.5	ug/L	08/07/94
1,1,1-Trichloroethane	71-55-6	ND	0.5	ug/L	08/07/94

LEVINE-FRICKE

SAMPLE ID: MW-3
AEN LAB NO: 9408034-03
AEN WORK ORDER: 9408034
CLIENT PROJ. ID: 2680.41

DATE SAMPLED: 08/01/94
DATE RECEIVED: 08/02/94
REPORT DATE: 08/26/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
1,1,2-Trichloroethane	79-00-5	ND	0.5	ug/L	08/07/94
Trichloroethene	79-01-6	ND	0.5	ug/L	08/07/94
Trichlorofluoromethane	75-69-4	ND	0.5	ug/L	08/07/94
1,1,2Trichlorotrifluoroethane	76-13-1	ND	0.5	ug/L	08/07/94
Vinyl Chloride	75-01-4	ND	0.5	ug/L	08/07/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

LEVINE-FRICKE

SAMPLE ID: MW-103
 AEN LAB NO: 9408034-04
 AEN WORK ORDER: 9408034
 CLIENT PROJ. ID: 2680.41

DATE SAMPLED: 08/01/94
 DATE RECEIVED: 08/02/94
 REPORT DATE: 08/26/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-			Extrn Date 08/10/94
TPH as Diesel	GC-FID	ND	0.05	mg/L	08/11/94
TPH as Oil	GC-FID	0.2 *	0.2	mg/L	08/11/94
Organo Lead in Water	DOHS-LUFT	ND	0.1	mg/L	08/08/94

ND = Not detected at or above the reporting limit
 * = Value above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9408034

CLIENT PROJECT ID: 2680.41

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration that can reliably be determined during routine laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix and method dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

AEN JOB NO: 9408034
 DATE EXTRACTED: 08/10/94
 INSTRUMENT: C
 MATRIX: WATER

SURROGATE STANDARD RECOVERY SUMMARY
 METHOD: EPA 3510 GCFID

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Client Id.	Lab Id.	n-Pentacosane
08/11/94	MW-3	03	35
08/11/94	MW-103	04	41

CURRENT QC LIMITS

<u>Surrogate</u>	<u>Percent Recovery</u>
n-Pentacosane	30-100

QUALITY CONTROL DATA

AEN JOB NO: 9408034
 DATE EXTRACTED: 08/10/94
 DATE ANALYZED: 08/10/94
 SAMPLE SPIKED: DI WATER
 INSTRUMENT: C
 MATRIX: WATER

METHOD SPIKE RECOVERY SUMMARY
 METHOD: EPA 3510 GCFID

Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Diesel	2.01	85	8	65-103	12

METHOD BLANK RESULT

Lab Id.	Extractable Hydrocarbons as Diesel (mg/L)	Extractable Hydrocarbons as Oil (mg/L)
081094-METHOD BLANK	ND	ND
Reporting Limit	0.05	0.2

QUALITY CONTROL DATA

AEN JOB NO: 9408034
 AEN LAB NO: 0807-BLANK
 DATE ANALYZED: 08/07/94
 INSTRUMENT: G
 MATRIX: WATER

EPA METHOD 8010
 HALOGENATED VOLATILE ORGANICS

Analyte	CAS #	Concentration (ug/L)	Reporting Limit (ug/L)
Bromodichloromethane	75-27-4	ND	0.5
Bromoform	75-25-2	ND	0.5
Bromomethane	74-83-9	ND	0.5
Carbon Tetrachloride	56-23-5	ND	0.5
Chlorobenzene	108-90-7	ND	0.5
Chloroethane	75-00-3	ND	0.5
2-Chloroethyl Vinyl Ether	110-75-8	ND	0.5
Chloroform	67-66-3	ND	0.5
Chloromethane	74-87-3	ND	0.5
Dibromochloromethane	124-48-1	ND	0.5
1,2-Dichlorobenzene	95-50-1	ND	0.5
1,3-Dichlorobenzene	541-73-1	ND	0.5
1,4-Dichlorobenzene	106-46-7	ND	0.5
Dichlorodifluoromethane	75-71-8	ND	0.5
1,1-Dichloroethane	75-34-3	ND	0.5
1,2-Dichloroethane	107-06-2	ND	0.5
1,1-Dichloroethene	75-35-4	ND	0.5
cis-1,2-Dichloroethene	156-59-2	ND	0.5
trans-1,2-Dichloroethene	156-60-5	ND	0.5
1,2-Dichloropropane	78-87-5	ND	0.5
cis-1,3-Dichloropropene	10061-01-5	ND	0.5
trans-1,3-Dichloropropene	10061-02-6	ND	0.5
Methylene Chloride	75-09-2	ND	0.5
1,1,2,2-Tetrachloroethane	79-34-5	ND	0.5
Tetrachloroethene	127-18-4	ND	0.5
1,1,1-Trichloroethane	71-55-6	ND	0.5
1,1,2-Trichloroethane	79-00-5	ND	0.5
Trichloroethene	79-01-6	ND	0.5
Trichlorofluoromethane	75-69-4	ND	0.5
1,1,2-Trichloro- 1,2,2-trifluoroethane	76-13-1	ND	0.5
Vinyl Chloride	75-01-4	ND	0.5

QUALITY CONTROL DATA

AEN JOB NO: 9408034
INSTRUMENT: G
MATRIX: WATER

SURROGATE STANDARD RECOVERY SUMMARY
METHOD: EPA 8010

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)	
	Client Id.	Lab Id.	Bromochloro-methane	1-Bromo-3-chloro-propane
08/07/94	MW-3	03	118	130

CURRENT QC LIMITS

<u>Surrogate</u>	<u>Percent Recovery</u>
Bromochloromethane	78-153
1-Bromo-3-chloropropane	74-143

QUALITY CONTROL DATA

AEN JOB NO: 9408034
 DATE ANALYZED: 08/07/94
 SAMPLE SPIKED: 9408095-02
 INSTRUMENT: G
 MATRIX: WATER

MATRIX SPIKE RECOVERY SUMMARY
 METHOD: EPA 8010

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD
1,1-Dichloroethene	50.0	103	5
Trichloroethene	50.0	102	6
Chlorobenzene	50.0	93	2

CURRENT QC LIMITS

Analyte	Percent Recovery	RPD
1,1-Dichloroethene	40-130	18
Trichloroethene	67-136	17
Chlorobenzene	59-123	15

QUALITY CONTROL DATA

AEN JOB NO: 9408034
 AEN LAB NO: 0812-BLANK
 DATE ANALYZED: 08/12/94
 INSTRUMENT: F
 MATRIX: WATER

BTEX AND HYDROCARBONS
 METHOD: EPA 8020, 5030 GCFID

	CAS #	Concentration (ug/L)	Reporting Limit (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/L	0.05 mg/L

QUALITY CONTROL DATA

AEN JOB NO: 9408034
AEN LAB NO: 0815-BLANK
DATE ANALYZED: 08/15/94
INSTRUMENT: F
MATRIX: WATER

BTEX AND HYDROCARBONS
METHOD: EPA 8020, 5030 GCFID

	CAS #	Concentration (ug/L)	Reporting Limit (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2
PURGEABLE HYDROCARBONS AS:			
Gasoline		ND mg/L	0.05 mg/L

QUALITY CONTROL DATA

AEN JOB NO: 9408034
INSTRUMENT: F
MATRIX: WATER

SURROGATE STANDARD RECOVERY SUMMARY
METHOD: EPA 8020, 5030 GCFID

Date Analyzed	SAMPLE IDENTIFICATION		SURROGATE RECOVERY (PERCENT)
	Client Id.	Lab Id.	Fluorobenzene
08/15/94	MW-1	01	93
08/12/94	MW-2	02	98
08/12/94	MW-3	03	95

CURRENT QC LIMITS

<u>Surrogate</u>	<u>Percent Recovery</u>
Fluorobenzene	70-115

QUALITY CONTROL DATA

AEN JOB NO: 9408034
DATE ANALYZED: 08/12/94
SAMPLE SPIKED: LCS
INSTRUMENT: F
MATRIX: WATER

LABORATORY CONTROL SAMPLE
METHOD: EPA 8020, 5030 GCFID

Analyte	Spike Added (ug/L)	Percent Recovery
Benzene	8.5	95
Toluene	32.2	94
Hydrocarbons as Gasoline	500	110

CURRENT QC LIMITS

<u>Analyte</u>	<u>Percent Recovery</u>
Benzene	65-122
Toluene	67-124
Gasoline	60-125

QUALITY CONTROL DATA

AEN JOB NO: 9408034
 DATE ANALYZED: 08/08/94
 MATRIX: WATER

MATRIX SPIKE RECOVERY SUMMARY

Analyte	Inst./ Method	Sample Spiked	Sample Result (mg/L)	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits	
							% Rec. Limit	RPD Limit
Organo Lead	V22/DHS	9408034-04	ND	1.0	92	1	75-125	20

METHOD SPIKE AND BLANK RECOVERY SUMMARY

Analyte	Inst./ Method	Blank Result (mg/L)	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits	
						% Rec. Limit	RPD Limit
Organo Lead	V22/DHS	ND	1.0	99	2	80-120	15

*** END OF REPORT ***

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

6-15-11
R-3,5-T

9408034

Project No.: 2680.41 Field Logbook No.: _____ Date: 8/1/94 Serial No.: _____
 Project Name: HARRISON ST. GARAGE Project Location: OAKLAND, CA. No: 12278

Sampler (Signature): JCK ANALYSES: _____
 Hold: _____ Rush: _____ Samplers: JCK

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	ANALYSES						REMARKS
						TPH-9	BTEX	TPH-D	TPH-O	HOLD	RUSH	
MW-1	8/1/94	17:20	01A-D	4	H2O	X	X	X				STANDARD TAT
MW-2	↓	15:15	02AB	2			X	X				
MW-3	↓	16:40	03A-H	8		X	X	X	X	X		RESULTS TO
MW-103	↓	16:50	04A-D	4		X			X	X		TAYLOR BENNETT
												BTEX 8020
												TPH-9 5030 GCFID
												TPH-D 3510/3550
												TPH-O " "
												VOC's 8010
												ORGANIC Pb DHS METHOD

RELINQUISHED BY: <u>JCK</u> (Signature)	DATE: <u>8/2/94</u>	TIME: <u>12:40</u>	RECEIVED BY: <u>Michael E. McHale</u> (Signature)	DATE: <u>8/2/94</u>	TIME: <u>12:40</u>
RELINQUISHED BY: <u>Michael E. McHale</u> (Signature)	DATE: <u>8/2/94</u>	TIME: <u>13:20</u>	RECEIVED BY: <u>Gina Gillespie</u> (Signature)	DATE: <u>8-2-94</u>	TIME: <u>1320</u>
RELINQUISHED BY: _____ (Signature)	DATE: _____	TIME: _____	RECEIVED BY: _____ (Signature)	DATE: _____	TIME: _____

METHOD OF SHIPMENT: _____ DATE: _____ TIME: _____ LAB COMMENTS: _____

Sample Collector: LEVINE-FRICKE
 1900 Powell Street, 12th Floor
 Emeryville, California 94608
 (510) 652-4500

Analytical Laboratory: AEN
PLEASANT HILL CA.