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21-015 751116 02

MARKETING DEPARTMENT

ENVIRONMENTAL ENGINEERING

G. D. GIBSON
SENIOR ENVIRONMENTAL ENGINEER

June 26, 1990

Exxon RAS 7-3006
720 High Street
Oakland, California

Mr. Larry Seto
Alameda County Environmental Health Department
Hazardous Materials Division
80 Swan Way, Suite 200
Oakland, California 94621

Dear Mr. Seto:

Attached for your review and comment is the report on the Quarterly Groundwater Monitoring which was performed at the above referenced site in the City of Oakland during April, 1990. This report, by Applied GeoSystems of Fremont, California, indicates a general increasing trend in dissolved hydrocarbon concentrations and free product. We will be initiating monthly site visits to monitor the free product and bail this product when required. AGS is continuing to develop a plan for site remediation which I will present to you in the near future.

Should you have any comments or concerns please contact me at (415) 246-8768. Thank you.

Sincerely,



Gary D. Gibson

GDG:vv
1217E
Attachments

c - w/attachment:
Mr. L. Feldman - San Francisco Bay Region Water Quality Control Board

w/o attachment:
Mr. P. J. Brininstool
Ms. J. E. Folger
Mr. J. R. Hastings
Mr. J. K. Hunter
Mr. L. W. Lindeen
Mr. R. C. Witham - Applied GeoSystems



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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June 15, 1990

0515ggib

AGS 87042-9

Mr. Gary D. Gibson
Exxon Company U.S.A.
P.O. Box 4032
2300 Clayton Road
Concord, California 94520

Subject: Letter Report on Quarterly Ground-Water Monitoring at Exxon Station No. 7-3006, 720 High Street, Oakland, California.

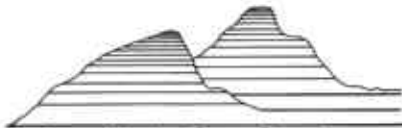
Mr. Gibson:

This letter report summarizes the results of quarterly ground-water monitoring and sampling performed by Applied GeoSystems (AGS) at the request of Exxon Company, U.S.A. (Exxon). The site is at 720 High Street, in a predominantly industrial area of Oakland, California (Site Location Map, Plate P-1). It is bounded on the northwest by High Street, on the southwest by Coliseum Way, on the northeast by a former dry-cleaning facility, and on the south by Alameda Avenue. The locations of the wells are shown on the Site Map, Plate P-2.

Previous Environmental Work

In April 1987, AGS performed a first-phase environmental investigation related to underground storage tank (UST) removal at the site (AGS Report No. 87042-1, May 13, 1987), and further investigation of soil at the site was recommended. In June 1987, results of a soil vapor survey conducted by Exxon's contractor indicated that the highest vapor concentrations were between the former gasoline UST pit and the southern pump islands, extending southwestward towards Coliseum Way.

A second phase of work was conducted by AGS to evaluate soil for the presence of petroleum hydrocarbons in the gasoline UST pit and beneath the former product piping. A lens of black soil was observed extending southwest from the tank pit at approximately



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LETTER REPORT
ON
QUARTERLY GROUND-WATER MONITORING
FOR FIRST QUARTER 1990
at
Exxon Station No. 7-3006
720 High Street
Oakland, California

14 feet below grade, and free product was observed seeping into the pit from this lens (AGS Report No. 87042-2, July 10, 1987).

In September 1987, AGS installed ground-water monitoring wells MW-2 through MW-9. In May 1988, monitoring well MW-1 was installed. Concentrations of up to 2,689 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPHg) and 4,261 ppm total petroleum hydrocarbons as diesel (TPHd) were detected in soil samples collected during the investigation. Floating product up to 30 inches thick was measured in wells MW-2, MW-4, MW-5 and MW-8. Ground-water flow was estimated to be toward the southwest during May and July 1988 (AGS Report No. 87042-5, August 5, 1988).

In July 1989, AGS observed excavation of additional soil from the southern portion of the gasoline UST pit (AGS Report No. 87042-6, October 16, 1989). Prior to excavation, well MW-5 was abandoned. In November 1989, AGS drilled 11 soil borings and installed four additional monitoring wells (MW-10, MW-11, MW-12, and MW-13) to evaluate further the extent of hydrocarbons in soil and ground water. In December 1989 floating product was observed in MW-2, MW-3, and MW-4. The highest dissolved TPHg and TPHd concentrations were detected in ground water from the western part of the site and the plume boundary appeared to be defined in the northern part of the site. Samples of free product from two of the wells, MW-3 and MW-8, were analyzed; product from MW-3 was found to be predominantly diesel and product from MW-8 was found to be predominantly gasoline. Volatile organic compounds (VOC) and total oil and grease (TOG) were not detected in ground-water samples from wells MW-7 and MW-9, which are near the waste-oil UST pit (AGS Report 87042-6R, January 30, 1990).

Field Activities

The site was visited on February 20 and April 19, 1990, to measure depths to ground water and perform subjective evaluations of initial water samples on each well. On April 19, each well without free product was purged, and ground-water samples were collected (MW-1 and MW-6 through MW-13). Free product was bailed when encountered. The purpose of the work was to evaluate trends in hydrocarbon concentrations and ground-water gradient and flow direction beneath the site. Field work was conducted in accordance with the attached Field Procedures.

Results of Subjective Evaluation

In February, floating product from 0.01 to 0.29 foot thick was observed in initial water samples collected from wells MW-2, MW-3, and MW-8. In April, product from 0.03 to

0.10 foot thick was observed in wells MW-2, MW-3, and MW-4. Cumulative results of subjective evaluations are presented in Table 1.

Ground-water levels increased an average of 1.3 feet between December 1989 and February 1990 and decreased an average of 0.5 feet between February and April 1990 (Table 1). A hydrograph was prepared for the four wells that have periodically contained free product, MW-2, MW-3, MW-4, and MW-8 (Plate P-3). The hydrograph shows the product and ground-water elevations in each well to illustrate trends in water levels and product thicknesses. In general, product thicknesses decreased to a thin layer between April 1989 and July 1989 and fluctuated until November 1989, probably as a result of periodic product pumping. Product disappeared in each well except MW-2 in December 1989, as water levels rose. A general increase in product thicknesses has been observed since December 1989.

Ground-Water Gradient

The data indicate that ground-water levels vary by as much 2 feet across the site (Table 2). The monitoring wells at this site are constructed in various permeable zones; for continuity, the ground-water elevation data from wells constructed in the shallow gravel were used to estimate the difference in water level across the site on April 19, 1990. The water level is shown on the Ground-Water Elevation Map, Plate P-4. The map suggests that ground water flows toward the south at an estimated gradient of 0.012 (approximately 1.2 feet vertical change per 100 feet horizontal).

Ground-Water Analyses

Ground-water samples were analyzed for TPHg and TPHd by Environmental Protection Agency (EPA) Method 8015 and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 602. Samples from wells MW-7, MW-9, and MW-10 were also analyzed for VOC by EPA Method 601. In addition, a sample from MW-11 was analyzed for water-quality parameters. Samples were analyzed for TPHg, TPHd, and BTEX at Applied Analytical laboratory in Fremont, California (Certificate No. 153); for VOC by Chromalab, Inc. laboratory in San Ramon, California (Certificate No. 238); and for water-quality parameters at Sequoia Analytical in Redwood City, California (Certificate No. 145). Copies of Chain of Custody Records and Analysis Reports are attached.

Results of the analyses of ground-water samples collected in April 1990 indicated increased concentrations of petroleum hydrocarbons in wells MW-6, MW-7, MW-8, MW-12, and MW-13 compared to the December 1989 results. Petroleum hydrocarbons were not detected in ground water from wells MW-9, MW-10, and MW-11, at the northern and eastern site perimeters. Petroleum hydrocarbons were not detected in well MW-1, opposite

the site to the southwest across Coliseum Way. Volatile organic compounds were not detected in ground-water samples from wells MW-7, MW-9, and MW-10, on the northeastern site perimeter adjacent to the former dry-cleaning facility. Cumulative results of ground-water analyses are presented in Table 3.

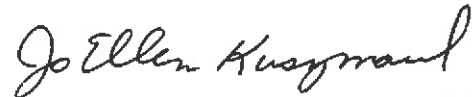
Concentrations of TPHg and TPHd ranged from 2.7 to 110 ppm and 3.5 to 53 ppm, respectively, in ground water from wells where hydrocarbons were detected. Plates P-5 and P-6 show the estimated distribution of the dissolved TPHg and TPHd plumes, and the estimated extent of free product in the formation. In general, the greatest concentrations of dissolved TPHg and TPHd were detected in ground water from the western part of the site, with floating product concentrated in the southwestern part of the site.

Benzene concentrations ranged from nondetectable to 6.6 ppm in the ground-water samples. Up to 1.8 ppm ethylbenzene, 11 ppm total xylenes, and 7.4 ppm toluene were detected in the ground-water samples.

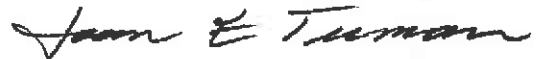
The results of the water-quality analyses reported in Table 4 suggest that the ground water at the site does not meet some State and Federal drinking water standards. Concentrations of iron and manganese were slightly greater than the Secondary Drinking Water Standards set by Title 22 of the California Code of Regulations, indicating that the water is potable but may cause staining and may be unsuitable for some industrial uses. In addition, the total dissolved solids (TDS) concentration exceeds the Federal Secondary Drinking Water Standard MCL set by the Code of Federal Regulations, which may impart a salty taste to the water. Its use for irrigation would therefore be limited to non-salt-sensitive crops.

Please call if you have any questions.

Sincerely,
Applied GeoSystems



JoEllen Kuzmaul
Project Geologist



Joan E. Tiernan
Registered Civil Engineer
No. 044600

Enclosures: Table 1, Results of Subjective Evaluation of Water Samples
Table 2, Summary of Ground-Water Elevations
Table 3, Summary of Analytical Results of Ground Water
Table 4, Summary of Analytical Results for Water Quality Parameters
Site Location Map, Plate P-1
Site Map, Plate P-2
Hydrograph, Plate P-3
Ground-Water Elevation Map, Plate P-4
Concentration of TPHg in Ground Water, Plate P-5
Concentration of TPHd in Ground Water, Plate P-6
Field Procedures
Chain of Custody Records and Laboratory Reports

TABLE 1
RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
(page 1 of 3)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-1				
4/25/89	7.55	NONE	NONE	NONE
4/27/89	10.16	NONE	SLIGHT	NONE
9/06/89	10.88	NONE	V. SLIGHT	NONE
9/22/89	11.06	NONE	NONE	NONE
11/1/89	10.82	NONE	NONE	NONE
11/15/89	11.07	NONE	NONE	NONE
12/6/89	10.33	NONE	NONE	NONE
2/20/90	8.81	NONE	NONE	NONE
4/19/90	9.33	NONE	NONE	NONE
MW-2				
4/25/89	9.27	2.16	---	NONE
7/19/89	10.81	1.56	---	NONE
7/27/89	10.18	0.13	---	HEAVY
9/06/89	10.89	0.09	---	SLIGHT
9/22/89	11.56	0.56	---	SLIGHT
11/1/89	10.85	0.09	---	NONE
11/15/89	11.05	0.07	---	NONE
12/6/89	10.23	0.13	---	NONE
2/20/90	8.86	0.29	---	NONE
4/19/90	9.09	0.10	---	NONE
MW-3				
4/25/89	7.57	0.08	---	NONE
7/19/89	10.33	0.66	---	NONE
7/27/89		covered by soil		
9/06/89	11.22	0.07	---	SLIGHT
9/22/89	11.38	0.28	---	SLIGHT
11/1/89	10.90	0.01	---	NONE
11/15/89	11.18	0.11	---	NONE
12/6/89	10.29	NONE	SLIGHT	NONE
2/20/90	8.73	0.04	---	NONE
4/19/90	9.20	0.09	---	NONE

TABLE 1
 RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
 (page 2 of 3)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-4				
4/25/89	7.26	0.16	---	NONE
7/19/89	10.32	0.72	---	NONE
7/27/89		covered by soil		
9/06/89	11.40	0.07	---	SLIGHT
9/22/89	11.64	0.19	---	SLIGHT
11/1/89	11.00	NONE	SLIGHT	NONE
11/15/89	11.18	0.10	---	NONE
12/6/89	10.25	NONE	SLIGHT	NONE
2/20/90	8.40	NONE	NONE	NONE
4/19/90	9.04	0.03	---	NONE
MW-5				
4/25/89	8.06	0.32	---	NONE
7/18/89		well abandoned		
MW-6				
4/25/89	8.02	NONE	NONE	NONE
9/06/89	13.64	0.08	---	SLIGHT
9/22/89	13.79	0.07	---	SLIGHT
11/1/89	12.78	NONE	SLIGHT	NONE
11/15/89	12.91	NONE	SLIGHT	NONE
12/6/89	11.84	NONE	NONE	NONE
2/20/90	9.08	NONE	NONE	NONE
4/19/90	9.72	NONE	NONE	NONE
MW-7				
4/25/89	8.66	NONE	NONE	NONE
9/06/89	11.72	NONE	SLIGHT	NONE
9/22/89	11.89	NONE	NONE	NONE
12/6/89	10.46	NONE	NONE	NONE
2/20/90	8.44	NONE	NONE	NONE
4/19/90	9.54	NONE	NONE	NONE
MW-8				
4/25/89	8.31	0.66	---	NONE
7/19/89	10.97	1.25	---	NONE
7/27/89	10.34	0.08	---	HEAVY
continued				

TABLE 1
 RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
 (page 3 of 3)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-8 continued				
9/06/89	11.09	0.17	---	SLIGHT
9/22/89	11.58	0.36	---	SLIGHT
11/1/89	11.03	NONE	NONE	NONE
11/15/89	11.25	0.01	---	NONE
12/6/89	10.30	NONE	SLIGHT	NONE
2/20/90	8.00	0.01	---	NONE
4/19/90	8.50	NONE	NONE	NONE
MW-9				
4/25/89	8.25	NONE	NONE	NONE
9/06/89		covered by soil		
9/22/89		covered by soil		
12/6/89	10.12	NONE	NONE	NONE
2/20/90	9.38	NONE	NONE	NONE
4/19/90	9.40	NONE	NONE	NONE
MW-10				
12/6/89	10.46	NONE	NONE	NONE
2/20/90	8.12	NONE	NONE	NONE
4/19/90	8.54	NONE	NONE	NONE
MW-11				
12/6/89	10.62	NONE	NONE	NONE
2/20/90	9.20	NONE	NONE	NONE
4/19/90	9.80	NONE	NONE	NONE
MW-12				
12/6/89	8.00	NONE	NONE	NONE
2/20/90	6.33	NONE	NONE	NONE
4/19/90	7.18	NONE	NONE	NONE
MW-13				
12/6/89	9.35	NONE	NONE	NONE
2/20/90	7.73	NONE	NONE	NONE
4/19/90	8.68	NONE	NONE	NONE

TABLE 2
SUMMARY OF GROUND-WATER ELEVATIONS
April 19, 1990

Well Number	Depth to Water (ft)	Casing Elevation (ft)	Ground-Water Elevation (ft)
MW-1▲	9.33	12.87	3.54
MW-2*			
MW-3*			
MW-4*			
MW-6▲	9.72	14.27	4.55
MW-7▲	9.54	14.84	5.30
MW-8	8.50	13.45	4.95
MW-9	9.40	14.64	5.24
MW-10	8.54	14.05	5.51
MW-11	9.80	13.55	3.75
MW-12▲	7.18	12.01	4.83
MW-13▲	8.68	14.20	5.52

* Not calculated due to free product in well.
▲ Wells used for gradient calculation.

TABLE 3
RESULTS OF GROUND-WATER ANALYSES
(page 1 of 3)

Sample No.		TPHg ppm	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Xylenes ppm	TPHd ppm	TOG ppm	VOC ppm
5/88	W-11-MW1*	0.240	0.090	0.005	0.015	0.025	--	--	ND
12/89	W-11-MW1	0.63	0.012	0.0056	0.0037	0.025	0.24	--	--
4/90	W-9-MW1	<0.020	<0.00050	<0.00050	<0.00050	<0.00050	<0.10	--	--
9/87	W-25-MW2	1.445	0.233	0.81	0.056	0.209	--	--	--
5/88	free product								
12/89	free product								
4/90	free product								
9/87	W-25-MW3	2.101	0.360	1.062	0.068	0.298	0.66	--	--
5/88	W-14-MW3	8.7	3.98	0.28	0.24	0.65	--	--	--
12/89	free product encountered during purging								
4/90	free product								
9/87	W-25-MW4	0.925	0.070	0.007	0.010	0.016	0.74	--	--
5/88	free product								
12/89	free product encountered during purging								
4/90	free product								

See notes on page 3.

Quarterly Ground-Water Monitoring
Exxon Station No. 7-3006, Oakland, California

June 15, 1990
AGS 87042-9

TABLE 3
RESULTS OF GROUND-WATER ANALYSES
(page 2 of 3)

Sample No.		TPHg ppm	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Xylenes ppm	TPHd ppm	TOG ppm	VOC ppm
9/87	W-25-MW5	26.66	0.56	1.71	1.58	7.15	37.22	--	--
5/88	free product								
7/89	well abandoned								
9/87									
5/88	W-15-MW6	29.3	12.82	0.55	1.44	5.50	--	--	--
12/89	W-18-MW6	9.0	0.37	0.013	0.0026	0.43	4.8	--	--
4/90	W-30-MW6	27	3.0	0.12	0.49	2.1	26	--	--
9/87	W-25-MW7	1.531	0.258	0.002	<0.002	0.042	2.79	--	ND
5/88	W-15-MW7	--	0.300**	<0.010**	<0.010**	<0.010**	0.190	--	ND
12/89	W-11-MW7	1.70	0.22	0.0053	0.0050	0.0086	2.5	<5	ND
4/90	W-10-MW7	2.7	0.22	0.0086	0.0070	0.020	3.5	--	ND
9/87	W-25-MW8	1.325	0.081	0.074	0.042	0.182	--	--	--
5/88	free product								
12/89	W-11-MW8	42	2.6	0.63	0.21	3.7	34	--	--
4/90	W-14-MW8	49	2.1	0.82	1.1	4.8	53	--	--

See notes on page 3.

TABLE 3
RESULTS OF GROUND-WATER ANALYSES
(page 3 of 3)

Sample No.	TPHg ppm	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Xylenes ppm	TPHd ppm	TOG ppm	VOC ppm	
5/88	W-14-MW9	<0.05	<0.0005	0.001	<0.001	<0.001	--	--	ND
12/89	W-14-MW9	0.1	0.0018	0.0037	0.0014	0.0088	0.11	<5	ND
4/90	W-10-MW9	<0.020	<0.00050	<0.00050	<0.00050	<0.00050	<0.10	--	ND
12/89	W-12-MW10	0.32	0.0037	0.014	0.0056	0.032	<0.10	--	--
4/90	W-9-MW10	<0.020	<0.00050	<0.00050	<0.00050	<0.00050	<0.10	--	ND
12/89	W-11-MW11	0.078	0.0059	0.00063	<0.0005	0.0048	<0.10	--	--
4/90	W-12-MW11	<0.020	<0.00050	<0.00050	<0.00050	<0.00050	<0.10	--	--
12/89	W-8-MW12	85	6.7	6.3	1.8	7.8	40	--	--
4/90	W-7-MW12	110	6.6	7.4	1.8	11	97	--	--
12/89	W-10-MW13	52	2.1	2.0	1.4	6.1	31	--	--
4/90	W-9-MW13	59	1.8	1.5	1.4	7.2	54	--	--

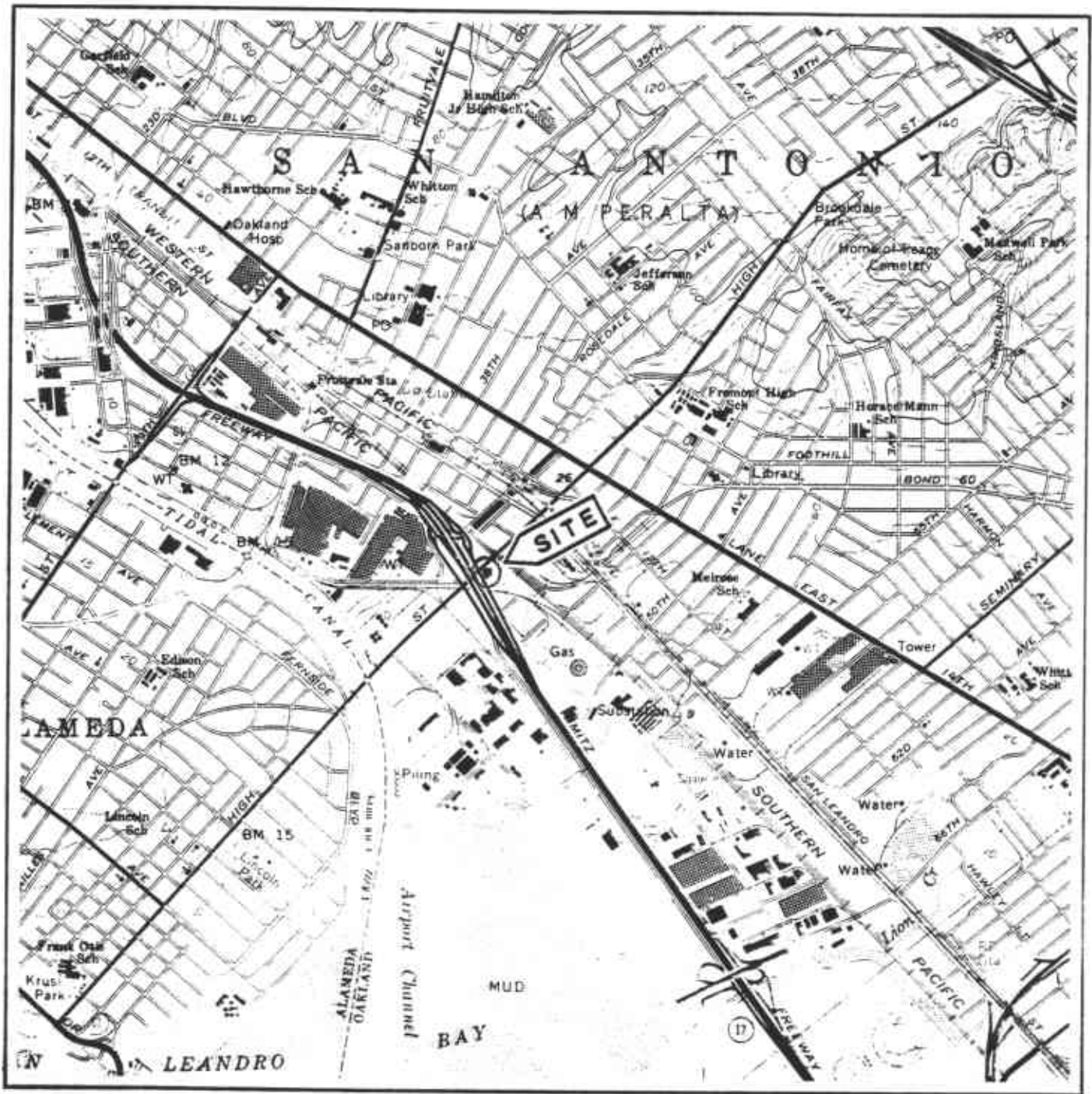
<: Not detected at method detection level
 ND: No VOC detected other than BTEX
 *: W-11-MW1 = water sample - depth - well number
 **: From VOC analysis

TABLE 4
RESULTS OF WATER-QUALITY ANALYSES
FOR GROUND-WATER FROM WELL MW-11

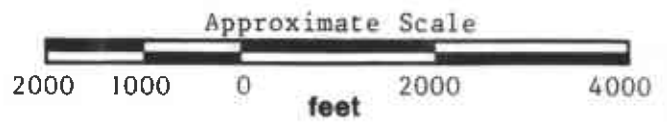
Parameter	Unit	Concentration in MW-11	State SMCL ¹	Federal SMCL ²
Copper	ppm	<0.010	1.0	--
Iron	ppm	0.34	0.3	--
Manganese	ppm	0.078	0.05	--
Magnesium	ppm	85	--	--
Zinc	ppm	<0.010	5.0	--
Surfactants	ppm	<0.020	0.5	--
Sulfate	ppm	49	500	250
Total Dissolved Solids	ppm	930	1,000	500
Specific Conductance	μmhos/cm	1,100	900-1,600	--
Chloride	ppm	52	500	250
Bicarbonate Alkalinity	ppm	450	--	--
Carbonate Alkalinity	ppm	<0.50	--	--
Hydroxide Alkalinity	ppm	<0.0010	--	--
Calcium	ppm	64	--	--
Sodium	ppm	79	--	--
Hardness	ppm	440	--	--
pH	---	7.0	--	--

¹Secondary Drinking Water Standards Maximum Contaminant Level, Title 22, California Code of Regulations.

²Secondary Drinking Water Standards Maximum Contaminant Level, U. S. Environmental Protection Agency, Code of Federal Regulations, 40CFR143, July 19, 1979.



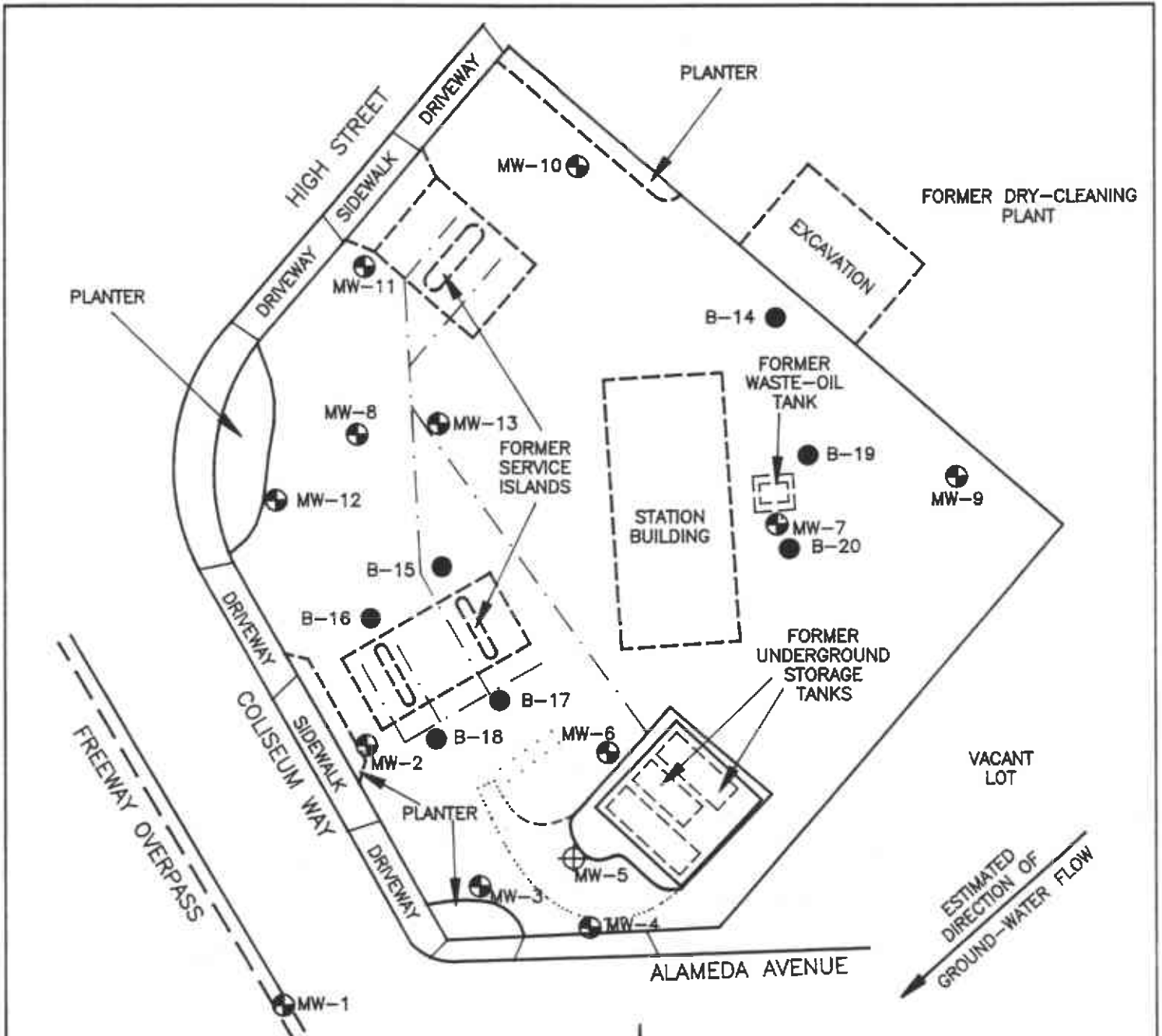
Source: U.S. Geological Survey
 Oakland East
 7.5-Minute Quadrangle



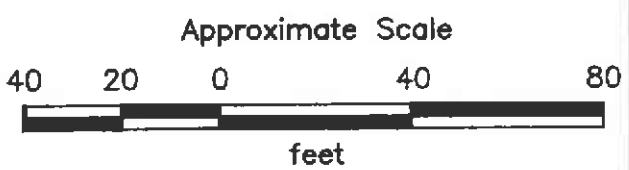
PROJECT NO. 87042-9

SITE VICINITY MAP
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P - 1



- . - . = Product piping trenches
- = Area excavated by Applied GeoSystems in July 1989
- B-20 ● = Soil boring drilled by Applied GeoSystems
- MW-9 ⊕ = Monitoring well installed by Applied GeoSystems
- MW-5 ⊕ = Monitoring well (destroyed) installed by Applied GeoSystems



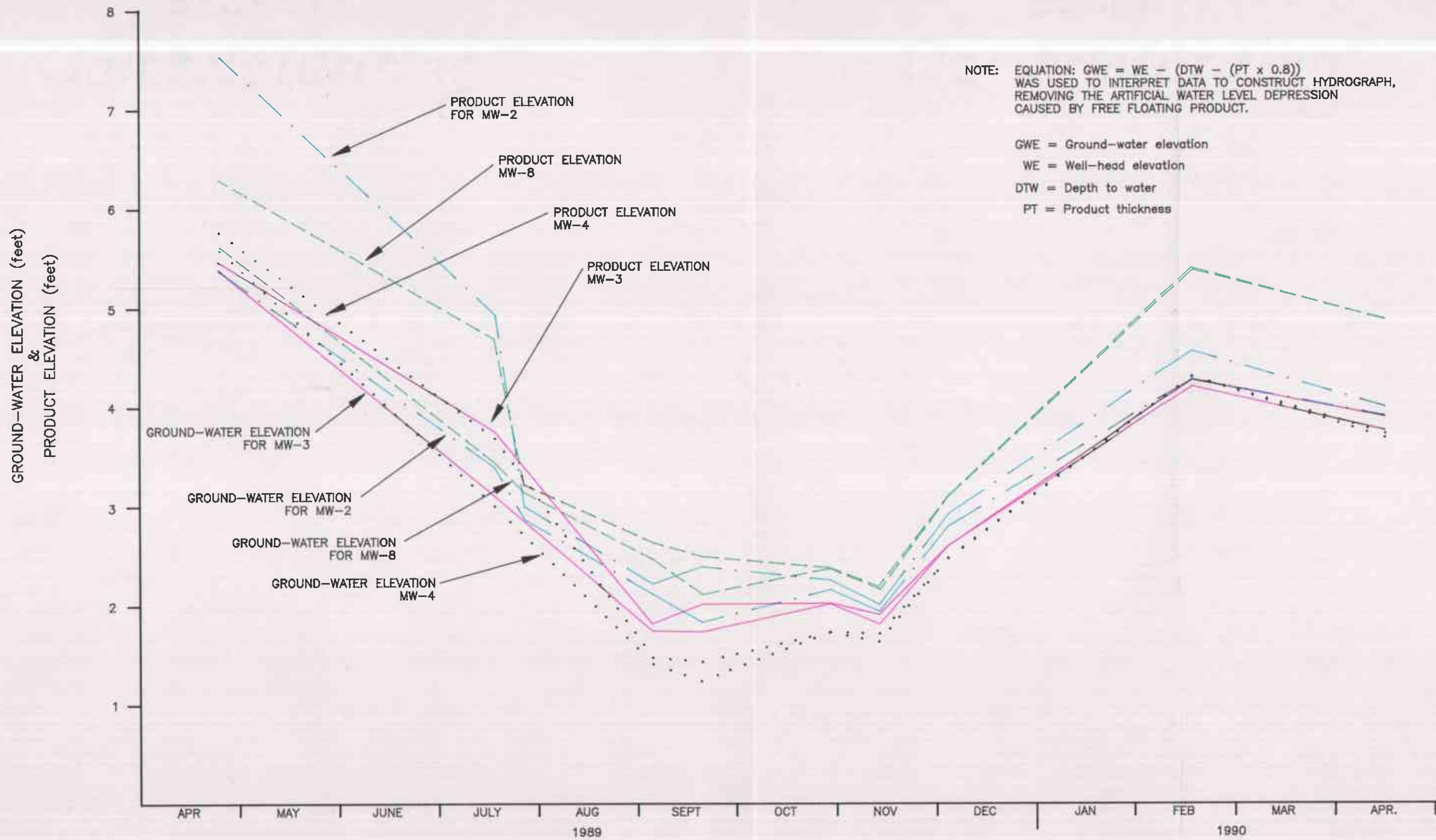
Source: Modified from plan supplied by Exxon Company, USA



SITE MAP
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P - 2

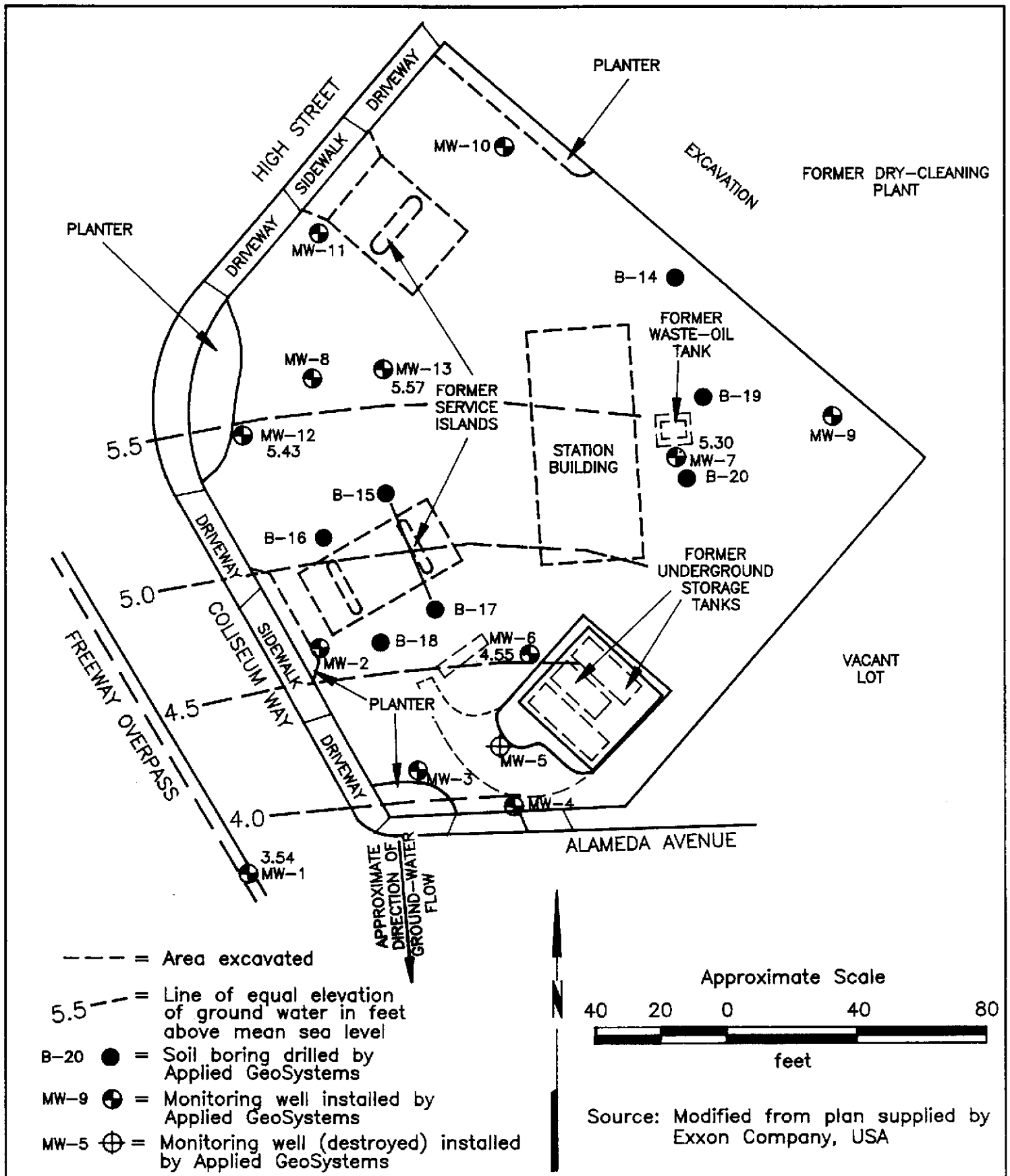
PROJECT NO. 87042-9



PROJECT NO. 87042-9

HYDROGRAPH
Exxon Station No. 7-3006
720 High Street
Oakland, California

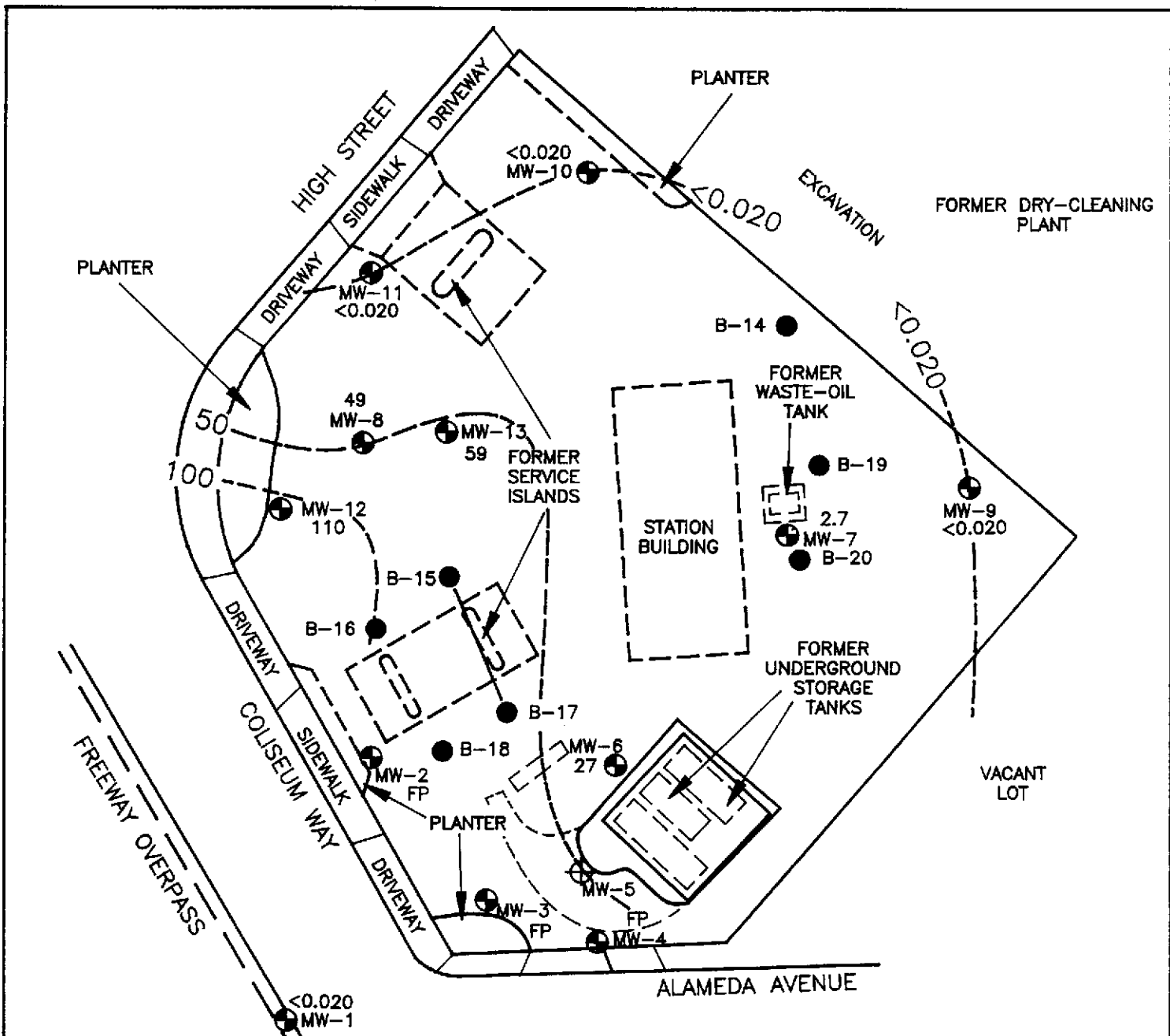
PLATE
P - 3



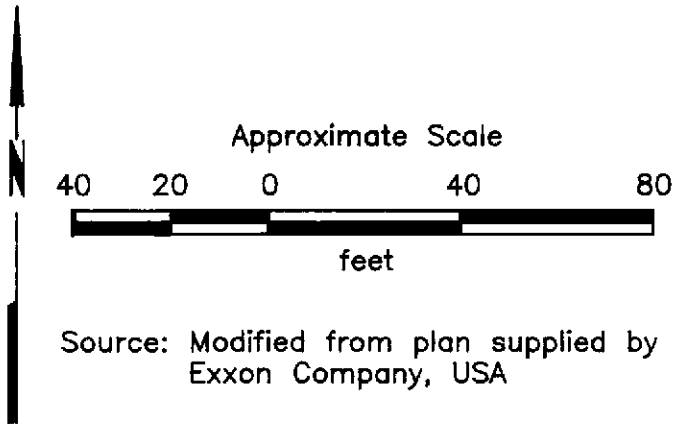
PROJECT NO. 87042-9

GROUND-WATER ELEVATION MAP
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P - 4



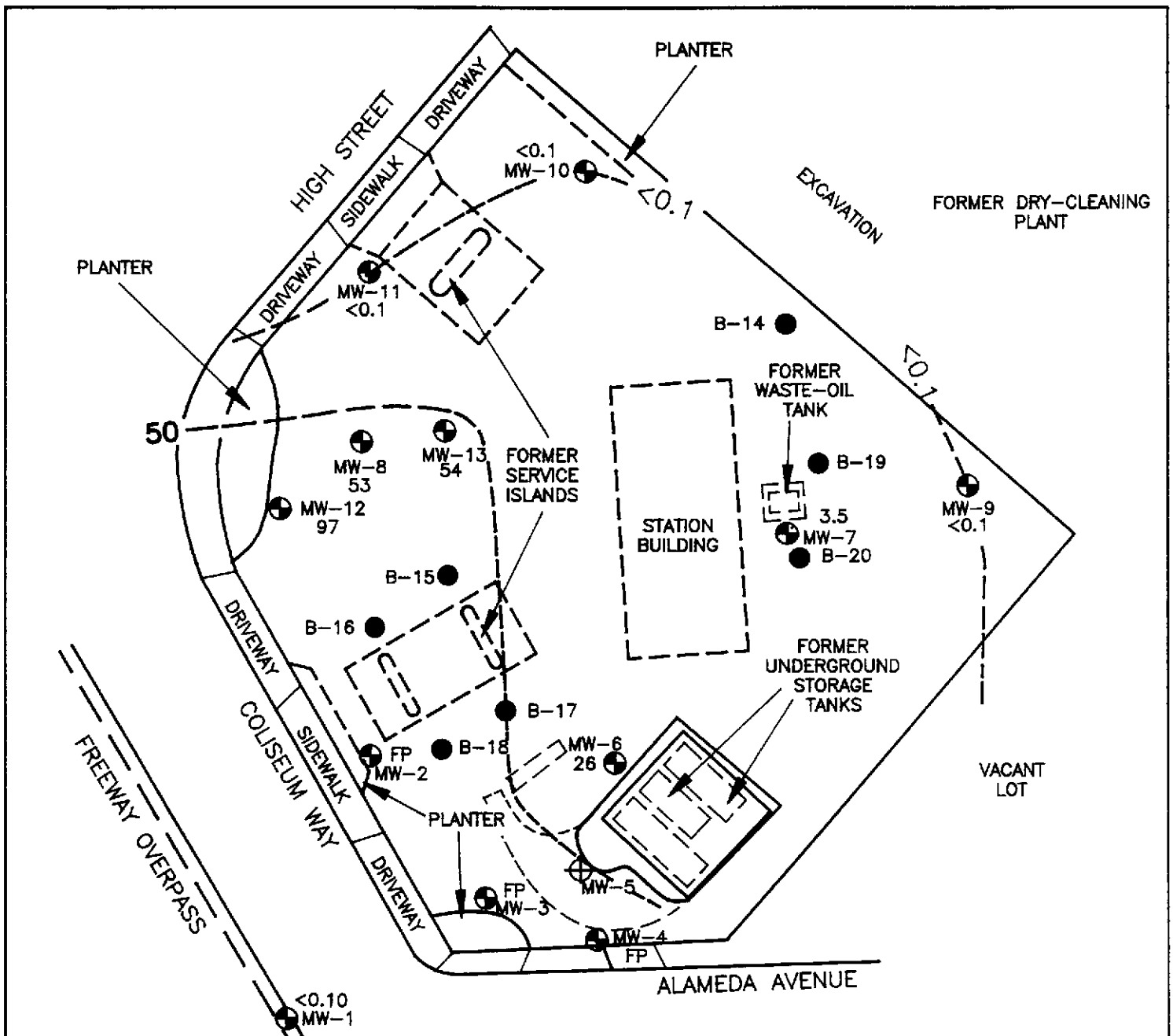
- = Area excavated
- 100 --- = Line of equal concentration of TPHg in parts per million (ppm)
- 110 = Concentration of TPHg
- FP = Floating product
- B-20 ● = Soil boring drilled by Applied GeoSystems
- MW-9 ⊕ = Monitoring well installed by Applied GeoSystems
- MW-5 ⊕ = Monitoring well (destroyed) installed by Applied GeoSystems



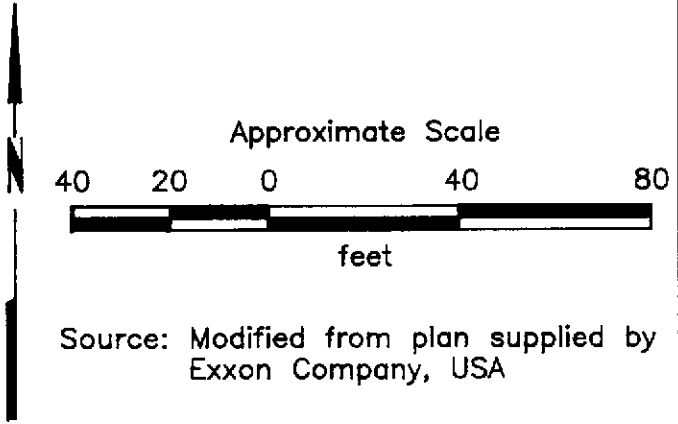
**CONCENTRATION OF TPHg
IN GROUND WATER
Exxon Station No. 7-3006
720 High Street
Oakland, California**

**PLATE
P - 5**

PROJECT NO. 87042-9



- = Area excavated
- 50 — = Line of equal concentration of TPHd in parts per million (ppm)
- 97 = Concentration of TPHd
- FP = Floating product
- B-20 ● = Soil boring drilled by Applied GeoSystems
- MW-9 ⊕ = Monitoring well installed by Applied GeoSystems
- MW-5 ⊕ = Monitoring well (destroyed) installed by Applied GeoSystems



PROJECT NO. 87042-9

**CONCENTRATION OF TPHd
IN GROUND WATER
Exxon Station No. 7-3006
720 High Street
Oakland, California**

**PLATE
P - 6**

STANDARD FIELD PROCEDURES

Monitoring and Subjective Analysis of Ground Water

The depth to static water level was measured to the nearest 0.01 foot with a Solinst electronic water-level indicator. In wells with free product, an Oil Recovery Systems oil-water interface probe was used to measure the depth of the product and the depth of the product-water interface. Ground-water samples were then collected for subjective analysis from each well by gently lowering approximately half the length of a Teflon bailer past the air-water interface. The bailer was washed with Alconox (a commercial biodegradable detergent) and rinsed with deionized water before each use. The samples were retrieved and examined for evidence of floating product, sheen, and emulsion.

Ground-Water Sampling for Laboratory Analyses

Before collecting ground-water samples, the wells were purged of approximately 3 well volumes of water or until temperature, pH, and conductivity stabilized. A water sample was collected from each well after the well had recharged to more than 80 percent of the static level. A disposable bailer certified clean by the manufacturer was used for collecting each water sample. Half the length of the bailer was lowered past the air-water interface to retrieve the water sample. The bailer was retrieved and the water samples slowly decanted into laboratory-cleaned sample containers. For TPHg, BTEX, and VOC analyses, 40-milliliter, volatile organic analysis glass sample vials with Teflon-lined caps were used. Hydrochloric acid was added to the samples as a preservative. For TPHd analyses, 1-liter glass bottles were used. The sample vials were promptly capped, labeled, and placed in iced storage for transport to a State-certified analytical laboratory for testing. A Chain of Custody Record was initiated in the field and chain-of-custody protocol was observed throughout subsequent handling of the samples.

The purged ground water and product were stored onsite in sealed, properly labeled, 17E, 55-gallon, liquid-waste drums approved for this use by the Department of Transportation. The water was removed from the site by H&H Ship Service of San Francisco, California.



CHAIN-OF-CUSTODY RECORD

PROJ. NO. <i>87012-9</i>		PROJECT NAME <i>EXXON 8 High Street, Oakland</i>		ANALYSIS								REMARKS	LABORATORY I.D. NUMBER
P.O. NO.		SAMPLERS (Signature) <i>Russell L. Bell</i>		TPH Gasoline (8015)	BTEX (802/8020)	TPH Diesel (8015)	General Metals	EPA 601/102			Preserved?		
DATE MM/DD/YY	TIME		No. of Containers										
<i>4-19-90</i>		<i>W-9-MW 1</i>	<i>6</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<i>ACT + ICC</i>		
		<i>W-30-MW 6</i>	<i>6</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
		<i>W-7-MW 12</i>	<i>6</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
		<i>W-9-MW 13</i>	<i>6</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
		<i>W-14-MW 8</i>	<i>6</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
		<i>W-12-MW 11</i>	<i>8</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
<i>4-20-90</i>		<i>W-9-MW 10</i>	<i>9</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
		<i>W-10-MW 9</i>	<i>9</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
		<i>W-10-MW 7</i>	<i>9</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						

RELINQUISHED BY (Signature): <i>Russell L. Bell</i>	DATE / TIME <i>4-20-90</i>	RECEIVED BY (Signature):	Laboratory:	SEND RESULTS TO: Applied GeoSystems 43255 Mission Boulevard Fremont, California 95826 (415) 651-1906
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):	Turn Around: <i>2 weeks</i>	Proj. Mgr.: <i>Jo Ellen Kuzmanov</i>
RELINQUISHED BY (Signature):	DATE / TIME <i>4/27/1200</i>	RECEIVED FOR LABORATORY BY (Signature): <i>Adriana Luek</i>		

APPLIED ANALYTICAL

Environmental Laboratories

3459 Edison Way
Fremont, CA 94538
(415) 623-0775

ANALYSIS REPORT

Attention: Ms. JoEllen Kuszmaul
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Project: AGS 87042-9

Date Sampled: 04-19-90
Date Received: 04-24-90
BTEX Analyzed: 04-27-90
TPHg Analyzed: 04-27-90
TPHd Analyzed: 04-27-90
Matrix: Water

1020lab.frm

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>
Detection Limit:	0.50	0.50	0.50	0.50	20	100

SAMPLE

Laboratory Identification

W-9-MW1 W1004187	ND	ND	ND	ND	ND	ND
W-12-MW11 W1004192	ND	ND	ND	ND	ND	ND

ppb = parts per billion = $\mu\text{g/L}$ = micrograms per liter.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg--Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd--Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Laboratory Representative

05-02-90

Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

3459 Edison Way
Fremont, CA 94538
(415) 623-0775

ANALYSIS REPORT

1020lab.frm

Attention: Ms. JoEllen Kuzmaul
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Project: AGS 87042-9

Date Sampled: 04-19-90
Date Received: 04-24-90
BTEX Analyzed: 04-27-90
TPHg Analyzed: 04-27-90
TPHd Analyzed: 04-27-90
Matrix: Water

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>
Detection Limit:	2.5	2.5	2.5	2.5	100	100

SAMPLE Laboratory Identification

W-30-MW6 W1004188	3000	120	490	2100	27000	26000
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ppb = parts per billion = $\mu\text{g/L}$ = micrograms per liter.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX— Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg—Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd—Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3516 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Laboratory Representative

05-02-90

Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

3459 Edison Way
Fremont, CA 94538
(415) 623-0775

ANALYSIS REPORT

Attention: Ms. JoEllen Kuszmaul
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Project: AGS 87042-9

Date Sampled: 04-20-90
Date Received: 04-24-90
BTEX Analyzed: 04-27-90
TPHg Analyzed: 04-27-90
TPHd Analyzed: 04-27-90
Matrix: Water

1020lab.frm

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>
Detection Limit:	0.50	0.50	0.50	0.50	20	100

SAMPLE

Laboratory Identification

W-10-MW7 W1004189	220	8.6	7.0	20	2700	3500
W-10-MW9 W1004191	ND	ND	ND	ND	ND	ND
W-9-MW10 W1004195	ND	ND	ND	ND	ND	ND

ppb = parts per billion = $\mu\text{g/L}$ = micrograms per liter.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX— Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg—Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd—Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Laboratory Representative

05-02-90

Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

3459 Edison Way
Fremont, CA 94538
(415) 623-0775

ANALYSIS REPORT

1020lab.frm

Attention: Ms. JoEllen Kuszmaul
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Project: AGS 87042-9

Date Sampled: 04-19-90
Date Received: 04-24-90
BTEX Analyzed: 04-27-90
TPHg Analyzed: 04-27-90
TPHd Analyzed: 04-27-90
Matrix: Water

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>
Detection Limit:	10	10	10	10	400	1000

SAMPLE

Laboratory Identification

W-14-MW8 W1004190	2100	820	1100	4800	49000	53000
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ppb = parts per billion = $\mu\text{g/L}$ = micrograms per liter.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX— Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg—Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd—Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Laboratory Representative

05-02-90

Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

3459 Edison Way
Fremont, CA 94538
(415) 623-0775

ANALYSIS REPORT

Attention: Ms. JoEllen Kuszmaul
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539

Project: AGS 87042-9

Date Sampled: 04-19-90
Date Received: 04-24-90
BTEX Analyzed: 04-27-90
TPHg Analyzed: 04-27-90
TPHd Analyzed: 04-27-90
Matrix: Water

1020lab.frm

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>
Detection Limit:	100	100	100	100	4000	2000

SAMPLE

Laboratory Identification

W-7-MW12	6600	7400	1800	11000	110000	97000
W1004193						

ppb = parts per billion = $\mu\text{g/L}$ = micrograms per liter.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX— Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg—Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd—Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Laboratory Representative

05-02-90

Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

3459 Edison Way
Fremont, CA 94538
(415) 623-0775

ANALYSIS REPORT

1020lab.frm

Attention: Ms. JoEllen Kuszmaul
Applied GeoSystems
43255 Mission Boulevard
Fremont, CA 94539
Project: AGS 87042-9

Date Sampled: 04-19-90
Date Received: 04-24-90
BTEX Analyzed: 04-27-90
TPHg Analyzed: 04-27-90
TPHd Analyzed: 04-27-90
Matrix: Water

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>	<u>ppb</u>
Detection Limit:	50	50	50	50	2000	1000

SAMPLE

Laboratory Identification

W-9-MW13 W1004194	1800	1500	1400	7200	59000	54000
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ppb = parts per billion = $\mu\text{g/L}$ = micrograms per liter.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg--Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd--Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Laboratory Representative

05-02-90

Date Reported

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#238)
- Drinking Water (#955)
- Waste Water
- Consultation

May 2, 1990
APPLIED GEOSYSTEMS, INC.
Project No.: 87042-9
Detection Limit: 1.0µg/L (WATER)

ChromaLab File No.: 0490103C
Attn: Laura Kuck
Sample No.: W-10-MW7
Date of Analysis: May 1-2, 1990


601/8010

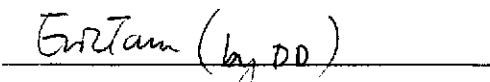
Dichlorodifluoromethane	<u>N.D.</u>
Chloromethane	<u>N.D.</u>
Vinyl Chloride	<u>N.D.</u>
Bromomethane	<u>N.D.</u>
Chlorethane	<u>N.D.</u>
Trichlorofluoromethane	<u>N.D.</u>
1,1-Dichloroethene	<u>N.D.</u>
t-1,2-Dichloroethene	<u>N.D.</u>
c-1,2-Dichloroethene	<u>N.D.</u>
1,1-Dichloroethane	<u>N.D.</u>
Chloroform	<u>N.D.</u>
1,1,1-Trichloroethane	<u>N.D.</u>
Carbon Tetrachloride	<u>N.D.</u>
Trichloroethene	<u>N.D.</u>
1,2-Dichloropropane	<u>N.D.</u>
Bromodichloromethane	<u>N.D.</u>
2-Chloroethylvinyl ether	<u>N.D.</u>
t-1,2-Dichloropropene	<u>N.D.</u>
Cis-1,3-Dichloropropene	<u>N.D.</u>
1,1,2-Trichloroethane	<u>N.D.</u>
1,1,2-Trichlorotrifluorethane	<u>N.D.</u>
Tetrachloroethene	<u>N.D.</u>
Dibromochloromethane	<u>N.D.</u>
Chlorobenzene	<u>N.D.</u>
Bromoform	<u>N.D.</u>
1,1,2,2-Tetrachloroethane	<u>N.D.</u>
1,3-Dichlorobenzene	<u>N.D.</u>
1,4-Dichlorobenzene	<u>N.D.</u>
1,2-Dichlorobenzene	<u>N.D.</u>

QA/QC:

*Sample blank concentration is none detected
*Spiked recovery for Trans-1,2-Dichloroethene is 98.9%, for 1,1,1-Trichloroethane is 102.4%, for Trichloroethene is 82.4%

CHROMALAB, INC.


David Duong, Sr. Chemist


Eric Tam, Lab Director

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#238)
- Drinking Water (#955)
- Waste Water
- Consultation

May 2, 1990
APPLIED GEOSYSTEMS, INC.
Project No.: 87042-9
Detection Limit: 1.0ug/L (WATER)

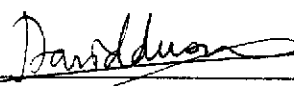
ChromaLab File No.: 0490103B
Attn: Laura Kuck
Sample No.: W-10-MW9
Date of Analysis: May 1-2, 1990

<u>601/8010</u>	
Dichlorodifluoromethane	<u>N.D.</u>
Chloromethane	<u>N.D.</u>
Vinyl Chloride	<u>N.D.</u>
Bromomethane	<u>N.D.</u>
Chlorethane	<u>N.D.</u>
Trichlorofluoromethane	<u>N.D.</u>
1,1-Dichloroethene	<u>N.D.</u>
t-1,2-Dichloroethene	<u>N.D.</u>
c-1,2-Dichloroethene	<u>N.D.</u>
1,1-Dichloroethane	<u>N.D.</u>
Chloroform	<u>N.D.</u>
1,1,1-Trichloroethane	<u>N.D.</u>
Carbon Tetrachloride	<u>N.D.</u>
Trichloroethene	<u>N.D.</u>
1,2-Dichloropropane	<u>N.D.</u>
Bromodichloromethane	<u>N.D.</u>
2-Chloroethylvinyl ether	<u>N.D.</u>
t-1,2-Dichloropropene	<u>N.D.</u>
Cis-1,3-Dichloropropene	<u>N.D.</u>
1,1,2-Trichloroethane	<u>N.D.</u>
1,1,2-Trichlorotrifluorethane	<u>N.D.</u>
Tetrachloroethene	<u>N.D.</u>
Dibromochloromethane	<u>N.D.</u>
Chlorobenzene	<u>N.D.</u>
Bromoform	<u>N.D.</u>
1,1,1,2-Tetrachloroethane	<u>N.D.</u>
1,3-Dichlorobenzene	<u>N.D.</u>
1,4-Dichlorobenzene	<u>N.D.</u>
1,2-Dichlorobenzene	<u>N.D.</u>

QA/QC:

- *Sample blank concentration is none detected
- *Spiked recovery for Trans-1,2-Dichloroethene is 98.9%, for 1,1,1-Trichloroethane is 102.4%, for Trichloroethene is 82.4%

CHROMALAB, INC.


David Duong, Sr. Chemist


Eric Tam, Lab Director

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#238)
- Drinking Water (#955)
- Waste Water
- Consultation

May 2, 1990
APPLIED GEOSYSTEMS, INC.
Project No.: 87042-9
Detection Limit: 1.0µg/L (WATER)

ChromaLab File No.: 0490103A
Attn: Laura Kuck
Sample No.: W-9-MW10
Date of Analysis: May 1-2, 1990

<u>601/8010</u>	
Dichlorodifluoromethane	<u>N.D.</u>
Chloromethane	<u>N.D.</u>
Vinyl Chloride	<u>N.D.</u>
Bromomethane	<u>N.D.</u>
Chlorethane	<u>N.D.</u>
Trichlorofluoromethane	<u>N.D.</u>
1,1-Dichloroethene	<u>N.D.</u>
t-1,2-Dichloroethene	<u>N.D.</u>
c-1,2-Dichloroethene	<u>N.D.</u>
1,1-Dichloroethane	<u>N.D.</u>
Chloroform	<u>N.D.</u>
1,1,1-Trichloroethane	<u>N.D.</u>
Carbon Tetrachloride	<u>N.D.</u>
Trichloroethene	<u>N.D.</u>
1,2-Dichloropropane	<u>N.D.</u>
Bromodichloromethane	<u>N.D.</u>
2-Chloroethylvinyl ether	<u>N.D.</u>
t-1,2-Dichloropropene	<u>N.D.</u>
Cis-1,3-Dichloropropene	<u>N.D.</u>
1,1,2-Trichloroethane	<u>N.D.</u>
1,1,2-Trichlorotrifluorethane	<u>N.D.</u>
Tetrachloroethene	<u>N.D.</u>
Dibromochloromethane	<u>N.D.</u>
Chlorobenzene	<u>N.D.</u>
Bromoform	<u>N.D.</u>
1,1,2,2-Tetrachloroethane	<u>N.D.</u>
1,3-Dichlorobenzene	<u>N.D.</u>
1,4-Dichlorobenzene	<u>N.D.</u>
1,2-Dichlorobenzene	<u>N.D.</u>

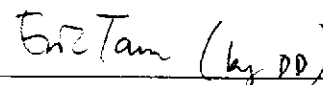
QA/QC:

*Sample blank concentration is none detected
*Spiked recovery for Trans-1,2-Dichloroethene is 98.9%, for 1,1,1-Trichloroethane is 102.4%, for Trichloroethene is 82.4%

CHROMALAB, INC.



David Duong, Sr. Chemist



Eric Tam, Lab Director



SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems
43255 Mission Blvd., Suite B
Fremont, CA 94539
Attention: Jo Ellen

Project: 87042-9

Enclosed are the results from 1 water samples received at Sequoia Analytical on May 2, 1990. The requested analyses are listed below:

<u>SAMPLE #</u>	<u>SAMPLE DESCRIPTION</u>	<u>DATE OF COLLECTION</u>	<u>TEST METHOD</u>
50259	Water, W-12-MW11	4/19/90	General Mineral

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Victor P. Menon
Project Manager



SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems
43255 Mission Blvd., Suite B
Fremont, CA 94539
Attention: Jo Ellen

Client Project ID: 87042-9
Sample Descript: Water, W-12-MW11
Lab Number: 005-0259

Sampled: Apr 19, 1990
Received: May 2, 1990
Analyzed: May 11, 1990
Reported: May 16, 1990

GENERAL MINERAL ANALYSIS

Analyte	Detection Limit mg/L (ppm)	Sample Results mg/L (ppm)
Bicarbonate Alkalinity.....	2.0	450
Calcium.....	2.0	64
Carbonate Alkalinity.....	0.50	N.D.
Chloride.....	0.20	52
Copper.....	0.010	N.D.
Hardness.....	2.0	440
Hydroxide Alkalinity.....	0.0010	N.D.
Iron.....	0.010	0.34
Magnesium.....	2.0	68
Manganese.....	0.010	0.078
pH (pH units).....	N.A.	7.0
Sodium.....	0.50	79
Specific Conductance (µmhos/cm).....	1.0	1,100
Sulfate.....	0.10	49
Surfactants.....	0.020	N.D.
Total Dissolved Solids.....	5.0	930
Zinc.....	0.010	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Victor P. Menon
Project Manager