EXXON COMPANY, U.S.A.

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ENVIRONMENTAL ENGINEERING

W. Y. Wang
SENIOR ENVIRONMENTAL ENGINEER

August 1, 1991

Exxon RAS 7-3006
720 High Street
Oakland, California

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

Dear Mr. Seto:

Attached for your review and comment is the Report on Supplemental Subsurface Environmental Investigation for the above referenced Exxon Company, U.S.A. facility in the City of Oakland. This report, by Applied GeoSystems of Fremont, California, details the results of the work performed in November and December, 1990. The work included the installation of 10 soil borings, the installation of 2 additional groundwater monitoring wells and a review of the environmental investigation being performed at an adjacent property.

Applied GeoSystems is currently designing a remediation system to address both the soil and groundwater problems at this site. Should you have any comments or concerns please contact me at (415) 246-8768. Thank you.

Sincerely,

William Y. Wang

WYW:hs
0651E
Attachments

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

w/o attachment:
Mr. D. J. Bertoch
Mr. P. J. Brininstool
Mr. J. R. Hastings
Mr. R. C. Witham - Applied GeoSystems

Applied GeoSystems 42501 Albrae Street, Suite 100, Fremont, CA 94538 (415) 651-1906

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LETTER REPORT
ON
GROUND-WATER MONITORING
FOR FIRST QUARTER 1991
at
Exxon Station No. 7-3006
720 High Street
Oakland, California

AGS Job No. 87042-9

SITE CONTACTS

Site Name: Exxon Station No. 7-3006
Site Address: 720 High Street
Oakland, California 94601
(415) 533-6066

Owner: Victor Chu

Exxon's Environmental Engineer:

Gary Gibson
Senior Environmental Engineer
Environmental Engineering, Marketing Department
Exxon Company, U.S.A.
2300 Clayton Road
Concord, California 94520
(415) 246-8768

Consultant: Applied GeoSystems (AGS)
42501 Albrae Street, Suite 100
Fremont, California 94538
(415) 651-1906

SITE BACKGROUND

The site is located at 720 High Street, in a predominantly industrial area of Oakland, California (Site Vicinity 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. AGS drilled borings B-14 through B-20 in November 1989 and drilled borings B-21 through B-30 in November 1990. AGS installed ground-water monitoring wells MW-2 through MW-9 in September 1987, MW-1 in May 1988, MW-10 through MW-13 in November 1989, and MW-14 and MW-15 in November 1990. The locations of the borings, wells, and pertinent site facilities are shown on the Generalized Site Plan, Plate P-2.

SITE ACTIVITIES JANUARY THROUGH MARCH 1991

Activities conducted at the site during the past quarter (see Attached Field Procedures):

- Soil sampling was performed in January 1991 in conjunction with the excavation of a new tank pit, which was performed by station owner's contractor (AGS Report No. 87042-9, dated May 10, 1991).
- Depths to ground water were measured and subjective evaluations were performed on initial water samples from each well on January 17 and March 26, 1991.
- Each well without free product was purged, and ground-water samples were collected (MW-1, MW-6, MW-7, and MW-10 through MW-14) on November 27, 1990, and submitted for analysis. Two wells, MW-9 and MW-15, were covered by excavated soil and were not sampled.
- Free product was bailed when encountered on January 17 and March 26, 1991.

SITE ACTIVITIES PLANNED FOR APRIL THROUGH JUNE 1991

Activities planned for the next quarter:

- Evaluate results of aquifer test conducted on April 22, 1991.
- Complete aeration and disposal of excavated soil from new tank pit.
- Design a remediation system for ground water.
- Prepare a Remedial Action Plan for the County of Alameda.
- Prepare permit applications for ground-water discharge.
- Continue monthly ground-water monitoring and product removal.
- Conduct quarterly ground-water sampling and analysis in June 1991.
- Report monthly monitoring and quarterly analytical results.
- Prepare engineering drawings and submit with permit applications for remediation system installation.

RESULTS OF SUBJECTIVE EVALUATIONS

In January 1991, floating product (0.05 to 0.20 foot thick) was observed in initial water samples collected from wells MW-2, MW-3, and MW-4. In March 1991, floating product (0.08 to 0.10 foot thick) was observed in wells MW-2, MW-3, and MW-4. During both January and March 1991, a sheen was observed in the sample from MW-8. Cumulative results of subjective evaluations are presented in Table 1.

The ground-water level rose an average of 0.5 foot between November 1990 and January 1991; the level rose an average of 1.6 feet between January and March 1991 (Table 1). Product thicknesses decreased compared to those observed in November 1990.

GROUND-WATER GRADIENT AND FLOW DIRECTION

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 ground-water elevation across the site on January 17 and March 26, 1990. The ground-water elevation contours are shown on the Ground-Water Elevation Maps, Plates P-3 and P-4. Plates P-3 and P-4 suggest that ground water flowed toward the southwest with average estimated gradients of 0.02 and 0.03, respectively. This is consistent with previous flow directions and gradient results. The maps also suggest that the ground-water level and gradient in the northern part of the site may be affected by the open excavation on the adjacent site.

ANALYTICAL METHODS AND RESULTS OF GROUND-WATER SAMPLES

Ground-water samples were analyzed for TPHg and TPHd by Environmental Protection Agency (EPA) modified Method 8015 and for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 602. Because the former waste-oil tank and former dry-cleaning facility are potential sources of solvents, the sample from well MW-7 was also analyzed for volatile organic compounds (VOCs) by EPA Method 601. Samples were analyzed for TPHg, TPHd, and BTEX at Applied Analytical laboratory in Fremont, California (Hazardous Waste Testing Laboratory Certification No. 1211), and for VOCs by Chromalab, Inc. laboratory in San Ramon, California (Hazardous Waste Testing Laboratory Certification No. E694). Copies of Chain of Custody Records and Analysis Reports are attached.

In wells without free product, concentrations of TPHg ranged from nondetectable to 100 parts per million (ppm), and benzene concentrations ranged from nondetectable to 15 ppm. In general, concentrations of gasoline hydrocarbons increased compared to previous results

(Table 3), probably as a result of the higher water level observed in March 1991. To illustrate the distribution of hydrocarbons, concentration maps were prepared for TPHg and benzene (Plates P-5 and P-6). The maps suggest that dissolved hydrocarbons are mainly found beneath the southern half of the site, and the highest concentrations are found northwest of the former main service island and in the vicinity of the former fuel tanks.

Concentrations of TPHd were nondetectable in the ground-water samples. Previously, TPHd had been detected in the wells that also contained detectable TPHg. However, Applied Analytical laboratory has revised its method of calculating TPHd, and it appears that the TPHd previously detected are now classified as TPHg.

No VOCs were in the ground-water sample from well MW-7 next to the former waste-oil tank. Cumulative results of ground-water analyses are presented in Table 3.

REMEDIATION OF GROUND-WATER

Ground-water wells with floating product have been periodically bailed. Data from the aquifer test will be used to evaluate the hydraulic parameters of the aquifer in conjunction with the proposed ground-water and floating-product extraction system.

REMEDIATION OF SOIL

Soil excavated from the new tank pit is currently being aerated onsite. Aerated soil will be removed from the site and disposed of at a Class III facility.

RECOMMENDATIONS

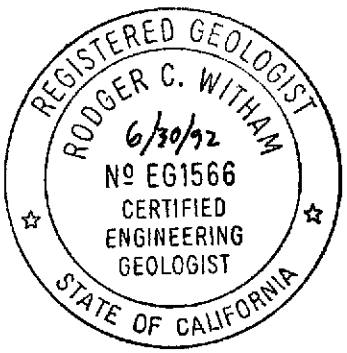
We recommend that copies of this report be sent to

- Mr. Larry Seto, Alameda County Health Agency, Department of Environmental Health, 80 Swan Way, Room 200, Oakland, California 94621, and

- Mr. Lester Feldman, California Regional Water Quality Control Board, San Francisco Bay Region, 2101 Webster Street, Suite 500, Oakland, California 94612.

Please call if you have any questions.

Sincerely,
Applied GeoSystems



Rasmi El-Jurf
Project Engineer

Rodger C. Witham
Project Manager

Enclosures:
Results of Subjective Evaluation of Water Samples, Table 1
Summary of Ground-Water Elevations, Table 2
Results of Latest Ground-Water Analyses, Table 3
Results of Ground-Water Analyses, Table 4
Site Vicinity Map, Plate P-1
Generalized Site Plan, Plate P-2
Ground-Water Elevation Map (January 17, 1991), Plate P-3
Ground-Water Elevation Map (March 26, 1991), Plate P-4
Concentration of TPHg in Ground Water, Plate P-5
Concentration of Benzene in Ground Water, Plate P-6
Field Procedures
Chain of Custody Record and Certified Analysis Reports

Submitted: May 24, 1991
Revised: July 29, 1991

TABLE 1
RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
(page 1 of 6)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-1				
04/25/89	7.55	NONE	NONE	NONE
04/27/89	10.16	NONE	SLIGHT	NONE
09/06/89	10.88	NONE	V.SLIGHT	NONE
09/22/89	11.06	NONE	NONE	NONE
11/01/89	10.82	NONE	NONE	NONE
11/15/89	11.07	NONE	NONE	NONE
12/06/89	10.33	NONE	NONE	NONE
02/20/90	8.81	NONE	NONE	NONE
04/19/90	9.33	NONE	NONE	NONE
07/03/90	8.44	NONE	NONE	NONE
07/26/90	8.99	NONE	NONE	NONE
08/20/90	9.50	NONE	NONE	NONE
09/19/90	9.99	NONE	NONE	NONE
11/27/90	10.62	NONE	NONE	NONE
01/17/91	10.31	NONE	NONE	NONE
03/26/91	7.97	NONE	NONE	NONE
MW-2				
04/25/89	9.27	2.16	NONE	NONE
07/19/89	10.81	1.56	NONE	NONE
07/27/89	10.18	0.13	NONE	HEAVY
09/06/89	10.89	0.09	NONE	SLIGHT
09/22/89	11.56	0.56	NONE	SLIGHT
11/01/89	10.85	0.09	NONE	NONE
11/15/89	11.05	0.07	NONE	NONE
12/06/89	10.23	0.13	NONE	NONE
02/20/90	8.86	0.29	NONE	NONE
04/19/90	9.09	0.10	NONE	NONE
07/03/90	8.75	0.05	NONE	NONE
07/26/90	8.71	0.10	NONE	NONE
08/20/90	9.25	0.02	NONE	NONE
09/19/90	9.79	0.02	NONE	NONE
11/27/90	10.40	0.07	NONE	NONE
01/17/91	10.03	0.05	NONE	NONE
03/26/91	8.98	0.08	NONE	NONE

TABLE 1
RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
(page 2 of 6)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-3				
04/25/89	7.57	0.08	NONE	NONE
07/19/89	10.33	0.66	NONE	NONE
07/27/89		covered by soil		
09/06/89	11.22	0.07	NONE	SLIGHT
09/22/89	11.38	0.28	NONE	SLIGHT
11/01/89	10.90	0.01	NONE	NONE
11/15/89	11.18	0.11	NONE	NONE
12/06/89	10.29	NONE	SLIGHT	NONE
02/20/90	8.73	0.04	NONE	NONE
04/19/90	9.20	0.09	NONE	NONE
07/03/90	8.50	0.03	NONE	NONE
07/26/90	8.58	0.04	NONE	NONE
08/20/90	9.21	0.01	NONE	NONE
09/19/90	10.02	0.35	NONE	NONE
11/27/90	10.72	0.42	NONE	NONE
01/17/91	10.05	0.10	NONE	NONE
03/26/91	7.65	0.10	NONE	NONE
MW-4				
04/25/89	7.26	0.16	NONE	NONE
07/19/89	10.32	0.72	NONE	NONE
07/27/89		covered by soil		
09/06/89	11.40	0.07	NONE	SLIGHT
09/22/89	11.64	0.19	NONE	SLIGHT
11/01/89	11.00	NONE	SLIGHT	NONE
11/15/89	11.18	0.10	NONE	NONE
12/06/89	10.25	NONE	SLIGHT	NONE
02/20/90	8.40	NONE	NONE	NONE
04/19/90	9.04	0.03	NONE	NONE
07/03/90	8.00	---	NONE	MODERATE
07/26/90	8.57	0.04	NONE	NONE
08/20/90	9.08	0.01	NONE	NONE
09/19/90	9.76	0.03	NONE	NONE
11/27/90	10.83	0.09	NONE	NONE
01/17/91	9.96	0.20	NONE	NONE
03/26/91	6.20	0.09	NONE	NONE

TABLE 1
RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
(page 3 of 6)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-5				
04/25/89	8.06	0.32	NONE	NONE
07/18/89		well destroyed		
MW-6				
04/25/89	8.02	NONE	NONE	NONE
09/06/89	13.64	0.08	NONE	SLIGHT
09/22/89	13.79	0.07	NONE	SLIGHT
11/01/89	12.78	NONE	SLIGHT	NONE
11/15/89	12.91	NONE	SLIGHT	NONE
12/06/89	11.84	NONE	NONE	NONE
02/20/90	9.08	NONE	NONE	NONE
04/19/90	9.72	NONE	NONE	NONE
07/03/90	8.00	NONE	NONE	NONE
07/26/90	8.70	NONE	NONE	NONE
08/20/90	9.62	NONE	NONE	NONE
09/19/90	10.25	NONE	MODERATE	NONE
11/27/90	10.82	NONE	SLIGHT	NONE
01/17/91	9.93	NONE	NONE	NONE
03/26/91	8.45	NONE	NONE	NONE
MW-7				
04/25/89	8.66	NONE	NONE	NONE
09/06/89	11.72	NONE	SLIGHT	NONE
09/22/89	11.89	NONE	NONE	NONE
12/06/89	10.46	NONE	NONE	NONE
02/20/90	8.44	NONE	NONE	NONE
04/19/90	9.54	NONE	NONE	NONE
07/03/90	7.45	NONE	NONE	NONE
07/26/90	8.08	NONE	NONE	NONE
08/20/90	8.82	NONE	NONE	NONE
09/19/90	9.01	NONE	NONE	NONE
11/27/90	9.54	NONE	NONE	NONE
01/17/91	8.50	NONE	NONE	NONE
03/26/91	5.92	NONE	NONE	NONE

TABLE 1
RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
(page 4 of 6)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-8				
04/25/89	8.31	0.66	NONE	NONE
07/19/89	10.97	1.25	NONE	NONE
07/27/89	10.34	0.08	NONE	HEAVY
09/06/89	11.09	0.17	NONE	SLIGHT
09/22/89	11.58	0.36	NONE	SLIGHT
11/01/89	11.03	NONE	NONE	NONE
11/15/89	11.25	0.01	NONE	NONE
12/06/89	10.30	NONE	SLIGHT	NONE
02/20/90	8.00	0.01	NONE	NONE
04/19/90	8.50	NONE	NONE	NONE
07/03/90	7.55	NONE	NONE	NONE
07/26/90	7.86	NONE	NONE	NONE
08/20/90	8.92	NONE	NONE	NONE
09/19/90	9.55	NONE	NONE	NONE
11/27/90	10.29	0.01	NONE	NONE
01/17/91	9.97	NONE	HEAVY	NONE
03/26/91	8.45	NONE	MODERATE	NONE
MW-9				
04/25/89	8.25	NONE	NONE	NONE
09/06/89		covered by soil		
09/22/89		covered by soil		
12/06/89	10.12	NONE	NONE	NONE
02/20/90	9.38	NONE	NONE	NONE
04/19/90	9.40	NONE	NONE	NONE
07/03/90	8.79	NONE	NONE	NONE
07/26/90	8.70	NONE	NONE	NONE
08/20/90	9.09	NONE	NONE	NONE
09/19/90	9.52	NONE	NONE	NONE
11/27/90	9.89	NONE	NONE	NONE
01/17/91		covered by soil		
03/26/91		covered by soil		

TABLE 1
RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
(page 5 of 6)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-10				
12/06/89	10.46	NONE	NONE	NONE
02/20/90	8.12	NONE	NONE	NONE
04/19/90	8.54	NONE	NONE	NONE
07/03/90	7.88	NONE	NONE	NONE
07/26/90	8.19	NONE	NONE	NONE
08/20/90	10.33	NONE	NONE	NONE
09/19/90	9.49	NONE	NONE	NONE
11/27/90	9.89	NONE	NONE	NONE
01/17/91	9.19	NONE	NONE	NONE
03/26/91	7.48	NONE	NONE	NONE
MW-11				
12/06/89	10.62	NONE	NONE	NONE
02/20/90	9.20	NONE	NONE	NONE
04/19/90	9.80	NONE	NONE	NONE
07/03/90	8.90	NONE	NONE	NONE
07/26/90	9.36	NONE	NONE	NONE
08/20/90	9.90	NONE	NONE	NONE
09/19/90	10.39	NONE	NONE	NONE
11/27/90	10.97	NONE	NONE	NONE
01/17/91	10.76	NONE	NONE	NONE
03/26/91	8.80	NONE	NONE	NONE
MW-12				
12/06/89	8.00	NONE	NONE	NONE
02/20/90	6.33	NONE	NONE	NONE
04/19/90	7.18	NONE	NONE	NONE
07/03/90	7.41	NONE	NONE	NONE
07/26/90	6.54	NONE	NONE	NONE
08/20/90	7.23	NONE	NONE	NONE
09/19/90	7.77	NONE	NONE	NONE
11/27/90	8.15	NONE	NONE	NONE
01/17/91	8.06	NONE	NONE	NONE
03/26/91	7.21	NONE	NONE	NONE

TABLE 1
RESULTS OF SUBJECTIVE EVALUATION OF WATER SAMPLES
(page 6 of 6)

Date	Depth to Water (ft)	Floating Product (ft)	Sheen	Emulsion
MW-13				
12/06/89	9.35	NONE	NONE	NONE
02/20/90	7.73	NONE	NONE	NONE
04/19/90	8.68	NONE	NONE	NONE
07/03/90	8.00	NONE	NONE	NONE
07/26/90	7.95	NONE	NONE	NONE
08/20/90	8.66	NONE	NONE	NONE
09/19/90	9.13	NONE	NONE	NONE
11/27/90	9.49	NONE	NONE	NONE
01/17/91	9.61	NONE	NONE	NONE
03/26/91	9.25	NONE	NONE	NONE
MW-14				
11/27/90	9.88	NONE	NONE	NONE
01/17/91	9.13	NONE	NONE	NONE
03/26/91	8.51	NONE	NONE	NONE
MW-15				
11/27/90	8.67	NONE	NONE	NONE
01/17/91	8.03	NONE	NONE	NONE
03/26/91		covered by soil		

TABLE 2
SUMMARY OF GROUND-WATER ELEVATIONS

Well Number	Casing Elevation (ft)	Depth to Water (ft)	Ground-Water Elevation (ft)
January 17, 1991			
MW-1	12.87	10.31	2.56
MW-6	14.27	9.63	4.64
MW-7	14.84	8.50	6.34
MW-12	12.01	8.06	3.95
MW-13	14.20	9.61	4.59
MW-14	15.18	9.13	6.05
MW-15	13.73	8.03	5.70
March 26, 1991			
MW-1	12.87	7.97	4.90
MW-6	14.27	8.45	5.82
MW-7	14.84	5.92	8.92
MW-12	12.01	7.21	4.80
MW-13	14.20	9.25	4.95
MW-14	15.18	8.51	6.67

TABLE 3
RESULTS OF LATEST GROUND-WATER ANALYSES
March 26, 1991

Well No.	Sample No.	TPHg ppm	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Xylenes ppm	TPHd ppm	TOG ppm	VOC ppm
MW-1	W-7-MW1	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.10	--	--
MW-2				free product					
MW-3				free product					
MW-4				free product					
MW-6	W-8-MW6	55	10	0.38	1.6	6.9	<0.10	--	--
MW-7	W-6-MW7	3.5	0.42	0.018	0.017	0.027	<0.10	--	ND
MW-8				sheen					
MW-9				covered by soil					
MW-10	W-7-MW10	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.10	--	--
MW-11	W-8-MW11	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.10	--	--
MW-12	W-8-MW12	100	15	16	2.4	11	<0.10	--	--
MW-13	W-9-MW13	72	10	8.3	1.7	6.9	<0.10	--	--
MW-14	W-7-MW14	0.20	<0.0005	0.0015	0.0008	0.0036	<0.10	--	--
MW-15				covered by soil					

TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TOG = Total oil and grease
VOC = Volatile organic compounds
<: Not detected at method detection limit
ND: No VOC detected other than BTEX
*: W-11-MW1 = water sample - depth - well number

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TABLE 4
RESULTS OF GROUND-WATER ANALYSES
(page 1 of 5)

Date	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	<0.0005	<0.00050	<0.00050	<0.00050	<0.10	--	--
7/90	W-11-MW1	0.13	0.006	<0.00050	<0.00050	<0.00050	0.16	--	--
11/90	W-10-MW1	<0.050	0.0007	<0.00050	<0.00050	<0.00050	<0.10	--	--
3/91	W-7-MW1	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<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								
7/90	free product								
11/90	free product								
3/91	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								
4/90	free product								
7/90	free product								
11/90	free product								
3/91	free product								

See notes on page 5 of 5.

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TABLE 4
RESULTS OF GROUND-WATER ANALYSES
(page 2 of 5)

Date	Sample No.	TPHg ppm	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Xylenes ppm	TPHd ppm	TOG ppm	VOC ppm
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								
4/90	free product								
7/90	emulsion								
11/90	free product								
3/91	free product								
9/87	W-25-MW5	26.66	0.56	1.71	1.58	7.15	37.22	--	--
5/88	free product								
7/89	well destroyed								
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	--	--
7/90	W-30-MW6	30	5.5	1.4	1.2	3.1	13	--	--
11/90	W-10-MW6	15	4.4	0.12	0.8	2.3	7.6	--	--
3/91	W-8-MW6	55	10	0.38	1.6	6.9	<0.10	--	--

See notes on page 5 of 5.

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TABLE 4
RESULTS OF GROUND-WATER ANALYSES
(page 3 of 5)

Date	Sample No.	TPHg ppm	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Xylenes ppm	TPHd ppm	TOG ppm	VOC ppm
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
7/90	W-17-MW7	2.5	0.38	0.013	0.016	0.035	0.91	--	ND
11/90	W-9-MW7	2.3	0.63	0.016	0.032	0.029	1.3	--	0.0024
3/91	W-6-MW7	3.5	0.42	0.018	0.017	0.027	<0.10	--	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	--	--
7/90	W-23-MW8	44	4.0	1.5	2.0	6.3	32	--	--
11/90	free product								
3/91	sheen								
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
7/90	W-10-MW9	<0.020	<0.00050	<0.00050	<0.00050	<0.00050	<0.10	--	ND
11/90	W-9-MW9	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.10	--	ND
3/91	covered by soil								

See notes on page 5 of 5.

Applied GeoSystems

TABLE 4
RESULTS OF GROUND-WATER ANALYSES
(page 4 of 5)

Date	Sample No.	TPHg ppm	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Xylenes ppm	TPHd ppm	TOG ppm	VOC ppm
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
7/90	W-11-MW10	<0.020	<0.00050	<0.00050	<0.00050	<0.00050	<0.10	--	--
11/90	W-9-MW10	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.10	--	--
3/91	W-7-MW10	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.10	--	--
12/89	W-11-MW11	0.078	0.0059	0.00063	<0.0005	48	<0.10	--	--
4/90	W-12-MW11	<0.020	<0.00050	<0.00050	<0.00050	<0.00050	<0.10	--	--
7/90	W-12-MW11	<0.020	<0.00050	<0.00050	<0.00050	<0.00050	<0.10	--	--
11/90	W-10-MW11	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<0.10	--	--
3/91	W-8-MW11	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<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	--	--
7/90	W-8-MW12	92	11	11	3.1	13	50	--	--
11/90	W-8-MW12	69	11	10	3.1	12	31	--	--
3/91	W-8-MW12	100	15	16	2.4	11	<0.10	--	--

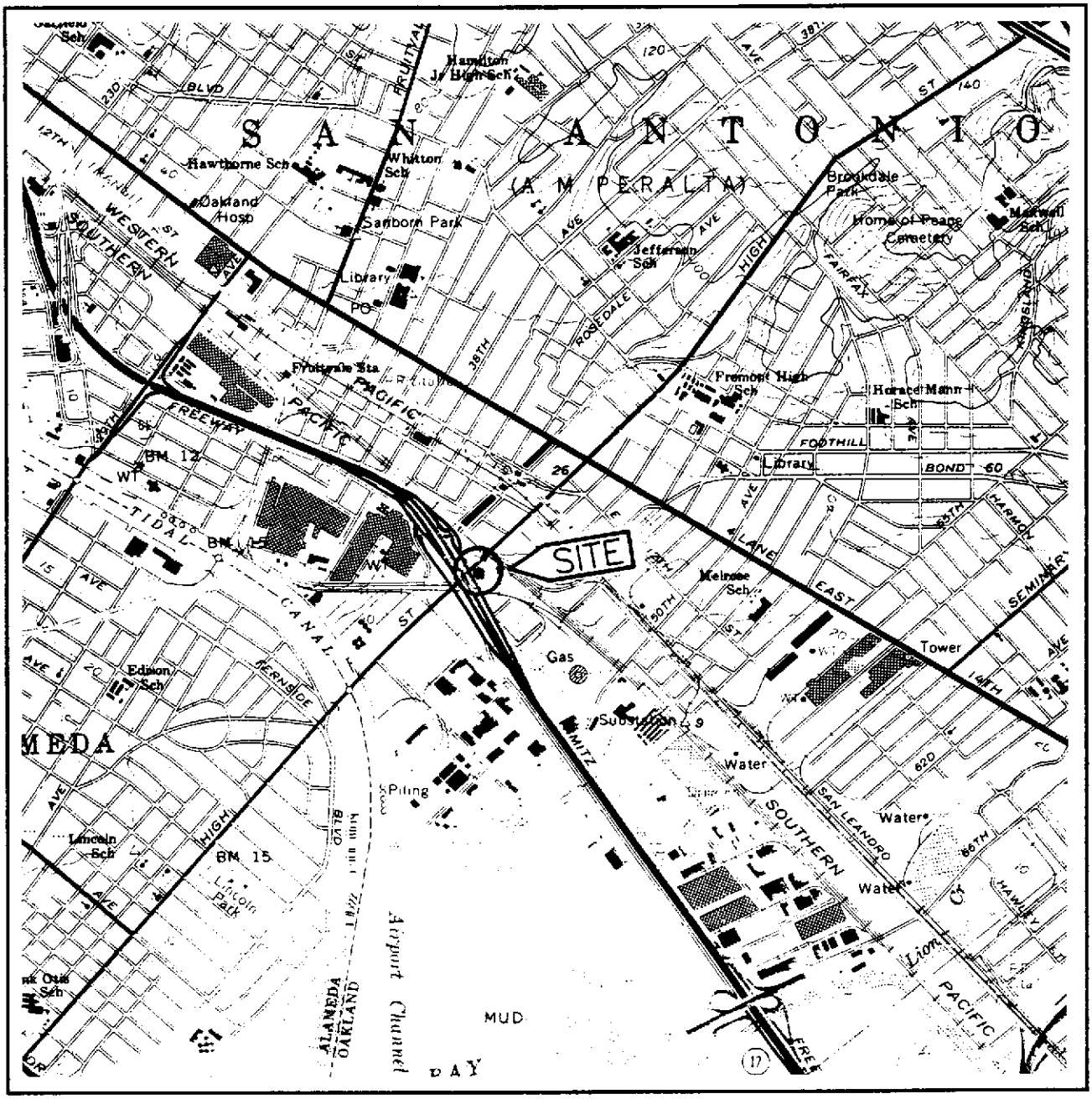
See notes on page 5 of 5.

Applied GeoSystems

TABLE 4
RESULTS OF GROUND-WATER ANALYSES
(page 5 of 5)

Date	Sample No.	TPHg ppm	Benzene ppm	Toluene ppm	Ethyl-benzene ppm	Xylenes ppm	TPHd ppm	TOG ppm	VOC ppm
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	--	--
7/90	W-10-MW13	53	4.5	3.1	2.2	7.8	26	--	--
11/90	W-9-MW13	20	4.5	1.1	0.88	3.3	1.6	--	--
3/91	W-9-MW13	72	10	8.3	1.7	6.9	<0.10	--	--
11/90	W-9-MW14	0.39	<0.0005	<0.0005	0.0036	0.0037	0.12	--	--
3/91	W-7-MW14	0.20	<0.0005	0.0015	0.0008	0.0036	<0.10	--	--
11/90	W-8-MW15	2.7	0.21	0.0055	0.6	0.25	0.34	--	--
3/91	covered by soil								

TPHg = Total petroleum hydrocarbons as gasoline
TPHg = Total petroleum hydrocarbons as diesel
TOG = Total oil and grease
<: Not detected at method detection limit
■: Chloromethane
ND: No VOC detected other than BTEX
*: W-11-MW1 = water sample - depth - well number
**: Analyzed by Environmental Protection Agency Method 624 (volatile organic compounds)



Source: U.S. Geological Survey
7.5–Minute Quadrangle
Oakland East, California

N

Approximate Scale

2000 1000 0 2000 4000

feet

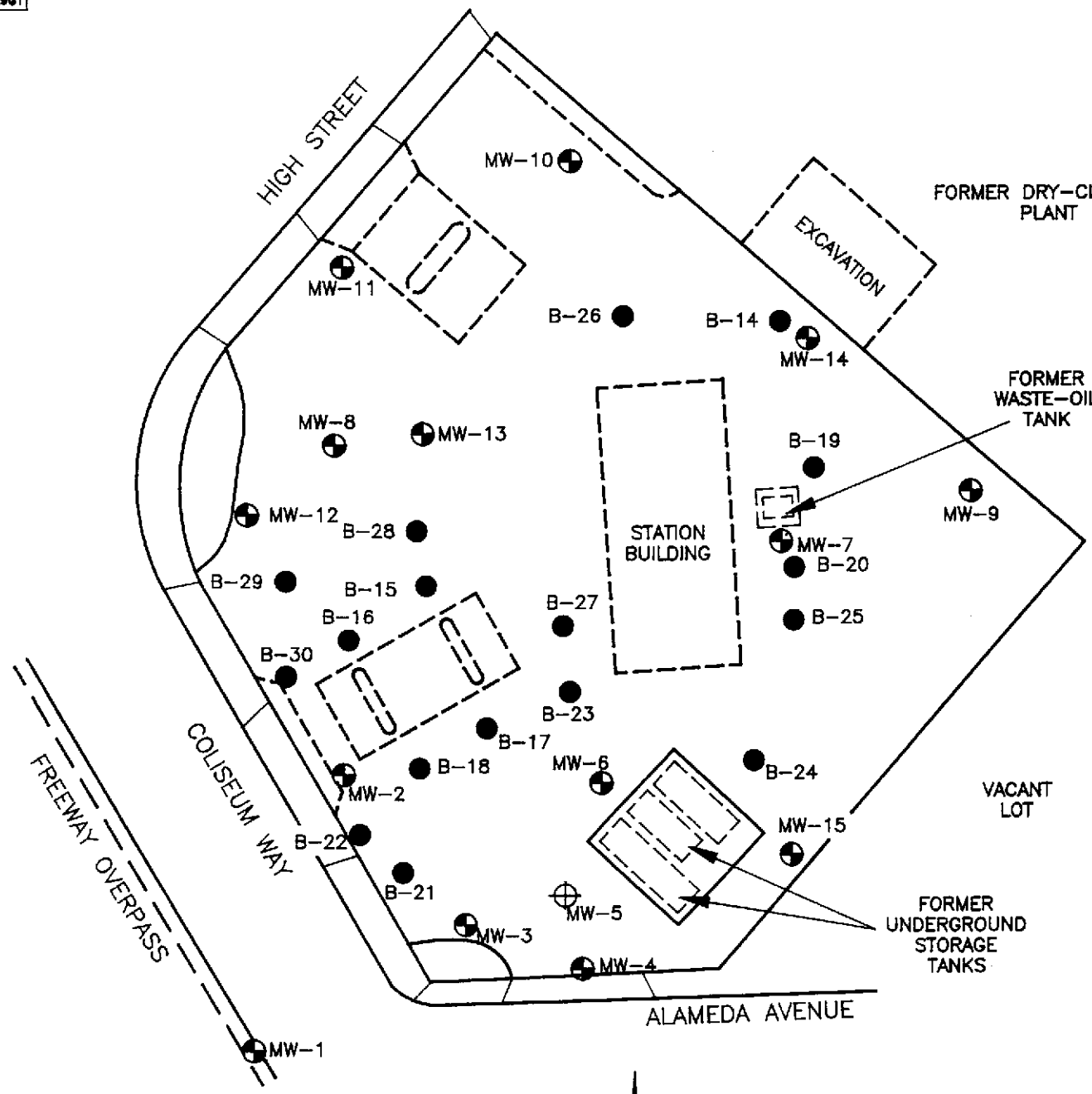
Applied GeoSystems

PROJECT NO. 87042-9

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

PLATE
P - 1

87042991



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

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Exxon Company, USA

Applied GeoSystems

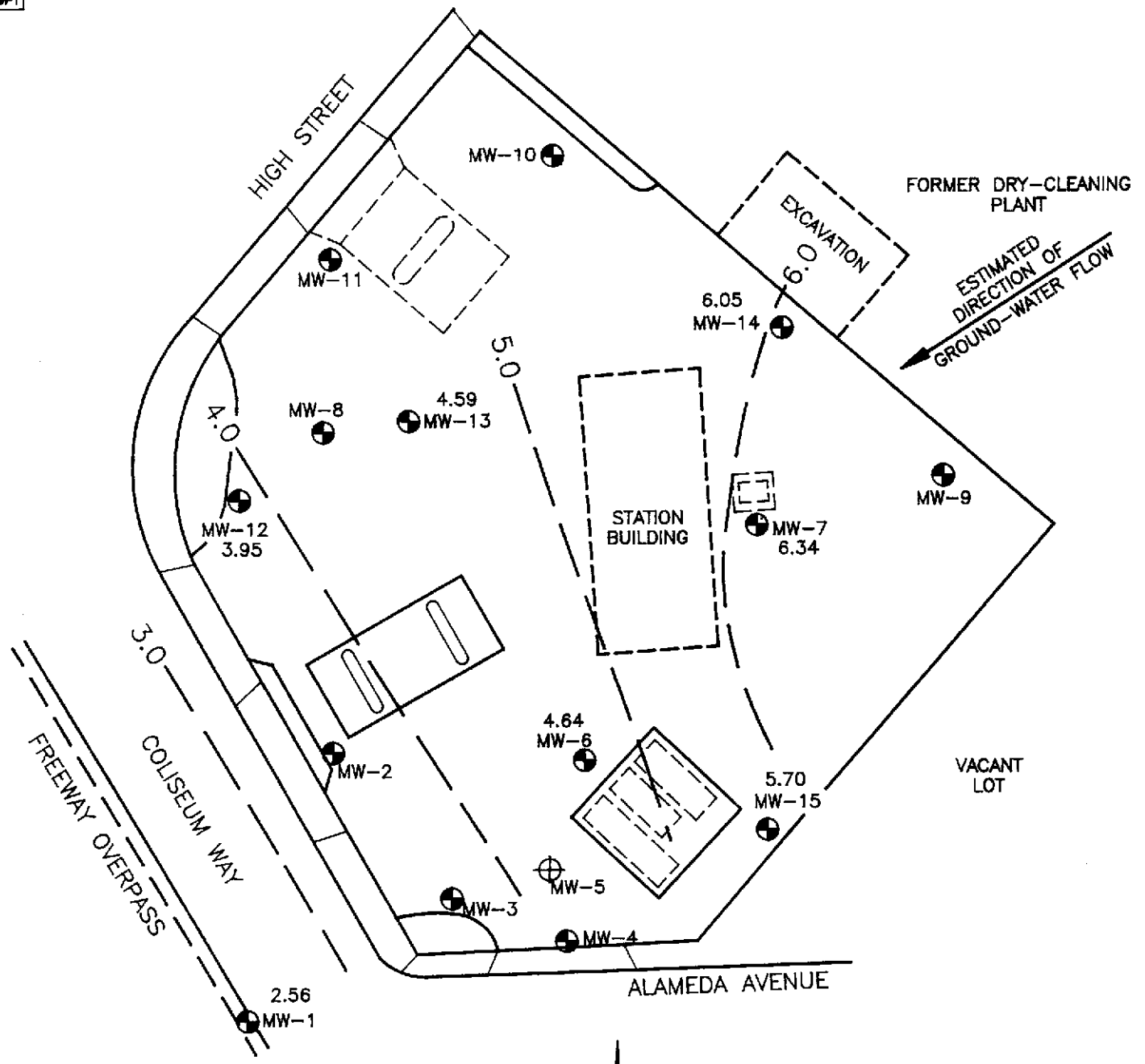
PROJECT NO. 87042-9

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

PLATE

P-2

870429P1



6.0 = Line of equal elevation of ground water in feet above mean sea level

MW-9 = Monitoring well installed by Applied GeoSystems

MW-5 = Monitoring well (destroyed) installed by Applied GeoSystems

Approximate Scale

40 20 0 40 80

feet

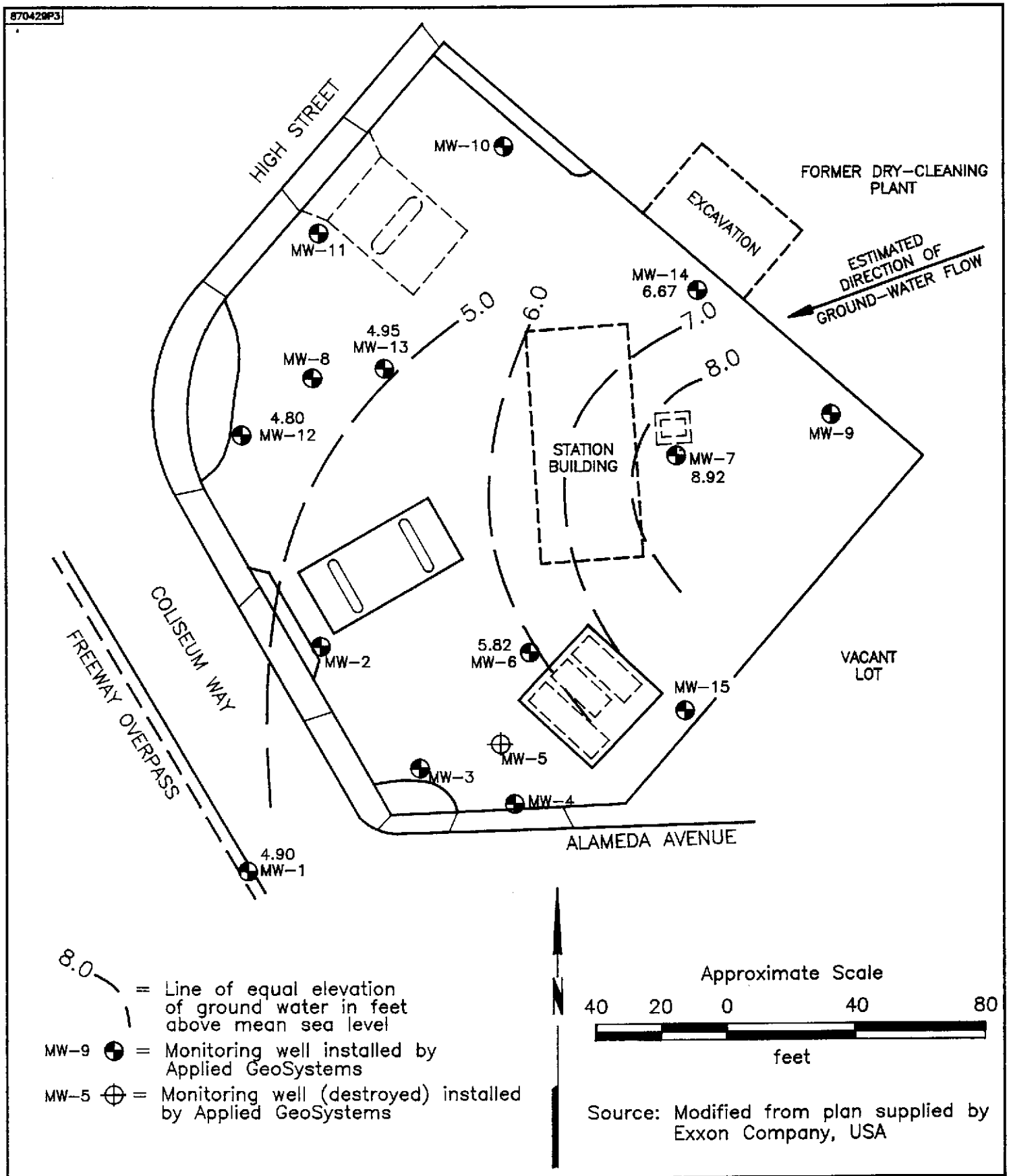
Source: Modified from plan supplied by Exxon Company, USA

Applied GeoSystems

PROJECT NO. 87042-9

GROUND-WATER ELEVATION MAP
January 17, 1991
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P-3



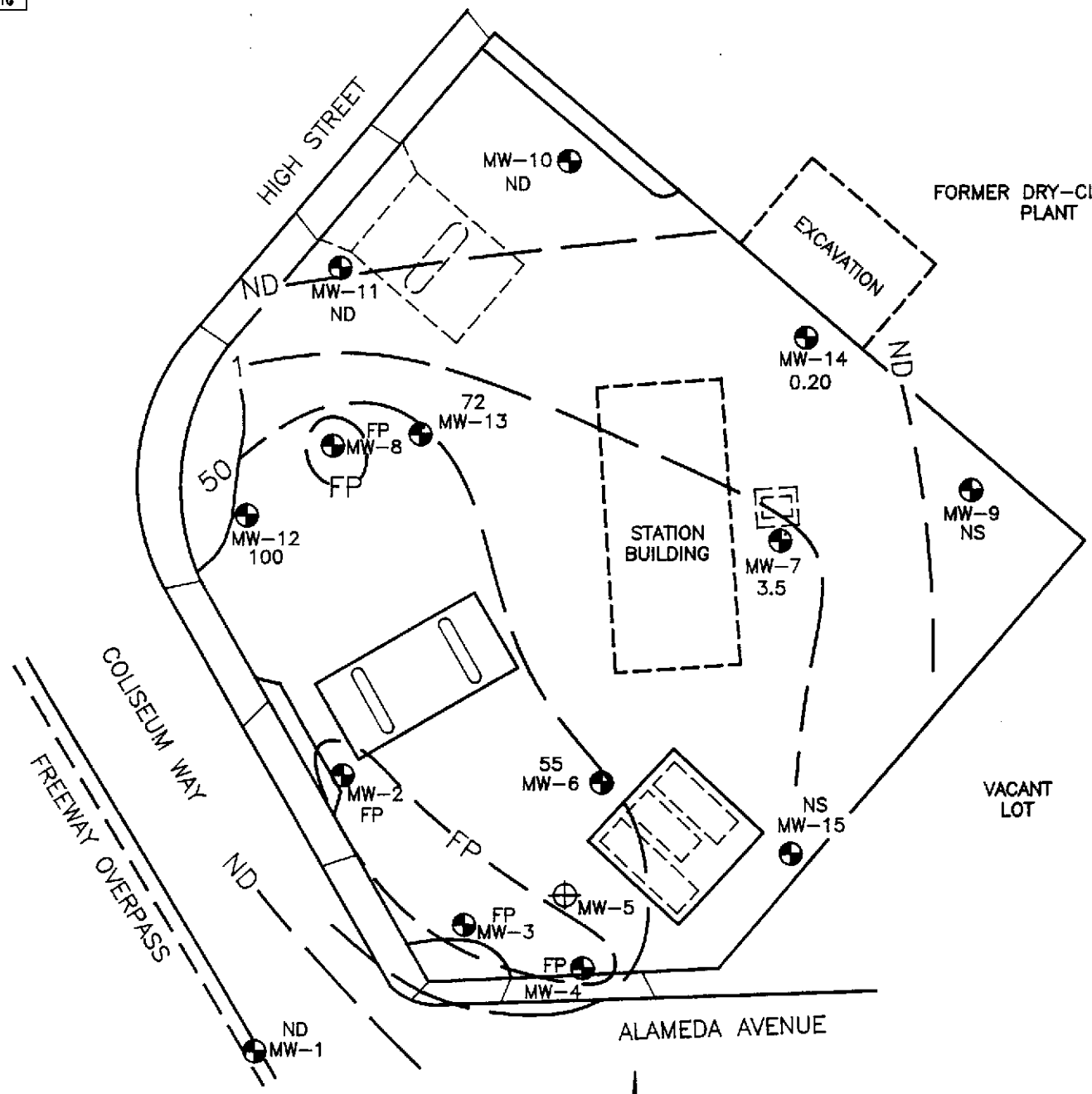
Applied GeoSystems

PROJECT NO. 87042-9

GROUND-WATER ELEVATION MAP
March 26, 1991
Exxon Station No. 7-3006
720 High Street
Oakland, California

PLATE
P-4

87042TG



50 = Line of equal concentration in parts per million

100 = Concentration in parts per million

FP = Free product

NS = Not sampled

ND = Nondetectable

MW–9 = Monitoring well installed by Applied GeoSystems

MW–5 = Monitoring well (destroyed) installed by Applied GeoSystems

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Exxon Company, USA

TPHg = Total petroleum hydrocarbons as gasoline

Applied GeoSystems

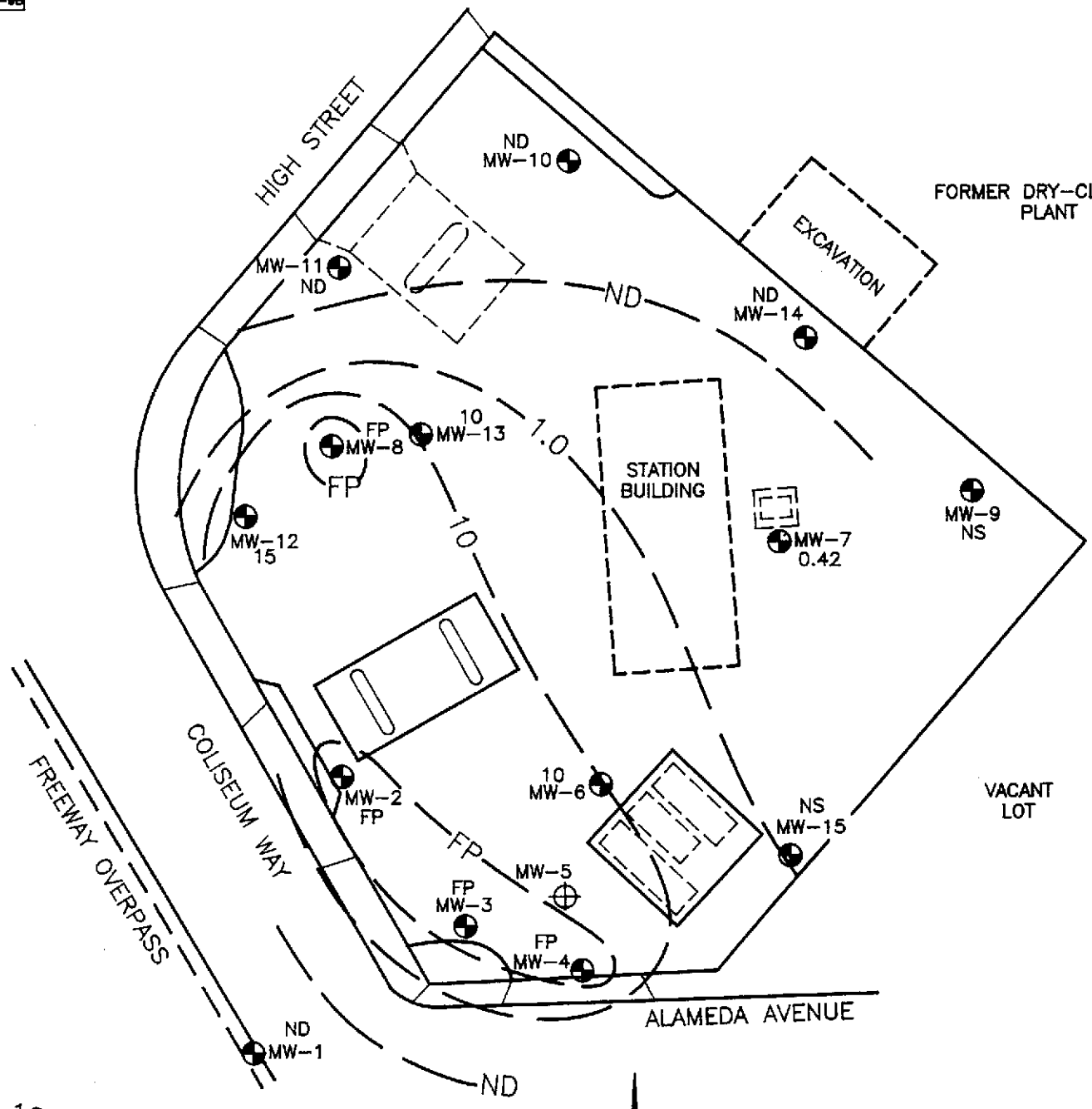
PROJECT NO. 87042-9

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

PLATE

P-5

87042-9B



10 = Line of equal concentration in parts per million

15 = Concentration in parts per million

FP = Free product

NS = Not sampled

ND = Nondetectable

MW-9 = Monitoring well installed by Applied GeoSystems

MW-5 = Monitoring well (destroyed) installed by Applied GeoSystems

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Exxon Company, USA

Applied GeoSystems

PROJECT NO. 87042-9

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

PLATE

P-6

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 is scheduled to be removed from the site in May 1991.

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

-1387

PROJ. NO.	PROJECT NAME
810429	EXXON OAKLAND
P.O. NO.	SAMPLERS (Signature)
	LOUIS RUIZ

DATE MM/DD/YY	TIME		No. of Containers	TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)	VOC (601)				Preserved?	REMARKS	LABORATORY I.D. NUMBER
3/27/91	2:00	W-8-MW11	5	✓	✓	✓					HCl	100 ml In TPHD	
	2:10	W-7-MW10	5	✓	✓	✓							
	2:20	W-7-MW1	5	✓	✓	✓							
	2:30	W-7-MW14	5	✓	✓	✓							
	2:40	W-6-MW7	8	✓	✓	✓	✓						
	2:50	W-8-MW6	5	✓	✓	✓							
	3:00	W-9-MW13	5	✓	✓	✓							
	3:10	W-7-MW12	5	✓	✓	✓							

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
LOUIS RUIZ	3/27/91 17:30	
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):
	3/27/91 17:30	

Laboratory: APPLIED ANALYTICAL

Turn Around: 2 wk

SEND RESULTS TO:
Applied GeoSystems
42501 Albrae Street
Fremont, CA 94538
(415) 651-1906

Proj. Mgr.: JOELLEN

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Ms. JoEllen Kuszmaul	Date Sampled:	03-27-91
	Applied GeoSystems	Date Received:	03-27-91
	42501 Albrae Street	BTEX Analyzed:	04-04-91
	Fremont, CA 94538	TPHg Analyzed:	04-04-91
Project:	AGS 87042-9	TPHd Analyzed:	04-04-91
		Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
W-8-MW6 W1103664	10000	380	1600	6900	55000	ND
W-9-MW13 W1103665	10000	8300	1700	6900	72000	ND
W-7-MW12 W1103666	15000	16000	2400	11000	100000	ND

ppb = parts per billion = µg/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

April 8, 1991
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St.. Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention: Ms. JoEllen Kuszmaul
Applied GeoSystems
42501 Albrae Street
Fremont, CA 94538
Project: AGS 87042-9

Date Sampled: 03-27-91
Date Received: 03-27-91
BTEX Analyzed: 04-04-91
TPHg Analyzed: 04-04-91
TPHd Analyzed: 04-04-91
Matrix: Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
W-8-MW11 W1103659	ND	ND	ND	ND	ND	ND
W-7-MW10 W1103660	ND	ND	ND	ND	ND	ND
W-7-MW1 W1103661	ND	ND	ND	ND	ND	ND
W-7-MW14 W1103662	ND	1.5	0.8	3.6	200	ND
W-6-MW7 W1103663	420	18	17	27	3500	ND

ppb = parts per billion = µg/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

April 8, 1991
Date Reported

CHAIN-OF-CUSTODY RECORD

CHROMALAB FILE # 491006

1928

PROJ. NO.	PROJECT NAME
87042-9	EXXON Oakland
P.O. NO.	SAMPLERS (Signature)

DATE MM/DD/YY	TIME		No. of Cont-ainers	ANALYSIS: TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)	601 (VOC)				Preserved?	REMARKS	LABORATORY I.D. NUMBER
3/27		W-6-MW7				X							

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
[signature]	4/2 1:18	T. Donovan
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):
	4-2 2:35	T. Donovan

Laboratory: Chromalab

Turn Around: W/L

SEND RESULTS TO:
Applied Analytical
42501 Albrae Street
Fremont, California

(415) 623-0775

Proj. Mgr.: Laura Leach

CHROMALAB, INC.

Analytical Laboratory (E694)

5 DAYS TURNAROUND

April 9, 1991 — ChromaLab File # 0491006

Client: Applied Analytical — Attn: Laura Kuck
Date Sampled: Mar. 27, 1991 — Date Submitted: Apr. 02, 1991
Date of Analysis: Apr. 05, 1991

Project Number: 87042-9 — Project Name: Exxon Oakland
Sample I.D.: W-6-MW7
Method of Analysis: EPA 601 — Detection Limit: 0.5 µg/l

COMPOUND NAME	µg/l	Spike Recovery
CHLOROMETHANE	N.D.	---
VINYL CHLORIDE	N.D.	---
BROMOMETHANE	N.D.	---
CHLOROETHANE	N.D.	---
TRICHLOROFLUOROMETHANE	N.D.	---
1,1-DICHLOROETHENE	N.D.	102.5% 96.5%
METHYLENE CHLORIDE	N.D.	---
1,2-DICHLOROETHENE (TOTAL)	N.D.	---
1,1-DICHLOROETHANE	N.D.	---
CHLOROFORM	N.D.	---
1,1,1-TRICHLOROETHANE	N.D.	---
CARBON TETRACHLORIDE	N.D.	99.7% 93.5%
1,2-DICHLOROETHANE	N.D.	---
TRICHLOROETHENE	N.D.	---
1,2-DICHLOROPROPANE	N.D.	---
BROMODICHLOROMETHANE	N.D.	---
2-CHLOROETHYLVINYLETHER	N.D.	---
TRANS-1,3-DICHLOROPROPENE	N.D.	98.2% 96.1%
CIS-1,3-DICHLOROPROPENE	N.D.	---
1,1,2-TRICHLOROETHANE	N.D.	---
TETRACHLOROETHENE	N.D.	---
DIBROMOCHLOROMETHANE	N.D.	---
CHLOROBENZENE	N.D.	101.5% 96.4%
BROMOFORM	N.D.	---
1,1,2,2-TETRACHLOROETHANE	N.D.	---
1,3-DICHLOROBENZENE	N.D.	---
1,4-DICHLOROBENZENE	N.D.	---
1,2-DICHLOROBENZENE	N.D.	---

ChromaLab, Inc.

David Duong
Senior Chemist

Eric Tam
Lab Director

2239 Omega Road, #1 • San Ramon, California 94583
415/831-1788 • Facsimile 415/831-8798
Federal ID #68-0140157