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TO: MR. GIL WISTAR
ALAMEDA COUNTY DEPT OF
ENVIRONMENTAL HEALTH
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94612

DATE: 4/16/91
PROJECT NUMBER: AGS 60025-2
SUBJECT: ARCO STATION 374, 6407 TELEGRAPH
AVENUE, OAKLAND, CALIFORNIA

FROM: GREG BARCLAY
TITLE: GENERAL MANAGER

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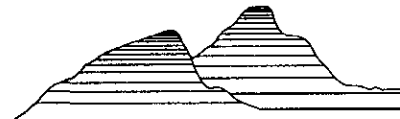
REMARKS: THIS REPORT HAS BEEN FORWARDED TO YOU AT THE REQUEST
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SAN JOSE READER'S FILE

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LETTER REPORT
QUARTERLY GROUND-WATER MONITORING
First Quarter 1991
at
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

AGS 60025-2





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3315 Almaden Expressway, Suite 34, San Jose, CA 95118 (408) 264-7723

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April 16, 1991
0320ccar
AGS 60025-2

Mr. Chuck Carmel
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: First Quarter 1991 Ground-Water Monitoring Report for ARCO Station 374,
6407 Telegraph Avenue, Oakland, California.

Mr. Carmel:

This letter report summarizes the methods and results of the first quarter 1991 ground-water monitoring performed by RESNA/Applied GeoSystems (AGS) at and near the above-referenced site. The station is on the northwestern side of the intersection of Alcatraz and Telegraph Avenues in Oakland, California, as shown on the Site Vicinity Map (Plate 1). ARCO Products Company (ARCO) has requested that AGS perform monthly water level measurements and quarterly ground-water sampling and analyses to monitor ground-water gradient and hydrocarbon concentrations associated with the former waste-oil and gasoline tanks at the site, and to evaluate trends related to fluctuations of these hydrocarbon concentrations.

Prior to the present monitoring, AGS performed limited subsurface environmental investigations related to the former underground waste-oil and gasoline-storage tanks at the site. AGS performed a preliminary assessment, including the drilling of four exploratory borings (B-1 through B-4) in April 1988, prior to tank replacement activities at the site. In June 1988, AGS performed soil sampling and observation during removal of four underground storage tanks. Four tank pit monitoring wells were installed at the site during tank replacement activities; two in the former tank pit (W-1 and W-2), and two in the new tank pit (W-3 and W-4). In addition, AGS performed a subsurface investigation in July 1989, which included the installation of four ground-water monitoring wells (MW-1, MW-2, MW-3, and MW-4), three onsite and one offsite. The results of these investigations are presented in the reports listed in the references attached to this letter report. The locations of the ground-water monitoring wells and pertinent site features are shown on the Generalized Site Plan (Plate 2).

Ground-Water Sampling and Gradient Evaluation

AGS personnel performed quarterly ground-water monitoring and sampling on February 20, 1991. Field work consisted of measuring depth-to-water (DTW) levels in wells MW-1, MW-2, MW-3, and MW-4; subjectively analyzing water from these wells for the presence of petroleum hydrocarbon sheen and floating product; and purging and sampling ground water from these monitoring wells for laboratory analysis. In addition, water levels were measured at the site and subjective analysis was performed to monitor ground-water gradient at the site and presence of hydrocarbon sheen or product in the wells on January 29, 1991. The ground-water sampling protocol is attached.

The DTW levels, wellhead elevations, and ground-water elevations for this and previous monitoring episodes at the site are summarized in Table 1, Cumulative Ground-Water Monitoring Data. The ground-water gradients interpreted from the January 29 and February 20, 1991 monitoring data are about 0.03 to the southwest, as shown on the Ground-Water Gradient Maps (Plates 3 and 4, respectively). These interpreted gradients are generally consistent with the previously interpreted ground-water gradients for this site.

Water samples were collected from wells MW-1, MW-2, MW-3, and MW-4 for subjective analysis before the monitoring wells were purged and sampled on February 20, 1991. A product odor was noted in the water samples from wells MW-2, MW-3 and MW-4 on this date. On January 29, 1991 floating product sheen was noted in well MW-4 and product odor was noted in wells MW-2 and MW-3. No evidence of hydrocarbon product was noted on either date in water samples from well MW-1. Cumulative results of water levels and subjective analyses data are presented in Table 1, Cumulative Ground-Water Monitoring Data.

Monitoring wells MW-1, MW-2, and MW-3 were purged and sampled on February 20, 1991, in accordance with the attached protocol. Well purge data sheets for the parameters monitored for each well are also attached.

Laboratory Analysis

Water samples collected from the wells were delivered under chain of custody to Applied Analytical Environmental Laboratories in Fremont, California (Hazardous Waste Testing Laboratory Certification No. 1211). The water samples from wells MW-1 through MW-4 were analyzed for total petroleum hydrocarbons as gasoline (TPHg) by Environmental Protection Agency (EPA) method 5030/8015, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified EPA Methods 5030/8020/602. The water samples from wells MW-3 and MW-4 were also analyzed for total petroleum hydrocarbons as diesel

(TPHd) by EPA methods 3510/8015 since TPHd was previously reported in water samples from well MW-3, downgradient of the site. Water samples from wells MW-3 and MW-4 were also analyzed for total oil and grease (TOG) by Standard Method 5520 B/F and a water sample from well MW-4 was analyzed for halogenated volatile organics (HVOs) by EPA method 601/8010 to confirm nondetectable concentrations of TOG and HVOs reported in July and August 1990. The Chain of Custody Records and Laboratory Analysis Reports are attached. Results of these and previous water analyses are summarized in Table 2, Cumulative Results of Ground-Water Laboratory Analyses. A concentration maps of TPHg and benzene from February 20, 1991 is presented on Plate 5.

Results of this quarter's laboratory analyses of water samples from wells MW-1 through MW-4 indicate that:

- o nondetectable concentrations of TPHg and BTEX in well MW-1;
- o wells MW-2, MW-3, and MW-4 have been impacted with gasoline hydrocarbons at concentrations of 470 to 5,200 ppb TPHg (well MW-2 is generally upgradient of the former underground storage tanks);
- o benzene levels of 160 ppb in well MW-2, 36 ppb in well MW-3, and 690 ppb in well MW-4, which exceed the Maximum Contaminant Levels (MCLs) as regulated by the California Department of Health Services (DHS), and toluene levels of 200 ppb in well MW-4, which exceed the State recommended Action Level of 100 ppb;
- o TPHd and TOG are not present in wells MW-3 and MW-4, and HVOs are not present in well MW-4, with the exception of 3.4 ppb chloromethane, which is unregulated by the California DHS.

Conclusions

First ground water beneath the northwest portion of the site, near well MW-1, has not been impacted by gasoline hydrocarbons, as suggested by nondetectable concentrations of TPHg and BTEX since August 1989 (with the exception of detectable levels of BTEX reported in December 1990). In general, concentrations of gasoline hydrocarbons in wells MW-2 and MW-3 have decreased since October 1989. Reported concentrations of TPHg and BTEX in well MW-2 may be from an offsite source(s), since well MW-2 is generally upgradient of the former underground gasoline-storage tanks.

Recommendations

We recommend continued monthly water level measurements and quarterly ground-water monitoring at this site. Since TPHd and TOG have not been detected in wells MW-3 and MW-4 and HVOs (with the exception of chloromethane) have not been detected in well MW-4 during monitoring at and near the site, we recommend that these analyses be discontinued on a quarterly basis. Additional recommendations for subsequent subsurface investigation at the site will be submitted under separate cover.

Schedule

Applied GeoSystems will continue monthly water level measurements and quarterly ground-water monitoring and sampling at this site to evaluate trends in petroleum hydrocarbons and changes in ground-water gradient with time. The next quarterly monitoring event is scheduled for May 22, 1991. Routine well maintenance and quality control will be performed as necessary during all site visits.

We recommend that copies of this report be forwarded to:

Mr. Gil Wistar
Alameda County Department of
Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

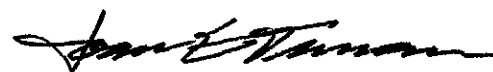
Mr. Lester Feldman
Regional Water Quality Control Board
San Francisco Bay Region
1800 Harrison Street, 7th Floor
Oakland, California 94612

If you have any questions or comments, please call us at (408) 264-7723.

Sincerely,
Applied GeoSystems



Michael J. Barminski
Staff Geologist



Joan E. Tiernan
Registered Civil
Engineer No. 044600

Attachments: References

- Plate 1, Site Vicinity Map
- Plate 2, Generalized Site Plan
- Plate 3, Ground-Water Gradient Map, January 29, 1991
- Plate 4, Ground-Water Gradient Map, February 20, 1991
- Plate 5, TPHg/Benzene Concentration Map, February 20, 1991

- Table 1, Cumulative Ground-Water Monitoring Data
- Table 2, Cumulative Results of Laboratory Analyses of Water Samples

- Appendix A: Ground-Water Sampling Protocol
 - Well Purge Data Sheets
 - Chain of Custody Record (2 pages)
 - Laboratory Analysis Report (3 pages)

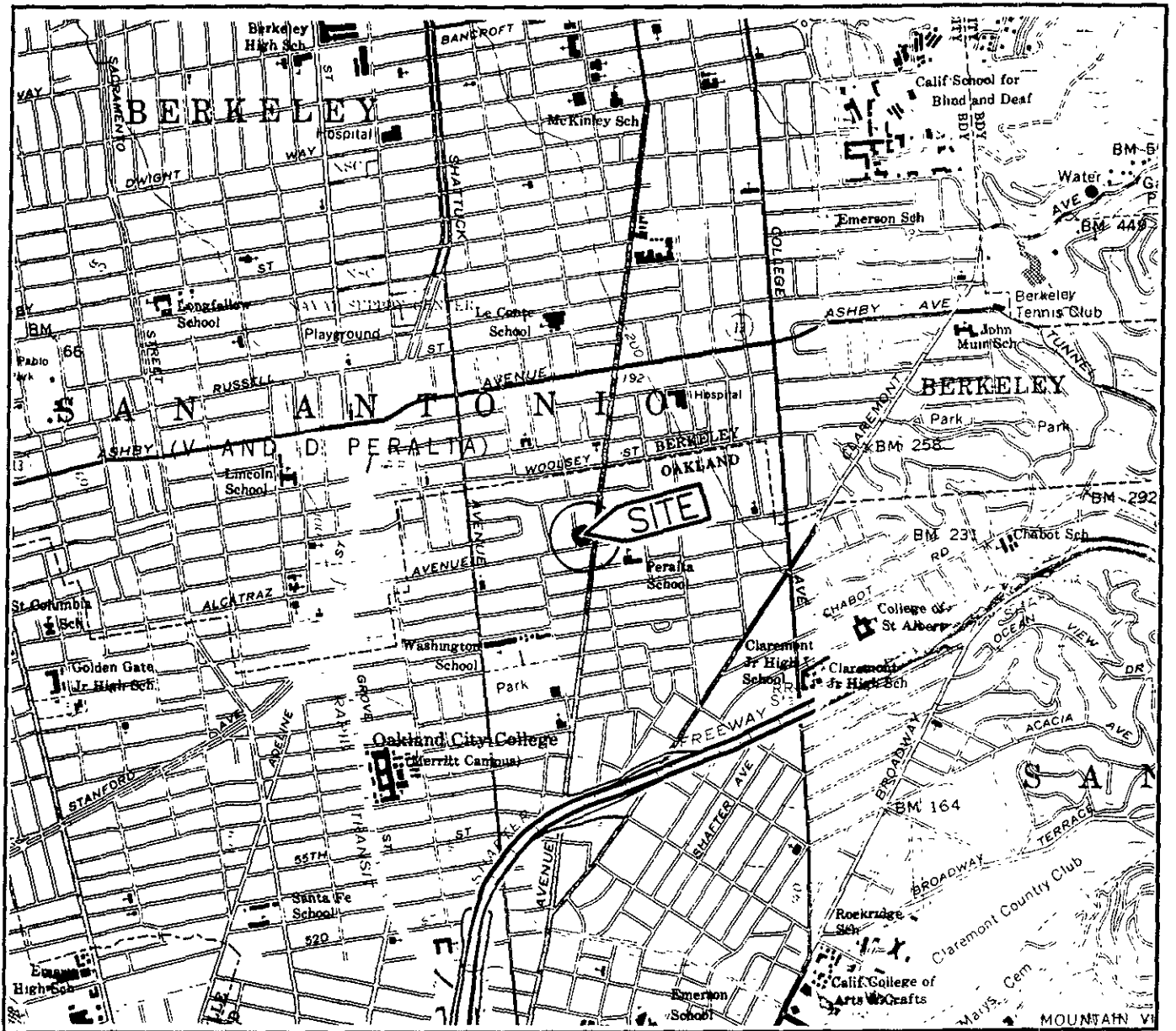
REFERENCES

Applied GeoSystems. February 20, 1990. "Letter Report, Quarterly Ground-Water Monitoring Fourth Quarter 1990 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California". AGS 60025-1.

Applied GeoSystems. August 30, 1990. "Letter Report, Quarterly Ground-Water Monitoring at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California". AGS 60025-1.

Applied GeoSystems. June 15, 1988. "Limited Environmental Site Assessment at ARCO Service Station No. 374, Telegraph Avenue and Alcatraz Avenue, Oakland, California". Job 18039-1.

Applied GeoSystems. August 1, 1989. "Report Environmental Investigation Related to Underground Tank Removal at ARCO Service Station No. 374, Telegraph Avenue and Alcatraz Avenue, Oakland, California". Job 18039-2.



Source: U.S. Geological Survey
 7.5-Minute Quadrangles
 Oakland West/East,
 California.
 Photorevised 1980

Approximate Scale

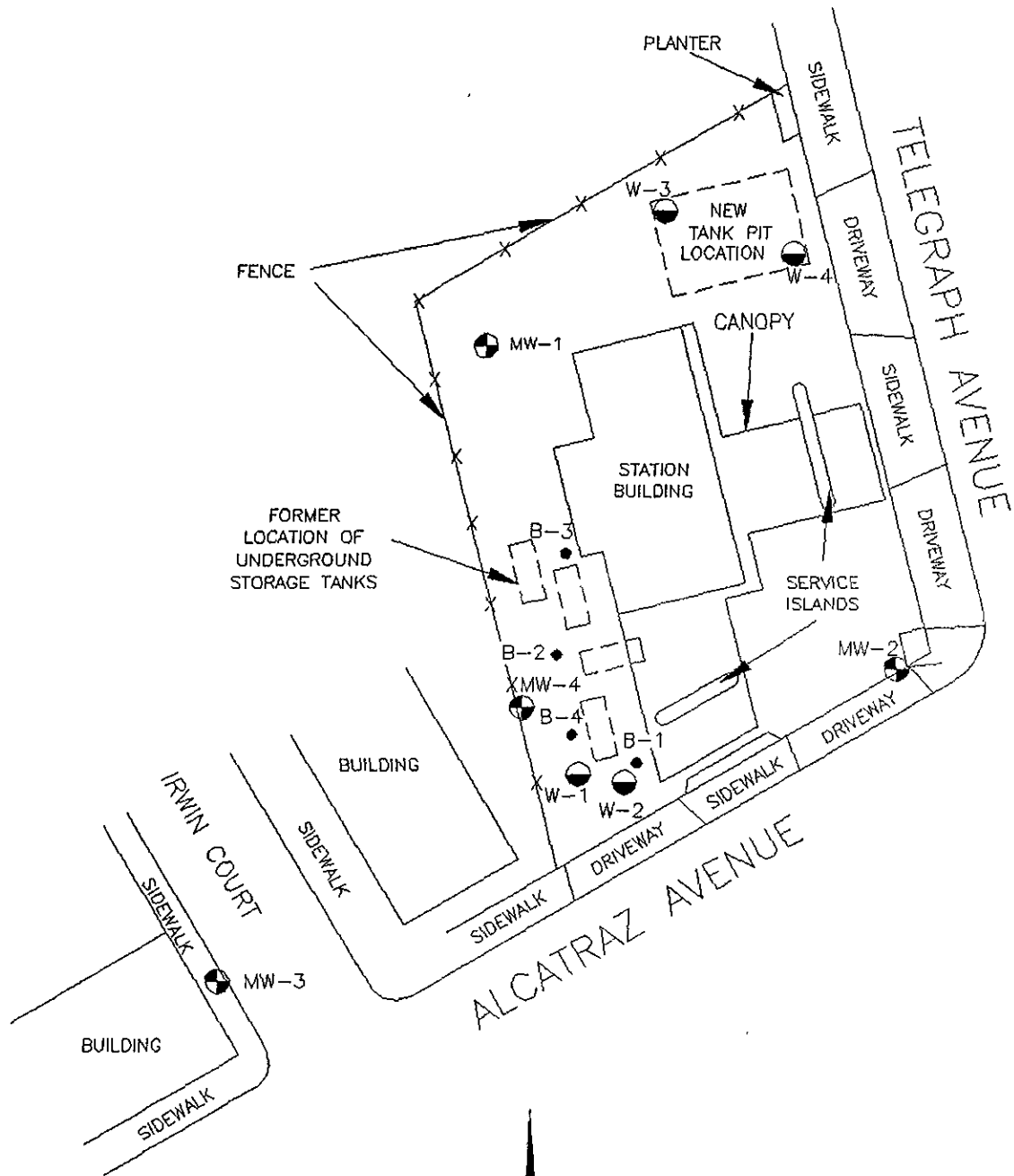


SITE VICINITY MAP
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE

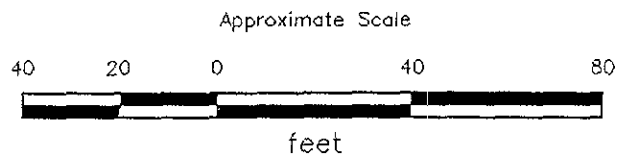
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PROJECT 60025-2



EXPLANATION

- MW-4 = Monitoring well
(Applied GeoSystems, 1989)
- W-4 = Tank pit monitoring well
(Applied GeoSystems, 1988)
- B-4 = Soil boring
(Applied GeoSystems, 1988)



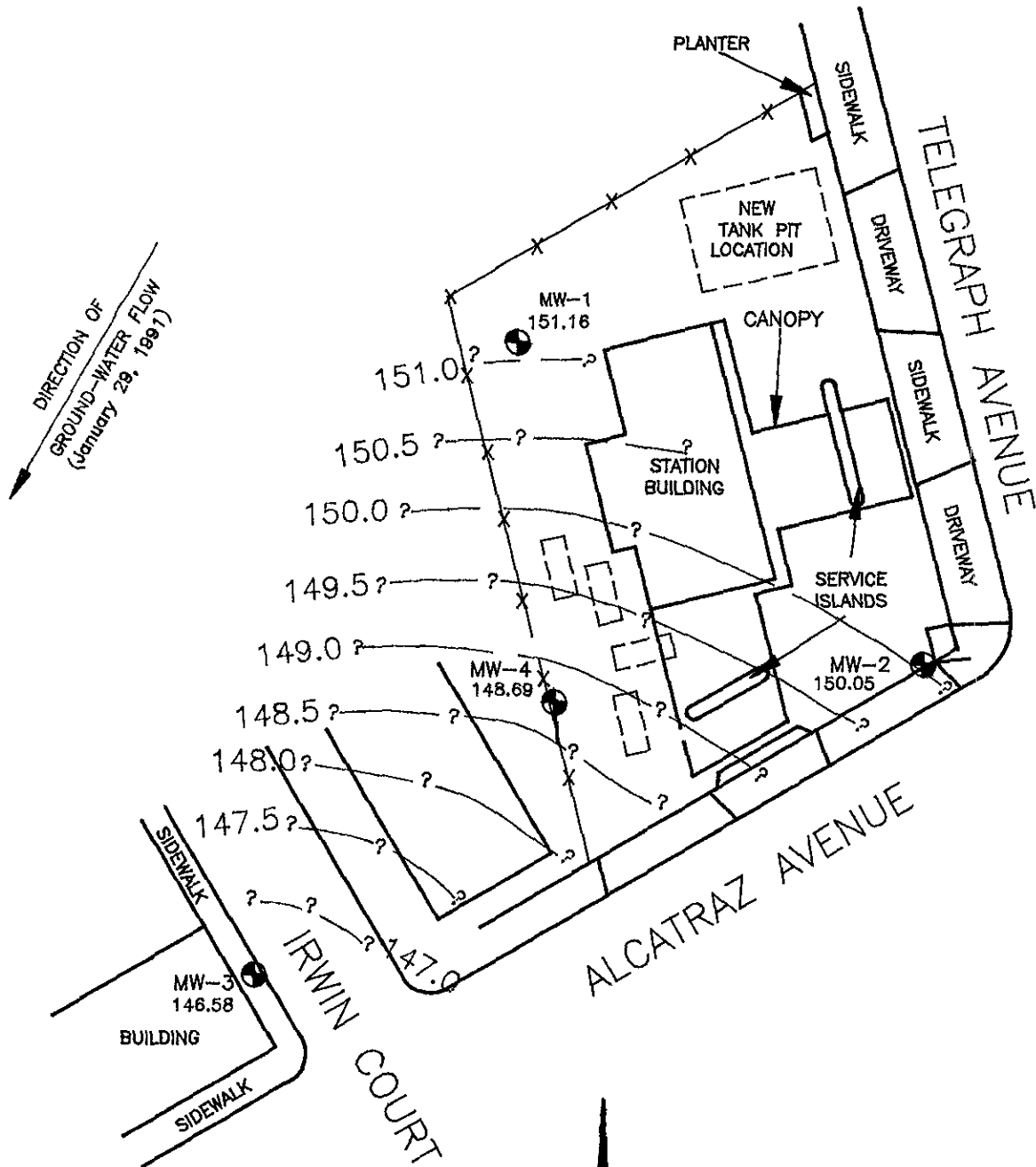
Source: Surveyed by Ron Archer, Civil Engineer, Inc.



GENERALIZED SITE PLAN
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE
2


PROJECT 60025-2

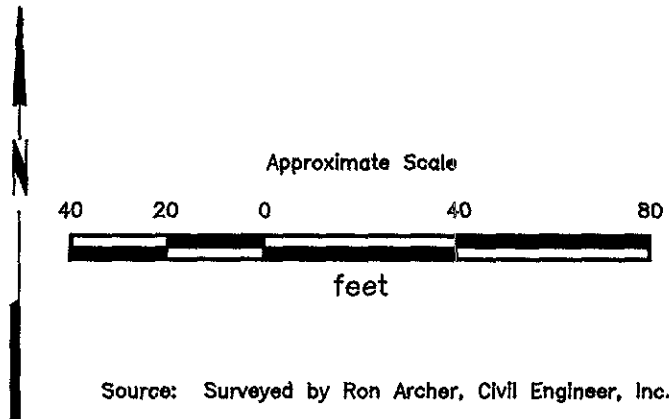


DIRECTION OF
GROUND-WATER FLOW
(January 29, 1991)

151.0

EXPLANATION

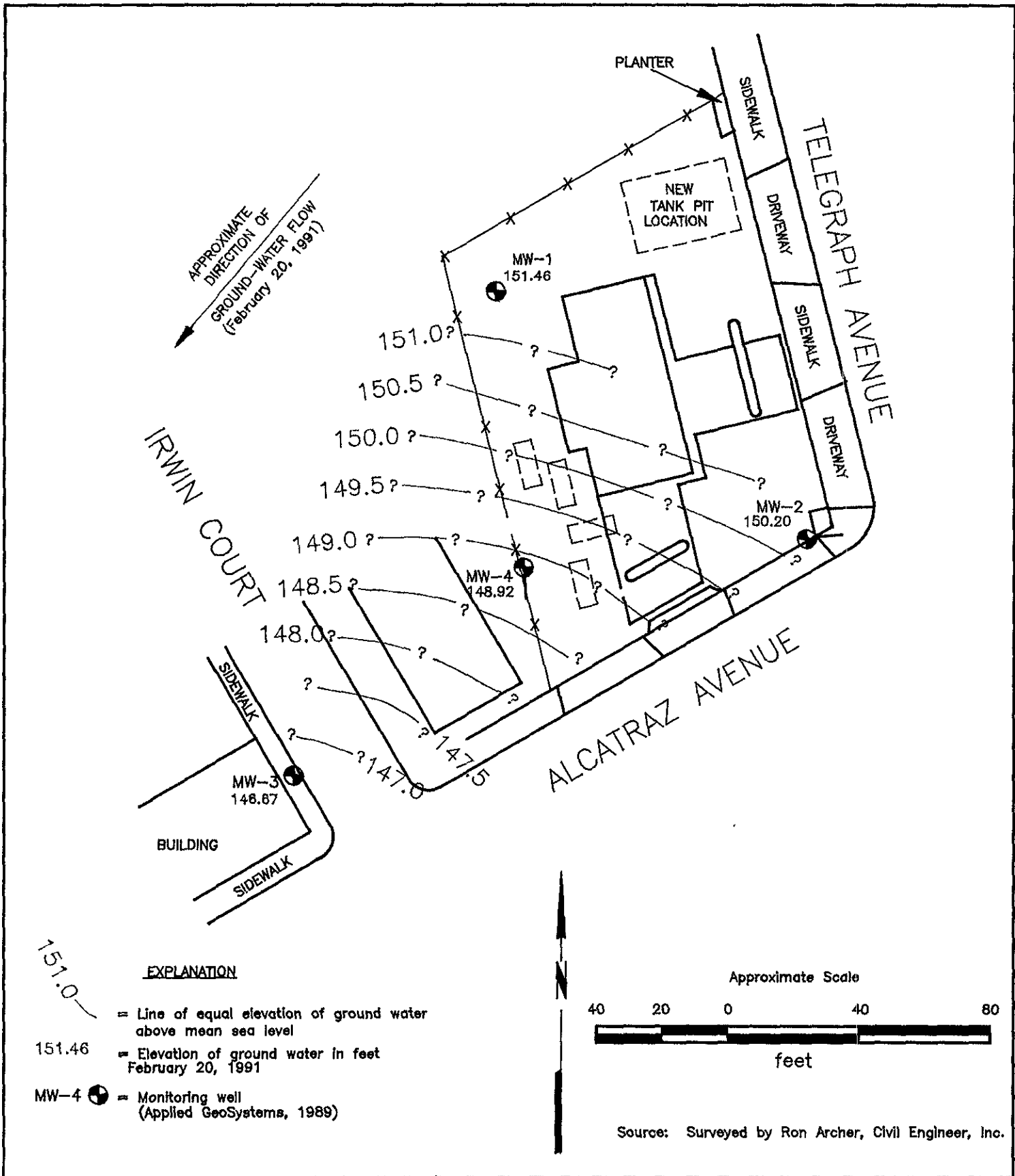
- Line of equal elevation of ground water above mean sea level
- 151.16 = Elevation of ground water in feet January 29, 1991
- MW-4  = Monitoring well (Applied GeoSystems, 1989)



PROJECT 60025-2

GROUND-WATER GRADIENT MAP
January 29, 1991
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

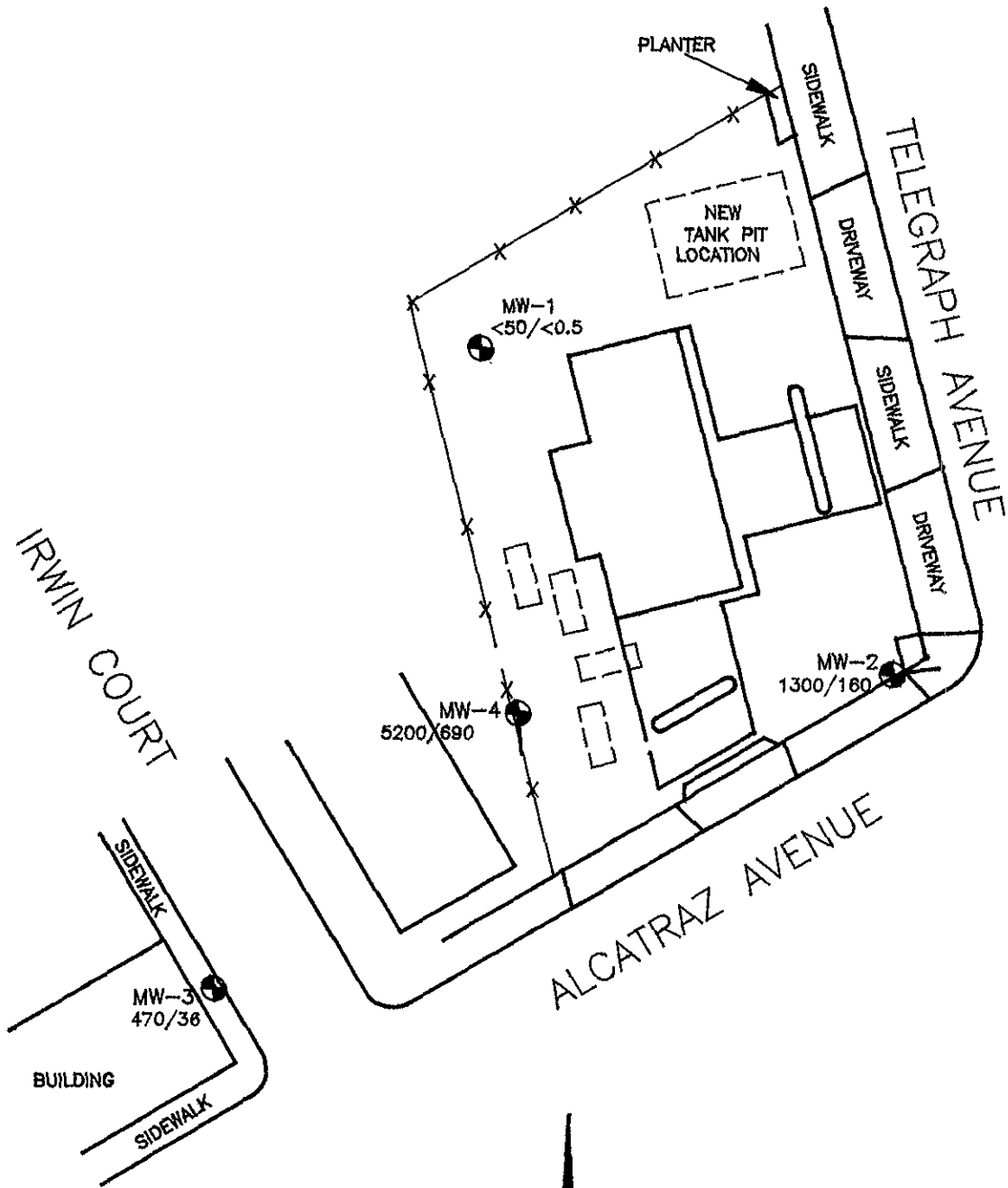
PLATE
3




GROUND-WATER GRADIENT MAP
February 20, 1991
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

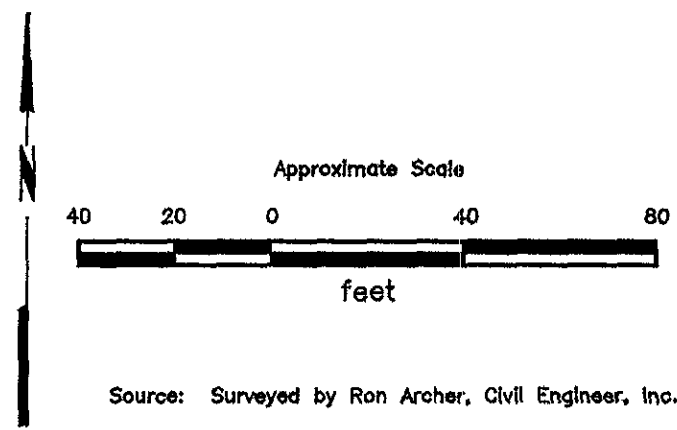
PLATE
4

PROJECT 60025-2



EXPLANATION

- 5200/690 = Concentration of TPHg/Benzene in ground water in ppb, February 1991
- MW-4  = Monitoring well (Applied GeoSystems, 1989)



**TPHg/BENZENE CONCENTRATIONS
IN GROUND WATER
ARCO Station 374
6407 Telegraph Avenue
Oakland, California**

**PLATE
5**

PROJECT 60025-2

TABLE 1
CUMULATIVE GROUND-WATER MONITORING DATA
ARCO Station 374
Oakland, California

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
<u>MW-1</u>				
07/20/89		8.04	151.40	None
08/30/89		8.47	150.97	None
10/04/89	159.44	8.50	150.94	None
01/10/90		6.74	152.70	None
08/07/90		6.87	152.57	None
12/06/90		7.35	152.09	None
12/19/90		7.22	152.22	None
01/29/91		8.28	151.16	None
02/20/91		7.98	151.46	None
<u>MW-2</u>				
07/20/89		8.15	150.31	None
08/30/89		8.42	150.04	None
10/04/89	158.46	8.40	150.06	None
01/10/90		6.12	152.34	None
08/07/90		6.35	152.11	Odor
12/06/90		7.15	151.31	Odor
12/19/90		7.38	151.08	Odor
01/29/01		8.41	150.05	Odor
02/20/91		8.26	150.20	Odor
<u>MW-3</u>				
07/20/89		7.58	146.60	None
08/30/89		8.00	146.18	None
10/04/89	154.18	7.73	146.45	Emulsion
01/10/90		7.78	146.40	Odor
08/07/90		7.66	146.52	Odor
12/06/90		7.75	146.43	Odor
12/19/90		7.58	146.60	Odor
01/29/91		7.60	146.58	Odor
02/20/91		7.51	146.67	Odor
<u>MW-4</u>				
07/20/89		8.09	148.99	None
08/30/89		8.45	148.63	Sheen
10/04/89	157.08	8.57	148.51	Sheen/Emulsion
01/10/90		7.26	149.82	Odor
08/07/90		6.87	150.21	Odor
12/06/90		8.02*	149.06*	Product Sheen
12/19/90		7.69	149.39	Odor
01/29/91		8.39	148.69	Odor/Sheen
02/20/91		8.16	148.92	Odor

Elevations and DTW measured in feet.

* = Floating Product.

TABLE 2
 CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES
 ARCO Service Station 374
 Oakland, California
 (page 1 of 2)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
<u>MW-1</u>							
07/21/89	33	NA	0.77	1.6	1.5	5.0	NA
08/30/89	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
10/04/89	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
01/10/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
08/07/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
12/06/90	<50	NA	3.6	2.7	0.6	5.8	NA
02/20/91	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
<u>MW-2</u>							
07/21/89	4200	NA	280	210	38	24	NA
08/30/89	4200	NA	160	260	45	240	NA
10/04/89	4300	NA	860	300	29	330	NA
01/10/90	8000	NA	890	710	120	760	NA
08/07/90	6000	NA	880	76	25	80	NA
12/06/90	1600	NA	330	69	18	63	NA
02/20/91	1300	NA	160	46	13	48	NA
<u>MW-3</u>							
07/21/89	430	NA	9	4.8	<0.50	50	NA
08/30/89	1200	NA	85	46	8.4	55	NA
10/04/89	7000	NA	580	900	120	670	NA
01/10/90	940	NA	130	59	21	73	NA
08/07/90	2300	NA	180	64	59	120	NA
12/06/90	460	350	52	55	14	39	NA
02/20/91	470	<100	36	30	9.3	31	<5000
<u>MW-4</u>							
07/21/89	8700	NA	720	360	120	640	NA
08/30/89	7300	NA	630	220	72	320	NA
10/04/89	21000	NA	2300	1300	280	1300	NA
01/10/90	4300	NA	470	250	63	430	NA
08/07/90	69000	28000	8700	4200	540	4600	<5000
12/06/90	NA	NA	NA	NA	NA	NA	NA
02/20/91	5200	<100	690	200	95	580	<5000

See notes on page 2 of 2

TABLE 2
 CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES
 ARCO Service Station 374
 Oakland, California
 (page 2 of 2)

Date/Well	HALOGENATED VOLATILE ORGANICS					
<u>MW-4</u>						
07/31/90	Nondetectable for thirty one compounds tested (<1.0)					
02/20/91	Chloromethane* 3.4; nondetectable for twenty eight other compounds tested (<0.5)					
MCL:	B=1	---	E=680	X=1,750	Chloromethane=NR	
AL:	---	T=100	---	---	---	

Results in micrograms per liter (ug/L) = parts per billion (ppb).

TPHg: Total petroleum hydrocarbons as gasoline by EPA method 5030/8015.

TPHd: Total petroleum hydrocarbons as diesel by EPA method 3510/8015.

BTEX: B: Benzene, T: Toluene, E: Ethylbenzene, T: Total Xylene isomers; measured by EPA method 8020/602.

TOG: Total oil and grease measured by Standard Method 5520 B/F.

Halogenated Volatile Organics measured by EPA method 601/8010.

<: Results reported as less than the detection limit.

NA: Not analyzed

*: Unregulated by California DHS, October 24, 1990.

MCL: State Maximum Contaminant Level.

AL: State recommended Action Level.

NR: Not regulated.

APPENDIX A

GROUND-WATER SAMPLING PROTOCOL

The static water level in each well that contained water was measured with a Solinst® water-level indicator; this instrument is accurate to the nearest 0.01 foot. These ground-water depths were subtracted from wellhead elevations measured in 1989 by Ron Archer, Civil Engineer, Inc., of Pleasanton, California, a licensed land surveyor, to calculate the differences in ground-water elevations.

Water samples collected for subjective evaluation were collected by gently lowering approximately half the length of a clean Teflon® bailer past the air-water interface (if possible) and collecting a sample from near the surface of the water in the well. The samples were checked for measurable floating hydrocarbon product and sheen.

Before water samples were collected from the ground-water monitoring wells, the wells were purged until stabilization of the temperature, Ph, and conductivity was obtained. Approximately 1 well casing volume of water was purged before these characteristics stabilized or the well was pumped dry. The quantity of water purged from the wells was calculated as follows:

1 well casing volume = $\pi r^2 h(7.48)$ where:

r = radius of the well casing in feet.

h = column of water in the well in feet
(well depth - depth to water).

7.48 = conversion constant from cubic feet to gallons

gallons of water purged/gallons in 1 well casing volume = well casing volumes removed.

After purging, each well was allowed to recharge to at least 80% of the approximate initial water level. Water samples were then collected with an Environmental Protection Agency (EPA) approved Teflon® bailer which had been cleaned with Alconox® and deionized water. The water samples were carefully poured into 40-milliliter glass vials, which were filled so as to produce a positive meniscus. Each sample container was preserved with hydrochloric acid, sealed with a cap containing a Teflon® septum, and subsequently examined for air bubbles to avoid headspace which would allow volatilization to occur. The samples were promptly transported in iced storage in a thermally-insulated ice chest, accompanied by a Chain of Custody Record, to a California-certified laboratory.

WELL PURGE DATA SHEET

Project Name: ARCO 374

Job No. 60025-2

Date: 02/20/91

Page 1 of 2

Well No. MW-1

Time Started 11:05

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromhos)
11:05	Begin pumping well MW-1			
11:10	5	68.4	5.93	7.74
11:15	10	68.3	6.04	7.75
11:20	20	70.1	6.11	7.76
11:30	25	71.1	6.44	7.60
11:35	30	69.4	6.46	7.59
11:40	35	68.5	6.88	7.71
11:45	40	68.7	7.16	7.85
11:50	45	68.3	7.64	8.10
11:53	47	Stop pumping well dry.		

Notes:

Depth to Bottom (feet) : 26.85
 Depth to Water - initial (feet) : 7.98
 Depth to Water - final (feet) : 10.75
 % recovery : 85.3
 Time Sampled : 3:30
 Gallons per Well Casing Volume : 48.25
 Gallons Purged : 47
 Well Casing Volumes Purged : 0.97
 Approximate Pumping Rate (gpm) : 1.09

WELL PURGE DATA SHEET

Project Name: ARCO 374

Job No. 60025-2

Date: 02/20/91

Page 1 of 1

Well No. MW-2

Time Started 11:55

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromhos)
11:55	Begin pumping well MW-2			
12:00	5	73.4	9.11	8.09
12:05	10	73.1	9.35	8.34
12:10	15	73.7	9.73	8.73
12:15	20	73.8	9.61	8.53
12:20	25	73.9	9.84	8.22
12:25	30	73.8	10.66	8.22
12:30	35	75.6	10.27	8.44
12:35	40	75.2	10.08	8.44
12:40	45	78.0	10.79	8.84
12:45	50	76.1	11.38	8.67
12:50	55	77.7	10.72	8.46
12:55	65	76.9	11.73	8.34
1:00	73	76.5	11.81	8.45
1:01	Well dry, stop pumping.			

Notes:

Depth to Bottom (feet) : 26.39
 Depth to Water - initial (feet) : 8.26
 Depth to Water - final (feet) : 9.52
 % recovery : 93.0
 Time Sampled : 3:45
 Gallons per Well Casing Volume : 46.36
 Gallons Purged : 73
 Well Casing Volumes Purged : 1.58
 Approximate Pumping Rate (gpm) : 1.21

WELL PURGE DATA SHEET

Project Name: ARCO 374

Job No. 60025-2

Date: 02/20/91

Page 1 of 1

Well No. MW-3

Time Started 1:15

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromhos)
1:15	Begin pumping well MW-3			
1:20	10	79.1	11.76	8.04
1:25	20	73.8	11.80	7.27
1:30	25	72.7	11.76	7.35
1:35	30	71.2	9.85	7.59
1:38	33	70.7	10.39	7.63
1:39	Well dry, stop pumping.			

Notes:

Depth to Bottom (feet) : 26.90
 Depth to Water - initial (feet) : 7.51
 Depth to Water - final (feet) : 10.76
 % recovery : 83.2
 Time Sampled : 4:00
 Gallons per Well Casing Volume : 49.58
 Gallons Purged : 33
 Well Casing Volumes Purged : 0.66
 Approximate Pumping Rate (gpm) : 1.83

WELL PURGE DATA SHEET

Project Name: ARCO 374

Job No. 60025-2

Date: 02/20/91

Page 1 of 1

Well No. MW-4

Time Started 1:45

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromhos)
1:45	Begin pumping well MW-4			
1:50	5	74.3	9.61	14.32
1:55	10	71.9	10.02	14.18
2:00	15	71.0	10.16	14.04
2:05	20	71.5	9.69	14.31
2:10	25	71.7	10.24	14.44
2:15	30	71.6	9.79	13.17
2:20	35	73.1	11.72	12.62
2:25	40	72.7	12.88	11.64
2:30	45	72.8	13.01	12.07
2:31	Stop pumping.			

Notes:

Depth to Bottom (feet) : 26.70
 Depth to Water - initial (feet) : 8.16
 Depth to Water - final (feet) : 11.66
 % recovery : 81.1
 Time Sampled : 4:15
 Gallons per Well Casing Volume : 47.40
 Gallons Purged : 45
 Well Casing Volumes Purged : 0.949
 Approximate Pumping Rate (gpm) : 1.125

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Mike Barminski	Date Sampled:	02-20-91
	Applied GeoSystems	Date Received:	02-22-91
	3315 Almaden Expressway	BTEX Analyzed:	03-05-91
	San Jose, CA 95811	TPHg Analyzed:	03-05-91
Project:	AGS 60025-2	TPHd Analyzed:	03-02-91
		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:	0.5	0.5	0.5	0.5	50	100

SAMPLE

Laboratory Identification

W-11-MW1 W1102407	ND	ND	ND	ND	ND	NR
W-10-MW2 W1102408	160	46	13	48	1300	NR
W-11-MW3 W1102409	36	30	9.3	31	470	ND
W-12-MW4 W1102411	690	200	95	580	5200	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

March 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: Mr. Mike Barminski
Applied GeoSystems
42501 Albrae Street
Fremont, CA 94538
Project: AGS 60025-2

Date Sampled: 02-20-91
Date Received: 02-22-91
TOG Analyzed: 02-28-91
Matrix: Water
Detection Limit: 5000 µg/L

TOG
(µg/L)

SAMPLE
Laboratory Identification

W-11-MW3
W1102411

ND

W-12-MW4
W1102413

ND

µg/L = micrograms per liter = ppb = parts per billion
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

ANALYTICAL PROCEDURES

TPH as Oil and Grease – Total Oil and Grease (TOG) of mineral or petroleum origin are measured by extraction and gravimetric analysis according to Standard Method 5520 B/F.



Laboratory Representative

March 8, 1991

Date Reported

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

March 5, 1991

ChromaLab File # 0291130

Client: Applied Analytical
Date Sampled: Feb. 20, 1991
Date of Analysis: Mar. 04, 1991

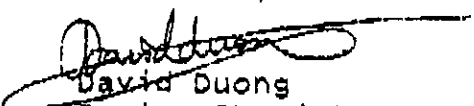
Attn: Laura Kuck
Date Submitted: Feb. 26, 1991

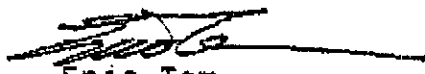
Project No.: 60025-2
Sample I.D.: w-12-MW4
Method of Analysis: EPA 601

Project Name: Anco 374
Detection Limit: 0.5 ug/L

COMPOUND NAME	ug/L	Spike Recovery
CHLOROMETHANE	3.4	---
VINYL CHLORIDE	N.D.	---
BROMOMETHANE	N.D.	---
CHLOROETHANE	N.D.	---
TRICHLOROFLUOROMETHANE	N.D.	---
1,1-DICHLOROETHENE	N.D.	88.6% 90.1%
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.	---
1,2-DICHLOROETHANE	N.D.	---
TRICHLOROETHENE	N.D.	90.6% 91.2%
1,2-DICHLOROPROPANE	N.D.	---
BROMODICHLOROMETHANE	N.D.	---
2-CHLOROETHYL VINYLETHER	N.D.	---
TRANS-1,3-DICHLOROPROPENE	N.D.	---
CIS-1,3-DICHLOROPROPENE	N.D.	---
1,1,2-TRICHLOROETHANE	N.D.	---
TETRACHLOROETHENE	N.D.	88.9% 92.5%
DIBROMOCHLOROMETHANE	N.D.	---
CHLOROBENZENE	N.D.	---
BROMOFORM	N.D.	---
1,1,2,2-TETRACHLOROETHANE	N.D.	92.2% 95.7%
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