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

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LETTER REPORT
QUARTERLY GROUND-WATER MONITORING
Third Quarter 1990
at
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

AGS 60025-1

08/30/90

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

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August 30, 1990
AGS 60025-1

Mr. Kyle Christie
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: Third Quarter 1990 Quarterly Ground-Water Monitoring Report for ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.

Mr. Christie:

This letter report summarizes the methods and results of Third Quarter 1990 ground-water monitoring performed by 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 has requested that AGS perform quarterly ground-water sampling and analyses to monitor 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 drilled exploratory borings at the site and performed soil sampling and observation during removal of four underground storage tanks in 1988. AGS did additional work which included the installation of four ground-water monitoring wells (MW-1, MW-2, MW-3, and MW-4) in 1989. 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).

Applied GeoSystems

3315 Almaden Expressway, Suite 34
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90 NOV 15 AM 11:51

TRANSMITTAL

TO: MR. GIL WISTAR
ALAMEDA COUNTY DEPARTMENT OF
ENVIRONMENTAL HEALTH
80 SWAN WAY, ROOM 200
OAKLAND, CA 94621

DATE: 11/9/90
PROJECT NUMBER: 60025-1
SUBJECT: LETTER REPORT

FROM: MIKE BARMINSKI
TITLE: STAFF GEOLOGIST

WE ARE SENDING YOU [XX] Attached [ ] Under separate cover via _____ the following items:

[ ] Shop drawings [ ] Prints [XX] Reports [ ] Specifications

[ ] Letters [ ] Change Orders [ ] _____

COPIES	DATED	NO.	DESCRIPTION
1	8/30/90	60025-1	LETTER REPORT QUARTERLY GROUND-WATER MONITORING THIRD QUARTER 1990 AT ARCO STATION 374, 6407 TELEGRAPH AVENUE, OAKLAND, CA. 609

THESE ARE TRANSMITTED as checked below:

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REMARKS: PER ARCO'S AUTHORIZATION, REPORT HAS BEEN FORWARDED FOR YOUR REVIEW.

Copies: 1 to AGS project file no. 60025-1 SJ READER'S FILE

*Revision Date: 10/15/90
*File Name: TRANSMT.PRJ

Ground-Water Sampling and Gradient Evaluation

AGS personnel performed quarterly ground-water monitoring and sampling on August 7, 1990. 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. The ground-water sampling protocol is attached.

The DTW levels, relative wellhead elevations, and relative ground-water elevations for this and previous monitoring episodes at the site are summarized in Table 1, Ground-Water Elevation Data. The ground-water gradient interpreted from the August 7, 1990 monitoring data is about 0.0369 (approximately 3.69 feet vertical per 100 feet horizontal) toward the southwest, as shown on the Ground-Water Gradient Map (Plate 3). This interpreted gradient is generally consistent with the previously interpreted ground-water gradient 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. No evidence of floating product was noted in any of the wells, but product odor was noted in the water samples from wells MW-2, MW-3 and MW-4. Cumulative results of water levels and subjective analyses data are presented in Table 1. Monitoring wells MW-1, MW-2, MW-3, and MW-4 were purged and sampled in accordance with the attached protocol. Well purge data sheets for the parameters monitored and stabilization graphs 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 No. 153). The water samples from well MW-4 were analyzed for total oil and grease (TOG) using standard method 503E, halogenated volatile organics (HVOs) by EPA method 601/8010, and total petroleum hydrocarbons as diesel (TPHd) by EPA methods 3510/8015. The water samples from wells MW-1 through MW-4 were also analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 5030/8015/8020/602. 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.

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

- Laboratory analysis of water samples from well MW-4 reported concentrations of TOG are less than the laboratory detection limit (5,000 parts per billion [ppb]), 28000 ppb of TPHd, and thirty one HVOs tested less than the laboratory detection limit (1 ppb).

- Reported concentrations of BTEX are; nondetectable in MW-1; 880 ppb for benzene, 76 ppb for toluene, 25 ppb for ethylbenzene, and 80 ppb for total xylenes in MW-2; 180 ppb for benzene, 64 ppb for toluene, 59 ppb for ethylbenzene, and 120 ppb for total xylenes in MW-3; 8700 ppb for benzene, 4200 ppb for toluene, 540 ppb for ethylbenzene, and 4600 ppb for total xylenes in MW-4.

- Reported concentrations of TPHg in water samples are nondetectable in MW-1, 6000 ppb in MW-2, 2300 ppb in MW-3, and 69000 ppb in MW-4.

Conclusions

Hydrocarbon concentrations in MW-1 have been nondetectable for the last four quarters. TPHg concentrations in MW-2 and MW-3 have increased slightly since July 1989. Benzene and TPHg in MW-4 has fluctuated since July 1989, but in August 1990 was at the highest reported level since monitoring began. The concentrations of benzene in wells MW-2, MW-3, and MW-4 and the concentrations of toluene and total xylenes in well MW-4 exceed the drinking water action level and maximum contaminant level (AL and MCL) set by the State of California Department of Health Services (DHS).

Schedule

Applied GeoSystems will continue the quarterly ground-water monitoring 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 November 20, 1990. Routine well maintenance and quality control will be performed as necessary during these 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
Oakland, California 94612

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

Sincerely,
Applied GeoSystems

Michael J. Barminski
Staff Geologist

Joan E. Tiernan
Registered Civil
Engineer No. 044600

Enclosures: References
Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Ground-Water Gradient Map
Table 1, Cumulative Ground-Water Elevation Data
Table 2, Cumulative Results of Ground-Water Laboratory Analyses
Appendix A: Ground-Water Sampling Protocol
Well Purge Data Sheets and Stabilization Graphs
Chain of Custody Records (1 pages)
Laboratory Analysis Reports (4 pages)

REFERENCES

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

Applied GeoSystems. July 5, 1989. "Site Safety Plan for ARCO Station No. 374, Oakland, California". Job No. 18039-1S.

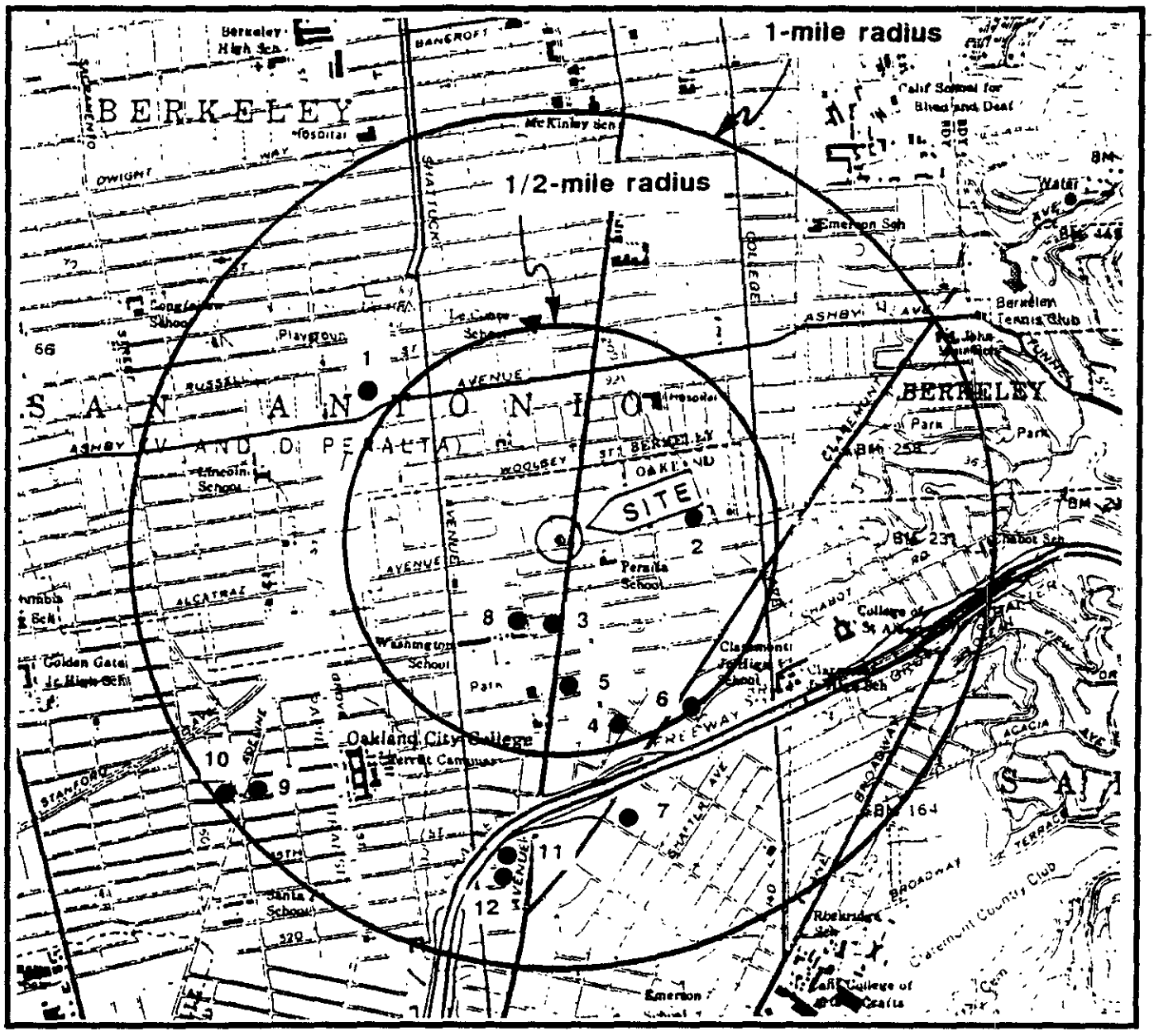
Applied GeoSystems. August 1, 1989. "Report Environmental Investigation Related to Underground Tank Removal at ARCO Service Station No. 374, Telegraph Avenue and Alcatraz Avenue, Oakland, California". Job No. 18039-2.

*Applied GeoSystems. Future. "Report Limited Subsurface Environmental Investigation at ARCO Service Station No. 374, 6407 Telegraph Avenue Oakland, California". Job No. 18039-3.

AquaScience Engineers. May 27, 1986. "Report Soil and Water Sampling and Determination of Hydrocarbon Contamination from Tank Removal at the Telegraph and Alcatraz Property, 6392 Telegraph Avenue, Oakland, California".

Helley, E.S., Lajoie, K.R., Spangle, W.E., and Blair, M.L., 1979, "Flatland Deposits of the San Francisco Bay Region, California": U.S. Geological Survey Professional Paper 943, p. 87.

Hickenbottom K., Muir K., June 1988, "Geohydrology and Ground-water Quality Overview, of the East Bay Plain Area, Alameda County, California 205 (j)", Figure 8.



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

N

Approximate Scale

2000 1000 0 2000 4000

feet

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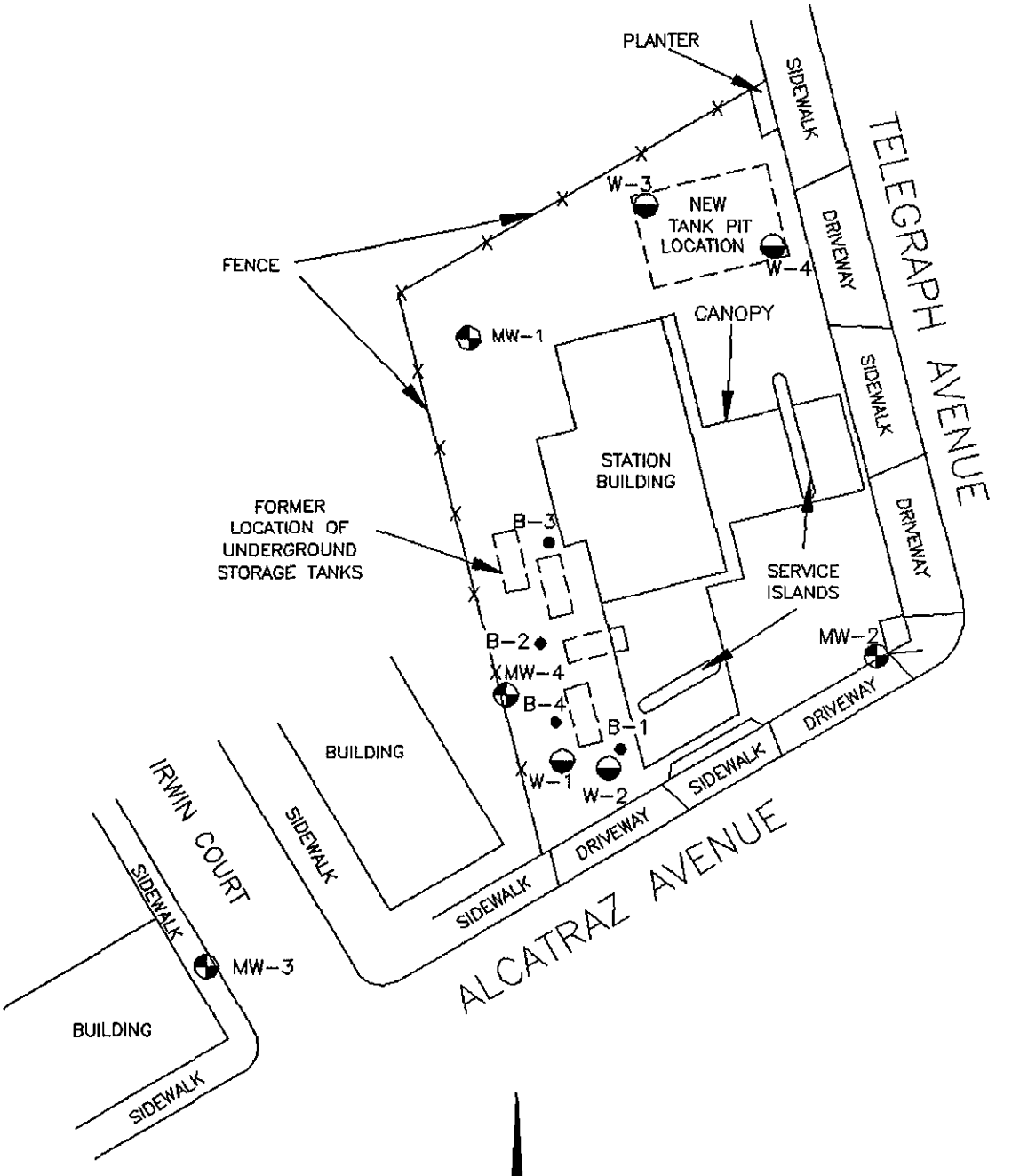
SITE VICINITY MAP
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE
1



EXPLANATION

MW-4 = Monitoring well installed by (Applied GeoSystems, 1989)

W-4 = Tank pit monitoring well installed by (Applied GeoSystems, 1988)

B-4 = Soil boring (Applied GeoSystems, 1988)

N

Approximate Scale

40 20 0 40 80

feet

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

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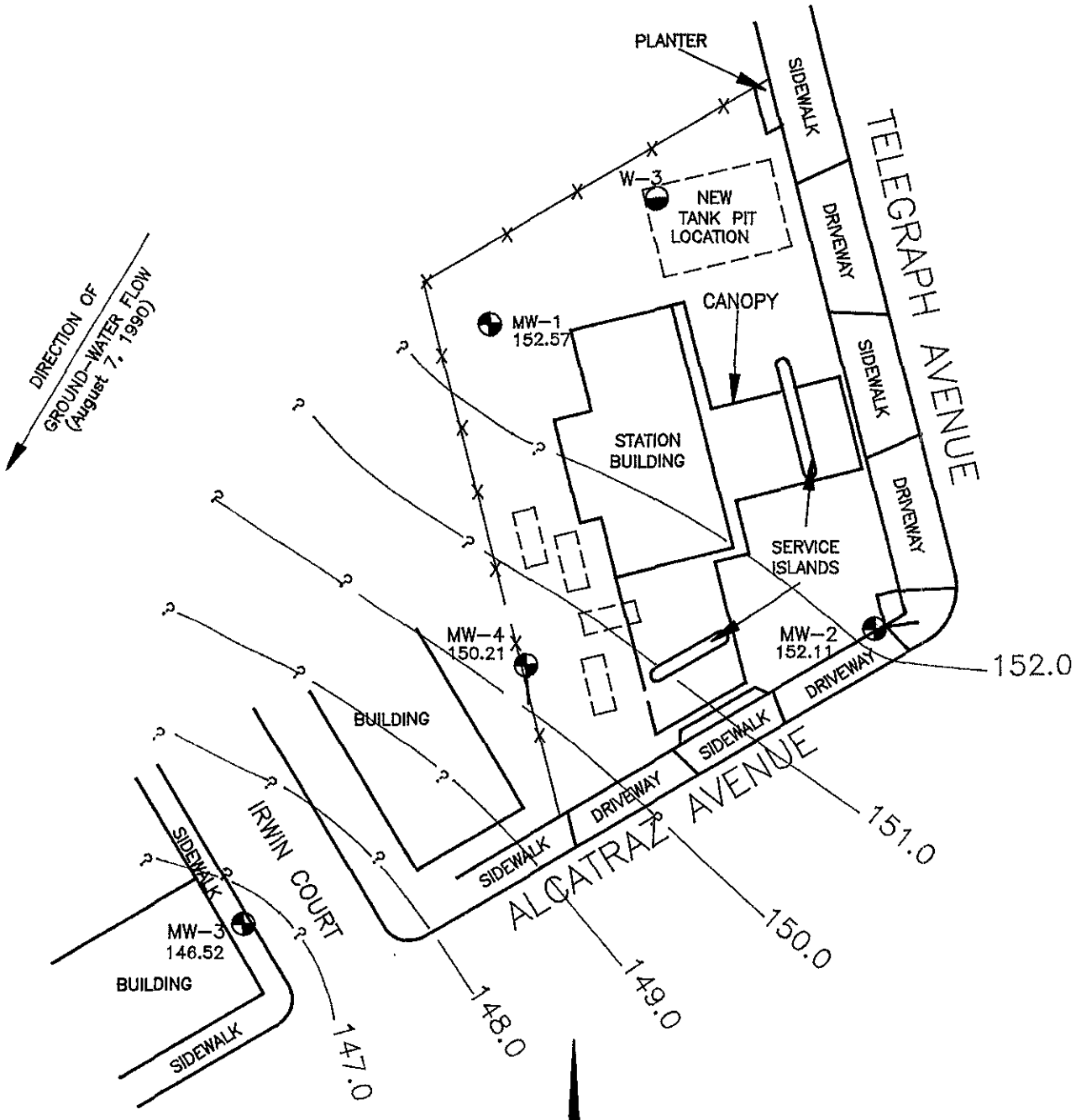
PROJECT 60025-1

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

PLATE 2



152.0 — = Line of equal elevation of ground water above mean sea level

152.57 = Elevation of ground water in feet above mean sea level, August 7, 1990

MW-4 = Monitoring well installed by (Applied GeoSystems, 1989)

EXPLANATION

N

Approximate Scale

40 20 0 40 80

feet

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

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PROJECT 60025-1

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

PLATE 3

TABLE 1
CUMULATIVE GROUND-WATER ELEVATION DATA
ARCO Station 374
6407 Telegraph Avenue
Oakland, California
(Page 1 of 2)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-1				
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
MW-2				
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
MW-3				
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

TABLE 1
CUMULATIVE GROUND-WATER ELEVATION DATA
ARCO Station 374
6407 Telegraph Avenue
Oakland, California
(Page 2 of 2)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-4				
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

TABLE 2
CUMULATIVE RESULTS OF GROUNDWATER LABORATORY ANALYSES
ARCO Service Station 374
6407 Telegraph Avenue
Oakland, California
(Page 1 of 3)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
MW-1							
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
MW-2							
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
MW-3							
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

See notes on page 2 of 3

TABLE 2
CUMULATIVE RESULTS OF GROUNDWATER LABORATORY ANALYSES
ARCO Service Station 374
6407 Telegraph Avenue
Oakland, California
(Page 2 of 3)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
MW-4							
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

Results in micrograms per liter (ug/L) = parts per billion (ppb).
TPHg: Total petroleum hydrocarbons as gasoline by EPA method 8015.
TPHd: Total petroleum hydrocarbons as diesel by EPA method 3550/3510.
B: Benzene, T: Toluene, E: Ethlybenzene, T: Total Xylene isomers
BTEX: Measured by EPA method 8020/602.
TOG: Total oil and grease measured by Standard Method 503A/E.
<: Results reported as less than the detection limit.

NA: Not analyzed

TABLE 2
CUMULATIVE RESULTS OF GROUNDWATER LABORATORY ANALYSES
ARCO Service Station 374
6407 Telegraph Avenue
Oakland, California
(Page 3 of 3)

Date/Well	HALOGENATED VOLATILE ORGANICS	
MW-4		
07/31/90	Nondetectable for thirty one compounds tested	(<1 ppb)

Results in micrograms per liter (ug/L) = parts per billion (ppb).
Halogenated Volatile Organics: Measured by EPA method 601/8010.
<: Results reported as less than the detection limit.

NA: Not analyzed

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 7 to 8 well casing volumes of water were purged before these characteristics stabilized. Turbidity measurements and dissolved oxygen readings were also collected from the purged well water. 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. 60025-1

Date: August 8, 1990 Page 1 of 1

Well No. MW-1 Time Started 13:27

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)	Turbidity (NTU)
13:27	Start purging MW-1				
13:29	0.1	80.2	8.42	10.64	13.0
13:40	5	75.7	7.63	9.75	16.0
13:48	10	75.3	7.42	9.80	18.0
13:56	15	72.8	7.37	9.57	25
14:04	20	71.5	7.17	9.26	27
14:12	25	70.5	7.22	9.19	61
14:20	30	69.4	7.59	9.25	69
14:29	35	69.1	8.45	9.32	59
14:37	40	69.3	8.74	9.35	46
14:43	45	70.5	8.76	9.74	39
14:49	49	70.5	8.65	9.94	115
14:50	Start purging MW-1				

Notes:

Depth to Bottom (feet) :	26.86
Depth to Water - initial (feet) :	6.78
Depth to Water - final (feet) :	8.21
% recovery :	92.9%
Time Sampled :	18:30
Dissolved Oxygen - initial (ppm) :	
Dissolved Oxygen - final (ppm) :	
Gallons per Well Casing Volume :	13.05
Gallons Purged :	49.0
Well Casing Volumes Purged :	3.75
Approximate Pumping Rate (gpm) :	0.59

WELL PURGE DATA SHEET

Project Name: Arco 374 — Job No. 60025-1

Date: August 8, 1990 — Page 1 of 1

Well No. MW-2 — Time Started 15:05

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)	Turbidity (NTU)
15:05	Start purging MW-2				
15:09	0.1	79.2	12.35	10.97	20
15:14	5	75.6	11.72	10.26	16
15:19	10	74.7	12.67	10.03	11
15:23	15	74.2	12.47	9.88	8
15:27	20	75.2	12.15	9.92	5
15:33	25	73.4	11.61	10.13	7
15:41	30	73.0	11.78	9.87	5
15:47	35	72.3		9.76	4.6
15:53	40	72.6	12.74	9.88	6.0
15:59	45	71.8	11.74	9.92	5.7
16:05	50	71.3		9.82	6.8
16:11	55	71.2	11.79	9.88	6.5
16:12	Stop purging MW-2				

Notes:

Depth to Bottom (feet)	:	26.43
Depth to Water - initial (feet)	:	6.35
Depth to Water - final (feet)	:	6.98
% recovery	:	97.8%
Time Sampled	:	18:55
Dissolved Oxygen - initial (ppm)	:	
Dissolved Oxygen - final (ppm)	:	
Gallons per Well Casing Volume	:	13.05
Gallons Purged	:	55.0
Well Casing Volumes Purged	:	4.21
Approximate Pumping Rate (gpm)	:	0.82

WELL PURGE DATA SHEET

Project Name: Arco 374 Job No. 60025-1

Date: August 8, 1990 Page 1 of 1

Well No. MW-3 Time Started 16:30

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)	Turbidity (NTU)
16:30	Start purging MW-3				
16:32	0.1	74.4	10.92	10.09	5.4
16:38	5	70.4	12.00	7.69	>200
16:44	10	68.9	12.32	7.50	>200
16:48	15	68.6	12.48	7.61	65
16:54	20	68.0	13.50	7.35	27
17:00	25	67.5	12.63	7.34	28
17:05	30	67.3	11.89	7.06	34
17:12	34	66.7		7.47	44.1
17:13	Stop purging MW-3				

Notes:

Depth to Bottom (feet)	:	26.87
Depth to Water - initial (feet)	:	7.66
Depth to Water - final (feet)	:	14.38
% recovery	:	65.0%
Time Sampled	:	19:15
Dissolved Oxygen - initial (ppm)	:	
Dissolved Oxygen - final (ppm)	:	
Gallons per Well Casing Volume	:	12.49
Gallons Purged	:	34.0
Well Casing Volumes Purged	:	2.72
Approximate Pumping Rate (gpm)	:	0.79

WELL PURGE DATA SHEET

Project Name: Arco 374 Job No. 60025-1

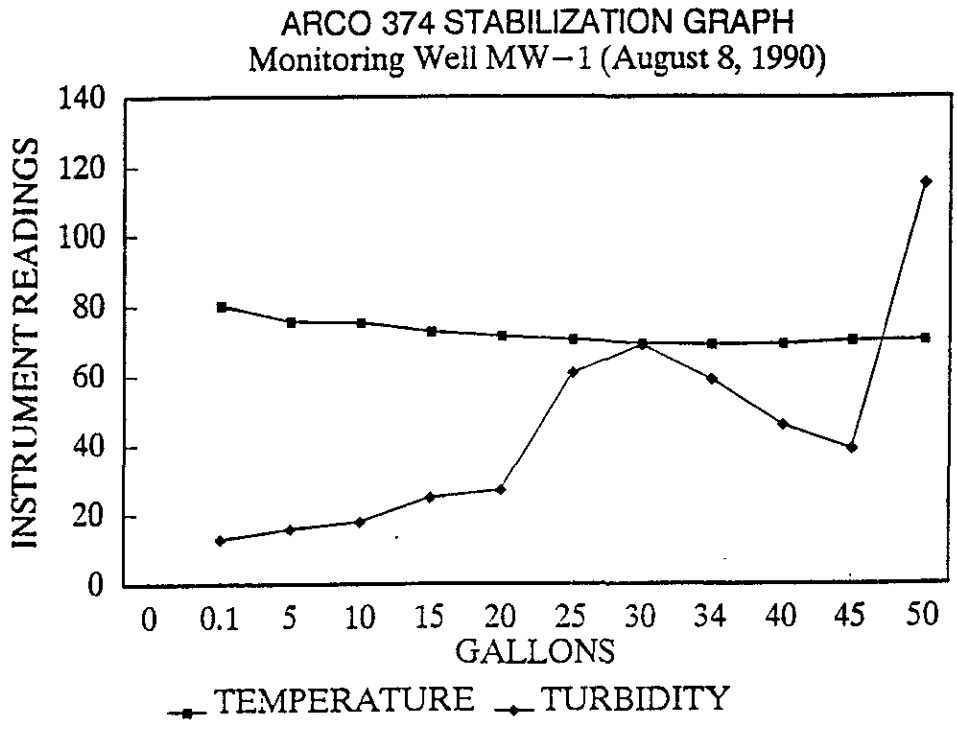
Date: August 8, 1990 Page 1 of 1

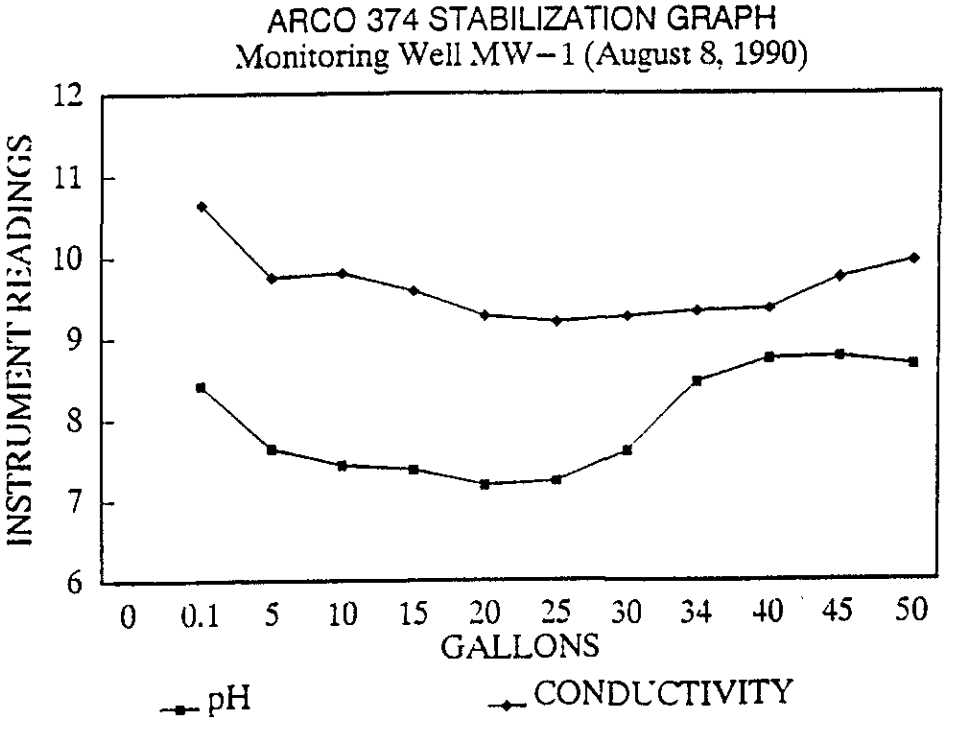
Well No. MW-4 Time Started 17:50

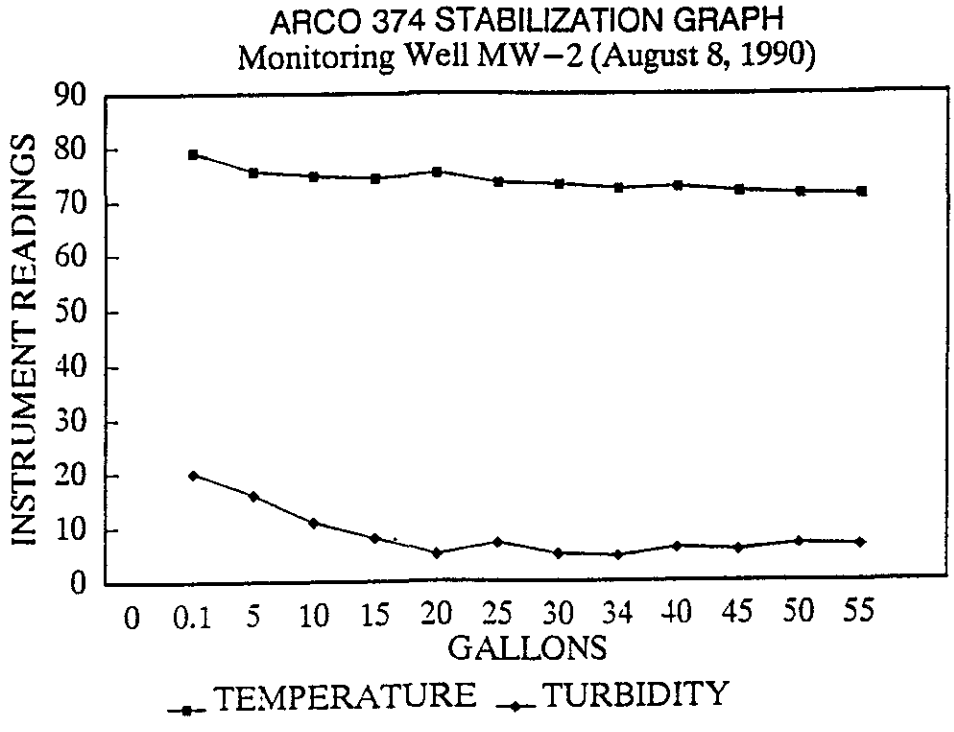
Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)	Turbidity (NTU)
17:50	Start purging MW-4				
17:51	0.1	74.2	13.03	17.21	20
18:01	5	66.8	12.91	8.49	>200
18:05	10	66.6		9.30	>200
18:12	15	66.9		10.12	68
18:17	20	66.5		9.55	>200
18:20	Stop purging MW-4 - Well dry				

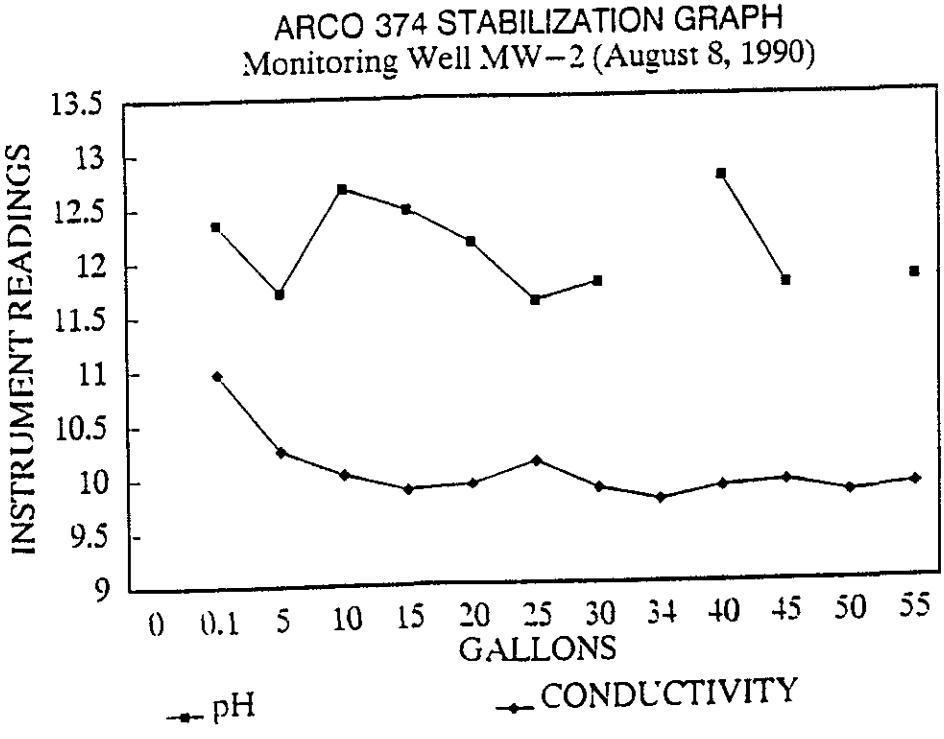
Notes:

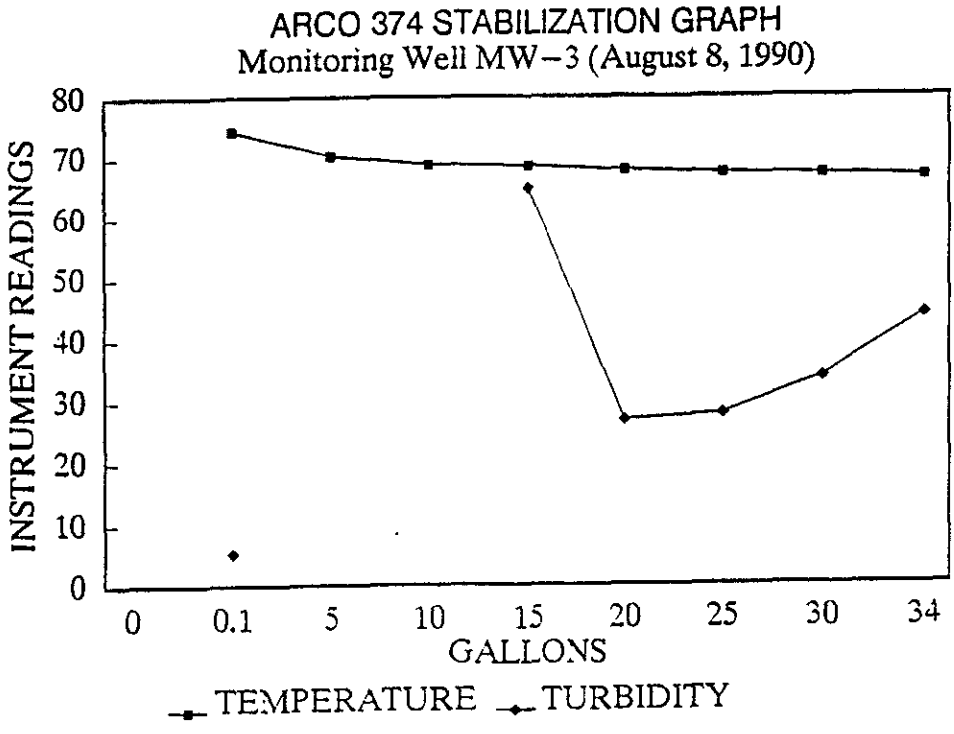
Depth to Bottom (feet)	:	26.68
Depth to Water - initial (feet)	:	6.87
Depth to Water - final (feet)	:	10.31
% recovery	:	82.6%
Time Sampled	:	20:15
Dissolved Oxygen - initial (ppm)	:	
Dissolved Oxygen - final (ppm)	:	
Gallons per Well Casing Volume	:	12.88
Gallons Purged	:	20.0
Well Casing Volumes Purged	:	1.55
Approximate Pumping Rate (gpm)	:	0.67

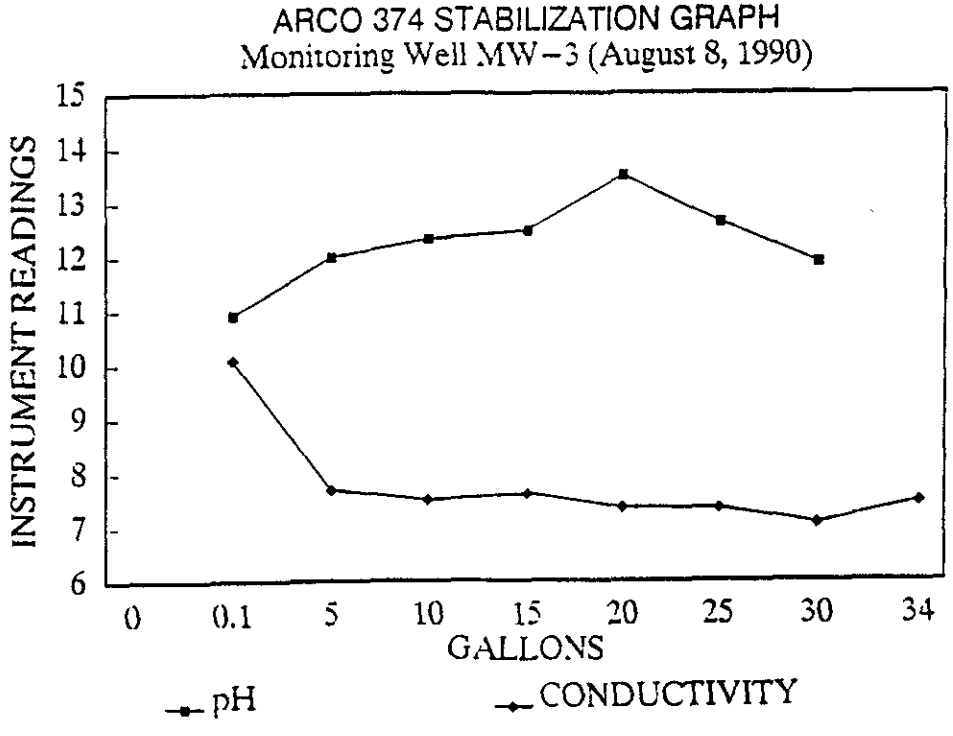

ARCO 374 STABILIZATION GRAPH
Monitoring Well MW-1 (August 8, 1990)
INSTRUMENT READINGS
140
120
100
80
60
40
20
0
0 0.1 5 10 15 20 25 30 34 40 45 50
GALLONS
TEMPERATURE
TURBIDITY

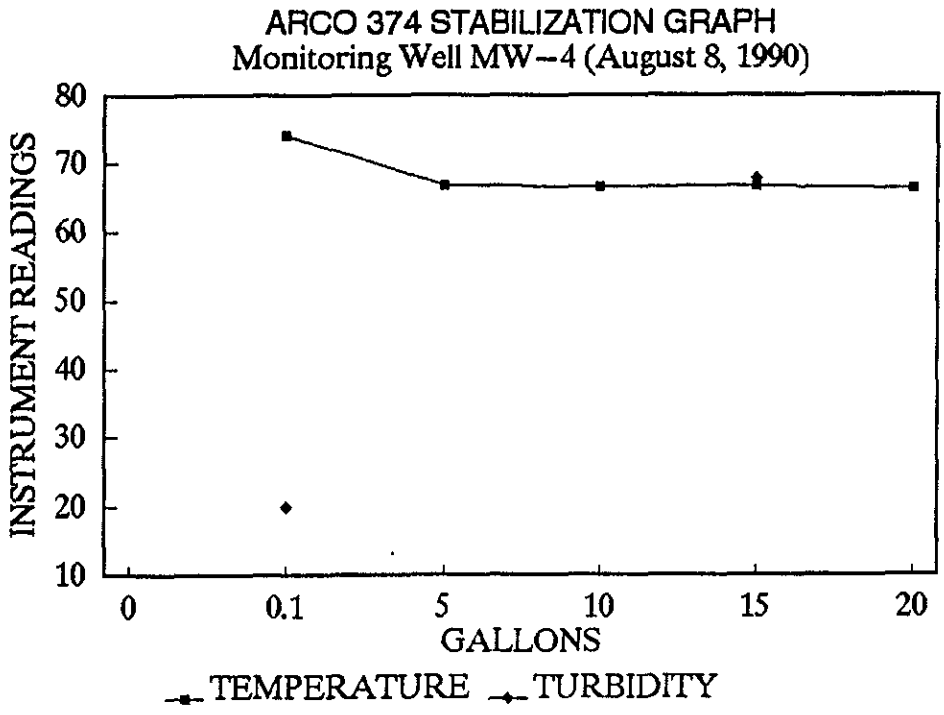

ARCO 374 STABILIZATION GRAPH
Monitoring Well MW-1 (August 8, 1990)
INSTRUMENT READINGS
12
11
10
9
8
7
6
0 0.1 5 10 15 20 25 30 34 40 45 50
GALLONS
pH
CONDUCTIVITY

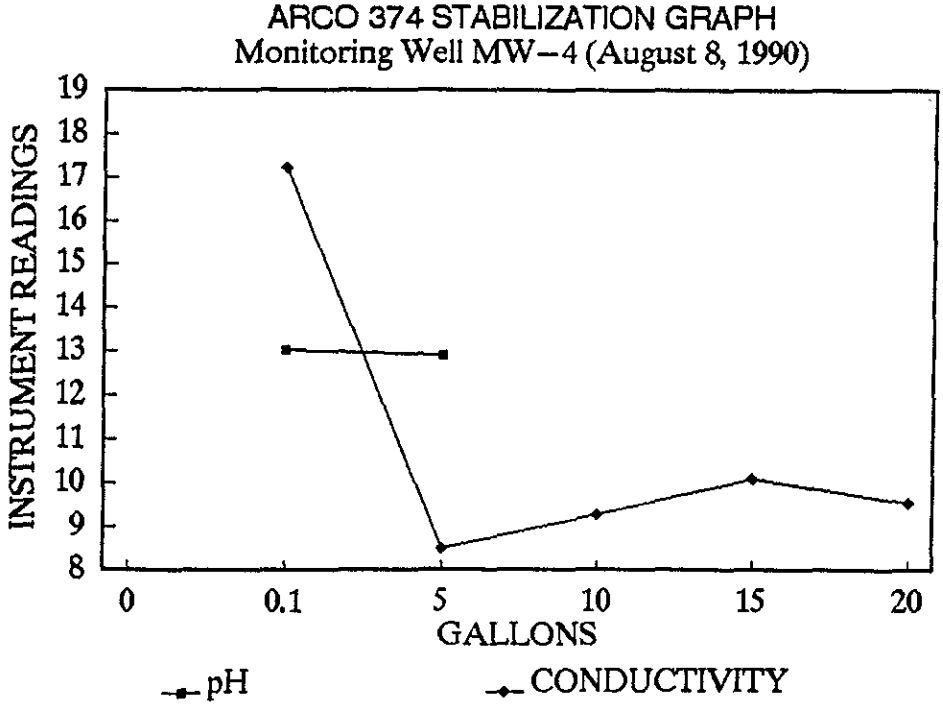

ARCO 374 STABILIZATION GRAPH
Monitoring Well MW-2 (August 8, 1990)
INSTRUMENT READINGS
90
80
70
60
50
40
30
20
10
0
0 0.1 5 10 15 20 25 30 34 40 45 50 55
GALLONS
TEMPERATURE
TURBIDITY


ARCO 374 STABILIZATION GRAPH
Monitoring Well MW-2 (August 8, 1990)
INSTRUMENT READINGS
13.5
13
12.5
12
11.5
11
10.5
10
9.5
9
0 0.1 5 10 15 20 25 30 34 40 45 50 55
GALLONS
pH
CONDUCTIVITY


ARCO 374 STABILIZATION GRAPH
Monitoring Well MW-3 (August 8, 1990)
INSTRUMENT READINGS
80
70
60
50
40
30
20
10
0
0
0.1
5
10
15
20
25
30
34
GALLONS
TEMPERATURE
TURBIDITY


ARCO 374 STABILIZATION GRAPH
Monitoring Well MW-3 (August 8, 1990)
INSTRUMENT READINGS
15
14
13
12
11
10
9
8
7
6
0
0.1
5
10
15
20
25
30
34
GALLONS
pH
CONDUCTIVITY


ARCO 374 STABILIZATION GRAPH
Monitoring Well MW--4 (August 8, 1990)
INSTRUMENT READINGS
80
70
60
50
40
30
20
10
0
0.1
5
10
15
20
GALLONS
TEMPERATURE
TURBIDITY


ARCO 374 STABILIZATION GRAPH
Monitoring Well MW--4 (August 8, 1990)
INSTRUMENT READINGS
19
18
17
16
15
14
13
12
11
10
9
8
0
0.1
5
10
15
20
GALLONS
pH
CONDUCTIVITY

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ. NO.	PROJECT NAME
60025-1	ARCO 374
P.O. NO.	SAMPLERS (Signature)
	Mike Barminski

DATE MM/DD/YY	TIME	SAMPLE I.D.	No. of Containers	TPHg	BTEX	TPHd	8010	1,2 DCA				Preserved?	LABORATORY I.D. NUMBER
8/8/90	6:30	W-7-MW-1	4	X	X							X	
8/8/90	655	W-7-MW-2	4	X	X							X	
		(1)											
8/8/90	7:15	W-14-MW-3	4	X	X							X	
8/8/90	8:15	W-10-MW-1	1	X	X							X	
8/8/90	8:20	W-10 MW-4	2				X						
8/8/90	8:25	W-10 MW-4	3			X		X					

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
Mike Barminski	8/8/90 9:00	
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature): 8/8/90
		Mehran 2:00

REMARKS: 2 week

SEND RESULTS TO:
Applied GeoSystems
3315 Almaden Expressway
Suite 34
San Jose, California 95118
(408) 264-7723

Proj. Mgr.: Mike Barminski

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	Date Sampled:	08-08-90
	Applied GeoSystems	Date Received:	08-08-90
	3315 Almaden Expressway	BTEX Analyzed:	08-10-90
	San Jose, CA 95118	TPHg Analyzed:	08-10-90
Project:	AGS 60025-1	TPHd Analyzed:	NR
		Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.50	0.50	0.50	0.50	20	100
SAMPLE Laboratory Identification						
W-9-MW1 W1008106	ND	ND	ND	ND	ND	NR
W-7-MW2 W1008107	880	76	25	80	6000	NR
W-14-MW3 W1008108	180	64	59	120	2300	NR

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.

Laura Kuck
Laboratory Representative

August 14, 1990
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
3315 Almaden Expressway
San Jose, CA 95118
Project: AGS 60025-1

Date Sampled: 08-08-90
Date Received: 08-08-90
BTEX Analyzed: 08-10-90
TPHg Analyzed: 08-10-90
TPHd Analyzed: 08-10-90
Matrix: Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	5.0	5.0	5.0	5.0	200	100
SAMPLE Laboratory Identification						
W-10-MW4 W1008109	8700	4200	540	4600	69000	28000

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.

Laura Kuck
Laboratory Representative

August 14, 1990
Date Reported

APPLIED ANALYTICAL LABORATORY IS CERTIFIED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 153)

APPLIED ANALYTICAL

Environmental Laboratories

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

ANALYSIS REPORT

togwater.rpt

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Attention: Mike Barminski

Date Received: 08-08-90
Laboratory #: W1008109
Project #: 60025-1
Sample #: W-10-MW4
Matrix: Water

Parameter	Result (µg/L)	Detection Limit (µg/L)	Date Analyzed
TPH as Oil and Grease	ND	5000	08-09-90

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

PROCEDURES

TPH as Oil and Grease: Total Oil and Grease of mineral or petroleum origin are measured by extraction and gravimetric analysis according to Standard Method 503A/E.

Laura Kuck, Laboratory Manager

August 10, 1990
Date Reported

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

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

August 27, 1990
APPLIED GEOSYSTEMS, INC.
Project No.: 60025-1
Date Sampled: Aug. 8, 1990
Sample No.: W-10-MW4
Detection Limit: 1µg/L

ChromaLab File No.: 0890069
Attn: Mike Barminski
Project Name: ARCO 374
Date Submitted: Aug. 14, 1990
Date Analyzed: Aug. 22, 1990

601/8010	(µg/L)
Dichlorodifluoromethane	N.D.
Chloromethane	N.D.
Vinyl Chloride	N.D.
Bromomethane	N.D.
Chlorethane	N.D.
Trichlorofluoromethane	N.D.
1,1-Dichloroethene	N.D.
Methylene Chloride	N.D.
t-1,2-Dichloroethene	N.D.
c-1,2-Dichloroethene	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.
1,2-Dichloropropane	N.D.
Bromodichloromethane	N.D.
2-Chloroethylvinyl ether	N.D.
t-1,3-Dichloropropene	N.D.
Cis-1,3-Dichloropropene	N.D.
1,1,2-Trichloroethane	N.D.
1,1,2-Trichlorotrifluorethane	N.D.
Tetrachloroethene	N.D.
Dibromochloromethane	N.D.
Chlorobenzene	N.D.
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.

QA/QC:
*Method Blank concentration is none detected.
*Spiked recovery for Methylene Chloride are 98.2% & 89.7%, Chloroform is 103.2% & 95.7%, 1,1,2-Trichloroethane are 97.7% & 103.1%, 1,3-Dichlorobenzene are 95.5% & 97.6%.

CHROMALAB, INC.

David Duong, Sr. Chemist

Eric Tam, Lab Director