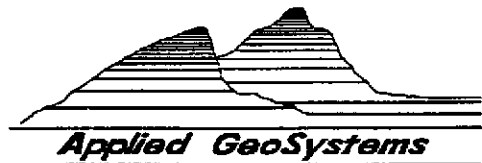


2/14/91



91 FEB 15 AM 10:55

TRANSMITTAL

3315 Almaden Expressway, Suite 34  
San Jose, California 95118  
(408) 264-7723 FAX (408) 264-2435

TO: MS. KATHERINE CHESICK  
ALAMEDA COUNTY DEPARTMENT OF  
ENVIRONMENTAL HEALTH  
80 SWAN WAY, ROOM 200  
OAKLAND, CALIFORNIA 94621

DATE: 2/14/91  
PROJECT NUMBER: AGS 69038-4  
SUBJECT: ARCO 4494, 566 HEGENBERGER  
ROAD, OAKLAND, CALIFORNIA.

FROM: MIKE BARMINSKI  
TITLE: STAFF GEOLOGIST

WE ARE SENDING YOU  Attached  Under separate cover via \_\_\_\_\_ the following items:  
 Shop drawings  Prints  Reports  Specifications  
 Letters  Change Orders  \_\_\_\_\_

COPIES	DATED	NO.	DESCRIPTION
1	2/8/91	69038-4	FOURTH QUARTER 1990 GROUND-WATER MONITORING REPORT FOR THE ABOVE SUBJECT SITE.

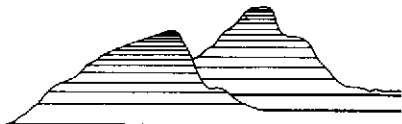
THESE ARE TRANSMITTED as checked below:

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Copies: 1 to AGS project file no. 69038-4 S.I. READER'S FILE

\*Revision Date: 10/15/90  
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DRAFT LETTER REPORT  
QUARTERLY GROUND-WATER MONITORING  
Fourth Quarter 1990  
at  
ARCO Station 4494  
566 Hegenberger Road  
Oakland, California

AGS 69038-4





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• FREMONT • IRVINE • HOUSTON • BOSTON • SACRAMENTO • CULVER CITY • SAN JOSE

February 8, 1991  
0124kchr  
AGS 69038-4

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

Subject: Fourth Quarter 1990 Ground-Water Monitoring Report for ARCO  
Station 4494 at 566 Hegenberger Road, Oakland, California.

Mr. Carmel:

This letter report summarizes the methods and results of the Fourth Quarter 1990 ground-water monitoring performed by Applied GeoSystems (AGS) at the above-referenced site. The station is on the northeastern side of the intersection of Edes Avenue and Hegenberger Road in Oakland, California, as shown on the Site Vicinity Map (Plate 1). ARCO has contracted with AGS to perform quarterly ground-water sampling and analyses to monitor gasoline hydrocarbon concentrations in the ground water beneath the site, and evaluate trends related to fluctuations of these gasoline hydrocarbon concentrations. In addition, ARCO has requested that AGS perform monthly monitoring of ground-water levels in the wells at the site, and evaluate fluctuations in the ground-water gradient over time.

Prior to the present monitoring, Pacific Environmental Group (Pacific), AGS, and others performed limited subsurface environmental investigations related to the former underground waste-oil storage tank and existing gasoline-storage tanks at the site. Pacific performed soil sampling and observation during removal of the waste-oil tank in December 1988. AGS performed a site history and offsite records review in October 1990, and is presently conducting a subsurface environmental investigation at the site. Our work has included the installation of four ground-water monitoring wells (MW-1, MW-2, MW-3, and MW-4) and the drilling of one boring (B-5) near the former waste-oil storage tank in October 1989 and August 1990. 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 monthly monitoring of depth-to-water (DTW) levels and subjective analyses of water samples from the wells on November 29 and December 19, 1990, and performed quarterly ground-water monitoring and sampling on November 29, 1990. Field work consisted of measuring DTW levels in wells MW-1 through 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 monitoring wells MW-1, MW-3, and MW-4 for laboratory analysis. 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 November 29 and December 19, 1990 monitoring data are approximately 0.010 toward the northeast, 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. The elevation data for well MW-2 was not used in evaluating the gradient for November 29, 1990 because of the presence of floating product sheen in the well on that date.

Water samples were collected from wells MW-1, MW-3 and MW-4 for subjective analysis (see Table 1) before the monitoring wells were purged and sampled. Subjective analysis of water samples from well MW-2 indicated a floating product sheen on November 29, 1990. The floating product was subsequently removed from well MW-2 by pumping the well dry and the purge water was disposed of by Armour Petroleum on November 30, 1990. No evidence of floating product was observed in water samples collected from wells MW-1, MW-3, and MW-4 on November 29, 1990. On December 19, 1990, no evidence of floating product was observed in wells MW-1 through MW-4, however, a product odor was noted in well MW-2.

Monitoring wells MW-1, MW-3, and MW-4 were purged and sampled on November 29, 1990 in accordance with the attached protocol. Well purge data sheets for the parameters monitored and stabilization graphs for each well sampled are also attached (Appendix A).

### Laboratory Analysis

Water samples collected from the wells were delivered under Chain of Custody protocol to Applied Analytical Environmental Laboratories in Fremont, California (Hazardous Waste Testing Laboratory No. 1211). The water samples from wells MW-1, MW-3, and MW-4

were analyzed for total petroleum hydrocarbons as gasoline (TPHg), and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 5030/8015/602. The Chain of Custody Records and Laboratory Analysis Reports are attached (Appendix A). Results of these and previous water analyses are summarized in Table 2, Cumulative Results of Laboratory Analyses of Water Samples.

Results of this quarter's laboratory analyses of water samples from wells MW-1, MW-3 and MW-4 indicated:

- o nondetectable levels of TPHg in wells MW-1, MW-3, and MW-4;  
and,
- o nondetectable levels of BTEX in wells MW-1, MW-3, and MW-4, with the exception of 0.7 parts per billion (ppb) of toluene in well MW-1.

#### Conclusions and Recommendations

Hydrocarbon levels detected in wells MW-1, MW-3, and MW-4 are within Department of Health Services (DHS) drinking water standards set in October 1990. The amount of free product in well MW-2 has decreased since monthly removal was implemented in November 1990.

We recommend continued ground-water monitoring at this site and monthly measurement of ground-water levels to evaluate trends of petroleum hydrocarbons and changes in ground-water gradient and floating product with time. Recommendations for additional work at the site will be included under separate cover.

#### 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. Routine well maintenance, removal of free product from well MW-2, and quality control will be performed as necessary during these site visits. The next quarterly monitoring episode is scheduled for March 5, 1991. Also, at the request of Alameda County Department of Environmental Health (ACDEH) monthly site visits will be conducted between quarterly monitoring visits to monitor ground-water conditions at the site.

We recommend that copies of this report be forwarded to:

Ms. Katherine Chesick  
Alameda County Department of  
Environmental Health  
80 Swan Way, Room 200  
Oakland, California 94621

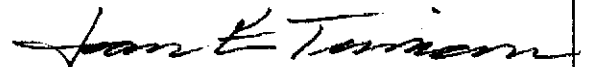
Mr. Lester Feldman  
Regional Water Quality Control Board  
San Francisco Bay Region  
1800 Harrison Street  
Oakland, California 94612

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 044600

Enclosures:      References

Plate 1, Site Vicinity Map  
Plate 2, Generalized Site Plan  
Plate 3, Ground-Water Gradient Map, November 29, 1990  
Plate 4, Ground-Water Gradient Map, December 19, 1990

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  
                  Stabilization Graphs  
                  Chain of Custody Record (1 page)  
                  Laboratory Analysis Report (1 page)

cc: H.C. Winsor, ARCO Products Company

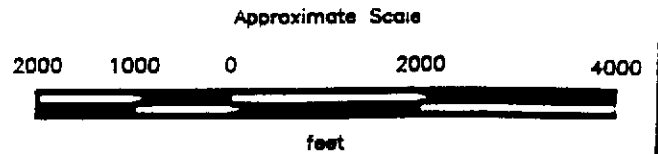
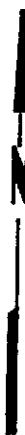
### REFERENCES

- Applied GeoSystems. September 29, 1989. Work Plan for Initial Subsurface Investigation at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-1.
- Applied GeoSystems. October 1, 1990. Report on Site History and Limited Environmental Records Review at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-3.
- Pacific Environmental Group. May 3, 1989. Arco Station No. 4494, 566 Hegenberger Road, California. Project 330-41.





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

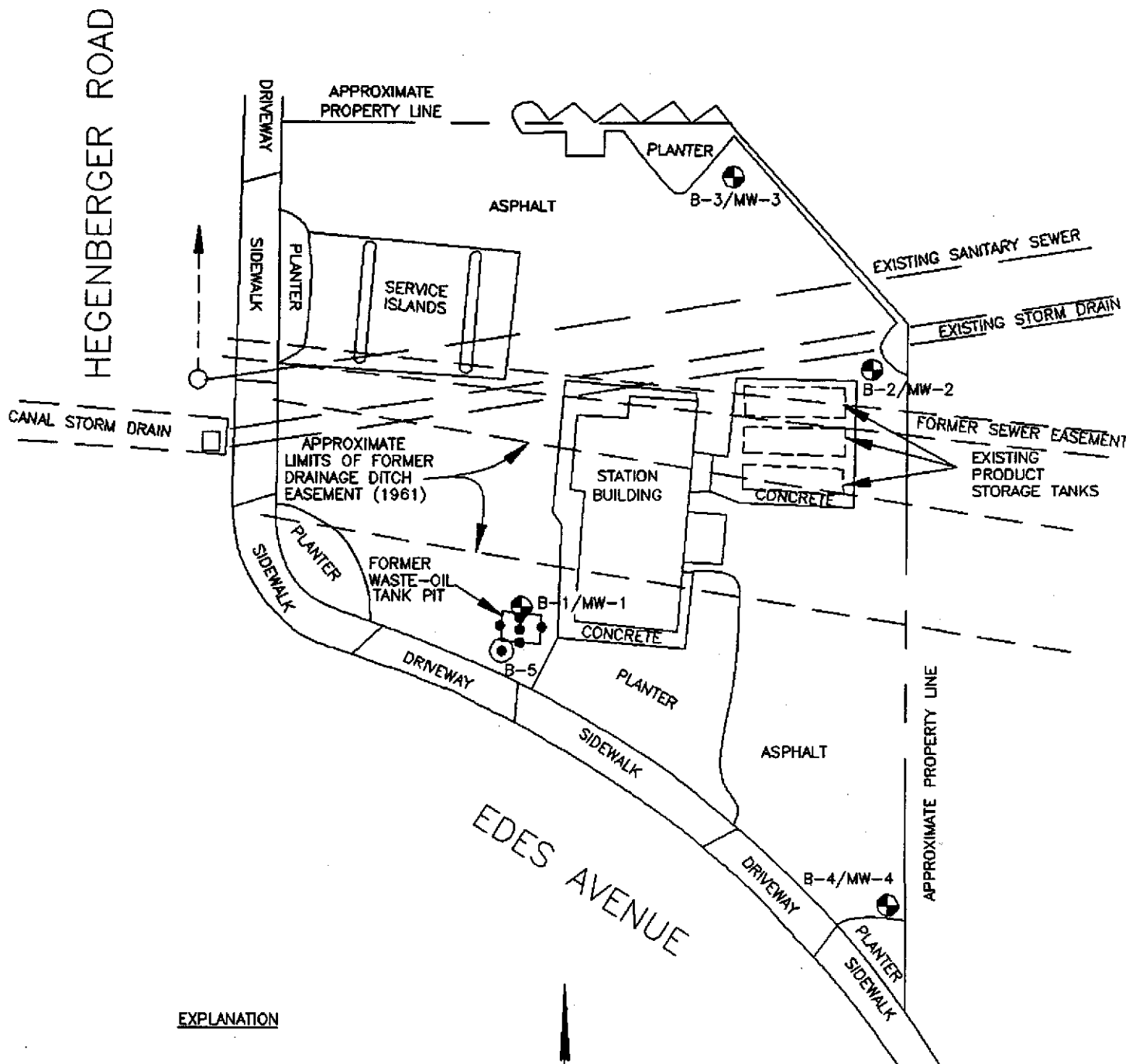


**PROJECT 69038-4**



**SITE VICINITY MAP  
 ARCO Service Station 4494  
 566 Hegenberger Road  
 Oakland, California**

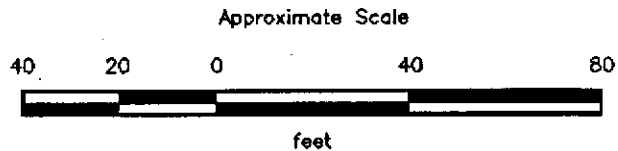
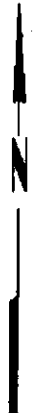
**PLATE**

**1**



**EXPLANATION**

- = Waste-oil tank excavation soil samples (Pacific Environmental Group, January 1989)
- B-4/MW-4  = Monitoring well (Applied GeoSystems, October 1989 and August 1990)
- B-5  = Soil boring (Applied GeoSystems, August 1990)



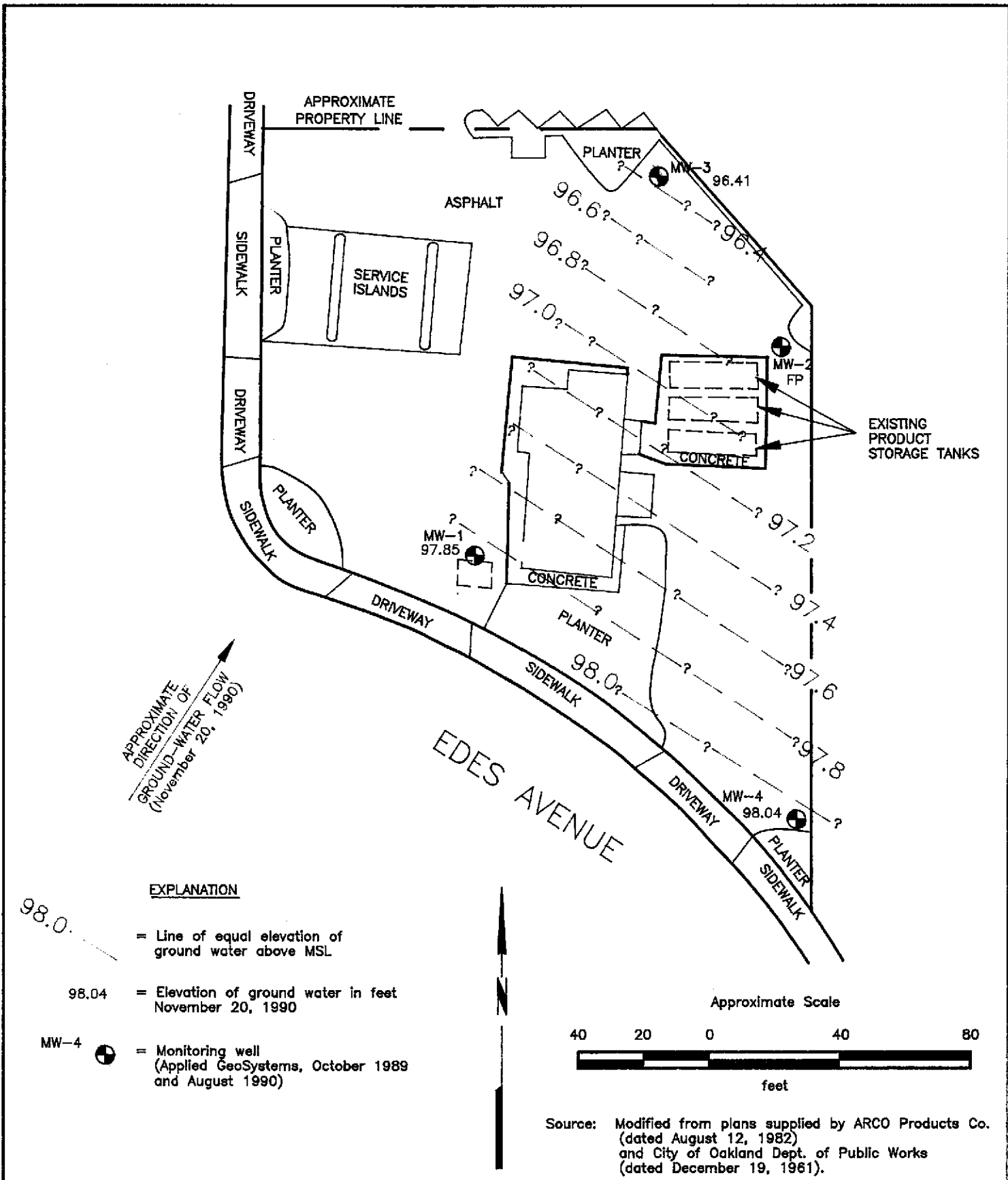
Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1961).




**PROJECT 69038-4**

**GENERALIZED SITE PLAN  
ARCO Service Station 4494  
566 Hegenberger Road  
Oakland, California**

**PLATE  
2**



**EXPLANATION**

- 98.0. — = Line of equal elevation of ground water above MSL
- 98.04 = Elevation of ground water in feet November 20, 1990
- MW-4  = Monitoring well (Applied GeoSystems, October 1989 and August 1990)

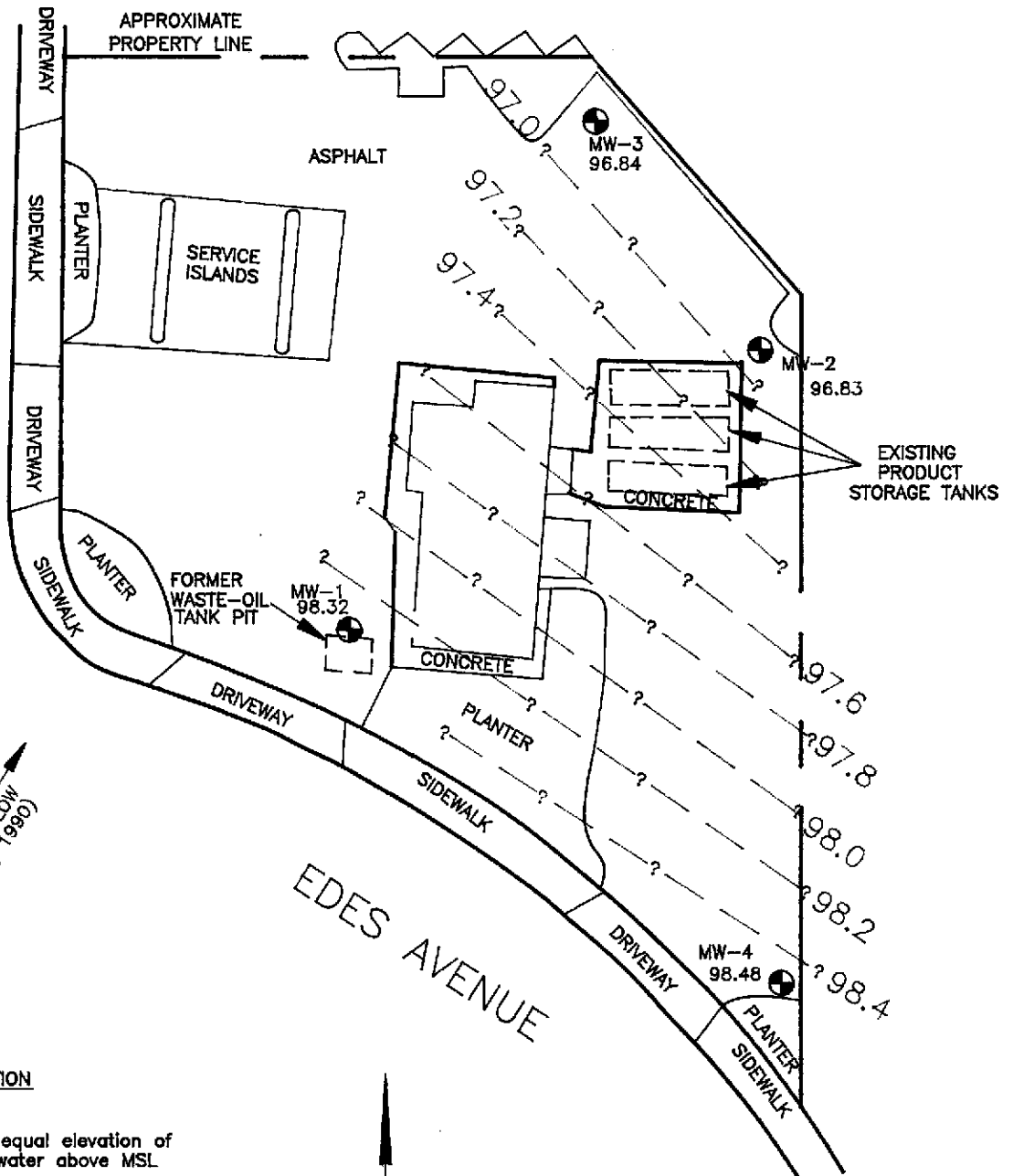


**PROJECT 69038-4**

**GROUND-WATER GRADIENT MAP**  
**November 20, 1990**  
**ARCO Service Station 4494**  
**566 Hegenberger Road**  
**Oakland, California**


**PLATE**  
**3**

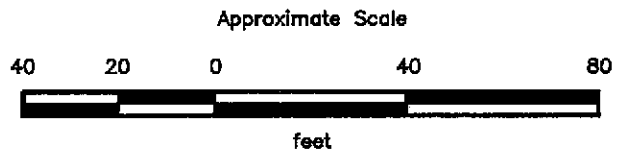
HEGENBERGER ROAD



APPROXIMATE  
DIRECTION OF  
GROUND-WATER FLOW  
(December 19, 1990)

**EXPLANATION**

- 97.0 — Line of equal elevation of ground water above MSL
- 98.48 — Elevation of ground water in feet December 19, 1990
- MW-4  = Monitoring well (Applied GeoSystems, October 1989 and August 1990)



Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1981).



**GROUND-WATER GRADIENT MAP**  
**December 19, 1990**  
**ARCO Service Station 4494**  
**566 Hegenberger Road**  
**Oakland, California**

**PLATE**  
**4**

**PROJECT 69038-4**

TABLE 1  
 CUMULATIVE GROUND-WATER MONITORING DATA  
 ARCO Station 4494  
 566 Hegenberger Road  
 Oakland, California  
 (Page 1 of 2)

<u>Well</u> Date	Elevation of Wellhead	Depth to Water	Water Elevation	Product Evidence
<u>MW-1</u>				
06/06/90	105.31	6.65	98.66	None
08/16/90		7.00	98.31	None
08/21/90		7.05	98.26	None
09/07/90		7.24	98.07	None
11/20/90		7.46	97.85	None
11/29/90		7.40	97.91	None
12/19/90		6.99	98.32	None
<u>MW-2</u>				
06/06/90	105.78	9.00*	96.78*	11" of Black Product
08/16/90		NM	--	2" of Black Product
08/21/90		NM	--	2" of Black Product
09/07/90		9.17*	96.61*	2" of Black Product
11/20/90		9.20*	96.58*	Heavy Sheen
11/29/90		9.92*	95.86*	Heavy Sheen
12/19/90		8.95	96.83	Obvious Odor
<u>MW-3</u>				
08/16/90	105.51	8.87	96.64	None
08/21/90		8.85	96.66	None
09/07/90		8.98	96.53	None
11/20/90		9.10	96.41	None
11/29/90		9.05	96.46	None
12/19/90		8.67	96.84	None

See notes on page 2 of 2.

TABLE 1  
CUMULATIVE GROUND-WATER MONITORING DATA  
ARCO Station 4494  
566 Hegenberger Road  
Oakland, California  
(Page 2 of 2)

<u>Well</u> Date	Elevation of Wellhead	Depth to Water	Water Elevation	Product Evidence
MW-4				
08/16/90	106.61	8.16	98.45	None
08/21/90		8.22	98.39	None
09/07/90		8.39	98.22	None
11/20/90		8.57	98.04	None
11/29/90		8.53	98.08	None
12/19/90		8.13	98.48	None

Depth measurements in feet. \* = Floating Product present in well. NM = Not measured.  
Elevations in feet above mean sea level (plus one hundred feet to avoid negative ground-water elevations).

TABLE 2  
 CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES  
 ARCO Station 4494  
 566 Hegenberger Road  
 Oakland, California  
 (Page 1 of 2)

<u>Well</u> Date	TPHg	TPHd	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TOG
<u>MW-1</u>							
06/19/90	ND	ND	ND	ND	ND	ND	ND
08/16/90	ND	NA	ND	ND	ND	ND	NA
09/07/90	NA	NA	NA	NA	NA	NA	ND
11/29/90	ND	NA	ND	0.7	ND	ND	NA
<u>MW-3</u>							
08/16/90	ND	ND	ND	ND	ND	ND	NA
09/07/90	NA	NA	NA	NA	NA	NA	NA
11/29/90	ND	NA	ND	ND	ND	ND	NA
<u>MW-4</u>							
08/16/90	ND	ND	ND	ND	ND	ND	NA
09/07/90	NA	NA	NA	NA	NA	NA	NA
11/29/90	ND	NA	ND	ND	ND	ND	NA

Results in micrograms per liter (ug/l), or parts per billion (ppb).

TPHg: Total petroleum hydrocarbons as gasoline by EPA Methods 5030 and 8015.

TPHd: Total petroleum hydrocarbons as diesel by EPA Methods 3550 and 8015.

BTEX: Benzene, toluene, ethylbenzene, and total xylene isomers by EPA Method 5030 and 8020.

TOG: Total oil and grease by EPA Standard Method 503E.

NA: Not Analyzed.

ND: Below the detection limit; see laboratory data sheets for detection limits.

TABLE 2  
 CUMULATIVE RESULTS OF LABORATORY ANALYSIS OF WATER SAMPLES  
 ARCO Station 4494  
 566 Hegenberger Road  
 Oakland, California  
 (Page 2 of 2)

<u>Well</u> Date	BNA's	VOC's	Total Cadmium	Chromium	Lead	Zinc
<u>MW-1</u>						
06/19/90	ND	ND	0.024	ND	0.10	0.049
08/16/90	NA	NA	NA	NA	NA	NA
11/29/90	NA	NA	NA	NA	NA	NA
<u>MW-3</u>						
08/16/90	ND	ND	ND	0.06	0.07	0.07
11/29/90	NA	NA	NA	NA	NA	NA
<u>MW-4</u>						
08/16/90	ND	ND	ND	ND	ND	0.03
11/29/90	NA	NA	NA	NA	NA	NA
DWALs/MCLs	—	—	0.010	0.05	0.05	NE

Results in milligrams per liter (mg/l), or parts per million (ppm).

NA: Not Analyzed.

ND: Below the detection limit; see laboratory data sheets for detection limits.

DWALs: Drinking Water Action Levels (California Department of Health Services, Office of Drinking Water, October 1990).

MCLs: Maximum Contaminant Levels (California Department of Health Services, Office of Drinking Water, October 1990).

NE: No established DWAL or MCL.



**APPENDIX A**

**Ground-Water Sampling Protocol**

## 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 product sheen.

The static water level in each well that was suspected to contain floating product was measured with an ORS® interface probe; this instrument is accurate to the nearest 0.01 foot. The probe contains two different sensor units, one for detecting the liquid/air interface, and one for distinguishing between water and hydrocarbon. The thickness of the floating product and the ground-water depths were recorded. The recorded thickness of the floating product was then multiplied by 0.80 to obtain an approximate value for the displacement of water by the floating product. This approximate displacement value is then subtracted from the measured depth to water to obtain a calculated depth to water. These calculated ground-water depths were subtracted from wellhead elevations measured by Ron Archer, Civil Engineer, Inc., of Pleasanton, California, a licensed land surveyor, to calculate the differences in ground-water elevations.

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. 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

$$\frac{\text{gallons of water purged}}{\text{gallons in 1 well casing volume}} = \text{well casing volumes removed.}$$

After purging, each well was allowed to recharge to at least approximately 80% of the 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 4494**

**Job No. 69038-4**

**Date: 11/29/90**

**Page 1 of 1**

**Well No. MW-1**

**Time Started 2:45**

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromhos)
2:45	Begin pumping well MW-1			
2:50	5	64.5	7.77	16.65
3:07	10	66.6	7.96	13.33
3:24	15	67.3	7.84	12.93
3:35	20	65.7	7.94	12.66
3:50	25	64.5	7.90	12.34
4:05	30	64.2	7.91	12.35
4:20	35	63.4	7.96	11.96
4:25	37	62.9	8.05	11.60
4:26	Well dry, stop pumping.			

**Notes:**

Depth to Bottom (feet) : 23.35  
 Depth to Water - initial (feet) : 7.40  
 Depth to Water - final (feet) : 7.65  
                                   % recovery : 98.4  
                                   Time Sampled : 5:45  
 Gallons per Well Casing Volume : 41.47  
                                   Gallons Purged : 37.0  
                                   Well Casing Volumes Purged : 0.89  
 Approximate Pumping Rate (gpm) : 0.38

**WELL PURGE DATA SHEET**

**Project Name:** ARCO 4494

**Job No.** 69038-4

**Date:** 11/29/90

**Page** 1 **of** 1

**Well No.** MW-3

**Time Started** 1:00

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromhos)
1:00	Begin pumping well MW-3			
1:05	1	69.0	8.01	6.62
1:15	5	68.6	7.91	8.19
1:22	10	67.4	7.88	8.21
1:29	15	66.1	7.72	8.18
1:35	20	65.2	7.64	8.17
1:45	25	65.2	7.40	9.20
1:55	30	67.3	7.41	9.36
2:00	35	66.3	7.39	9.09
2:05	40	67.3	7.38	9.21
2:16	45	65.7	7.38	9.12
2:25	50	66.6	7.40	9.34
2:30	55	66.4	7.41	9.28
2:31	Stop pumping.			

**Notes:**

Depth to Bottom (feet) : 18.05  
 Depth to Water - initial (feet) : 9.00  
 Depth to Water - final (feet) : 9.05  
                                   % recovery : 99.4  
                                   Time Sampled : 4:45  
 Gallons per Well Casing Volume : 23.4  
                                   Gallons Purged : 55.0  
                                   Well Casing Volumes Purged : 2.35  
 Approximate Pumping Rate (gpm) : 0.60

**WELL PURGE DATA SHEET**

**Project Name:** ARCO 4494

**Job No.** 69038-4

**Date:** 11/29/90

**Page** 1 **of** 1

**Well No.** MW-4

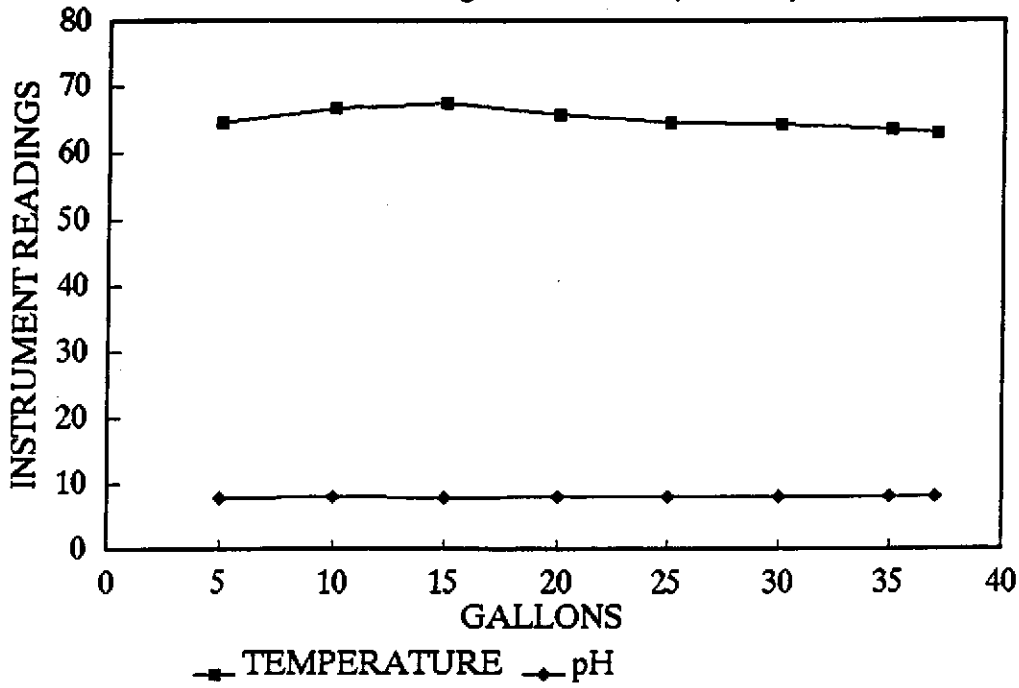
**Time Started** 3:15

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromhos)
3:15	Begin pumping well MW-4			
3:18	5	66.3	7.64	7.85
3:21	10	67.5	7.62	7.12
3:23	15	67.4	8.04	7.06
3:24	Well dry, wait for recovery			
3:38	20	65.8	7.56	7.20
3:43	25	66.9	7.96	7.20
3:44	Well dry, wait for recovery			
4:07	30	66.8	7.69	7.48
4:10	37	65.1	7.82	7.28
2:31	Stop pumping.			

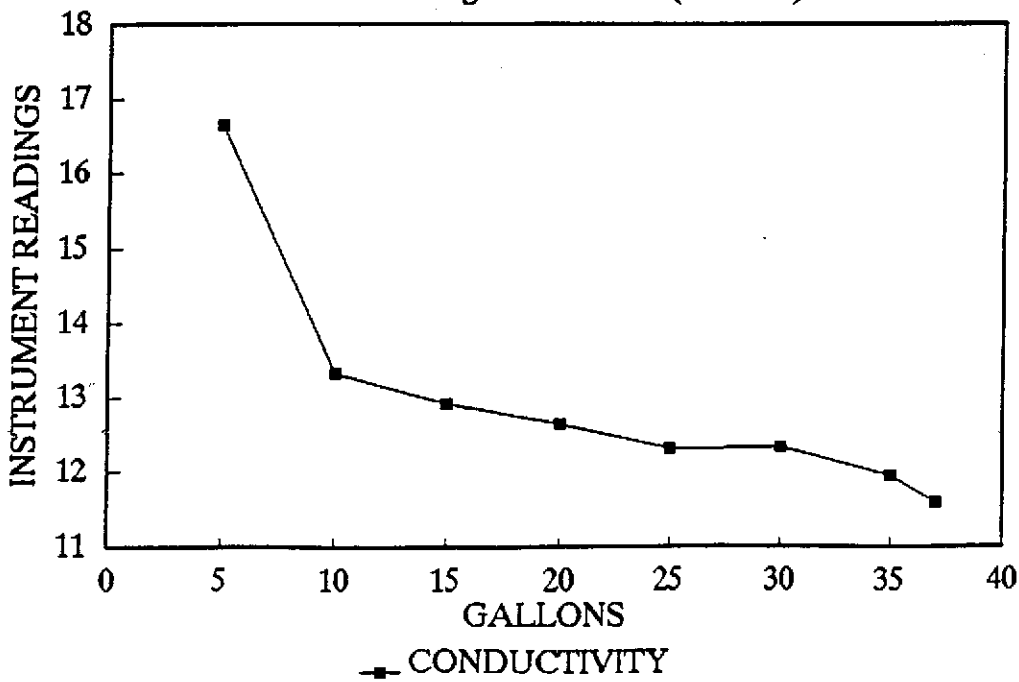
**Notes:**

Depth to Bottom (feet) : 18.24  
 Depth to Water - initial (feet) : 8.53  
 Depth to Water - final (feet) : 8.75  
                                   % recovery : 97.7  
                                   Time Sampled : 5:15  
 Gallons per Well Casing Volume : 25.25  
                                   Gallons Purged : 37.0  
                                   Well Casing Volumes Purged : 1.46  
                                   Approximate Pumping Rate (gpm) : 0.31

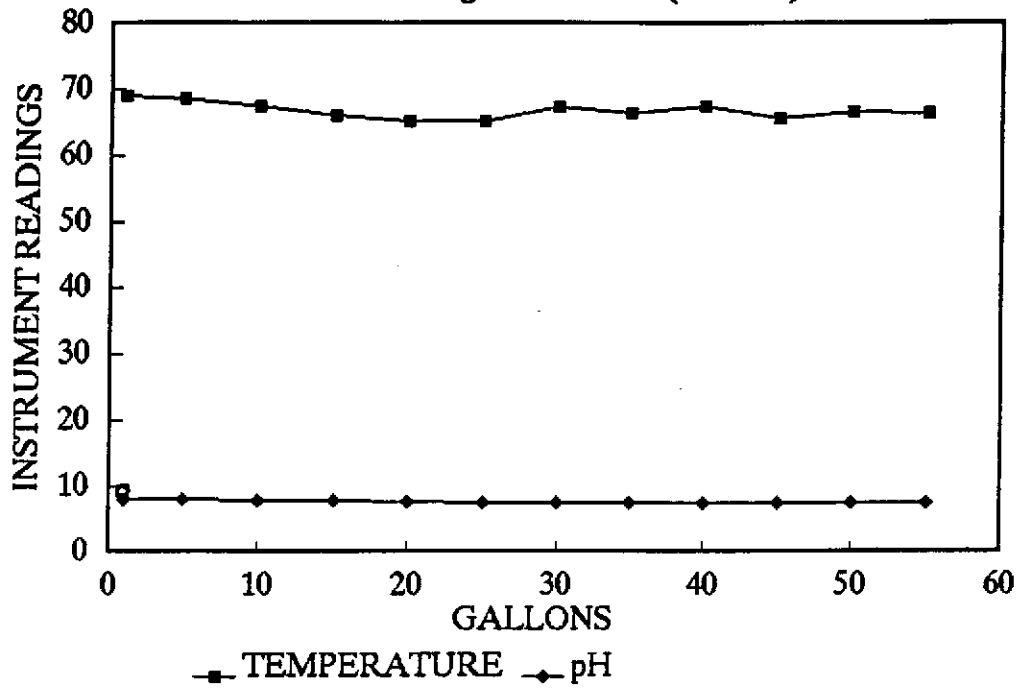
ARCO 4494 STABILIZATION GRAPH  
Monitoring Well MW-1 (11/29/90)



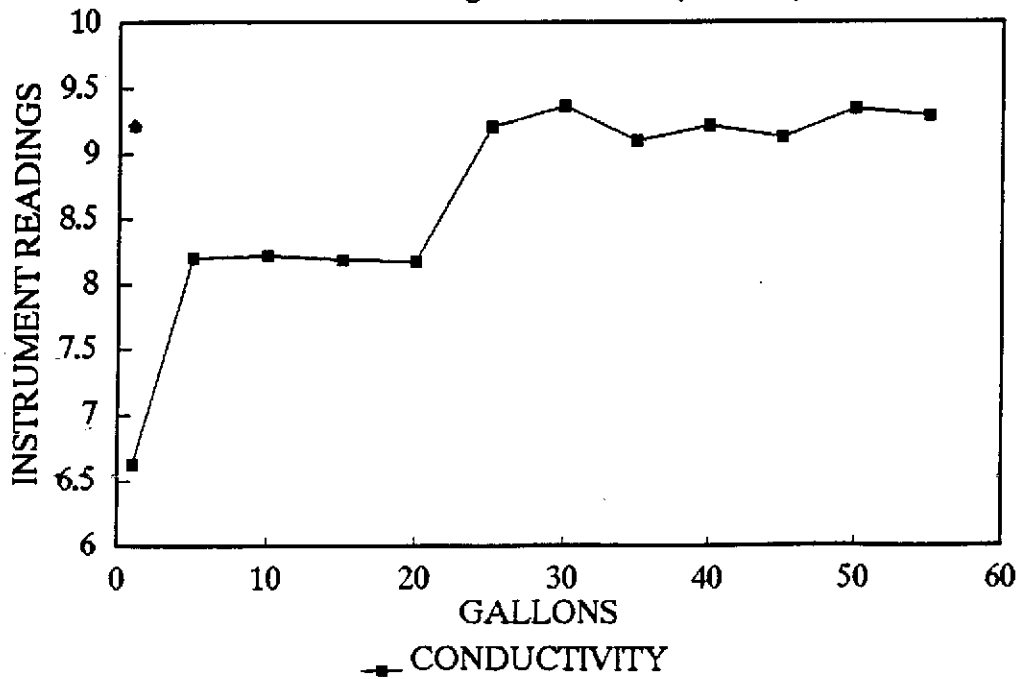
ARCO 4494 STABILIZATION GRAPH  
Monitoring Well MW-1 (11/29/90)



ARCO 4494 STABILIZATION GRAPH  
Monitoring Well MW-3 (11/29/90)

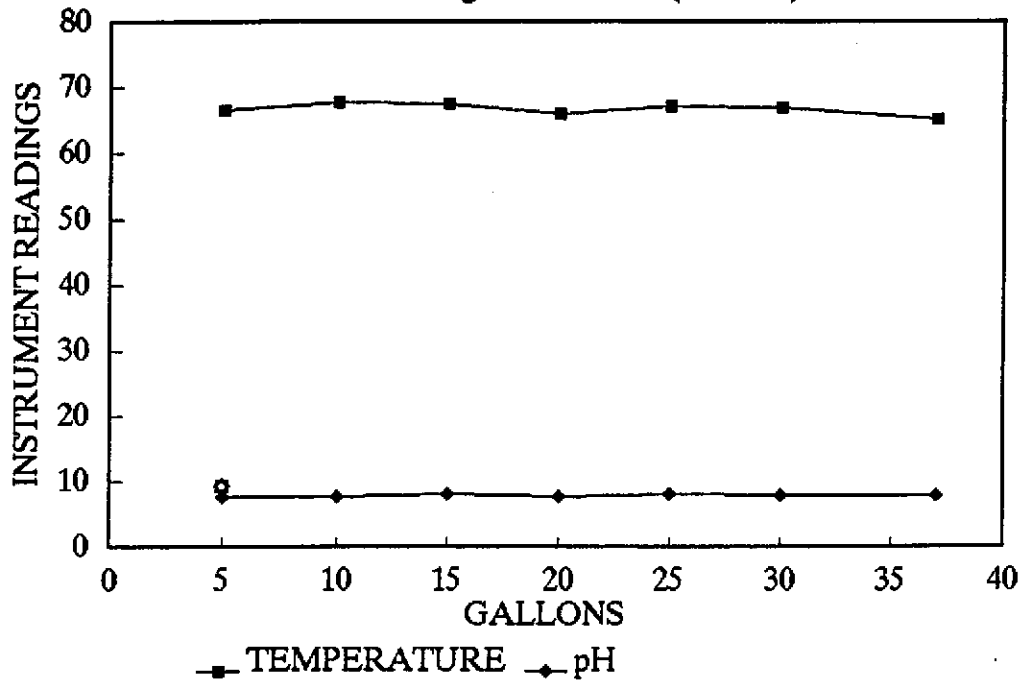


ARCO 4494 STABILIZATION GRAPH  
Monitoring Well MW-3 (11/29/90)

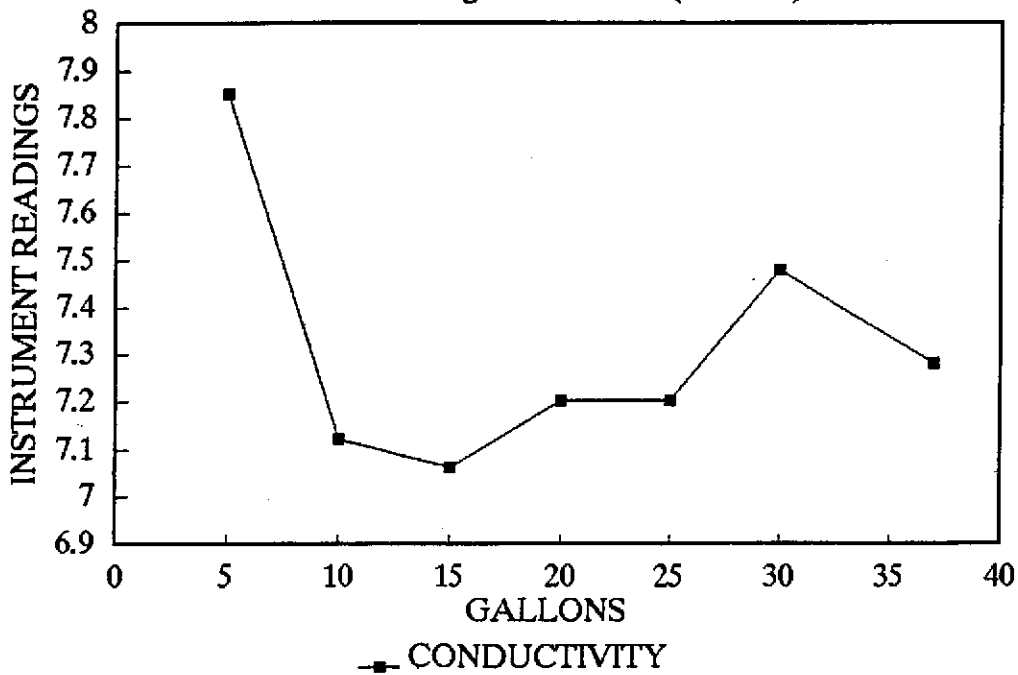




ARCO 4494 STABILIZATION GRAPH  
Monitoring Well MW-4 (11/29/90)



ARCO 4494 STABILIZATION GRAPH  
Monitoring Well MW-4 (11/29/90)





# APPLIED ANALYTICAL

## Environmental Laboratories

42501 Albrae St., Suite 100  
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### ANALYSIS REPORT

Attention: Mr. Mike Barminski  
Applied GeoSystems  
3315 Almaden Expressway  
San Jose, CA 95118  
Project: AGS 69038-4

Date Sampled: 11-29-90  
Date Received: 11-30-90  
BTEX Analyzed: 12-06-90  
TPHg Analyzed: 12-06-90  
TPHd Analyzed: NR  
Matrix: Water

1020lab.frm

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
Detection Limit:	<u>ppb</u> 0.5	<u>ppb</u> 0.5	<u>ppb</u> 0.5	<u>ppb</u> 0.5	<u>ppb</u> 50	<u>ppb</u> 100

#### SAMPLE

#### Laboratory Identification

W-9-MW3 W1011459	ND	ND	ND	ND	ND	NR
W-9-MW4 W1011460	ND	ND	ND	ND	ND	NR
W-8-MW1 W1011458	ND	0.7	ND	ND	ND	NR

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

December 12, 1990

Date Reported