Applied GeoSystems, Inc.
A RESNA Company

RESNA
Working To Restore Nature

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LETTER REPORT
QUARTERLY GROUND-WATER MONITORING
Second Quarter 1991
at
ARCO Station 4494
566 Hegenberger Road
Oakland, California

9/12/91

69038.04

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September 12, 1991
0713ccar
69038.04

Mr. Chuck Carmel
ARCO Products Company
2000 De Las Pulgas, Suite 222
San Mateo, California 94402

Subject: Second Quarter 1991 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 second quarter 1991 ground-water monitoring performed by RESNA/Applied GeoSystems (RESNA) 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 RESNA 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. ARCO has also requested that RESNA perform monthly monitoring of ground-water levels in the wells at the site and evaluate fluctuations in the ground-water gradient and flow direction over time.

Prior to the present monitoring, Pacific Environmental Group (Pacific) and RESNA performed limited subsurface environmental investigations related to the former underground waste-oil storage tank and existing gasoline-storage tanks at the site. On December 16, 1989, Pacific performed soil sampling and observation during removal of the waste-oil tank and excavation of the soil by Crosby & Overton (Pacific, May 3, 1989). In October 1989, RESNA performed a site history and records review and a limited subsurface environmental investigation at the site, which included installation of two 4-inch ground-water monitoring wells (MW-1 and MW-2) (Applied GeoSystems, October 1, 1990). On August 10, 1990, RESNA performed a limited subsurface environmental investigation, which included installation of two additional 4-inch ground-water monitoring wells (MW-3 and MW-4) and one additional soil boring (B-5) (Applied GeoSystems, February 13, 1991). 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

RESNA personnel performed monitoring of depth-to-water (DTW) levels and subjective analyses of water samples from the wells on May 2, 1991 and quarterly ground-water monitoring and sampling on June 27, 1991. 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; removing floating product as necessary; and purging well MW-2 to remove product sheen and ground water; and purging and sampling ground water from the monitoring wells for laboratory analysis. The ground-water sampling protocol is attached in Appendix A.

The DTW levels, wellhead elevations, and ground-water elevations for this and previous monitoring episodes at the site are summarized in the Cumulative Ground-Water Monitoring Data, Table 1. The ground-water gradients interpreted from the May and June 1991 monitoring data were approximately 0.01 to 0.02 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.

Water samples were collected from wells MW-1 through MW-4 for subjective analysis before the monitoring wells were purged and sampled. Subjective analyses of water samples from well MW-2 indicated product odor and sheen during this quarter; product sheen was subsequently removed from the well. No evidence of petroleum product was observed in water samples collected from wells MW-1, MW-3, and MW-4 during this quarter.

Monitoring wells MW-1, MW-3, and MW-4 were purged and sampled on June 27, 1991, in accordance with the attached protocol. Well MW-2 was not sampled due to the presence of product sheen. Well purge data sheets for the parameters monitored and stabilization graphs for each well sampled are attached in Appendix A.

Laboratory Analysis

Water samples collected from the wells were delivered under Chain of Custody protocol to Sequoia Analytical in Redwood City, California (Hazardous Waste Testing Laboratory No. 145). 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

5030/8015/8020. The Chain of Custody Records and Laboratory Analysis Reports are attached in 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:

- nondetectable levels of TPHg and BTEX in wells MW-1 and MW-3;
- 0.75 parts per billion (ppb) benzene, 1.1 ppb toluene, 1.6 ppb xylenes, and nondetectable levels of TPHg were reported in well MW-4 for the first time; and
- product sheen in well MW-2.

Product Removal

Product sheen was removed from well MW-2 during monthly and quarterly monitoring episodes. Quantities of floating product and water removed from previous monitoring episodes are presented in Approximate Cumulative Product Recovered, Table 3. The total year-to-date recovered product is approximately 0.3 gallons; the total cumulative recovered product for the site is approximately 8.8 gallons.

Conclusions and Recommendations

Low levels of petroleum hydrocarbons were detected in well MW-4 for the first time since ground-water monitoring was initiated at this site in August 1990. This well is generally upgradient of the underground storage tanks at the site. The amount of floating product in well MW-2 has decreased to a sheen since monthly removal was implemented in November 1990. First ground water in the areas of wells MW-1 and MW-3 has not been impacted by petroleum hydrocarbons, as indicated by reported nondetectable concentrations of TPHg and BTEX during this sampling episode and reported nondetectable concentrations of TPHg, BTEX (with the exception of 0.7 toluene reported during November 1990), TPHd, and TOG during previous monitoring episodes between June 1990 and November 1990. All wells have remained within regulatory limits.

RESNA recommends 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

RESNA 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 September 23, 1991.

It is recommended that copies of this report be forwarded to:

Mr. Barney Chan
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
2101 Webster Street, Suite 500
Oakland, California 94612

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

Sincerely,
RESNA/Applied GeoSystems

L. J. Leet
Lou Leet
Geologic Technician

Joan E. Tiernan
Registered Civil
Engineer 044600

cc: H.C. Winsor, ARCO Products Company

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Ground-Water Gradient Map, May 2, 1991
Plate 4, Ground-Water Gradient Map, June 28, 1991
Plate 5, TPHg/Benzene Concentration Map, June 28, 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
Stabilization Graphs
Chain of Custody Record
Laboratory Analysis Report
Uniform Hazardous Waste Manifest

REFERENCES

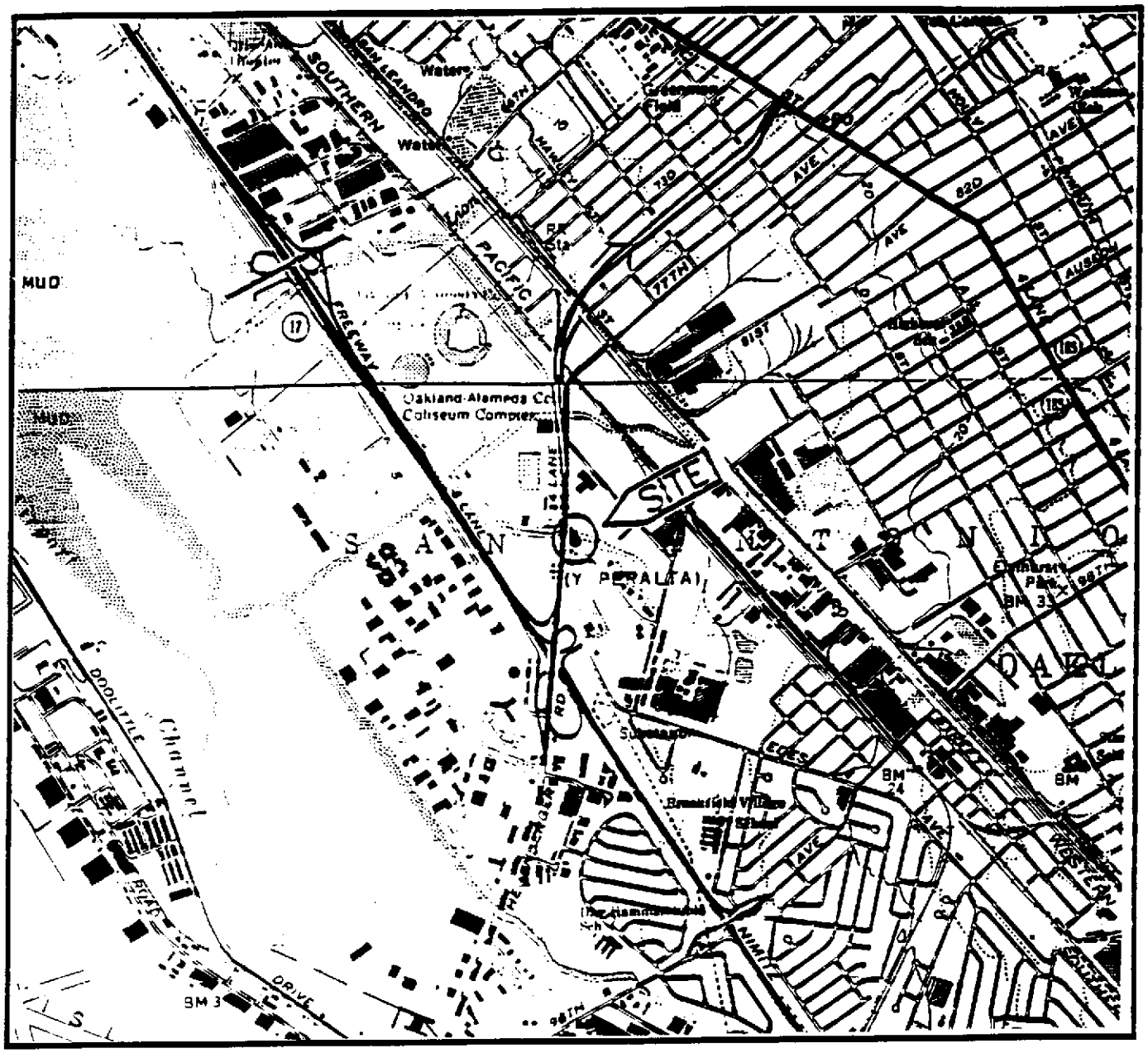
Applied GeoSystems. April 30, 1991. Letter Report on First Quarter 1991 Ground-Water Monitoring at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-4.

Applied GeoSystems. February 13, 1991. Limited Subsurface Environmental Investigation at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-2.

Applied GeoSystems. February 8, 1991. Letter Report on Fourth Quarter 1990 Ground-Water Monitoring at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-4.

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

N

Approximate Scale

2000 1000 0 2000 4000

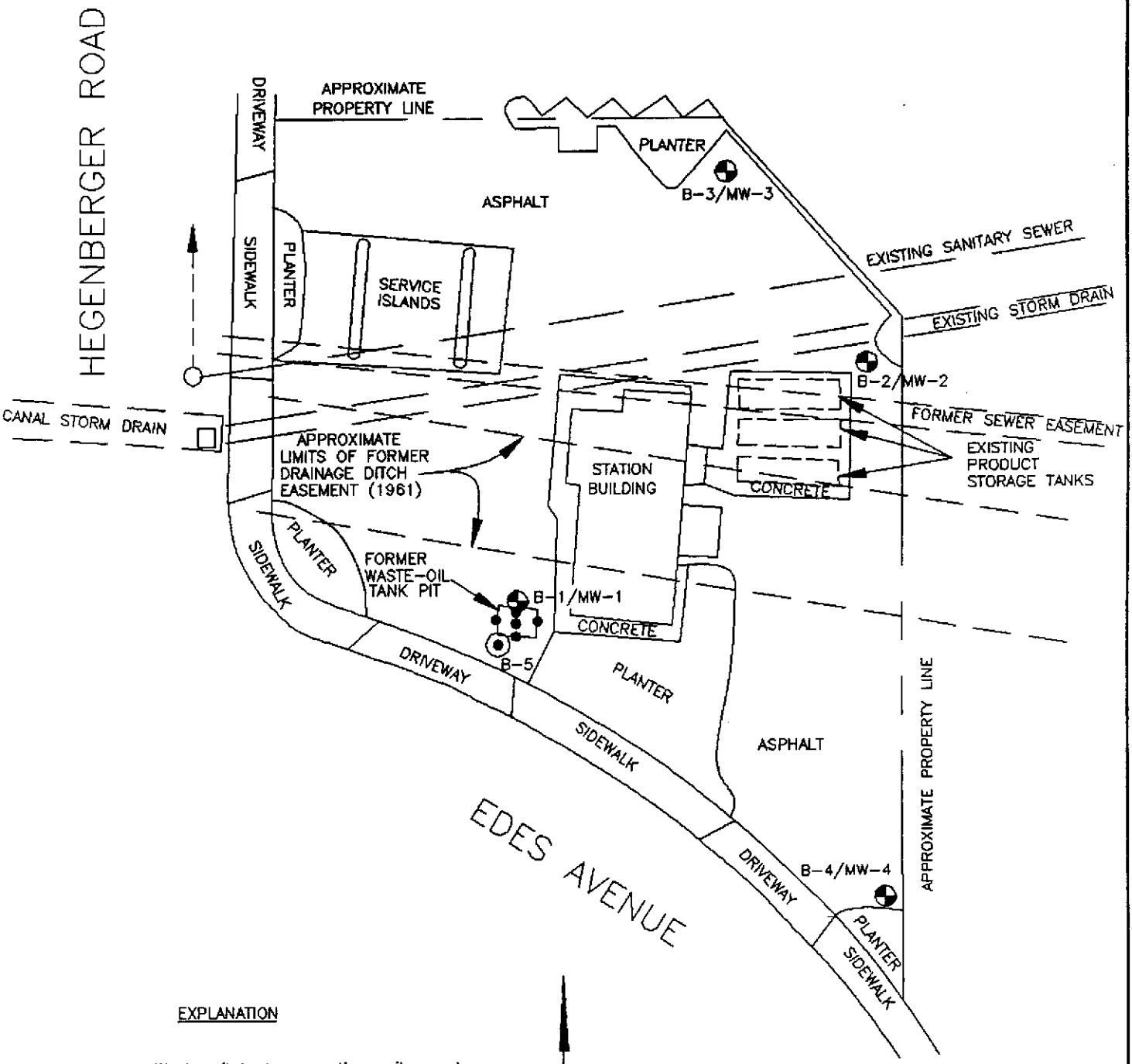
feet

Applied GeoSystems

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)

N

Approximate Scale

40 20 0 40 80

feet

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).

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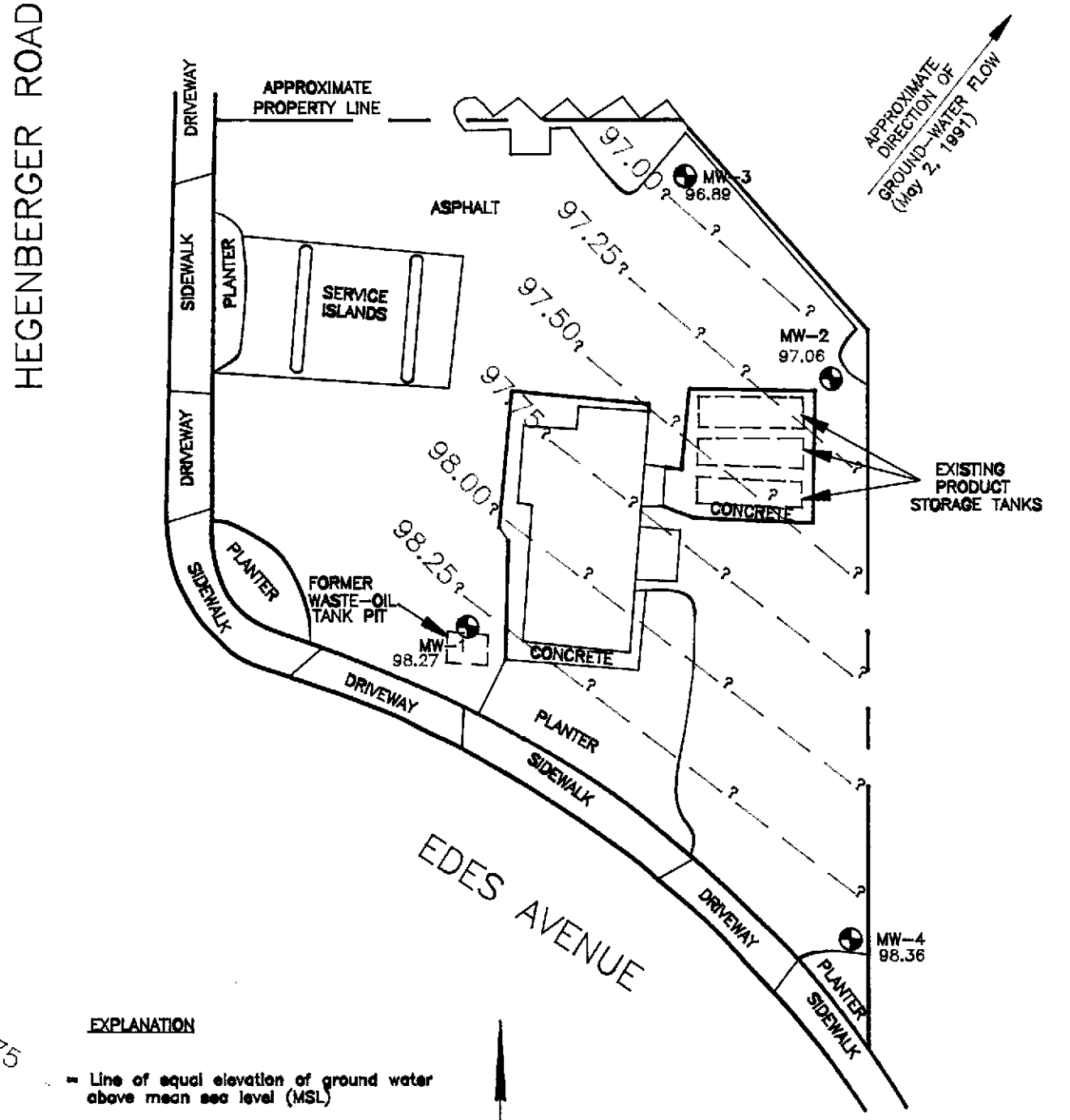
PROJECT 69038-4

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

PLATE 2



98.75 EXPLANATION

98.75 = Line of equal elevation of ground water above mean sea level (MSL)

98.36 = Elevation of ground water in feet (MSL), May 2, 1991

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, 1961).

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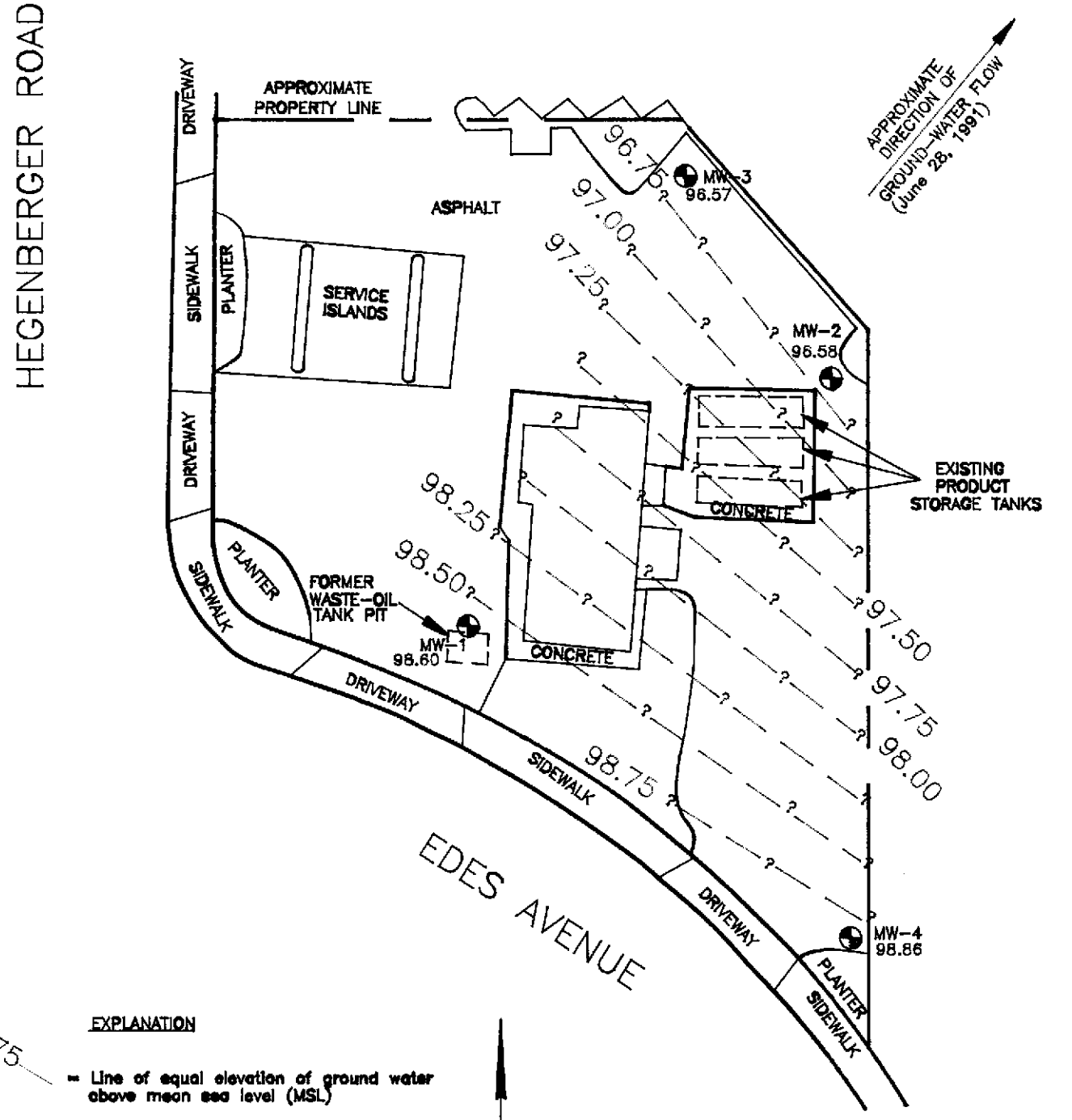
PROJECT 69038-4

GROUND-WATER GRADIENT MAP
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 3



EXPLANATION

98.75 — = Line of equal elevation of ground water above mean sea level (MSL)

98.86 = Elevation of ground water in feet (MS), June 28, 1991

MW-4 = Monitoring well (Applied GeoSystems, October 1989 and August 1990)

Approximate Scale

40 20 0 40 80

feet

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).

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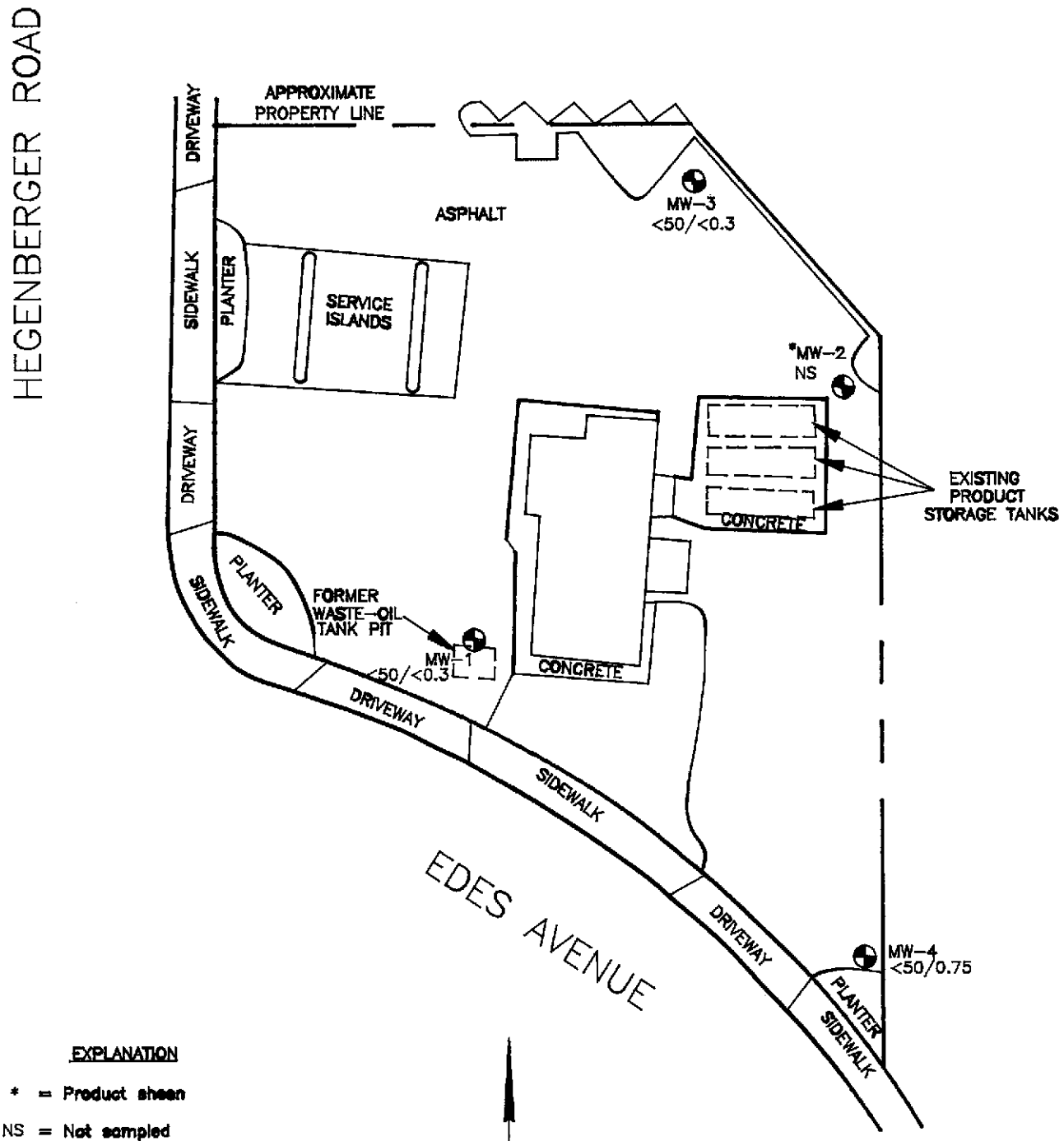
PROJECT 69038-4

GROUND-WATER GRADIENT MAP

ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 4



EXPLANATION

* = Product sheen

NS = Not sampled

<50/0.75 = Concentration of TPHg/Benzene in ground water, in ppb, June 28, 1991

MW-4 = Monitoring well (Applied GeoSystems, October 1989 and August 1990)

Approximate Scale

40 20 0 40 80

feet

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).

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PROJECT 69038-4

CONCENTRATION OF TPHg/BENZENE IN GROUND WATER
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 5

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

Well / Date	Elevation of Wellhead	Depth to Water	Water Elevation	Product Evidence
MW-1				
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
01/29/91		7.23	98.08	None
02/27/91		7.45	97.86	None
03/07/91		6.96	98.35	None
03/26/91		6.02	99.29	None
05/02/91		7.04	98.27	None
06/27/91		6.71	98.60	None
MW-2				
06/06/90	105.78	9.00*	96.78*	11" of Black Product
08/16/90		NM	NM	2" of Black Product
08/21/90		NM	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
01/29/91		9.01	96.77	Sheen
02/27/91		9.14	96.64	Sheen
03/07/91		8.94	96.84	Sheen
03/26/91		8.11	97.67	Sheen
05/02/91		8.72	97.06	Odor
06/27/91		9.20	96.58	Sheen
MW-3				
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
01/29/91		8.96	96.55	None
02/27/91		8.71	96.80	None
03/07/91		8.49	97.02	None
03/26/91		7.65	97.86	None
05/02/91		8.62	96.89	None
06/27/91		8.94	96.57	None

See notes on page 2 of 2.

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

Well 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
01/29/91		8.66	97.95	None
02/27/91		8.44	98.17	None
03/07/91		8.18	98.43	None
03/26/91		7.56	99.05	None
05/02/91		8.25	98.36	None
06/27/91		7.75	98.86	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
Oakland, California
(Page 1 of 2)

Well / Date	TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG
MW-1							
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
03/07/91	ND	NA	ND	ND	ND	ND	NA
06/27/91	ND	NA	ND	ND	ND	ND	NA
MW-3							
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
03/07/91	ND	NA	ND	ND	ND	ND	NA
06/26/91	ND	NA	ND	ND	ND	ND	NA
MW-4							
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
03/07/91	ND	NA	ND	ND	ND	ND	NA
06/26/91	ND	NA	0.75	1.1	ND	1.6	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
Oakland, California
(Page 2 of 2)

Well / Date	BNAs	VOCs	Total Cadmium	Chromium	Lead	Zinc
MW-1						
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
03/07/91	NA	NA	NA	NA	NA	NA
06/27/91	NA	NA	NA	NA	NA	NA
MW-3						
08/16/90	ND	ND	ND	0.06	0.07	0.07
11/29/90	NA	NA	NA	NA	NA	NA
03/07/91	NA	NA	NA	NA	NA	NA
06/27/91	NA	NA	NA	NA	NA	NA
MW-4						
08/16/90	ND	ND	ND	ND	ND	0.03
03/07/91	NA	NA	NA	NA	NA	NA
11/29/90	NA	NA	NA	NA	NA	NA
03/07/91	NA	NA	NA	NA	NA	NA
06/27/91	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. The purge water is removed by H & H Ship Services Company. The Uniform Hazardous Waste Manifest is attached.

Wells with evidence of free product including floating product, emulsion, or sheen will not be sampled . These wells will have the free product removed with at least one well volume of water and the total volume removed will be hauled and disposed of by a contracted licensed waste hauler/disposer.

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. The purge water was removed by H & H Ship Service Company. The Uniform Hazardous Waste Manifest is attached.

WELL PURGE DATA SHEET

Project Name: ARCO 4494 Job No. 69038.04

Date: June 27, 1991 Page 1 of 1

Well No. MW-1 Time Started 12:12

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromho)
12:12	Begin purging MW-1			
12:20	10	71.1	7.62	off scale
12:33	20	72.1	7.31	12.51
12:45	30	73.0	7.39	12.55
1:03	40	74.6	7.43	12.65
1:17	50	77.0	7.59	12.12
1:27	59	Stop purging MW-1, well dewatered		

Notes:

Depth to Bottom (feet) :	23.1
Depth to Water - initial (feet) :	6.71
Depth to Water - final (feet) :	6.95
% recovery :	98%
Time Sampled :	3:30
Gallons per Well Casing Volume :	15.4
Gallons Purged :	59.0
Well Casing Volumes Purged :	3.8
Approximate Pumping Rate (gpm) :	0.79

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WELL PURGE DATA SHEET

Project Name: ARCO 4494 Job No. 69038.04

Date: June 27, 1991 Page 1 of 1

Well No. MW-3 Time Started 9:44

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromho)
9:45	Begin purging MW-3			
9:46	0.5	67.2	7.17	off scale
9:50	5.0	68.7	7.73	5.43
10:01	10	69.6	7.53	6.45
10:10	15	69.9	7.54	6.73
10:17	20	70.5	7.56	6.61
10:27	25	69.9	7.53	6.81
10:34	30	69.2	7.54	6.87
10:41	35	67.5	7.58	6.86
10:52	40	67.6	7.69	6.82
11:02	45	66.9	7.73	6.86
11:12	50	67.3	NA	6.82
	Stop purging MW-3			

Notes:

Depth to Bottom (feet)	:	17.8
Depth to Water - initial (feet)	:	8.94
Depth to Water - final (feet)	:	8.90
% recovery	:	100%
Time Sampled	:	3:00
Gallons per Well Casing Volume	:	8.3
Gallons Purged	:	65.0
Well Casing Volumes Purged	:	7.8
Approximate Pumping Rate (gpm)	:	0.56

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WELL PURGE DATA SHEET

Project Name: ARCO 4494 Job No. 69038.04

Date: June 27, 1991 Page 1 of 1

Well No. MW-4 Time Started 8:53

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromho)
8:53	Begin purging MW-4			
8:54	0.3	68.0	7.02	off scale
8:57	5.0	67.9	7.29	off scale
9:00	10.0	67.8	7.18	7.77
9:04	15.0	67.2	7.30	7.81
9:11	20.0	66.8	7.37	7.78
9:17	25.0	66.6	7.43	7.71
9:24	29.0	Stopped purging MW-4		

Notes:

Depth to Bottom (feet)	:	17.90
Depth to Water - initial (feet)	:	7.75
Depth to Water - final (feet)	:	7.92
% recovery	:	98.0%
Time Sampled	:	2:45
Gallons per Well Casing Volume	:	9.5
Gallons Purged	:	29.0
Well Casing Volumes Purged	:	3.1
Approximate Pumping Rate (gpm)	:	

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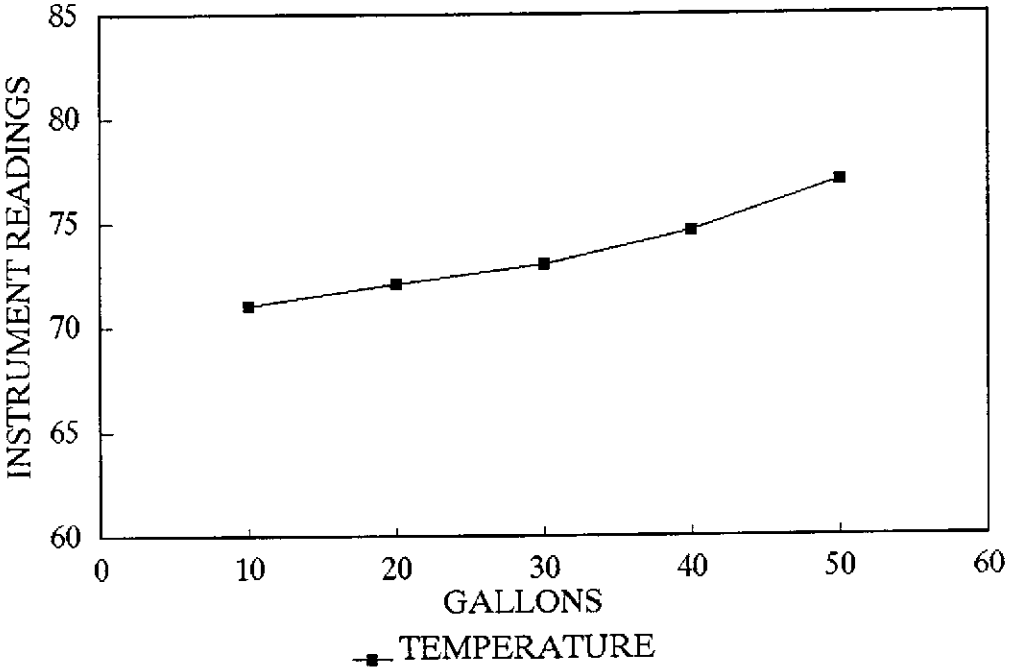
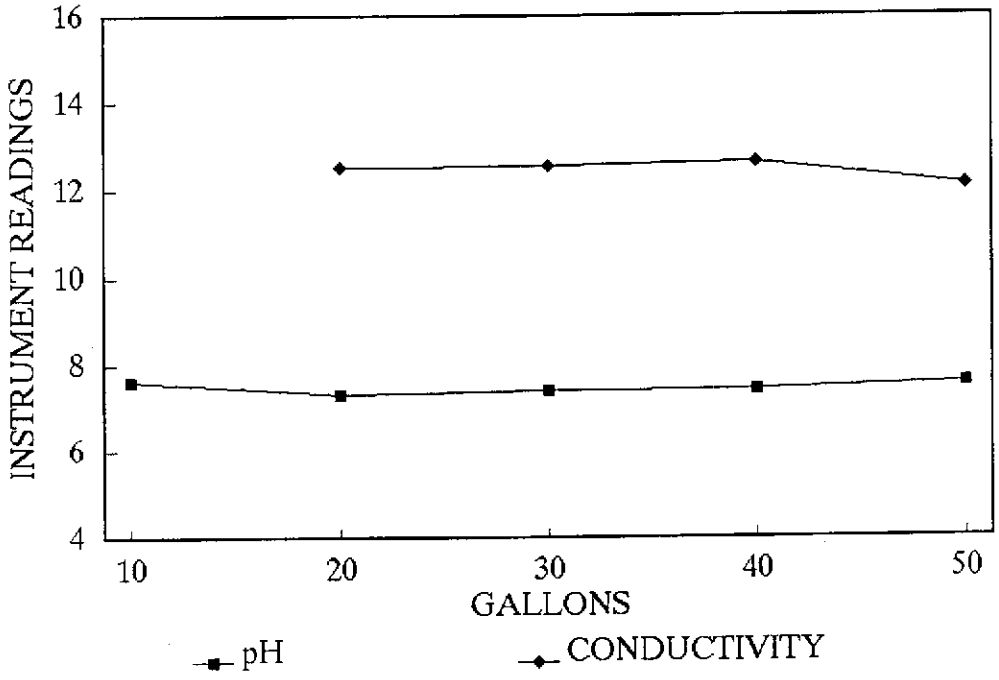
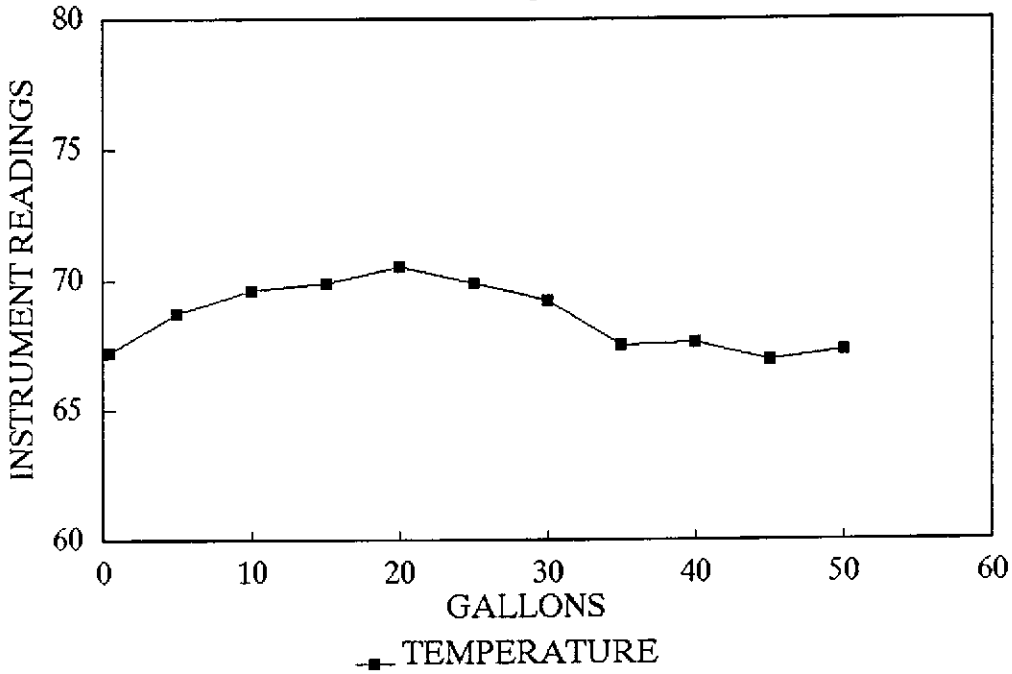
ARCO 4494 STABILIZATION GRAPH
Ground–Water Monitoring Well MW–1 (June 27, 1991)



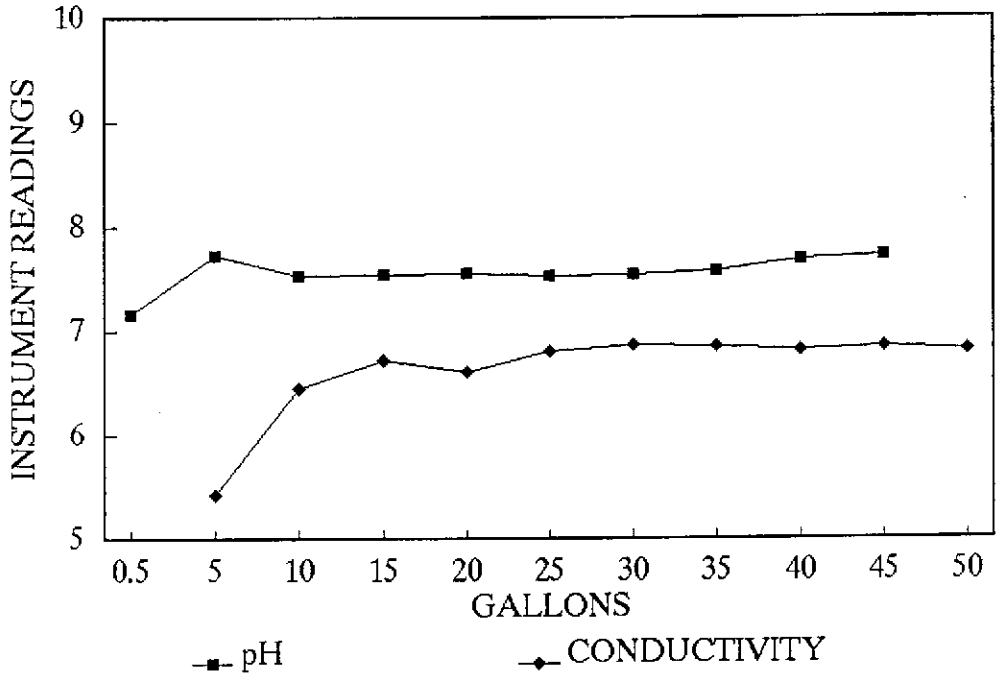
ARCO 4494 STABILIZATION GRAPH
Ground–Water Monitoring Well MW–1 (June 27, 1991)



ARCO 4494 STABILIZATION GRAPH
Ground–Water Monitoring Well MW–3 (June 27, 1991)

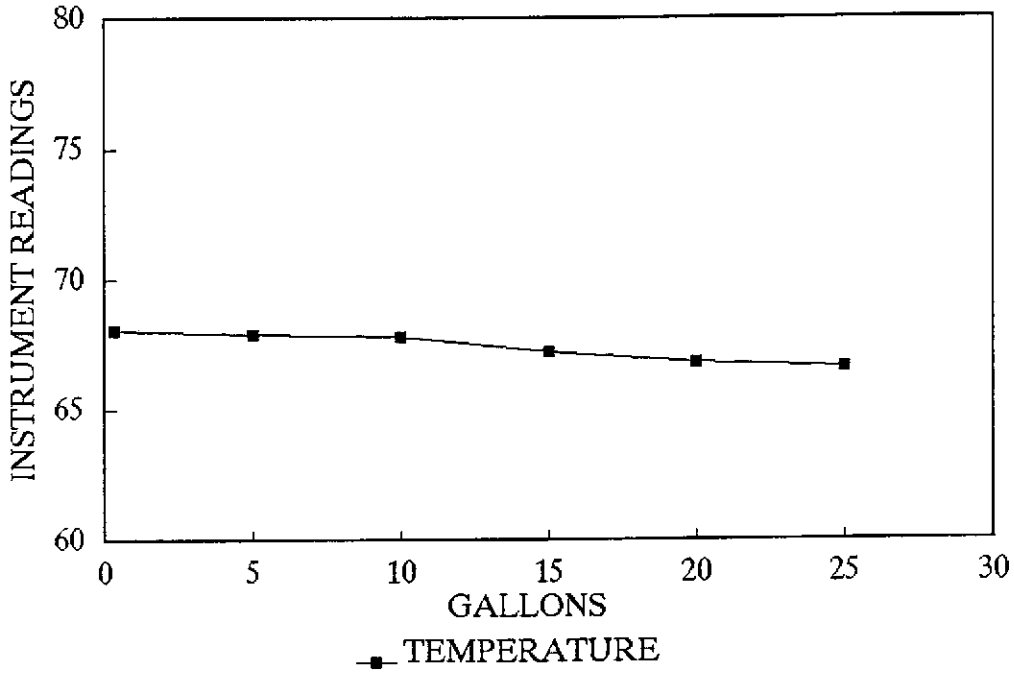


ARCO 4494 STABILIZATION GRAPH
Ground–Water Monitoring Well MW–3 (June 27, 1991)

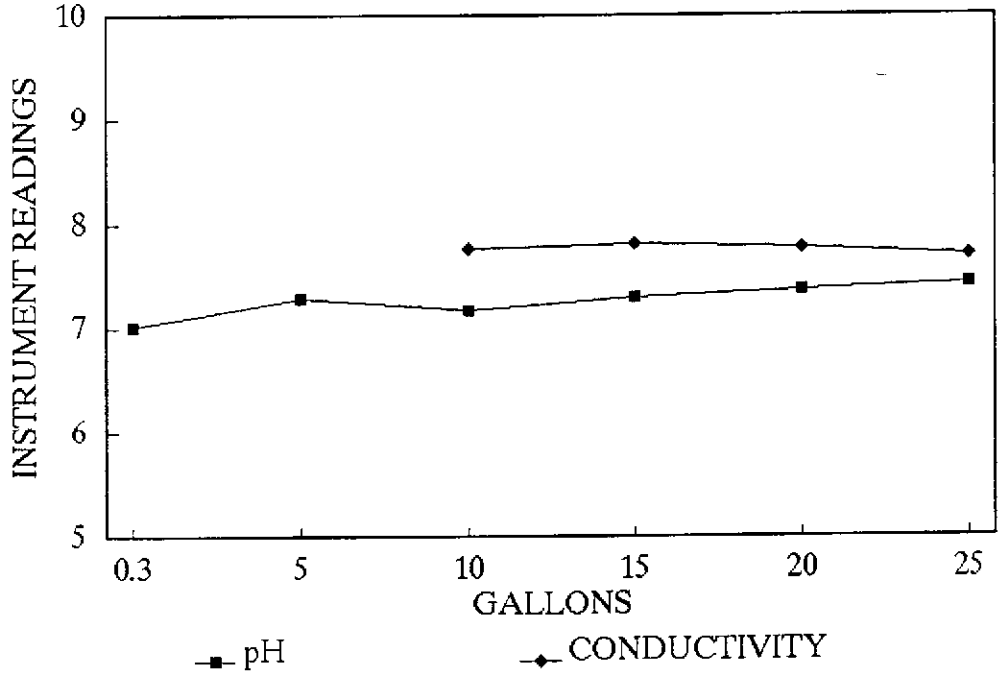


RESNA

ARCO 4494 STABILIZATION GRAPH
Ground–Water Monitoring Well MW–4 (June 27, 1991)



ARCO 4494 STABILIZATION GRAPH
Ground–Water Monitoring Well MW–4 (June 27, 1991)



ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 4494-90-3

Chain of Custody

ARCO Facility no. 4494	City (Facility) OAKLAND	Project manager (Consultant) JOEL COFFMAN	Laboratory name SEQUOIA
ARCO engineer CHUCK CARMEL	Telephone no. (ARCO)	Telephone no. (Consultant) 408-264-7723	Fax no. (Consultant) 408-264-2435
Consultant name APPLIED GEOSYSTEMS	Address (Consultant) 3315 ALMADEN EXPRESSWAY, SUITE 34, SAN JOSE, CA		Contract number 07-073

Method of shipment: SEQUOIA FIELD TECH

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	
W-7-MW1		4		X		X	X	6-27-91	3:30		X					1624	1625		91		
W-9-MW3		4		X		X	X	6-27-91	3:00		X						↓		92		
W-8-MW4		4		X		X	X	6-27-91	2:45		X								93		
FIELD BLANK		1		X		X		6-27-91	2:30	HOLD											

Special detection Limit/reporting

Special QA/QC

Remarks: JOB NO. 69038.04

Lab number

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample: good		Temperature received: Cool	
Relinquished by sampler: L. J. Leet	Date 6-28-91 Time 310PM	Received by: Craig C. Lum 6/28/91 310 PM	
Relinquished by: Craig Lum	Date 6/28/91 Time 436PM	Received by:	
Relinquished by:	Date Time	Received by laboratory: Beth Thompson	Date 6/28/91 Time 1636

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

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

Applied GeoSystems
3315 Almaden Expressway, Ste 34
San Jose, CA 95118
Attention: Joel Coffman

Project: ARCO 4494, Oakland

Enclosed are the results from 3 water samples received at Sequoia Analytical on June 28,1991. The requested analyses are listed below:

1064391	Water, W-7-MW1	6/28/91	EPA 5030/8015/8020
1064392	Water, W-9-MW3	6/28/91	EPA 5030/8015/8020
1064393	Water, W-8-MW4	6/28/91	EPA 5030/8015/8020

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

Very truly yours,

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

SEQUOIA ANALYTICAL

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

Applied GeoSystems	Client Project ID:	ARCO 4494, Oakland	Sampled:	Jun 28, 1991
3315 Almaden Expressway, Ste 34	Matrix Descript:	Water	Received:	Jun 28, 1991
San Jose, CA 95118	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Jul 1, 1991
Attention: Joel Coffman	First Sample #:	106-4391	Reported:	Jul 10, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
106-4391	W-7-MW1	N.D.	N.D.	N.D.	N.D.	N.D.
106-4392	W-9-MW3	N.D.	N.D.	N.D.	N.D.	N.D.
106-4393	W-8-MW4	N.D.	0.75	1.1	N.D.	1.6
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

SEQUOIA ANALYTICAL

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

Applied GeoSystems
3315 Almaden Expressway, Ste 34
San Jose, CA 95118
Attention: Joel Coffman

Client Project ID: ARCO 4494, Oakland

QC Sample Group: 1064391-4393

Reported: Jul 10, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	L. Laikhtman	L. Laikhtman	L. Laikhtman	L. Laikhtman
Reporting Units:	ng	ng	ng	ng
Date Analyzed:	Jul 1, 1991	Jul 1, 1991	Jul 1, 1991	Jul 1, 1991
QC Sample #:	GBLK 070191	GBLK 070191	GBLK 070191	GBLK 070191
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	100	100	100	300
Conc. Matrix Spike:	100	100	100	310
Matrix Spike % Recovery:	100	100	100	100
Conc. Matrix Spike Dup.:	100	100	100	310
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	0.0	0.0	0.0	0.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

IN CASE OF AN EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA CALL 1-800-852-7550

GENERATOR

3. Generator's Name and Mailing Address		4. Generator's EPA ID No.
ARCO P. O. Box 9611, San Mateo, CA 94402		
5. Generator's Phone (415) 571-2420		
6. Transporter 1 Company Name	6. US EPA ID Number	
H & H Ship Service Company	C A D 0 0 4 7 7 1 1 6 8	
7. Transporter 2 Company Name	8. US EPA ID Number	
9. Designated Facility Name and Site Address	10. US EPA ID Number	
H & H Ship Service Company 220 China Basin Street San Francisco, CA 94107	C A D 0 0 4 7 7 1 1 6 8	

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	
a. OIL AND WATER NON-RCRA HAZARDOUS WASTE LIQUID	0 0 1	T T	0 0 1 6 5	G	State EPA/Other
b.					State EPA/Other
c.					State EPA/Other
d.					State EPA/Other

J. Additional Descriptions for Materials Listed Above	K. Handling Codes for Wastes Listed Above	
FUEL, OIL AND WATER PROFILE #A1042	a. 01	b.
	c.	d.

15. Special Handling Instructions and Additional Information

JOB #7317 JOB SITE: ARCO STATION, #4494
24 Hr Emergency Contact: H & H #(415) 543-4835 566 Heyenberger Road
APPROPRIATE PROTECTIVE CLOTHING AND RESPIRATOR. Oakland, California

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[illegible] ARCO	0 7	1 0	9 1

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
ROBERT S. HAGEN		0 7	1 0	9 1

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

Do Not Write Below This Line

DHS 8022 A
EPA 8700—22
(Rev. 6-89) Previous editions are obsolete.

YELLOW: GENERATOR RETAINS