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A RESNA Company

RESNA
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TRANSMITTAL

TO: MR. BARNEY CHAN
ALAMEDA COUNTY DEH
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94621

DATE: 11/22/91
PROJECT NUMBER: 69038.04
SUBJECT: ARCO STATION 4494 AT 566 HEGENBERGER ROAD, OAKLAND, CALIF.

FROM: LOU LEET
TITLE: GEOLOGIC TECHNICIAN

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REMARKS: THIS REPORT HAS BEEN FORWARDED TO YOU AT THE REQUEST OF MR. CHUCK CARMEL OF ARCO PRODUCTS COMPANY.

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Third Quarter 1991
at
ARCO Station 4494
566 Hegenberger Road
Oakland, California

69038.04

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November 22, 1991
1015ccar
69038.04

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

Subject: Third Quarter 1991 Groundwater Monitoring Report for ARCO Station 4494 at 566 Hegenberger Road, Oakland, California.

Mr. Carmel:

This letter report summarizes the methods and results of the third quarter 1991 groundwater monitoring performed by 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 groundwater sampling and analyses to monitor gasoline hydrocarbon concentrations in the groundwater beneath the site, and evaluate trends related to fluctuations of these gasoline hydrocarbon concentrations. ARCO has also requested that RESNA perform monthly monitoring of groundwater levels in the wells at the site and evaluate fluctuations in the groundwater gradient and flow direction over time.

Prior to the present monitoring, Pacific Environmental Group (Pacific) and RESNA (formerly Applied GeoSystems [AGS]) performed limited subsurface environmental investigations related to the former underground waste-oil storage tank and existing gasoline-storage tanks at the site. 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 groundwater monitoring wells (MW-1 and MW-2) (Applied GeoSystems, October 1, 1990). 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). On August 10, 1990, RESNA performed a limited subsurface environmental investigation, which included installation of two additional 4-inch groundwater 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 groundwater monitoring wells and pertinent site features are shown on the Generalized Site Plan, Plate 2.

Groundwater Sampling and Gradient Evaluation

RESNA personnel performed monitoring of depth-to-water (DTW) levels and subjective analyses of water samples from the wells on July 24, August 22, and September 30, 1991 and quarterly groundwater sampling on September 30, 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, on September 30, 1991, purging and sampling groundwater from the monitoring wells for laboratory analysis. Well MW-2 was not sampled due to the presence of product sheen. The groundwater sampling protocol is attached in Appendix A.

The DTW levels, wellhead elevations, and groundwater elevations for this and previous monitoring episodes at the site are summarized in the Cumulative Groundwater Monitoring Data, Table 1. Groundwater elevations have dropped 0.1 to 0.5 feet between June and September 1991. The groundwater gradients interpreted from the July, August, and September 1991 monitoring data were approximately 0.02 toward the northeast, as shown on the Groundwater Gradient Maps (Plates 3, 4, and 5, respectively). These interpreted gradients are generally consistent with the previously interpreted groundwater 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 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 September 30, 1991, in accordance with the attached protocol. Purge water was removed from the site by a licensed hazardous waste hauler; the Uniform Hazardous Waste Manifest is 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 Certification No. 1210). 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--TPHg, total petroleum hydrocarbons as diesel (TPHd), BTEX, and total oil and grease (TOG), and Table 3, Cumulative Results of Laboratory Analyses of Water Samples--BNAs, volatile organic compounds (VOCs), and Metals.

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, MW-3, and MW-4; and
- product sheen in well MW-2.

Product Removal

Since June 1990, evidence of floating product or product sheen has been observed only in well MW-2. 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 4. The total year-to-date recovered product is approximately 6.4 gallons; the total cumulative recovered water for the site is approximately 41.9 gallons.

Conclusions and Recommendations

Concentrations of TPHg and BTEX have been nondetectable in wells MW-1, MW-3, and MW-4 since initiation of quarterly monitoring in August 1990, with the exception of wells MW-1 and MW-4. On November 29, 1990, a low concentration of toluene (0.7 parts per billion [ppb]) was detected in well MW-1, and on June 26, 1991, low concentrations of benzene (0.75 ppb), toluene (1.1 ppb), and xylene (1.6 ppb) were detected in well MW-4 (which is located generally upgradient from the underground storage tanks onsite); all of these wells have remained within regulatory limits. The downgradient extent of gasoline hydrocarbons in groundwater has not been delineated; it appears from the presence of product sheen in well MW-2 that the petroleum hydrocarbons may have migrated offsite.

RESNA recommends continued groundwater monitoring at this site and monthly measurement of groundwater levels to evaluate trends of petroleum hydrocarbons and

changes in groundwater gradient and floating product with time. Additional work at the site is pending offsite access from private property owners. Further recommendations will be submitted under separate cover.

Schedule

RESNA will continue the quarterly groundwater monitoring at this site to evaluate trends in petroleum hydrocarbons and changes in groundwater 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 December 19, 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

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, Groundwater Gradient Map, July 24, 1991
Plate 4, Groundwater Gradient Map, August 22, 1991
Plate 5, Groundwater Gradient Map, September 30, 1991
Plate 6, TPHg/Benzene Concentrations in Groundwater, September 30, 1991

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Water Samples--TPHg, TPHd, BTEX, and TOG
Table 3, Cumulative Results of Laboratory Analyses of Water Samples--BNAs, VOCs, and Metals
Table 4, Approximate Cumulative Product Removed

Appendix A: Groundwater Sampling Protocol
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.

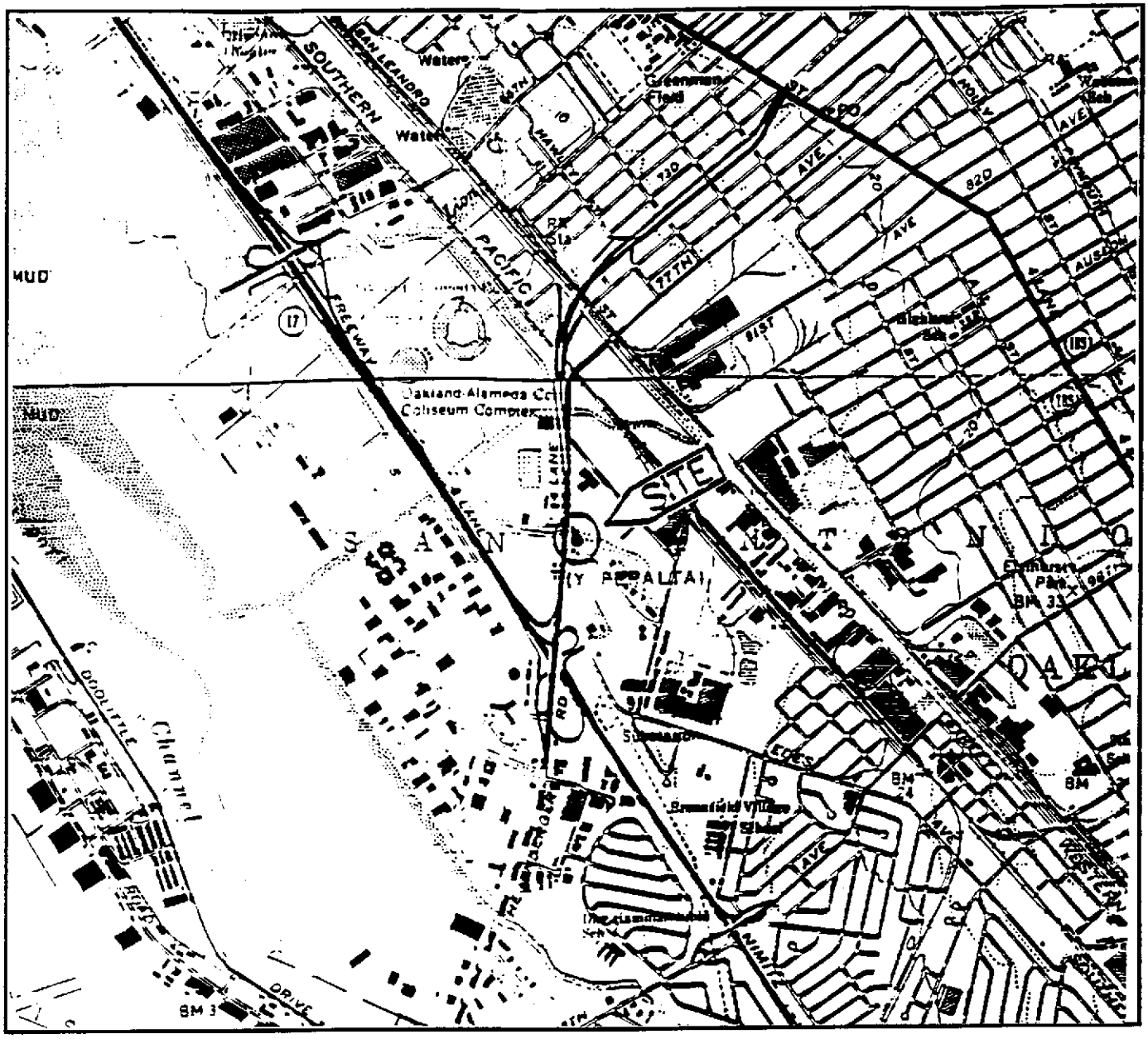
Applied GeoSystems. February 13, 1991. Limited Subsurface Environmental Investigation at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-2.

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.

RESNA/Applied GeoSystems. September 12, 1991. Letter Report on Second Quarter 1991 Ground-Water Monitoring at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-4.



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

LEGEND

⊙ = Site Location

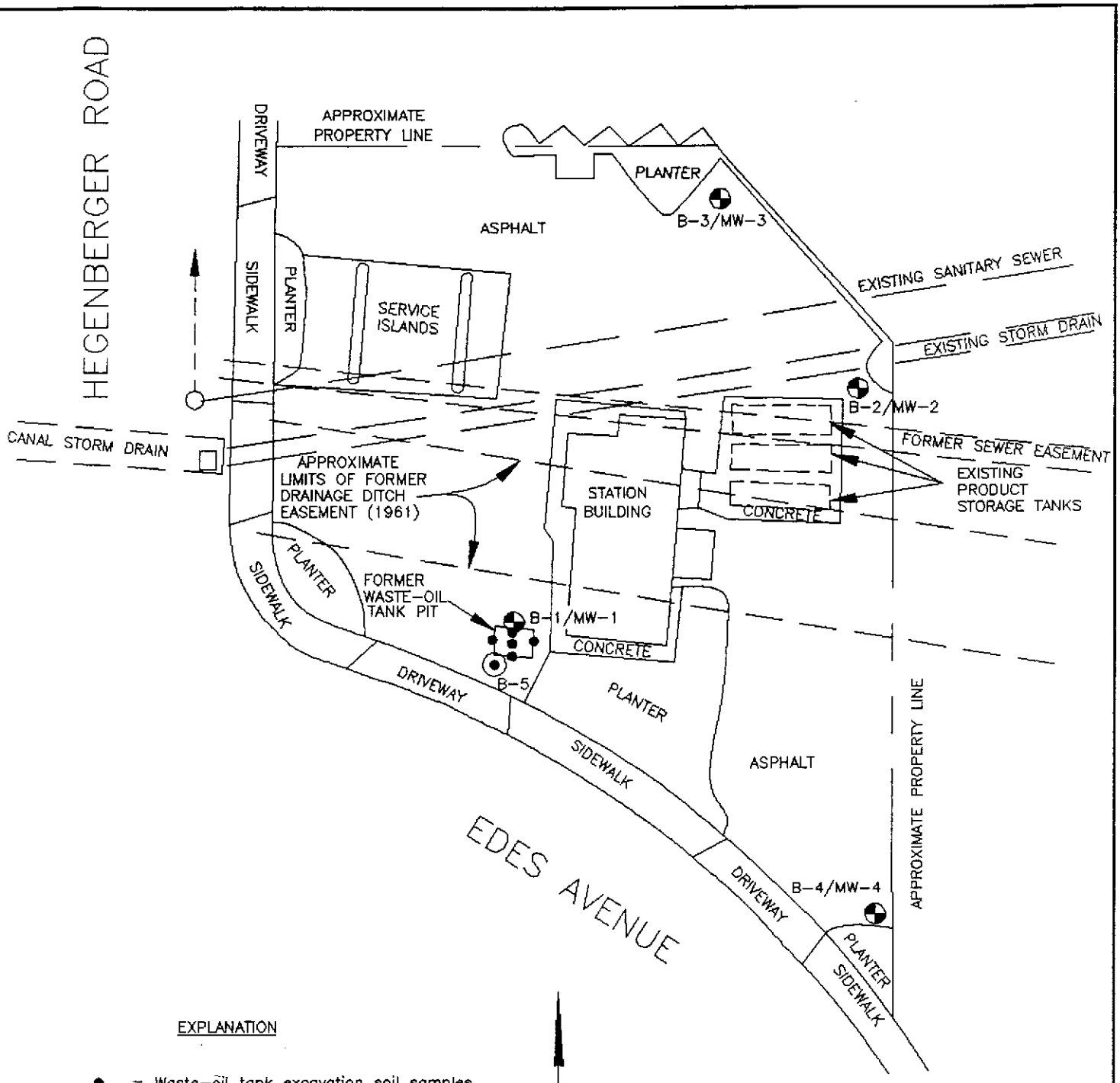
N

Approximate Scale

2000 1000 0 2000 4000

feet

RESNA	**SITE VICINITY MAP** **ARCO Service Station 4494** **566 Hegenberger Road** **Oakland, California**	**PLATE** **1**
PROJECT 69038.04		



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

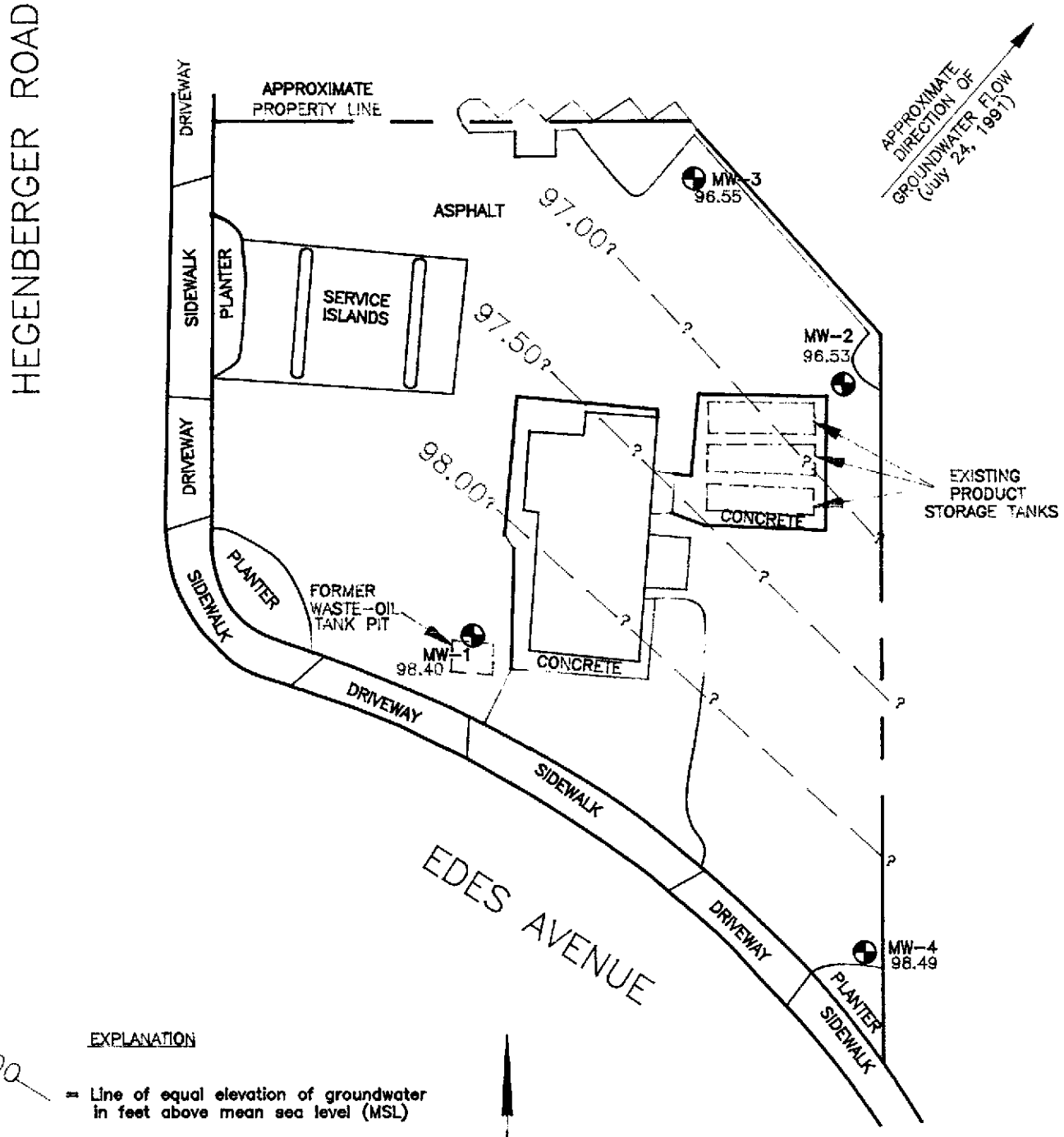
Approximate Scale

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).

RESNA	**GENERALIZED SITE PLAN** **ARCO Service Station 4494** **566 Hegenberger Road** **Oakland, California**	**PLATE** **2**
PROJECT 69038.04		



EXPLANATION

98.00 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

98.49 = Elevation of groundwater in feet MSL, July 24, 1991

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

N

Approximate Scale

40 20 0 40 80

feet

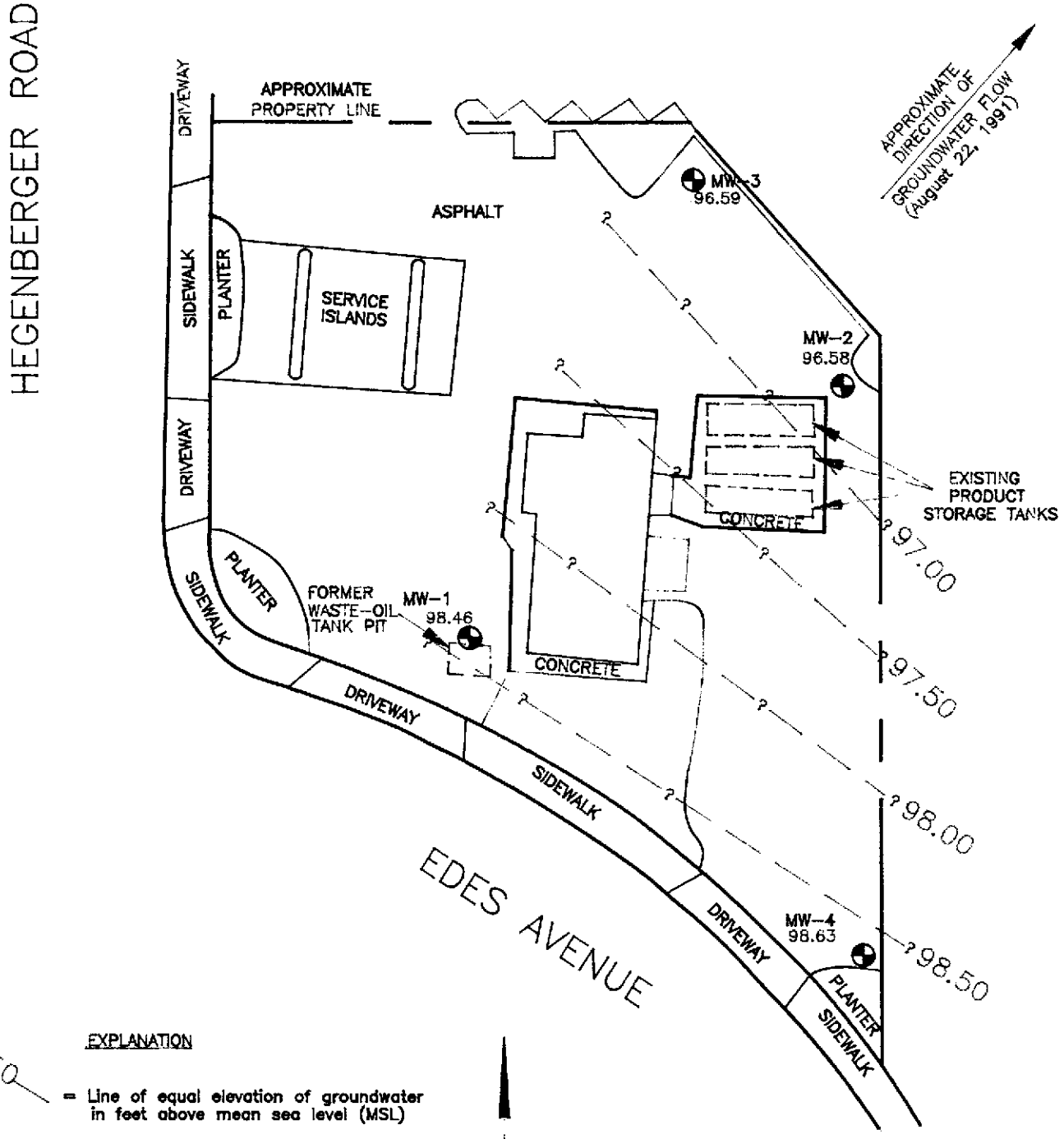
Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1961).

RESNA

PROJECT 69038.04

GROUNDWATER GRADIENT MAP
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 3



EXPLANATION

98.50 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

98.63 = Elevation of groundwater in feet MSL, August 22, 1991

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

N

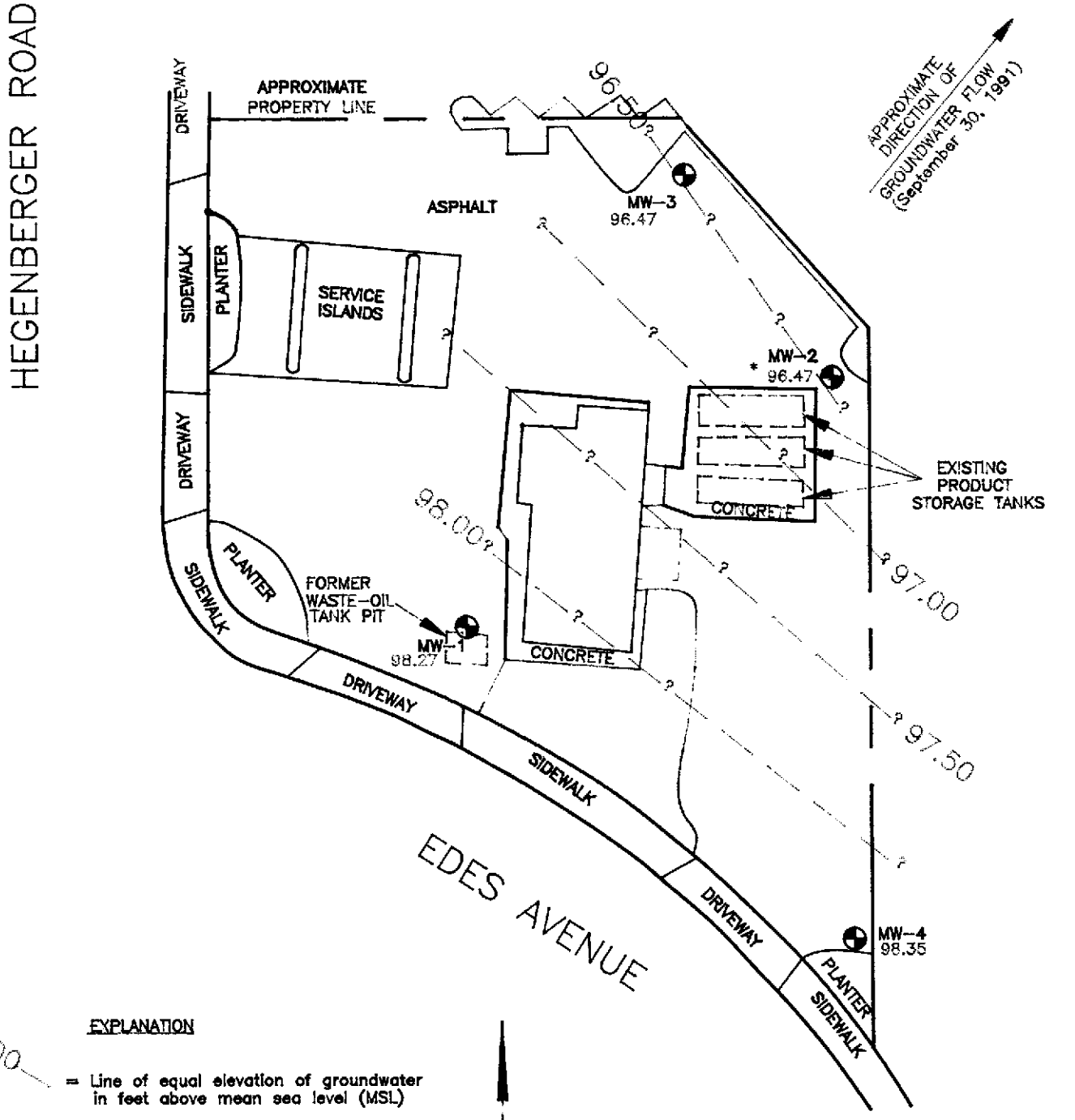
Approximate Scale

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).

RESNA	**GROUNDWATER GRADIENT MAP** **ARCO Service Station 4494** **566 Hegenberger Road** **Oakland, California**	**PLATE** **4**
PROJECT 69038.04		



98.00 — = Line of equal elevation of groundwater in feet above mean sea level (MSL)

98.35 = Elevation of groundwater in feet MSL, September 30, 1991

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

* = Product or product sheen

Approximate Scale

40 20 0 40 80

feet

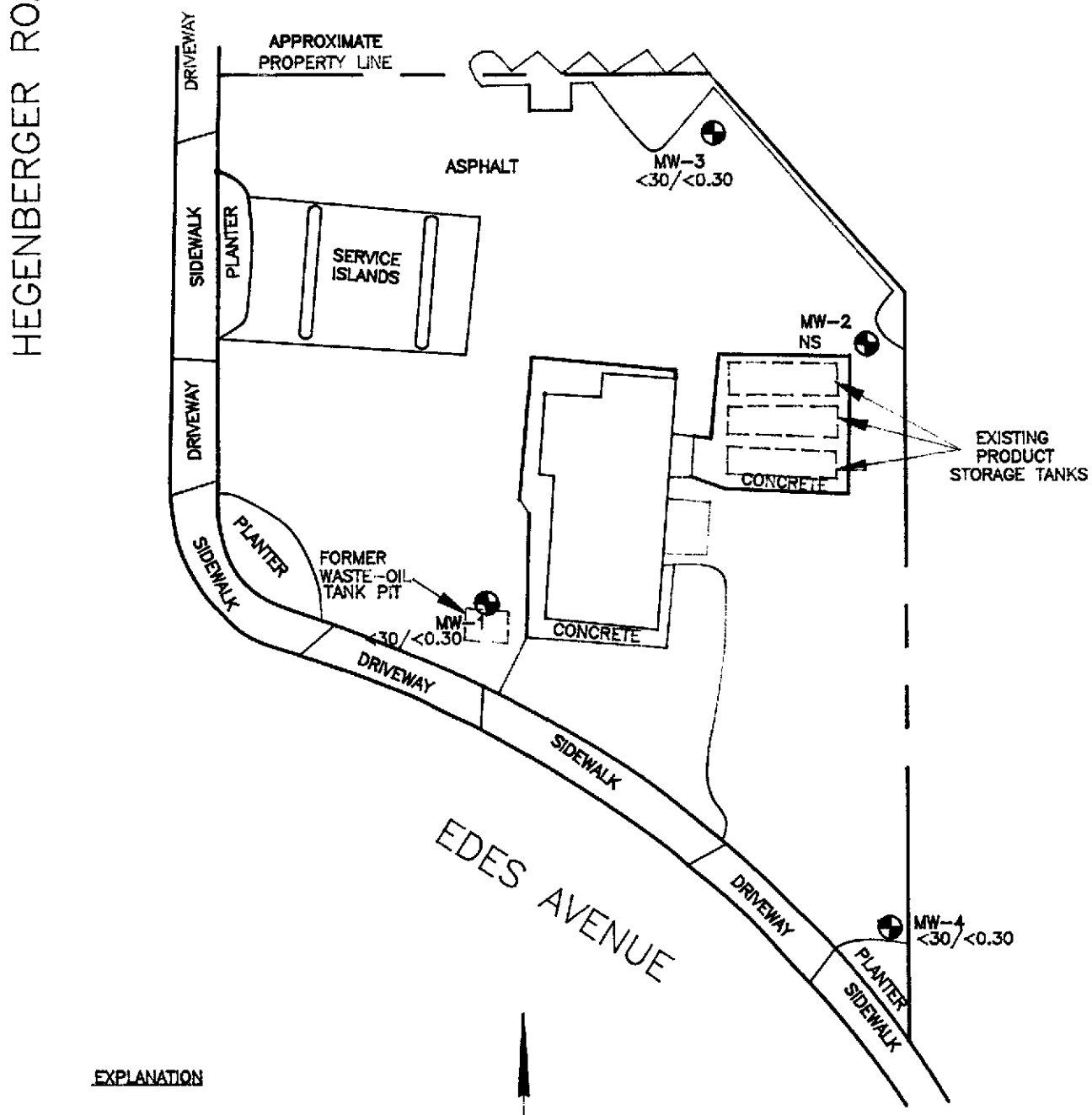
Source: Modified from plans supplied by ARCO Products Co. (dated August 12, 1982) and City of Oakland Dept. of Public Works (dated December 19, 1961).

RESNA

PROJECT 69038.04

GROUNDWATER GRADIENT MAP
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 5



EXPLANATION

<30/0.30 = Concentration of TPHg, Benzene in groundwater, in ppb, September 30, 1991

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

NS = Not sampled due to the presence of product or product sheen

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).

RESNA	**TPHg/BENZENE CONCENTRATIONS IN GROUNDWATER** **ARCO Service Station 4494** **566 Hegenberger Road** **Oakland, California**	**PLATE** **6**
PROJECT 69038.04		

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

Well Date	Elevation of Wellhead	Depth to Water	Water Elevation	Floating Product
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
07/24/91		6.91	98.40	None
08/22/91		6.85	98.46	None
09/30/91		7.04	98.27	None
MW-2				
06/06/90	105.78	9.00*	96.78*	0.92 Black Product
08/16/90		NM	NM	0.17 Black Product
08/21/90		NM	NM	0.17 Black Product
09/07/90		9.17*	96.61*	0.17 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	None
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	None
06/27/91		9.20	96.58	Sheen
07/24/91		9.25	96.53	None
08/22/91		9.20	96.58	None
09/30/91		9.31	96.47	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

See notes on page 2 of 2.

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

Well Date	Elevation of Wellhead	Depth to Water	Water Elevation	Floating Product
MW-3				
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
07/24/91		8.96	96.55	None
08/22/91		8.92	96.59	None
09/30/91		9.04	96.47	None
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
07/24/91		8.12	98.49	None
08/22/91		7.98	98.63	None
09/30/91		8.26	98.35	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–TPHg, TPHd, BTEX, and TOG
ARCO Station 4494
Oakland, California
(Page 1 of 1)

Well Date	TPHg (ppb)	TPHd (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Total Xylenes (ppb)	TOG (ppb)
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
09/30/91	ND	NA	ND	ND	ND	ND	NA
MW-2							
06/19/90			Not sampled--product				
08/16/90			Not sampled--product				
09/07/90			Not sampled--product				
11/29/90			Not sampled--sheen				
03/07/91			Not sampled--sheen				
06/27/91			Not sampled--sheen				
09/30/91			Not sampled--sheen				
MW-3							
08/16/90	ND	ND	ND	ND	ND	ND	NA
09/07/90	NA	NA	NA	NA	NA	NA	ND
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
09/30/91	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	ND
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
09/30/91	ND	NA	ND	ND	ND	ND	NA
Jan. 1990							
MCLs	---	---	1.0	---	680	1,750	---
ALs	---	---	---	100	---	---	---

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 3
CUMULATIVE RESULTS OF LABORATORY ANALYSIS OF WATER SAMPLES–BNAs, VOCs, and Metals
ARCO Station 4494
Oakland, California
(Page 1 of 1)

Well / Date	BNAs (ppm)	VOCs (ppb)	Total Cadmium (ppm)	Chromium (ppm)	Lead (ppm)	Zinc (ppm)
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
09/30/91	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
09/30/91	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
09/30/91	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), except for VOCs.
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.

TABLE 4
APPROXIMATE CUMULATIVE PRODUCT REMOVED
ARCO Station 4494
Oakland, California
(Page 1 of 1)

Date	Floating Product Removed (gallons)	Water Removed (gallons)
MW-2		
06/19/90	2	–
08/21/90	0.3	3.5
09/07/90	0.1	4
11/20/90	2	3
11/29/90	2	
01/29/91	Sheen	3.4
02/27/91	Sheen	7
03/07/91	Sheen	7
06/27/91	Sheen	7
09/30/91	Sheen	7
Total:	6.4 Gallons	41.9 Gallons

GROUNDWATER 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 groundwater 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 groundwater elevations.

Water samples collected for subjective evaluation were collected by gently lowering approximately half the length of a new, disposable 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 groundwater 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 groundwater 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 groundwater 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 groundwater 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 a new, disposable bailer. 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.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 4494-90-3

Chain of Custody

ARCO Facility no. 4494-690338.04	City (Facility) OAKLAND	Project manager (Consultant) JOEL COFFMAN/LOU LEE T	Laboratory name SEQUOIA
ARCO engineer Chuck CARMEL	Telephone no. (ARCO)	Telephone no. (Consultant) 409 264-7723	Fax no. (Consultant) (408) 264-2435
Consultant name RESNA	Address (Consultant) 3315 ALMADEN EXPRESSWAY, SUITE 34 SAN JOSE, CA		Contract number 91-073

Method of shipment: Sequoia Courier

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		3		X		X	X	9-30-91	3:30		X										110035
W-9-MW3		3		X		X	X		3:10		X										110036
W-8-MW4		3		X		X	X		3:35		X										110037

Special detection Limit/reporting

Special QA/QC

Remarks

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: 6061	
Relinquished by sampler: L. J. Lee	Date: 10-1-91 Time: 4:02	Received by: MARVIN MISTRY	
Relinquished by: Marvin Mistry	Date: 10/1/91 Time: 5:30	Received by:	
Relinquished by:	Date: Time:	Received by laboratory: L. Marcum	Date: 10-1 Time: 5:30

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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95112
Attention: Joel Coffman

Project: ARCO 4494, Oakland

Enclosed are the results from 3 water samples received at Sequoia Analytical on October 1,1991. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
1100355	Water, W-7-MW1	9/30/91	EPA 5030/8015/8020
1100356	Water, W-9-MW3	9/30/91	EPA 5030/8015/8020
1100357	Water, W-8-MW4	9/30/91	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

RESNA	Client Project ID:	ARCO 4494, Oakland	Sampled:	Sep 30, 1991
3315 Almaden Expwy., Suite 34	Matrix Descript:	Water	Received:	Oct 1, 1991
San Jose, CA 95112	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Oct 11, 1991
Attention: Joel Coffman	First Sample #:	110-0355	Reported:	Oct 14, 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)
110-0355	W-7-MW1	N.D.	N.D.	N.D.	N.D.	N.D.
110-0356	W-9-MW3	N.D.	N.D.	N.D.	N.D.	N.D.
110-0357	W-8-MW4	N.D.	N.D.	N.D.	N.D.	N.D.
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

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95112
Attention: Joel Coffman

Client Project ID: ARCO 4494, Oakland

QC Sample Group: 1100355-57

Reported: Oct 14, 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:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 11, 1991	Oct 11, 1991	Oct 11, 1991	Oct 11, 1991
QC Sample #:	GBLK101191 MS/MSD	GBLK101191 MS/MSD	GBLK101191 MS/MSD	GBLK101191 MS/MSD
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	10	11	11	32
Matrix Spike % Recovery:	100	110	110	107
Conc. Matrix Spike Dup.:	10	11	11	31
Matrix Spike Duplicate % Recovery:	100	110	110	103
Relative % Difference:	0.0	0.0	0.0	3.2

SEQUOIA ANALYTICAL

Elizabeth W. Hackl
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{\text{(Conc. of M.S. + Conc. of M.S.D.) / 2}} \times 100$

State of California—Health and Welfare Agency
Form Approved OMB No. 2050—0039 (Expires 9-30-91)
Please print or type. *Form designed for use on elite (12-pitch typewriter).*

See Instructions on Back of Page 6 and Front of Page 7

Department of Health Serv
Toxic Substances Control Divi
Sacramento, Califo

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.
C A L 0 0 0 0 0 9 8 6 8	0 0 0 0 2		

3. Generator's Name and Mailing Address
ARCO
P. O. Box 5811, San Mateo, CA 94402
4. Generator's Phone (415) 571-2131/571-2128

A. State Manifest Document Number 90537783

B. State Generator's ID H Y H 0 3 6 - 0 1 5 6 6 0

5. Transporter 1 Company Name	6. US EPA ID Number	C. State Transporter's ID	200585/200506
H & H Ship Service Company	C A D 0 0 4 7 7 1 1 6 8	D. Transporter's Phone	(415) 543-4835
7. Transporter 2 Company Name	8. US EPA ID Number	E. State Transporter's ID	
		F. Transporter's Phone	

9. Designated Facility Name and Site Address	10. US EPA ID Number	G. State Facility's ID	C A D 0 0 4 7 7 1 1 6 8
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	H. Facility's Phone	(415) 543-4835

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. OIL AND WATER NON-RCRA HAZARDOUS WASTE LIQUID	0 0 1	T T	150	G	State 134 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 #9361
24 Hr. Emergency Contact: H & H #(415) 543-4835
APPROPRIATE PROTECTIVE CLOTHING AND RESPIRATOR.

JOB SITE: ARCO STATION, #4494
566 Hegenberger Road
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
L. J. LEET for ARCO	L. J. Leet for ARCO	1 0	0 1	9 1

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
NORMAN L. BERG		1 0	0 1	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

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

Do Not Write Below This Line

YELLOW—GENERATOR RETAINS

GENERATOR

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

90537783