Applied GeoSystems, Inc.
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TRANSMITTAL

#3854 STID

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

DATE: 5/4/92
PROJECT NUMBER: 69038.11
SUBJECT: ARCO STATION 4494, 566 HEGENBERGER ROAD, OAKLAND, CALIFORNIA.

FROM: LOU LEET
TITLE: STAFF GEOLOGIST

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
First Quarter 1992
at
ARCO Station 4494
566 Hegenberger Road
Oakland, California

69038.11

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May 4, 1992
0504MWHE
69038.11

Mr. Michael Whelan
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: First Quarter 1992 Groundwater Monitoring Report for ARCO Station 4494 at 566 Hegenberger Road, Oakland, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), this letter report summarizes the results of first quarter 1992 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, California,at the above-referenced site. The objectives of this quarterly groundwater monitoring are to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with gasoline-storage tanks at the site. The field work and laboratory analyses of groundwater samples during this quarter was performed under the direction of EMCON and included measuring depths to groundwater, subjectively analyzing groundwater for the presence of petroleum product, collecting groundwater samples from the wells for laboratory analyses, and directing a State-certified laboratory to analyze the groundwater samples. Field procedures and acquisition of field data and field protocols is beyond RESNA Industries' (RESNA's) scope of work. RESNA's scope of work was limited to interpretation of field and laboratory analyses data, which included evaluating trends in reported hydrocarbon concentrations in the local groundwater, the groundwater gradient, and direction of groundwater flow beneath the site.

The operating Arco Station 4494 is located 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.

Prior to the present monitoring, Pacific Environmental Group (PEG) 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) (AGS, October 1, 1990). On December 16, 1989, PEG performed soil sampling and observation during removal of the waste-oil tank and excavation of the soil by Crosby & Overton (PEG, May 3, 1989). On June 6, 1990, quarterly monitoring was initiated by RESNA/AGS (AGS, February 8, 1991). 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) (AGS, February 13, 1991). Quarterly groundwater monitoring was performed in 1991 by AGS (AGS, April 30, 1991) and RESNA (RESNA/AGS, September 12, and November 22, 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

Depth to water measurements (DTW) were performed by EMCON field personnel on January 19, February 20, and March 20, 1992. Quarterly sampling was performed by EMCON field personnel on March 20, 1992. The results of EMCON's field work on the site, including DTW measurements and subjective analysis for the presence of product in the groundwater in MW-1 through MW-4, are presented on EMCON's field report sheets and EMCON's Summary of Groundwater Monitoring Data. These data are included in Appendix A.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations of product in the groundwater (if present) from MW-1 through MW-4 for this quarter and previous quarterly groundwater monitoring at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. EMCON's DTW measurements were used to evaluate groundwater elevations. Evidence of product or sheen was not observed by EMCON's field personnel during this quarterly monitoring (see EMCON's field report sheets, Appendix A). Groundwater elevations in wells MW-1 through MW-4 increased approximately 1 foot between January 19 and March 20, 1992. The groundwater gradients interpreted from the January, February, and March 1992 groundwater monitoring episodes are shown on the Groundwater Gradient Maps, Plates 3 through 5. The groundwater gradients interpreted from EMCON's DTW measurements are approximately 0.02 toward the northeast. The groundwater gradients for this quarter are generally consistent with previously interpreted data.

Groundwater monitoring wells MW-1 through MW-4 were purged and sampled by EMCON field personnel on March 10, 1992. EMCON's water sample field data sheets, field report sheets and Summary of Groundwater Monitoring Data, are included in Appendix A. EMCON's water sample field data sheets indicate that approximately 1.3 to 5 well volumes were purged from the wells. The purge water was removed from the site by a licensed hazardous waste hauler; the Monitoring Well Purge Water Disposal Form is also included in Appendix A.

Laboratory Methods and Analyses

Under the direction of EMCON, water samples collected from the wells were analyzed by Columbia Analytical Services, Inc. located in San Jose, California (Hazardous Waste Testing Laboratory Certification No. 1426). The water samples from MW-1 through MW-4 were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using Environmental Protection Agency (EPA) Methods 5030/8020. Concentrations of TPHg and benzene in the groundwater are shown on Plate 6, Concentration of TPHg in Groundwater, and Plate 7, Concentration of Benzene in Groundwater. The Chain of Custody Records and Laboratory Analysis Reports are included in Appendix A. Results of these and previous water analyses are summarized in Table 2, Cumulative Results of Laboratory Analyses of Groundwater--TPHg, TPHd, BTEX, and TOG and Table 3, Cumulative Results of Laboratory Analyses of Groundwater--VOCs and Metals.

Results of this quarter's groundwater monitoring indicate: 48ppm TPHg

- TPHg was detected in a groundwater sample from MW-2 at a concentration of 48,000 parts per billion (ppb) and was nondetectable (<50 ppb) in groundwater samples from wells MW-1, MW-3, and MW-4.

- Benzene was detected in a groundwater sample from MW-2 at a concentration of 2,000 ppb and was nondetectable (<0.5 ppb) in groundwater samples from wells MW-1, MW-3, and MW-4.

- Toluene, ethylbenzene, and total xylenes were detected in a groundwater sample from MW-2 at concentrations ranging from 580 ppb to 7,000 ppb. These constituents were nondetectable (<0.5 ppb) in groundwater samples from wells MW-1, MW-3, and MW-4.

The following general trends were noted in reported hydrocarbon concentrations in groundwater from the four monitoring wells since quarterly monitoring began at the site on

July 19, 1990. Reported concentrations of TPHg and BTEX have remained nondetectable in wells MW-1, MW-2, and MW-3; and concentrations of TPHg and ethylbenzene have remained nondetectable in well MW-4. However, during the November 29, 1990 quarterly monitoring a low concentration (0.7 ppb) of toluene was detected in groundwater from MW-1. Except for the two quarterly monitorings on June 27, 1991 and December 18, 1991, concentrations of benzene, toluene, and total xylenes in well MW-4 have been nondetectable. During the June and December 1991 quarterly monitorings, concentrations of benzene were 0.75 and 0.83 ppb, and concentrations of toluene, and total xylenes ranged from 0.58 to 1.6 ppb. Prior to this quarterly monitoring, the groundwater from MW-2 had not been sampled due to the presence of hydrocarbon product or sheen.

Product Removal

Since June 1990, evidence of floating product or product sheen has been observed only in well MW-2. Product sheen and associated water were removed from well MW-2 during the December 18, 1991 quarterly sampling. Quantities of floating product and water removed during this and previous quarterly monitorings are presented on Table 4, Approximate Cumulative Product Recovered. On December 24, 1991, a Horner EZY Floating Product Skimmer was installed in monitoring well MW-2 to collect floating product. The skimmer is checked for product and adjusted on a monthly basis. As mentioned previously, no product or sheen was observed during this quarter and floating product has been removed to a sheen or non-existent since November 1990.

Conclusions and Recommendations

Although concentrations of petroleum hydrocarbons detected in wells MW-1, MW-3, and MW-4 have remained within regulatory limits, the downgradient extent of gasoline hydrocarbons in groundwater has not been delineated.

RESNA recommends continuing quarterly groundwater sampling at this site, performing laboratory analyses of groundwater samples for TPHg and BTEX, and monthly measurements of groundwater levels to evaluate trends of petroleum hydrocarbons, and changes in groundwater gradient and floating product with time. RESNA also recommends that the product skimmer in well MW-2 be checked for product and adjusted on a monthly basis. Additional subsurface exploration to delineate the presence of hydrocarbons offsite is pending permission for access from private property owners. Further recommendations for additional work will be submitted under separate cover.

Schedule

Monthly groundwater monitoring and quarterly groundwater sampling will continue to be performed by ARCO's contracted sampler. At ARCO's request, RESNA will continue to analyze and report monthly and quarterly groundwater monitoring data from this site to evaluate trends in petroleum hydrocarbons, and changes in groundwater gradient with time. The product skimmer in well MW-2 will be checked for floating product and adjusted on a monthly basis.

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

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Mr. Eddy So
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 Industries, Inc.

L. J. Leet

Lou Leet
Staff Geologist

REGISTERED GEOLOGIST
JAMES LEWIS NELSON
No. 1463
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

James L. Nelson
Certified Engineering Geologist No. 1463

cc: H.C. Winsor, ARCO Products Company

RESNA

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, January 19, 1992
Plate 4, Groundwater Gradient Map, February 20, 1992
Plate 5, Groundwater Gradient Map, March 20, 1992
Plate 6, Concentration of TPHg in Groundwater, March 20, 1992
Plate 7, Concentration of Benzene in Groundwater, March 20, 1992

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 Recovered

Appendix A: EMCON's Field Reports (2), Depth to Water/Floating Product Survey Results, Summary of Groundwater Monitoring Data, Certified Analytical Reports with Chain of Custody Record, and Water Sample Field Data Sheets

Monitoring Well Purge Water Disposal Form

REFERENCES

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.

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

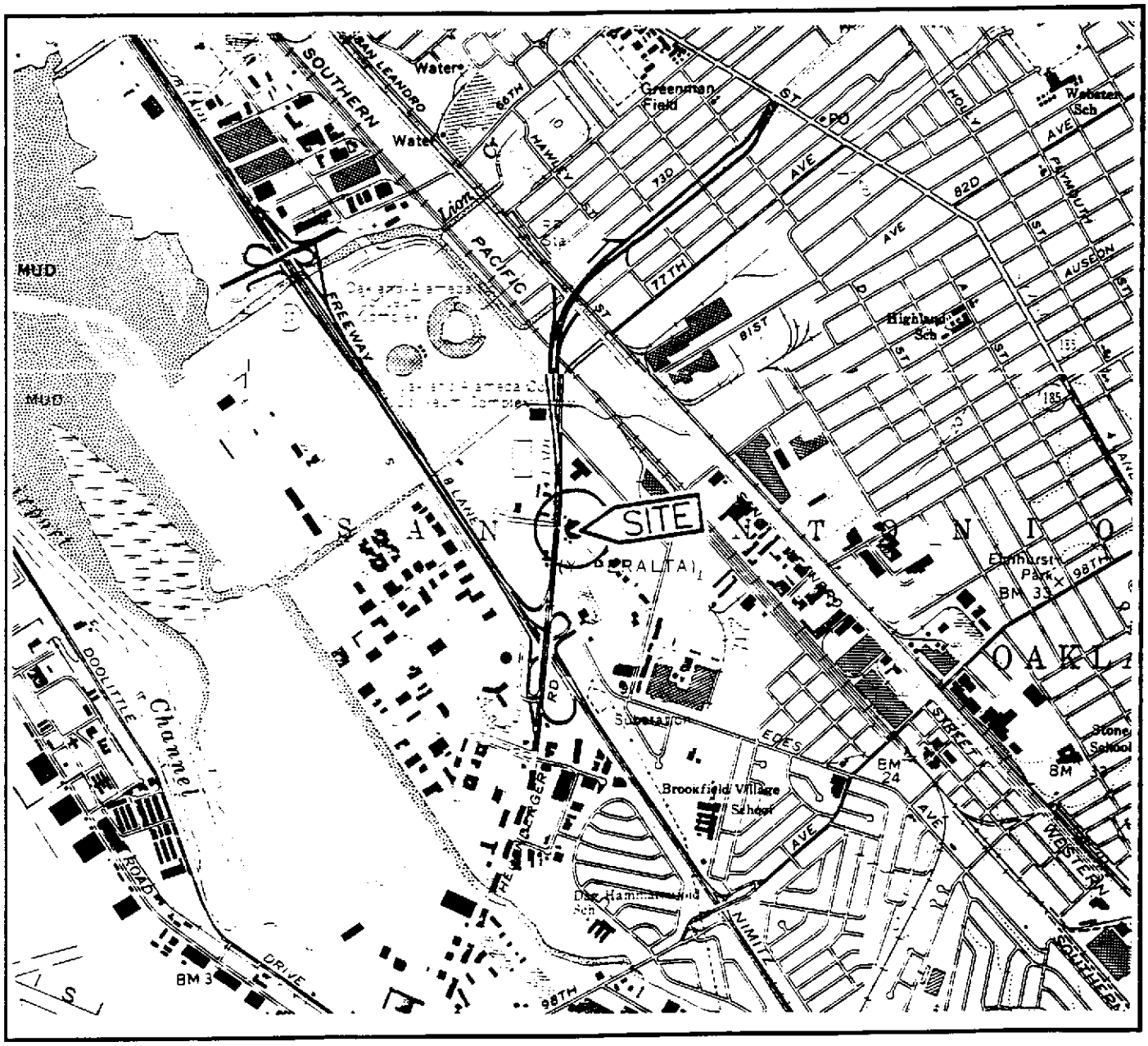
Applied GeoSystems. April 30, 1991. Letter Report on Quarterly Ground-Water Monitoring, First Quarter 1991, at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-4.

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 Quarterly Ground-Water Monitoring, Second Quarter 1991, at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. AGS Report 69038-4.

RESNA. November 22, 1992. Letter Report on Quarterly Groundwater Monitoring, Third Quarter 1991, at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. 69038.04.

RESNA. April 8, 1992. Letter Report on Quarterly Groundwater Monitoring, Fourth Quarter 1991, at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. 69038.04.



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

LEGEND

⊙ = Site Location

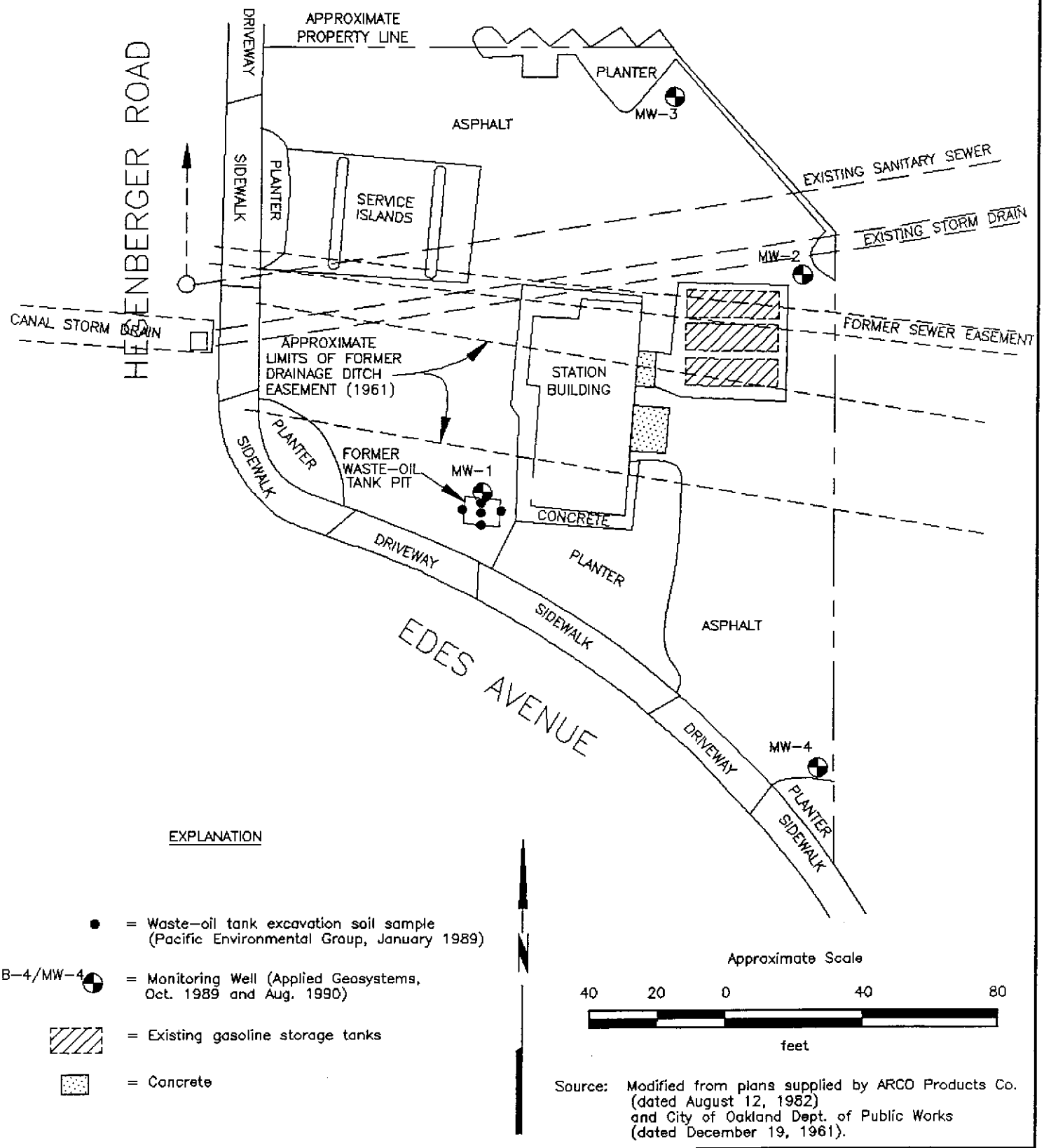
N

Approximate Scale

2000 1000 0 2000 4000

feet

RESNA	**SITE VICINITY MAP** **ARCO Service Station 4494** **566 Hegenberger Road** **Oakland, California**	**PLATE** **1**
PROJECT 69038.11		



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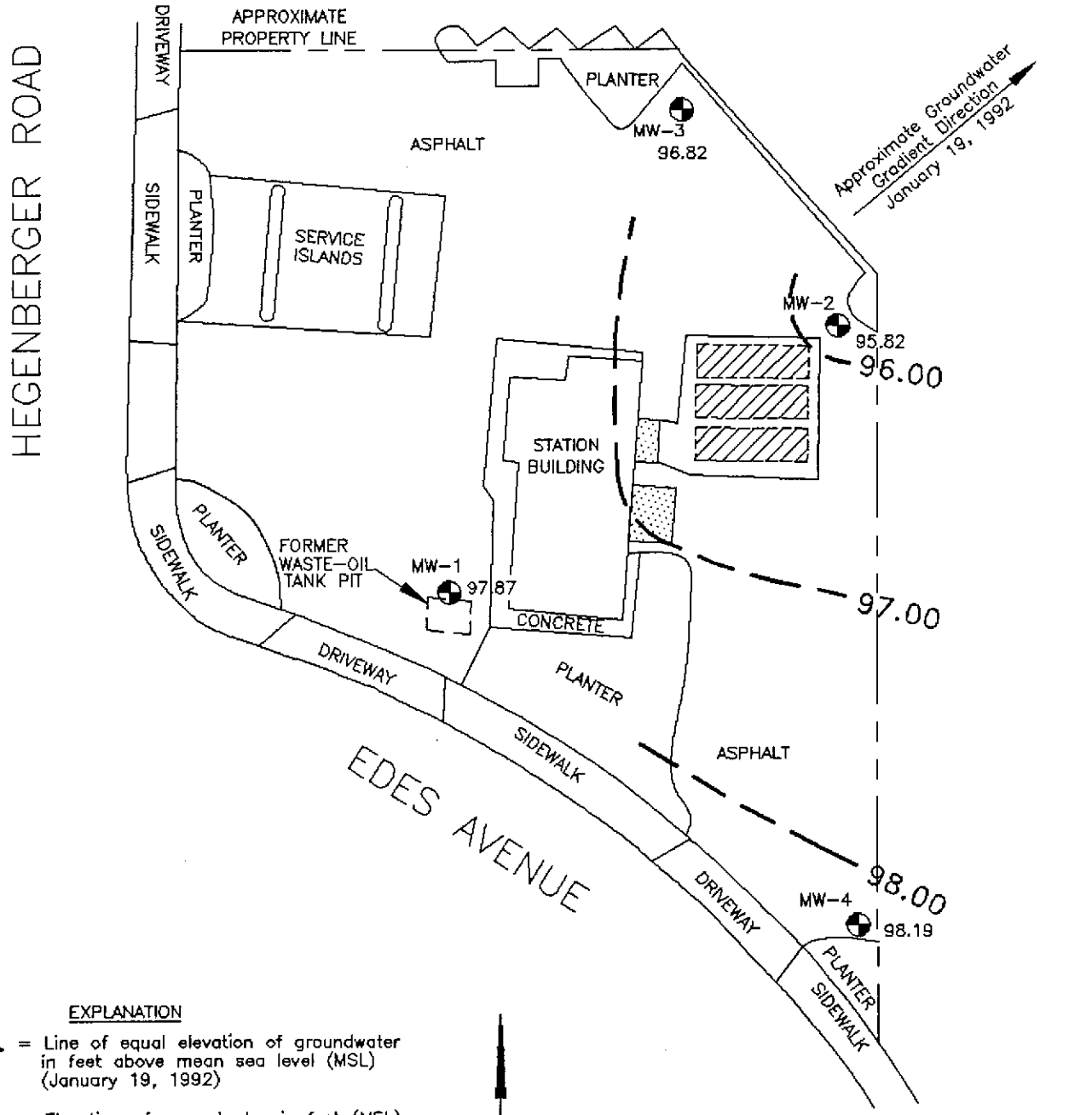
GENERALIZED SITE PLAN
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 2



98.00 — = Line of equal elevation of groundwater in feet above mean sea level (MSL) (January 19, 1992)

98.19 = Elevation of groundwater in feet (MSL) (January 19, 1992)

B-4/MW-4 = Monitoring Well (Applied Geosystems, Oct. 1989 and Aug. 1990)

= Existing gasoline storage tanks

= Concrete

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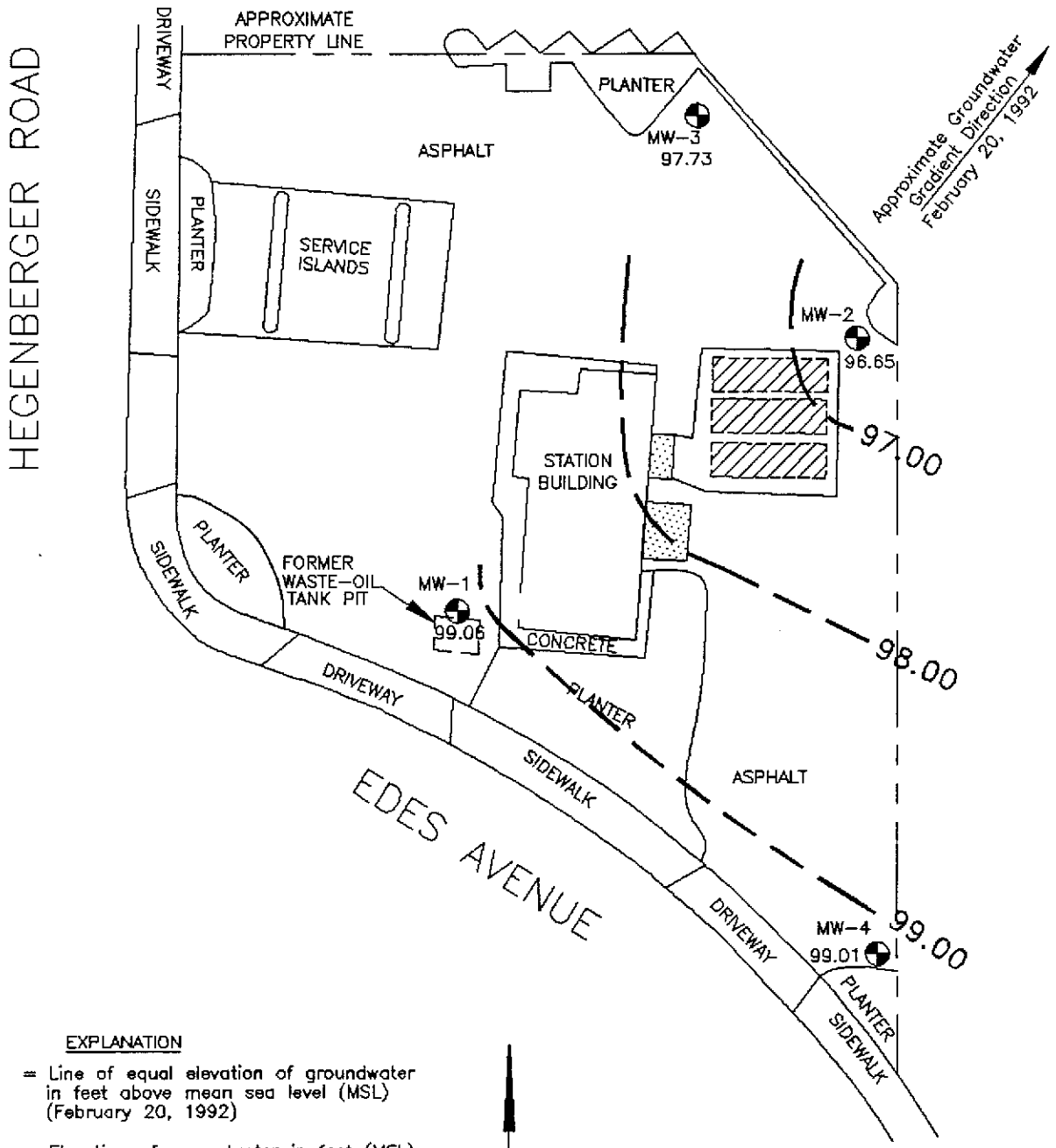
GROUNDWATER GRADIENT MAP
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 3



99.00 — EXPLANATION

= Line of equal elevation of groundwater in feet above mean sea level (MSL) (February 20, 1992)

99.06 = Elevation of groundwater in feet (MSL) (February 20, 1992)

B-4/MW-4 = Monitoring Well (Applied Geosystems, Oct. 1989 and Aug. 1990)

= Existing gasoline storage tanks

= Concrete

N

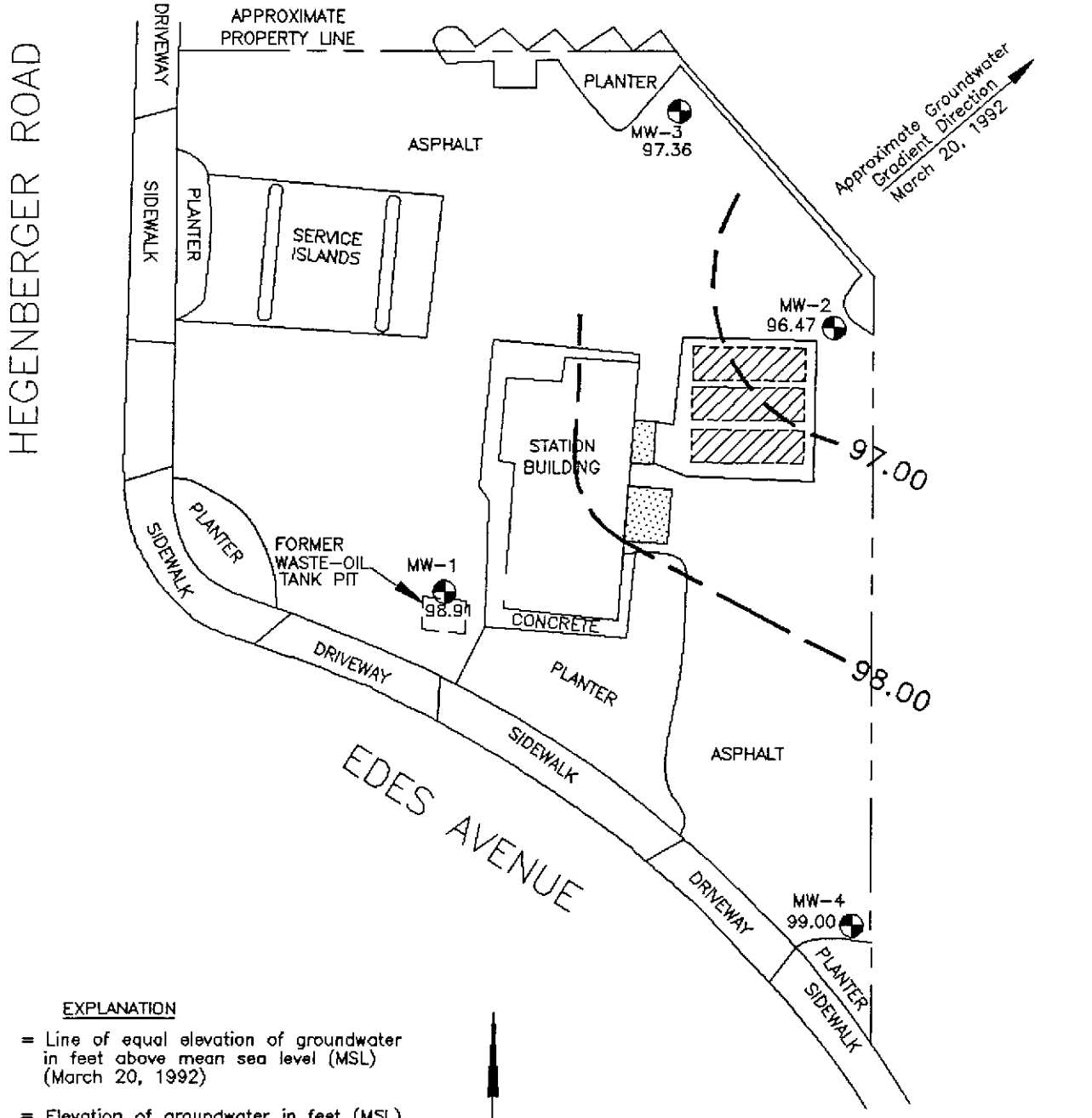
Approximate Scale

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 69038.11		



98.00 — EXPLANATION

= Line of equal elevation of groundwater in feet above mean sea level (MSL) (March 20, 1992)

99.00 = Elevation of groundwater in feet (MSL) (March 20, 1992)

B-4/MW-4 = Monitoring Well (Applied Geosystems, Oct. 1989 and Aug. 1990)

= Existing gasoline storage tanks

= Concrete

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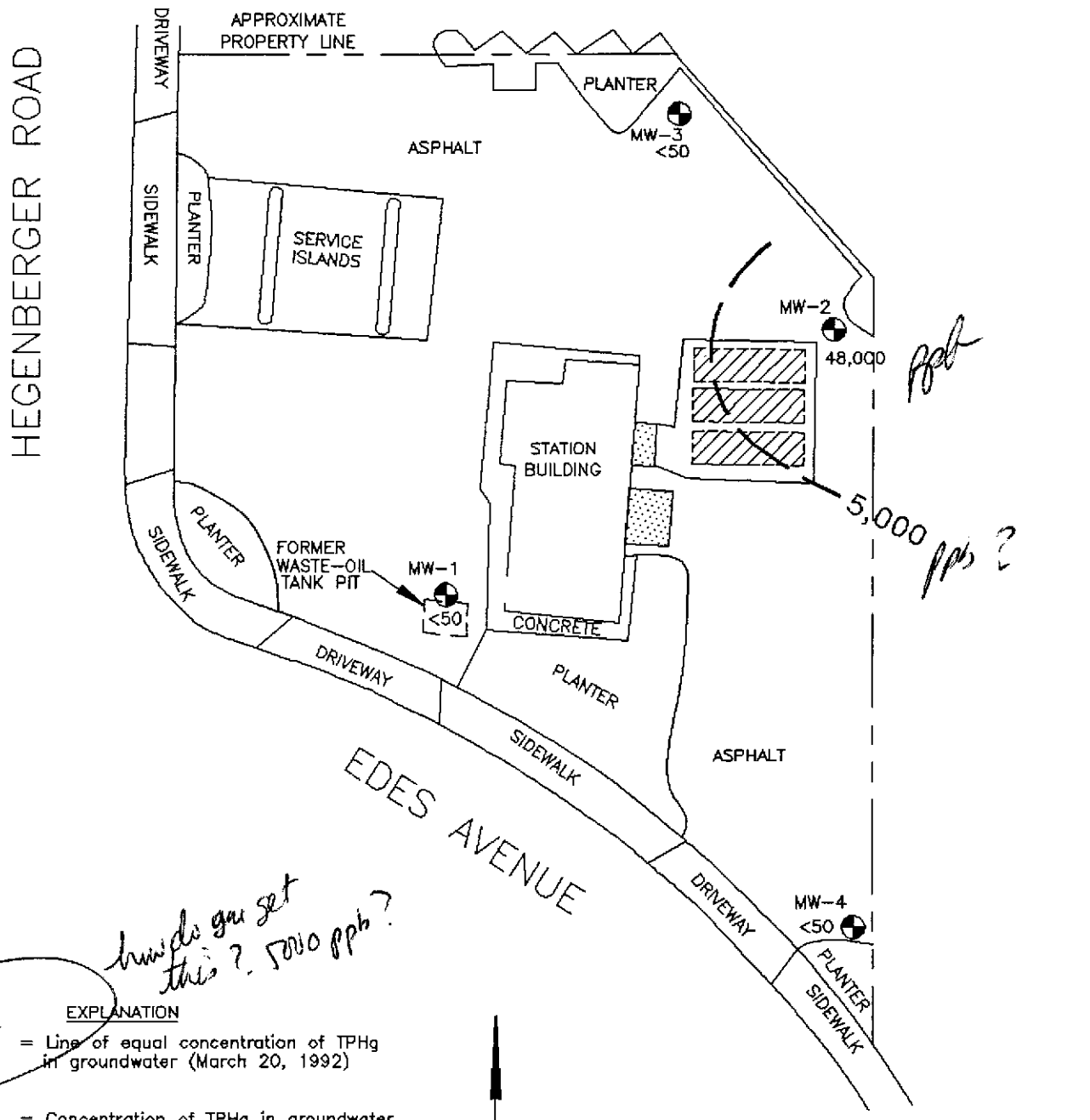
GROUNDWATER GRADIENT MAP
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 5



how do you get this ? 5000 ppb ?

EXPLANATION

5000 = Line of equal concentration of TPHg in groundwater (March 20, 1992)

48,000 = Concentration of TPHg in groundwater (March 20, 1992)

B-4/MW-4 = Monitoring Well (Applied Geosystems, Oct. 1989 and Aug. 1990)

= Existing gasoline storage tanks

= Concrete

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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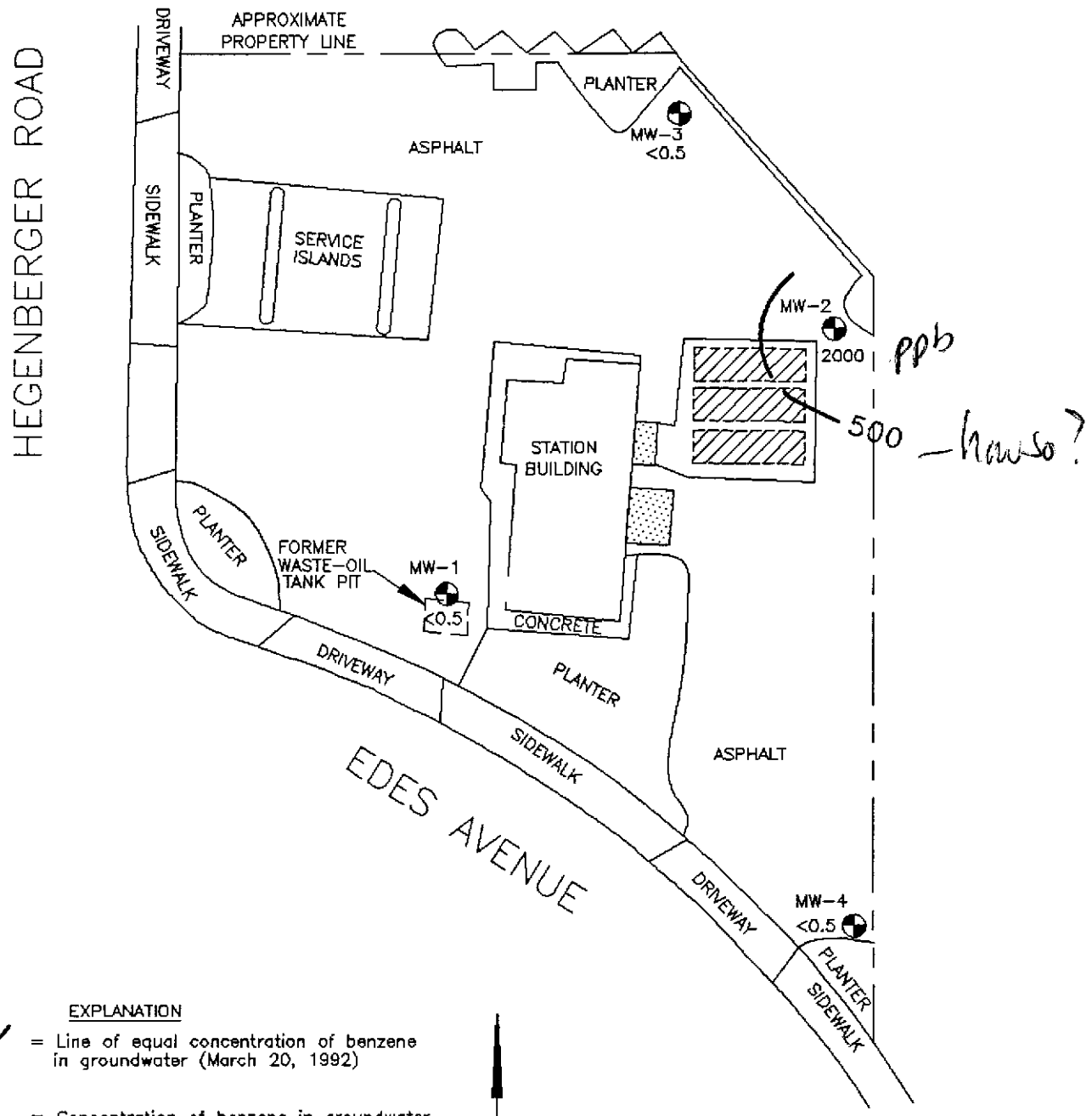
CONCENTRATION OF TPHg IN GROUNDWATER
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 6



EXPLANATION

500 = Line of equal concentration of benzene in groundwater (March 20, 1992)

2000 = Concentration of benzene in groundwater (March 20, 1992)

B-4/MW-4 = Monitoring Well (Applied Geosystems, Oct. 1989 and Aug. 1990)

= Existing gasoline storage tanks

= Concrete

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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CONCENTRATION OF BENZENE IN GROUNDWATER
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 7

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
10/17/91		7.22	98.09	None
11/21/91		7.17	98.14	None
12/18/91		7.46	97.85	None
01/19/92		7.44	97.87	None
02/20/92		6.25	99.06	None
03/20/92		6.40	98.91	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
10/17/91		9.39	96.39	Sheen
11/21/91		9.20	96.58	None
12/18/91		9.23	96.55	Sheen
01/19/92		9.96**	95.82	Skimmer
02/20/92		9.13**	96.65	Skimmer
03/20/92		9.31**	96.47	Skimmer

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				
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
07/24/91		8.96	96.55	None
08/22/91		8.92	96.59	None
09/30/91		9.04	96.47	None
10/17/91		9.12	96.39	None
11/21/91		8.92	96.59	None
12/18/91		8.97	96.54	None
01/19/92		8.69	96.82	None
02/20/92		7.78	97.73	None
03/20/92		8.15	97.36	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
10/17/91		8.42	98.19	None
11/21/91		8.65	97.96	None
12/18/91		8.77	97.84	None
01/19/92		8.42	98.19	None
02/20/92		7.60	99.01	None
03/20/92		7.61	99.00	None

Depth measurements in feet. * = Floating Product present in well. ** = Skimmer Installed (12/24/91)
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 2)

Well / Date	TPHg (ppb)	TPHd (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	TOG (ppm)
MW-1							
06/19/90	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<5,000
08/16/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
09/07/90	NA	NA	NA	NA	NA	NA	<5,000
11/29/90	<50	NA	<0.50	0.7	<0.50	<0.50	NA
03/07/91	<50	NA	<0.30	<0.30	<0.30	<0.50	NA
06/27/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
09/30/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
12/18/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
03/20/92	<50	NA	<0.5	<0.5	<0.5	<0.5	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				
12/18/91			Not sampled–sheen				
03/20/92	48,000	NA	2,000	580	2,300	7,000	NA
MW-3							
08/16/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
09/07/90	NA	NA	NA	NA	NA	NA	<5,000
11/29/90	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
03/07/91	<50	NA	<0.30	<0.30	<0.30	<0.50	NA
06/27/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
09/30/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
12/18/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
03/20/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
MW-4							
08/16/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
09/07/90	NA	NA	NA	NA	NA	NA	<5,000
11/29/90	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
03/07/91	<50	NA	<0.30	<0.30	<0.30	<0.50	NA
06/27/91	<30	NA	0.75	1.1	<0.30	1.6	NA
09/30/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
12/18/91	<30	NA	0.83	1.2	<0.30	0.58	NA
03/20/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
Jan. 1990							
MCLs	—	—	1.0	—	680	1,750	—
Als	—	—	—	100	—	—	—

See notes on page 2 of 2.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES–TPHg, TPHd, BTEX, and TOG
ARCO Station 4494
Oakland, California
(Page 2 of 2)

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.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES--BNAs, VOCs, and Metals
ARCO Station 4494
Oakland, California

Well / Date	BNAs (ppm)	VOCs (ppb)	Total Cadmium (ppm)	Chromium (ppm)	Lead (ppm)	Zinc (ppm)
MW-1						
06/19/90	<0.05	<0.05	0.024	<0.02	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
12/18/91	NA	NA	NA	NA	NA	NA
03/20/92	NA	NA	NA	NA	NA	NA
MW-3						
08/16/90	<0.05	<0.05	<0.01	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
12/18/91	NA	NA	NA	NA	NA	NA
03/20/92	NA	NA	NA	NA	NA	NA
MW-4						
08/16/90	<0.05	<0.05	<0.01	<0.02	<0.02	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
12/18/91	NA	NA	NA	NA	NA	NA
03/20/92	NA	NA	NA	NA	NA	NA
DWALs/MCLs	—	—	0.010	0.05	0.05	NE

NA: Not Analyzed.
BNA: Base neutral and acid extractables including polynuclear aromatics concentrations are below laboratory reporting limits for respectable compounds except as indicated. ([a] = naphthalene, [b] = 2-methylnaphthalene)
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 RECOVERED
ARCO Station 4494
Oakland, California

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
12/18/91	Sheen	7
01/30/92	None present	0
02/28/92	None present	0
03/25/92	None present	0
Total:	6.4 Gallons	48.9 Gallons

APPENDIX A

EMCON'S FIELD REPORTS (2), DEPTH TO WATER/FLOATING PRODUCT SURVEY FORM, SUMMARY OF GROUNDWATER MONITORING DATA, CERTIFIED ANALYTICAL REPORTS WITH CHAIN OF CUSTODY RECORD, AND WATER SAMPLE FIELD DATA SHEETS

MONITORING WELL PURGE WATER DISPOSAL FORM

EMCON
ASSOCIATES
Consultants in Wastes Management and Environmental Control

RECEIVED
MAR 2 - 1992
RESNA
SAN JOSE

Date February 25, 1992
Project G70-31.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	Depth To Water/Floating Product Survey Form, February 1992 monthly water level survey, ARCO station 4494, 566 Hegenberger Road, Oakland, CA

For your: X Information Sent by: X Mail

Comments:
Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by:

Mark Knuttel MK

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-31.01 STATION ADDRESS : 566 Hegenberger Road, Oakland DATE : 2-20-92

ARCO STATION # : 4494 FIELD TECHNICIAN : VINCE BARLOCK DAY : THURSDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	OK	YES	OK	YES	YES	6.25	6.25	ND	ND	23.25	—
2	MW-2	OK	YES	OK	YES	YES	9.13	9.13	ND	ND	17.50	DEDICATED BAILER IN WELL
3	MW-3	OK	YES	OK	YES	YES	7.78	7.78	NO	ND	18.00	—
4	MW-4	OK	YES	OK	YES	YES	7.59	7.60	NO	NO	18.10	—

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

Date January 29, 1992
Project G70-31.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	DTW/FP Survey Form, January 1992 monthly water level survey, ARCO station 4494, 566 Hegenberger Road, Oakland, CA

For your: X Information Sent by: X Mail

Comments:
Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
No. 4094
Exp. 6/30/92
INDUSTRIAL
STATE OF CALIFORNIA

Mark Knuttel MK

Robert Porter

Robert Porter, Senior P.E. #4094

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-31.01 STATION ADDRESS : 566 Hegenberger Road, Oakland DATE : 1-19-92

ARCO STATION # : 4494 FIELD TECHNICIAN : J Williams DAY : Sunday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	ok	yes	ok	yes	yes	7.43	~~7.44~~	N/D	N/D	23.27	—
2	MW-2	"	"	"	"	"	4.96	9.96	N/D	N/D	17.49	—
3	MW-3	"	"	"	"	"	8.69	8.69	N/D	N/D	18.00	—
4	MW-4	"	"	"	"	"	8.42	8.42	N/D	N/D	18.10	—

EMCON
ASSOCIATES
Consultants in Wastes
Management and
Environmental Control

Date April 1, 1992
Project G70-31.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Alamden Expressway, Suite 34
San Jose, California 95050

We are enclosing:

Copies	Description
1	Depth To Water / Floating Product Survey Results
1	Summary of Groundwater Monitoring Data
1	Certified Analytical Reports with Chain-of-Custody
4	Water Sample Field Data Sheets

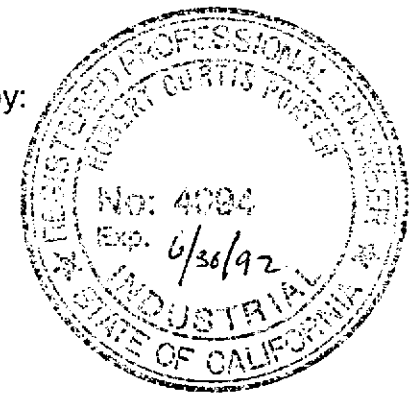
For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the first quarter 1992 monitoring event at ARCO service station 4494, 566 Hegenberger Road, Oakland, California. Please call if you have any questions:.(408) 453-2266.

Mark Knuttel MK

Reviewed by:



Robert Porter, Senior Project Engineer.

1938 Junction Avenue, San Jose, California 95131-2102, (408) 453-0719, Fax (408) 453-0452

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-31.01 STATION ADDRESS : 566 Hegenberger Road, Oakland DATE : 3/20/92

ARCO STATION # : 4494 FIELD TECHNICIAN : L. RATH DAY : FRI

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	good	Yes	good	3259	good	6.141	6.410	NA	NA	23.29	Heavy Rain storm
2	MW-2	good	Yes	good	↓	good	9.30	9.31	NA	NA	17.55	
3	MW-3	good	Yes	good	↓	good	~~8.15~~	~~8.15~~	NA	NA	~~17.53~~	18.0
4	MW-4	good	Yes	good	↓	good	7.61	7.61	NA	NA	18.14	

Summary of Groundwater Monitoring Data
First Quarter 1992
ARCO Service Station 4494
566 Hegenberger Road, Oakland, California
micrograms per liter (µg/l) or parts per billion (ppb)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH[1] as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)
MW-1(22)	03/20/92	6.41	ND.[2]	<50	<0.5	<0.5	<0.5	<0.5
MW-2(16)	03/20/92	9.30	ND.	48,000.	2,000.	580.	2,300.	7,000.
MW-3(17)	03/20/92	8.15	ND.	<50	<0.5	<0.5	<0.5	<0.5
MW-4(17)	03/20/92	7.61	ND.	<50	<0.5	<0.5	<0.5	<0.5
FB-1[3]	03/20/92	NA.[4]	NA.	<50	<0.5	<0.5	<0.5	<0.5

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. FB. = Field blank
4. NA. = Not applicable

Columbia Analytical Services INC.

March 31, 1992

Mr. Mark Knuttel
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **EMCON Project No. G70-31.01**
Arco Facility No. 4494

Dear Mr. Knuttel:

Enclosed are the results of the water samples submitted to our lab on March 20, 1992. For your reference, our service request number for this work is SJ92-0293.

All analyses were performed in accordance with the laboratory's quality assurance program.

Please call if you have any questions.

Respectfully submitted:

Keoni A. Murphy
COLUMBIA ANALYTICAL SERVICES, INC.

le/KAM

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	03/20/92
Project:	EMCON Project No. G70-31.01	**Work Order #:**	SJ92-0293
	Arco Facility No. 4494	**Sample Matrix:**	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
µg/L (ppb)

Sample Name:		MW-1 (22)	MW-2 (16)	MW-3 (17)
Date Analyzed:		03/24/92	03/25/92	03/24/92
Analyte	**MRL**			
Benzene	0.5	ND	2,000.	ND
Toluene	0.5	ND	580.	ND
Ethylbenzene	0.5	ND	2,300.	ND
Total Xylenes	0.5	ND	7,000.	ND
TPH as Gasoline	50	ND	48,000.	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date March 31, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	03/20/92
Project:	EMCON Project No. G70-31.01	**Work Order #:**	SJ92-0293
	Arco Facility No. 4494	**Sample Matrix:**	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
µg/L (ppb)

Sample Name:		MW-4 (17)	FB-1	Method Blank
Date Analyzed:		03/24/92	03/24/92	03/24/92
Analyte	**MRL**			
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
TPH as Gasoline	50	ND	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date March 31, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	03/20/92
Project:	EMCON Project No. G70-31.01	**Work Order #:**	SJ92-0293
	Arco Facility No. 4494	**Sample Matrix:**	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
µg/L (ppb)

Sample Name:		Method Blank
Date Analyzed:		03/25/92
Analyte	**MRL**	
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
TPH as Gasoline	50	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Kevin Murphy Date March 31, 1992

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMLGC-92-1

Chain of Custody

ARCO Facility no. 4494	City (Facility) Oakland	Project manager (Consultant) Mark Knuttel	Laboratory name CAS
ARCO engineer Kyle Christie	Telephone no. (ARCO) 415-571-2434	Telephone no. (Consultant) 408-453-0719	Fax no. (Consultant) 408-453-0452
Consultant name Emcon Associates	Address (Consultant) 1938 Junction Ave, San Jose, CA		Contract number 07077

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 gas 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 Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-1(22)	1-2	2		X		X	HCl	3/20/92	1315		X											
MW-2(16)	3-4	2		X		X	HCl		1340		X											
MW-3(17)	5-6	2		X		X	HCl		1420		X											
MW-4(17)	7-8	2		X		X	HCl		1505		X											
FB-1	9-10	2		X		X	HCl	↓	1315		X											
									↓													
MW-4(17)		1		X		X	~~HNO₃~~	3/20/92	1505					NO SAMPLE						X		

Special detection Limit/reporting: Lowest possible

Special QA/QC: as normal

Remarks: G70-31.01
TPH-g/BTXE
2-40 ml HCl VOAs
Total Lead
1-500 ml LPE HNO_3
- NOT FILTERED -

Lab number: SJ92-0293

Turnaround time
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☑

Method of shipment: Sampler will deliver

Condition of sample: ok / product-MW-2 no Pb sample recd

Temperature received: cool

Relinquished by sampler: Lisa Peaty	Date 3/20/92	Time 1646	Received by:
Relinquished by:	Date	Time	Received by: 3-20-92 16:50
Relinquished by:	Date	Time	Received by laboratory: Date: Time:

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

WATER SAMPLE FIELD DATA SHEET

Rev. 2

EMCON ASSOCIATES

PROJECT NO: 7C-31 01 | SAMPLE ID: MW-1

PURGED BY: L. RATTI | CLIENT NAME: ARCO 4494

SAMPLED BY: L. RATTI | LOCATION: 566 Hegenberge

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 X 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR | VOLUME IN CASING (gal.): 11.07

DEPTH TO WATER (feet): 6.41 | CALCULATED PURGE (gal.): 55.36

DEPTH OF WELL (feet): 23.29 / 16.88 x | ACTUAL PURGE VOL (gal.): 23.0

DATE PURGED: 3/20/97 | Start (2400 Hr) 1250 | End (2400 Hr) 1301

DATE SAMPLED: 3/20/97 | Start (2400 Hr) 1315 | End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (visual)
1252	11.25	7.16	5760	61.8	Clear	light
1255	22.50	7.26	9750	64.3	"	"
	~~33.75~~	Well Dried at 23.0 gal at 1301				
1315	~~45.00~~	7.09	9.620	64.0	"	mod
	56.25					

D. O. (ppm): NR | ODOR: None | COLOR (COBALT 0 - 100): NR | TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB 1

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good | LOCK #: 3259

REMARKS: Well Purged During a heavy down pour of Rain
Sheen From Active GAS pump ISLANDS Seen on Asphalt
well Dried at 23.0 Gal at 1301

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-1 [illegible]

Signature: [signature] | Reviewed By: MK | Page 1 of 4

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/

EMCON ASSOCIATES

PROJECT NO: G70-31.01 | SAMPLE ID: MW-2

PURGED BY: L. RATTI | CLIENT NAME: ARCO 61494

SAMPLED BY: L. RATTI | LOCATION: 566 Hegenberger

TYPE: Ground Water X | Surface Water ___ | Treatment Effluent ___ | Other ___

CASING DIAMETER (inches): 2 ___ | 3 ___ | 4 X | 4.5 ___ | 6 ___ | Other ___

CASING ELEVATION (feet/MSL): NR | VOLUME IN CASING (gal.): 5.41

DEPTH TO WATER (feet): 9.30 | CALCULATED PURGE (gal.): 27.06

DEPTH OF WELL (feet): 17.55 (5.25 x 3.28) | ACTUAL PURGE VOL. (gal.): 7.0

DATE PURGED: 3/20/92 | Start (2400 Hr) 1320 | End (2400 Hr) 1329

DATE SAMPLED: ↓ | Start (2400 Hr) 1340 | End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (Visual)
1324	5.5	8.01	8920	60.7	Brown	mod
	H.O	Well Dried at 7.0 gal at 13:29 HRS				
1340	~~H.5~~	8.10	8840	60.8	Black	Heavy
	~~2.0~~					
	~~2.5~~					

D. O. (ppm): NR | ODOR: Strong | NR (COBALT 0 - 100) | NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good | LOCK #: 3259

REMARKS: Well Dried at 7.0 gal at 13:29 HRS

Well Purged and Sampled During a Heavy Rain Storm

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-1

Signature: [signature] | Reviewed By: MK | Page 2 of 4

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/

EMCON ASSOCIATES

PROJECT NO: 670-31.01 | SAMPLE ID: MW-3
PURGED BY: L.RATH | CLIENT NAME: ARCO 4494
SAMPLED BY: L.RATH | LOCATION: 566 Hegenberger

TYPE: Ground Water X | Surface Water ___ | Treatment Effluent ___ | Other ___

CASING DIAMETER (inches): 2 ___ | 3 ___ | 4 X | 4.5 ___ | 6 ___ | Other ___

CASING ELEVATION (feet/MSL): NR
DEPTH TO WATER (feet): 8.15
DEPTH OF WELL (feet): 18.0
9.55 x 3.38
VOLUME IN CASING (gal.): 6.46
CALCULATED PURGE (gal.): 32.30
ACTUAL PURGE VOL. (gal.): 32.5

DATE PURGED: 3/20/92 | Start (2400 Hr) 1355 | End (2400 Hr) 1415
DATE SAMPLED: ✓ | Start (2400 Hr) 1420 | End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1401	6.5	7.71	84440	64.6	Brown	Mod
1405	13.0	7.31	84580	65.5	"	"
1409	19.5	7.25	84150	66.0	"	"
1413	26.0	7.30	84470	66.3	"	"
1415	32.5	7.40	84160	66.41	"	"

D. O. (ppm): NR | ODOR: NONE | NR (COBALT 0 - 100) | NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good | LOCK #: 3259

REMARKS: Well Sampled and Purged During a heavy Rain Storm

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-1

Signature: [signature] | Reviewed By: MK | Page 3 of 4

WATER SAMPLE FIELD DATA SHEET

Rev. 2.5

EMCON ASSOCIATES

PROJECT NO: 370 310' | SAMPLE ID: MW-4

PURGED BY: L. RATH | CLIENT NAME: ARCO 4494

SAMPLED BY: L. RATH | LOCATION: 566 Hegenberger

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 X 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR | VOLUME IN CASING (gal.): 6.90

DEPTH TO WATER (feet): 7.61 | CALCULATED PURGE (gal.): 34.53

DEPTH OF WELL (feet): 18.14 (10.53 x 3.28) | ACTUAL PURGE VOL (gal.): 17.0

DATE PURGED: 3/20/92 | Start (2400 Hr) 1435 | End (2400 Hr) 1446

DATE SAMPLED: ↓ | Start (2400 Hr) 1505 | End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1439	7	7.51	8970	66.9	Clear	light
1442	14	7.39	9120	66.2	Cloudy	MOD
	~~21~~ Recharge	Well	Dried at 17.0 gal at	1446 HRS.		
1505	~~28~~	7.41	9210	66.3	"	"
	~~35~~					

D. O. (ppm): NR | ODOR: NONE | COLOR (COBALT 0 - 100): NR | TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- X Centrifugal Pump
- ___ Submersible Pump
- ___ Well Wizard™
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)
- ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

- ___ 2" Bladder Pump
- ___ DDL Sampler
- ___ Dipper
- ___ Well Wizard™
- X Bailer (Teflon®)
- ___ Bailer (Stainless Steel)
- ___ Submersible Pump
- ___ Dedicated

Other: ___

WELL INTEGRITY: Good | LOCK #: 3259

REMARKS: Well Dried at 17.0 gal. at 1446 HRS

Well Sampled and Purged During a Heavy Rain Storm

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-1

Signature: [signature] | Reviewed By: MK | Page 4 of 4