RESNA
Working To Restore Nature

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TRANSMITTAL

TO: Mr. Barney Chan
ACHCSA, Dept. of Envir. Health
80 Swan Way, Room 200
Oakland, California 94621

DATE: December 30, 1993
PROJECT NUMBER: 69038.12
SUBJECT: ARCO Station 4494
566 Hegenberger Road, Oakland, California

FROM: John C. Young

354

94 JAN -3 PM 1:54
ALCO HAZMAT

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REMARKS:
cc: Mr. Richard Hiett, RWQCB
Mr. Michael Whelan, ARCO
1 to RESNA project file no. 69038.12

John C. Young, Client Manager

RESNA
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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Third Quarter 1993
at
ARCO Station 4494
566 Hegenberger Road
Oakland, California

69038.12

RESNA
Working To Restore Nature

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December 30, 1993
3rdqtr93
69038.12

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

Subject: Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1993, ARCO Station 4494, 566 Hegenberger Road, Oakland, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) prepared this letter report which summarizes the results of third quarter 1993 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, California, at the above-referenced site. The scope of work for quarterly monitoring at the site was reduced from monthly monitoring (depth-to-water measurements and subjective analysis) and quarterly sampling, to quarterly monitoring and sampling. The reduced monitoring is in response to a relatively stable groundwater gradient and flow direction.

The objectives of this quarterly groundwater monitoring event are to evaluate changes in the groundwater flow direction and gradient, and evaluate changes in concentrations of petroleum hydrocarbons in the local groundwater associated with former underground gasoline-storage tanks (USTs) 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's scope of work. RESNA's scope of work was limited to interpretation of field and laboratory analytical 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 corner of the intersection of Edes Avenue and Hegenberger Road in Oakland, California as shown on the Site Vicinity Map, Plate 1.

Previous work associated with the subject site is presented in prior subsurface investigation reports listed in the references section. The locations of the groundwater monitoring wells and pertinent site features are shown on Generalized Site Plan, Plate 2.

Groundwater Sampling and Gradient Evaluation

Depth to water measurements (DTW) and quarterly sampling were performed by EMCON field personnel on August 16, 1993. 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, and MW-3 through MW-7, are presented on EMCON's Field Reports, Summary of Groundwater Monitoring Data, and Water Sample Field Data Sheets. These data are included in Appendix A. Wells MW-2 and RW-1 were not monitored because MW-2 was destroyed as part of tank replacement activities at the site, and recovery well RW-1, constructed the behind the slurry wall between the former tank pit excavation and the storm drain, has subsequently filled in with sediment and does not contain water. In the first quarter of 1994, RESNA will remove the sediment and install a 2-inch diameter well inside the existing 6-inch diameter well.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations of product in the groundwater (if present) from MW-1, and MW-3 through MW-7 for this and previous quarters are summarized in Table 1, Cumulative Groundwater Monitoring Data. EMCON's DTW measurements were used to evaluate groundwater elevations. No floating product or product sheen was detected during this monitoring event (see EMCON's Field Reports and Water Sample Field Data Sheets, Appendix A). The groundwater gradient and flow direction interpreted from the August 1993 groundwater monitoring event are shown on Groundwater Gradient Map, Plate 3. The groundwater gradient and flow direction interpreted from EMCON's DTW measurements was approximately 0.004 ft/ft toward the north-northwest. The groundwater gradient for this quarter is generally consistent with previously interpreted data.

Groundwater monitoring wells MW-1 and MW-3 through MW-7 were purged and sampled by EMCON field personnel on August 16, 1993. The purge water was removed from the site by a licensed hazardous waste hauler.

Laboratory Methods and Results

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 and MW-3 through MW-7 were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total petroleum hydrocarbons as gasoline (TPHg) using Environmental Protection Agency (EPA) Methods 5030/8020/DHS LUFT Method. 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 Water Samples--TPHg, TPHd, BTEX, and TOG and Table 3, Cumulative Results of Laboratory Analyses of Water Samples--BNAs, VOCs, and Metals. Concentrations of TPHg and benzene in the groundwater are shown on Plate 4, TPHg/Benzene Concentrations in Groundwater.

Concentrations of TPHg and BTEX were not detected at the laboratory method detection limit in wells MW-1, and MW-3 through MW-7. The wells had not previously been sampled since October 1992, however, concentrations of TPHg and BTEX were not detected in October 1992.

Product Removal

Since monitoring began in June 1990, evidence of floating product or product sheen has been observed only in well MW-2, which was destroyed as part of tank replacement activities at the site. Quantities of floating product and water removed during previous quarterly monitoring events are presented on Table 4, Approximate Cumulative Product Recovered.

Distribution

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. Richard Hiett
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.

Erin D. Krueger
Staff Geologist

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

James L. Nelson
Certified Engineering Geologist No. 1463

Enclosures: References

Plate 1: Site Vicinity Map
Plate 2: Generalized Site Plan
Plate 3: Groundwater Gradient Map, August 16, 1993
Plate 4: TPHg/Benzene Concentrations in Groundwater, August 16, 1993

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-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

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 Environmentai 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.

Department of Health Services, State of California. October 24, 1990. Summary of California Drinking Water Standards.

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. RESNA Report 69038.04.

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

RESNA. May 8, 1992. Letter Report on Quarterly Groundwater Monitoring, First Quarter 1992 at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. RESNA Report 69038.11

REFERENCES
(Continued)

RESNA. September 3, 1992. Letter Report on Quarterly Groundwater Monitoring, Second Quarter 1992 at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. RESNA Report 69038.11.

RESNA. October 29, 1992. Additional Subsurface Investigation at ARCO Station 4494, 566 Hegenberger Road in Oakland, California. RESNA Report 69038.10.

RESNA. November 30, 1992. Letter Report on Quarterly Groundwater Monitoring, Third Quarter 1992 at ARCO Station 4494, 566 Hegenberger Road in Oakland, California. RESNA Report 69038.11.

RESNA. December 31, 1992. Addendum to Work Plan to Construct an Interim Slurry Wall at ARCO Station 4494, 566 Hegenberger Road in Oakland, California. RESNA Report 69038.13.

RESNA. March 9, 1993. Letter Report on Quarterly Groundwater Monitoring, Fourth Quarter 1992 at ARCO Station 4494, 566 Hegenberger Road in Oakland, California. RESNA Report 69038.12.

RESNA. May 17, 1993. Report of Findings Underground Gasoline-Storage Tank Removal and Replacement at ARCO Station 4494, 566 Hegenberger Road in Oakland, California. RESNA Report 69038.13.

RESNA. June 17, 1993. Letter Report on Quarterly Groundwater Monitoring, First Quarter 1993 at ARCO Station 4494, 566 Hegenberger Road in Oakland, California. RESNA Report 69038.12.

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

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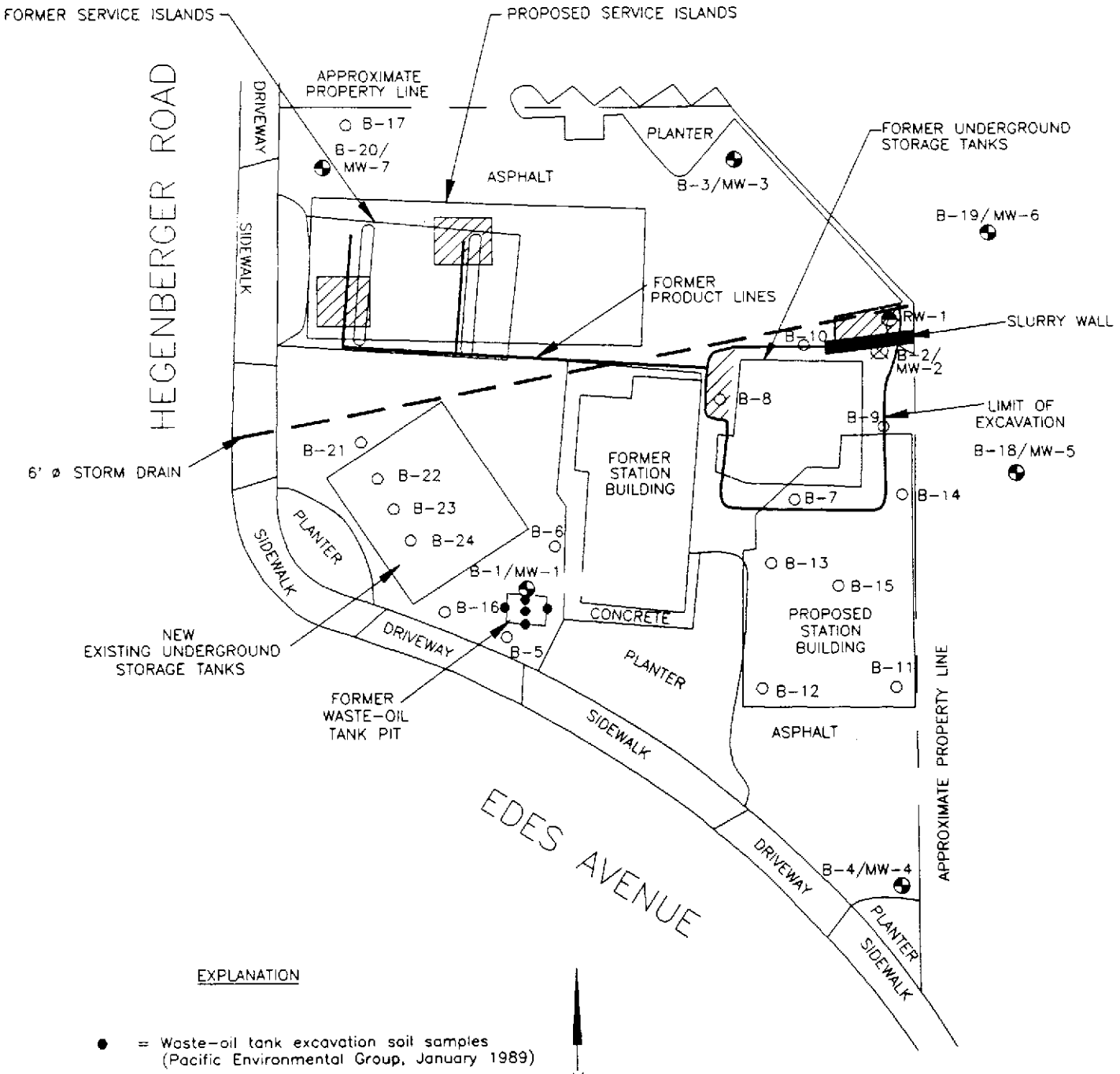
SITE VICINITY MAP
ARCO Station 4494
566 Hegenberger Road
Oakland, California

PLATE
1



Source: Surveyed by John Koch, Licensed Land surveyor, July 1992.

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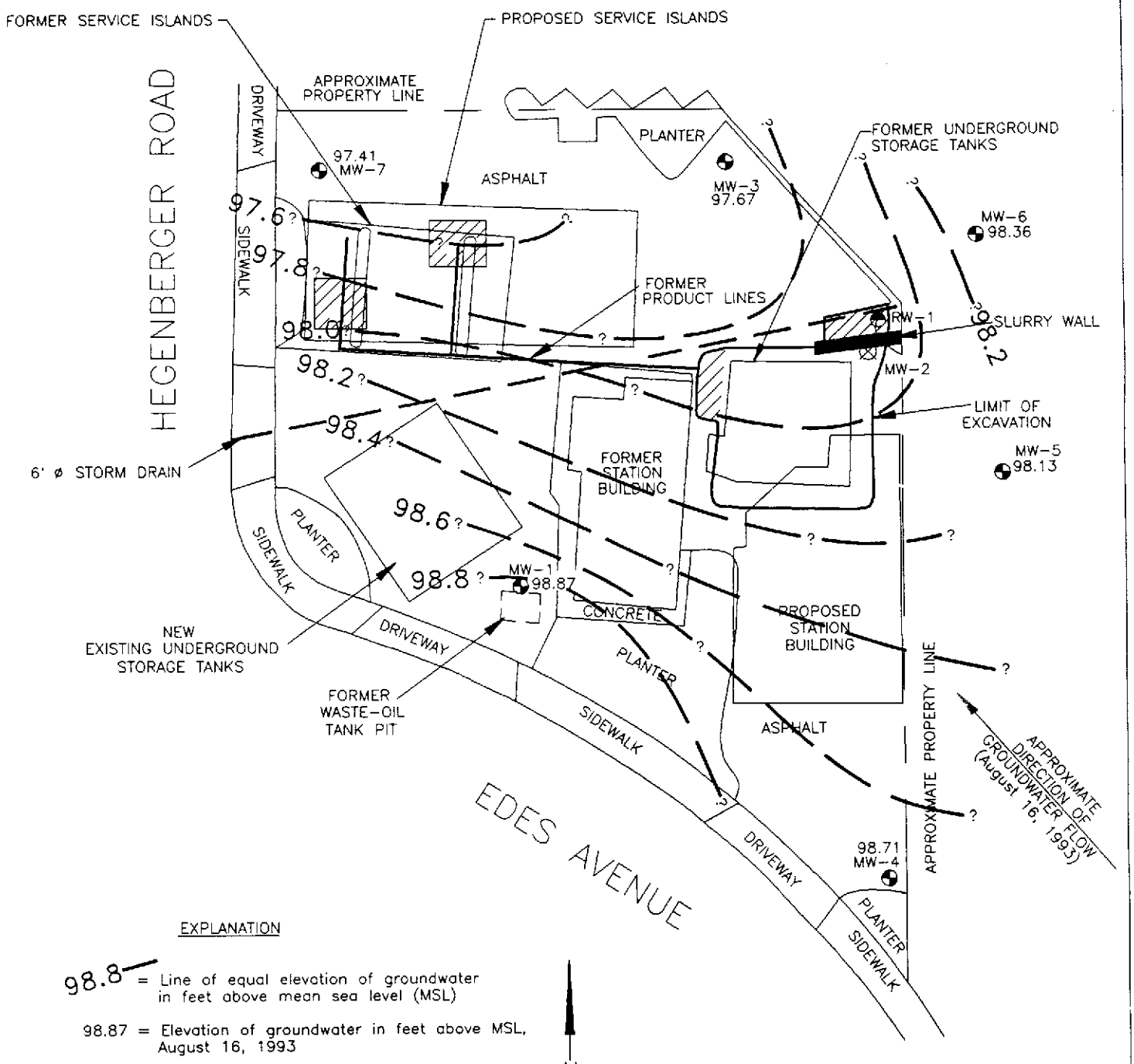
GENERALIZED SITE PLAN
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 2



Source: Surveyed by John Koch, Licensed Land surveyor, July 1992.

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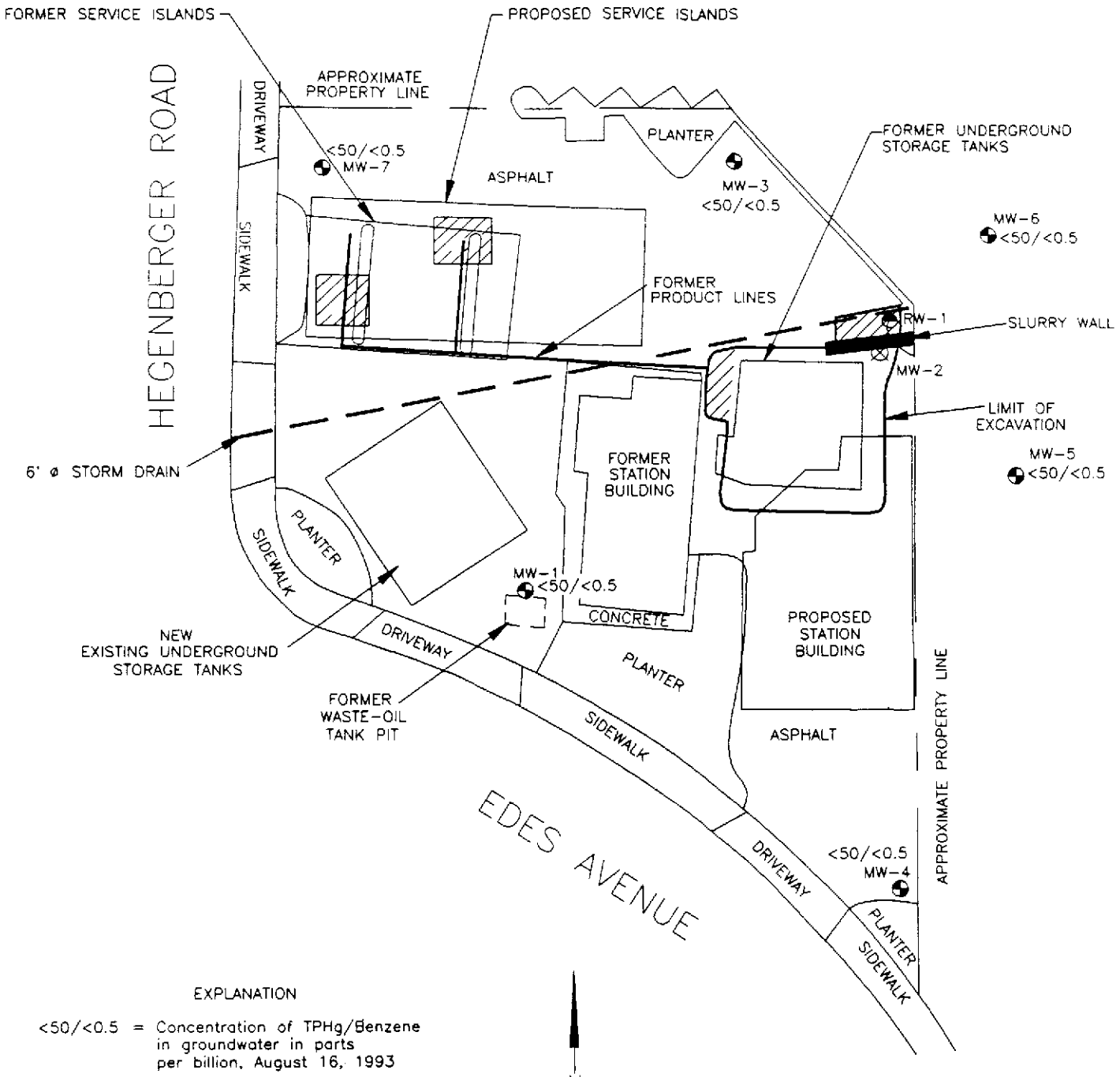
GROUNDWATER GRADIENT MAP
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 3



EXPLANATION

<50/<0.5 = Concentration of TPHg/Benzene in groundwater in parts per billion, August 16, 1993

RW-1 = Recovery well installed during slurry wall construction (RESNA April 1993)

MW-7 = Monitoring wells (Applied GeoSystems, October 1989, August 1990; and RESNA, July 1992)

MW-2 = Destroyed monitoring well (December 1992)

= Approximate location of over-excavated areas

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land surveyor, July 1992.

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TPHg/BENZENE CONCENTRATIONS IN GROUNDWATER
ARCO Service Station 4494
566 Hegenberger Road
Oakland, California

PLATE 4

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 4494
Oakland, California
(Page 1 of 4)

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
04/20/92		6.88	98.43	None
05/19/92		7.10	98.21	None
06/08/92		7.22	98.09	None
07/15/92		7.92	97.39	None
08/06/92	106.10	7.29	98.81	None
10/29/92		7.34	98.76	None
11/23/92		8.15	97.95	None
08/16/93		7.23	98.87	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

See notes on page 4 of 4.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 4494
Oakland, California
(Page 2 of 4)

Well Date	Elevation of Wellhead	Depth to Water	Water Elevation	Floating Product
MW-2 (Cont.)				
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	105.78	9.31**	96.47	Skimmer
04/20/92		9.69	96.09	Skimmer
05/15/92		9.92	95.86	Skimmer
06/08/92		9.84	95.94	Skimmer
07/15/92		10.19	95.59	Skimmer
08/06/92	106.57	10.05	96.52	Skimmer
10/29/92		10.00	96.57	Skimmer
11/23/92		9.87	96.70	0.01
12/08/92		Well Destroyed		
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

See notes on page 4 of 4.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 4494
Oakland, California
(Page 3 of 4)

Well Date	Elevation of Wellhead	Depth to Water	Water Elevation	Floating Product
MW-3 (Cont.)				
04/20/92		8.57	96.94	None
05/15/92		8.76	96.75	None
06/08/92		8.74	96.77	None
07/15/92		9.12	96.39	None
08/06/92	106.29	8.95	97.34	None
10/29/92		8.78	97.51	None
11/23/92		9.91	96.38	None
08/16/93		8.62	97.67	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	106.61	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
04/20/92		8.15	98.46	None
05/15/92		8.34	98.27	None
06/08/92		8.40	98.21	None
07/15/92		8.72	97.89	None
08/06/92	107.40	8.52	98.09	None
10/29/92		8.63	98.77	None
11/23/92		8.75	98.65	None
08/16/93		8.69	98.71	None

See notes on page 4 of 4.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 4494
Oakland, California
(Page 4 of 4)

Well Date	Elevation of Wellhead	Depth to Water	Water Elevation	Floating Product
MW-5				
08/06/92	105.19	7.19	98.00	None
10/29/92		6.99	98.20	None
11/23/92		6.90	98.29	None
08/16/93		7.06	98.13	None
MW-6				
08/06/92	105.07	7.01	98.06	None
10/29/92		6.70	98.37	None
11/23/92		6.75	98.32	None
08/16/93		6.71	98.36	None
MW-7				
08/06/92	105.52	8.28	97.24	None
10/29/92		8.62	96.90	None
11/23/92		8.21	97.31	None
08/16/93		8.11	97.41	None
RW-1				
08/16/93	Not Surveyed	Dry	Dry	NM

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	<0.50	<0.50	<0.50	<0.50	NA
06/08/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
08/06/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
10/29/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/16/93	<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
06/08/92	43,000	NA	2,900	940	2,400	5,100	NA
08/06/92	78,000	NA	2,500	6,700	2,900	16,000	NA
10/29/92			Not sampled–product				
12/08/92			Well Destroyed				
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	<0.50	<0.50	<0.50	<0.50	NA
06/08/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
08/06/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
10/29/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/16/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA

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)

Well Date	TPHg (ppb)	TPHd (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Total Xylenes (ppb)	TOG (ppm)
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	<0.50	<0.50	<0.50	<0.50	NA
06/08/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
08/06/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
10/29/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/16/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
MW-5							
08/06/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
10/29/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/16/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
MW-6							
08/06/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
10/29/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/16/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
MW-7							
08/06/92	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
10/29/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/16/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
RW-1							
08/16/93	NS	NS	NS	NS	NS	NS	NS
Jan. 1990							
MCLs	—	—	1.0	—	680	1,750	—
DWAL	—	—	—	100	—	—	—

TPHg : Total petroleum hydrocarbons as gasoline using EPA Methods 5030 and 8015.
TPHd : Total petroleum hydrocarbons as diesel using EPA Methods 3550 and 8015.
BTEX : Benzene, toluene, ethylbenzene, and total xylene isomers using EPA Method 5030 and 8020.
TOG : Total oil and grease using EPA Standard Method 503E.
NA : Not Analyzed.
NS : Not Sampled.
MCL : State Maximum Contaminant Level (October 1990).
DWAL : State Drinking Water Action Level (October 1990).

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES--BNAs, VOCs, and Metals
ARCO Station 4494
Oakland, California
(Page 1 of 2)

Well / Date	BNAs (ppm)	VOCs (ppb)	Total Cadmium (ppm)	Chromium (ppm)	Lead (ppm)	Nickel (ppm)	Zinc (ppm)
MW-1							
06/19/90	<0.05	<0.05	0.024	<0.02	0.10	NA	0.049
08/16/90	NA	NA	NA	NA	NA	NA	NA
11/29/90	NA	NA	NA	NA	NA	NA	NA
03/07/91	NA	NA	NA	NA	NA	NA	NA
06/27/91	NA	NA	NA	NA	NA	NA	NA
09/30/91	NA	NA	NA	NA	NA	NA	NA
12/18/91	NA	NA	NA	NA	NA	NA	NA
03/20/92	NA	NA	NA	NA	NA	NA	NA
06/08/92	NA	NA	0.003	<0.005	<0.002	<0.02	0.018
08/06/92	NA	NA	NA	NA	NA	NA	NA
10/29/92	NA	NA	NA	NA	NA	NA	NA
08/16/93	NA	NA	NA	NA	NA	NA	NA
MW-2							
06/08/92	NA	NA	0.214	0.402	0.658	0.434	252
08/06/92	NA	NA	0.005	0.018	0.088	0.041	4.7
10/29/92	NA	NA	NA	NA	NA	NA	NA
12/08/92			Well Destroyed				
MW-3							
08/16/90	<0.05	<0.05	<0.01	0.06	0.07	NA	0.07
11/29/90	NA	NA	NA	NA	NA	NA	NA
03/07/91	NA	NA	NA	NA	NA	NA	NA
06/27/91	NA	NA	NA	NA	NA	NA	NA
09/30/91	NA	NA	NA	NA	NA	NA	NA
12/18/91	NA	NA	NA	NA	NA	NA	NA
03/20/92	NA	NA	NA	NA	NA	NA	NA
06/08/92	NA	NA	<0.003	0.012	0.016	<0.02	0.038
08/06/92	NA	NA	NA	NA	NA	NA	NA
10/29/92	NA	NA	NA	NA	NA	NA	NA
08/16/93	NA	NA	NA	NA	NA	NA	NA
MW-4							
08/16/90	<0.05	<0.05	<0.01	<0.02	<0.02	NA	0.03
03/07/91	NA	NA	NA	NA	NA	NA	NA
11/29/90	NA	NA	NA	NA	NA	NA	NA
03/07/91	NA	NA	NA	NA	NA	NA	NA
06/27/91	NA	NA	NA	NA	NA	NA	NA
09/30/91	NA	NA	NA	NA	NA	NA	NA
12/18/91	NA	NA	NA	NA	NA	NA	NA
03/20/92	NA	NA	NA	NA	NA	NA	NA

See notes on page 2 of 2.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES–BNAs, VOCs, and Metals
ARCO Station 4494
Oakland, California
(Page 2 of 2)

Well / Date	BNAs (ppm)	VOCs (ppb)	Total Cadmium (ppm)	Chromium (ppm)	Lead (ppm)	Nickel (ppm)	Zinc (ppm)
MW-4 cont.							
06/08/92	NA	NA	<0.003	<0.005	<0.002	<0.02	0.013
08/06/92	NA	NA	NA	NA	NA	NA	NA
10/29/92	NA	NA	NA	NA	NA	NA	NA
08/16/93	NA	NA	NA	NA	NA	NA	NA
MW-5							
08/06/92	NA	NA	NA	NA	NA	NA	NA
10/29/92	NA	NA	NA	NA	NA	NA	NA
08/16/93	NA	NA	NA	NA	NA	NA	NA
MW-6							
08/06/92	NA	NA	NA	NA	NA	NA	NA
10/29/92	NA	NA	NA	NA	NA	NA	NA
08/16/93	NA	NA	NA	NA	NA	NA	NA
MW-7							
08/06/92	NA	NA	NA	NA	NA	NA	NA
10/29/92	NA	NA	NA	NA	NA	NA	NA
08/16/93	NA	NA	NA	NA	NA	NA	NA
DWALs/MCLs	-----	-----	0.010	0.05	0.05	NE	5.0

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
04/15/92	None Present	0
05/14/92	None Present	0
06/30/92	None Present	0
07/31/92	None Present	0
08/26/92	None Present	0
10/26/92	Sheen	0
11/23/92	None Present	0
12/08/92	Well Destroyed	
Total:	6.41 Gallons	48.9 Gallons

APPENDIX A

EMCON'S FIELD REPORT 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

EMCON Associates
1921 Ringwood Avenue • San Jose, California 95131-1721 • (408) 453-7300 • Fax (408) 437-9526

Date September 2, 1993
Project 0G70-031.01

To:
Mr. John Young
RESNA
3315 Almaden Expressway, Suite 34
San Jose, California 95118

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
7	Water Sample Field Data Sheets

For your: X Information Sent by: X Mail

Comments:
Enclosed are the data from the third quarter 1993 monitoring event at ARCO service station 4494, 566 Hegenberger Road, Oakland, California. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions: (408) 453-2266.

Jim Butera JB

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
ROBERT CURTIS PORTER
No: 4094
Exp. 6/30/96
INDUSTRIAL
STATE OF CALIFORNIA

Robert Porter

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-031.01 STATION ADDRESS : 566 Hegenberger Road, Oakland DATE : 8-16-93

ARCO STATION # : 4494 FIELD TECHNICIAN : K REICHELDERFER DAY : MONDAY

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	NO (HEX)	OK	NONE	BAD	7.23	7.23	ND	NA	23.3	LWC BROKEN - NO LOCKING POTENTIAL BOTH HEX BOLTS ARE GONE
2	MW-3	OK	YES	OK	3259	OK	8.62	8.62	ND	NA	17.8	IT TOOK 25 MINUTES TO OPEN FLAT 18 INCH LID W/ 7/16" BOLTS (BOLT HEADS WE
3	MW-4	OK	YES	NA	3259	OK	8.69	8.69	ND	NA	15.8	OPW 12" LIFT OFF LID - GREY CASING EXTENSION IS TOO THIN, LWC WON'T TIGHTEN
4	MW-5	OK	YES	OK	3259	BAD	7.06	7.05	ND	NA	16.9	LWC IS BROKEN, NO LOCKING CAPABILITIES; MORRISON TEST PLUG
5	MW-6	OK	YES	OK	3259	OK	6.71	6.71	ND	NA	18.1	—
6	MW-7	OK	YES* (5/16)	OK	DOLPHIN	BAD	8.11	8.11	ND	NA	14.4	ONE BOLT DOESN'T ATTACH TO INSIDE OF BOX BECAUSE TAB IS BROKEN INSIDE REPLACED LWC & BOLT W/ 3259
7	RW-1	OK	YES	OK	NONE	SLIP	DRY	DRY	ND	NA	7.9	BOLT HEADS DID NOT NEED TO BE DUG OUT
												MOIST DIRT WAS STUCK ON THE END OF THE PROBE WELL WAS DRY

SURVEY POINTS ARE TOP OF WELL CASINGS

MW-3 & RW-1 ARE UNDER FLAT 18 INCH LIDS W/ 7/16" BOL

Summary of Groundwater Monitoring Data
Third Quarter 1993
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(23)	08/16/93	7.23	ND.[2]	<50	<0.5	<0.5	<0.5	<0.5
MW-3(17)	08/16/93	8.62	ND.	<50	<0.5	<0.5	<0.5	<0.5
MW-4(15)	08/16/93	8.69	ND.	<50	<0.5	<0.5	<0.5	<0.5
MW-5(16)	08/16/93	7.06	ND.	<50	<0.5	<0.5	<0.5	<0.5
MW-6(18)	08/16/93	6.71	ND.	<50	<0.5	<0.5	<0.5	<0.5
MW-7(14)	08/16/93	8.11	ND.	<50	<0.5	<0.5	<0.5	<0.5
RW-1	08/16/93	Dry.[3]	NA.[4]	NA.	NA.	NA.	NA.	NA.
FB-1[5]	08/16/93	NA.	NA.	<50	<0.5	<0.5	<0.5	<0.5

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. Dry. = Well was dry, no sample was taken
4. NA. = Not applicable
5. FB. = Field blank

Columbia Analytical Services, Inc.

August 31, 1993

Service Request No. SJ93-1015

Jim Butera
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **EMCON Project No. 0G70-031.01**
ARCO Facility No. 4494

Dear Mr. Butera:

Attached are the results of the water samples submitted to our lab on August 17, 1993. For your reference, these analyses have been assigned our service request number SJ93-1015.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/kmh

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NR	Not Requested
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	08/17/93
Project:	EMCON Project No. 0G70-031.01	**Service Request No.:**	SJ93-1015
	ARCO Facility No. 4494	**Sample Matrix:**	Water

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

Sample Name:		MW-1 (23)	MW-3 (17)	MW-4 (15)
Date Analyzed:		08/24/93	08/24/93	08/24/93
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

Sample Name:		MW-5 (16)	MW-6 (18)	MW-7 (14)
Date Analyzed:		08/24/93	08/24/93	08/24/93
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

Approved by: Kenneth Murphy Date: August 31, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	08/17/93
Project:	EMCON Project No. 0G70-031.01	**Service Request No.:**	SJ93-1015
	ARCO Facility No. 4494	**Sample Matrix:**	Water

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

Sample Name:		FB-1	Method Blank
Date Analyzed:		08/24/93	08/24/93
Analyte	**MRL**		
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
TPH as Gasoline	50	ND	ND

Approved by: Keenan Murphy Date: August 31, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	08/17/93
Project:	EMCON Project No. 0G70-031.01	**Service Request No.:**	SJ93-1015
	ARCO Facility No. 4494	**Sample Matrix:**	Water

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (23)	08/24/93	87.
MW-3 (17)	08/24/93	87.
MW-4 (15)	08/24/93	88.
MW-5 (16)	08/24/93	87.
MW-6 (18)	08/24/93	91.
MW-7 (14)	08/24/93	89.
FB-1	08/24/93	85.
MW-1 (23) MS	08/24/93	96.
MW-1 (23) DMS	08/24/93	97.
Method Blank	08/24/93	91.
	CAS Acceptance Criteria	70-130

Approved by: Kenneth Murphy Date: August 31, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-031.01
ARCO Facility No. 4494

Date Received: 08/17/93
Service Request No.: SJ93-1015

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

Date Analyzed: 08/24/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	25.	24.1	96.	85-115
Toluene	25.	24.7	99.	85-115
Ethylbenzene	25.	23.2	93.	85-115
Total Xylenes	75.	69.2	92.	85-115
TPH as Gasoline	250.	257.	103.	90-110

Approved by: Kathleen Murphy Date: August 31, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	08/17/93
Project:	EMCON Project No. 0G70-031.01	**Service Request No.:**	SJ93-1015
	ARCO Facility No. 4494	**Sample Matrix:**	Water

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline
EPA Methods 5030/California DHS LUFT Method
µg/L (ppb)

Sample Name: MW-1 (23)
Date Analyzed: 08/24/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
TPH as Gasoline	250.	ND	245.	247.	98.	99.	76-130

Approved by: Robert Murphy Date: August 31, 1993

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ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. ~~EMCOC-93~~ / EMC-93-5

Chain of Custody

ARCO Facility no. 4494 | City (Facility) OAKLAND | Project manager (Consultant) Jim Butera

ARCO engineer Kyle Christie | Telephone no. (ARCO) [illegible] | Telephone no. (Consultant) 453-0719 | Fax no. (Consultant) 453-0452

Consultant name EMCON Associates | Address (Consultant) 1933 Junction Ave San Jose

Laboratory name: CAS

Contract number: 07077

Method of shipment: Sampler will deliver

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 ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-1(23)	1-2	2		X		X	HCl	8-16-93	1230		X											
MW-3(17)	3-4	2		X		X	HCl	↓	1318		X											
MW-4(15)	5-6	2		X		X	HCl	↓	1409		X											
MW-5(16)	7-8	2		X		X	HCl	↓	1446		X											
MW-6(18)	9-10	2		X		X	HCl	↓	1522		X											
MW-7(14)	11-12	2		X		X	HCl	↓	1606		X											
FB-1(NA)	13-14	2		X		X	HCl	↓	1235		X											
~~[illegible](NA)~~		~~2~~		~~X~~		~~X~~	~~HCl~~				~~X~~	NO SAMPLES TAKEN, WELL WAS DRY										

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40ml HCl VOA's

31

Lab number: SJ93-1015

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

Condition of sample: ok

Temperature received: cool

Relinquished by sampler	Date	Time	Received by
[signature]	8-17-93	0900	

Relinquished by	Date	Time	Received by

Relinquished by	Date	Time	Received by laboratory	Date	Time
			[signature]	8-17-93	9:00

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-031.01 SAMPLE ID: MW-1 (23)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 4494

SAMPLED BY: ↓ LOCATION: 566 HEGENBERGER RD. OAKLAND, CA

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.):	10.50
DEPTH TO WATER (feet):	7.23	CALCULATED PURGE (gal.):	31.50
DEPTH OF WELL (feet):	23.3	ACTUAL PURGE VOL. (gal.):	16.00

DATE PURGED: 8-16-93 Start (2400 Hr) 1209 End (2400 Hr) 1218

DATE SAMPLED: 8-16-93 Start (2400 Hr) 1230 End (2400 Hr) 1232

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1213	10.50	7.22	5460	72.5	CLOUDY	LIGHT
1218	WELL DRIED @ 16.00 GALLONS					
1233	RECHARGE	7.41	5120	71.8	CLOUDY	LIGHT
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): FB-1 @ 1235

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: OK LOCK #: NONE (3259)

REMARKS: • LWC WAS BROKEN, NO LOCK ON LWC → ~~INSTALLED~~ NEW LWC & LOCK (3259) NO DIV HEX BOLTS IN LID

• 1218 WELL DRIED @ 16.00 GALLONS (DTW 22.80)

• DTW PRIOR TO SAMPLING 20.08

→ LWC2 WOULD NOT FIT UNDER LID, TOO HIGH; I PUT OLD LWC BACK ON (N. LOCK PUT ON BROKEN LWC)

(ORANGE MORRISON TEST PLUG)

Meter Calibration: Date: 8-16-93 Time: 1200 Meter Serial #: 9203 Temperature °F: 77.3

(EC 1000 977 / 1000) (DI 4.16) (pH 7 6.99 / 7.00) (pH 10 10.02 / 10.00) (pH 4 3.92 / —)

Location of previous calibration: ___

Signature: Kevin Reichelderfer Reviewed By: JB Page 1 of 7

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-031.01 SAMPLE ID: MW-3 (17)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 4494

SAMPLED BY: ↓ LOCATION: 566 HEGENBERGER OAKLAND, CA

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.):	6.00
DEPTH TO WATER (feet):	8.62	CALCULATED PURGE (gal.):	17.99
DEPTH OF WELL (feet):	17.8	ACTUAL PURGE VOL. (gal.):	~~24.00~~ 30.00

DATE PURGED: 8-16-93 Start (2400 Hr) 1246 End (2400 Hr) 1310

DATE SAMPLED: 8-16-93 Start (2400 Hr) 1318 End (2400 Hr) 1320

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1250	6.00	7.31	3780	72.4	BROWN	HEAVY
1254	12.00	6.99	>20,000	71.4	↓	↓
1300	18.00	7.06	12,610	71.1	↓	MODERATE
1305	24.00	7.20	7,526	70.6	YELLOW	LIGHT
1310	30.00	7.16	7,580	70.3	↓	↓
					NR (COBALT 0 - 100)	NR (NTU 0 - 200)

D. O. (ppm): NR ODOR: NONE

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)	___ QDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: • IT TOOK 25 MINUTES TO GET 7/16" BOLTS OUT OF 18 INCH LID; BOLT HEADS WERE SEALED - HAD TO DIG/CHIP OUT
• WELL DID NOT STABILIZE @ 3RD OR 4TH C.V.

Meter Calibration: Date: 8-16-93 Time: 1200 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Kevin Reichelderfer Reviewed By: JB Page 2 of 7

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-031.01 SAMPLE ID: MW-4 (15)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 4494

SAMPLED BY: ↓ LOCATION: 566 HEGENBERGER OAKLAND, CA

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.):	4.65
DEPTH TO WATER (feet):	8.69	CALCULATED PURGE (gal.):	13.94
DEPTH OF WELL (feet):	15.8	ACTUAL PURGE VOL. (gal.):	11.00

DATE PURGED: 8-16-93 Start (2400 Hr) 1342 End (2400 Hr) 1357

DATE SAMPLED: 8-16-93 Start (2400 Hr) 1409 End (2400 Hr) 1411

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1348	5.00	7.28	6470	73.2	BROWN	HEAVY
1353	10.00	7.25	6130	71.9	↓	↓
1357	WELL DRIED @	11.00 GALLONS				
1413	RECHARGE	6.98	9130	72.7	LT GREY	LIGHT

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		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: OK LOCK #: 3259

REMARKS: • LWC DOES NOT FIT CASING (CASING EXTENSION IS GREY, THINNER THAN USUAL CASING) THE LWC IS TOO LOOSE PVC

• 1357 WELL DRIED @ 11.00 GALLONS

• DTW PRIOR TO SAMPLING 11.81

Meter Calibration: Date: 8-16-93 Time: 1200 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Kevin Reichelderfer Reviewed By: JB Page 3 of 7

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: OG70-031.01 | SAMPLE ID: MW-5 (16)

PURGED BY: K REICHELDERFER | CLIENT NAME: ARCO 4494

SAMPLED BY: ↓ | LOCATION: 566 HEGENBERGER OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	1.60
DEPTH TO WATER (feet):	7.08	CALCULATED PURGE (gal.):	4.81
DEPTH OF WELL (feet):	16.9	ACTUAL PURGE VOL. (gal.):	5.00

DATE PURGED: 8-16-93 | Start (2400 Hr) 1430 | End (2400 Hr) 1440

DATE SAMPLED: 8-16-93 | Start (2400 Hr) 1446 | End (2400 Hr) 1448

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1433	2.00	7.03	~~16,430~~ 16,430	76.0	GREY	HEAVY
1436	3.50	7.09	12,280	73.8	↓	↓
1440	5.00	7.12	11,410	72.9	↓	↓

D. O. (ppm): NR | ODOR: MILD | COLOR: NR (COBALT 0 - 100) | TURBIDITY: 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: OK | LOCK #: 3259

REMARKS: • LWC BAD, IT'S BROKEN CAN'T LOCK IT (MORRISON TEST PLUG SITS TOO HIGH, LID WONT FIT WITH THAT TYPE OF LWC)

Meter Calibration: Date: 8-16-93 Time: 1200 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Kevin Reichelderfer | Reviewed By: JB | Page 4 of 7

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0G70-031.01 | SAMPLE ID: MW-7(14)

PURGED BY: K REICHELDERFER | CLIENT NAME: ARCO 4494

SAMPLED BY: ↓ | LOCATION: 566 HEGENBERGER OAKLAND, CA

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.):	4.10
DEPTH TO WATER (feet):	8.13	CALCULATED PURGE (gal.):	12.29
DEPTH OF WELL (feet):	14.4	ACTUAL PURGE VOL. (gal.):	12.50

DATE PURGED: 8-16-93 | Start (2400 Hr) 1543 | End (2400 Hr) 1559

DATE SAMPLED: 8-16-93 | Start (2400 Hr) 1606 | End (2400 Hr) 1608

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1548	4.50	6.81	6190	75.0	BROWN	HEAVY
1552	9.00	6.88	12,080	73.8	BROWN/GREY	↓
1559	12.50	6.88	10,920	73.1	↓	↓

D. O. (ppm): NR | ODOR: MILD | COLOR: NR (COBALT 0 - 100) | TURBIDITY: 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: OK* | LOCK #: DOLPHIN (3259)

REMARKS: * ONE BOLT DOESNT ATTACH TO INSIDE OF BOX BECAUSE TAB IS BROKEN INSIDE

• REPLACED LWC & LOCK (W/3259)

Meter Calibration: Date: 8-16-93 Time: 1200 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Kevin Reichelderfer | Reviewed By: JB | Page 6 of 7

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-031.01 SAMPLE ID: RW-1 (NA)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 4494

SAMPLED BY: NA LOCATION: 566 HEGENBERGER OAKLAND, CA

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

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

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

DEPTH TO WATER (feet): DRY CALCULATED PURGE (gal.): NA

DEPTH OF WELL (feet): 7.9 ACTUAL PURGE VOL. (gal.): NA

DATE PURGED: 8-16-93 Start (2400 Hr) NA End (2400 Hr) NA

DATE SAMPLED: NA Start (2400 Hr) NA End (2400 Hr) NA

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
NO SAMPLES TAKEN, WELL WAS DRY						

D. O. (ppm): NR ODOR: NA 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		SAMPLING EQUIPMENT	
X 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: NA		Other: NA	

WELL INTEGRITY: OK LOCK #: NONE (SLIP)

REMARKS: - MOIST DIRT (NOT MUD) WAS STUCK TO THE PROBE

- NO SAMPLES TAKEN, WELL WAS DRY

Meter Calibration: Date: 8-16-93 Time: ___ Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: ___

Signature: Kevin Reichelderfer Reviewed By: JB Page 1 of 1

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-031.01 SAMPLE ID: MW-6(18)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 4494

SAMPLED BY: ↓ LOCATION: 566 HEGENBERGER OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	1.86
DEPTH TO WATER (feet):	6.70	CALCULATED PURGE (gal.):	5.59
DEPTH OF WELL (feet):	18.1	ACTUAL PURGE VOL. (gal.):	6.00

DATE PURGED: 8-16-93 Start (2400 Hr) 1507 End (2400 Hr) 1517

DATE SAMPLED: 8-16-93 Start (2400 Hr) 1522 End (2400 Hr) 1525

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1510	2.00	6.97	7490	74.6	GREY	HEAVY
1514	4.00	6.94	5270	73.1	↓	MODERATE
1517	6.00	6.91	5050	72.3	↓	↓

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): NF

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: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 8-16-93 Time: 1200 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Kevin Reichelderfer Reviewed By: JB Page 5 of 7