RESNA
Working To Restore Nature

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Third Quarter 1993
at
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

12/30/93

61035.06

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TRANSMITTAL

TO: Ms. Susan Hugo
ACHCSA, Dept. of Envir. Health
80 Swan Way, Room 200
Oakland, California 94621

DATE: December 30, 1993
PROJECT NUMBER: 61035.06
SUBJECT: ARCO Station 6148
5131 Shattuck Avenue, Oakland, California

FROM: John C. Young

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	12/30/93	Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1993, ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California

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REMARKS:
cc: Mr. Richard Hiett, RWQCB
Mr. Michael Whelan, ARCO
1 to RESNA project file no. 61035.06

John C. Young, Client Manager

RESNA
Working To Restore Nature

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
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December 30, 1993
61035.06

Mr. Michael Whelan
ARCO Products Company
Post Office Box 5811
San Mateo, California 94402

Subject: Letter Report on Quarterly Groundwater Monitoring for the Third Quarter 1993 at ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) prepared this letter report summarizing the results of the third quarter 1993 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, California, at the above-referenced site. The operating ARCO Station 6148 is located on the southwestern corner of the intersection of Shattuck Avenue and 52nd Street at 5131 Shattuck Avenue, in Oakland, California, as shown on Plate 1, Site Vicinity Map. The locations of the groundwater monitoring wells and pertinent site features are shown on Plate 2, Generalized Site Plan. Previous work is discussed in the previous subsurface investigations listed in the reference section of this report.

The purpose of quarterly groundwater monitoring is to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with a former waste-oil tank and the existing underground gasoline-storage tanks (USTs) at the site. The field work and laboratory analyses of groundwater samples during this quarter were 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 were performed under the direction of EMCON; evaluation and warrant of their 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 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.

Groundwater Sampling and Gradient Evaluation

Depth to water levels (DTW) were measured on July 27, August 29, and September 30, 1993, and quarterly sampling was performed on September 30, 1993. Results of EMCON's field work on the site, including DTW levels and subjective analysis for the presence of product in the groundwater in wells MW-1 through MW-7, and initial monitoring data for air sparging well AS-2, are presented on EMCON's Field Reports, Summary of Groundwater Monitoring Data, and Water Sample Field Data Sheets (Appendix A). Cumulative Groundwater Monitoring Data is summarized in Table 1.

During this quarter, floating product was encountered in well MW-2 on July 27, August 29, and September 30, 1993, at thicknesses of 0.26, 0.03, and 0.01 foot, respectively. Floating product or sheen was not observed in the other site wells during this quarter (see EMCON's Field Reports, Appendix A). Approximately 0.4 galllon of floating product was recovered during this quarter.

Except in well MW-1, groundwater elevations in the wells fell an average of 0.2 foot since the last monitoring event in June 1993. The groundwater elevation in well MW-1 rose 0.34 foot. DTW levels from July 27, August 29, and September 30, 1993, were used to evaluate the groundwater gradients and flow directions, shown on Plates 3 through 5, Groundwater Gradient Maps. The interpreted average groundwater gradient for July, August, and September 1993 was approximately 0.017 ft/ft with an average flow direction to the southwest. This gradient and flow direction is generally consistent with those previously interpreted for the site.

Groundwater monitoring wells MW-1, MW-3 through MW-7, and air sparging well AS-2 were purged and sampled by EMCON field personnel on September 30, 1993. Monitoring well MW-2 was not sampled due to the presence of floating product. EMCON's Water Sample Field Data Sheets are included in Appendix A. Purge water generated during purging and sampling of the monitoring wells was transported to Gibson Environmental in Redwood City, California for recycling.

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 (California Hazardous Waste Testing Laboratory Certification No. 1426). The water samples from MW-1, and MW-3 through MW-7 were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 8020/5030/DHS LUFT Method, and for halogenated

volatile organic compounds (VOCs) using EPA Methods 5030/8010. Additional groundwater samples were collected from well MW-3 and analyzed for volatile organic compounds using EPA Method 624, total petroleum hydrocarbons as diesel (TPHd) using EPA Method 3510/California LUFT Method, total oil and grease (TOG) using Standard Method 5520F, base neutral/acid semivolatile organic compounds (BNAs) using EPA Methods 3510/8270, and the metals cadmium (Cd), chromium (Cr), nickel (Ni), zinc (Zn) using EPA Method 3010/6010, and lead (Pb) using EPA Method 3020/7421. The Chain of Custody Records and Laboratory Analytical Reports are included in Appendix A. Results of these and previous water analyses are summarized in Tables 2 and 3, Cumulative Results of Laboratory Analyses of Water Samples.

Compared to the last quarter, concentrations of TPHg and benzene have increased in monitoring wells MW-1, MW-3, MW-4, and MW-6, and decreased in well MW-5. TPHg and BTEX were not detected in the water samples from well MW-7, which is consistent with the analytical results from the last quarter. TPHg/Benzene Concentrations in Groundwater are shown on Plate 6.

TPHd was detected in the groundwater sample from well MW-3 at a concentration of 17,000 ppb. Although TPHd was detected in this well, the chromatograph was not typical of a diesel fingerprint. The concentration of TOG in well MW-3 showed little change since the last quarter.

The metals Cr, Pb, Ni, and Zn detected in well MW-3 showed an increase in concentrations compared to the previous sampling event. The levels of metals detected were equal to or below the respective Maximum Contaminant Levels (MCLs).

VOCs were detected in water samples collected from monitoring wells MW-1 and MW-3 through MW-7. Monitoring well MW-6, located upgradient and crossgradient of the USTs, former waste-oil tank, and service islands, contained the highest concentrations of tetrachloroethene (PCE). The BNAs Naphthalene and 2-Methylnaphthalene were detected in well MW-3 at concentrations of 480 and 320 ppb, respectively. BNA concentrations increased since last quarter.

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

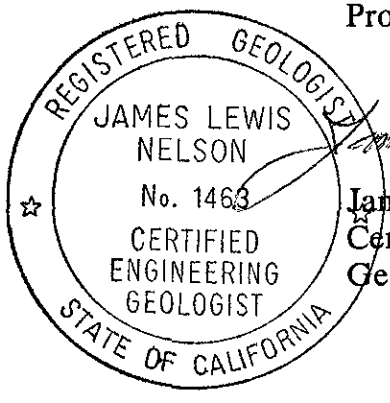
Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Mr. Richard Hiett
California 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.

Keith M. McVicker
Project Geologist



James L. Nelson
Certified Engineer
Geologist No. 1463

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, July 27, 1993
Plate 4, Groundwater Gradient Map, August 29, 1993
Plate 5, Groundwater Gradient Map, September 30, 1993
Plate 6, Concentrations of TPHg/Benzene in Groundwater

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

Appendix A: EMCON's Field Reports,
Summary of Groundwater Monitoring Data,
Certified Analytical Reports with Chain-of-Custody,
Water Sample Field Data Sheets

REFERENCES

RESNA. August 30, 1991. Work Plan for Initial Subsurface Investigation Related to the Former Waste-Oil Tank at ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California. RESNA Report 61035.01.

RESNA. November 7, 1991. Addendum to Work Plan at ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California. RESNA Report 61035.02.

RESNA. June 6, 1992. Letter Report, Quarterly Groundwater Monitoring First Quarter 1992 at ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California. RESNA Report 61035.03.

RESNA. September 28, 1992. Letter Report, Quarterly Groundwater Monitoring Second Quarter 1992 at ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California. RESNA Report 61035.03.

RESNA. September 29, 1992. Initial Subsurface Investigation Related to the Former Waste-Oil Tank at ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California. RESNA Report 61035.02.

RESNA. September 29, 1992. Work Plan for Additional Subsurface Investigation at ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California. RESNA Report 61035.04.

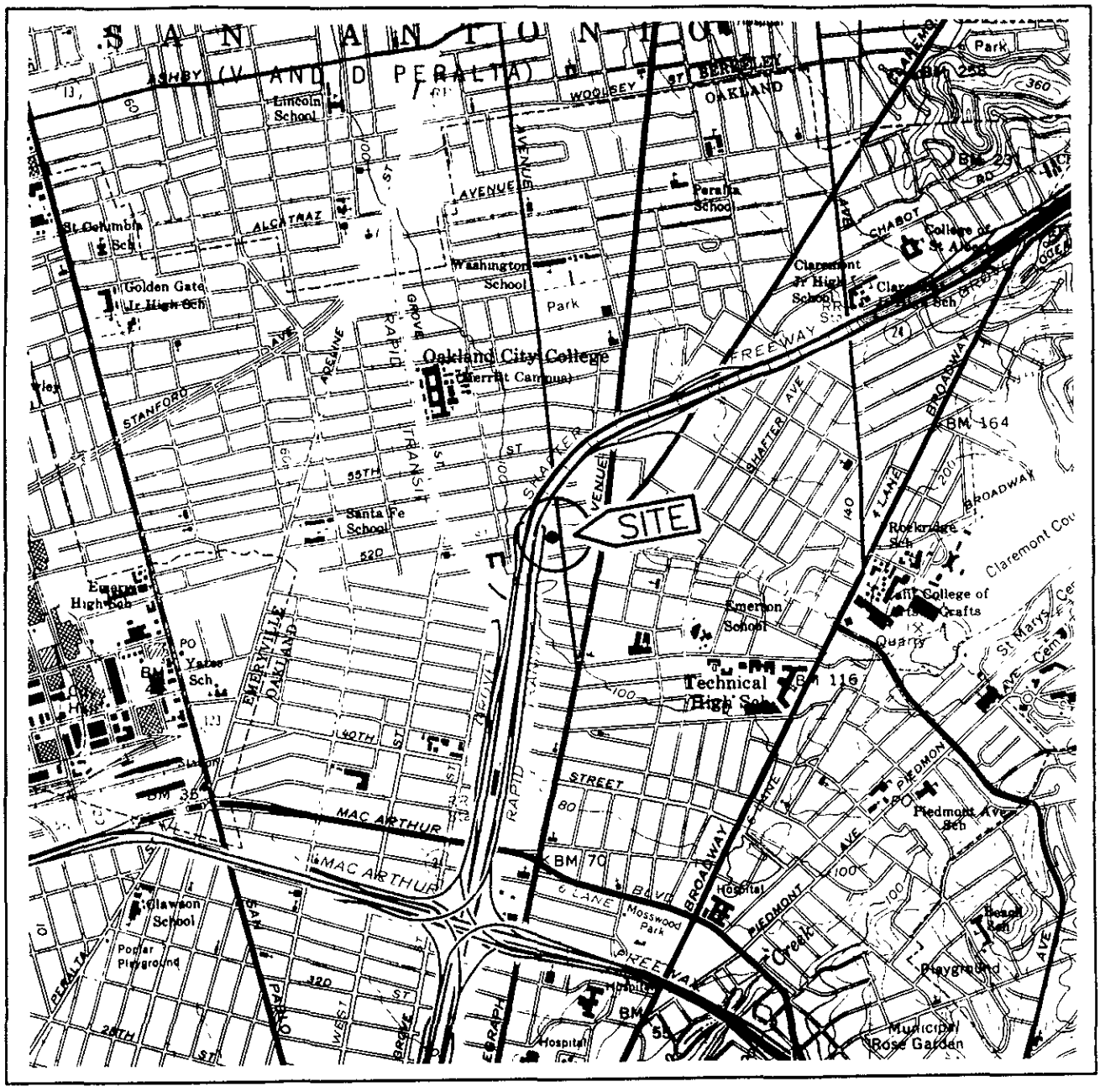
RESNA. November 30, 1992. Letter Report, Quarterly Groundwater Monitoring Third Quarter 1992 at ARCO Station 6148, 5131 Shattuck Avenue in Oakland, California. RESNA Report 61035.03.

RESNA. February 23, 1993. Work Plan for Additional Subsurface Investigation and Evaluate Viable Interim Remediation Alternatives at ARCO Station 6148, 5131 Shattuck Avenue in Oakland, California. RESNA Report 61035.08.

RESNA. March 10, 1993. Letter Report, Quarterly Groundwater Monitoring Fourth Quarter 1992 at ARCO Station 6148, 5131 Shattuck Avenue in Oakland, California. RESNA Report 61035.03.

RESNA. June 8, 1993. Letter Report, Quarterly Groundwater Monitoring First Quarter 1992 at ARCO Station 6148, 5131 Shattuck Avenue in Oakland, California. RESNA Report 61035.06.

RESNA. September 9, 1993. Letter Report, Quarterly Groundwater Monitoring Second Quarter 1992 at ARCO Station 6148, 5131 Shattuck Avenue in Oakland, California. RESNA Report 61035.06.

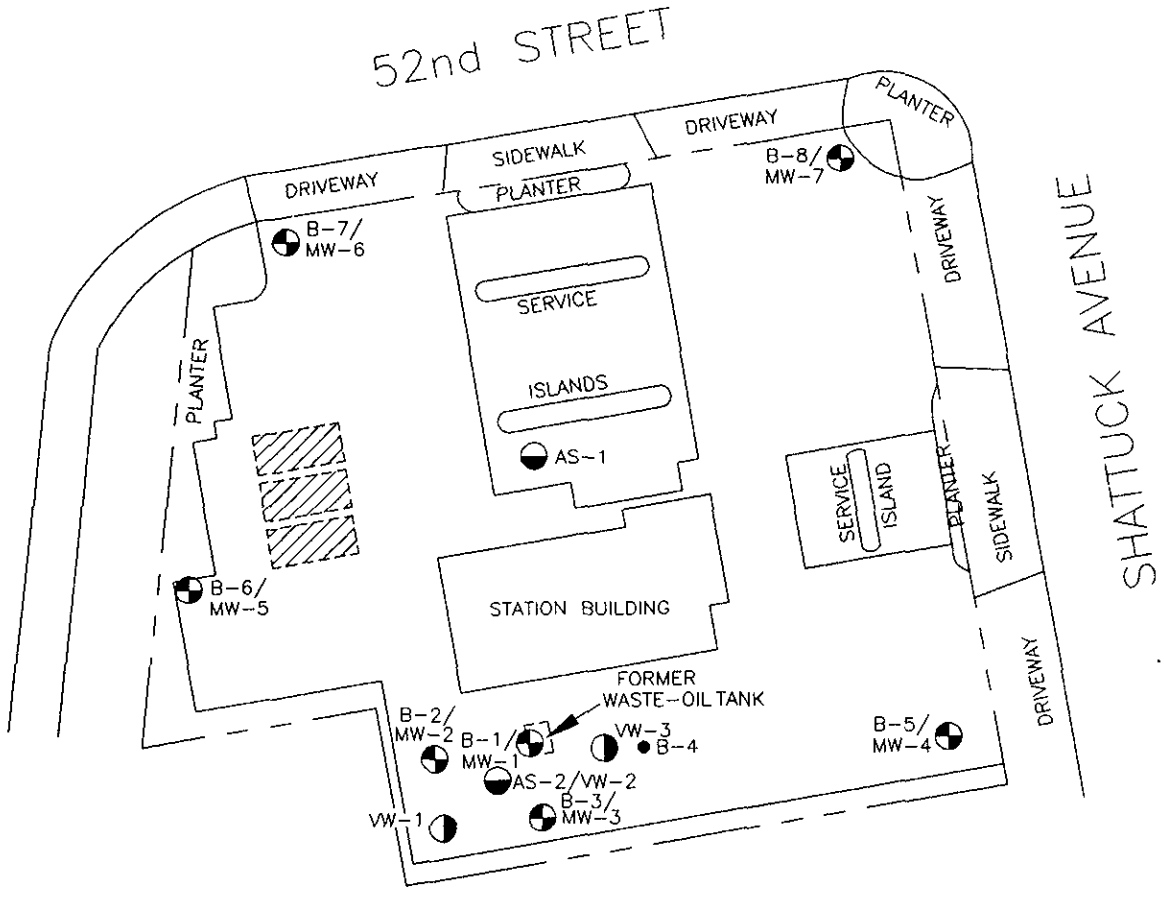


Source U.S. Geological Survey
7.5-Minute Quadrangle
Oakland East/West, California
Photorevised 1980

N

Approximate Scale
2000 1000 0 2000
feet

RESNA Working to Restore Nature	SITE VICINITY MAP ARCO Station 6148 5131 Shattuck Avenue Oakland, California	PLATE 1
PROJECT 61035.06		



EXPLANATION

= Existing underground storage tanks

B-4 ● = Soil boring (RESNA, December 1991)

B-8/MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

VW-3 = Vapor extraction well (RESNA, June 1993)

AS-2/VW-2 = Air-sparge/vapor extraction well (RESNA, June 1993)

Approximate Scale

40 20 0 40 80

feet

Source: Based on data by John Koch, Land Surveyor, November 1992

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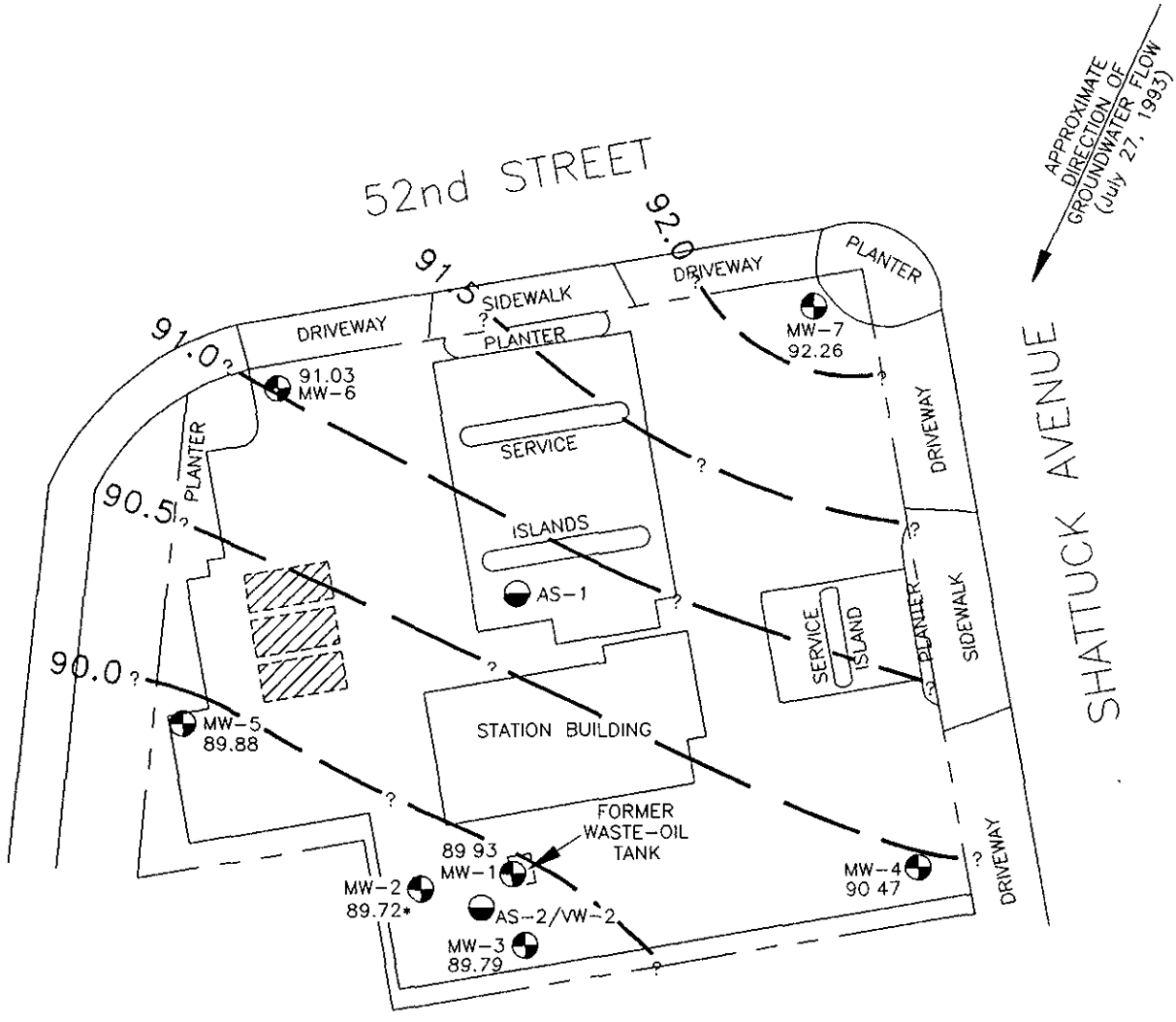
GENERALIZED SITE PLAN
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 2



EXPLANATION

AS-2/VW-2 = Air-sparge/vapor extraction well (RESNA, June 1993)

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

92.26 = Elevation of groundwater in feet above MSL, July 27, 1993

MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

= Underground storage tanks

* = Elevation corrected for presence of floating product

Approximate Scale

40 20 0 40 80

feet

Source: Based on data supplied by John Koch, Land Surveyor, November 1992.

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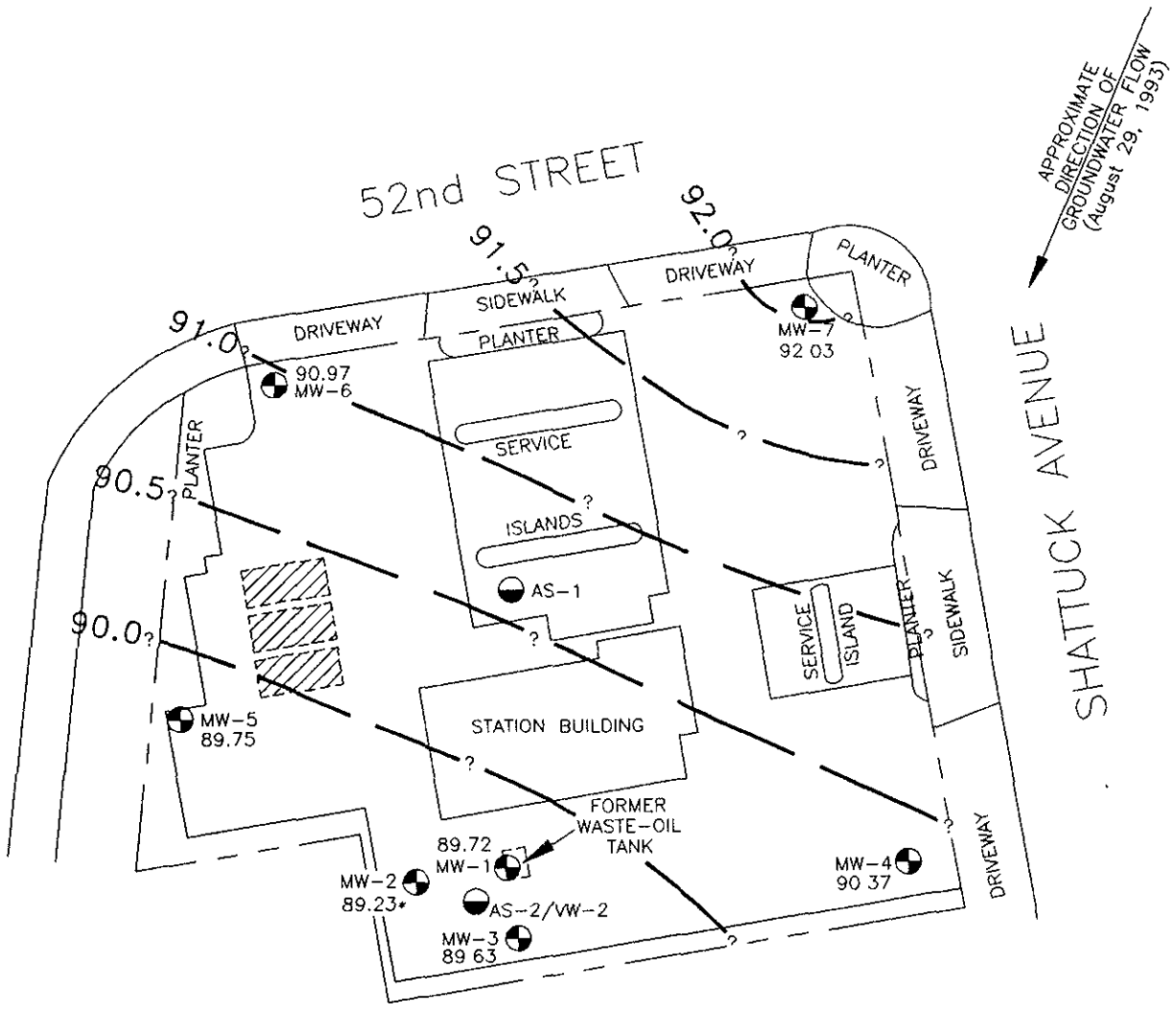
GROUNDWATER GRADIENT MAP
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 3



EXPLANATION

AS-2/VW-2 = Air-sparge/vapor extraction well (RESNA, June 1993)

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

92.03 = Elevation of groundwater in feet above MSL, August 29, 1993

MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

= *Underground storage tanks*

* = Elevation corrected for presence of floating product

Approximate Scale

40 20 0 40 80

feet

Source: Based on data supplied by John Koch, Land Surveyor, November 1992.

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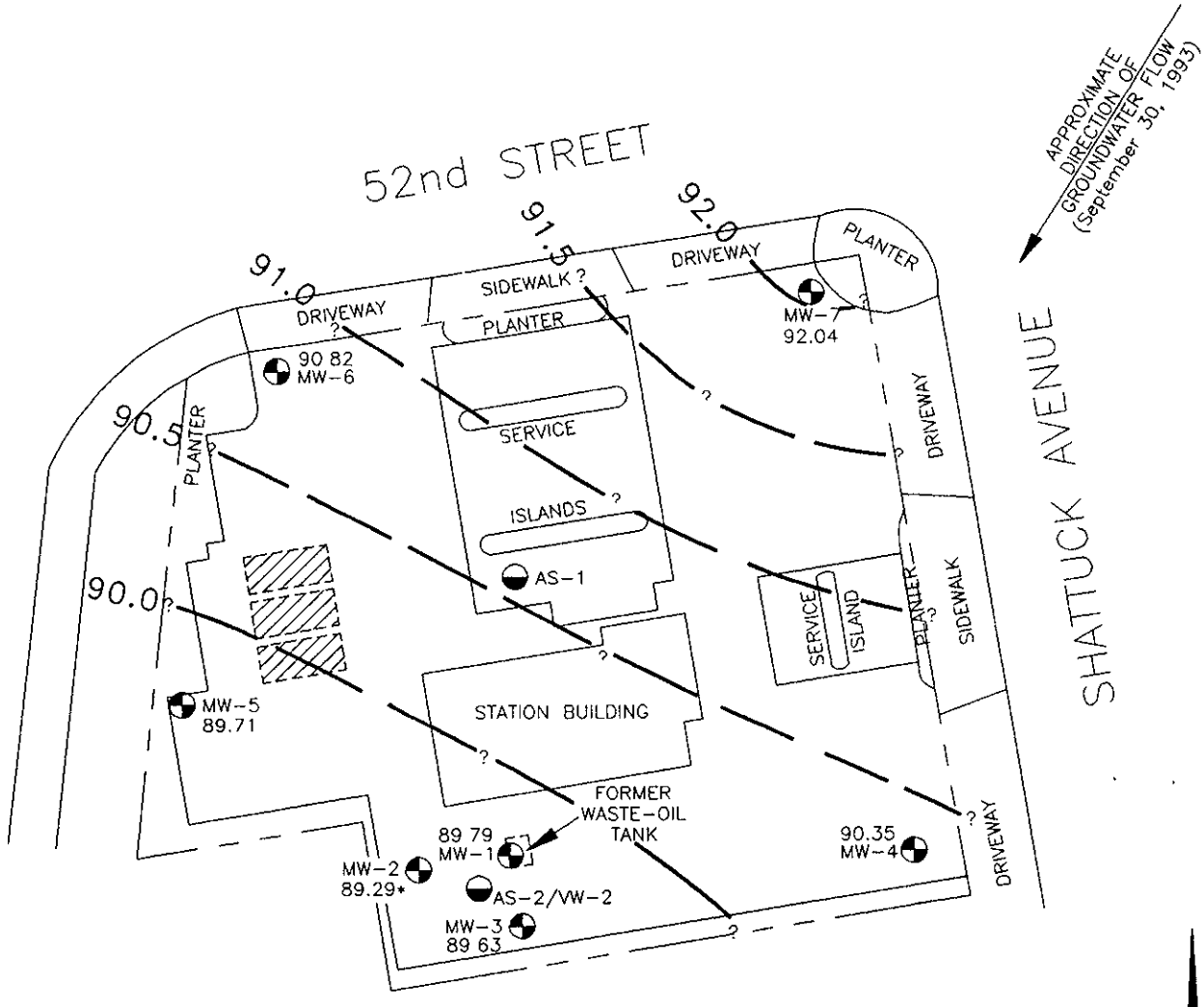
PROJECT 61035.06

GROUNDWATER GRADIENT MAP

ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 4



EXPLANATION

AS-2/VW-2 = Air-sparge/vapor extraction well (RESNA, June 1993)

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

92.04 = Elevation of groundwater in feet above MSL, September 30, 1993

MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

= Underground storage tanks

* = Elevation corrected for presence of floating product

Approximate Scale

40 20 0 40 80

feet

Source. Based on data supplied by John Koch, Land Surveyor, November 1992.

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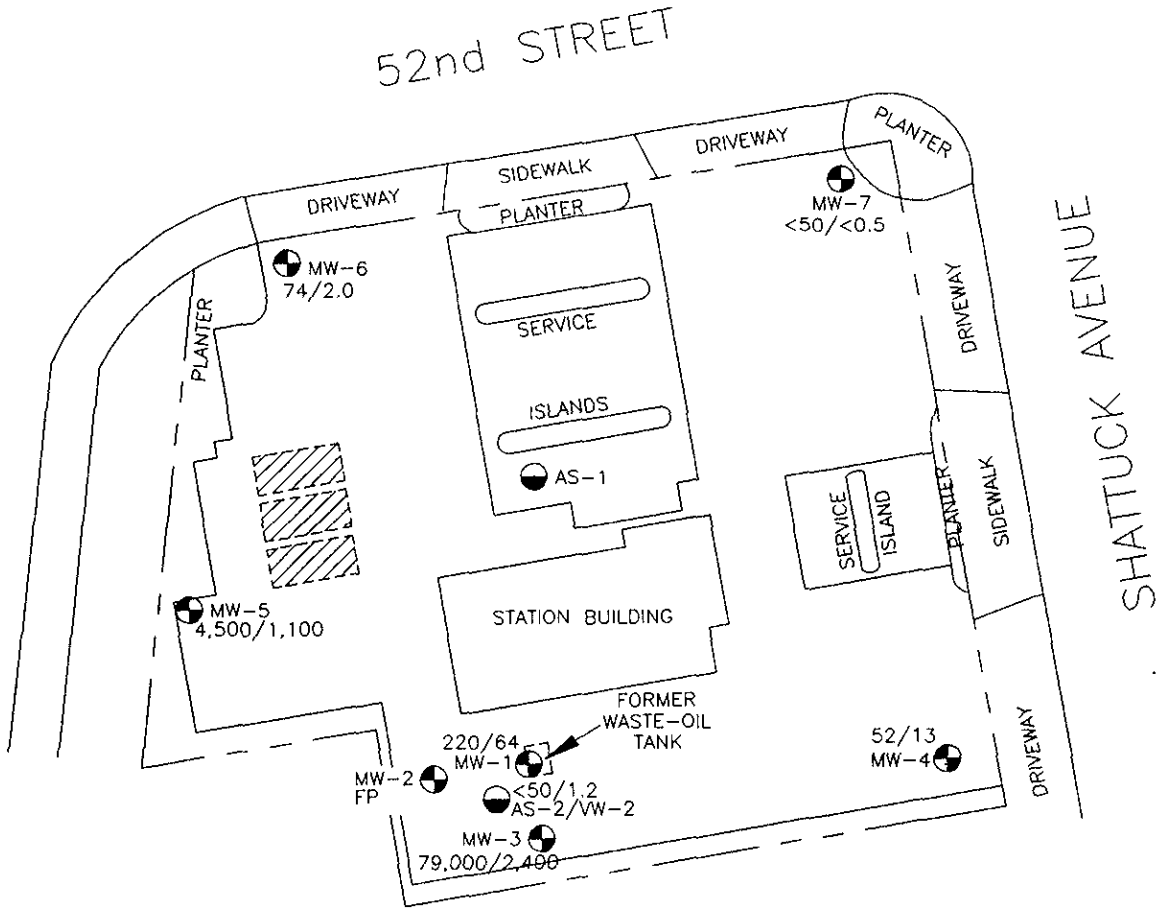
GROUNDWATER GRADIENT MAP
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE 5



EXPLANATION

AS-2/VW-2 = Air-sparge/vapor extraction well (RESNA, June 1993)

79,000/2,400 = Concentrations of TPHg/Benzene in groundwater in parts per billion (ppb), September 30, 1993

FP = Floating product present in well, not sampled

MW-7 = Monitoring well (RESNA, December 1991 and October 1992)

= Underground storage tanks

Approximate Scale

40 20 0 40 80

feet

Source: Based on data supplied by John Koch, Land Surveyor, November 1992.

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CONCENTRATIONS OF TPHg/BENZENE
IN GROUNDWATER
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
6

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6148
Oakland, California
(Page 1 of 4)

Date Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-1				
12-23-91	108.03	18.26	89.77	Sheen
01-07-92		17.44	90.59	Sheen
01-19-92		17.17	90.86	None
02-19-92		16.52	91.51	None
03-18-92		16.81	91.22	None
04-20-92		17.56	90.47	None
05-15-92		17.96	90.07	None
06-12-92		18.16	89.87	None
07-15-92		18.32	89.71	None
08-07-92		18.34	89.69	None
09-14-92		18.46	89.57	None
10-07-92		18.52	89.51	None
11-12-92		18.11	89.92	None
12-09-92		17.10	90.93	None
01-21-93		15.44	92.59	None
02-22-93		16.54	91.49	None
03-25-93		17.05	90.98	None
04-14-93		17.45	90.58	None
05-22-93		17.78	90.25	None
06-17-93		17.90	90.13	None
07-27-93		18.10	89.93	None
08-29-93		18.31	89.72	None
09-30-93		18.24	89.79	None
MW-2				
12-23-91	107.43	17.98	89.45	Sheen
01-07-92		17.15	90.28	Sheen
01-19-92		17.47	89.96	None
02-19-92		16.28	91.15	None
03-18-92		16.52	90.91	None
04-20-92		17.27	90.16	None
05-15-92		17.62	89.81	None
06-12-92		17.63*	89.80*	0.05
07-15-92		17.65	89.78	None
08-07-92		17.80	89.63	None
09-14-92		18.09*	89.34*	0.55
10-07-92		18.55*	88.88*	0.31
11-12-92		17.95	89.48	Sheen
12-09-92		16.85*	90.58*	0.02
01-21-93		15.08*	92.35*	0.01
02-22-93		16.20*	91.23*	0.01
03-25-93		16.72*	90.71*	0.01

See notes on page 4 of 4.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6148
Oakland, California
(Page 2 of 4)

Date Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-2 cont.				
04-14-93	107.43	17.15*	90.28*	0.01
05-22-93		17.44*	89.99*	0.07
06-17-93		17.57	89.86	None
07-27-93		17.71*	89.72*	0.26
08-29-93		18.20*	89.23*	0.03
09-30-93		18.14*	89.29*	0.01
MW-3				
12-23-91	107.77	18.14	89.63	Sheen
01-07-92		17.26	90.51	Sheen
01-19-92		17.63	90.14	None
02-19-92		16.34	91.43	None
03-18-92		16.62	91.15	None
04-20-92		17.38	90.39	None
05-15-92		17.80	89.97	None
06-12-92		18.01	89.76	None
07-15-92		18.17	89.60	None
08-07-92		18.23	89.54	None
09-14-92		18.36	89.41	None
10-07-92		18.90	88.87	Sheen
11-12-92		18.00	89.77	Sheen
12-09-92		16.85	90.92	Droplets
01-21-93		15.24	92.53	None
02-22-93		16.36	91.41	None
03-25-93		16.89	90.88	None
04-14-93		17.29	90.48	None
05-22-93		17.64	90.13	None
06-17-93		17.75	90.02	None
07-27-93		17.98	89.79	None
08-29-93		18.14	89.63	None
09-30-93		18.14	89.63	None
MW-4				
11-12-92	106.58	16.08	90.50	None
12-09-92		15.00	91.58	None
01-21-93		13.35	93.23	None
02-22-93		14.48	92.10	None
03-25-93		15.06	91.52	None
04-14-93		15.50	91.08	None
05-22-93		15.79	90.79	None
06-17-93		14.90	91.68	None

See notes on page 4 of 4.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6148
Oakland, California
(Page 3 of 4)

Date Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-4 cont.				
07-27-93	106.58	16.11	90.47	None
08-29-93		16.21	90.37	None
09-30-93		16.23	90.35	None
MW-5				
11-12-92	106.68	16.81	89.87	None
12-09-92		16.40	90.28	None
01-21-93		14.58	92.10	None
02-22-93		15.65	91.03	None
03-25-93		16.07	90.61	None
04-14-93		16.34	90.34	None
05-22-93		16.56	90.12	None
06-17-93		NA	—	—
07-27-93		16.80	89.88	None
08-29-93		16.93	89.75	None
09-30-93		16.97	89.71	None
MW-6				
11-12-92	105.16	14.05	91.11	None
12-09-92		13.37	91.79	None
01-21-93		11.76	93.40	None
02-22-93		12.62	92.54	None
03-25-93		13.04	92.12	None
04-14-93		13.47	91.69	None
05-22-93		13.80	91.36	None
06-17-93		13.88	91.28	None
07-27-93		14.13	91.03	None
08-29-93		14.19	90.97	None
09-30-93		14.34	90.82	None
MW-7				
11-12-92	107.08	14.75	92.33	None
12-09-92		12.55	94.53	None
01-21-93		11.52	95.56	None
02-22-93		12.82	94.26	None
03-25-93		13.43	93.65	None
04-14-93		13.98	93.10	None
05-22-93		14.41	92.67	None
06-17-93		14.50	92.58	None

See notes on page 4 of 4.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6148
Oakland, California
(Page 4 of 4)

Date Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-7 cont.				
07-27-93	107.08	14.82	92.26	None
08-29-93		15.05	92.03	None
09-30-93		15.04	92.04	None
AS-2				
09-30-93	---	18.31	---	None

Measurements in feet.
Well elevation = Top of casing elevations.
Wells surveyed on November 9, 1992, by John Koch. Datum is City of Oakland = (USGS) + 3.00
Elevations in feet above mean sea level.
* indicates that the depth to water (DTW) and water elevation were corrected for the presence of floating product by the following method. Measured product thickness (PT) is multiplied by a correction factor of 0.8 and subtracted from DTW to get adjusted DTW. (Adjusted DTW = DTW - [PT X 0.8]). The corrected DTW is then subtracted from the well elevation.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES-
TPHg, TPHd, BTEX, TOG, and Metals
ARCO Station 6148
Oakland, California
(Page 1 of 2)

WELL SAMPLE DATE	TPHg	TPHd	B	T	E	X	Cd	Cr	Pb	Ni	Zn	TOG
MW-1												
03-18-92	790	<50	310	26	12	44	<3	5	3	<20	31	<0.5 (1.4)
06-12-92	1,000	<50	290	15	10	30	NA	NA	NA	NA	NA	<0.5
09-14-92	1,000	<80*	370	6.5	6.5	17	NA	NA	NA	NA	NA	0.9
10-07-92	590	<50	200	19	6.7	19	NA	NA	NA	NA	NA	<0.5
01-22-93	1,200	NA	370	57	18	39	NA	NA	NA	NA	NA	NA
04-14-93	140	NA	46	<2.5	<2.5	<2.5	<3	<5	3	<20	25	NA
09-30-93	220	NA	64	0.9	2.2	4.0	NA	NA	NA	NA	NA	NA
MW-2												
03-18-92	8,400	230**	1,400	1,000	220	870	<3	21	9	38	54	1.2 (3.0)
06-12-92	Not sampled--floating product											
09-14-92	Not sampled--floating product											
10-07-92	Not sampled--floating product											
01-22-93	Not sampled--floating product											
04-14-93	Not sampled--floating product											
09-30-93	Not sampled--floating product											
MW-3												
03-18-92	20,000	2,800**	3,200	560	380	1,000	<3	67	27	113	156	7.8 (8.1)
06-12-92	46,000	1,600**	3,400	4,200	1,300	5,400	NA	NA	NA	NA	NA	16
09-14-92	53,000	40,000**	4,300	5,700	1,300	7,300	NA	NA	NA	NA	NA	5.5
10-07-92	Not sampled--floating product											
01-22-93	35,000	13,000**	2,100	1,400	1,200	4,400	<3	10	8	23	28	31
04-14-93	13,000	<50	1,800	390	990	3,500	<3	<5	3	<20	25	26
09-30-93	79,000	17,000**	2,400	3,400	1,900	8,100	<5	50	26	70	100	23
MW-4												
11-12-92	77	NA	32	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA
01-22-93	170	NA	66	0.8	<0.5	1.5	NA	NA	NA	NA	NA	NA
04-14-93	<50	NA	4.6	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
09-30-93	52	NA	13	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
MW-5												
11-12-92	2,900	NA	1,300	12	67	18	NA	NA	NA	NA	NA	NA
01-22-93	17,000	NA	5,000	780	260	330	NA	NA	NA	NA	NA	NA
04-14-93	12,000	NA	4,600	<50	180	130	NA	NA	NA	NA	NA	NA
09-30-93	4,500	NA	1,100	<10***	39	16	NA	NA	NA	NA	NA	NA

See Notes on Page 2 of 2.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES-
TPHg, TPHd, BTEX, TOG, and Metals
ARCO Station 6148
Oakland, California
(Page 2 of 2)

WELL SAMPLE DATE	TPHg	TPHd	B	T	E	X	Cd	Cr	Pb	Ni	Zn	TOG
MW-6												
11-12-92	51	NA	2.6	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA
01-22-93	<50	NA	1.2	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
04-14-93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
09-30-93	74	NA	2.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
MW-7												
11-12-92	<50	NA	1.8	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA
01-22-93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
04-14-93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
09-30-93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
AS-2												
09-30-93	<50	NA	1.2	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
MCL:	—	—	1	—	680	1,750	10	50	50	—	—	—
DWAL:	—	—	—	100	—	—	—	—	—	—	—	—

Results in parts per billion (ppb), except TOG which is in parts per million (ppm).

TPHg: Total petroleum hydrocarbons as gasoline by EPA method 5030/8015/8020.
TPHd: Total petroleum hydrocarbons as diesel by EPA method 3510/California DHS LUFT Method.
BTEX: Benzene, toluene, ethylbenzene, total xylenes isomers. Analyzed by EPA method 5030/8020/DHS LUFT Method.
TOG: Total oil and grease by Standard method 5520F-IR (on 09/14/92 by EPA Method 418.1)
Cd: Cadmium by EPA method 6010.
Cr: Chromium by EPA method 6010.
Pb: Lead by EPA method 7421.
Zn: Zinc by EPA method 6010.
Ni: Nickel by EPA method 6010.
( ): Concentrations in parentheses were results of Method 5520C.
*: Raised Method Reporting Limit (MRL) due to insufficient sample quantity.
Metals: By EPA method 3010/6010 and 3020/7421.
<: Results reported below the listed laboratory detection limit.
**: Laboratory reported sample contains a lower boiling point hydrocarbon mixture quantified as diesel. The chromatogram does not match the typical diesel fingerprint, but appears to be weathered gasoline.
***: Raised MRL due to high analyte concentration requiring sample dilution.
MCL: Adopted Maximum Contaminant Levels in Drinking Water (DHS, October 1990).
DWAL: Recommended Drinking Water Action Level (DHS, October 1990).
NA: Not Analyzed

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES
OF WATER SAMPLES-VOCs AND BNAs
ARCO Station 6148
Oakland, California
(Page 1 of 3)

Date/Well	Compound	VOCs (ppb)	Compound	BNAs (ppb)
MW-1				
03-18-92	Tetrachloroethene	13		NA
	Trichloroethene	1.2		
06-12-92	Tetrachloroethene	18		NA
	Trichloroethene	1.4		
09-14-92	Tetrachloroethene	15		NA
	Trichloroethene	1.5		
10-07-92	Tetrachloroethene	23		NA
	Trichloroethene	1.5		
	Chloroform	0.6		
01-22-93	Tetrachloroethene	11		<20
	Trichloroethene	0.9		
04-14-93	Tetrachloroethene	21		NA
	Trichloroethene	1.8		
	Chloroform	0.6		
09-30-93	Tetrachloroethene	19		NA
	Trichloroethene	1.1		
	Chloroform	0.7		
MW-2				
03-18-92	Tetrachloroethene	19		NA
	Trichloroethene	2.22		
	cis-1,2-Dichloroethene	0.5		
06-12-92	Not sampled--floating product			NA
09-14-92	Not sampled--floating product			NA
10-07-92	Not sampled--floating product			NA
01-22-93	Not sampled--floating product			NA
04-14-93	Not sampled--floating product			NA
09-30-93	Not sampled--floating product			NA
MW-3				
03-18-92	Tetrachloroethene	2.7	NA	
06-12-92	Tetrachloroethene	1.9	NA	
09-14-92	Tetrachloroethene	2.0	NA	
10-07-92	Not sampled--floating product		NA	
01-22-93	Tetrachloroethene	1.9	Naphthalene	440
			Naphthalene	440
			2-Methylnaphthalene	350
			Bis(2-ethylhexyl) Phthalate	280
			Di-n-octyl Phthalate	13

See Notes on Page 3 of 3.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES-VOCs
ARCO Station 6148
Oakland, California
(Page 2 of 3)

Date/Well	Compound	VOCs (ppb)	Compound	BNAs (ppb)
MW-3				
03-18-92	Tetrachloroethene	2.7	NA	
06-12-92	Tetrachloroethene	1.9	NA	
09-14-92	Tetrachloroethene	2.0	NA	
10-07-92	Not sampled--floating product		NA	
01-22-93	Tetrachloroethene	1.9	Naphthalene	440
			Naphthalene	440
			2-Methylnaphthalene	350
			Bis(2-ethylhexyl) Phthalate	280
			Di-n-octyl Phthalate	13
04-14-93	Tetrachloroethene	1.7	Naphthalene	130
			2-Methylnaphthalene	100
			Bis(2-ethylhexyl) Phthalate	250
			Di-n-octyl Phthalate	14
09-30-93	Tetrachloroethene	1.2	Naphthalene	480
			2-Methylnaphthalene	320
MW-4				
01-22-93	Tetrachloroethene	1.4		<20
04-14-93	Tetrachloroethene	1.1		NA
09-30-93	Tetrachloroethene	1.6		NA
MW-5				
01-22-93	Tetrachloroethene	11		<20
	Trichloroethene	4.7		<20
	cis-1,2-Dichloroethene	1.8		<20
04-14-93	Tetrachloroethene	7.9		NA
	Trichloroethene	2.0		
	cis-1,2-Dichloroethene	1.5		
	Vinyl chloride	0.9		
09-30-93	Tetrachloroethene	17		NA
	Trichloroethene	2.8		
	cis-1,2-Dichloroethene	2.9		
	Vinyl chloride	0.8		
MW-6				
01-22-93	Tetrachloroethene	120		NA
	Trichloroethene	6.2		
	Chloroform	6.6		
	cis-1,2-Dichloroethene	1.8		
MCL:	PCE 5	TCE 5	cis-1,2-DCE 6*	

See notes on page 3 of 3.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES-VOCs
ARCO Station 6148
Oakland, California
(Page 3 of 3)

Date/Well	Compound	VOCs (ppb)	Compound	BNAs (ppb)
MW-6 cont.				
04-14-93	Tetrachloroethene	120		NA
	Trichloroethene	5.8		
	cis-1,2-Dichloroethene	1.1		
	1,1-Dichloroethane	6.3		
09-30-93	Tetrachloroethene	220		NA
	Trichloroethene	5.2		
	cis-1,2-Dichloroethene	2.7		
MW-7				
01-22-93	Tetrachloroethene	6.8		NA
04-14-93	Tetrachloroethene	4.3		NA
09-30-93	Tetrachloroethene	2.5		NA
AS-2				
09-30-93	Tetrachloroethene	29		
	Trichloroethene	1.5		
	Chloroform	1.0		NA
MCL:	PCE 5	TCE 5	cis-1,2-DCE 6*	

Results in parts per billion (ppb).
VOCs: Volatile Organic Compounds by EPA method 5030/8010. Compounds not shown were not detected.
MCLs: Maximum Contaminant Levels as reported by the California Department of Health Services 10/24/90.
*: Proposed MCL.
NA: Not available

APPENDIX A

EMCON'S FIELD REPORTS, SUMMARY OF GROUNDWATER MONITORING DATA, CERTIFIED ANALYTICAL REPORTS WITH CHAIN-OF-CUSTODY, WATER SAMPLE FIELD DATA SHEETS

EMCON Associates

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

Date August 5, 1993
Project 0G70-039.01

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
	July 1993 monthly water level survey, ARCO
	station 6148, 5131 Shattuck Avenue, 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: Jim Butera JB

REGISTERED ... No: ... Exp. 6/30/96 ... INDUSTRIAL ... STATE OF CALIFORNIA

Robert Porter

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-039.01 STATION ADDRESS : 5131 Shattuck Ave., Oakland, CA DATE : July 27, 1993

ARCO STATION # : 6148 FIELD TECHNICIAN : Ian Graham / Steve Horton DAY : Tuesday

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-7**	bad ~~good~~	15/16"	na	3259	yes	14.82	14.82	ND	ND	27.0	water in box grout needed around casing
2	**MW-6**	good	15/16"	na	3259	yes	14.13	14.13	ND	ND	26.6	—
3	**MW-4**	good	15/16"	na	3259	yes	16.11	16.11	ND	ND	26.0	moderate odor
4	**MW-1**	good	15/16"	na	3259	yes	18.10	18.10	ND	ND	25.7	slight odor
5	**MW-5**	good	15/16"	na	3259	yes	16.80	16.80	ND	ND	25.0	—
6	**MW-3**	bad ~~good~~	15/16"	na	3259	yes	17.98	17.98	ND	ND	25.9	water in box grout needed around casing strong odor and sheen
7	**MW-2**	good	15/16"	na	3259	yes	17.92	17.92	17.66	0.26	25.8	no skimmer strong odor NAPL coated with product

SURVEY POINTS ARE TOP OF WELL CASINGS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-039.01 STATION ADDRESS : 5131 Shattuck Ave., Oakland, CA DATE : 8-29-93

ARCO STATION # : 6148 FIELD TECHNICIAN : K REICHELDERFER 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-7	OK	15/16 YES	OK	BAD 3259	OK	15.05	15.05	ND	NA	27.0	NEEDS NEW LOCK
2	MW-6	OK	15/16 Y	OK	3259	OK	14.19	14.19	ND	NA	26.16	
3	MW-4	OK	15/16 Y	OK	3259	OK	16.21	16.20	ND	NA	26.0	
4	MW-1	OK	15/16 Y	OK	3259	OK	18.31	18.31	ND	NA	25.7	
5	MW-5	OK	15/16 Y	OK	3259	OK	16.93	16.93	ND	NA	25.0	
6	MW-3	OK	15/16 Y	OK	~~BAD 3259~~ 3259	OK	18.14	18.14	ND	NA	25.8	STRONG ODOR; NEEDS NEW 3259 LOCK
7	MW-2	OK	15/16 Y	OK	3259	OK	18.22	18.22	~~18.19~~	0.03	25.8	0.03' OF PRODUCT (DARK BROWN IN COLOR)
												NO SKIMMER IN WELL

SURVEY POINTS ARE TOP OF WELL CASINGS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-039.01 STATION ADDRESS : 5131 Shattuck Ave., Oakland, CA DATE : 9-30-93

ARCO STATION # : 6148 FIELD TECHNICIAN : IAN GRAHAM 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	AS-2	OK	15/16	OK	DOLPHIN	OK	18.85	18.85	ND	NR	26.2	—
2	MW-7	OK	15/16	OK	3259	OK	15.04	15.04	ND	NR	27.0	—
3	MW-6	OK	15/16	OK	3259	OK	14.34	14.34	ND	NR	26.5	—
4	MW-4	OK	15/16	OK	3259	OK	16.23	16.23	ND	NR	25.9	—
5	MW-1	OK	15/16	OK	3259	OK	18.24	18.24	ND	NR	25.7	—
6	MW-5	OK	15/16	OK	3259	OK	16.97	16.97	ND	NR	25.0	—
7	MW-3	OK	15/16	OK	3259	OK	18.14	18.14	ND	NR	25.8	GROUT AROUND CASING IS BAD (STRONG ODOR)
8	MW-2	OK	15/16	OK	3259	OK	18.15	18.15	ND *	NR	25.8	STRONG ODOR (W/ BAILER .01') * NO REFLECT W/ MMC

SURVEY POINTS ARE TOP OF WELL CASINGS

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

Date October 21,1993
Project 0G70-039.01

To:
Mr. John Young
RESNA
3315 Almaden 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
8	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 6148, located at 5131 Shattuck Avenue, Oakland CA. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions. (408) 453-2266.

Jim Butera JB

Reviewed by:

Robert Porter, Senior Project Engineer.

Summary of Groundwater Monitoring Data
Third Quarter 1993
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter (µg/l) and milligrams per liter (mg/l)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH[1] as Gasoline (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	TPH as Diesel (µg/l)	Total Oil and Grease, 5520F (mg/l)
MW-1(24)	09/30/93	18.24	ND.[2]	220.	64.	0.9	2.2	4.0	NR.[3]	NR.
MW-2	09/30/93	18.15	0.01	FP.[4]	FP.	FP.	FP.	FP.	FP.	FP.
MW-3(24)	09/30/93	18.14	ND.	79,000.	2,400.	3,400.	1,900.	8,100.	17,000.	23.
MW-4(24)	09/30/93	16.23	ND.	52.	13.	<0.5	<0.5	<0.5	NR.	NR.
MW-5(24)	09/30/93	16.97	ND.	4,500.	1,100.	<10.	39.	16.	NR.	NR.
MW-6(25)	09/30/93	14.34	ND.	74.	2.0	<0.5	<0.5	<0.5	NR.	NR.
MW-7(26)	09/30/93	15.04	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
AS-2(25)	09/30/93	18.85	ND.	<50.	1.2	<0.5	<0.5	<0.5	NR.	NR.
FB-1.[5]	09/30/93	NA.[6]	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. NR. = Not reported; sample was not scheduled for analysis of the selected parameter
4. FP.= Floating product detected in well, no sample was taken
5. FB. = Field Blank
6. NA. = Not applicable

Summary of Analytical Results
Halogenated Volatile Organic Compounds by EPA[1] Methods 5030/601
Third Quarter 1993
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter (µg/l) or parts per billion (ppb)

Well ID and Sample Depth	*cis* - 1,2-DCE[2] (ppb)	Chloroform (ppb)	TCE[3] (ppb)	Vinyl Chloride (ppb)	1,1-Dichloro-ethane (ppb)	PCE[4] (ppb)
MW-1(24)	<0.5	0.7	1.1	<0.5	<0.5	19.
MW-2	FP.[5]	FP.	FP.	FP.	FP.	FP.
MW-3(24)	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
MW-4(24)	<0.5	<0.5	<0.5	<0.5	<0.5	1.6
MW-5(24)	2.9	<0.5	2.8	0.8	<0.5	17.
MW-6(25)	2.7	<0.5	5.2	<0.5	<0.5	220.
MW-7(26)	<0.5	<0.5	<0.5	<0.5	<0.5	2.5
AS-2(25)	<0.5	1.0	1.5	<0.5	<0.5	29.

1. EPA = United States Environmental Protection Agency.
2. *cis* - 1,2- DCE = *cis* - 1,2- Dichloroethene
3. TCE = Trichloroethene
4. PCE = Tetrachloroethene
5. FP.= Floating product detected, well not sampled

Summary of Analytical Results
Volatile Organic Compounds by EPA[1] Method 624
Third Quarter 1993
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter (µg/l) or parts per billion (ppb)

Well ID and Sample Depth	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylenes (ppb)
MW-3(24)	2,500.	3,700.	2,500.	11,000.

1. EPA = United States Environmental Protection Agency.

Summary of Analytical Results
Base Neutral / Acid Semivolatile Organic Compounds by EPA[1] Methods 3510/8270
Third Quarter 1993
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter (µg/l) or parts per billion (ppb)

Well ID and Sample Depth	Naphthalene (ppb)	2-Methylnaphthalene (ppb)	Bis(2-ethylhexyl) Phthalate (ppb)	Di-n-octyl Phathalate (ppb)
MW-3(24)	480.	320.	<25.	<25.

1. EPA = United States Environmental Protection Agency.

Columbia Analytical Services, Inc.

October 14, 1993

Service Request No. SJ93-1210

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

Re: **EMCON Project No. 0G70-039.01**
ARCO Facility No. 6148

Dear Mr. Butera:

Attached are the results of the water samples submitted to our lab on September 30, 1993. For your reference, these analyses have been assigned our service request number SJ93-1210.

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

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	ARCO Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**Sample Matrix:**	Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name:			MW-3 (24)	Method Blank
Date Sampled:			09/30/93	
Analyte	**EPA Method**	**MRL**		
Hydrocarbons, IR	SM 5520F	0.5	23.	ND

SM *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989

[1] Unless otherwise noted, all analyses were performed within EPA recommended maximum holding times specified in *Test Methods for Evaluating Solid Waste,* (SW-846, 3rd Edition) and *Methods for Chemical Analysis of Water and Waste* (EPA-600/4-79-020, Revised March 1983).

Approved by: Kenneth Murphy Date: October 14, 1993

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01 ARCO Facility No. 6148	**Date Extracted:**	10/7/93
		Service Request No.:	SJ93-1210
Sample Matrix:	Water		

Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/California DHS LUFT Method
µg/L (ppb)

Sample Name	Date Analyzed	TPH as Diesel
MW-3 (24)	10/12/93	17,000. *
Method Blank	10/11/93	ND
MRL		50

* The sample contains a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

Approved by: Kevin A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**Sample Matrix:**	Water

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

Sample Name:		MW-1 (24)	MW-3 (24)	MW-4 (24)
Date Analyzed:		10/07/93	10/07/93	10/07/93 *
Analyte	**MRL**			
Benzene	0.5	64.	2,400.	13.
Toluene	0.5	0.9	3,400.	ND
Ethylbenzene	0.5	2.2	1,900.	ND
Total Xylenes	0.5	4.0	8,100.	ND
TPH as Gasoline	50	220.	79,000.	52.

Sample Name:		MW-5 (24)	MW-6 (25)	MW-7 (26)
Date Analyzed:		10/08/93	10/07/93 *	10/07/93 *
Analyte	**MRL**			
Benzene	0.5	1,100.	2.0	ND
Toluene	0.5	<10. **	ND	ND
Ethylbenzene	0.5	39.	ND	ND
Total Xylenes	0.5	16.	ND	ND
TPH as Gasoline	50	4,500.	74.	ND

* This sample was part of the analytical batch started on October 7, 1993. However, it was analyzed after midnight so the actual date analyzed is October 8, 1993.

** Raised MRL due to high analyte concentration requiring sample dilution.

Approved by: Keon A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	09/30/93
Project:	EMCON Project No. 0G70-039.01	Service Request No.:	SJ93-1210
	ARCO Facility No. 6148	Sample Matrix:	Water

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

Sample Name:		AS-2 (25)	FB-1	Method Blank
Date Analyzed:		10/07/93 *	10/07/93 *	10/07/93
Analyte	**MRL**			
Benzene	0.5	1.2	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:		Method Blank
Date Analyzed:		10/08/93
Analyte	**MRL**	
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
TPH as Gasoline	50	ND

* This sample was part of the analytical batch started on October 7, 1993. However, it was analyzed after midnight so the actual date analyzed is October 8, 1993.

Approved by: Kevin A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	***Sample Matrix:***	Water

Halogenated Volatile Organic Compounds
EPA Methods 5030/8010
$\mu g/L$ (ppb)

Sample Name:		MW-1 (24)	MW-3 (24)	MW-4 (24)
Date Analyzed:		10/01/93	10/01/93	10/01/93
Analyte	**MRL**			
Dichlorodifluoromethane (Freon 12)	1	ND	ND	ND
Chloromethane	1	ND	ND	ND
Vinyl Chloride	0.5	ND	ND	ND
Bromomethane	0.5	ND	ND	ND
Chloroethane	0.5	ND	ND	ND
Trichlorofluoromethane (Freon 11)	0.5	ND	ND	ND
1,1-Dichloroethene	0.5	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	0.5	ND	ND	ND
Methylene Chloride	0.5	ND	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND	ND
cis-1,2-Dichloroethene	0.5	ND	ND	ND
1,1-Dichloroethane	0.5	ND	ND	ND
Chloroform	0.5	0.7	ND	ND
1,1,1-Trichloroethane (TCA)	0.5	ND	ND	ND
Carbon Tetrachloride	0.5	ND	ND	ND
1,2-Dichloroethane	0.5	ND	ND	ND
Trichloroethene (TCE)	0.5	1.1	ND	ND
1,2-Dichloropropane	0.5	ND	ND	ND
Bromodichloromethane	0.5	ND	ND	ND
2-Chloroethyl Vinyl Ether	5	ND	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND	ND
Tetrachloroethene (PCE)	0.5	19.	1.2	1.6
Dibromochloromethane	0.5	ND	ND	ND
Chlorobenzene	0.5	ND	ND	ND
Bromoform	0.5	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND	ND
1,3-Dichlorobenzene	1	ND	ND	ND
1,4-Dichlorobenzene	1	ND	ND	ND
1,2-Dichlorobenzene	1	ND	ND	ND

Approved by: Kathleen Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	09/30/93
Project:	EMCON Project No. 0G70-039.01	Service Request No.:	SJ93-1210
	ARCO Facility No. 6148	Sample Matrix:	Water

Halogenated Volatile Organic Compounds
EPA Methods 5030/8010
µg/L (ppb)

Sample Name:		MW-5 (24)	MW-6 (25)	MW-7 (26)
Date Analyzed:		10/01/93	10/01/93	10/01/93
Analyte	**MRL**			
Dichlorodifluoromethane (Freon 12)	1	ND	ND	ND
Chloromethane	1	ND	ND	ND
Vinyl Chloride	0.5	0.8	ND	ND
Bromomethane	0.5	ND	ND	ND
Chloroethane	0.5	ND	ND	ND
Trichlorofluoromethane (Freon 11)	0.5	ND	ND	ND
1,1-Dichloroethene	0.5	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	0.5	ND	ND	ND
Methylene Chloride	0.5	ND	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND	ND
cis-1,2-Dichloroethene	0.5	2.9	2.7	ND
1,1-Dichloroethane	0.5	ND	ND	ND
Chloroform	0.5	ND	12.	ND
1,1,1-Trichloroethane (TCA)	0.5	ND	ND	ND
Carbon Tetrachloride	0.5	ND	ND	ND
1,2-Dichloroethane	0.5	ND	ND	ND
Trichloroethene (TCE)	0.5	2.8	5.2	ND
1,2-Dichloropropane	0.5	ND	ND	ND
Bromodichloromethane	0.5	ND	ND	ND
2-Chloroethyl Vinyl Ether	5	ND	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND	ND
Tetrachloroethene (PCE)	0.5	17.	220.	2.5
Dibromochloromethane	0.5	ND	ND	ND
Chlorobenzene	0.5	ND	ND	ND
Bromoform	0.5	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND	ND
1,3-Dichlorobenzene	1	ND	ND	ND
1,4-Dichlorobenzene	1	ND	ND	ND
1,2-Dichlorobenzene	1	ND	ND	ND

Approved by: Keana A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**Sample Matrix:**	Water

Halogenated Volatile Organic Compounds
EPA Methods 5030/8010
µg/L (ppb)

Sample Name:		AS-2 (25)	Method Blank
Date Analyzed:		10/01/93	10/01/93
Analyte	**MRL**		
Dichlorodifluoromethane (Freon 12)	1	ND	ND
Chloromethane	1	ND	ND
Vinyl Chloride	0.5	ND	ND
Bromomethane	0.5	ND	ND
Chloroethane	0.5	ND	ND
Trichlorofluoromethane (Freon 11)	0.5	ND	ND
1,1-Dichloroethene	0.5	ND	ND
Trichlorotrifluoroethane (Freon 113)	0.5	ND	ND
Methylene Chloride	0.5	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND
cis-1,2-Dichloroethene	0.5	ND	ND
1,1-Dichloroethane	0.5	ND	ND
Chloroform	0.5	1.0	ND
1,1,1-Trichloroethane (TCA)	0.5	ND	ND
Carbon Tetrachloride	0.5	ND	ND
1,2-Dichloroethane	0.5	ND	ND
Trichloroethene (TCE)	0.5	1.5	ND
1,2-Dichloropropane	0.5	ND	ND
Bromodichloromethane	0.5	ND	ND
2-Chloroethyl Vinyl Ether	5	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Tetrachloroethene (PCE)	0.5	29.	ND
Dibromochloromethane	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Bromoform	0.5	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND
1,3-Dichlorobenzene	1	ND	ND
1,4-Dichlorobenzene	1	ND	ND
1,2-Dichlorobenzene	1	ND	ND

Approved by: Kevin A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**Sample Matrix:**	Water

Volatile Organic Compounds
EPA Method 624
µg/L (ppb)

Sample Name:		MW-3 (24) *	Method Blank
Date Analyzed:		10/11/93	10/11/93
Analyte	**MRL**		
Chloromethane	10	<500.	ND
Vinyl Chloride	10	<500.	ND
Bromomethane	10	<500.	ND
Chloroethane	10	<500.	ND
Trichlorofluoromethane (Freon 11)	1	<50.	ND
Trichlorotrifluoroethane (Freon 113)	10	<500.	ND
1,1-Dichloroethene	1	<50.	ND
Acetone	20	<1,000.	ND
Carbon Disulfide	1	<50.	ND
Methylene Chloride	10	<500.	ND
trans-1,2-Dichloroethene	1	<50.	ND
cis-1,2-Dichloroethene	1	<50.	ND
2-Butanone (MEK)	10	<500.	ND
1,1-Dichloroethane	1	<50.	ND
Chloroform	1	<50.	ND
1,1,1-Trichloroethane (TCA)	1	<50.	ND
Carbon Tetrachloride	1	<50.	ND
Benzene	1	2,500.	ND
1,2-Dichloroethane	1	<50.	ND
Vinyl Acetate	10	<500.	ND
Trichloroethene (TCE)	1	<50.	ND
1,2-Dichloropropane	1	<50.	ND
Bromodichloromethane	1	<50.	ND
2-Chloroethyl Vinyl Ether	10	<500.	ND
trans-1,3-Dichloropropene	1	<50.	ND
2-Hexanone	10	<500.	ND
4-Methyl-2-pentanone (MIBK)	10	<500.	ND
Toluene	1	3,700.	ND
cis-1,3-Dichloropropene	1	<50.	ND
1,1,2-Trichloroethane	1	<50.	ND
Tetrachloroethene (PCE)	1	<50.	ND
Dibromochloromethane	1	<50.	ND
Chlorobenzene	1	<50.	ND
Ethylbenzene	1	2,500.	ND
Styrene	1	<50.	ND
Total Xylenes	5	11,000.	ND
Bromoform	1	<50.	ND
1,1,2,2-Tetrachloroethane	1	<50.	ND
1,3-Dichlorobenzene	1	<50.	ND
1,4-Dichlorobenzene	1	<50.	ND
1,2-Dichlorobenzene	1	<50.	ND

* Raised MRL due to high analyte concentration requiring sample dilution.

Approved by: Kevin A. Murphy Date: October 14, 1993

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APPENDIX A

LABORATORY QC RESULTS

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	Arco Facility No. 6148	**Sample Matrix:**	Water

Continuing Calibration Summary
Petroleum Hydrocarbons, IR
SM 5520-F

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Hydrocarbon Mix	40	36.7	92.	90-110

Approved by: Kevin A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**Sample Matrix:**	Water

Matrix Spike/Duplicate Matrix Spike Summary
Petroleum Hydrocarbons, IR
SM 5520-F
mg/L (ppm)

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
Hydrocarbon Mix	8.0	ND	5.24	5.44	66.	68.	56-151

Approved by: Kevin Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**Sample Matrix:**	Water

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel
EPA Methods 3510/California DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery *p*-Terphenyl
MW-3 (24)	10/12/93	106.
MW-3 (24) MS	10/11/93	104.
MW-3 (24) DMS	10/11/93	105.
Method blank	10/11/93	84.
	CAS Acceptance Criteria	46-133

Approved by: Kevin Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	***Sample Matrix:***	Water

Initial Calibration Verification
Total *Petroleum Hydrocarbons* as Diesel
EPA Methods 3510/DHS LUFT Method
mg/L (ppm)

Date Analyzed: 10/11/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TPH as Diesel	500.	489.	98.	90-110

Approved by: Kevin Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
ARCO Facility No. 6148

Date Received: 09/30/93
Service Request No.: SJ93-1210
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/DHS LUFT Method
µg/L (ppb)

Sample Name: MW-3 (24)
Date Analyzed: 10/11/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Acceptance Criteria
Diesel	4,000.	17,000.	NA	NA	NA	NA	61-121

NA Not Applicable because of the sample matrix. Accuracy of the spike recovery value is reduced since the sample concentration was greater than four times the amount spiked.

Approved by: Kevin Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**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 (24)	10/07/93	89.
MW-3 (24)	10/07/93	109.
MW-4 (24)	10/07/93	90.
MW-5 (24)	10/08/93	94.
MW-6 (25)	10/07/93	89.
MW-7 (26)	10/07/93	87.
AS-2 (25)	10/07/93	87.
FB-1	10/07/93	87.
MW-3 (24) MS	10/07/93	110.
MW-3 (24) DMS	10/07/93	110.
Method Blank	10/07/93	87.
Method Blank	10/08/93	89.
	CAS Acceptance Criteria	70-130

Approved by: Karen Murphy Date: October 19, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
ARCO Facility No. 6148

Date Received: 09/30/93
Service Request No.: SJ93-1210

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

Date Analyzed: 10/07/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	25.	25.6	102.	85-115
Toluene	25.	26.6	106.	85-115
Ethylbenzene	25.	25.8	103.	85-115
Total Xylenes	75.	79.4	106.	85-115
TPH as Gasoline	250.	245.	98.	90-110

Approved by: Kenneth Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**Sample Matrix:**	Water

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
µg/L (ppb)

Sample Name: MW-3 (24)
Date Analyzed: 10/07/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
Benzene	2,500.	2,450.	4,750.	4,620.	92.	87.	76-122
Toluene	2,500.	3,360.	5,590.	5,460.	89.	84.	75-127
Ethylbenzene	2,500.	1,900.	4,240.	4,170.	94.	91.	70-135

Approved by: Kevin A. Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	09/30/93
Project:	EMCON Project No. 0G70-039.01	**Service Request No.:**	SJ93-1210
	ARCO Facility No. 6148	**Sample Matrix:**	Water

Surrogate Recovery Summary
Halogenated Volatile Organic Compounds
EPA Methods 5030/8010

Sample Name	Date Analyzed	**Percent Recovery** 4-Bromofluorobenzene
MW-1 (24)	10/01/93	104.
MW-3 (24)	10/01/93	96.
MW-4 (24)	10/01/93	100.
MW-5 (24)	10/01/93	96.
MW-6 (25)	10/01/93	90.
MW-7 (26)	10/01/93	90.
AS-2 (25)	10/01/93	97.
MW-3 (24) MS	10/01/93	110.
MW-3 (24) DMS	10/01/93	103.
Method Blank	10/01/93	105.
	CAS Acceptance Criteria	70-130

Approved by: Kevin A. Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
ARCO Facility No. 6148

Date Received: 09/30/93
Service Request No.: SJ93-1210

Initial Calibration Verification
Halogenated Volatile Organic Compounds
EPA Methods 5030/8010
Nanograms

Date Analyzed: 10/01/93

Analyte	True Value	Result	Percent Recovery	EPA Percent Recovery Acceptance Criteria
Chloromethane	100	92.	92.	D-193
Vinyl Chloride	100	99.	99.	28-163
Bromomethane	100	122.	122.	D-144
Chloroethane	100	105.	105.	46-137
Trichlorofluoromethane (Freon 11)	100	82.	82.	21-156
1,1-*Dichloroethene*	100	92.	92.	28-167
Methylene Chloride	100	87.	87.	25-162
trans-1,2-Dichloroethene	100	86.	86.	38-155
1,1-Dichloroethane	100	85.	85.	47-132
Chloroform	100	86.	86.	49-133
1,1,1-Trichloroethane (TCA)	100	84.	84.	41-138
Carbon Tetrachloride	100	90.	90.	43-143
1,2-Dichloroethane	100	94.	94.	51-147
Trichloroethene (TCE)	100	78.	78.	35-146
1,2-Dichloropropane	100	89.	89.	44-156
Bromodichloromethane	100	94.	94.	42-172
trans-1,3-Dichloropropene	100	109.	109.	22-178
cis-1,3-Dichloropropene	100	92.	92.	22-178
1,1,2-*Trichloroethane*	100	88.	88.	39-136
Tetrachloroethene (PCE)	100	89.	89.	26-162
Dibromochloromethane	100	89.	89.	24-191
Chlorobenzene	100	89.	89.	38-150
Bromoform	100	82.	82.	13-159
1,1,2,2-Tetrachloroethane *	100	285.	285.	8-184
1,3-Dichlorobenzene	100	83.	83.	7-187
1,4-Dichlorobenzene	100	88.	83.	42-143
1,2-Dichlorobenzene	100	87.	87.	D-208

D Detected

* Recovery of 1,1,2,2-Tetrachloroethane was above the acceptance criteria. However, it was not detected in any of the samples so quantitation was not required. This standard demonstrates that 1,1,2,2-Tetrachloroethane would have been detected if present.

Approved by: Keoni A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
ARCO Facility No. 6148

Date Received: 09/30/93
Service Request No.: SJ93-1210
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
Halogenated Volatile Organic Compounds
EPA Methods 5030/8010
µg/L (ppb)

Sample Name: MW-3 (24)
Date Analyzed: 10/01/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	EPA Acceptance Criteria
1,1-Dichloroethene	10.	ND	10.0	10.9	100.	109.	59-145
Trichloroethene	10.	ND	8.24	8.93	82.	89.	66-156
Tetrachloroethene	10.	1.24	10.5	11.5	92.	103.	77-146

Approved by: Kevin A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
ARCO Facility No. 6148

Date Received: 09/30/93
Service Request No.: SJ93-1210
Sample Matrix: Water

Surrogate Recovery Summary
Volatile Organic Compounds
EPA Method 624

Sample Name	Date Analyzed	Percent Recovery		
		1,2-Dichloroethane - D_4	Toluene - D_8	4-Bromofluorobenzene
MW-3 (24)	10/11/93	112.	101.	110.
MW-3 (24) MS	10/11/93	111.	103.	110.
MW-3 (24) DMS	10/11/93	113.	101.	111.
Method Blank	10/11/93	112.	101.	109.
	EPA Acceptance Criteria	76-114	88-110	86-115

Approved by: Kevin A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
ARCO Facility No. 6148

Date Received: 09/30/93
Service Request No.: SJ93-1210

Initial Calibration Verification
Volatile Organic Compounds
EPA Method 624
µg/L (ppb)

Date Analyzed: 10/11/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Chloromethane	50	45.8	92.	70-130
Vinyl Chloride	50	41.0	82.	70-130
Bromomethane	50	49.0	98.	70-130
Chloroethane	50	39.9	80.	70-130
Acetone	50	54.8	110.	70-130
1,1-Dichloroethene	50	40.5	81.	70-130
Carbon Disulfide	50	43.0	86.	70-130
Methylene Chloride	50	47.5	95.	70-130
trans-1,2-Dichloroethene	50	42.5	85.	70-130
cis-1,2-Dichloroethene	50	49.0	98.	70-130
1,1-Dichloroethane	50	47.3	95.	70-130
Vinyl Acetate	50	50.5	101.	70-130
2-Butanone	50	50.0	100.	70-130
Chloroform	50	50.4	101.	70-130
1,1,1-Trichloroethane (TCA)	50	45.3	91.	70-130
Carbon Tetrachloride	50	43.9	88.	70-130
Benzene	50	53.8	108.	70-130
1,2-Dichloroethane	50	55.6	111.	70-130
Trichloroethene (TCE)	50	53.2	106.	70-130
1,2-Dichloropropane	50	56.9	114.	70-130
Bromodichloromethane	50	62.4	125.	70-130
2-Chloroethyl Vinyl Ether	50	51.5	103.	70-130
2-Hexanone	50	54.0	108.	70-130
trans-1,3-Dichloropropene	50	59.3	119.	70-130
Toluene	50	50.5	101.	70-130
cis-1,3-Dichloropropene	50	59.1	118.	70-130
1,1,2-Trichloroethane	50	56.1	112.	70-130
Tetrachloroethene (PCE)	50	59.8	120.	70-130
Dibromochloromethane	50	58.7	117.	70-130
Chlorobenzene	50	47.9	96.	70-130
Ethylbenzene	50	43.9	88.	70-130
o-Xylene	50	46.4	93.	70-130
Styrene	50	45.4	91.	70-130
Bromoform	50	69.3	139.	70-130
1,1,2,2-Tetrachloroethane	50	57.8	116.	70-130

Approved by: Thomas A Murphy Date: October 14, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-039.01
ARCO Facility No. 6148

Date Received: 09/30/93
Service Request No.: SJ93-1210
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds
EPA Method 624
µg/L (ppb)

Sample Name: MW-3 (24)
Date Analyzed: 10/11/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	EPA Acceptance Criteria	Relative Percent Difference
1,1-Dichloroethene	2,500.	ND	2,510.	2,360.	100.	94.	61-145	6.
Trichloroethene	2,500.	ND	2,960.	2,840.	118.	114.	71-120	4.
Chlorobenzene	2,500.	ND	2,480.	2,440.	99.	98.	75-130	2.
Toluene	2,500.	3,740.	6,420.	6,180.	107.	98.	76-125	4.
Benzene	2,500.	2,480.	5,240.	5,000.	110.	101.	76-127	5.

Approved by: Kenneth Murphy Date: October 14, 1993

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RECEIVED OCT 1 3 1993

GOLDEN STATE/CAS
LABORATORIES, INC.

October 11, 1993

Jim Butera
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95161-0187

Re: **ARCO Facility #6148-Oakland/Project #0G70-039.01/SJ93-1210**

Dear Jim:

Enclosed are the results of the samples submitted to our lab on October 1, 1993. For your reference, these analyses have been assigned our service request number LA932931.

All analyses were performed in accordance with our laboratory's quality assurance program. Golden State / CAS is certified for environmental analyses by the California Department of Health Services (Certificate # 1296).

Please call if you have any questions.

Respectfully submitted,

Golden State / CAS Laboratories, Inc.

Thomas X. Robinson
Project Chemist

Gary Pechter
Quality Assurance Coordinator

TR/ib

GOLDEN STATE / CAS LABORATORIES, INC.

Analytical Report

Client:	EMCON Associates	**Date Collected:**	09/30/93
Project:	ARCO Products Company/#0G70-039.01	**Date Received:**	10/01/93
Sample Matrix:	Water	**Date Extracted:**	10/04/93
		Date Analyzed:	10/06/93
		Service Request No.:	LA932931

Base Neutral/Acid Semivolatile Organic Compounds
EPA Methods 3510/8270
µg/L (ppb)

Sample Name: MW-3 (24)
Lab Code: LA2931-1

Base Neutral Analyte	MRL*	Result	Base Neutral Analyte	MRL*	Result
N-Nitrosodimethylamine	25	ND	2,6-Dinitrotoluene	25	ND
Bis(2-chloroethyl) Ether	25	ND	Diethyl Phthalate	25	ND
1,2-Dichlorobenzene	25	ND	4-Chlorophenyl Phenyl Ether	25	ND
1,3-Dichlorobenzene	25	ND	Fluorene	25	ND
1,4-Dichlorobenzene	25	ND	4-Nitroaniline	100	ND
Bis(2-chloroisopropyl) Ether	25	ND	N-Nitrosodiphenylamine	25	ND
N-Nitrosodi-n-propylamine	25	ND	4-Bromophenyl Phenyl Ether	25	ND
Hexachloroethane	25	ND	Hexachlorobenzene	25	ND
Nitrobenzene	25	ND	Phenanthrene	25	ND
Isophorone	25	ND	Anthracene	25	ND
Bis(2-chloroethoxy) methane	25	ND	Di-n-butyl Phthalate	25	ND
1,2,4-Trichlorobenzene	25	ND	Fluoranthene	25	ND
Naphthalene	25	480	Pyrene	25	ND
4-Chloroaniline	25	ND	Butylbenzyl Phthalate	25	ND
Hexachlorobutadiene	25	ND	3,3'-Dichlorobenzidine	100	ND
2-Methylnaphthalene	25	320	Benz(a)anthracene	25	ND
Hexachlorocyclopentadiene	50	ND	Bis(2-ethylhexyl) Phthalate	25	ND
2-Chloronaphthalene	25	ND	Chrysene	25	ND
2-Nitroaniline	100	ND	Di-n-octyl Phthalate	25	ND
Dimethyl Phthalate	25	ND	Benzo(b)fluoranthene	25	ND
Acenaphthylene	25	ND	Benzo(k)fluoranthene	25	ND
3-Nitroaniline	100	ND	Benzo(a)pyrene	25	ND
Acenaphthene	25	ND	Indeno(1,2,3-c,d)pyrene	25	ND
Dibenzofuran	25	ND	Dibenz(a,h)anthracene	25	ND
2,4-Dinitrotoluene	25	ND	Benzo(g,h,i)perylene	25	ND

Acid Analyte	MRL*	Result	Acid Analyte	MRL*	Result
Phenol	25	ND	2,4-Dichlorophenol	25	ND
2-Chlorophenol	25	ND	4-Chloro-3-methylphenol	25	ND
Benzyl Alcohol	50	ND	2,4,6-Trichlorophenol	25	ND
2-Methylphenol	25	ND	2,4,5-Trichlorophenol	25	ND
3- and 4-Methylphenol♦	25	ND	2,4-Dinitrophenol	250	ND
2-Nitrophenol	25	ND	4-Nitrophenol	250	ND
2,4-Dimethylphenol	25	ND	2-Methyl-4,6-dinitrophenol	100	ND
Benzoic Acid	250	ND	Pentachlorophenol	150	ND

MRL Method Reporting Limit
* MRL's are elevated because of matrix interferences and because the sample required diluting.
ND None Detected at or above the method reporting limit
♦ Quantified as 4-methylphenol.

Approved by Thomas D. Robinson Date 10/11/93

6925 CANOGA AVENUE ■ CANOGA PARK, CA 91303 ■ 818 587-5550 ■ FAX 818 587-5555

GOLDEN STATE / CAS LABORATORIES, INC.

Analytical Report

Client:	EMCON Associates	**Date Extracted:**	10/04/93
Project:	ARCO Products Company/#0G70-039.01	**Date Analyzed:**	10/04/93
Sample Matrix:	Water	**Service Request No.:**	LA932931

Base Neutral/Acid Semivolatile Organic Compounds
EPA Methods 3510/8270
µg/L (ppb)

Sample Name: Method Blank
Lab Code: LA2931-MB

Base Neutral Analyte	MRL	Result	Base Neutral Analyte	MRL	Result
N-Nitrosodimethylamine	5	ND	2,6-Dinitrotoluene	5	ND
Bis(2-chloroethyl) Ether	5	ND	Diethyl Phthalate	5	ND
1,2-Dichlorobenzene	5	ND	4-Chlorophenyl Phenyl Ether	5	ND
1,3-Dichlorobenzene	5	ND	Fluorene	5	ND
1,4-Dichlorobenzene	5	ND	4-Nitroaniline	20	ND
Bis(2-chloroisopropyl) Ether	5	ND	N-Nitrosodiphenylamine	5	ND
N-Nitrosodi-n-propylamine	5	ND	4-Bromophenyl Phenyl Ether	5	ND
Hexachloroethane	5	ND	Hexachlorobenzene	5	ND
Nitrobenzene	5	ND	Phenanthrene	5	ND
Isophorone	5	ND	Anthracene	5	ND
Bis(2-chloroethoxy) methane	5	ND	Di-n-butyl Phthalate	5	ND
1,2,4-Trichlorobenzene	5	ND	Fluoranthene	5	ND
Naphthalene	5	ND	Pyrene	5	ND
4-Chloroaniline	5	ND	Butylbenzyl Phthalate	5	ND
Hexachlorobutadiene	5	ND	3,3'-Dichlorobenzidine	20	ND
2-Methylnaphthalene	5	ND	Benz(a)anthracene	5	ND
Hexachlorocyclopentadiene	10	ND	Bis(2-ethylhexyl) Phthalate	5	ND
2-Chloronaphthalene	5	ND	Chrysene	5	ND
2-Nitroaniline	20	ND	Di-n-octyl Phthalate	5	ND
Dimethyl Phthalate	5	ND	Benzo(b)fluoranthene	5	ND
Acenaphthylene	5	ND	Benzo(k)fluoranthene	5	ND
3-Nitroaniline	20	ND	Benzo(a)pyrene	5	ND
Acenaphthene	5	ND	Indeno(1,2,3-c,d)pyrene	5	ND
Dibenzofuran	5	ND	Dibenz(a,h)anthracene	5	ND
2,4-Dinitrotoluene	5	ND	Benzo(g,h,i)perylene	5	ND

Acid Analyte	MRL	Result	Acid Analyte	MRL	Result
Phenol	5	ND	2,4-Dichlorophenol	5	ND
2-Chlorophenol	5	ND	4-Chloro-3-methylphenol	5	ND
Benzyl Alcohol	10	ND	2,4,6-Trichlorophenol	5	ND
2-Methylphenol	5	ND	2,4,5-Trichlorophenol	5	ND
3- and 4-Methylphenol*	5	ND	2,4-Dinitrophenol	50	ND
2-Nitrophenol	5	ND	4-Nitrophenol	50	ND
2,4-Dimethylphenol	5	ND	2-Methyl-4,6-dinitrophenol	20	ND
Benzoic Acid	50	ND	Pentachlorophenol	30	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* Quantified as 4-methylphenol.

Approved by Thomas D. Robinson Date 10/11/93

GOLDEN STATE / CAS LABORATORIES, INC.

Analytical Report

Client:	EMCON Associates	**Date Collected:**	09/30/93
Project:	ARCO Products Company/#0G70-039.01	**Date Received:**	10/01/93
Sample Matrix:	Water	**Date Analyzed:**	10/04-06/93
		Service Request No.:	LA932931

Total Metals
mg/L (ppm)

Sample Name:		MW-3 (24)	Method Blank
Lab Code:		LA2931-1	LA2931-MB
Analyte	**EPA Method**	**MRL**	
Cadmium	3010/6010	0.005	ND ND
Chromium	3010/6010	0.01	0.05 ND
Lead	3020/7421	0.002	0.026 ND
Nickel	3010/6010	0.04	0.07 ND
Zinc	3010/6010	0.01	0.10 ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Thomas D. Robinson Date 10/11/93

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GOLDEN STATE / CAS LABORATORIES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Products Company/#0G70-039.01
Sample Matrix: Water
Service Request No.: LA932931

Surrogate Recovery Summary
Base Neutral/Acid Semivolatile Organic Compounds
EPA Methods 3510/8270

Sample Name	Lab Code	Percent Recovery					
		2FP	PHL	TBP	NBZ	FBP	TPH
MW-3 (24)	LA2931-1	NA	NA	NA	NA	NA	NA
Method Blank	LA2931-MB	72	36	72	101	85	98
EPA Acceptance Criteria		21-100	10-94	10-123	35-114	43-116	33-141

2FP 2-Fluorophenol
PHL Phenol-D_6
TBP 2,4,6-Tribromophenol
NBZ Nitrobenzene-D_5
FBP 2-Fluorobiphenyl
TPH Terphenyl-D_{14}

NA Not Applicable because of the sample matrix. Analysis of this sample required a dilution such that the surrogate concentration was diluted below the MRL.

Approved by Thomas V. Bowers Date 10/11/93

GOLDEN STATE / CAS LABORATORIES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Extracted:**	10/04/93
Project:	ARCO Products Company/#0G70-039.01	**Date Analyzed:**	10/05/93
LCS Matrix:	Water	**Service Request No.:**	LA932931

Laboratory Control Sample Summary
Base Neutral/Acid Semivolatile Organic Compounds
EPA Methods 3510/8270
µg/L (ppb)

Analyte	True Value	Result	Percent Recovery	EPA Percent Recovery Acceptance Criteria
Phenol	50.0	19.9	40	5-112
2-Chlorophenol	50.0	42.8	86	23-134
1,4-Dichlorobenzene	50.0	34.4	69	20-124
N-Nitrosodi-n-propylamine	50.0	45.1	90	D-230
1,2,4-Trichlorobenzene	50.0	35.2	70	44-142
4-Chloro-3-methylphenol	50.0	43.4	87	22-147
Acenaphthene	50.0	46.1	92	47-145
4-Nitrophenol	50.0	17.3	35	D-132
2,4-Dinitrotoluene	50.0	45.3	91	39-139
Pentachlorophenol	50.0	38.1	76	14-176
Pyrene	50.0	48.2	96	52-115

D Detected; result must be greater than zero.

Approved by Thomas D. Robinson Date 10/11/93

GOLDEN STATE / CAS LABORATORIES, INC.

QA/QC Report

Client: EMCON Associates **Service Request No.:** LA932931
Project: ARCO Products Company/#0G70-039.01
LCS Matrix: Water

Laboratory Control Sample Summary
Total Metals
mg/L (ppm)

Analyte	EPA Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Cadmium	6010	0.100	0.093	93	75-125
Chromium	6010	0.500	0.474	95	75-125
Lead	7421	0.0400	0.0346	86	75-125
Nickel	6010	0.500	0.491	98	75-125
Zinc	6010	0.500	0.439	88	75-125

Approved by Thomas K. Robinson Date 10/11/93

GOLDEN STATE / CAS LABORATORIES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Extracted:**	09/30/93
Project:	ARCO Products Company/#0G70-039.01	**Date Analyzed:**	09/30/93
Sample Matrix:	Water	**Service Request No.:**	LA932931

Matrix Spike/Duplicate Matrix Spike Summary
Base Neutral/Acid Semivolatile Organic Compounds
EPA Methods 3510/8270
µg/L (ppb)

Lab Code: LA2916-2

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	EPA Acceptance Criteria	Relative Percent Difference
Phenol	50.0	50.0	ND	19.2	18.8	38	38	12-89	2
2-Chlorophenol	50.0	50.0	ND	45.9	45.4	92	91	27-123	1
1,4-Dichlorobenzene	50.0	50.0	ND	34.7	35.5	69	71	36-97	2
N-Nitrosodi-n-propylamine	50.0	50.0	ND	47.1	46.8	94	94	41-116	1
1,2,4-Trichlorobenzene	50.0	50.0	ND	37.0	38.8	74	78	39-98	5
4-Chloro-3-methylphenol	50.0	50.0	ND	35.4	25.4	71	51	23-97	33
Acenaphthene	50.0	50.0	ND	47.3	48.2	95	96	46-118	2
4-Nitrophenol	50.0	50.0	ND	11.4	9.99	23	20	10-80	13
2,4-Dinitrotoluene	50.0	50.0	ND	38.4	42.1	77	84	24-96	9
Pentachlorophenol	50.0	50.0	ND	34.6	32.0	69	64	9-103	8
Pyrene	50.0	50.0	ND	49.8	47.3	100	95	26-127	5

ND None Detected at or above the method reporting limit

Approved by Thomas N. Robinson Date 10/11/93

GOLDEN STATE / CAS LABORATORIES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Products Company/#0G70-039.01
Sample Matrix: Water

Date Analyzed: 10/04-06/93
Service Request No.: LA932931

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals
mg/L (ppm)

Lab Code: LA2934-1 (LA2971-2 for Lead)

						Percent Recovery			
Analyte	MRL	Spike Level	Sample Result	Spiked Sample Result	Duplicate Spiked Sample Result	Spiked Sample	Duplicate Spiked Sample	CAS Acceptance Criteria	Relative Percent Difference
Cadmium	0.005	0.100	ND	0.090	0.090	90	90	75-125	<1
Calcium	0.010	0.500	0.022	0.0469	0.462	89	88	75-125	2
Lead	0.002	0.0400	ND	0.0384	0.0410	96	102	75-125	7
Nickel	0.04	0.500	ND	0.461	0.466	92	93	75-125	1
Zinc	0.02	0.500	0.040	0.472	0.464	86	85	75-125	2

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Thomas V. Robinson Date 10/11/93

APPENDIX B

CHAIN OF CUSTODY

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ARCO Products Company

Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. EMC-935

ARCO Facility no	6148	City (Facility)	OAKLAND	Project manager (Consultant)	JIM BUTERA
ARCO engineer	Kyle Christie	Telephone no (ARCO)	571-2434	Telephone no (Consultant)	453-7300
Consultant name	EMCON	Address (Consultant)	1921 RINGWOOD AVENUE SANJOSE	Fax no (Consultant)	453-0452

Laboratory name: CAS

Contract number: 07077

Method of shipment: SAMPLER WILL DELIVER

Sample ID	Lab no	Container no	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 GAS	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 ☐ Sem. VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐	METALS Cd, Cr, Pb, Zn, Ni
MW-1(24)	1-4	4		X		X	HCl	9-30-93	1103		X				X						
MW-2(24)		4									X				X						
MW-3(24)	5-12	8							1128		X		X		X	X					
MW-4(24)	13-16	4							1012		X				X						
MW-5(24)	17-20	4							1036		X				X						
MW-6(25)	21-24	4							0948		X				X						
MW-7(24)	25-28	4							0925		X				X						
AS-2(25)	29-32	4							0905		X				X						
FB-1	33-34	2							1130		X										
MW-3	35-36	4		X		X	NP	9-30-93	1128			X					X				
MW-3		1		X		X	HNO_3		1128												X

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC: AS NORMAL

Remarks:
- 4 - 40 ml HCl
- 4 - Liter NP
- 2 - Liter HCl
- 1 - 500 ml HNO_3
- 2 - 40 ml HCl

Lab number: SJ93-12-10

Turnaround time:
- Priority Rush 1 Business Day [ ]
- Rush 2 Business Days [ ]
- Expedited 5 Business Days [ ]
- Standard 10 Business Days [X]

Condition of sample: OKAY

Temperature received: COOL

	Date	Time	Received by
Relinquished by Sampler	9-30-93	1330	
Relinquished by			
Relinquished by			
			Received by laboratory: CAS/SJ — Date: 9/30/93 — Time: 1330

White — Company copy — ARCO Environmental Engineering, Pink copy — Consultant

8270 ; METAL , 8270

ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. EMC-93-5

ARCO Facility no 6148	City (Facility) OAKLAND	Project manager (Consultant) JIM BUTERA		Laboratory name CAS	
ARCO engineer Kyle Christie	Telephone no. (ARCO) 571-2434	Telephone no. (Consultant) 453-7300	Fax no (Consultant) 453-0452	Contract number 07077	
Consultant name EMCON	Address (Consultant) 1921 RINGWOOD AVENUE SAN JOSE			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 EPA M602/8020/8015 GAS	TPH Modified 8015 Gas ☐ Diesel ☐ 5300 F	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 ☐	METALS Cd, Cr, Pb, Zn, Ni.
MW-1(24)	LA2931-	4		X		X	HCl	9-30-93	1103		X				X						
MW-2(24)		4									X				X			.01 PRODUCT			
MW-3(24)	1	10							1128		X		X		X	X					
MW-4(24)		4							1012		X				X						
MW-5(24)		4							1036		X				X						
MW-6(25)		4							0948		X				X						
MW-7(24)		4							0925		X				X						
AS-2(25)		4							0905		X				X						
FB-1		2							1130		X										
MW-3		4		X		X	NP	9-30-93	1128			X					X				
MW-3		1		X		X	HNO_3	↓	1128												X

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC: AS NORMAL

Remarks:
4 - 40 ml HCl
4 - Liter NP
2 - Liter HCl
1 - 500 ml HNO_3
2 - 40 ml HCl

LA932931

Lab number: SJ93-1210

Turnaround time

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

Condition of sample: OKAY

Temperature received: COOL

Relinquished by Sampler	Date 9-30-93	Time 1330	Received by
Relinquished by	Date 9-30-93	Time 1600	Received by
Relinquished by	Date	Time	Received by laboratory CAS/SJ

Date 9/30/93 Time 1330

GS/CAS 10-1-93 0845

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

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 | SAMPLE ID: MW-1 (24)
PURGED BY: IAN GRAHAM | CLIENT NAME: ARCO # 6148
SAMPLED BY: IAN GRAHAM | LOCATION: 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
DEPTH TO WATER (feet): 18.24
DEPTH OF WELL (feet): 25.7

VOLUME IN CASING (gal.): 4.87
CALCULATED PURGE (gal.): 14.62
ACTUAL PURGE VOL. (gal.): 15.0

DATE PURGED: 9-30-93 | Start (2400 Hr) 1055 | End (2400 Hr) 1101
DATE SAMPLED: 9-30-93 | Start (2400 Hr) 1103 | End (2400 Hr) 1103

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1055	5.0	6.57	481	68.7	BROWN	HEAVY
1058	10.0	6.60	476	69.0	"	"
1101	15.0	6.59	480	68.8	"	"

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

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
X 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: OK | LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9-30-93 Time: 0830 Meter Serial #: 9105 Temperature °F: ___

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

Location of previous calibration: AS-2

Signature: [signature] | Reviewed By: [signature] | Page 1 of 8

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 SAMPLE ID: MW-2(24)

PURGED BY: IAN GRAHAM CLIENT NAME: ARCO# 6148

SAMPLED BY: IAN GRAHAM LOCATION: 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.): N/A

DEPTH TO WATER (feet): N/A CALCULATED PURGE (gal.): N/A

DEPTH OF WELL (feet): N/A ACTUAL PURGE VOL. (gal.): N/A

DATE PURGED: 9-30-93 Start (2400 Hr) N/A End (2400 Hr) N/A

DATE SAMPLED: 9-30-93 Start (2400 Hr) N/A End (2400 Hr) N/A

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
* NO SAMPLE .02' OF PRODUCT IN WELL *						

D. O. (ppm): NR ODOR: VERY STRONG

COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™ N/A
___ Bailer (Teflon®)
X Bailer (PVC)
___ Bailer (Stainless Steel)
___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper N/A
___ Well Wizard™
X Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: CHECKED W/ BAILER .02' PRODUCT THICKNESS

Meter Calibration: Date: 9-30-93 Time: ___ Meter Serial #: 9105 Temperature °F: ___

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

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 2 of 8

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 | SAMPLE ID: MW-3(24)
PURGED BY: IAN GRAHAM | CLIENT NAME: ARCO# 6148
SAMPLED BY: IAN GRAHAM | LOCATION: 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
DEPTH TO WATER (feet): 18.14
DEPTH OF WELL (feet): 25.8

VOLUME IN CASING (gal.): 5.00
CALCULATED PURGE (gal.): 15.01
ACTUAL PURGE VOL (gal.): 15.5

DATE PURGED: 9-30-93 Start (2400 Hr) 1112 End (2400 Hr) 1125
DATE SAMPLED: 9-30-93 Start (2400 Hr) 1128 End (2400 Hr) 1128

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1115	5.0	6.60	648	65.4	GREY	HEAVY
1120	10.0	6.65	647	65.9	"	"
1125	15.5	6.59	651	66.7	"	"

D. O. (ppm): NR
ODOR: VERY STRONG
COLOR: NR (COBALT 0 - 100)
TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): ~~NONE~~ FB-1

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9-30-93 Time: 0830 Meter Serial #: 9105 Temperature °F: ___

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

Location of previous calibration: AS-2

Signature: ___ Reviewed By: ___ Page 3 of 8

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 | SAMPLE ID: MW-4 (24)

PURGED BY: IAN GRAHAM | CLIENT NAME: ARCO # 6148

SAMPLED BY: IAN GRAHAM | LOCATION: 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.):	6.31
DEPTH TO WATER (feet):	16.24	CALCULATED PURGE (gal.):	18.93
DEPTH OF WELL (feet):	25.9	ACTUAL PURGE VOL. (gal.):	19.0

DATE PURGED: 9-30-93 | Start (2400 Hr) 0955 | End (2400 Hr) 1010

DATE SAMPLED: 9-30-93 | Start (2400 Hr) 1012 | End (2400 Hr) 1012

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0958	6.5	6.79	548	67.8	BROWN	HEAVY
1005	13.0	6.57	550	67.9	"	"
1010	19.0	6.50	539	67.7	"	"

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

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
X 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: OK | LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9-30-93 | Time: 0830 | Meter Serial #: 9105 | Temperature °F: ___

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

Location of previous calibration: AS-2

Signature: [signature] | Reviewed By: [signature] | Page 4 of 8

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 | SAMPLE ID: MW-5(24)
PURGED BY: IAN GRAHAM | CLIENT NAME: ARCO# 6148
SAMPLED BY: IAN GRAHAM | LOCATION: 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.):	5.24
DEPTH TO WATER (feet):	16.97	CALCULATED PURGE (gal.):	15.73
DEPTH OF WELL (feet):	25.0	ACTUAL PURGE VOL (gal.):	16.0

DATE PURGED: 9-30-93 | Start (2400 Hr) 1025 | End (2400 Hr) 1034
DATE SAMPLED: 9-30-93 | Start (2400 Hr) 1036 | End (2400 Hr) 1036

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1028	5.5	6.57	564	68.7	BROWN	HEAVY
1031	11.0	6.67	558	69.8	"	"
1034	16.0	6.65	552	68.6	"	"

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

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

Other: ___

INTEGRITY: OK | LOCK #: 3259

Meter Calibration: (EC 1413 Date: 9-30-93 Time: 0830 Meter Serial #: 9105 Temperature °F: ___ Location ___) (DI ___) (pH 7 ___/___) (pH 10 ___/___) (pH 4 ___/___)

Signature: [signature] | Reviewed By: [signature] | Page 5 of 8

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 | SAMPLE ID: MW-6 (25)

PURGED BY: IAN GRAHAM | CLIENT NAME: ARCO # 6148

SAMPLED BY: IAN GRAHAM | LOCATION: 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.):	7.94
DEPTH TO WATER (feet):	14.34	CALCULATED PURGE (gal.):	23.83
DEPTH OF WELL (feet):	26.5	ACTUAL PURGE VOL. (gal.):	24.0

DATE PURGED: 9-30-93 Start (2400 Hr) 0935 End (2400 Hr) 0946

DATE SAMPLED: 9-30-93 Start (2400 Hr) 0948 End (2400 Hr) 0948

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0939	8.0	7.01	425	67.1	BROWN	HEAVY
0943	16.0	7.03	430	67.3	"	"
0946	24.0	7.07	431	66.9	"	"

D. O. (ppm): NR ODOR: ND

COLOR (COBALT 0 - 100): NR

TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
X 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: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9-30-93 Time: 0830 Meter Serial #: 9105 Temperature °F: ___

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

Location of previous calibration: AS-2

Signature: [signature] Reviewed By: [signature] Page 6 of 8

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 | SAMPLE ID: MW-7 (26)
PURGED BY: IAN GRAHAM | CLIENT NAME: ARCO# 6148
SAMPLED BY: IAN GRAHAM | LOCATION: 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
DEPTH TO WATER (feet): 15.05
DEPTH OF WELL (feet): 27.0
VOLUME IN CASING (gal.): 7.80
CALCULATED PURGE (gal.): 23.42
ACTUAL PURGE VOL. (gal.): 23.5

DATE PURGED: 9-30-93 Start (2400 Hr) 0910 End (2400 Hr) 0923
DATE SAMPLED: 9-30-93 Start (2400 Hr) 0925 End (2400 Hr) 0925

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0915	8.0	6.45	410	69.5	BROWN	HEAVY
0919	16.0	6.45	409	69.7	"	"
0923	23.5	6.52	412	69.8	"	"

D. O. (ppm): NR ODOR: ND COLOR: NR (COBALT 0 - 100) TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT
___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
X 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: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9-30-93 Time: 0830 Meter Serial #: 9105 Temperature °F: ___
(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)
Location of previous calibration: AS-2

Signature: [signature] Reviewed By: [signature] Page 7 of 8

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 SAMPLE ID: AS-2(25)
PURGED BY: IAN GRAHAM CLIENT NAME: ARCO # 6148
SAMPLED BY: IAN GRAHAM LOCATION: 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
DEPTH TO WATER (feet): 15.85
DEPTH OF WELL (feet): 26.2
VOLUME IN CASING (gal.): 4.80
CALCULATED PURGE (gal.): 14.40
ACTUAL PURGE VOL. (gal.): 10.0

DATE PURGED: 9-30-93 Start (2400 Hr) 0840 End (2400 Hr) 0850
DATE SAMPLED: 9-30-93 Start (2400 Hr) 0905 End (2400 Hr) 0905

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0845	5.0	6.90	505	67.0	CLEAR	LIGHT
0850	10.0	6.90	490	68.1	BROWN	HEAVY
0850	WELL DRIED @	10.0 GAL	W/L @ 26.02			
0906	RECHARGE	6.89	500	68.2	BROWN	HEAVY
D. O. (ppm): NR			ODOR: ND		NR (COBALT 0 - 100)	NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
X 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: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9-30-93 Time: 0830 Meter Serial #: 9105 Temperature °F: 65.0
(EC 1000 1060/1000) (DI 490) (pH 7 7.00 / 7.00) (pH 10 10.01 / 10.00) (pH 4 4.00 / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 8 of 8

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

Date October 21,1993
Project 0G70-039.01

To:
Mr. John Young
RESNA
3315 Almaden 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
3	Water Sample Field Data Sheets

For your: X Information Sent by: X Mail

Comments:
Enclosed are the dissolved oxygen data from the third quarter 1993 event at ARCO service station 6148, located at 5131 Shattuck Avenue, Oakland CA. 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. 4091 Exp. 6/30/96 CIVIL

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER BEFORE DISSOLVED OXYGEN SAMPLING

PROJECT # 0G70-039.01 STATION ADDRESS 5131 Shattuck Ave., Oakland DATE 9-30-93

ARCO STATION # 6148 FIELD TECHNICIAN Ian Graham DAY Thursday

DTW Order	Well ID	Depth to water after purge (feet)	Finish purge Time	Depth to water after stabilization (feet)	Stabilization Time	Depth to water at sample time (feet)	Sample Time	COMMENTS
1	AS-1	24.12	0850	18.31	1010	18.33	1145	—
2	MW-2	N/A	N/A	N/A	N/A	18.16	1155	—
3	MW-3	20.02	1125	18.25	1140	18.25	1205	—

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: OG70-039.01
PURGED BY: IAN GRAHAM
SAMPLED BY: IAN GRAHAM

SAMPLE ID: MW-2 (24)
CLIENT NAME: ARCO #6148
LOCATION: 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
DEPTH TO WATER (feet): 18.16
DEPTH OF WELL (feet): 25.8

VOLUME IN CASING (gal.): N/A
CALCULATED PURGE (gal.): N/A
ACTUAL PURGE VOL. (gal.): N/A

DATE PURGED: 9-30-93 Start (2400 Hr) N/A End (2400 Hr) N/A
DATE SAMPLED: 9-30-93 Start (2400 Hr) 1155 End (2400 Hr) 1155

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
	*	DISSOLVED	OXYGEN *			

D. O. (ppm): NR
ODOR: VERY STRONG
COLOR (COBALT 0 - 100): NR
TURBIDITY (NTU 0 - 200): NR

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™ N/A
___ 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: ___

LOCK #: 3259

WELL INTEGRITY: OK

REMARKS: ___

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

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

Location of previous calibration: ___

Signature: [signature] Reviewed By: JB

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 | SAMPLE ID: MW-3 (24)
PURGED BY: IAN GRAHAM | CLIENT NAME: ARCO #6148
SAMPLED BY: IAN GRAHAM | LOCATION: 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
DEPTH TO WATER (feet): 18.25
DEPTH OF WELL (feet): 25.8

VOLUME IN CASING (gal.): N/A
CALCULATED PURGE (gal.): N/A
ACTUAL PURGE VOL. (gal.): N/A

DATE PURGED: 9-30-93 | Start (2400 Hr) N/A | End (2400 Hr) N/A
DATE SAMPLED: 9-30-93 | Start (2400 Hr) 1205 | End (2400 Hr) 1205

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
	* DISSOLVED		OXYGEN	*		

D. O. (ppm): NR
ODOR: VERY STRONG
COLOR: NR (COBALT 0 - 100)
TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™ N/A
___ 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: OK | LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___
(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)
Location of previous calibration: ___

Signature: ___ Reviewed By: ___ Page 2 of 3

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-039.01 | SAMPLE ID: AS-2
PURGED BY: IAN GRAHAM | CLIENT NAME: ARCO # 6148
SAMPLED BY: IAN GRAHAM | LOCATION: 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
DEPTH TO WATER (feet): 18.33
DEPTH OF WELL (feet): 26.2

VOLUME IN CASING (gal.): N/A
CALCULATED PURGE (gal.): N/A
ACTUAL PURGE VOL. (gal.): N/A

DATE PURGED: 9-30-93 | Start (2400 Hr) N/A | End (2400 Hr) N/A
DATE SAMPLED: 9-30-93 | Start (2400 Hr) 1145 | End (2400 Hr) 1145

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
	*	DISSOLVED	OXYGEN *			

D. O. (ppm): N/A | ODOR: ND | COLOR: NR (COBALT 0 - 100) | TURBIDITY: NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™ N/A
___ 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: OK | LOCK #: 3259

REMARKS: ___

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

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

Location of ~~previous~~ calibration: ___

Signature: [signature] Reviewed By: [signature] Page 3 of 3