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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
First Quarter 1993
at
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

04/30/93

61035.06

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
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T R A N S M I T T A L

DATE: May 5, 1993
PROJECT NO.: 61035.06
TO: Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621
ATTENTION: Ms. Susan Hugo
SUBJECT: ARCO Station No. 6148

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	4/21/93	First Quarter 1993 Groundwater Monitoring Report for ARCO Station No. 6148, 5131 Shattuck Avenue, Oakland, California.

THESE ARE TRANSMITTED as checked below:

For review and comment As requested For your files For approval

REMARKS:


James L. Nelson, C.E.G. 1463

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
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April 30, 1993
0420MWHE
61035.06

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

Subject: First Quarter 1993 Groundwater Monitoring Report for 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, which summarizes the results of first quarter 1993 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, California, at the above-referenced site. The objectives of this quarterly groundwater monitoring are to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with a former waste-oil tank and 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.

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 the Site Vicinity Map, Plate 1.

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Previous work is discussed in prior subsurface investigations listed in the reference section of this report. The location of the groundwater monitoring wells, borings, and pertinent site features are shown on the Generalized Site Plan, Plate 2.

Groundwater Sampling and Gradient Evaluation

Depth to water levels (DTW) were measured by EMCON field personnel on January 21, February 22, and March 25, 1993. Quarterly sampling was performed by EMCON field personnel on January 22, 1993. The results of EMCON's field work on the site, including DTW levels and subjective analysis for the presence of product in the groundwater in MW-1 through MW-7 are presented on EMCON's Field Reports, Summary of Groundwater Monitoring Data, and Water Sample Field Data Sheets. These data are included in Appendix A.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations of product in the groundwater from MW-1 through MW-7 for this and previous quarterly groundwater monitoring at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. EMCON's DTW levels from January 22, February 22, and March 25, 1993, were used to evaluate groundwater gradients. Floating product was recorded by EMCON's field personnel to be 0.01 foot thick in MW-2 on January 21, February 22, and March 25, 1993. Floating product or sheen was not observed in wells MW-1, and MW-3 through MW-7 by EMCON's field personnel during this quarter (see EMCON's Field Reports, Appendix A). On March 31, 1993, RESNA field personnel measured the DTW level in well MW-2, and measured approximately 0.01 foot of floating product. Immediately after measuring DTW in well MW-2, RESNA field personnel installed a Horner EZY Floating Product Skimmer in this well. No product was bailed from well MW-2 by EMCON or RESNA field personnel this quarter.

Groundwater gradients interpreted for this quarter are shown on Plates 3 through 5, Groundwater Gradient Maps. The interpreted average groundwater gradient for January, February, and March 1993 was approximately 0.02 ft/ft with a 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, and MW-3 through MW-7 were purged and sampled by EMCON field personnel on January 22, 1993. Monitoring well MW-2 was not sampled due to the presence of product sheen. 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.

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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 5030/8020/DHS LUFT Method, and for halogenated volatile organic compounds (VOCs) using EPA Methods 5030/601. Additional groundwater samples were collected from well MW-3 and analyzed for 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 6010, and lead (Pb) using EPA Method 7421. TPHg/Benzene Concentrations in Groundwater are shown on Plate 6. 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.

Since last quarter, concentrations of TPHg have remained nondetectable in monitoring well MW-7, decreased in monitoring wells MW-3, and MW-6, and have increased in monitoring wells MW-1, MW-4, and MW-5. Concentrations of benzene have remained nondetectable in monitoring well MW-7, decreased in wells MW-3 and MW-6, and increased in wells MW-1, MW-4, and MW-5.

Although the laboratory analytical results indicated detectable amounts of TPHd, according to the laboratory, the chromatography of the detected TPHd does not match the typical diesel fingerprint, but falls within the expected weathered gasoline range. According to ARCO, diesel has not been stored at the site. Analytical results indicated VOCs were detected in water samples collected from monitoring wells MW-1 and MW-3 through MW-7. Monitoring well MW-6, located upgradient from the USTs, former waste-oil tank, and service islands, contained the highest levels of tetrachloroethylene (PCE). This may indicate an offsite source for the VOCs in groundwater at the site.

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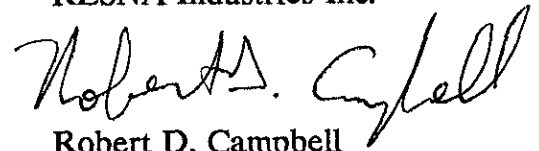
It is recommended that copies of this report be forwarded to:

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


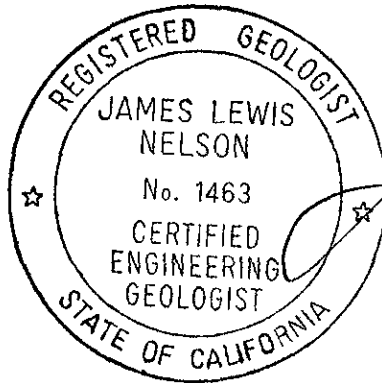
Mr. Richard Hiatt
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

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

Sincerely,
RESNA Industries Inc.



Robert D. Campbell
Staff Geologist



James L. Nelson
Certified Engineering
Geologist No. 1463

Quarterly Groundwater Monitoring
ARCO Station 6148, Oakland, California

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Enclosures: References

- Plate 1, Site Vicinity Map
- Plate 2, Generalized Site Plan
- Plate 3, Groundwater Gradient Map, January 21, 1993
- Plate 4, Groundwater Gradient Map, February 22, 1993
- Plate 5, Groundwater Gradient Map, March 25, 1993
- Plate 6, Concentrations of TPHg/Benzene in Groundwater, January 21, 1992

- 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, and



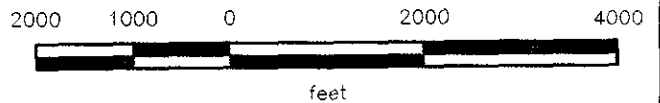
Base: U.S. Geological Survey
 7.5-Minute Quadrangles
 Oakland, California
 Photorevised 1980

LEGEND

(●) = Site Location



Approximate Scale



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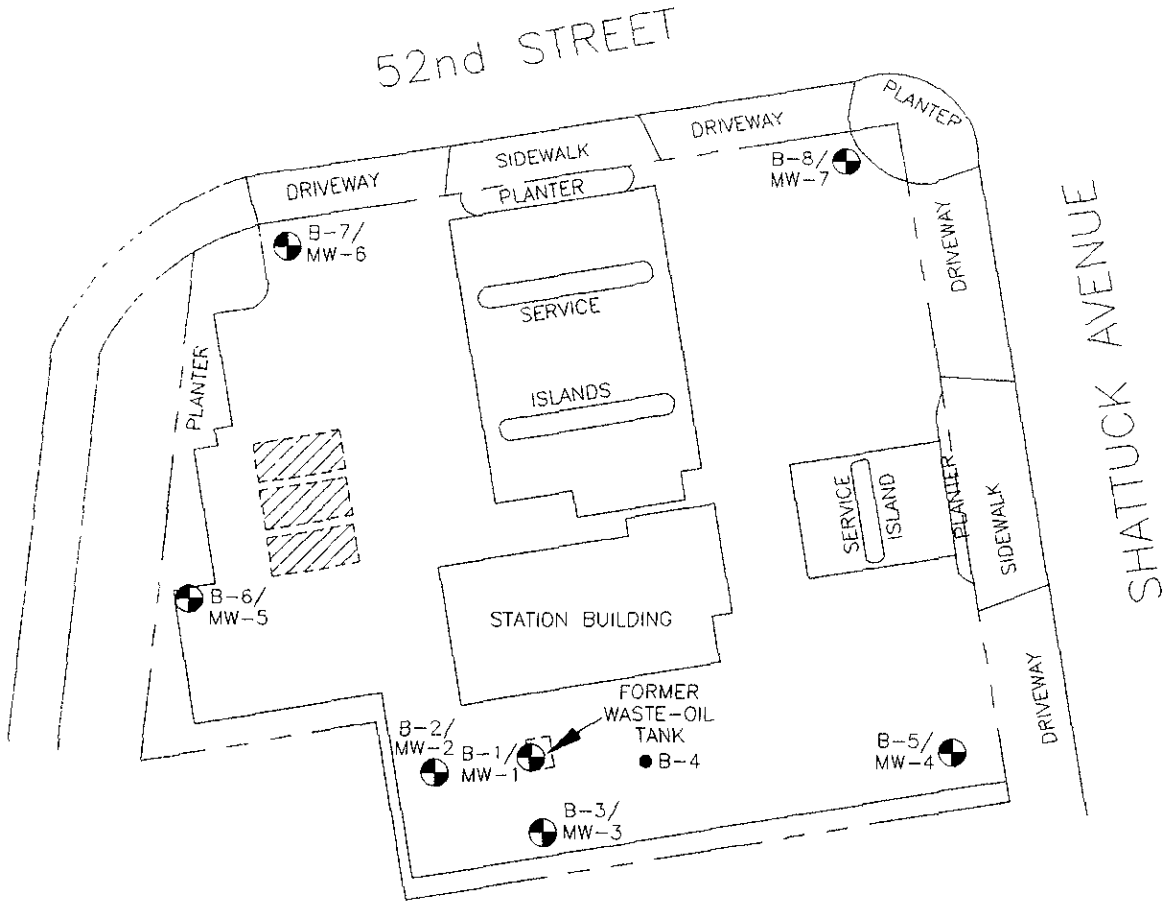
SITE VICINITY MAP
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE

1

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EXPLANATION

 = Existing underground storage tanks

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

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

Approximate Scale



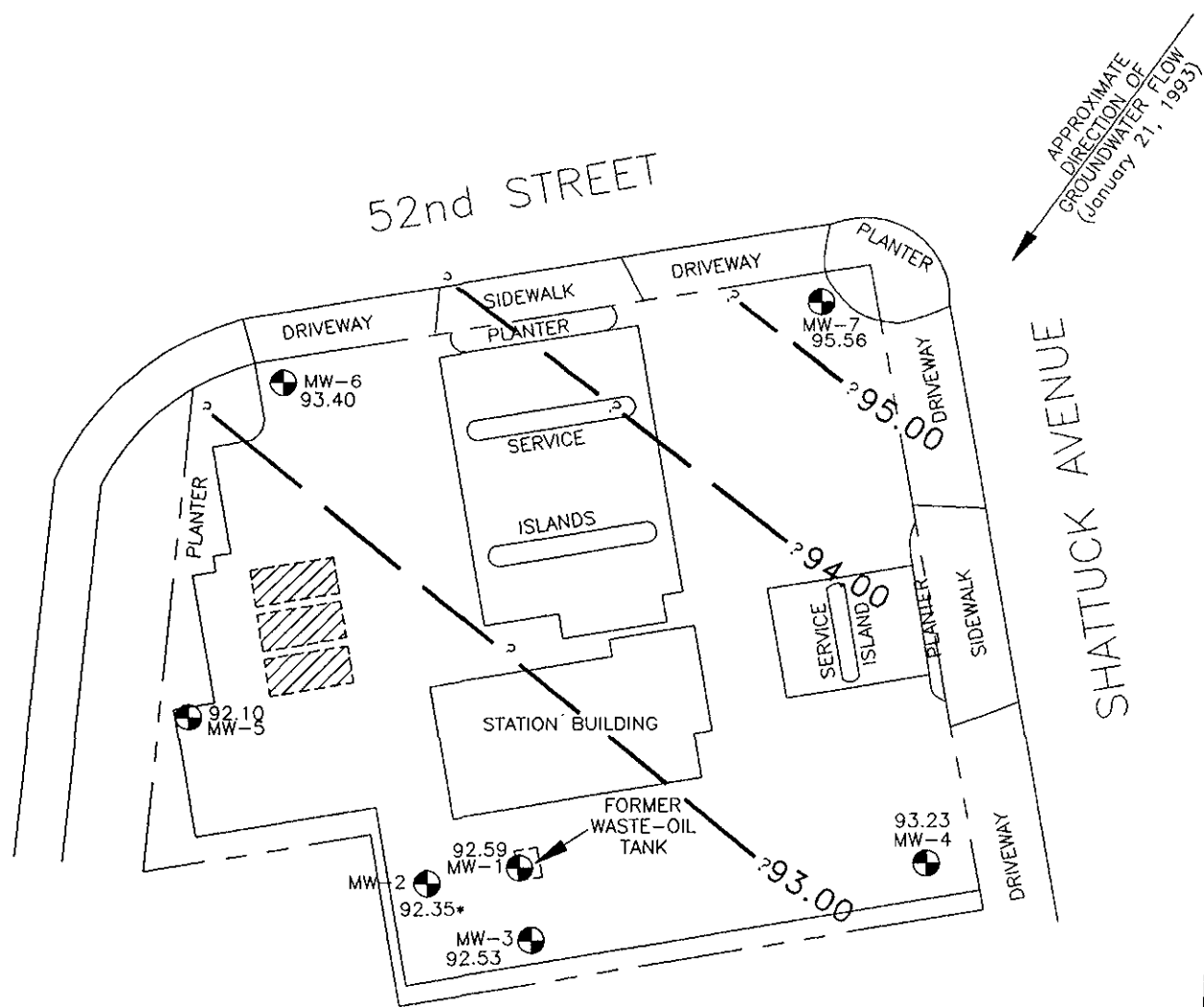
Source Based on data by John Koch,
Land Surveyor, November 1992

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

PLATE
2

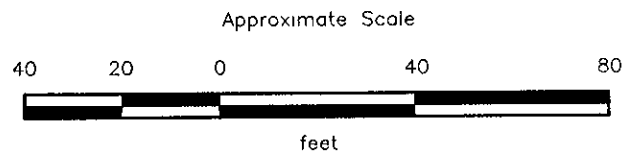
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APPROXIMATE
DIRECTION OF
GROUNDWATER FLOW
(January 21, 1993)

EXPLANATION

- = Line of equal elevation of groundwater in feet above mean sea level (MSL)
- 95.56 = Elevation of groundwater in feet above MSL, January 21, 1993
- * = Elevation adjusted for presence of floating product
- MW-7 = Monitoring well (RESNA, December 1991 and October 1992)
- = Underground storage tanks



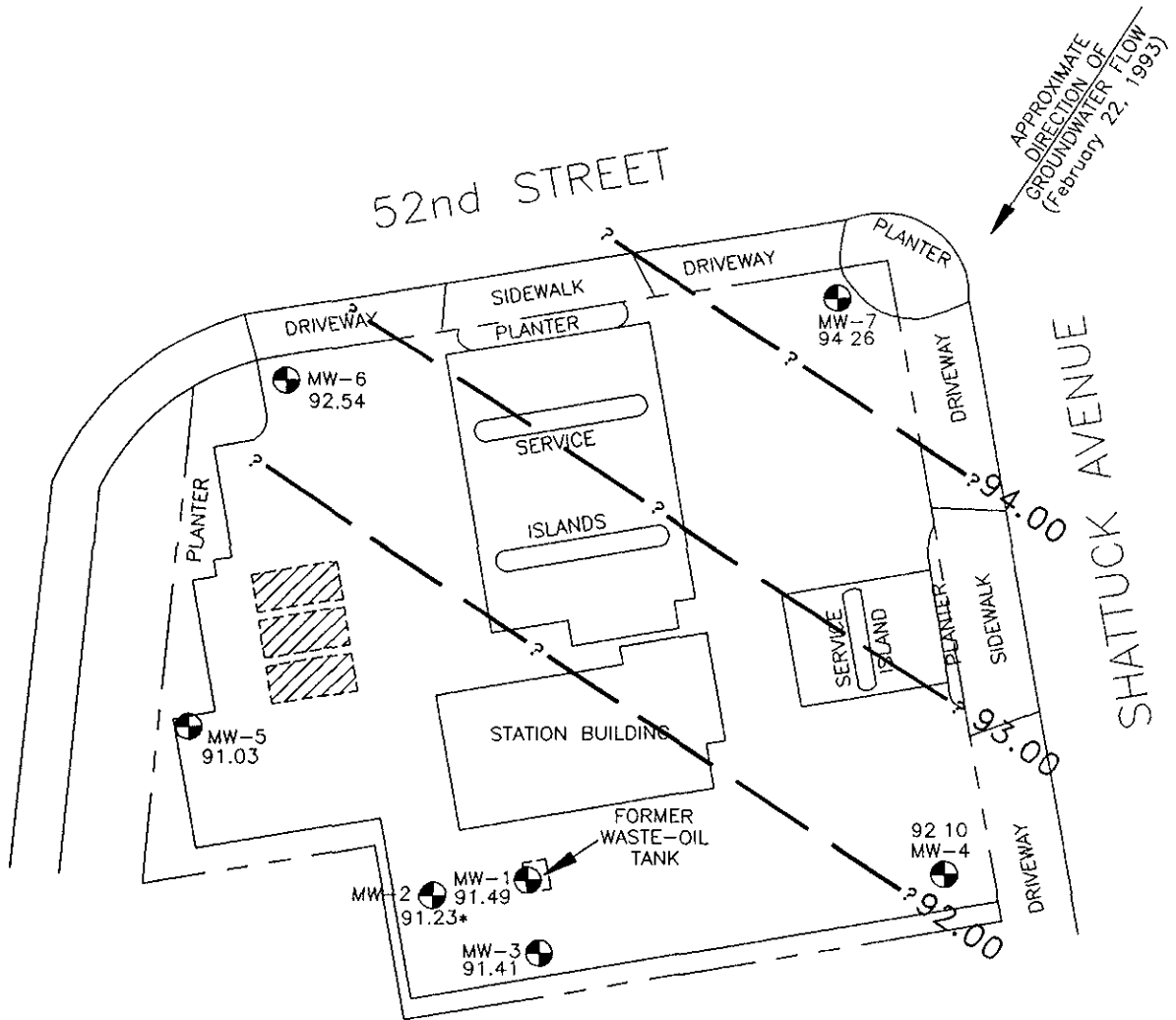
Source: Based on data supplied by John Koch, Land Surveyor, November 1992

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

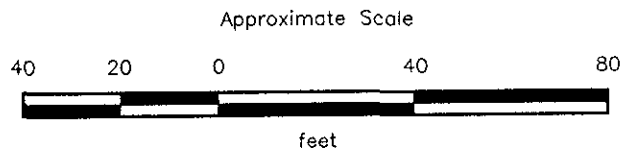
PLATE
3

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EXPLANATION

- = Line of equal elevation of groundwater in feet above mean sea level (MSL)
- 94.26 = Elevation of groundwater in feet above MSL, February 22, 1993
- * = Elevation adjusted for presence of floating product
- MW-7 = Monitoring well (RESNA, December 1991 and October 1992)
- = Underground storage tanks



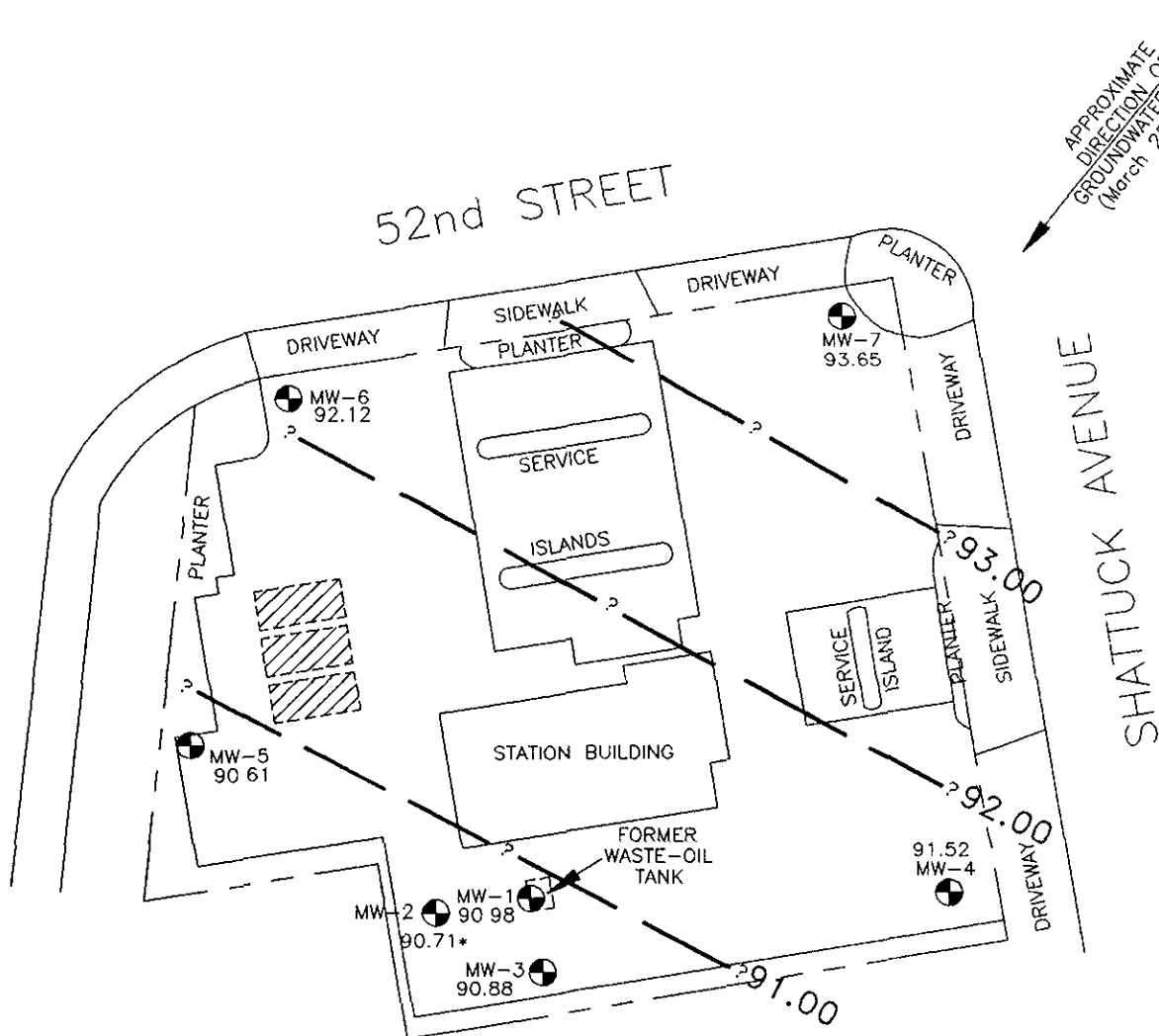
Source: Based on data supplied by John Koch, Land Surveyor, November 1992

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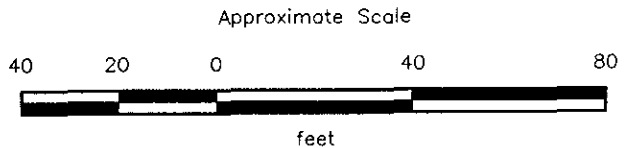
GROUNDWATER GRADIENT MAP
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California

PLATE
4



EXPLANATION

- 93.00 = Line of equal elevation of groundwater in feet above mean sea level (MSL)
- 93.65 = Elevation of groundwater in feet above MSL, March 25, 1993
- * = Elevation adjusted for presence of floating product
- MW-7 = Monitoring well (RESNA, December 1991 and October 1992)
- = Underground storage tanks



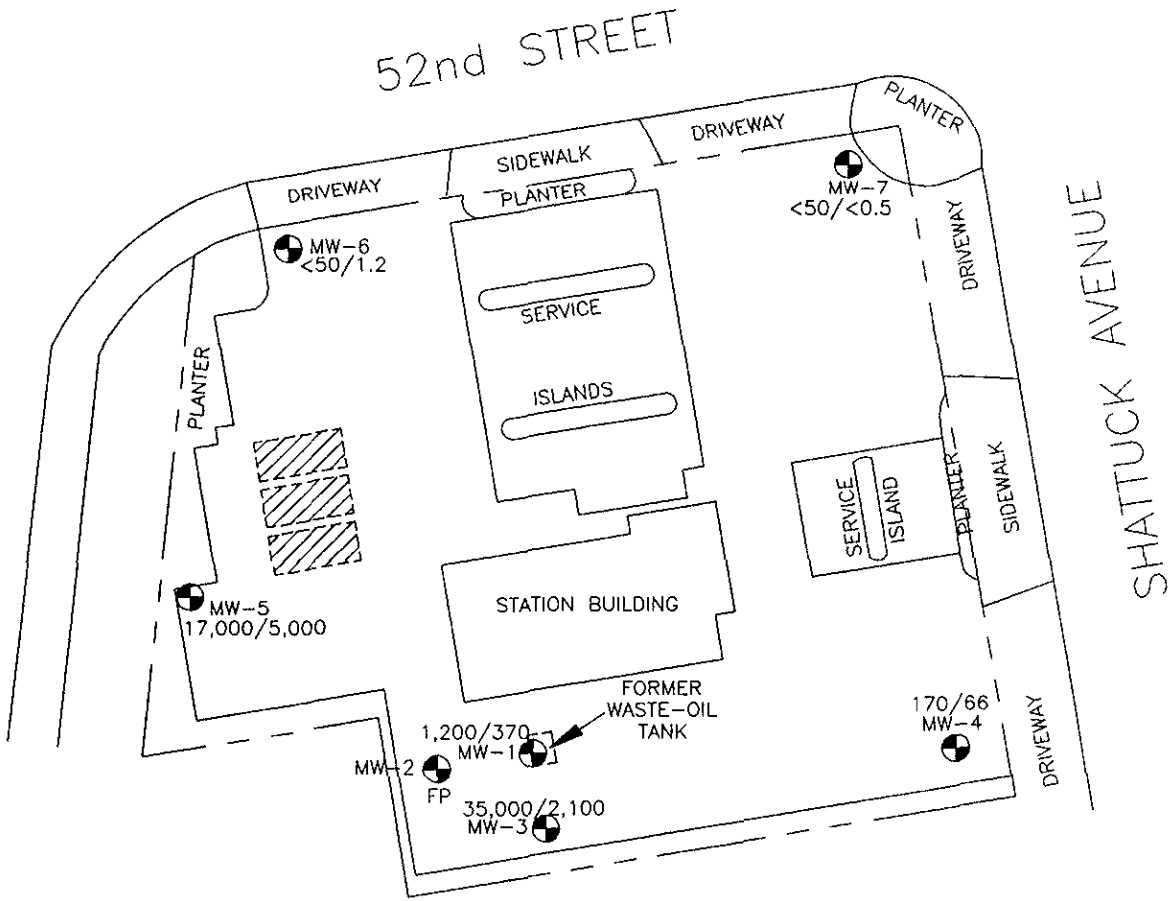
Source: Based on data supplied by John Koch, Land Surveyor, November 1992.

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

PLATE
5

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
EXPLANATION

35,000/2,100 = Concentration of total petroleum hydrocarbons as gasoline (TPHg) and benzene in groundwater in parts per billion (ppb), January 22, 1993

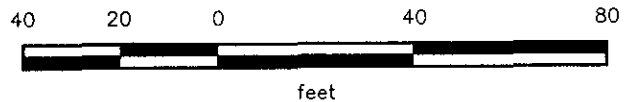
< = Less than laboratory detection limit

FP = Floating product present in well, not sampled

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

 = Underground storage tanks

Approximate Scale



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

Quarterly Groundwater Monitoring
ARCO Station 6148, Oakland, California

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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.

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

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
<u>MW-1</u>				
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
<u>MW-2</u>				
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
<u>MW-3</u>				
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

See notes on page 3 of 3.

Quarterly Groundwater Monitoring
ARCO Station 6148, Oakland, California

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6148
Oakland, California
(Page 2 of 3)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
<u>MW-3 Cont.</u>				
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
<u>MW-4</u>				
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
<u>MW-5</u>				
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
<u>MW-6</u>				
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
<u>MW-7</u>				
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

See notes on page 3 of 3.

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

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 = $DTW - (PT \times 0.8)$). The corrected DTW is then subtracted from the well elevation.

Quarterly Groundwater Monitoring
ARCO Station 6148, Oakland, California

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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 DATE	TPHg	TPHd	B	T	E	X	Cd	Cr	Pb	Ni	Zn	TRPH
<u>MW-1</u>												
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
<u>MW-2</u>												
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											
<u>MW-3</u>												
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
<u>MW-4</u>												
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
<u>MW-5</u>												
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
<u>MW-6</u>												
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
<u>MW-7</u>												
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
MCL:	--	--	1	--	680	1,750	10	50	50	--	--	--
DWAL:	--	--	--	100	--	--	--	--	--	--	--	--

See Notes on Page 2 of 2.

Quarterly Groundwater Monitoring
ARCO Station 6148, Oakland, California

April 21, 1993
61035.06

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)

Results in parts per billion (ppb), except TRPH (total recoverable petroleum hydrocarbons) 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.
B: benzene, T: toluene, E: ethylbenzene, X: total xylenes isomers
BTEX: 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)
(): Concentrations in parentheses were results of Method 5520C.
*: Raised MRL due to insufficient sample quantity.
Metals: By EPA method 6010 and 7421.
<: Results reported below the 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.
MCL: Adopted Maximum Contaminant Levels in Drinking Water (DHS, October 1990).
DWAL: Recommended Drinking Water Action Level (DHS, October 1990).

Quarterly Groundwater Monitoring
ARCO Station 6148, Oakland, California

April 21, 1993
61035.06

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES
OF WATER SAMPLES-VOCs AND BNAs
ARCO Station 6148
Oakland, California
(Page 1 of 2)

Date/Well	Compound	VOCs (ppb)	Compound	BNAs (ppb)
<u>MW-1</u>				
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		
<u>MW-2</u>				
03-18-92	Tetrachloroethene	19		NA
	Trichloroethene	2.22		
	cis-1,2-Dichloroethene	0.5		
06-12-92	Not sampled--floating product	NA		NA
09-14-92	Not sampled--floating product	NA		NA
10-07-92	Not sampled--floating product	NA		NA
01-22-93	Not sampled--floating product	NA		NA
<u>MW-3</u>				
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	NA	
01-22-93	Tetrachloroethene	1.9	Naphthalene	440
			2-Methylnaphthalene	350
			Bis(2-ethylhexyl) Phthalate	280
			Di-n-octyl Phthalate	13
<u>MW-4</u>				
01-22-93	Tetrachloroethene	1.4		<20
<u>MW-5</u>				
01-22-93	Tetrachloroethene	11		<20
	Trichloroethene	4.7		<20
	cis-1,2-Dichloroethene	1.8		<20

See Notes on Page 2 of 2.

Quarterly Groundwater Monitoring
ARCO Station 6148, Oakland, California

April 21, 1993
61035.06

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

Date/Well	Compound	VOCs (ppb)	Compound	BNAs (ppb)
<u>MW-6</u> 01-22-93	Tetrachloroethene	120		NA
	Trichloroethene	6.2		
	Chloroform	6.6		
	<u>cis-1,2-Dichloroethene</u>	1.8		
<u>MW-7</u> 01-22-93	Tetrachloroethene	6.8		NA
MCL:	<u>PCE</u> 5	<u>TCE</u> 5	<u>cis-1,2-DCE</u> 6*	

Results in parts per billion (ppb).

VOCs: Volatile Organic Compounds by EPA method 5030/8010. Compounds not shown were not detected.

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.

MCLs: Maximum Contaminant Levels as reported by the California Department of Health Services 10/24/90.

*: Proposed MCL.

APPENDIX A

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



Date February 11, 1993
 Project OG70-039.01
61035-26

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

FFP 1 - 33

We are enclosing:

Copies	Description
<u>1</u>	<u>Depth To Water / Floating Product Survey Results</u>
<u>1</u>	<u>Summary of Groundwater Monitoring Data</u>
<u>1</u>	<u>Certified Analytical Reports with Chain-of-Custody</u>
<u>7</u>	<u>Water Sample Field Data Sheets</u>

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the first 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.

Reviewed by:



Jim Butera JB

Robert Porter
 Robert Porter, Senior Project Engineer.



FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT #: OG70-039.01

STATION ADDRESS : 5131 Shattuck Ave., Oakland, CA

DATE : 1-21-93

ARCO STATION # : 6148

FIELD TECHNICIAN : M. Adler

DAY : Thursday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-7	OK	Yes	OK	3259	OK	11.52	11.52	ND	ND	27.0	-
2	MW-6	OK	Yes	OK	3259	OK	11.76	11.76	ND	ND	26.6	-
3	MW-4	OK	Yes	OK	3259	OK	13.35	13.35	ND	ND	26.0	replaced LWC.
4	MW-1	OK	Yes	OK	3259	OK	15.44	15.44	ND	ND	25.7	-
5	MW-5	OK	Yes	OK	3259	OK	14.58	14.58	ND	ND	25.0	-
6	MW-3	OK	Yes	OK	3259	OK	15.24	15.24	ND	ND	25.9	Strong odor
7	MW-2	OK	Yes	OK	3259	OK	15.09	15.09	ND 0.1	ND 0.1	25.8	0.1' product in well casing see bales

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
 First Quarter 1993
 ARCO Service Station 6148
 5131 Shattuck Avenue, Oakland, California
 micrograms per liter ($\mu\text{g/l}$) 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 ($\mu\text{g/l}$)	Benzene ($\mu\text{g/l}$)	Toluene ($\mu\text{g/l}$)	Ethyl- benzene ($\mu\text{g/l}$)	Total Xylenes ($\mu\text{g/l}$)	TPH as Diesel ($\mu\text{g/l}$)	Total Oil and Grease, 5520F (mg/l)
MW-1(25)	01/21/93	15.44	ND. ²	1,200.	370.	57.	18.	39.	NR. ³	NR.
MW-2	01/21/93	15.09	0.01	FP. ⁴	FP.	FP.	FP.	FP.	FP.	FP.
MW-3(25)	01/21/93	15.24	ND.	35,000.	2,100.	1,400.	1,200.	4,400.	13,000.	31.
MW-4(26)	01/21/93	13.35	ND.	170.	66.	0.8	<0.5	1.5	NR.	NR.
MW-5(25)	01/21/93	14.58	ND.	17,000.	5,000.	780.	260.	330.	NR.	NR.
MW-6(26)	01/21/93	11.76	ND.	<50.	1.2	<0.5	<0.5	<0.5	NR.	NR.
MW-7(27)	01/21/93	11.52	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
FB-1. ⁵	01/21/93	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 EPA¹ Methods 5030/601
 First Quarter 1993
 ARCO Service Station 6148
 5131 Shattuck Avenue, Oakland, California
 micrograms per liter ($\mu\text{g/l}$) or parts per billion (ppb)

Well ID and Sample Depth	<i>cis</i> - 1,2-DCE ² (ppb)	Chloroform (ppb)	TCE ³ (ppb)	PCE ⁴ (ppb)
MW-1(25)	<0.5	<0.5	0.9	11.
MW-2	FP. ⁵	FP.	FP.	FP.
MW-3(25)	<0.5	<0.5	<0.5	1.9
MW-4(26)	<0.5	<0.5	<0.5	1.4
MW-5(25)	1.8	<0.5	4.7	11.
MW-6(26)	1.7	6.6	6.2	120.
MW-7(27)	<0.5	<0.5	<0.5	6.8

-
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
Total Metals by EPA¹ Method 6010 and 7421
First Quarter 1993
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter ($\mu\text{g/l}$) or parts per billion (ppb)

Well ID and Sample Depth	Cadmium (ppb)	Chromium (ppb)	Lead (ppb)	Nickel (ppb)	Zinc (ppb)
MW-3(24)	<3.	10.	8.	23.	28.

1. EPA = United States Environmental Protection Agency

Summary of Analytical Results
Base Neutral / Acid Semivolatile Organic Compounds by EPA¹ Methods 3510/8270
First Quarter 1993
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter ($\mu\text{g/l}$) or parts per billion (ppb)

Well ID and Sample Depth	Naphthalene (ppb)	2-Methylnaphthalene (ppb)	Bis(2-ethylhexyl) Phthalate (ppb)	Di-n-octyl Phthalate (ppb)
MW-3(25)	440.	350.	280.	13.

1. EPA = United States Environmental Protection Agency.



February 8, 1993

Service Request No. SJ93-0093

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 January 22, 1993. For your reference, these analyses have been assigned our service request number SJ93-0093.


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/kt

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. OG71-039.01
ARCO Facility No. 6148

Date Received: 01/22/93
Service Request No.: SJ93-0093
Sample Matrix: Water

Inorganic Parameters¹
mg/L (ppm)

Sample Name:
Date Sampled:

MW-3 (25) Method Blank
01/22/93

<u>Analyte</u>	<u>Method</u>	<u>MRL</u>		
Hydrocarbons, IR	SM 5520F	0.5	31.	ND

MRL Method Reporting Limit

ND None Detected at or above the method reporting limit

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: _____

K. C. Murphy

Date: _____

February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. 0G71-039.01
ARCO Facility No. 6148
Sample Matrix: Water

Date Received: 01/22/93
Date Extracted: 01/25/93
Date Analyzed: 01/27/93
Service Request No.: SJ93-0093

Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/California DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

<u>Sample Name</u>	<u>MRL</u>	<u>TPH as Diesel</u>
MW-3 (25)	50	13,000. *
Method Blank	50	ND

MRL Method Reporting Limit

TPH Total Petroleum Hydrocarbons

ND None Detected at or above the method reporting limit

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

Approved by: Kevin Murphy

Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. 0G71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093
 Sample Matrix: Water

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

Sample Name:	<u>MW-1 (25)</u>	<u>MW-3 (25)</u>	<u>MW-4 (26)</u>
Date Analyzed:	02/01/93	02/02/93	02/01/93

<u>Analyte</u>	<u>MRL</u>			
Benzene	0.5	370.	2,100.	66.
Toluene	0.5	57.	1,400.	0.8
Ethylbenzene	0.5	18.	1,200.	ND
Total Xylenes	0.5	39.	4,400.	1.5
TPH as Gasoline	50	1,200.	35,000.	170.

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

Approved by: _____

Keenan Murphy

Date: _____

February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. 0G71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093
 Sample Matrix: Water

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

Sample Name: MW-5 (25) MW-6 (26) MW-7 (27)
 Date Analyzed: 02/03/93 02/01/93 02/01/93

<u>Analyte</u>	<u>MRL</u>	<u>MW-5 (25)</u>	<u>MW-6 (26)</u>	<u>MW-7 (27)</u>
Benzene	0.5	5,000.	1.2	ND
Toluene	0.5	780.	ND	ND
Ethylbenzene	0.5	260.	ND	ND
Total Xylenes	0.5	330.	ND	ND
TPH as Gasoline	50	17,000.	ND	ND

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

Approved by: K. O. Murphy Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. 0G71-039.01
ARCO Facility No. 6148

Date Received: 01/22/93
Service Request No.: SJ93-0093
Sample Matrix: Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Sample Name: FB-1 Method Blank Method Blank
Date Analyzed: 02/01/93 02/01/93 02/02/93

<u>Analyte</u>	<u>MRL</u>			
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
TPH as Gasoline	50	ND	ND	ND

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

Approved by: K. O. Murphy Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. 0G71-039.01
ARCO Facility No. 6148

Date Received: 01/22/93
Service Request No.: SJ93-0093
Sample Matrix: Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Sample Name: Method Blank
Date Analyzed: 02/03/93

<u>Analyte</u>	<u>MRL</u>	
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
TPH as Gasoline	50	ND

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

Approved by: K. O. Murphy

Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. 0G71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093
 Sample Matrix: Water

Halogenated Volatile Organic Compounds
 EPA Methods 5030/601
 µg/L (ppb)

Sample Name: MW-1 (25) MW-3 (25) MW-4 (26)
 Date Analyzed: 01/25/93 01/25/93 01/25/93

Analyte	MRL	MW-1 (25)	MW-3 (25)	MW-4 (26)
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	1	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	ND	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	0.9	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	11.	1.9	1.4
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

MRL Method Reporting Limit

ND None Detected at or above the method reporting limit

Approved by: Keon Murphy Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. OG71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093
 Sample Matrix: Water

Halogenated Volatile Organic Compounds
 EPA Methods 5030/601
 µg/L (ppb)

Sample Name: MW-5 (25) MW-6 (26) MW-7 (27)
 Date Analyzed: 01/25/93 01/25/93 01/25/93

Analyte	MRL	MW-5 (25)	MW-6 (26)	MW-7 (27)
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	1	ND	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND	ND
cis-1,2-Dichloroethene	0.5	1.8	1.7	ND
1,1-Dichloroethane	0.5	ND	ND	ND
Chloroform	0.5	ND	6.6	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	4.7	6.2	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	11.	120.	6.8
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

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

Approved by: Kenneth Murphy Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. 0G71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093
 Sample Matrix: Water

Halogenated Volatile Organic Compounds
 EPA Methods 5030/601
 µg/L (ppb)

Sample Name:
 Date Analyzed:

Method Blank
 01/25/93

Analyte	MRL	
Dichlorodifluoromethane (Freon 12)	1	ND
Chloromethane	1	ND
Vinyl Chloride	0.5	ND
Bromomethane	0.5	ND
Chloroethane	0.5	ND
Trichlorofluoromethane (Freon 11)	0.5	ND
1,1-Dichloroethene	0.5	ND
Trichlorotrifluoroethane (Freon 113)	0.5	ND
Methylene Chloride	1	ND
<i>trans</i> -1,2-Dichloroethene	0.5	ND
<i>cis</i> -1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	ND
1,1,1-Trichloroethane (TCA)	0.5	ND
Carbon Tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	ND
Trichloroethene (TCE)	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
2-Chloroethyl Vinyl Ether	5	ND
<i>trans</i> -1,3-Dichloropropene	0.5	ND
<i>cis</i> -1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene (PCE)	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND

MRL Method Reporting Limit

ND None Detected at or above the method reporting limit

Approved by: Kenneth Murphy

Date: February 8, 1993

APPENDIX A
LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G71-039.01
ARCO Facility No. 6148

Date Received: 01/22/93
Service Request No.: SJ93-0093
Sample Matrix: Water

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

Date Analyzed: 01/27/93

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
TPH as Diesel	1,000.	1,018.	102.	90-110

TPH Total Petroleum Hydrocarbons

Approved by:

Kenneth Murphy

Date:

February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G71-039.01
ARCO Facility No. 6148

Date Received: 01/22/93
Service Request No.: SJ93-0093
Sample Matrix: Water

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

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> <i>p</i> -Terphenyl
MW-3 (25)	01/27/93	94.
MS	01/27/93	83.
DMS	01/27/93	85.
Method Blank	01/27/93	98.

CAS Acceptance Criteria 46-133

Approved by: *Kedon Murphy* Date: *February 5, 1993*

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G71-039.01
ARCO Facility No. 6148

Date Received: 01/22/93
Service Request No.: SJ93-0093
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Date Analyzed: 01/27/93

Percent Recovery

<u>Parameter</u>	<u>Spike Level</u>	<u>Sample Result</u>	<u>Spike Result</u>		<u>Percent Recovery</u>		<u>Acceptance Criteria</u>
			<u>MS</u>	<u>DMS</u>	<u>MS</u>	<u>DMS</u>	
Diesel	4,000.	ND	3,620.	3,730.	91.	93.	61-121

ND None Detected at or above the method reporting limit

Approved by: *Richard Murphy*

Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: EMCON Project No. 0G71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093

Initial Calibration Verification
 BTEX and TPH as Gasoline
 EPA Methods 5030/8020/California DHS LUFT Method
 Nanograms

Date Analyzed: 02/01/93

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
Benzene	250.	238.	95.	85-115
Toluene	250.	247.	99.	85-115
Ethylbenzene	250.	238.	95.	85-115
Total Xylenes	750.	719.	96.	85-115
TPH as Gasoline	2,500.	2,639.	106.	90-110

Date Analyzed: 02/02/93

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
Benzene	250.	248.	99.	85-115
Toluene	250.	257.	103.	85-115
Ethylbenzene	250.	249.	99.	85-115
Total Xylenes	750.	736.	98.	85-115
TPH as Gasoline	2,500.	2,510.	100.	90-110

TPH Total Petroleum Hydrocarbons

Approved by: *Kearney Murphy*

Date: *February 8, 1993*

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G71-039.01
ARCO Facility No. 6148

Date Received: 01/22/93
Service Request No.: SJ93-0093

Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Nanograms

Date Analyzed: 02/03/93

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
Benzene	250.	231.	93.	85-115
Toluene	250.	241.	96.	85-115
Ethylbenzene	250.	235.	94.	85-115
Total Xylenes	750.	690.	92.	85-115
TPH as Gasoline	2,500.	2,657.	106.	90-110

TPH Total Petroleum Hydrocarbons

Approved by:

K. O'Rourke

Date:

February 6, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: EMCON Project No. 0G71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093
 Sample Matrix: Water

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

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> <i>a,a,a</i> -Trifluorotoluene
MW-1 (25)	02/01/93	90.
MW-3 (25)	02/02/93	95.
MW-4 (26)	02/01/93	90.
MW-5 (25)	02/03/93	107.
MW-6 (26)	02/01/93	87.
MW-7 (27)	02/01/93	86.
FB-1	02/01/93	90.
MS	02/01/93	93.
DMS	02/01/93	97.
Method Blank	02/01/93	89.
Method Blank	02/02/93	89.
Method Blank	02/03/93	93.

CAS Acceptance Criteria

70-130

TPH Total Petroleum Hydrocarbons

Approved by: *Kenneth Murphy*

Date: *February 8, 1993*

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: EMCON Project No. OG71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093
 Sample Matrix: Water

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

Date Analyzed: 02/01/93

Percent Recovery

Analyte	Spike Level	Sample Result	Spike Result		Percent Recovery		CAS Acceptance Criteria
			MS	DMS	MS	DMS	
TPH as Gasoline	2,500.	761.	3,200.	3,220.	98.	98.	70-130

TPH Total Petroleum Hydrocarbons
 ND None Detected at or above the method reporting limit

Approved by: Kenneth Murphy Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: EMCON Project No. OG71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093

Initial Calibration Verification
 Halogenated Volatile Organic Compounds
 EPA Methods 5030/601
 Nanograms

Date Analyzed: 01/25/93

Analyte	True Value	Result	Percent Recovery	EPA Percent Recovery Acceptance Criteria
Chloromethane	50	41.3	83.	D-193
Vinyl Chloride	50	43.6	87.	28-163
Bromomethane	50	41.6	83.	D-144
Chloroethane	50	46.4	93.	46-137
Trichlorofluoromethane (Freon 11)	50	49.5	99.	21-156
1,1-Dichloroethene	50	39.6	79.	28-167
Methylene Chloride	50	39.9	80.	25-162
<i>trans</i> -1,2-Dichloroethene	50	43.3	87.	38-155
1,1-Dichloroethane	50	42.8	86.	47-132
Chloroform	50	42.0	84.	49-133
1,1,1-Trichloroethane (TCA)	50	43.9	88.	41-138
Carbon Tetrachloride	50	46.9	94.	43-143
1,2-Dichloroethane	50	47.9	96.	51-147
Trichloroethene (TCE)	50	44.3	89.	35-146
1,2-Dichloropropane	50	46.4	93.	44-156
Bromodichloromethane	50	44.9	90.	42-172
<i>trans</i> -1,3-Dichloropropene	50	57.7	115.	22-178
<i>cis</i> -1,3-Dichloropropene	50	47.2	94.	22-178
1,1,2-Trichloroethane	50	46.6	93.	39-136
Tetrachloroethene (PCE)	50	47.6	95.	26-162
Dibromochloromethane	50	47.0	94.	24-191
Chlorobenzene	50	47.9	96.	38-150
Bromoform	50	45.2	90.	13-159
1,1,2,2-Tetrachloroethane	50	48.1	96.	8-184
1,3-Dichlorobenzene	50	44.9	90.	7-187
1,4-Dichlorobenzene	50	48.9	98.	42-143
1,2-Dichlorobenzene	50	47.0	94.	D-208

D Detected

Approved by: Kedra Murphy

Date: February 8, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. OG71-039.01
ARCO Facility No. 6148

Date Received: 01/22/93
Service Request No.: SJ93-0093
Sample Matrix: Water

Surrogate Recovery Summary
Halogenated Volatile Organic Compounds
EPA Methods 5030/601

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> 4-Bromofluorobenzene
MW-1 (25)	01/25/93	86.
MW-3 (25)	01/25/93	92.
MW-4 (26)	01/25/93	84.
MW-5 (25)	01/25/93	88.
MW-6 (26)	01/25/93	89.
MW-7 (27)	01/25/93	93.
MW-3 (25) MS	01/25/93	95.
MW-3 (25) DMS	01/25/93	96.
Method Blank	01/25/93	78.

CAS Acceptance Criteria

70-130

Approved by:

K. Conroy

Date:

February 5, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: EMCON Project No. 0G71-039.01
 ARCO Facility No. 6148

Date Received: 01/22/93
 Service Request No.: SJ93-0093
 Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
 Halogenated Volatile Organic Compounds
 EPA Methods 5030/601
 µg/L (ppb)

Sample Name: MW-3 (25)
 Date Analyzed: 01/25/93

Percent Recovery

Analyte	Spike Level	Sample Result	Spike Result		MS	DMS	EPA Acceptance Criteria
			MS	DMS			
1,1-Dichloroethene	10.	ND	8.48	8.09	85.	81.	28-167
Trichloroethene	10.	ND	8.86	8.47	89.	85.	35-146
Tetrachloroethene	10.	1.88	10.4	10.2	85.	83.	26-162

ND None Detected at or above the method reporting limit

Approved by: *Kenneth Murphy*

Date: *February 8, 1993*

APPENDIX B
CHAIN OF CUSTODY

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) **453-0719** Fax no (Consultant) **453-0452** Contract number **07077**
 Consultant name **EMCON Associates** Address (Consultant) **1938 Junction Avenue San Jose CA 95128** Method of shipment **HT - Sampler will deliver**

Sample I.D.	Lab no	Container no	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA 8620/8020/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 4131 <input type="checkbox"/> 4132 <input type="checkbox"/>	TPH EPA 418 1/SM608E	EPA 600/6010	EPA 624/6270	EPA 624/6270	TCLP Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	Semi Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	CAM Metals EPA 8010/7000 TTL <input type="checkbox"/> STL <input type="checkbox"/>	Lead Org/DHS <input type="checkbox"/> Lead EPA 7420/7421 <input type="checkbox"/>	Metals Cd, Cr, Pb, Ni	Special detection Limit/reporting	
			Soil	Water	Other	Ice	Acid																	
W-1 (25) i-4	4	4		X		X	HCl	9-22-93/1141		X					X									Lowest possible
W-2 ()	4	4					HCl			X					X									No Sample Product
W-3 (25) 5-10	6	6					HCl	1253		X	X			X		X								
W-4 (26) 11-14	4	4					HCl	1102		X				X										
W-5 (25) 15-18	4	4					HCl	1215		X				X										Normal
W-6 (26) 19-22	4	4					HCl	1028		X				X										* cancelled form W-3 per J. Butera 1-23-93 HT
W-7 (27) 23-26	4	4					HCl	0955		X				X										Remarks
FB-1 27-28	2	2					HCl	1315		X				X										2-40 ml / HCl HF 1-23-93 UOA 1's * 100-8240 to MW-3 per J. Butera F2B-93 OG70-03901 559 HT
W-3 (25) 29-32	4	4					NP	1253			X													
W-3 (25)	1	1					HNO3	1253																

Condition of sample: **2 samples MW-3 (25) NP, All else OK** Temperature received: **COOL**
 Relinquished by sampler **[Signature]** Date **1-27-93** Time **1510** Received by
 Relinquished by **[Signature]** Date _____ Time _____ Received by
 Relinquished by **[Signature]** Date **1-22-93** Time **1510** Received by laboratory

Lab number **SJFB-0093**
 Turnaround time
 Priority Rush 1 Business Day
 Rush 2 Business Days
 Expedited 5 Business Days
 Standard 10 Business Days

* Note J. Butera ordered then cancelled 8240

RECEIVED

FEB 11 1993

CAS S.I.

**Columbia
Analytical
Services** inc.

February 9, 1993

Service Request No.: K930374C

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

Re: **ARCO #6148 - Oakland/Project #0070-039.01/SJ930093**

Dear Jim:


Enclosed are the results of the sample submitted to our laboratory on January 23, 1993. Preliminary results were transmitted via facsimile on February 4, 1993. For your reference, these analyses have been assigned our service request number K930374C.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (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.


Joe Wiegel
Project Chemist

JW/gb

Page 1 of 12

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO #6148 - Oakland
Sample Matrix: Water

Date Received: 01/23/93
Work Order No.: K930374C

Total Metals
µg/L (ppb)

Sample Name:
Lab Code:

MW-3
K0374-1

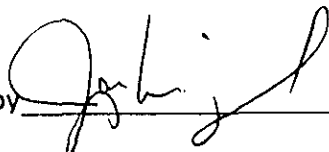
Method Blank
K0374-MB

Analyte	EPA Method	MRL		
Cadmium	6010	3	ND	ND
Chromium	6010	5	10	ND
Lead	7421	2	8	ND
Nickel	6010	20	23	ND
Zinc	6010	10	28	ND

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

99002

Approved by



Date

2/9/93

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: ARCO #6148 - Oakland
 Sample Matrix: Water

Date Received: 01/23/93
 Date Extracted: 01/27/93
 Date Analyzed: 02/01/93
 Work Order No.: K930374C

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

Sample Name: MW-3
 Lab Code: K0374-1

Base Neutral Analyte	MRL	Result	Base Neutral Analyte	MRL	Result
N-Nitrosodimethylamine	5	ND	2,6-Dinitrotoluene	5	ND
Aniline	20	ND	Diethyl Phthalate	5	ND
Bis(2-chloroethyl) Ether	5	ND	4-Chlorophenyl Phenyl Ether	5	ND
1,2-Dichlorobenzene	5	ND	Fluorene	5	ND
1,3-Dichlorobenzene	5	ND	4-Nitroaniline	20	ND
1,4-Dichlorobenzene	5	ND	N-Nitrosodiphenylamine	5	ND
Bis(2-chloroisopropyl) Ether	5	ND	4-Bromophenyl Phenyl Ether	5	ND
N-Nitrosodi-n-propylamine	5	ND	Hexachlorobenzene	5	ND
Hexachloroethane	5	ND	Phenanthrene	5	ND
Nitrobenzene	5	ND	Anthracene	5	ND
Isophorone	5	ND	Di-n-butyl Phthalate	5	ND
Bis(2-chloroethoxy)methane	5	ND	Fluoranthene	5	ND
1,2,4-Trichlorobenzene	5	ND	Pyrene	5	ND
Naphthalene	5	^a 440	Butylbenzyl Phthalate	5	ND
4-Chloroaniline	5	ND	3,3'-Dichlorobenzidine	20	ND
Hexachlorobutadiene	5	ND	Benz(a)anthracene	5	ND
2-Methylnaphthalene	5	^a 350	Bis(2-ethylhexyl) Phthalate	5	^a 280
Hexachlorocyclopentadiene	10	ND	Chrysene	5	ND
2-Chloronaphthalene	5	ND	Di-n-octyl Phthalate	5	13
2-Nitroaniline	20	ND	Benzo(b)fluoranthene	5	ND
Dimethyl Phthalate	5	ND	Benzo(k)fluoranthene	5	ND
Acenaphthylene	5	ND	Benzo(a)pyrene	5	ND
3-Nitroaniline	20	ND	Indeno(1,2,3-c,d)pyrene	5	ND
Acenaphthene	5	ND	Dibenz(a,h)anthracene	5	ND
Dibenzofuran	5	ND	Benzo(g,h,i)perylene	5	ND
2,4-Dinitrotoluene	5	ND			

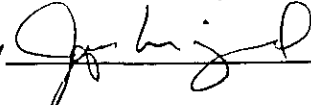
Acid Analyte	MRL	Result	Acid Analyte	MRL	Result
Phenol	5	ND	2,4-Dichlorophenol	5	ND
2-Chlorophenol	5	ND	4-Chloro-3-methylphenol	5	ND
Benzyl Alcohol	5	ND	2,4,6-Trichlorophenol	5	ND
2-Methylphenol	5	ND	2,4,5-Trichlorophenol	5	ND
3- and 4-Methylphenol [♦]	5	ND	2,4-Dinitrophenol	50	ND
2-Nitrophenol	5	ND	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.

^a Result is from the analysis of a diluted sample, performed on February 2, 1993.

Approved by  Date 2/9/93

00003

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: ARCO #6148 - Oakland
 Sample Matrix: Water

Date Extracted: 01/27/93
 Date Analyzed: 02/01/93
 Work Order No.: K930374C

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

Sample Name: Method Blank
 Lab Code: K0374-MB

Base Neutral Analyte	MRL	Result	Base Neutral Analyte	MRL	Result
N-Nitrosodimethylamine	5	ND	2,6-Dinitrotoluene	5	ND
Aniline	20	ND	Diethyl Phthalate	5	ND
Bis(2-chloroethyl) Ether	5	ND	4-Chlorophenyl Phenyl Ether	5	ND
1,2-Dichlorobenzene	5	ND	Fluorene	5	ND
1,3-Dichlorobenzene	5	ND	4-Nitroaniline	20	ND
1,4-Dichlorobenzene	5	ND	N-Nitrosodiphenylamine	5	ND
Bis(2-chloroisopropyl) Ether	5	ND	4-Bromophenyl Phenyl Ether	5	ND
N-Nitrosodi-n-propylamine	5	ND	Hexachlorobenzene	5	ND
Hexachloroethane	5	ND	Phenanthrene	5	ND
Nitrobenzene	5	ND	Anthracene	5	ND
Isophorone	5	ND	Di-n-butyl Phthalate	5	ND
Bis(2-chloroethoxy)methane	5	ND	Fluoranthene	5	ND
1,2,4-Trichlorobenzene	5	ND	Pyrene	5	ND
Naphthalene	5	ND	Butylbenzyl Phthalate	5	ND
4-Chloroaniline	5	ND	3,3'-Dichlorobenzidine	20	ND
Hexachlorobutadiene	5	ND	Benz(a)anthracene	5	ND
2-Methylnaphthalene	5	ND	Bis(2-ethylhexyl) Phthalate	5	ND
Hexachlorocyclopentadiene	10	ND	Chrysene	5	ND
2-Chloronaphthalene	5	ND	Di-n-octyl Phthalate	5	ND
2-Nitroaniline	20	ND	Benzo(b)fluoranthene	5	ND
Dimethyl Phthalate	5	ND	Benzo(k)fluoranthene	5	ND
Acenaphthylene	5	ND	Benzo(a)pyrene	5	ND
3-Nitroaniline	20	ND	Indeno(1,2,3-c,d)pyrene	5	ND
Acenaphthene	5	ND	Dibenz(a,h)anthracene	5	ND
Dibenzofuran	5	ND	Benzo(g,h,i)perylene	5	ND
2,4-Dinitrotoluene	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	5	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 *J. Higley* Date 2/9/93

00004

APPENDIX A
LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: ARCO #6148 - Oakland
 Sample Matrix: Water

Date Received: 01/23/93
 Work Order No.: K930374C

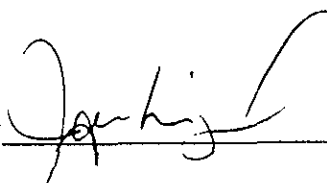
Matrix Spike/Duplicate Matrix Spike Summary
 Total Metals
 µg/L (ppb)

Sample Name: MW-3
 Lab Code: K0374-1

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	3	50	ND	49	47	98	94	75-125	4
Chromium	5	200	10	215	213	102	102	75-125	<1
Lead	2	20	8	27	27	95	95	75-125	<1
Nickel	20	500	23	476	487	91	93	75-125	2
Zinc	10	500	28	511	506	97	96	75-125	1

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

Approved by  Date 2/9/93

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO #6148 - Oakland

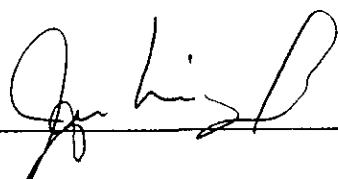
Date Analyzed: 01/28/93
Work Order No.: K930374C

Initial Calibration Verification (ICV) Summary
 $\mu\text{g/L}$ (ppb)

Analyte	EPA Method	True Value	Result	Percent Recovery
Cadmium	6010	1,250	1,340	107
Chromium	6010	500	525	105
Lead	7421	98	97	99
Nickel	6010	1,250	1,320	106
Zinc	6010	1,250	1,290	103

ICV Source: Inorganic Ventures

Approved by



Date

2/9/93

00007

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

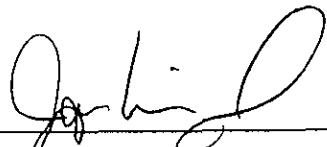
Client: EMCON Associates
 Project: ARCO #6148 - Oakland
 Sample Matrix: Water

Date Received: 01/23/93
 Date Extracted: 01/27/93
 Date Analyzed: 02/01/93
 Work Order No.: K930374C

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

Sample Name	Lab Code	P e r c e n t R e c o v e r y					TPH
		2FP	PHL	TBP	NBZ	FBP	
MW-3	K0374-1	52	35	91	37	67	78
MW-3	K0374-1MS	61	51	93	43	67	75
MW-3	K0374-1DMS	59	49	93	43	67	71
Laboratory Control Sample	K0374-LCS	52	34	89	80	65	81
Method Blank	K0374-MB	51	34	81	78	68	88
EPA Acceptance Criteria		21-100	10-94	10-123	35-114	43-116	33-141

2FP 2-Fluorophenol
 PHL Phenol-D₆
 TBP 2,4,6-Tribromophenol
 NBZ Nitrobenzene-D₅
 FBP 2-Fluorobiphenyl
 TPH Terphenyl-D₁₄

Approved by  Date 2/9/93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: ARCO #6148 - Oakland
 Sample Matrix: Water

Date Received: 01/23/93
 Date Extracted: 01/27/93
 Date Analyzed: 02/01/93
 Work Order No.: K930374C

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

Sample Name: MW-3
 Lab Code: K0374-1

Percent Recovery

Analyte	Spike Level		Sample Result	Spike Result		Percent Recovery		EPA Acceptance Criteria	Relative Percent Difference
	MS	DMS		MS	DMS	MS	DMS		
Phenol	400	400	ND	168	163	42	41	12-89	2
2-Chlorophenol	400	400	ND	280	275	70	69	27-123	1
1,4-Dichlorobenzene	200	200	ND	142	138	71	69	36-97	3
N-Nitrosodi-n-propylamine	200	200	ND	83	73	42	^a 36	41-116	15
1,2,4-Trichlorobenzene	200	200	ND	189	196	94	98	39-98	4
4-Chloro-3-methylphenol	400	400	ND	^b 352	^b 372	88	93	23-97	6
Acenaphthene	200	200	ND	160	162	80	81	46-118	1
4-Nitrophenol	400	400	ND	233	232	58	58	10-80	<1
2,4-Dinitrotoluene	200	200	ND	212	207	^c 106	^c 104	24-96	2
Pentachlorophenol	400	400	ND	^b 408	^b 423	102	^c 106	9-103	4
Pyrene	200	200	ND	176	164	88	82	26-127	7

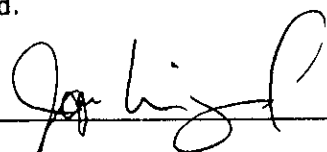
ND None Detected at or above the method reporting limit

a Outside of acceptance limits because of matrix interferences. The chromatogram showed nontarget components that interfered with the analysis.

b Analyte concentration is an estimate because the result was above the instrument calibration range.

c Outside of acceptance limits. Low RPD value indicates that the elevated spike recovery does not represent an out of control situation. It is the opinion of CAS that the quality of the sample data has not been significantly affected.

Approved by



Date 2/9/93

00003

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: ARCO #6148 - Oakland
 LCS Matrix: Water

Date Extracted: 01/27/93
 Date Analyzed: 02/01/93
 Work Order No.: K930374C

Laboratory Control Sample Summary^a
 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	200	61	30	5-112
2-Chlorophenol	200	158	79	23-134
1,4-Dichlorobenzene	100	64	64	20-124
N-Nitrosodi-n-propylamine	100	84	84	D-230
1,2,4-Trichlorobenzene	100	65	65	44-142
4-Chloro-3-methylphenol	200	143	72	22-147
Acenaphthene	100	81	81	47-145
4-Nitrophenol	200	68	34	D-132
2,4-Dinitrotoluene	100	97	97	39-139
Pentachlorophenol	200	^b 184	92	14-176
Pyrene	100	95	95	52-115

D Detected; result must be greater than zero.

a Prepared using an independent source of target analytes separate from the calibration standards.

b Analyte concentration is an estimate because the result was above the instrument calibration range.

Approved by

Date

2/9/93

00010

APPENDIX B
CHAIN OF CUSTODY INFORMATION

103746

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. **EMCGC-92-1**

Chain of Custody

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) 453-0719	Contract number 057077
Consultant name EMCON Associates	Address (Consultant) 1938 Encinan Avenue San Jose CA 95131		Contract number 057077

Sample I.D.	Lab no.	Container no	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA 821/8020/8010	TPH Modified 8015 GAS Diesel	Oil and Grease EPA 801/8020/8030	TPH EPA 418.1/SM503E	EPA 801/8010	EPA 821/8010	EPA 821/8010	TCLP Metals VOA VOA	Semi Metals VOA VOA	Cadmium EPA 801/07000 TCLP STLC	Lead Org/DHS Lead EPA 7420/7421	Metals Cd, Cr, Pb, Ni, Zn	
			Soil	Water	Other	Ice	Acid																
MW-1 (25)		4		X		X	HCl	1-22-93/1141		X													
MW-2 ()		4					HCl			X													
MW-3 (25)		6					HCl	1253		X	X			X	X								
MW-4 (26)		4					HCl	1102		X				X									
MW-5 (25)		4					HCl	1215		X				X									
MW-6 (24)		4					HCl	1028		X				X									
MW-7 (27)		4					HCl	0955		X				X									
FB-1		2					HCl	1315		X				X									
MW-3 (25)		4					NP	1253			X												
MW-3 (25)		1					HNO3	1253														X	

Method of shipment
Sampler will deliver

Special detection Limit/reporting
Lowest possible

Special QA/QC
As normal

Remarks
**3-40 ml HCl
WOM'S**

OG70-23901
559 HP

Lab number
SF93-0093

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

Condition of sample OK	Temperature received 100
Relinquished by sampler [Signature]	Date 1-22-93 Time 12:00
Relinquished by [Signature]	Date 1/23/93 Time 0830
Relinquished by [Signature]	Date 1-22-93 Time 1510



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: 06-70-039.01
PURGED BY: M Adler
SAMPLED BY: M Adler

SAMPLE ID: MW-1 (25)
CLIENT NAME: Arco 6178
LOCATION: 5131 Skattuck
DAK land CH.

TYPE: Ground Water Surface Water _____ Treatment Effluent _____ Other _____

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

CASING ELEVATION (feet/MSL): N/A VOLUME IN CASING (gal.): 6.74
DEPTH TO WATER (feet): 15.37 CALCULATED PURGE (gal.): 20.24
DEPTH OF WELL (feet): 25.7 ACTUAL PURGE VOL. (gal.): 20.5

DATE PURGED: 1-22-93 Start (2400 Hr) 1131 End (2400 Hr) 1139
DATE SAMPLED: 1-22-93 Start (2400 Hr) 1141 End (2400 Hr) 1142

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1137</u>	<u>7.0</u>	<u>6.91</u>	<u>503</u>	<u>65.7</u>	<u>Clear</u>	<u>light</u>
<u>1136</u>	<u>14.0</u>	<u>6.49</u>	<u>499</u>	<u>69.2</u>	<u>TAN</u>	<u>light</u>
<u>1139</u>	<u>20.5</u>	<u>6.53</u>	<u>507</u>	<u>68.3</u>	<u>TAN</u>	<u>light</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

D. O. (ppm): N/A ODOR: Moderate _____
(COBALT 0 - 100) (NTU 0 - 200)

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailor (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailor (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailor (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailor (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailor (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
- Other: _____ Other: _____

WELL INTEGRITY: OK LOCK #: 3255

REMARKS: _____

Meter Calibration: Date: 1-22-93 Time: 0910 Meter Serial #: 9112 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: MW-7 (27)

Signature: M Adler Reviewed By: AS Page 1 of 7



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/9

PROJECT NO: 0678-039.01

SAMPLE ID: MW-2

PURGED BY: Moller

CLIENT NAME: Arco 6148

SAMPLED BY: Moller

LOCATION: 5131 Shattuck Ave
Oakland, CA.

TYPE: Ground Water Surface Water Treatment Effluent Other

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

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

DEPTH TO WATER (feet): 15.07 CALCULATED PURGE (gal.): /

DEPTH OF WELL (feet): 25.8 ACTUAL PURGE VOL. (gal.): /

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

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

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
		<u>No Sample - Product in well</u>				

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

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|---|---|--|---|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailor (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailor (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailor (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailor (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailor (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

.01 of product in well - no sample

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

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

Location of previous calibration: _____

Signature: Moller Reviewed By: AB Page 2 of 7



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 070-039.01
PURGED BY: M. Adler
SAMPLED BY: M. Adler

SAMPLE ID: MW-3 (25)
CLIENT NAME: Avco 6148
LOCATION: 5131 Shattuck Oakland, CA.

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): NK VOLUME IN CASING (gal.): 7.04
DEPTH TO WATER (feet): 15.12 CALCULATED PURGE (gal.): 21.12
DEPTH OF WELL (feet): 25.9 ACTUAL PURGE VOL. (gal.): 21.5

DATE PURGED: 1-22-93 Start (2400 Hr) 1240 End (2400 Hr) 1249
DATE SAMPLED: 1-22-93 Start (2400 Hr) 1253 End (2400 Hr) 1310

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1243</u>	<u>7.5</u>	<u>6.77</u>	<u>548</u>	<u>65.8</u>	<u>grey</u>	<u>light</u>
<u>1246</u>	<u>14.5</u>	<u>6.62</u>	<u>625</u>	<u>65.6</u>	<u>grey</u>	<u>light</u>
<u>1249</u>	<u>21.5</u>	<u>6.60</u>	<u>695</u>	<u>66.1</u>	<u>grey</u>	<u>light</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2' Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2' Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 0259

REMARKS: _____

Meter Calibration: Date: 1-22-93 Time: 0910 Meter Serial #: 9112 Temperature °F: _____
(EC 1000 _____ / _____) (Di _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: MW 7 (27)

Signature: M. Adler Reviewed By: JA Page 3 of 7



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 0678-039.01
PURGED BY: Madden
SAMPLED BY: Madden

SAMPLE ID: MW-4 (26)
CLIENT NAME: ARGO 6148
LOCATION: 5131 Shuttlecreek
Oakland, CA.

TYPE: Ground Water Surface Water _____ Treatment Effluent _____ Other _____
CASING DIAMETER (inches): 2 _____ 3 _____ 4 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL): NK VOLUME IN CASING (gal.): 8.27
DEPTH TO WATER (feet): 13.33 CALCULATED PURGE (gal.): 24.83
DEPTH OF WELL (feet): 26.0 ACTUAL PURGE VOL. (gal.): 25.0

DATE PURGED: 1-22-93 Start (2400 Hr) 1049 End (2400 Hr) 1058
DATE SAMPLED: 1-22-93 Start (2400 Hr) 1102 End (2400 Hr) 1104

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1052</u>	<u>8.5</u>	<u>6.62</u>	<u>515</u>	<u>66.8</u>	<u>TAN</u>	<u>light</u>
<u>1055</u>	<u>17.0</u>	<u>6.61</u>	<u>523</u>	<u>66.5</u>	<u>TAN</u>	<u>light</u>
<u>1058</u>	<u>25.0</u>	<u>6.64</u>	<u>538</u>	<u>67.5</u>	<u>clear</u>	<u>clear</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 1-22-93 Time: 0910 Meter Serial #: 9112 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: MW-7 (27)

Signature: Madden Reviewed By: MB Page 4 of 7

WATER SAMPLE FIELD DATA SHEET



PROJECT NO: DE70-039.01
 PURGED BY: M. Miller
 SAMPLED BY: M. Miller

SAMPLE ID: MW-5 (25)
 CLIENT NAME: Aveo 6148
 LOCATION: 5131 Shattuck Ave. Oakland, CA.

TYPE: Ground Water Surface Water _____ Treatment Effluent _____ Other _____
 CASING DIAMETER (inches): 2 _____ 3 _____ 4 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL): 112 VOLUME IN CASING (gal.): 6.89
 DEPTH TO WATER (feet): 14.45 CALCULATED PURGE (gal.): 20.67
 DEPTH OF WELL (feet): 25.0 ACTUAL PURGE VOL. (gal.): 21.0

DATE PURGED: 1-22-93 Start (2400 Hr) 1204 End (2400 Hr) 1212
 DATE SAMPLED: 1-22-93 Start (2400 Hr) 1215 End (2400 Hr) 1217

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1206</u>	<u>7.0</u>	<u>6.38</u>	<u>597</u>	<u>67.2</u>	<u>TAN</u>	<u>light</u>
<u>1209</u>	<u>14.0</u>	<u>6.78</u>	<u>792</u>	<u>67.0</u>	<u>TAN</u>	<u>moderate</u>
<u>1212</u>	<u>21.0</u>	<u>6.69</u>	<u>796</u>	<u>66.6</u>	<u>brown</u>	<u>moderate</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> ODL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 1-22-93 Time: 0910 Meter Serial #: 9112 Temperature °F: _____
 (EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
 Location of previous calibration: MW-7 (27)

Signature: M. Miller Reviewed By: JB Page 5 of 7



WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/9

PROJECT NO: 0670-039.01
PURGED BY: M Adler
SAMPLED BY: M Adler

SAMPLE ID: MW-6 (26)
CLIENT NAME: Arco 6188
LOCATION: 5131 Shattuck
Oakland, CA

TYPE: Ground Water Surface Water _____ Treatment Effluent _____ Other _____
CASING DIAMETER (inches): 2 _____ 3 _____ 4 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 9.80
DEPTH TO WATER (feet): 11.59 CALCULATED PURGE (gal.): 29.41
DEPTH OF WELL (feet): 26.6 ACTUAL PURGE VOL (gal.): 30.0

DATE PURGED: 1-22-93 Start (2400 Hr) 1013 End (2400 Hr) 1025
DATE SAMPLED: 1-22-93 Start (2400 Hr) 1028 End (2400 Hr) 1030

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1017</u>	<u>10.0</u>	<u>6.73</u>	<u>468</u>	<u>67.0</u>	<u>TAN</u>	<u>light</u>
<u>1021</u>	<u>20.0</u>	<u>6.74</u>	<u>474</u>	<u>66.9</u>	<u>TAN</u>	<u>light</u>
<u>1025</u>	<u>30.0</u>	<u>6.79</u>	<u>483</u>	<u>67.4</u>	<u>TAN</u>	<u>light</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 32579

REMARKS: _____

Meter Calibration: Date: 1-22-93 Time: 0910 Meter Serial #: 9112 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: MW-7 (27)

Signature: M Adler Reviewed By: AB Page 6 of 7



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: 0670-039.01

SAMPLE ID: MW-7 (27)

PURGED BY: M Adler

CLIENT NAME: Arco 5148

SAMPLED BY: M Adler

LOCATION: 5131 Sheffack

Oakland, CA

TYPE: Ground Water Surface Water _____ Treatment Effluent _____ Other _____

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 10.10

DEPTH TO WATER (feet): 11.53 CALCULATED PURGE (gal.): 30.32

DEPTH OF WELL (feet): 27.0 ACTUAL PURGE VOL (gal.): 30.5

DATE PURGED: 1-22-93 Start (2400 Hr) 0936 End (2400 Hr) 0951

DATE SAMPLED: 1-22-93 Start (2400 Hr) 0955 End (2400 Hr) 0957

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>0943</u>	<u>10.5</u>	<u>6.48</u>	<u>489</u>	<u>67.3</u>	<u>TAN</u>	<u>light</u>
<u>0947</u>	<u>20.5</u>	<u>6.62</u>	<u>544</u>	<u>70.9</u>	<u>TAN</u>	<u>light</u>
<u>0951</u>	<u>30.5</u>	<u>6.62</u>	<u>537</u>	<u>71.8</u>	<u>TAN</u>	<u>light</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> ODL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 1-22-93 Time: 0910 Meter Serial #: 9112 Temperature °F: 63.2
(EC 1000 957 / 1000) (DI _____) (pH 7 7.03 / 7.00) (pH 10 9.93 / 10.00) (pH 4 4.00 / _____)

Location of previous calibration: MW-7 (27)

Signature: M Adler Reviewed By: MS Page 7 of 7



EMCON Associates

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

Date February 25, 1993

Project OG70-039.01

61035-00

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

We are enclosing:

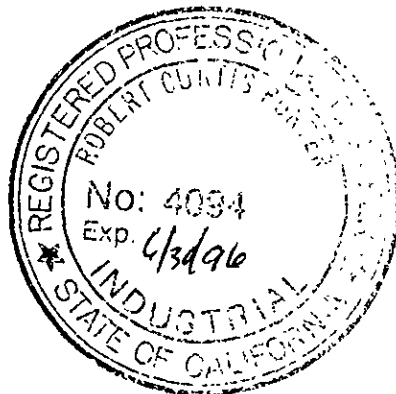
Copies	Description
<u>1</u>	<u>Depth To Water/Floating Product Survey Results</u>
<u> </u>	<u>February 1993 monthly water level survey, ARCO</u>
<u> </u>	<u>station 6148, 5131 Shattuck Avenue, Oakland, CA</u>

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*

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 : 2-22-93

ARCO STATION # : 6148

FIELD TECHNICIAN : L RATI

DAY : monday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-7	OK	YES	OK	2359	OK	12.82	12.81	ND	ND	27.0	—
2	MW-6	OK	YES	OK	2359	OK	12.62	12.62	ND	ND	26.6	—
3	MW-4	OK	YES	OK	2359	OK	14.48	14.48	ND	ND	26.0	—
4	MW-1	OK	YES	OK	2359	OK	16.54	16.55	ND	ND	25.7	—
5	MW-5	OK	YES	OK	2359	OK	15.65	15.65	ND	ND	25.0	—
6	MW-3	OK	YES	OK	2359	OK	16.36	16.36	ND	ND	25.9	—
7	MW-2	OK	YES	OK	2359	see comments	16.21	16.21	16.20	0.01	25.8	Rubber Seal on LWC is expanded and hard to fit back into the casing

SURVEY POINTS ARE TOP OF WELL CASINGS



EMCON Associates

1938 Junction Avenue • San Jose, California 95131-2002 • (408) 453-0719 • Fax (408) 453-0452

Date April 1, 1993
Project 0G70-039.01

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

We are enclosing:

Copies	Description
<u>1</u>	<u>Depth To Water/Floating Product Survey Results</u>
<u> </u>	<u>March 1993 monthly water level survey, ARCO</u>
<u> </u>	<u>station 6148, 5131 Shattuck Avenue, Oakland, CA</u>

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*

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 : 3 25 93

ARCO STATION # : 6148

FIELD TECHNICIAN : B. Stafford

DAY : Thursday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-7	OK	yes	OK	3259	yes	13.43	13.43	ND	ND	27.0	H ₂ O in C. Box
2	MW-6	OK	yes	OK	3259	yes	13.04	13.04	ND	ND	26.6	H ₂ O in C. Box
3	MW-4	OK	yes	OK	3259	yes	15.06	15.06	ND	ND	26.0	—
4	MW-1	OK	yes	OK	3259	yes	17.05	17.05	ND	ND	25.9	—
5	MW-5	OK	yes	OK	3259	yes	16.07	16.07	ND	ND	25.0	—
6	MW-3	OK	yes	OK	3259	yes	16.89	16.89	ND	ND	25.8	Slight Odor.
7	MW-2	OK	yes	OK	3259	yes	16.73	16.73	16.72	0.01'	25.8	strong odor.

SURVEY POINTS ARE TOP OF WELL CASINGS