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

ENVIRONMENTAL
PROTECTION

95 APR -5 AM 9:32

Date March 16, 1995
Project 0805-131.01

To:

Ms. Juliet Shin
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harborbay Parkway, Suite 250
Alameda, California 94502-6577

We are enclosing:

Copies	Description
1	Fourth quarter 1994 groundwater monitoring report for ARCO service station 6002, Oakland, California

For your:	X	Use	Sent by:		Regular Mail
		Approval			Standard Air
		Review			Courier
		Information		X	Other Certified Mail

Comments:
The enclosed groundwater monitoring report is being sent to you per the request of ARCO Products Company. Plaese call if you have questions or comments.

David Larsen
Project Coordinator

cc: Kevin Graves, RWQCB - SFBR
Michael Whelan, ARCO Products Company
David Larsen, EMCON
File

ARCO Products Company
2000 Alameda de las Pulgas
Mailing Address: Box 5811
San Mateo, California 94402
Telephone 415 571 2400

Date: March 13, 1995

Re: ARCO Station # 6002 • 6235 Seminary Avenue • Oakland, CA
Fourth Quarter 1994 Groundwater Monitoring Report

" I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached proposal or report are true and correct."

Submitted by:

Michael R. Whelan

Michael R. Whelan
Environmental Engineer

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

March 7, 1995
Project 0805-131.01

Mr. Michael Whelan
ARCO Products Company
2155 South Bascom Avenue, Suite 202
Campbell, California 95008

Re: Fourth quarter 1994 groundwater monitoring program results, ARCO service station 6002, Oakland, California

Dear Mr. Whelan:

This letter presents the results of the fourth quarter 1994 groundwater monitoring program at ARCO Products Company (ARCO) service station 6002, 6235 Seminary Avenue, Oakland, California (Figure 1). The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

BACKGROUND

In January 1994, RESNA conducted an initial subsurface environmental investigation to assess the extent of gasoline-hydrocarbons impact on the subsurface soils and groundwater at the site. This investigation included installing one groundwater monitoring well (MW-1) and two vadose wells (VW-1 and VW-2).

In June 1994, a second phase of subsurface investigation was conducted by GeoStrategies, Inc., which included installing four additional groundwater monitoring wells (MW-2 through MW-5).

Groundwater monitoring and sampling at this site was initiated in January 1994. There are currently five groundwater monitoring wells and two vadose wells on site. For additional background information please refer to *Additional On-Site Subsurface Investigation and Second Quarter 1994 Groundwater Monitoring Report* (GeoStrategies, Inc., August 29, 1994).

Wells MW-1 through MW-5 are monitored quarterly.

MONITORING PROGRAM FIELD PROCEDURES AND RESULTS

The fourth quarter 1994 groundwater monitoring event was performed by Integrated Wastestream Management (IWM) on November 21, 1994. Field work performed by

IWM during this quarter included (1) measuring depths to groundwater and subjectively analyzing groundwater for the presence of floating product in wells MW-1 through MW-5, (2) purging and subsequently sampling groundwater monitoring wells MW-1 through MW-5 for laboratory analysis, and (3) directing a state-certified laboratory to analyze the groundwater samples. The results of IWM's field work were transmitted to EMCON in a report dated December 16, 1994. These data are presented in Appendix A.

ANALYTICAL PROCEDURES

Groundwater samples collected during fourth quarter 1994 monitoring were analyzed for total petroleum hydrocarbons as gasoline (TPHG), and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Groundwater samples were prepared for analysis by U.S. Environmental Protection Agency (USEPA) method 5030 (purge and trap). Groundwater was analyzed for TPHG by the methods accepted by the Department of Toxic Substances Control, California Environmental Protection Agency (Cal-EPA), and referenced in the *Leaking Underground Fuel Tank* (LUFT) *Field Manual* (State Water Resources Control Board, October 1989). Samples were analyzed for BTEX by USEPA method 8020, as described in *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (USEPA, SW-846, November 1986, Third Edition). These methods are recommended for samples from petroleum-hydrocarbon-impacted sites in the *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites* (August 10, 1990).

MONITORING PROGRAM RESULTS

Results of the fourth quarter 1994 groundwater monitoring event are summarized in Table 1 and illustrated in Figure 2. Historical groundwater elevation data, including top-of-casing elevations, depth-to-water measurements, calculated groundwater elevations, floating-product thickness measurements, and groundwater flow direction and gradient data, are summarized in Table 2. Table 3 summarizes historical laboratory data for TPHG and BTEX analyses. Copies of the fourth quarter 1994 analytical results and chain-of-custody documentation are included in Appendix B.

MONITORING PROGRAM EVALUATION

Groundwater elevation data collected on November 21, 1994, illustrate that groundwater beneath the site flows southwest at an approximate hydraulic gradient of 0.07 foot per foot. Figure 2 illustrates groundwater contours and analytical data for the fourth quarter of 1994.

Groundwater samples collected from wells MW-2, MW-3, and MW-4 did not contain detectable concentrations of TPHG or BTEX. Groundwater samples collected from wells MW-1 and MW-5 contained 12,000 and 38,000 parts per billion (ppb) TPHG, and 2,800 and 3,100 ppb benzene, respectively. Similar analytical results were reported for all wells during previous monitoring events.

LIMITATIONS

Field procedures were performed by, and field data were acquired from, IWM. EMCON does not warrant the accuracy of data supplied by IWM. EMCON's scope of work was limited to interpreting field data, which included evaluating trends in the groundwater gradient, groundwater flow direction, and dissolved-petroleum-hydrocarbon concentrations beneath the site.

No monitoring event is thorough enough to describe all geologic/hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the site, but rather as the result of the scope, limitations, and cost of work performed during the monitoring event.

SITE STATUS UPDATE

This update reports site activities performed during the fourth quarter of 1994 and the anticipated site activities for the first quarter of 1995.

Fourth Quarter 1994 Activities

- Prepared and submitted quarterly groundwater monitoring report for third quarter 1994.
- Performed quarterly groundwater monitoring for fourth quarter 1994.

Work Anticipated First Quarter 1995

- Prepare and submit quarterly groundwater monitoring report for fourth quarter 1994.
- Perform quarterly groundwater monitoring for first quarter 1995.
- Prepare and submit workplan for additional assessment.

Please call if you have questions.

Sincerely,

EMCON

David Larsen
Project Coordinator

Lynn A. Gallagher, R.G. 6090
Project Geologist

REGISTERED GEOLOGIST
LYNN A. GALLAGHER
RG6090
STATE OF CALIFORNIA

Attachments:

Table 1 -	Groundwater Monitoring Data, Fourth Quarter 1994
Table 2 -	Historical Groundwater Elevation Data
Table 3 -	Historical Groundwater Analytical Data (TPHG and BTEX)
Figure 1 -	Site Location
Figure 2 -	Groundwater Data, Fourth Quarter 1994
Appendix A -	Field Data Report, Integrated Wastestream Management, December 16, 1994
Appendix B -	Analytical Results and Chain-of-Custody Documentation, Fourth Quarter 1994

cc: [redacted]
Kevin Graves, RWQCB - SFBR

Table 1
Groundwater Monitoring Data
Fourth Quarter 1994
Summary Report

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 02-10-95
Project Number: 0805-131.01

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot	Water Sample Field Date	TPHG ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb
MW-1	11-21-94	247.06	7.27	239.79	ND	SW	0.07	11-21-94	12000	2800	160	640	1300
MW-2	11-21-94	249.30	7.83	241.47	ND	SW	0.07	11-21-94	<50	<0.5	<0.5	<0.5	<0.5
MW-3	11-21-94	248.35	6.80	241.55	ND	SW	0.07	11-21-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	11-21-94	242.91	9.14	233.77	ND	SW	0.07	11-21-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	11-21-94	244.82	12.45	232.37	ND	SW	0.07	11-21-94	38000	3100	<50	3100	4100

TOC = Top of casing
ft-MSL = Elevation in feet, relative to mean sea level
MWN = Ground-water flow direction and gradient apply to the entire monitoring well network
TPHG = Total petroleum hydrocarbons as gasoline
ppb = Parts per billion or micrograms per liter (µg/l)
ND = None detected
SW = Southwest

esj/h:\6002\6002mdb.xls\Table 1:dcl
0805-131.01

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 02-10-95
Project Number: 0805-131.01

Well Desig-nation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-1	01-21-94	247.06	7.82	239.24	ND	NR	NR
MW-1	07-08-94	247.06	8.32	238.74	ND	W	0.08
MW-1	09-24-94	247.06	8.84	238.22	ND	WSW	0.08
MW-1	11-21-94	247.06	7.27	239.79	ND	SW	0.07
MW-2	07-08-94	249.30	9.51	239.79	ND	W	0.08
MW-2	09-24-94	249.30	10.02	239.28	ND	WSW	0.08
MW-2	11-21-94	249.30	7.83	241.47	ND	SW	0.07
MW-3	07-08-94	248.35	7.75	240.60	ND	W	0.08
MW-3	09-24-94	248.35	8.14	240.21	ND	WSW	0.08
MW-3	11-21-94	248.35	6.80	241.55	ND	SW	0.07
MW-4	07-08-94	242.91	10.97	231.94	ND	W	0.08
MW-4	09-24-94	242.91	11.81	231.10	ND	WSW	0.08
MW-4	11-21-94	242.91	9.14	233.77	ND	SW	0.07
MW-5	07-08-94	244.82	12.94	231.88	ND	W	0.08
MW-5	09-24-94	244.82	13.60	231.22	ND	WSW	0.08
MW-5	11-21-94	244.82	12.45	232.37	ND	SW	0.07

TOC = Top of casing
ft-MSL = Elevation in feet, relative to mean sea level
MWN = Ground-water flow direction and gradient apply to the entire monitoring well network
ND = None detected
NR = Not reported; data not available or not measurable
W = West
WSW = West-southwest
SW = Southwest

Table 3
Historical Groundwater Analytical Data
Summary Report

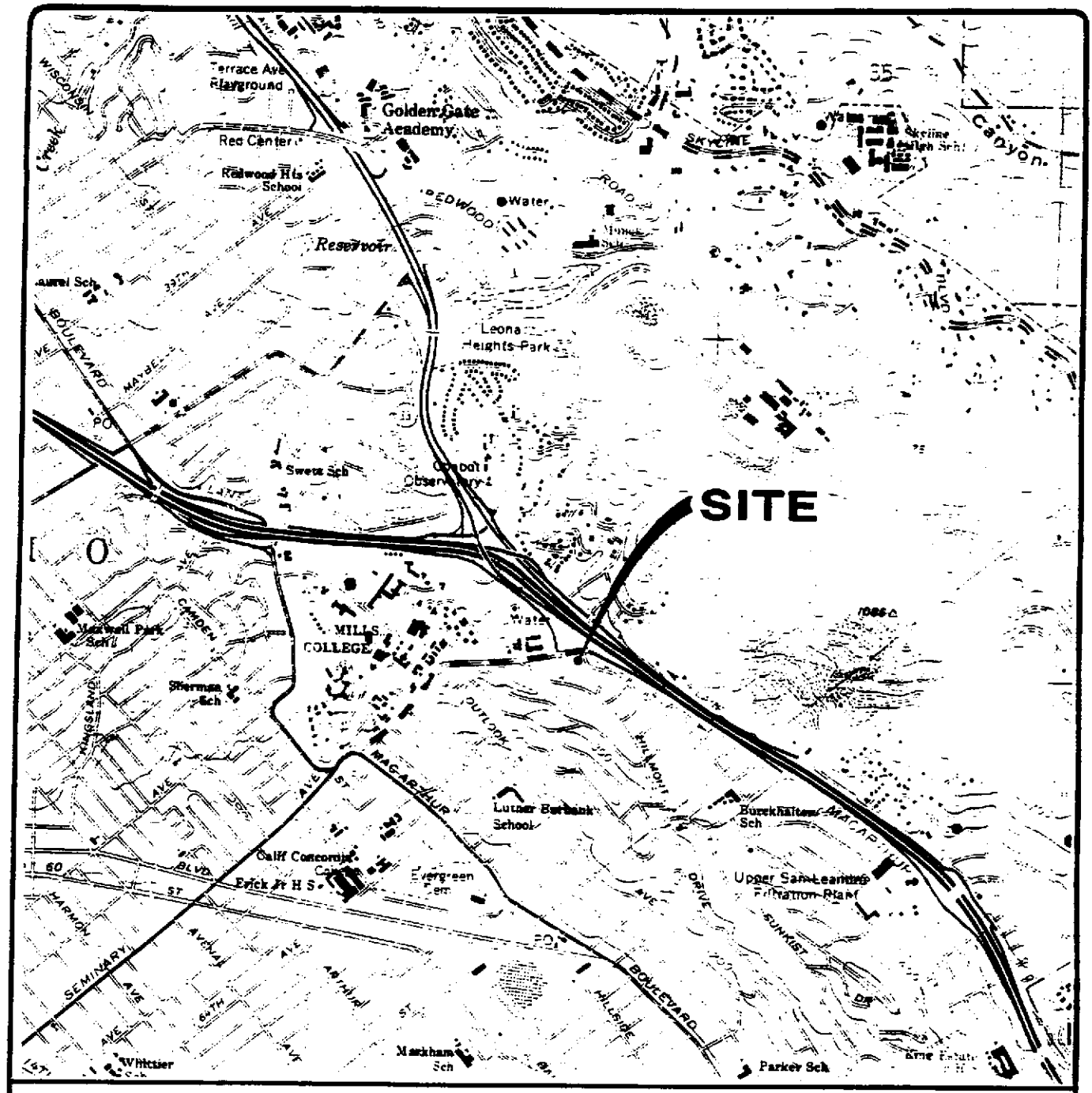
ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 02-10-95
Project Number: 0805-131.01

Well Designation	Water Sample Field Date	TPHG ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb
MW-1	01-21-94	18000	1300	1600	250	1900
MW-1	07-08-94	21000	5200	<50	1000	1500
MW-1	09-24-94	13000	2900	37	830	640
MW-1	11-21-94	12000	2800	160	640	1300
MW-2	07-08-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	09-24-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	11-21-94	<50	<0.5	<0.5	<0.5	<0.5
MW-3	07-08-94	<50	<0.5	<0.5	<0.5	<0.5
MW-3	09-24-94	<50	<0.5	<0.5	<0.5	<0.5
MW-3	11-21-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	07-08-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	09-24-94	140	<0.5	<0.5	<0.9	<0.5
MW-4	11-21-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	07-08-94	41000	3300	<50	2200	2900
MW-5	09-24-94	28000	4000	<50	2400	2100
MW-5	11-21-94	38000	3100	<50	3100	4100

TPHG = Total petroleum hydrocarbons as gasoline
ppb = Parts per billion or micrograms per liter (µg/l)

152753



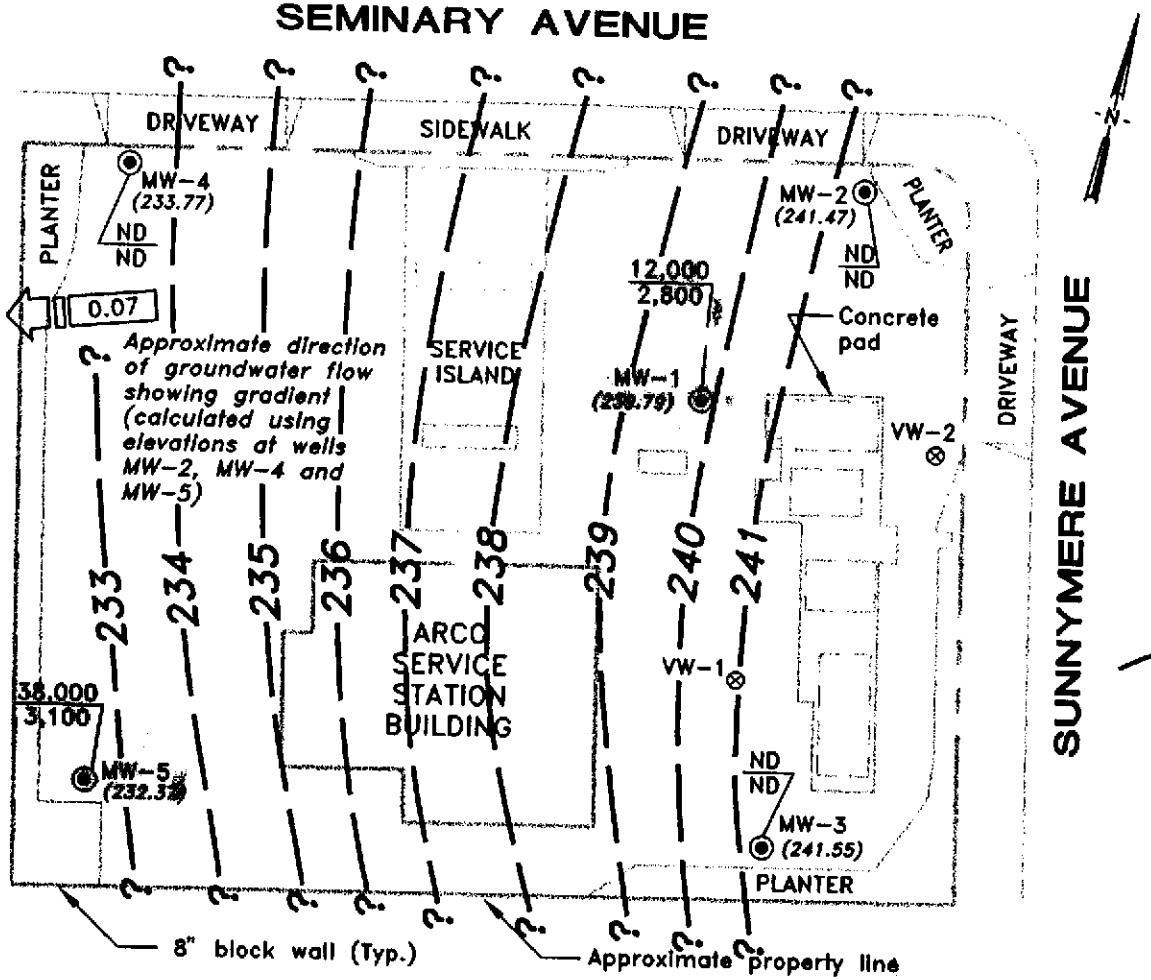
EMCON Associates

ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

SITE LOCATION

FIGURE 1

PROJECT NO. 605-131.01



Base map modified from GSI, 1994.

EMCON Associates

ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVENUE
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

GROUNDWATER DATA
FOURTH QUARTER 1994

FIGURE NO. 2

PROJECT NO. 805-131.01

APPENDIX A

FIELD DATA REPORT, INTEGRATED WASTESTREAM MANAGEMENT, DECEMBER 16, 1994

I NTEGRATED
W ASTESTREAM
M ANAGEMENT

December 16, 1994

John Young
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Dear Mr. Young:

Attached are the field data sheets and analytical results for quarterly ground water sampling at ARCO Facility No. 6002 in Oakland, California. Integrated Wastestream Management measured the depth to water and collected samples from wells at this site on November 21, 1994.

Sampling was carried out in accordance with the protocols described in the "Request for Bid for Quarterly Sampling at ARCO Facilities in Northern California".

Please call us if you have any questions.

Sincerely,
Integrated Wastestream Management

Tom DeLon
Project Manager

Walter H. Howe
Registered Geologist

REGISTERED GEOLOGIST
WALTER H. HOWE
No. 730
Exp. 4/'96
STATE OF CALIFORNIA

EMCON ASSOCIATES

DEC 2 8 1994

RECEIVED

950 AMES AVENUE MILPITAS, CA 95035 (408) 942-8955

I NTEGRATED
W ASTESTREAM
M ANAGEMENT

A6002Q4.XLS

Summary of Ground Water Sample Analyses for ARCO Facility A-6002, Oakland, California

WELL NUMBER	MW-1	MW-2	MW-3	MW-4	MW-5
DATE SAMPLED	11/21/94	11/21/94	11/21/94	11/21/94	11/21/94
DEPTH TO WATER	7.27	7.83	6.80	9.14	12.45
SHEEN	NONE	NONE	NONE	NONE	NONE
PRODUCT THICKNESS	NA	NA	NA	NA	NA
TPHg	12,000	ND	ND	ND	38,000
BTEX					
BENZENE	2,800	ND	ND	ND	3,100
TOLUENE	160	ND	ND	ND	<50#
ETHLYBENZENE	640	ND	ND	ND	3,100
XYLENES	1,300	ND	ND	ND	4,100

FOOTNOTES:

Concentrations reported in ug/L (ppb)
TPHg = Total Purgeable Petroleum Hydrocarbons (USEPA Method 8015 Modified)
BTEX Distinction (USEPA Method 8020)
PCE = Tetrachloroethene (USEPA Method 8010)
* = Well inaccessible

** = Not sampled per consultant request
DCE = cis-1, 2-Dichloroethene (USEPA Method 8010)
TCE = Trichloroethene (USEAP Method 8010)
ND = Not Detected
NA = Not applicable
FP = Floating product
# = See laboratory analytical report

950 AMES AVENUE MILPITAS, CA 95035 (408) 942-8955

FIELD REPORT

Depth To Water / Floating Product Survey

Site Arrival Time: 1530
Site Departure Time: 1745
Weather Conditions: Sunny Clear

DTW: Well Box or Well Casing (circle one)

Project No.: _____ **Location:** 6235 Serrimany Dr. OAK **Date:** November 21, 1994

Client / Station#: Arco 6002 **Field Technician:** Vince / Cisco **Day of Week:** Monday

DTW ORDER	WELL ID	SURFACE SEAL	LID SECURE	GASKET	LOCK	EXPANDING CAP	TOTAL DEPTH (Feet)	FIRST DEPTH TO WATER (Feet)	SECOND DEPTH TO WATER (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	FLOATING PRODUCT THICKNESS (Feet)	SHEEN (Y=YES, N=NO) FP=FLOATING PRODUCT	COMMENTS	MATERIALS
4	MW-1	OK	~~Y~~N	OK	22	OK	24.10	7.27	7.27	N/A	N/A	N	4" H20 filled well box	15/16
2	MW-2	OK	~~Y~~N	OK	22	OK	17.45	7.83	7.83	N/A	N/A	N	4"	15/16
1	MW-3	OK	~~Y~~N	OK	22	OK	24.40	6.80	6.80	N/A	N/A	N	4"	15/16
3	MW-4	OK	~~Y~~N	OK	22	OK	24.00	9.14	9.14	N/A	N/A	N	4"	15/16
5	MW-5	OK	~~Y~~N	OK	22	OK	24.39	12.45+	12.45+	N/A	N/A	N	4"	15/16

PAGE 2 OF 3 DATE: 11-21-94 CLIENT/STATION #: Arco 6002 ADDRESS: 6235 Seminary Dr. OAK

WELL ID: MW-3 TD 24.40 DTW 6.80 X 0.66 (Gal./Linear Ft.) X 3 (Casing Volume) - 34.84 (Calculated Purge)

DATE PURGED: 11-21-94 START (2400 HR): 1635 END (2400 HR) 1642
DATE SAMPLED: 11-21-94 TIME (2400 HR): 1645 DTW: 8.7

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1636	5	6.94	0.43	67.1	CLEAR
1638	15	6.84	0.43	66.2	CLEAR
1640	25	6.80	0.43	66.0	CLEAR
1642	35	6.83	0.43	65.7	CLEAR

Total purge: 35
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-2 TD 17.45 DTW 7.83 X 0.66 (Gal./Linear Ft.) X 3 (Casing Volume) - 19.04 (Calculated Purge)

DATE PURGED: 11-21-94 START (2400 HR): 1650 END (2400 HR) 1654
DATE SAMPLED: 11-21-94 TIME (2400 HR): 1657 DTW: 9

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1651	3	6.58	0.34	65.6	CLEAR
1652	10	6.64	0.34	65.9	CLEAR
1654	19	6.67	0.33	65.0	CLOUDY

Total purge: 19
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-1 TD 24.10 DTW 7.27 X 0.66 (Gal./Linear Ft.) X 3 (Casing Volume) - 33.32 (Calculated Purge)

DATE PURGED: 11-21-94 START (2400 HR): 1705 END (2400 HR) 1723
DATE SAMPLED: 11-21-94 TIME (2400 HR): 1725 DTW: 22.7

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1710	5	6.83	0.45	68.9	CLOUDY
1713	15	6.97	0.49	67.9	CLEAR
1716	25	6.99	0.54	67.2	CLEAR
1723	28	7.03	0.56	66.5	CLEAR

Total purge: 28
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: WELL PUMPED DRY AT 28 GALLONS

WELL ID: ____ TD ____ - DTW ____ X Gal./Linear Ft. ____ X Casing Volume ____ - Calculated Purge ____

DATE PURGED: ____ START (2400 HR): ____ END (2400 HR) ____
DATE SAMPLED: ____ TIME (2400 HR): ____ DTW: ____

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge: ____
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

PRINT NAME: Francisco Abunyan SIGNATURE: Francisco Abunyan

CASING DIAMETER (inches):	2	3	4	6	8	12	Other:
GALLON/LINEAR FOOT:	0.17	0.38	0.66	1.5	2.6	5.8	Other:

11

PAGE 3 OF 3 DATE: 11-21-94 CLIENT/STATION #: ARCO 6002 ADDRESS: 6235 Seminary Dr. OAK

WELL ID: MW-4 TD 21.0 - DTW 9.14 X 0.66 (Gal./Linear Ft.) X 3 (Casing Volume) = 29.40 (Calculated Purge)

DATE PURGED: 11-21-94 START (2400 HR): 1634 END (2400 HR) 1644
DATE SAMPLED: 11-21-94 TIME (2400 HR): 1646 DTW: 16

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1635	1	6.95	0.34	66.9	Clear
1637	10	6.90	0.35	67.8	~~Clear~~ Red
1643	25	6.87	0.38	67.0	Clear
1644	30	6.86	0.34	66.8	Clear

Total purge: 30
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: ~~Well pumped down at 25~~ Well pumped dry at 25 gallons & recovered.

WELL ID: MW-5 TD 24.39 - DTW 12.45 X 0.66 (Gal./Linear Ft.) X 3 (Casing Volume) = 23.64 (Calculated Purge)

DATE PURGED: 11-21-94 START (2400 HR): 1652 END (2400 HR) 1700
DATE SAMPLED: 11-21-94 TIME (2400 HR): 1703 DTW: 17.6

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1654	2	6.79	0.56	69.2	Cloudy
1656	10	6.74	0.58	69.0	Cloudy
1658	16	6.72	0.64	68.8	Clear
1700	17	6.71	0.63	68.7	Clear

Total purge: 17
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: Well pumped dry at 17 gallons.

WELL ID: _____ TD _____ - DTW _____ X Gal./Linear Ft. _____ X Casing Volume _____ = Calculated Purge _____

DATE PURGED: _____ START (2400 HR): _____ END (2400 HR) _____
DATE SAMPLED: _____ TIME (2400 HR): _____ DTW: _____

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge: _____
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: _____

WELL ID: _____ TD _____ - DTW _____ X Gal./Linear Ft. _____ X Casing Volume _____ = Calculated Purge _____

DATE PURGED: _____ START (2400 HR): _____ END (2400 HR) _____
DATE SAMPLED: _____ TIME (2400 HR): _____ DTW: _____

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge: _____
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: _____

PRINT NAME: Vince Valdes SIGNATURE: Vince Valdes

CASING DIAMETER (inches):	2	3	4	6	8	12	Other:
GALLON/LINEAR FOOT:	0.17	0.38	0.66	1.5	2.6	5.8	Other:

APPENDIX B

ANALYTICAL RESULTS AND CHAIN OF DOCUMENTATION, FOURTH QUARTER 1994

Columbia Analytical Services inc.

December 7, 1994

Service Request No. S941505

Gina Austin
Tom DeLon
IWM
950 Ames Avenue
Milpitas, CA 95035

Re: **ARCO Facility No. 6002**

Dear Ms. Austin/Mr. DeLon:

Attached are the results of the water samples submitted to our lab on November 22, 1994. For your reference, these analyses have been assigned our service request number S941505.

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
Program Director

Annelise J. Bazar
Regional QA Coordinator

KAM/ajb

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

Acronyms

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

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Service Request:**	S941505
Project:	ARCO Facility No. 6002	**Date Collected:**	11/21/94
Sample Matrix:	Water	**Date Received:**	11/22/94
		Date Extracted:	NA
		Date Analyzed:	12/2,5/94

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

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name / **Lab Code**					
MW-1 (22.2) S941505-001	12,000	2,800	160	640	1,300
MW-2 (8) S941505-002	ND	ND	ND	ND	ND
MW-3 (8.7) S941505-003	ND	ND	ND	ND	ND
MW-4 (16) S941505-004	ND	ND	ND	ND	ND
MW-5 (17.6) S941505-005	38,000	3,100	<50 *	3,100	4,100
Method Blank S941202-WB	ND	ND	ND	ND	ND
Method Blank S941205-WB	ND	ND	ND	ND	ND

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

Approved By: _____ Date: December 7, 1994

5ABTXGAS/061694

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 6002
Sample Matrix: Water

Service Request: S941505
Date Collected: 11/21/94
Date Received: 11/22/94
Date Extracted: NA
Date Analyzed: 12/2,5/94

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (22.2)	S941505-001	96
MW-2 (8)	S941505-002	95
MW-3 (8.7)	S941505-003	89
MW-4 (16)	S941505-004	89
MW-5 (17.6)	S941505-005	99
MW-2 (8) MS	S941505-002MS	102
MW-2 (8) DMS	S941505-002DMS	97
Method Blank	S941202-WB	91
Method Blank	S941205-WB	92

CAS Acceptance Limits: 69-116

Approved By: Kevin A. Murphy Date: December 7, 1994

SUR1/062994

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 6002

Service Request: S941505
Date Analyzed: 12/2/94

Initial Calibration Verification (ICV) Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	26.7	107	85-115
Toluene	25	25.7	103	85-115
Ethylbenzene	25	26.1	104	85-115
Xylenes, Total	75	76.2	102	85-115
Gasoline	250	242	97	90-110

Approved By: Keena A Murphy Date: December 7, 1994

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No. 6002
Sample Matrix: Water

Service Request: S941505
Date Collected: 11/21/94
Date Received: 11/22/94
Date Extracted: NA
Date Analyzed: 12/2/94

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

Sample Name: MW-2 (8)
Lab Code: S941505-002

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Gasoline	250	250	ND	229	224	92	90	67-121	2

Approved By: Leon A Murphy Date: December 7, 1994

DMS1S/060194

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ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. [illegible] IWM-94-5CC

ARCO Facility no. A 6002	City (Facility) Oakland	Project manager (Consultant) TOM LaSon	Laboratory name Columbia
ARCO engineer M.W	Telephone no. (ARCO) 415/571-2434	Telephone no. (Consultant) 408/942 8955	Fax no. (Consultant) 408/942 1499
Consultant name IWM	Address (Consultant) 950 Tower av. Milp CA 95035		Contract number 07077

Method of shipment: sampler deliver

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid HCl	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
FB-1	6	2		✓		✓	✓	11-21-94	1600		✓	✓										
22.2 MW-1	1	2		✓		✓	✓		1725		✓	✓										
8 MW-2	2	2		✓		✓	✓		1657		✓	✓										
37 MW-3	3	2		✓		✓	✓		1645		✓	✓										
16 MW-4	4	2		✓		✓	✓		1646		✓	✓										
7.6 MW-5	5	2		✓		✓	✓		1703		✓	✓										

Special detection Limit/reporting

Special QA/QC

Remarks: Hold on FB-1

Lab number: 9411505

Turnaround time

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

Condition of sample: okay		Temperature received: cool	
Relinquished by sampler: [signature]	Date 11/22/94 Time 1700	Received by [signature] CAS/BS	11/22/94 1700
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

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