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

Date June 27, 1997
Project 20805-131.012

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	First quarter 1997 groundwater monitoring results, ARCO service station 6002, Oakland, California
1	Jeffrey Enebly letter

For your:		Sent by:	
	X Use		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. Please call if you have questions or comments.

Valli Voruganti
Project Manager

cc: Kevin Graves, RWQCB - SFBR
Paul Supple, ARCO Products Company
File

ARCO Products Company

Date:

June 25, 1997

Re: ARCO Station #

6002 • 6235 Seminary Avenue • Oakland, CA
First Quarter 1997 Groundwater Monitoring Results

"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:

Paul Supple
Environmental Engineer

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

June 27, 1997
Project 20805-131.012

Mr. Paul Supple
ARCO Products Company
P.O. Box 6549
Moraga, California 94570

Re: First quarter 1997 groundwater monitoring results, ARCO service station 6002, Oakland, California

Dear Mr. Supple:

This letter presents the results of the first quarter 1997 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.

As requested by Ms. Juliet Shin of the ACHCSA in a letter dated May 29, 1997, EMCON has included geologic cross-sections that intersect on-site wells with off-site wells MW-7 and MW-8 in order to explain why MW-7 was dry during the third and fourth quarters of 1996 (Figures 3 and 4). The geology and hydrogeology in relation to observed water levels at off-site groundwater monitoring well MW-7 is summarized in Appendix B.

LIMITATIONS

No monitoring event is thorough enough to describe all geologic and 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.

Please call if you have questions.

Sincerely,

EMCON

Lynn Gallagher

Lynn Gallagher, R.G. 6090
Project Geologist

REGISTERED GEOLOGIST
LYNN A. GALLAGHER
RG6090
STATE OF CALIFORNIA

June 27, 1997

ARCO QUARTERLY REPORT

Station No.: 6002	Address: 6235 Seminary Avenue, Oakland, California
EMCON Project No.:	20805-131.012
ARCO Environmental Engineer/Phone No.:	Paul Supple /(510) 299-8891
EMCON Project Manager/Phone No.:	Valli Voruganti /(408) 453-7300
Primary Agency/Regulatory ID No.:	ACHCSA /Juliet Shin

WORK PERFORMED THIS QUARTER (First- 1997):

1. Performed quarterly groundwater monitoring and sampling for first quarter 1997.
2. Prepared and submitted quarterly groundwater monitoring report for fourth quarter 1996.

WORK PROPOSED FOR NEXT QUARTER (Second- 1997):

1. Perform quarterly groundwater monitoring and sampling for second quarter 1997.
2. Prepare and submit quarterly groundwater monitoring report for first quarter 1997.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring
Frequency of Sampling:	Quarterly (groundwater)
Frequency of Monitoring:	Quarterly (groundwater)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Bulk Soil Removed to Date :	approximately 370 cubic yards of TPH impacted soil
Bulk Soil Removed This Quarter :	None
Water Wells or Surface Waters, within 2000 ft., impacted by site:	None
Current Remediation Techniques:	None
Average Depth to Groundwater:	9.11 feet
Groundwater Gradient (Average):	WSW ft/ft toward west-southwest (consistent with past events)

ATTACHED:

- Table 1 - Groundwater Monitoring Data, First Quarter 1997
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Figure 1 - Site Location
- Figure 2 - Groundwater Data, First Quarter 1997
- Figure 3 - Geologic Cross Section A - A'
- Figure 4 - Geologic Cross Section B-B'
- Appendix A - Analytical Results and Chain of Custody Documentation, First Quarter 1997 Groundwater Monitoring Event
- Appendix B - Geology and Hydrogeology in Relation to Observed Water Levels at Off-Site Groundwater Monitoring Well MW-7

cc: Juliet Shin, ACHCSA
Kevin Graves, RWQCB - SFBR

Table 1
Groundwater Monitoring Data
First Quarter 1997

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 06-13-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-3	03-21-97	248.35	8.21	240.14	ND	WSW	0.051	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	- -
MW-4	03-21-97	242.91	10.94	231.97	ND	WSW	0.051	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	81	- -
MW-5	03-21-97	244.82	13.24	231.58	ND	WSW	0.051	03-21-97	18000	110	<50^	730	1500	1800	- -
MW-6	03-21-97	252.20	9.40	242.80	ND	WSW	0.051	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	- -
MW-7	03-21-97	235.95	7.13	228.82	ND	WSW	0.051	03-21-97	590	3.5	<0.5	<0.5	1.3	90	- -
MW-8	03-21-97	240.37	8.55	231.82	ND	WSW	0.051	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	- -
VW-1	03-21-97	NR	7.51	NR	ND	WSW	0.051	03-21-97	640	<4^	<1^	1	3	194	- -
VW-4	03-21-97	NR	9.11	NR	ND	WSW	0.051	03-21-97	10000	290	10	270	230	8900	- -

ft-MSL: elevation in feet, relative to mean sea level
MWN: groundwater flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG: total petroleum hydrocarbons as gasoline
µg/L: micrograms per liter
EPA: United States Environmental Protection Agency
MTBE: Methyl tert-butyl ether
NR: not reported; data not available or not measurable
ND: none detected
WSW: west-southwest
^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference
- -: not analyzed or not applicable

esj/h:\6002\6002mdb.xls\Table 1:imi
20805-131.012

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 06-13-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	03-15-95	247.06	7.37	239.69	ND	WSW	0.08	03-15-95	13000	1200	44	770	1100	--	--
MW-1	05-30-95	247.06	8.48	238.58	ND	WSW	0.08	05-30-95	19000	1600	30	890	1400	--	--
MW-1	09-01-95	247.06	9.47	237.59	ND	WSW	0.09	09-01-95	14000	1300	28	480	780	24000	--
MW-1	11-13-95	247.06	8.78	** 238.29	0.01	WSW	0.08	11-13-95	11000	570	17	260	410	--	25000
MW-1	02-23-96	247.06	Well was decommisioned on 2-12-96					03-01-96	Well was decommisioned on 2-12-96						
MW-2	03-15-95	249.30	8.25	241.05	ND	WSW	0.08	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-2	05-30-95	249.30	9.93	239.37	ND	WSW	0.08	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-2	09-01-95	249.30	10.69	238.61	ND	WSW	0.09	09-01-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-2	11-13-95	249.30	10.32	238.98	ND	WSW	0.08	11-13-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-2	02-23-96	249.30	Well was decommisioned on 2-12-96					03-01-96	Well was decommisioned on 2-12-96						
MW-3	03-15-95	248.35	6.76	241.59	ND	WSW	0.08	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-3	05-30-95	248.35	7.81	240.54	ND	WSW	0.08	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-3	09-01-95	248.35	8.65	239.70	ND	WSW	0.09	09-01-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-3	11-13-95	248.35	8.25	240.10	ND	WSW	0.08	11-13-95	120	45	0.7	<0.5	6.2	--	--
MW-3	02-23-96	248.35	6.64	241.71	ND	WSW	0.08	03-01-96	<50	<0.5	<0.5	0.6	1.9	<3	--
MW-3	05-10-96	248.35	7.95	240.40	ND	WSW	0.08	05-10-96	Not sampled: well sampled annually, during the first quarter						
MW-3	08-09-96	248.35	8.06	240.29	ND	SW	0.08	08-09-96	Not sampled: well sampled annually, during the first quarter						
MW-3	11-08-96	248.35	Not surveyed: inaccessible			SW	0.055	11-11-96	Not sampled: inaccessible						
MW-3	03-21-97	248.35	8.21	240.14	ND	WSW	0.051	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 06-13-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-4	03-15-95	242.91	9.37	233.54	ND	WSW	0.08	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	05-30-95	242.91	11.47	231.44	ND	WSW	0.08	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	09-01-95	242.91	12.28	230.63	ND	WSW	0.09	09-01-95	78	<0.5	0.7	<0.5	<0.5	<3	--
MW-4	11-13-95	242.91	11.75	231.16	ND	WSW	0.08	11-13-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	02-23-96	242.91	8.51	234.40	ND	WSW	0.08	03-01-96	59	1.2	7.4	1.6	9.3	3	--
MW-4	05-10-96	242.91	11.35	231.56	ND	WSW	0.08	05-10-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	08-09-96	242.91	9.70	233.21	ND	SW	0.08	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	11-08-96	242.91	11.79	231.12	ND	SW	0.055	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	03-21-97	242.91	10.94	231.97	ND	WSW	0.051	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	81	--
MW-5	03-15-95	244.82	11.99	232.83	ND	WSW	0.08	03-15-95	21000	870	22	1600	1900	--	--
MW-5	05-30-95	244.82	12.97	231.85	ND	WSW	0.08	05-30-95	17000	2100	250	1000	520	--	--
MW-5	09-01-95	244.82	14.03	230.79	ND	WSW	0.09	09-01-95	19000	1500	25	1600	880	8300	--
MW-5	11-13-95	244.82	13.65	231.17	ND	WSW	0.08	11-13-95	21000	1300	22	1400	630	--	--
MW-5	02-23-96	244.82	11.93	232.89	ND	WSW	0.08	03-01-96	27000	1300	<50	1600	1500	730	--
MW-5	05-10-96	244.82	13.05	231.77	ND	WSW	0.08	05-10-96	17000	460	21	760	480	1000	--
MW-5	08-09-96	244.82	13.22	231.60	ND	SW	0.08	08-09-96	16000	420	14	870	390	1500	--
MW-5	11-08-96	244.82	Not surveyed: inaccessible			SW	0.055	11-11-96	Not sampled: inaccessible						
MW-5	03-21-97	244.82	13.24	231.58	ND	WSW	0.051	03-21-97	18000	110	<50^	730	1500	1800	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 06-13-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-6	06-29-95	NR	6.63	NR	ND	NR	NR	06-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-6	09-01-95	NR	Not surveyed:					09-01-95	Not sampled:						
MW-6	11-13-95	NR	7.70	NR	ND	WSW	0.08	11-13-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-6	02-23-96	NR	9.82	NR	ND	WSW	0.08	03-01-96	<50	<0.5	0.8	<0.5	0.6	<3	--
MW-6	05-10-96	NR	15.25	NR	ND	WSW	0.08	05-10-96	Not sampled: well sampled annually, during the first quarter						
MW-6	08-09-96	252.20	11.11	241.09	ND	SW	0.08	08-09-96	Not sampled: well sampled annually, during the first quarter						
MW-6	11-08-96	252.20	9.31	242.89	ND	SW	0.055	11-11-96	Not sampled: well sampled annually, during the first quarter						
MW-6	03-21-97	252.20	9.40	242.80	ND	WSW	0.051	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-7	08-09-96	235.95	Not surveyed: well was dry			SW	0.08	08-09-96	Not sampled: well was dry						
MW-7	11-08-96	235.95	Not surveyed: well was dry			SW	0.055	11-11-96	Not sampled: well was dry						
MW-7	01-27-97	235.95	NR	NR	ND	NR	NR	01-27-97	2900	29	<5^	<5^	580	220	--
MW-7	03-21-97	235.95	7.13	228.82	ND	WSW	0.051	03-21-97	590	3.5	<0.5	<0.5	1.3	90	--
MW-8	08-09-96	240.37	9.41	230.96	ND	SW	0.08	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-8	11-08-96	240.37	9.19	231.18	ND	SW	0.055	11-11-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-8	03-21-97	240.37	8.55	231.82	ND	WSW	0.051	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
AS-1	06-29-95	NR	9.20	NR	ND	NR	NR	06-30-95	<50	1.6	<0.5	0.9	0.9	--	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 06-13-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
VW-1	02-23-96	NR	5.29	NR	ND	WSW	0.08	03-01-96	21000	490	57	520	1500	240	--
VW-1	05-10-96	NR	6.80	NR	ND	WSW	0.08	05-10-96	3700	61	<5	100	50	200	--
VW-1	08-09-96	NR	7.03	NR	ND	SW	0.08	08-09-96	970	2.7	<2.5	2.7	3.7	180	--
VW-1	11-08-96	NR	Not surveyed: inaccessible			SW	0.055	11-11-96	Not sampled: inaccessible						
VW-1	03-21-97	NR	7.51	NR	ND	WSW	0.051	03-21-97	640	<4^	<1^	1	3	194	--
VW-2	02-23-96	NR	6.92	NR	ND	WSW	0.08	03-01-96	Not sampled: not part of sampling program						
VW-2	05-10-96	NR	Not surveyed: not scheduled for monitoring					05-10-96	Not sampled: not part of sampling program						
VW-4	05-10-96	NR	8.58	NR	ND	WSW	0.08	05-10-96	13000	2500	41	420	660	43000	--
VW-4	08-09-96	NR	11.70	NR	ND	SW	0.08	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	6200	--
VW-4	11-08-96	NR	9.38	NR	ND	SW	0.055	11-08-96	7800	510	7	180	370	21000	--
VW-4	03-21-97	NR	9.11	NR	ND	WSW	0.051	03-21-97	10000	290	10	270	230	8900	--

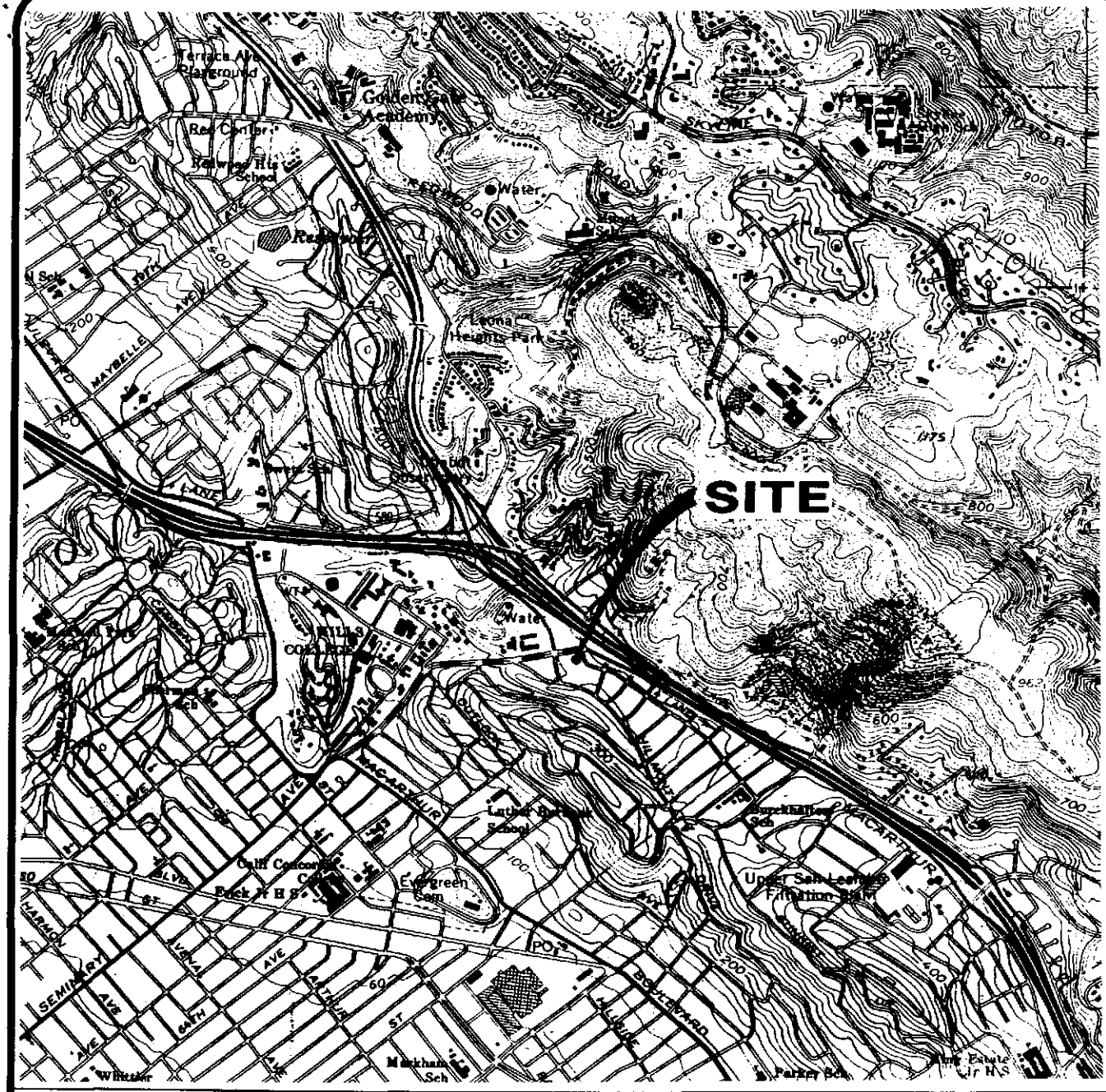
Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 06-13-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG: total petroleum hydrocarbons as gasoline
µg/L: micrograms per liter
EPA: United States Environmental Protection Agency
MTBE: Methyl-tert-butyl ether
ND: none detected
NR: not reported; data not available or not measurable
WSW: west-southwest
SW: southwest
- -: not analyzed or not applicable
*: For previous historical groundwater elevation data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6002, Oakland, California,* (EMCON, February 23, 1996).
^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference
** [corrected elevation (Z')] = Z + (h * 0.73) where: Z: measured elevation, h: floating product thickness, 0.73: density ratio of oil to water



EMCON

DATE APR. 1997
DWN KAJ
APP
REV
PROJECT NO.
805-131.012

FIGURE 1
ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
SITE LOCATION

EA-SANJOSE-CAD/DRAWINGS: I:\QZ002\SITELOC.dwg Xrefs: <NONE>
Scale: 1 = 1.00 DimScale: 1 = 1.00 Date: 3/12/97 Time: 5:19 PM Operator: KAJ

SEMINARY AVENUE

OVERDALE AVENUE

SUNNYMERE AVENUE

SIDEWALK

DRIVEWAY

SIDEWALK

DRIVEWAY

Gate

Gate

PLANTER

MW-4 (231.97)

ND
ND

4' block wall (Typ.)

MW-2

PLANTER

Former UST and Concrete pad

VW-3

SERVICE ISLAND

AS-1

MW-1

VW-2

VW-4 (NM)

DRIVEWAY

580 ON RAMP

ND
ND

MW-6 (242.80)

580 ON RAMP

6150

6152

6154

6209 (APTS.)

6217 (APTS.)

STAIRS

0.051

Approximate direction of groundwater flow showing gradient (calculated using wells MW-4, MW-6 and MW-8)

GRAVEL

GARAGE

CONCRETE

CONCRETE

PLANTER

MW-7 (228.82)

PLANTER

18,000
110

MW-5 (231.58)

ARCO SERVICE STATION BUILDING

VW-1 (NM)

ND
ND

MW-3 (240.14)

PLANTER

590
3.5

Elevation 8' lower than ARCO property

TREE

TREE

8" block wall

6166

ND
ND

MW-8 (231.82)

6267

Garage

Gate

Approximate property line (Typ.)

6174

A

A'

B

B'

230 232 234 236 238 240 242

EXPLANATION

- Groundwater monitoring well
- Decommissioned monitoring well
- Vapor extraction well
- Air sparge well
- (231.12) Groundwater elevation (Ft.–MSL) measured 3/21/97
- Groundwater elevation contour (Ft.–MSL)
- 7800 / 510 TPHG concentration in groundwater (ug/L); sampled 3/21/97 / Benzene concentration in groundwater 3/21/97
- NS Not sampled; not scheduled for chemical analysis
- ND Not detected at or above method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)
- NM Not measured; well inaccessible
- Line of geologic cross section (See Figures 3 and 4)

Base map modified from GSI, 1994.

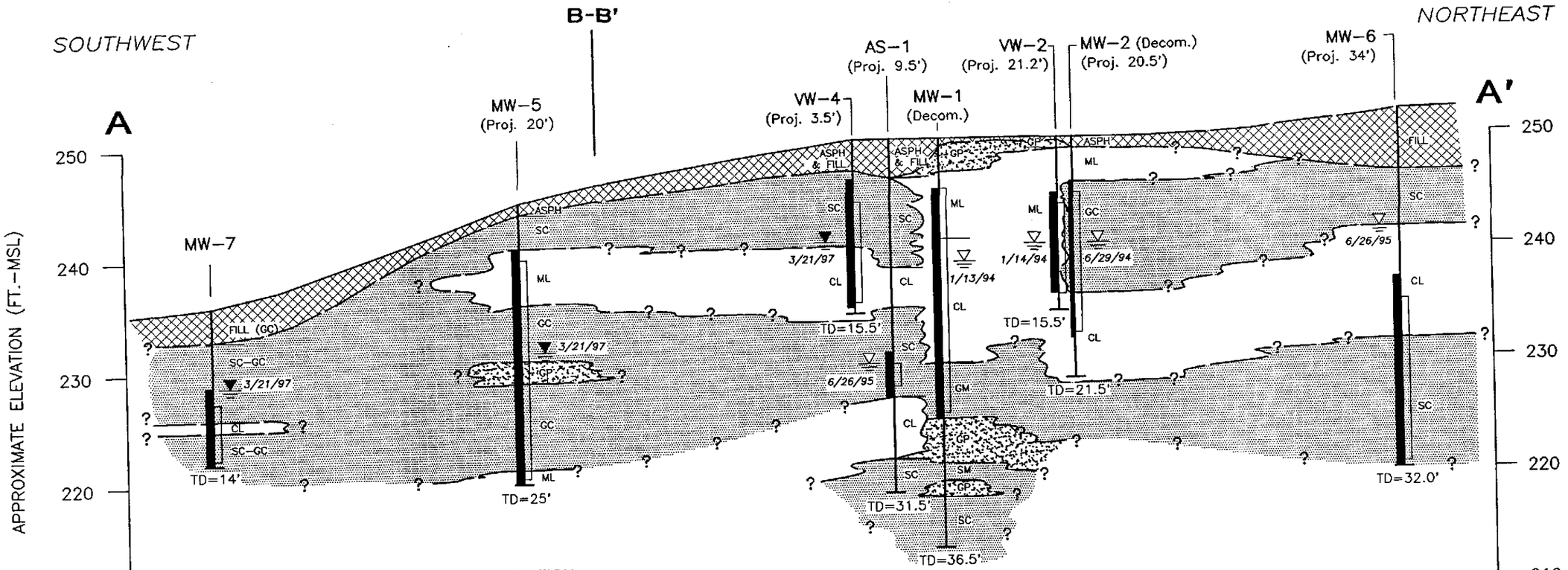
0 30 60

SCALE IN FEET

DATE MAY 1997
DWN KMM
APP
REV 0
PROJECT NO. 20805-131.012

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
GROUNDWATER DATA - 1ST QUARTER 1997

EA-SANJOSE-CAD/DRAWINGS: G:\805-131\SJGWELEV.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 6/13/97 Time: 1:19 PM Operator: KAJ



EXPLANATION

MW-5 (Proj. 13.5') — Well designation (Projected distance to section)

Borehole

Pack interval

Screen interval

GC — USCS symbol

3/21/97 — First encountered water level

3/21/97 — Static water level

Geologic contact; dashed where approximate, queried where uncertain

TD=25' — Total depth (Ft.-BGS)

Asphalt; asphalt and fill (ASPH, FILL)

Clays and silts (CL, ML)

Clayey and silty sands and gravels (SC, SM, GC, GM)

Sands and gravels (SP, GP)

NOTE: Well construction and lithology from RESNA, Geo Strategies, Inc., and EMCON boring logs.

0 30 60

SCALE IN FEET (HORIZONTAL)
VERTICAL EXAGGERATION = 3X

EMCON

DATE JUNE 1997
DWN KMM
APP
REV 0
PROJECT NO. 20805-131.012

FIGURE 3
ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
GEOLOGIC CROSS SECTION A-A'

EA-SANJOSE-CAD/DRAWINGS: G:\805-131\XSECAA.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 1.00 Date: 6/12/97 Time: 3:42 PM Operator: KMM

Columbia Analytical Services inc.

April 3, 1997 Service Request No.: S9700508

Mr. John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 6002 OAKLAND/20805-131.008/TO#19350.00

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on March 21, 1997. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above. To help expedite our service, please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 9, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely,

Steven L. Green
Project Chemist

Bernadette T. Cox for

Greg Anderson
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
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 method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
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TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

		Sample Name:	**MW-3 (9)**	**MW-4 (11)**	**MW-5 (14)**
		Lab Code:	S9700508-001	S9700508-002	S9700508-003
		Date Analyzed:	4/1/97	4/1/97	4/1/97
Analyte	**MRL**				
TPH as Gasoline	50		ND	ND	18,000
Benzene	0.5		ND	ND	110
Toluene	0.5		ND	ND	<50 C1
Ethylbenzene	0.5		ND	ND	730
Total Xylenes	0.5		ND	ND	1500
Methyl *tert*-Butyl Ether	3		ND	81	1800

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name:	**MW-6 (31)**	**MW-7 (13)**	**Method Blank**
Lab Code:	S9700508-004	S9700508-005	S970401-WB2
Date Analyzed:	4/1/97	4/1,3/97	4/1/97

Analyte	**MRL**			
TPH as Gasoline	50	ND	590	ND
Benzene	0.5	ND	3.5	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	1.3	ND
Methyl *tert*-Butyl Ether	3	ND	90	ND

3522/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name:	**Method Blank**
Lab Code:	S970403-WB1
Date Analyzed:	4/3/97

Analyte	**MRL**	
TPH as Gasoline	50	ND
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
Methyl *tert*-Butyl Ether	3	ND

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA
		Date Analyzed:	NA

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α–Trifluorotoluene
MW-3 (9)	S9700508-001	99	74
MW-4 (11)	S9700508-002	99	76
MW-5 (14)	S9700508-003	109	83
MW-6 (31)	S9700508-004	96	73
MW-7 (13)	S9700508-005	100	79
MW-5 (14) MS	S9700508-003 MS	101	95
MW-5 (14) DMS	S9700508-003 DMS	107	90
Method Blank	S970401-WB2	95	80
Method Blank	S970403-WB1	97	94
	CAS Acceptance Limits:	69-116	69-116

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA
		Date Analyzed:	4/1/97

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

Sample Name: MW-5 (14)
Lab Code: S9700508-003MS, DMS

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	25,000	25,000	18,000	50,000	45,000	128 A	108	67-121	11

A Outside of acceptance limits. Because LCS results were acceptable, no further corrective action was taken

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Analyzed:**	4/1/97

Initial Calibration Verification (ICV) Summary
BTEX, MTBE 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	24	96	85-115
Toluene	25	24	96	85-115
Ethylbenzene	25	25	100	85-115
Xylenes, Total	75	73	97	85-115
Gasoline	250	250	100	90-110
Methyl *tert*-Butyl Ether	25	23	92	85-115

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19350.00

Chain of Custody

ARCO Facility no. 6002	City (Facility) OAKLAND	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO) —	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) —
Consultant name EMCON / DWT	Address (Consultant) 1921 RINGWOOD AVE		Contract number —

Method of shipment: Delivered

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-3(9)	1	2		X		X	X	3-21-97	0850		X									
MW-4(11)	2	2		X		X	X		0915											
MW-5(14)	3	2		X		X	X		1110											
MW-6(31)	4	2		X		X	X		1155											
MW-7(13)	5	2		X		X	X		1230											
MW-9(9)	6	2		X		X	X		1010											

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC: AS NORMAL

Remarks: 2 40 ml VOA's

20805-131.007

Lab number: 5970508

Turnaround time

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

Condition of sample: OK

Temperature received: Cool

	Date	Time	
Relinquished by sampler	3-21-97	1345	Received by
Relinquished by			Received by
Relinquished by			Received by laboratory: Jamie Brood — Date 3-21-97 — Time 1345

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

APC-3292 (2-91)

Columbia Analytical Services, Inc.

June 6, 1997 Service Request No.: S9700508

Ms. Ivy Inouye
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 6002 OAKLAND/20805-131.008/TO#19350.00

Dear Ms. Inouye:

Enclosed is the revised analytical report for the sample received by the laboratory on March 21, 1997. Per your request, sample I.D. 'MW-8' has been issued its own CAR with the same Service Request No. (listed above) as the original report.

If you have anymore questions or concerns, please feel free to contact me.

Sincerely,

Bernadette T. Cox
Project Chemist

Greg Anderson
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
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CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
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 method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

		Sample Name:	**MW-8 (9)**	**Method Blank**
		Lab Code:	S9700508-006	S970401-WB2
		Date Analyzed:	4/2/97	4/1/97
Analyte	**MRL**			
TPH as Gasoline	50		ND	ND
Benzene	0.5		ND	ND
Toluene	0.5		ND	ND
Ethylbenzene	0.5		ND	ND
Total Xylenes	0.5		ND	ND
Methyl *tert*-Butyl Ether	3		ND	ND

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA
		Date Analyzed:	NA

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

Sample Name	**Lab Code**	**PID Detector Percent Recovery** 4-Bromofluorobenzene	**FID Detector Percent Recovery** α,α,α–Trifluorotoluene
MW-8 (9)	S9700508-006	102	74
Method Blank	S970401-WB2	95	80
CAS Acceptance Limits:		69-116	69-116

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA
		Date Analyzed:	4/1/97

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

Sample Name: MW-5 (14)
Lab Code: S9700508-003MS, DMS

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	25,000	25,000	18,000	50,000	45,000	128 A	108	67-121	11

A Outside of acceptance limits. Because LCS results were acceptable, no further corrective action was taken

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Analyzed:**	4/1/97

Initial Calibration Verification (ICV) Summary
BTEX, MTBE 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	24	96	85-115
Toluene	25	24	96	85-115
Ethylbenzene	25	25	100	85-115
Xylenes, Total	75	73	97	85-115
Gasoline	250	250	100	90-110
Methyl *tert*-Butyl Ether	25	23	92	85-115

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19350.00

Chain of Custody

ARCO Facility no. 6002	City (Facility) OAKLAND	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO) —	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) —
Consultant name EMCON / OWT	Address (Consultant) 1921 RINGWOOD AVE		Contract number —

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA 8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-3 (9)	1	2		X		X	X	3/21/97	0850		X									
MW-4 (11)	2	2		X		X	X		0915											
MW-5 (14)	3	2		X		X	X		1110											
MW-6 (31)	4	2		X		X	X		1155											
MW-7 (13)	5	2		X		X	X		1230											
MW-9 (9)	6	2		X		X	X	V	1010		V									

Method of shipment: Delivered

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC: AS NORMAL

Remarks: 2 40 ml VOA's

20805-131.008

Lab number: 5970508

Turnaround time

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

Condition of sample: ok		Temperature received: cool	
Relinquished by sampler: [signature]	Date 3-21-97 Time 1345	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory: [signature]	Date 3-21-97 Time 1345

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

Columbia Analytical Services, Inc.

April 3, 1997

Service Request No.: S9700507

Mr. John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 6002 OAKLAND/20805-131.008/TO#19350.00

Dear

The following pages contain analytical results for sample(s) received by the laboratory on March 21, 1997. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above. To help expedite our service, please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 8, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely,

Steven L. Green
Project Chemist

Greg Anderson
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, Inc.

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NAN	Not Analyzed
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NIOSH	National Institute for Occupational Safety and Health
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TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9700507
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

	Sample Name:	VW-1 (8)	VW-4 (10)	Method Blank
	Lab Code:	S9700507-001	S9700507-002	S970401-WB2
	Date Analyzed:	4/1/97	4/1,3/97	4/1/97
Analyte	**MRL**			
TPH as Gasoline	50	640	10,000	ND
Benzene	0.5	<4 M1	290	ND
Toluene	0.5	<1 C1	10	ND
Ethylbenzene	0.5	1	270	ND
Total Xylenes	0.5	3	230	ND
Methyl *tert*-Butyl Ether	3	194	8900	ND

C1	The MRL was elevated due to high analyte concentration requiring sample dilution.
M1	The MRL was elevated because of matrix interferences.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9700507
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name:	**Method Blank**
Lab Code:	S970403-WB1
Date Analyzed:	4/3/97

Analyte	**MRL**	
TPH as Gasoline	50	ND
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
Methyl *tert*-Butyl Ether	3	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700507
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA
		Date Analyzed:	NA

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α–Trifluorotoluene
VW-1 (8)	S9700507-001	97	94
VW-4 (10)	S9700507-002	96	98
Batch QC (MS)	S9700508-003 MS	101	95
Batch QC (DMS)	S9700508-003 DMS	107	90
Method Blank	S970401-WB2	95	80
Method Blank	S970403-WB1	97	94
CAS Acceptance Limits:		69-116	69-116

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700507
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA
		Date Analyzed:	4/1/97

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

Sample Name: Batch QC
Lab Code: S9700508-003MS, DMS

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	25,000	25,000	18,000	50,000	45,000	128 A	108	67-121	11

A Outside of acceptance limits. Because LCS results were acceptable, no further corrective action was taken.

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700507
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Analyzed:**	4/1/97

Initial Calibration Verification (ICV) Summary
BTEX, MTBE 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	24	96	85-115
Toluene	25	24	96	85-115
Ethylbenzene	25	25	100	85-115
Xylenes, Total	75	73	97	85-115
Gasoline	250	250	100	90-110
Methyl *tert*-Butyl Ether	25	23	92	85-115

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19350.00

Chain of Custody

ARCO Facility no. 6002	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO) —	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) —
Consultant name Emcon/ONT	Address (Consultant) 1921 Ring Wood Ave		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 (2nd)	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
VW-1(8)	(1)	2		X		X	X	3-21-97	1040		X											
VW-4(10)	(2)	2		X		X	X	3-21-97	1055		X											

Method of shipment: Delivered

Special detection Limit/reporting: Lowest Possible

Special QA/QC: AS Normal

Remarks: 2 - 40 ml VOA's

20805-131.007

Lab number: 9700507

Turnaround time

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

Condition of sample: OK		Temperature received: Cool	
Relinquished by sampler: [signature]	Date 3-21-97	Time 1345	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: [signature] Date 3-21-97 Time 13:45

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

GEOLOGY AND HYDROGEOLOGY IN RELATION TO OBSERVED WATER LEVELS AT OFF-SITE GROUNDWATER MONITORING WELL MW-7

This section is presented in the quarterly monitoring report in response to a request presented in a letter from the Alameda County Health Care Services Agency (ACHCSA) to ARCO, dated May 29, 1997. Ms. Juliet Shin of the ACHCSA requested in the letter that the next monitoring report include geologic cross-sections that intersect on-site wells with off-site wells MW-7 and MW-8. The ACHCSA requested the cross-sections to help explain why well MW-7 was dry in third and fourth quarters of 1996.

Accordingly, geologic cross-sections A-A' and B-B' (Figures 3 and 4) have been prepared and are included in this report. The location of on- and off-site wells, and geologic cross-section lines A-A' and B-B' are shown on Figure 2.

As seen on the cross-sections, a clayey sand or clayey gravel unit, with an average thickness of approximately 5 feet, extends across most of the Site and vicinity. This unit is underlain by a relatively continuous layer of fines (silts and clays), to a depth of approximately 10 to 15 feet BGS. Underlying the layer of fines is a unit represented by clayey to silty sands and gravels, interspersed with occasional clean gravel lenses. The gravel deposits appear to be laterally discontinuous, and are thicker and more common on the eastern portion of the Site. With the exception of the clean gravel lenses, sands and gravel units at the Site contain a significant fraction of fines, generally 30 to 40 percent. Conversely, the silt and clay units at the Site tend to contain a significant fraction of sands and gravels, also on the order of 30 to 40 percent.

A review of the groundwater elevation history (Table 2) at the Site indicates that the stratigraphic units described above together comprise a relatively homogenous water-bearing zone, and that historic gradients at the Site are sufficient to explain the lack of water observed in MW-7 in third and fourth quarters 1996. Wells at the Site and vicinity, when broken down by geographic distribution, show similar groundwater elevations within the groups, and predictable groundwater elevation gradients between groups. Historically, MW-6, the most upgradient well, has the highest groundwater elevations. Elevations at this well in 1995 and 1996 have usually been between 240 and 245 feet above mean sea level (ft, MSL). Further downgradient, the elevations observed in wells at the eastern portion of the Site (wells MW-1, MW-2, MW-3, AS-1, VW-2, and VW-4) have historically been similar to one another, and as a group averaged between 237 and

241 ft, MSL in 1995 and 1996. Still further downgradient, wells located at the western portion of the Site (wells MW-4, MW-5, and MW-8) have also been historically similar to one another, averaging between 231 and 234 ft, MSL as a groups in 1995 and 1996. Finally, offsite to the west and furthest downgradient, well MW-7 has historical groundwater elevations of less than 222 ft, MSL (approximate bottom of casing) to 229 ft, MSL (first quarter recorded elevation). The drop in average groundwater elevations from the most upgradient group to the adjacent downgradient group, has been relatively uniform in 1996 and 1997, generally on the order of 5 to 7 feet. The elevations observed or inferred at well MW-7 are consistent with the elevations at the adjacent upgradient well group minus this average difference.

Although the geology at the Site indicates a range of transmissivities, the mix of fines with coarse sediments, and coarse material with fines appears to have the effect of a relatively homogeneous water-bearing zone. The uniformity of the groundwater contour maps, generated on the basis of data gathered from wells screened across differing portions of the stratigraphic units, also suggests relatively good communication between units. The groundwater elevation and gradient data discussed above indicates that the groundwater elevations measured at well MW-7 (as well as the elevations suggested by the well when dry), are the result of a groundwater gradient progression across the Site and vicinity, and are not anomalous. Well MW-7 was drilled and installed using a hand-auger to a depth of 14 feet below grade surface. The well could not be advanced any further because of cobbles encountered at the base of the boring. Hand-augering of the boring was necessitated at the request of the off-site property owner due to access and noise constraints.

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

June 27, 1997
Project 20805-131.012

Mr. Jeffrey Enebly
6267 Sunnymere Avenue
Oakland, California 94605

Re: First quarter 1997 laboratory analytical results, groundwater samples,
6267 Sunnymere Avenue, Oakland, California

Dear Mr. Enebly:

Enclosed please find a copy of the first quarter 1997 groundwater monitoring results for ARCO service station 6002, Oakland, California. Included are the laboratory analytical results for the groundwater sample collected from well MW-8 during the first quarter of 1997. This well is located at 6267 Sunnymere Avenue, Oakland, California. The groundwater sample was collected on March 21, 1997, during quarterly sampling of the ARCO Products Company service station 6002, 6235 Seminary Avenue, Oakland. The laboratory analytical results indicate that the groundwater sample concentrations for well MW-8 were not detectable for total petroleum hydrocarbons as gasoline, and the gasoline constituents benzene, toluene, ethylbenzene, and total xylenes.

Please call if you have questions.

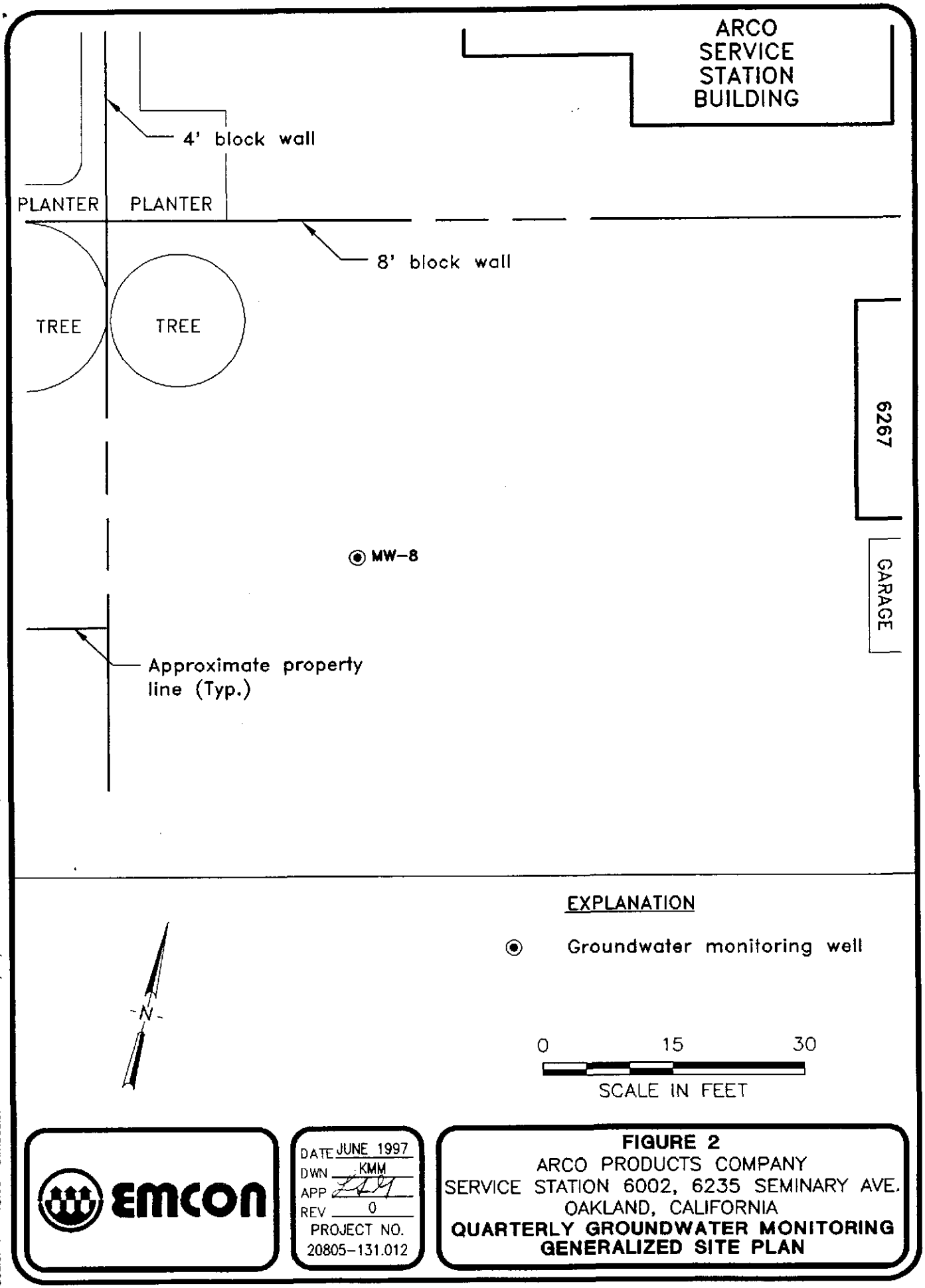
Sincerely,

EMCON

Valli Voruganti
Project Manager

Attachments: Figure 1 -Generalized Site Plan
Attachment A - Copy of Analytical Results and Chain-of-Custody Documentation, Well MW-8, First Quarter 1997

cc: Juliet Shin, ACHCSA
Kevin Graves, RWQCB - SFBR
Paul Supple, ARCO Products Company
File



EMCON

DATE JUNE 1997
DWN KMM
APP
REV 0
PROJECT NO.
20805-131.012

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
GENERALIZED SITE PLAN

EA-SANJOSE-CAD/DRAWINGS: G:\805-131\SJGENSP.dwg Xrefs: <NONE>
Scale: 1 = 15.00 DimScale: 1 = 30.00 Date: 6/12/97 Time: 12:13 PM Operator: KMM

ATTACHMENT A

COPY OF ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, WELL MW-8, FIRST QUARTER 1997

Columbia Analytical Services inc.

June 6, 1997 Service Request No.: S9700508

Ms. Ivy Inouye
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 6002 OAKLAND/20805-131.008/TO#19350.00

Dear Ms. Inouye:

Enclosed is the revised analytical report for the sample received by the laboratory on March 21, 1997. Per your request, sample I.D. 'MW-8' has been issued its own CAR with the same Service Request No. (listed above) as the original report.

If you have anymore questions or concerns, please feel free to contact me.

Sincerely,

Bernadette T. Cox
Project Chemist

Greg Anderson
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

		Sample Name:	**MW-8 (9)**	**Method Blank**
		Lab Code:	S9700508-006	S970401-WB2
		Date Analyzed:	4/2/97	4/1/97
Analyte	**MRL**			
TPH as Gasoline	50		ND	ND
Benzene	0.5		ND	ND
Toluene	0.5		ND	ND
Ethylbenzene	0.5		ND	ND
Total Xylenes	0.5		ND	ND
Methyl *tert*-Butyl Ether	3		ND	ND

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 6002 OAKLAND/20805-131.008/TO#19350.00
Sample Matrix: Water

Service Request: S9700508
Date Collected: 3/21/97
Date Received: 3/21/97
Date Extracted: NA
Date Analyzed: NA

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α–Trifluorotoluene
MW-8 (9)	S9700508-006	102	74
Method Blank	S970401-WB2	95	80
CAS Acceptance Limits:		69-116	69-116

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Collected:**	3/21/97
Sample Matrix:	Water	**Date Received:**	3/21/97
		Date Extracted:	NA
		Date Analyzed:	4/1/97

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

Sample Name: MW-5 (14)
Lab Code: S9700508-003MS, DMS

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	25,000	25,000	18,000	50,000	45,000	128 A	108	67-121	11

A Outside of acceptance limits. Because LCS results were acceptable, no further corrective action was taken

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9700508
Project:	6002 OAKLAND/20805-131.008/TO#19350.00	**Date Analyzed:**	4/1/97

Initial Calibration Verification (ICV) Summary
BTEX, MTBE 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	24	96	85-115
Toluene	25	24	96	85-115
Ethylbenzene	25	25	100	85-115
Xylenes, Total	75	73	97	85-115
Gasoline	250	250	100	90-110
Methyl *tert*-Butyl Ether	25	23	92	85-115

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19350.00

Chain of Custody

ARCO Facility no. 6002	City (Facility) OAKLAND	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO) —	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) —
Consultant name Emcon / DWT		Address (Consultant) 1921 Ringwood Ave	Contract number —

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-3 (9)	1	2		X		X	X	3/21/97	0850		X									
MW-4 (11)	2	2		X		X	X		0915											
MW-5 (14)	3	2		X		X	X		1110											
MW-6 (21)	4	2		X		X	X		1155											
MW-7 (13)	5	2		X		X	X		1230											
MW-9 (9)	6	2		X		X	X	V	1010		V									

Method of shipment: Delivered

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC: AS Normal

Remarks: 2 40 ml VOA's

20805-131.007

Lab number: 5970050

Turnaround time

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

Condition of sample: ok		Temperature received: cool	
Relinquished by sampler: [signature]	Date 3-21-97	Time 1345	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: [signature] Date 3-21-97 Time 1345

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

APC-3292 (2-91)