SHD
3042

August 3, 1998
Project 20805-131.013

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

Re: Quarterly Groundwater Monitoring Report, First Quarter 1998, for former ARCO Service Station No. 6002, located at 6235 Seminary Avenue, Oakland, California

Dear Mr. Supple:

Pinnacle Environmental Solutions, a division of EMCON (Pinnacle), is submitting the attached report which presents the results of the first quarter 1998 groundwater monitoring program at former ARCO Products Company (ARCO) Service Station No. 6002, located at 6235 Seminary Avenue, Oakland, California (see Figure 1). Pertinent site features, including existing monitoring and groundwater extraction wells, are shown in Figure 2. The monitoring program complies with the Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

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, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the product of the scope and limitations of work performed during the monitoring event.

Please call if you have questions.

Sincerely,

Pinnacle

Glen VanderVeen
Project Manager

Jay R. Johnson, R.G.
Senior Project Supervisor

Attachment: Quarterly Groundwater Monitoring Report, First Quarter 1998

cc: Thomas Peacock, ACHCSA

N:\PJO\0805\08051311.3AS-98\pzusmer:1

144-A Mayhew Way Walnut Creek, California 94596 (510) 977-9020 (510) 977-9030 Fax

August 3, 1998

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.: 6002	Address: 6235 Seminary Avenue, Oakland, California
Pinnacle Project No.:	20805-131.013
ARCO Environmental Engineer/Phone No.:	Paul Supple /(510) 299-8891
Pinnacle Project Manager/Phone No.:	Glen VanderVeen /(510) 977-9020
Primary Agency/Regulatory ID No.:	ACHCSA /Thomas Peacock

WORK PERFORMED THIS QUARTER (First - 1998):

1. Prepared and submitted quarterly groundwater monitoring report for fourth quarter 1997.
2. Performed quarterly groundwater monitoring and sampling for first quarter 1998.

WORK PROPOSED FOR NEXT QUARTER (Second - 1998):

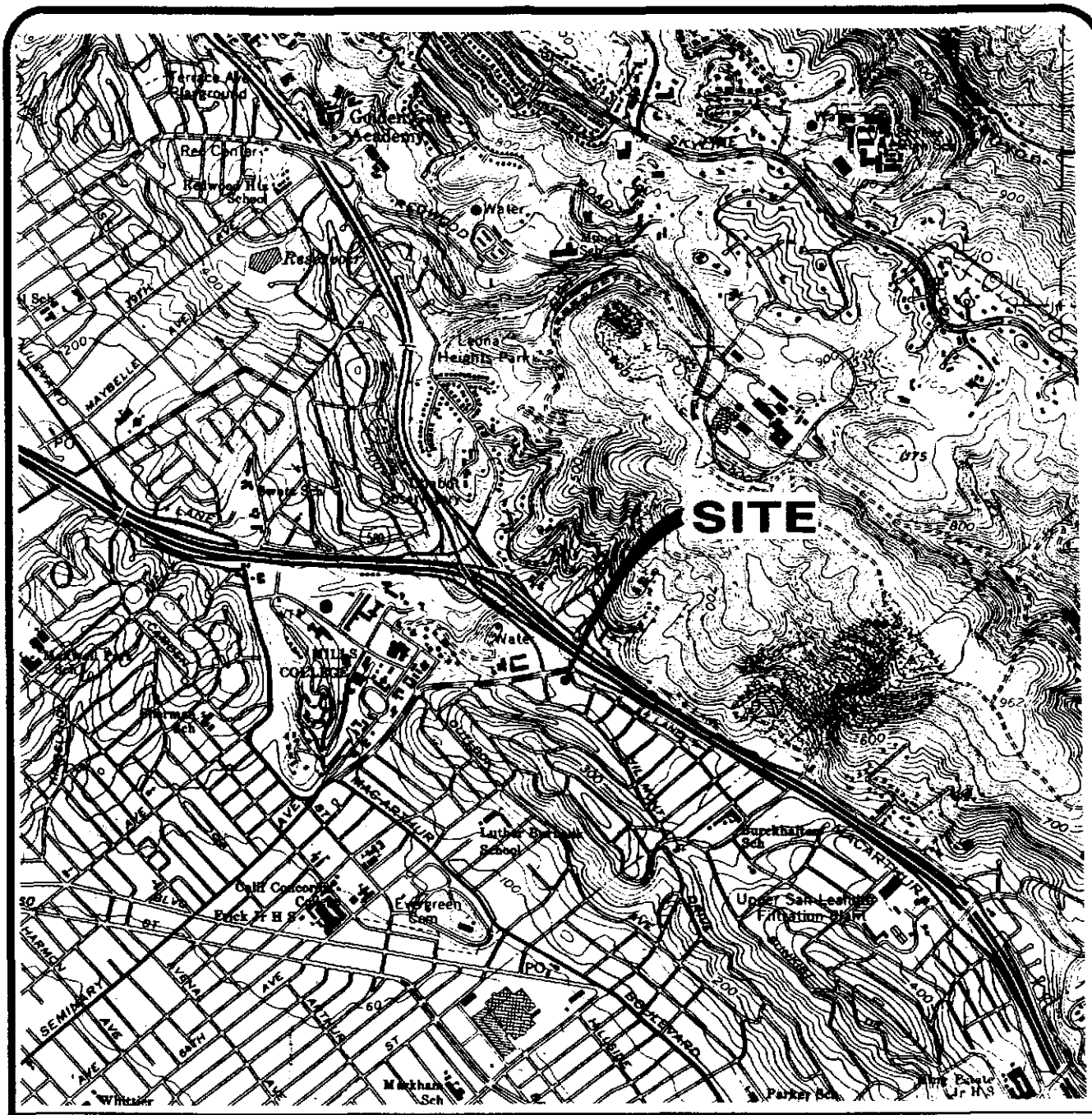
1. Prepare and submit quarterly groundwater monitoring report for first quarter 1998.
2. Perform quarterly groundwater monitoring and sampling for second quarter 1998.

QUARTERLY MONITORING:

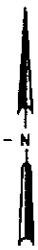
Current Phase of Project:	Quarterly Groundwater Monitoring
Frequency of Sampling:	Annual (1st Quarter): MW-3, MW-6 Quarterly: MW-4, MW-5, MW-7, MW-8, VW-1, VW-4
Frequency of Monitoring:	Quarterly (groundwater)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Bulk Soil Removed to Date :	approximately 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:	Natural Attenuation
Average Depth to Groundwater:	9.2 feet
Groundwater Gradient (Average):	0.052 ft/ft toward West-Southwest

ATTACHMENTS:

- Figure 1 - Site Location
- Figure 2 - Groundwater Analytical Summary Map
- Figure 3 - Groundwater Elevation Contour Map
- Table 1 - Groundwater Monitoring Data, First Quarter 1998
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Appendix A - Certified Analytical Reports, Chain-of Custody Documentation, and Field Data Sheets



Base map from USGS 7.5' Quad. Map:
Oakland East, California. Photorevised 1980.



0 2000 4000

SCALE IN FEET

EMCON

DATE	NOV. 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:\DZ002\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

4' block wall (Typ.)

STAIRS

6150

6152

6154

6209 (APTS.)

6217 (APTS.)

GRAVEL

GARAGE

CONCRETE

PLANTER

MW-7 (ND/ND)

CONCRETE

PLANTER

MW-4 (ND/ND)

MW-2

PLANTER

SERVICE ISLAND

AS-1

MW-1

Former UST and Concrete pad

VW-2

DRIVEWAY

SERVICE STATION BUILDING

MW-5 (8,500/19)

MW-3 (ND/ND)

PLANTER

Elevation 8' lower than ARCO property

TREE

TREE

8" block wall

6166

6267

MW-8 (ND/ND)

Garage

Gate

Approximate property line (Typ.)

6174

580 ON RAMP

(ND/ND)

MW-6

580 ON RAMP

Base map modified from GSI, 1994

0 30 60

SCALE IN FEET

EXPLANATION

- Groundwater monitoring well
- Decommissioned monitoring well
- Vapor extraction well
- Air sparge well

(8,500/19) Concentration of total petroleum hydrocarbons, as gasoline (TPHG) and benzene in groundwater (ug/L); water samples were collected on 2/25/98

ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)

< Method reporting limit raised due to high analyte concentration requiring sample dilution or matrix interference

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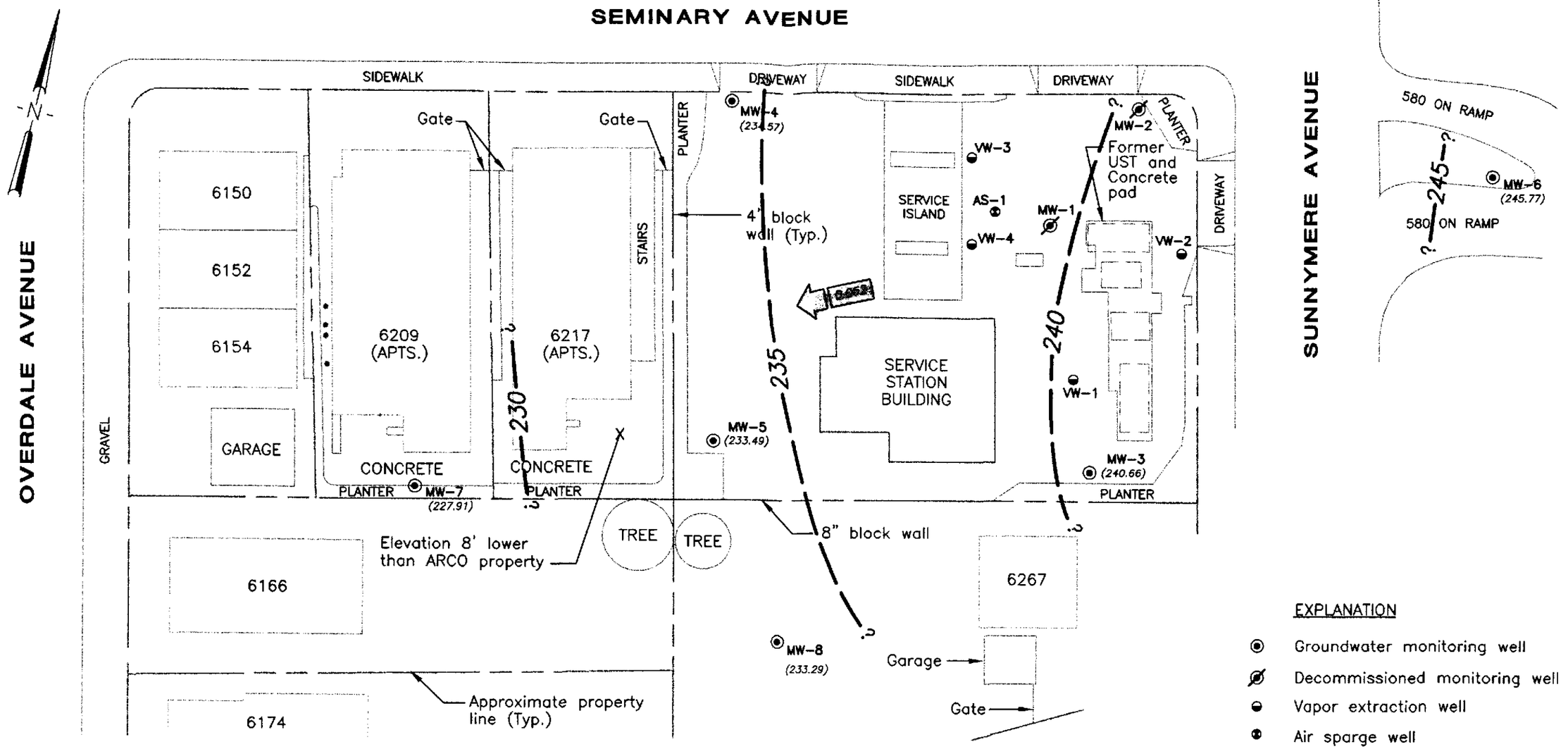
ENVIRONMENTAL SOLUTIONS
A DIVISION OF EMCON

DATE MAY 1998
DWN KAJ
APP
REV
PROJECT NO. 805-131.012

FIGURE 2
ARCO PRODUCTS COMPANY
FORMER STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
GROUNDWATER ANALYTICAL SUMMARY
1ST QUARTER 1998

SANJOSE/CAD: N:\PINACL\6002CHEM.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 6/29/98 Time: 11:53 AM Operator: KJOHNSON

1" 1/2" 0" 1"



Base map modified from GSI, 1994.

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DATE MAY 1998
DWN KAJ
APP
REV
PROJECT NO.
805-131.012

FIGURE 3
ARCO PRODUCTS COMPANY
FORMER STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOURS
1ST QUARTER 1998

SAN/JOSE/CAD: N:\PINACL\6002GWC.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 6/29/98 Time: 11:49 AM Operator: KJOHNSON
1" 1/2" 0" 1"

Table 1
Groundwater Monitoring Data
Second Quarter 1998

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 08-05-98

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	02-25-98	248.35	7.69	240.66	ND	WSW	0.052	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	02-25-98	242.91	8.34	234.57	ND	WSW	0.052	02-25-98	<50	<0.5	0.9	<0.5	0.9	4	--
MW-5	02-25-98	244.82	11.33	233.49	ND	WSW	0.052	02-25-98	[illegible]	[illegible]	13	190	100	170	--
MW-6	02-25-98	252.20	10.35	241.85	ND	WSW	0.052	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-7	02-25-98	235.95	8.04	NA	ND	WSW	0.052	02-25-98	<50	<0.5	0.6	<0.5	0.7	<3	--
MW-8	02-25-98	240.37	7.08	233.29	ND	WSW	0.052	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--
VW-1	02-25-98	NR	6.77	NR	ND	WSW	0.052	02-25-98	230	<4^	<0.7^	1.2	0.5	27	--
VW-4	02-25-98	NR	7.08	NR	ND	WSW	0.052	02-25-98	<50	2.5	<0.5	<0.5	0.7	<3	--

2-21-98

Every MW [illegible] looked ok except MW-5 ? Above

Even MW-5 was ok. except TPH [illegible].

VW-4 so much [illegible]

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

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient ft/ft	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 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	--
MW-3	05-27-97	248.35	8.25	240.10	ND	WSW	0.069	05-27-97	Not sampled: well sampled annually, during the first quarter						
MW-3	08-05-97	248.35	8.29	240.06	ND	W	0.076	08-05-97	Not sampled: well sampled annually, during the first quarter						
MW-3	02-25-98	248.35	7.69	240.66	ND	WSW	0.052	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient ft/ft	Water Sample Field Date	LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 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-4	05-27-97	242.91	11.51	231.40	ND	WSW	0.069	05-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	08-05-97	242.91	11.90	231.01	ND	W	0.076	08-05-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	02-25-98	242.91	8.34	234.57	ND	WSW	0.052	02-25-98	<50	<0.5	0.9	<0.5	0.9	4	--
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	--
MW-5	05-27-97	244.82	13.10	231.72	ND	WSW	0.069	05-27-97	21000	86	<20^	810	610	1700	--
MW-5	08-05-97	244.82	13.14	231.68	ND	W	0.076	08-05-97	340	2.2	<0.5	15	8.8	39	--
MW-5	02-25-98	244.82	11.33	233.49	ND	WSW	0.052	02-25-98	8500	19	13	190	100	150	--

N:XLS\0805\13113\080398R1.XLS
Table 2

Pinnacle

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

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-6	05-27-97	252.20	7.08	245.12	ND	WSW	0.069	05-27-97	Not sampled: well sampled annually, during the first quarter						
MW-6	08-05-97	252.20	7.12	245.08	ND	W	0.076	08-05-97	Not sampled: well sampled annually, during the first quarter						
MW-6	**02-25-98**	**252.20**	**10.35**	**241.85**	**ND**	**WSW**	**0.052**	**02-25-98**	**<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-7	05-27-97	235.95	9.02	226.93	ND	WSW	0.069	05-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-7	08-05-97	235.95	12.33	223.62	ND	W	0.076	08-05-97	110	0.5	<0.5	<0.5	0.8	81	--
MW-7	**02-25-98**	**235.95**	**8.04**	**NA**	**ND**	**WSW**	**0.052**	**02-25-98**	**<50**	**<0.5**	**0.6**	**<0.5**	**0.7**	**<3**	**--**
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	--
MW-8	05-27-97	240.37	11.06	229.31	ND	WSW	0.069	05-27-97	91	0.6	<0.5	<0.5	0.6	66	--
MW-8	08-05-97	240.37	9.32	231.05	ND	W	0.076	08-05-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-8	**02-25-98**	**240.37**	**7.08**	**233.29**	**ND**	**WSW**	**0.052**	**02-25-98**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<3**	**--**

Pinnacle

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

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
AS-1	06-29-95	NR	9.20	NR	ND	NR	NR	06-30-95	<50	1.6	<0.5	0.9	0.9	--	--
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-1	05-27-97	NR	7.51	NR	ND	WSW	0.069	05-27-97	Not sampled: well sampled semi-annually, during the first and third quarters						
VW-1	08-05-97	NR	7.51	NR	ND	W	0.076	08-05-97	630	<1^	<1^	3	2	120	--
VW-1	02-25-98	NR	6.77	NR	ND	WSW	0.052	02-25-98	[redacted]	[redacted]	<0.7^	1.2	0.5	[redacted]	--
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	[redacted]	--
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	[redacted]	--
VW-4	03-21-97	NR	9.11	NR	ND	WSW	0.051	03-21-97	10000	290	10	270	230	8900	--
VW-4	05-27-97	NR	9.34	NR	ND	WSW	0.069	05-27-97	Not sampled: well sampled semi-annually, during the first and third quarters						
VW-4	08-05-97	NR	9.47	NR	ND	W	0.076	08-05-97	<10000^	180	<100^	<100^	110	12000	--
VW-4	02-25-98	NR	7.08	NR	ND	WSW	0.052	02-25-98	[redacted]	[redacted]	<0.5	<0.5	0.7	[redacted]	--

Pinnacle

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

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
- -: 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

APPENDIX A

CERTIFIED ANALYTICAL REPORTS, CHAIN OF CUSTODY DOCUMENTATION, AND FIELD DATA SHEETS

Columbia Analytical Services inc.

March 11, 1998 Service Request No.: S9800408

Mr. Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-131.012/TO#22312.00/6002 OAKLAND

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on February 26, 1998. 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 16, 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
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)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	2/25/98
Sample Matrix:	Water	**Date Received:**	2/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3(10)	Units:	ug/L (ppb)
Lab Code:	S9800408-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/27/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/27/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	2/25/98
Sample Matrix:	Water	**Date Received:**	2/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-6(30)	Units:	ug/L (ppb)
Lab Code:	S9800408-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/27/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/27/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	2/25/98
Sample Matrix:	Water	**Date Received:**	2/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-4(10)	Units:	ug/L (ppb)
Lab Code:	S9800408-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/2/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/2/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/2/98	0.9	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/2/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/2/98	0.9	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/2/98	4	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	2/25/98
Sample Matrix:	Water	**Date Received:**	2/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	VW-1(10)	Units:	ug/L (ppb)
Lab Code:	S9800408-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/28/98	230	
Benzene	EPA 5030	8020	0.5	1	NA	2/28/98	<4	M1
Toluene	EPA 5030	8020	0.5	1	NA	2/28/98	<0.7	M1
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/28/98	1.2	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/28/98	0.5	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/28/98	27	

M1 The MRL was elevated because of matrix interferences.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	2/25/98
Sample Matrix:	Water	**Date Received:**	2/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-5(15)	Units:	ug/L (ppb)
Lab Code:	S9800408-005	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	10	NA	3/2/98	8,500	
Benzene	EPA 5030	8020	0.5	10	NA	3/2/98	19	
Toluene	EPA 5030	8020	0.5	10	NA	3/2/98	13	
Ethylbenzene	EPA 5030	8020	0.5	10	NA	3/2/98	190	
Xylenes, Total	EPA 5030	8020	0.5	10	NA	3/2/98	100	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	10	NA	3/2/98	170	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	2/25/98
Sample Matrix:	Water	**Date Received:**	2/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	VW-4(10)	Units:	ug/L (ppb)
Lab Code:	S9800408-006	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/10/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/10/98	2.5	
Toluene	EPA 5030	8020	0.5	1	NA	3/10/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/10/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/10/98	0.7	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/10/98	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980227-WB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/27/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/27/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/27/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980302-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/2/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/2/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/2/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/2/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/2/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/2/98	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800408
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980228-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/28/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/28/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/28/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/28/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/28/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/28/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	**S9800408**
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	**NA**
Sample Matrix:	Water	**Date Received:**	**NA**

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980310-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/10/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/10/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/10/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/10/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/10/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/10/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-131.012/TO#22312.00/6002 OAKLAND
Sample Matrix: Water

Service Request: S9800408
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method: EPA 5030
Analysis Method: 8020 CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			4-Bromofluorobenzene	a,a,a-Trifluorotoluene
MW-3(10)	S9800408-001		96	97
MW-6(30)	S9800408-002		98	99
MW-4(10)	S9800408-003		97	77
VW-1(10)	S9800408-004		100	87
MW-5(15)	S9800408-005		103	85
VW-4(10)	S9800408-006		100	79
MW-3(10)	S9800408-001MS		98	88
MW-3(10)	S9800408-001DMS		98	84
Method Blank	S980227-WB2		99	92
Method Blank	S980228-WB1		100	76
Method Blank	S980302-WB1		100	78
Method Blank	S980310-WB1		100	76
CAS Acceptance Limits:			69-116	69-116

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-131.012/TO#22312.00/6002 OAKLAND
Sample Matrix Water

Service Request: S9800408
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 3/1/98

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline

Sample Name: MW-3(10)
Lab Code: S9800408-001MS, S9800408-001DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	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	Result Notes
Gasoline	EPA 5030	CA/LUFT	50	250	250	ND	260	260	104	104	75-135	<1	

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-131.012/TO#22312.00/6002 OAKLAND

Service Request: S9800408
Date Analyzed: 2/27/98

Initial Calibration Verification (ICV) Summary
BTEX, MTBE and TPH as Gasoline

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: ug/L (ppb)
Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery Acceptance Limits	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	*CA/LUFT*	250	230	90-110	92	
Benzene	EPA 5030	8020	25	27	85-115	108	
Toluene	EPA 5030	8020	25	27	85-115	108	
Ethylbenzene	EPA 5030	8020	25	27	85-115	108	
Xylenes, Total	EPA 5030	8020	75	79	85-115	105	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	28	85-115	112	

ICV/032196

Columbia Analytical Services, Inc.

March 11, 1998 Service Request No.: S9800406

Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-131.012/TO#22312.00/6002 OAKLAND

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on February 26, 1998. 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 10, 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
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)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800406
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	2/25/98
Sample Matrix:	Water	**Date Received:**	2/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-7(13)	Units:	ug/L (ppb)
Lab Code:	S9800406-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/7/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/7/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/7/98	0.6	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/7/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/7/98	0.7	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/7/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800406
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	2/25/98
Sample Matrix:	Water	**Date Received:**	2/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-8(10)	Units:	ug/L (ppb)
Lab Code:	S9800406-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/26/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/26/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/26/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/26/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/26/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/26/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800406
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	**Units:**	ug/L (ppb)
Lab Code:	S980226-WB2	**Basis:**	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	2/26/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	2/26/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	2/26/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	2/26/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	2/26/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	2/26/98	ND	

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800406
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	**Units:**	ug/L (ppb)
Lab Code:	S980306-WB1	**Basis:**	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/6/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/6/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/6/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/6/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/6/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/6/98	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9800406
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method:	EPA 5030	**Units:**	PERCENT
Analysis Method:	8020 CA/LUFT	**Basis:**	NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			4-Bromofluorobenzene	a,a,a-Trifluorotoluene
MW-7(13)	S9800406-001		100	78
MW-8(10)	S9800406-002		93	105
BATCH QC	S9800489-005MS		96	88
BATCH QC	S9800489-005DMS		99	90
Method Blank	S980226-WB2		97	98
Method Blank	S980306-WB1		100	83
CAS Acceptance Limits:			69-116	69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-131.012/TO#22312.00/6002 OAKLAND
Sample Matrix Water

Service Request: S9800406
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 3/6/98

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline

Sample Name: BATCH QC
Lab Code: S9800489-005MS, S9800489-005DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	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	Result Notes
Gasoline	EPA 5030	CA/LUFT	50	250	250	ND	240	270	96	108	75-135	12	

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	**89800406**
Project:	20805-131.012/TO#22312.00/6002 OAKLAND	**Date Analyzed:**	**2/26/98**

Initial Calibration Verification (ICV) Summary
BTEX, MTBE and TPH as Gasoline

Sample Name:	ICV	**Units:**	**ug/L (ppb)**
Lab Code:	ICV1	**Basis:**	**NA**
Test Notes:			

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery Acceptance Limits	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	250	230	90-110	92	
Benzene	EPA 5030	8020	25	25	85-115	100	
Toluene	EPA 5030	8020	25	25	85-115	100	
Ethylbenzene	EPA 5030	8020	25	24	85-115	96	
Xylenes, Total	EPA 5030	8020	75	70	85-115	93	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	26	85-115	104	

ICV032196

...ducts Company

...sion of Atlantic/Richfield Company

Task Order No. 22312.00

Chain of Custody

...acility no. 6002	City (Facility) Oakland	Project manager (Consultant) Gary Messerotes	Laboratory Name CAS
...RCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 453-0452
Consultant name EMCON		Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131	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/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐	Lead EPA 7420/7421 ☐
MW-7(3)	1	2		X		X	HCl	2-25-98	1255		X										
MW-6(2)	2	2		X		X	HCl	↓	1225		X										

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40ml HCl VOAs RAT 8 separate CAR #20805-131.QR

Lab Number: 9802406

Turnaround Time:

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

Condition of sample:

Temperature received:

	Date	Time		Date	Time
Relinquished by sampler	2-26-98	1515	Received by		
Relinquished by			Received by	CAS	2/26/98 1515
Relinquished by			Received by laboratory		

Distribution: White Copy – Laboratory: Canary Copy – ARCO Environmental Engineering: Pink Copy – Consultant

R-11 / D3

EMCON - Groundwater Sampling and Analysis Request Form

PROJECT NAME : **ARCO 6002**
6235 Seminary Avenue, Oakland

Sampling Project #: **21775-241.003**
Reporting Project #: **20805-131.012**

DATE REQUESTED : **25-Feb-98**

Project Manager: **Gary Messerotes**

Groundwater Monitoring Instructions	Treatment System Instructions
Quarterly Monitoring- Second Month of the Quarter Perform a water level survey prior to sampling (see ARCO SOP). The survey points are the tops of the well casings. Purge three (3) casing volumes. Sample all wells regardless of product, per John Young's request. **Please use the reporting project number (#20805-131.012) on the chain-of-custody form, sample containers and analytical results. You will need a D.O. kit and the Redox meter.** Sample ID's on the sample bottles must include the depth at which the sample was collected [i.e. MW-1 (30)]. **Ring bell at Apt. #3 prior to accessing well MW-7.**	No treatment system is at this site. **Lisle Rath Pager # (888) 606-0933**

Site Contact: _____ Site Phone: _____ Well Locks: **ARCO Key**

Well ID or Source	Casing Diameter (inches)	Casing Length (feet)	Top Of Screen (feet)
MW-3	4.0	24.4	5.0 G
MW-6	2.0	30.0	17.0 Purge
MW-8	2.0	13.9	5.5 G
MW-4	4.0	24.0	4.5 G
MW-7	2.0	13.3	8.5 Purge
VW-1	4.0	13.5	6.0 G
MW-5	4.0	24.4	5.0 G
VW-4	4.0	15.0	6.0

Above wells in indicated order

Analyses Requested

<Separate COC & CAR

<Separate COC & (

Depth To Water
Total Depth
Dissolved Oxygen
TPH-Gasoline
BTEX
MTBE by EPA 8020
(2-40ml HCL VOAs)

If depth to water is below the top of the screen take a grab sample. If the water level is above the top of the screen purge as normal.

Laboratory Instructions:
Provide lowest detection limits possible.
Please use the EMCON reporting project number **(#20805-131.012)** on the CAR.

ND = None Detected IP = Intermitent Product

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 21775-241.003 STATION ADDRESS : 6235 Seminary Avenue, Oakland DATE : 2/25/98

ARCO STATION # : 6002 FIELD TECHNICIAN : Mike Ross DAY : Wednesday

DTW Order	WELL ID	Well Box Seal	Type Of Well Lid	Gasket Present	Lock Number	Type Of 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 (Roots in well from nearby trees)
1	MW-3	OK	15/16	~~NO~~ YES	ARCO	LW	7.69	7.69	NR	NR	24.6	one of the bolts is broken
2	MW-6	OK	6"	NO	DOLPHIN	LW	10.35	10.35	NR	NR	32.0	UNDER PRESSURE
3	MW-8	OK	(cannot find)	NO	DOLPHIN	LW	7.08	7.08	NR	NR	14.0	
4	MW-4	OK	15/16	YES	ARCO	LW	8.34	8.34	NR	NR	24.2	
5	MW-7	OK	(cannot find)	NO	3616	LW	8.04	8.04	NR	NR	13.4	
6	VW-1	OK	OK	~~NO~~ YES	3616	LW	6.77	6.77	NR	NR	14.0	Water in Box
7	MW-5	OK	OK	~~NO~~ YES	ARCO	LW	11.33	11.33	NR	NR	24.6	one Bolt Broken
8	VW-4	OK	15/16	YES	3616	LW	7.08	7.08	NR	NR	15.0	

SURVEY POINTS ARE TOP OF WELL CASINGS

WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-2#1.003 | SAMPLE ID MW-3(10)
PURGED BY NR | CLIENT NAME ARCO 6002
SAMPLED BY M. Ross | LOCATION OAKLAND, CA

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____
CASING DIAMETER (inches): 2 ____ 3 ____ 4 ✓ 4.5 ____ 6 ____ Other ____

CASING ELEVATION (feet/MSL): NR
DEPTH OF WELL (feet): 24.6
DEPTH OF WATER (feet): 7.69
VOLUME IN CASING (gal.): NR
CALCULATED PURGE (gal.): NR
ACTUAL PURGE VOL. (gal.): NR

DATE PURGED: 2-25-98 | END PURGE: NR
DATE SAMPLED: 2-25-98 | SAMPLING TIME: 1110

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1110	GRAB sample	6.76	339	66.7	clr	clr

OTHER: D.O. 1-2 mg/L, Redox 190 mV 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
____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Well Wizard™ ____ Dedicated
Other: NR

SAMPLING EQUIPMENT
____ 2" Bladder Pump ✓ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Well Wizard™ ____ Dedicated
Other: Disposable

WELL INTEGRITY: OK | LOCK: ~~Padlock~~ Arco

REMARKS: GRAB Sample Taken, water level Below Top of screen.

pH, E.C., Temp. Meter Calibration: Date: 2-25-98 Time: 1050 Meter Serial No.: 600112
E.C. 1000 1013 : 1000 pH 7 716 : 700 pH 10 995 : 1000 pH 4 394 : 400
Temperature °F 66.2
SIGNATURE: _____ REVIEWED BY: SH PAGE 1 OF 8

WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-241.003 | SAMPLE ID MW-4(10)
PURGED BY NR | CLIENT NAME ARCO 6002
SAMPLED BY M. Ross | LOCATION Oakland, Ca

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

CASING ELEVATION (feet/MSL): NR	VOLUME IN CASING (gal.): NR
DEPTH OF WELL (feet): 24.2	CALCULATED PURGE (gal.): NR
DEPTH OF WATER (feet): 8.34	ACTUAL PURGE VOL. (gal.): NR

DATE PURGED: 2-25-98 | END PURGE: NR
DATE SAMPLED: 2-25-98 | SAMPLING TIME: 1155

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1155	GRAB Sample	6.41	348	63.2	clr	clr

OTHER: D.O. 1-2 mg/L, Redox 163 mV ODOR: None | NR (COBALT 0-100) | NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Well Wizard™ ____ Dedicated
Other: NR

SAMPLING EQUIPMENT

____ 2" Bladder Pump ✓ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Well Wizard™ ____ Dedicated
Other: Disposable

WELL INTEGRITY: OK | LOCK: ARCO

REMARKS: GRAB Sample Taken, Water Level Below Top of Screen.

pH, E.C., Temp. Meter Calibration: Date: 2-25-98 | Time: 1050 | Meter Serial No.: 600112
E.C. 1000 ____ / ____ | pH 7 ____ / ____ | pH 10 ____ / ____ | pH 4 ____ / ____
Temperature °F MW-3

SIGNATURE: [signature] REVIEWED BY: SA PAGE 2 OF 8

WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 201175-241.003
PURGED BY NR
SAMPLED BY M. Ross

SAMPLE ID MW-5 (15)
CLIENT NAME ARCO 6002
LOCATION Oakland, Ca

TYPE Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

CASING ELEVATION (feet/MSL): NR
DEPTH OF WELL (feet): 24.6
DEPTH OF WATER (feet): 11.33

VOLUME IN CASING (gal.): NR
CALCULATED PURGE (gal.): NR
ACTUAL PURGE VOL. (gal.): NR

DATE PURGED: 2-25-98
DATE SAMPLED: 2-25-98

END PURGE: NR
SAMPLING TIME: 1210

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1210	GRAB Sample	6.68	446	64.0	clr	clr

OTHER D.O. 0-1 mg/L, ReDox -44 MV ODOR: None

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

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

PURGING EQUIPMENT

____ 2" Bladder Pump
____ Centrifugal Pump
____ Submersible Pump
____ Well Wizard™
____ Bailer (Teflon)
____ Bailer (PVC)
____ Bailer (Stainless Steel)
____ Dedicated
Other: NR

SAMPLING EQUIPMENT

____ 2" Bladder Pump
____ Bomb Sampler
____ Dipper
____ Well Wizard™
✓ Bailer (Teflon)
____ Bailer (Stainless Steel)
____ Submersible Pump
____ Dedicated
Other: Disposable

WELL INTEGRITY: OK
LOCK: ARCO

REMARKS: GRAB Sample Taken, Water Level Below Top of Screens.

pH, E.C., Temp. Meter Calibration: Date 2-25-98 Time: 1050 Meter Serial No.: 60112

E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____

Temperature °F ____ See MW-3

SIGNATURE: [signature] REVIEWED BY: [signature] PAGE 3 OF 8

WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-241.003 SAMPLE ID MW-6 (30)
PURGED BY M. Ross CLIENT NAME ARCO 6002
SAMPLED BY M. Ross LOCATION Oakland, Ca

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

0.49

CASING ELEVATION (feet/MSL): NR
DEPTH OF WELL (feet): 32.0
DEPTH OF WATER (feet): 6.43

VOLUME IN CASING (gal.): 4.17
CALCULATED PURGE (gal.): 12.5
ACTUAL PURGE VOL. (gal.): 13.0

DATE PURGED 2-25-98 END PURGE: 1321
DATE SAMPLED 2-25-98 SAMPLING TIME: 1335

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1307	4.5	6.87	472	64.6	Light Brn	TRACE
1313	9.0	7.23	446	64.5	"	"
1321	13.0	7.15	454	63.9	Brn	Heavy

OTHER: D.O. 1.2 mg/L, ORP 161 mV ODOR: NONE

NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ✓ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Well Wizard™ ____ Dedicated
Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ✓ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Well Wizard™ ____ Dedicated
Other: Disposable

WELL INTEGRITY: OK LOCK: Keyed

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: 2-25-98 Time: 1050 Meter Serial No.: 600412

E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____

Temperature °F See MW-3

SIGNATURE: Mike Ross REVIEWED BY: MA PAGE 4 OF 8

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO 21775-241.003 | SAMPLE ID M-7(13)
PURGED BY M. Ross | CLIENT NAME ARCO 6002
SAMPLED BY M. Ross | LOCATION Oakland, Ca

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

0.49

CASING ELEVATION (feet/MSL) :	NR	VOLUME IN CASING (gal.) :	0.87
DEPTH OF WELL (feet) :	13.4	CALCULATED PURGE (gal.) :	2.62
DEPTH OF WATER (feet) :	8.04	ACTUAL PURGE VOL. (gal.) :	1.0

DATE PURGED : 2-25-98 | END PURGE : 1240
DATE SAMPLED : 2-25-98 | SAMPLING TIME : 1255

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1240	1.0	6.71	456	63.0	BRN	MOD
	Well DRIED @		1.0 Gallon			
1255	Recharge	6.65	437	64.4	Light Brn	TRACE

OTHER: D.O. 1.2 mg/L, Redox 148 mV ODOR: None

NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ✓ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Well Wizard™ ____ Dedicated
Other: ____

SAMPLING EQUIPMENT

____ 2" Bladder Pump ✓ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Well Wizard™ ____ Dedicated
Other: D.I. Sprayed

WELL INTEGRITY: OK LOCK: Dolphin

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date 2-25-98 Time: 1050 Meter Serial No.: 60012

E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____

Temperature °F See MW-3

SIGNATURE: [signature] REVIEWED BY: [signature] PAGE 5 OF 8

WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-241.003 | SAMPLE ID MW-8 (10)
PURGED BY NR | CLIENT NAME ARCO 6002
SAMPLED BY M. Ross | LOCATION Oakland, Ca

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

CASING ELEVATION (feet/MSL): NR
DEPTH OF WELL (feet): 14.0
DEPTH OF WATER (feet): 7.08

VOLUME IN CASING (gal.): NR
CALCULATED PURGE (gal.): NR
ACTUAL PURGE VOL. (gal.): NR

DATE PURGED: NR | END PURGE: NR
DATE SAMPLED: 2-25-98 | SAMPLING TIME: 1225

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1225	GRAB Sample	6.62	298	61.9	clr	clr

OTHER: D.O. 2-3 mg/L, Redox 81 mV ODOR: None | COLOR: NR (COBALT 0-100) | TURBIDITY: NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Well Wizard™ ____ Dedicated
Other: NR

SAMPLING EQUIPMENT

____ 2" Bladder Pump ✓ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Well Wizard™ ____ Dedicated
Other: Disposable

WELL INTEGRITY: OK | LOCK: Dogplug

REMARKS: Grab Sample Taken, Water Level Below Top of Screens

pH, E.C., Temp. Meter Calibration: Date: 2-25-98 Time: 1050 Meter Serial No: 600612

E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____

Temperature °F See MW-3

SIGNATURE: [signature] REVIEWED BY: [signature] PAGE 6 OF 8

WATER SAMPLE FIELD DATA SHEET

Rev. 1/97

OWT

PROJECT NO 21775-241.003 | SAMPLE ID VW-1(10)
PURGED BY NR | CLIENT NAME ARCO 6002
SAMPLED BY M. Ross | LOCATION Oakland, Ca

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

CASING ELEVATION (feet/MSL)	NR	VOLUME IN CASING (gal.)	NR
DEPTH OF WELL (feet)	14.0	CALCULATED PURGE (gal.)	NR
DEPTH OF WATER (feet)	6.77	ACTUAL PURGE VOL. (gal.)	NR

DATE PURGED: NR | END PURGE: NR
DATE SAMPLED: 2-25-98 | SAMPLING TIME: 1125

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1125	Grab Sample	6.40	617	62.3	clr	clr

OTHER D.O. 1-2 mg/L, Redox 77 mV ODOR: None

NR (COBALT 0-100) NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Well Wizard™ ____ Dedicated
Other: NR

SAMPLING EQUIPMENT

____ 2" Bladder Pump ✓ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Well Wizard™ ____ Dedicated
Other: Disposable

WELL INTEGRITY: OK | LOCK: 3616

REMARKS: Grab Sample Taken, water level Below Top of Screen's.

pH, E.C., Temp. Meter Calibration: Date: 2-25-98 Time: 1050 Meter Serial No.: 600112

E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____

Temperature °F ____ See MW-3

SIGNATURE: Mike Ross REVIEWED BY: SH PAGE 7 OF 8

WATER SAMPLE FIELD DATA SHEET

Rev 1/97

OWT

PROJECT NO 21775-246.003 | SAMPLE ID VW-4(10)
PURGED BY NR | CLIENT NAME ARCO 6002
SAMPLED BY M. Ross | LOCATION Oakland, Ca

TYPE: Groundwater ✓ Surface Water ____ Leachate ____ Other ____

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

CASING ELEVATION (feet/MSL)	NR	VOLUME IN CASING (gal.)	NR
DEPTH OF WELL (feet)	15.0	CALCULATED PURGE (gal.)	NR
DEPTH OF WATER (feet)	7.08	ACTUAL PURGE VOL. (gal.)	NR

DATE PURGED: NR | END PURGE: NR
DATE SAMPLED: 2-25-98 | SAMPLING TIME: 1135

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1135	GRAB Sample	6.87	558	61.4	clr	clr

OTHER: D.O. 1-2 mg/L, ReDox 532 mV ODOR: NONE | NR (COBALT 0-100) | NR (NTU 0-200)

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

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Well Wizard™ ____ Dedicated
Other: NR

SAMPLING EQUIPMENT

____ 2" Bladder Pump ✓ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Well Wizard™ ____ Dedicated
Other: Disposable

WELL INTEGRITY: OK | LOCK: 3616

REMARKS: GRAB Sample Taken, Water Level Below Top of Screens.

pH, E.C., Temp. Meter Calibration: Date 2-25-98 | Time: 1050 | Meter Serial No.: 600112
E.C. 1000 ____ / ____ | pH 7 ____ / ____ | pH 10 ____ / ____ | pH 4 ____ / ____
Temperature °F ____ See MW-3

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EMCON Associates - Field Services

1921 Ringwood Avenue

San Jose, California

1998

Historical Monitoring Well Data

ARCO 6002

21775-241.003

Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product	
						Gallons
						First 14.00
						Second 0.00
						Third 0.00
						Fourth 12.50
MW-3	First	02/25/98	GRAB	NA	NO	
	Second					
	Third	08/05/97	NA	NA	NA	
	Fourth	10/29/97	GRAB	NO	NO	
MW-4	First	02/25/98	GRAB	NA	NO	
	Second					
	Third	08/05/97	GRAB	NO	NO	
	Fourth	10/29/97	GRAB	NO	NO	
MW-5	First	02/25/98	GRAB	NA	NO	
	Second					
	Third	08/05/97	GRAB	NO	NO	
	Fourth	10/29/97	GRAB	NO	NO	
MW-6	First	02/25/98	13.00	NO	NA	
	Second					
	Third	08/05/97	NA	NA	NA	
	Fourth	10/29/97	12.50	NO	NO	
MW-7	First	02/25/98	1.00	YES	NO	
	Second					
	Third	08/05/97	GRAB	NO	NO	
	Fourth	10/29/97	DRY	NA	NO	
MW-8	First	02/25/98	GRAB	NA	NO	
	Second					
	Third	08/05/97	GRAB	NO	NO	
	Fourth	10/29/97	GRAB	NO	NO	
VW-1	First	02/25/98	GRAB	NA	NO	
	Second					
	Third	08/05/97	GRAB	NO	NO	
	Fourth	10/29/97	GRAB	NO	NO	
VW-4	First	02/25/98	GRAB	NA	NO	
	Second					
	Third	08/05/97	GRAB	NO	NO	
	Fourth	10/29/97	GRAB	NO	NO	
						Steam water (gal) _____

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No. [illegible]

Chain of Custody

ARCO Facility no. 6007	City (Facility) Oakland	[illegible]	
ARCO engineer Paul Supple	Telephone no. (ARCO) [illegible]	[illegible]	
Consultant name EMCON	[illegible]		

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid
MW-3(?)	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	HCl
MW-4(?)	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	HCl
MW-[illegible]	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	HCl
MW-10(?)	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	HCl
MW-5(?)	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	HCl
MW-[illegible]	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	HCl

Condition of sample: [illegible]

Relinquished by [illegible]

Relinquished by [illegible]

Relinquished by [illegible]

Distribution: White Copy – Laboratory; Canary Copy – ARCO Environmental [illegible]

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order

ARCO Facility no. 6001 City (Facility) Oakland

ARCO engineer Paul Supple Telephone no. ARCO

Consultant name EHCA Address

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Water			Preservative:			
MW-7	13	2								
MW-8	14	2								

Condition of sample

Relinquished by sampler

Relinquished by

Relinquished by

Distribution: White Copy – Laboratory; Canary Copy – ARCO Environmental Engineering; Pink