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

Date December 31, 1997
Project 20805-120.008

To:

Mr. Barney Chan
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	Third quarter 1997 groundwater monitoring results and remediation system performance evaluations report, retail service station 0276, 10600 MacArthur Boulevard, Oakland, CA

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

Comments:

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

Gary P. Messerotes
Project Manager

cc: Richard Gilcrease, Drake Builders
Kyle Christie, ARCO Products Company
Beth Dorris, ARCO Legal Department
File

ARCO Products Company

Date: December 31, 1997

Re: ARCO Station #

0276 • 10600 MacArthur Boulevard • Oakland, CA
Third Quarter 1997 Groundwater Monitoring Results and
Remediation System Performance Evaluation Report

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

Submitted by:

Kyle Christie
Environmental Engineer

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

December 19, 1997
Project 20805-120.008

Kyle Christie
ARCO Products Company
P.O. Box 5077
Buena Park, California 90622-5077

Re: Third quarter 1997 groundwater monitoring results and remediation system performance evaluation report, SVE system at retail service station # 0276, 10600 MacArthur Boulevard, Oakland, California

Dear Mr. Christie:

This letter presents the results of the third quarter 1997 groundwater monitoring program for the retail service station # 0276 at 10600 MacArthur Boulevard, Oakland, California (Figure 1). Operation and performance data for the site's soil-vapor extraction (SVE) system are also presented. The quarterly monitoring program complies with 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,

EMCON

Valli Voruganti, P.E.
Project Engineer

Gary P. Messerotes, R.G. 5650
Project Manager

REGISTERED GEOLOGIST
GARY P. MESSEROTES
5650
STATE OF CALIFORNIA

December 19, 1997

ARCO QUARTERLY REPORT

Station No.: 276	Address: 10600 MacArthur Boulevard Oakland, California
EMCON Project No.:	20805-120.008 FAX (714) 670-5120
ARCO Environmental Engineer/Phone No.:	Kyle Christie /(714) 670-5303
EMCON Project Manager/Phone No.:	Gary P. Messerotes /(408) 453-7300 FAX (408) 437-9526
Primary Agency/Regulatory ID No.:	ACHCSA /Barney Chan
Reporting Period:	July 1, 1997 to October 1, 1997

WORK PERFORMED THIS QUARTER (Third- 1997):

1. Prepared and submitted quarterly report for second quarter 1997.
2. Performed quarterly groundwater monitoring and sampling for third quarter 1997.
3. Attempting to stimulate natural biodegradation with oxygen releasing compounds (ORCs) in groundwater monitoring wells MW-2 and MW-7.

WORK PROPOSED FOR NEXT QUARTER (Fourth- 1997):

1. Prepare and submit quarterly report for third quarter 1997.
2. Perform quarterly groundwater monitoring and sampling for fourth quarter 1997.
3. Continue monitoring dissolved oxygen in groundwater monitoring wells MW-2 and MW-7.
4. Request that this site be reviewed for closure.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring Stimulate natural biodegradation with ORCs. SVE system was shut down on 3-26-96, due to high groundwater levels and low hydrocarbon concentrations in extracted soil vapors.
Frequency of Sampling:	Quarterly (groundwater), Monthly (SVE)
Frequency of Monitoring:	Quarterly (groundwater), Monthly (SVE)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Cumulative FP Recovered to Date :	18.54 gallons, Wells MW-2 and MW-7
FP Recovered This Quarter :	None
Bulk Soil Removed to Date :	564 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:	SVE System and Enhanced Bioremediation
Average Depth to Groundwater:	28.03 feet
Groundwater Gradient (Average):	**0.003 ft/ft toward southwest**

SVE QUARTERLY OPERATION AND PERFORMANCE:

Equipment Inventory:	Anguil Energy Systems Remedi-Cat, 500 cfm, Catalytic Oxidizer For the period from September 6, 1990 through December 22, 1994, please refer to *Fourth Quarter 1994 Groundwater Monitoring Results and Remediation System Performance Evaluation Report,* (EMCON, March 1995), for system operation before December 1994. SVE system was shut down on 3-26-96, due to high groundwater levels and low hydrocarbon concentrations in extracted soil vapors.
Operating Mode:	Catalytic Oxidation
BAAQMD Permit #, A/N:	5998
TPH Conc. End of Period (lab):	NA (Not Available)
Benzene Conc. End of Period (lab):	NA
Flowrate End of Period:	NA
HC Destroyed This Period:	0.0 pounds
HC Destroyed to Date:	7,801.1 pounds
Utility Usage	
Electric (KWH):	0 KWH
Gas (Therms):	24 Therms
Operating Hours This Period:	0.0 hours
Percent Operational:	0.0%
Operating Hours to Date:	4282.8 hours
Unit Maintenance:	Routine monthly maintenance
Number of Auto Shut Downs:	0
Destruction Efficiency Permit Requirement:	90%
Percent TPH Conversion:	NA
Stack Temperature:	NA
Source Flow:	0.0 scfm
Process Flow:	0.0 scfm
Source Vacuum:	0.0 inches of water

ATTACHED:

- Table 1 - Groundwater Monitoring Data, Third Quarter 1997
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 3 - Historical Groundwater Analytical Data, Volatile Organic Compounds
- Table 4 - Approximate Cumulative Floating Product Recovered
- Table 5 - Soil-Vapor Extraction System Operation and Performance Data
- Table 6 - Soil-Vapor Extraction Well Data
- Figure 1 - Site Location
- Figure 2 - Groundwater Data Third Quarter 1997
- Figure 3 - Soil-Vapor Extraction and Treatment System, Historical Well Field Influent TVHG and Benzene Concentrations
- Figure 4 - Soil-Vapor Extraction and Treatment System, Historical Hydrocarbon Removal Rates
- Appendix A - Analytical Results and Chain-of-Custody Documentation, Third Quarter 1997 Groundwater Monitoring Event

- Appendix B - SVE System Monitoring Data Log Sheets

cc: Barney Chan, ACHCSA
Richard Gilcrease, Drake Builders
Beth Dorris, ARCO Legal Department

Table 1
Groundwater Monitoring Data
Third Quarter 1997

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

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	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	08-18-97	55 92	29.98	25.94	ND	SW	0.003	08-18-97	<50	<0.5	<0.5	<0.5	<0 5	<3	--	--	--
MW-2	08-18-97	55.10	17.28	37.82	ND	SW	0.003	08-18-97	1400	13	<10^	20	75	1400	--	--	--
MW-3	08-18-97	56.55	30.62	25.93	ND	SW	0.003	08-18-97	160"	<0 5	<0.5	<0.5	<0.5	<3	--	--	--
MW-4	08-18-97	55.98	30 10	25.88	ND	SW	0.003	08-18-97	440"	<0 5	<0.5	<0.5	<0.5	<3	--	--	--
MW-5	08-18-97	55 43	NR	NR	ND	SW	0 003	08-18-97	--	--	--	--	--	--	--	--	--
MW-6	08-18-97	61 21	35.47	25 74	ND	SW	0.003	08-18-97	170"	<0 5	<0.5	<0 5	<0 5	4	--	--	--
MW-7	08-18-97	58 22	22.21	36 01	ND	SW	0 003	08-18-97	9500	220	25	610	690	310	--	--	--
MW-8	08-18-97	53 65	28.03	25.62	ND	SW	0 003	08-18-97	<50	<0.5	<0 5	<0 5	<0 5	41	--	--	--
RW-1	08-18-97	56.32	30.46	25 86	ND	SW	0.003	08-18-97	<50	<0.5	<0 5	<0.5	<0 5	<3	--	--	--
WGR-3	08-18-97	NR	21.81	NR	ND	SW	0.003	08-18-97	<100^	<1^	<1^	<1^	<1^	120	--	--	--

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, California DHS LUFT Method
µg/L micrograms per liter
EPA United States Environmental Protection Agency
MTBE. Methyl tert-butyl ether
TRPH· total recoverable petroleum hydrocarbons
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
NR not reported, data not available or not measurable
ND: none detected
FG flat gradient; the groundwater gradient over the local area was nearly flat
-- not analyzed or not applicable
* raised method reporting limit due to matrix interference, the sample contains a single non-fuel component eluting in the gasoline range and quantitated as gasoline (possibly PCE), and the chromatogram does not match the typical gasoline fingerprint
^: raised method reporting limit due to (1) matrix interference requiring sample dilution or (2) high analyte concentration
": sample contains a single non-fuel component eluting in the gasoline range, and quntitated as gasoline, chromatogram does not match the typical gasoline range

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20805-120.008

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

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

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	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	03-10-95	55.92	26.26	29.66	ND	NNE	0.003	03-10-95	<57*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	06-05-95	55.92	25.71	30.21	ND	FG	FG	06-05-95	<84*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	08-29-95	55.92	28.44	27.48	ND	FG	FG	08-29-95	<60*	<0.5	<0.5	<0.5	<0.5	--	<1	--	--
MW-1	11-16-95	55.92	30.85	25.07	ND	SW	0.003	11-16-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	02-28-96	55.92	24.99	30.93	ND	NNE	0.004	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	05-28-96	55.92	24.92	31.00	ND	FG	FG	05-28-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	08-19-96	55.92	28.04	27.88	ND	FG	FG	08-19-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	11-21-96	55.92	30.19	25.73	ND	FG	FG	11-21-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	03-26-97	55.92	24.90	31.02	ND	FG	FG	03-26-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	05-20-97	55.92	26.99	28.93	ND	FG	FG	05-20-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	08-18-97	55.92	29.98	25.94	ND	SW	0.003	08-18-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-2	03-10-95	55.10	13.98	41.12	ND	NNE	0.003	03-11-95	2800	88	12	16	200	--	--	--	--
MW-2	06-05-95	55.10	15.65	39.45	ND	FG	FG	06-05-95	1800	59	10	53	130	--	--	--	--
MW-2	08-29-95	55.10	17.14	37.96	ND	FG	FG	08-29-95	4500	170	20	150	330	--	71	--	--
MW-2	11-16-95	55.10	Not surveyed: well was inaccessible					11-16-95	Not surveyed: well was inaccessible								
MW-2	02-28-96	55.10	12.46	42.64	ND	NNE	0.004	02-28-96	330	18	0.9	13	13	--	--	--	--
MW-2	05-28-96	55.10	15.23	39.87	ND	FG	FG	05-28-96	1200	48	3	28	75	87	--	--	--
MW-2	08-19-96	55.10	16.84	38.26	ND	FG	FG	08-21-96	880	45	1	15	31	80	--	--	--
MW-2	11-21-96	55.10	15.44	39.66	ND	FG	FG	11-21-96	2200	45	3.4	9	140	44	--	--	--
MW-2	03-26-97	55.10	15.73	39.37	ND	FG	FG	03-26-97	<2000^	<20^	<20^	<20^	<20^	1700	--	--	--
MW-2	05-20-97	55.10	16.07	39.03	ND	FG	FG	05-20-97	<1000^	<10^	<10^	<10^	<10^	1400	--	--	--
MW-2	08-18-97	55.10	17.28	37.82	ND	SW	0.003	08-18-97	1400	13	<10^	20	75	1400	--	--	--

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

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date. 11-25-97

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	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-3	03-10-95	56 55	26.74	29 81	ND	NNE	0.003	03-11-95	<440*	<0.5	<0.5	<0 5	0.7	- -	- -	- -	- -
MW-3	06-05-95	56 55	26.34	30 21	ND	FG	FG	06-05-95	<970*	<1^	<1^	1.1	1 8	- -	- -	- -	- -
MW-3	08-29-95	56 55	29.15	27.40	ND	FG	FG	08-29-95	<700*	<0 5	<0.5	<0.5	<0.5	- -	<20	- -	- -
MW-3	11-16-95	56 55	31.50	25 05	ND	SW	0.003	11-16-95	<500*	<0.5	<0 5	<0.5	<0 5	<3	- -	- -	- -
MW-3	02-28-96	56 55	25.32	31 23	ND	NNE	0.004	02-28-96	<500*	<0 5	<0 5	<0.5	<0 5	- -	- -	- -	- -
MW-3	05-28-96	56.55	25.46	31 09	ND	FG	FG	05-28-96	<600*	<0 5	<0 5	<0.5	<0 5	<3	- -	- -	- -
MW-3	08-19-96	56.55	28 71	27.84	ND	FG	FG	08-19-96	<400*	<0 5	<0 5	<0.5	<0 5	<3	- -	- -	- -
MW-3	11-21-96	56 55	30.85	25.70	ND	FG	FG	11-21-96	<300*	<0 5	<0 5	<0.5	<0 5	<3	- -	- -	- -
MW-3	03-26-97	56 55	25.36	31.19	ND	FG	FG	03-26-97	<500*	<0 5	<0 5	<0.5	<0.5	<3	- -	- -	- -
MW-3	05-20-97	56 55	27.61	28.94	ND	FG	FG	05-20-97	<300*	<0 5	<0 5	<0.5	<0 5	<3	- -	- -	- -
MW-3	08-18-97	56 55	30.62	25.93	ND	SW	0.003	08-18-97	160"	<0 5	<0 5	<0.5	<0 5	<3	- -	- -	- -
MW-4	03-10-95	55.98	26.22	29.76	ND	NNE	0.003	03-11-95	<780*	<1^	<1^	<1^	1	- -	- -	<500	- -
MW-4	06-05-95	55 98	25.79	30.19	ND	FG	FG	06-05-95	<1200*	<1^	<1^	<1^	<1^	- -	- -	600	- -
MW-4	08-29-95	55 98	28.56	27.42	ND	FG	FG	08-29-95	<1100*	<1^	<1^	<1^	<1^	- -	<20	- -	- -
MW-4	11-16-95	55 98	31.00	24.98	ND	SW	0.003	11-16-95	<900*	<0.5	<0 5	<0.5	<0 5	<6^	- -	<0 5	- -
MW-4	02-28-96	55 98	24.77	31.21	ND	NNE	0 004	02-28-96	<1000*	<1^	<1^	<1^	<1^	- -	- -	0 7	- -
MW-4	05-28-96	55 98	24.91	31 07	ND	FG	FG	05-28-96	<900*	<0 5	<0 5	<0.5	<0 5	<6^	- -	<0 5	- -
MW-4	08-19-96	55 98	28.17	27.81	ND	FG	FG	08-19-96	<800*	<0 5	<0.5	<0.5	<0 5	<7^	- -	0.8	- -
MW-4	11-21-96	55 98	30.30	25.68	ND	FG	FG	11-21-96	<400*	<1^	<1^	<1^	<1^	<5^	- -	<0 5	- -
MW-4	03-26-97	55 98	24 80	31 18	ND	FG	FG	03-26-97	<800*	<1^	<1^	<1^	<1^	<10^	- -	<0.5	- -
MW-4	05-20-97	55.98	27 03	28 95	ND	FG	FG	05-20-97	<500*	<1^	<1^	<1^	<1^	<6^	- -	0.6	- -
MW-4	08-18-97	55.98	30.10	25.88	ND	SW	0.003	08-18-97	440"	<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 276
10600 MacArthur Boulevard, Oakland, California

Date 11-25-97

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	TRPH EPA 418 1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-5	03-10-95	55.43	25.62	29 81	ND	NNE	0 003	03-10-95	<110*	<0.5	<0 5	<0.5	<0.5	--	--	--	--
MW-5	06-05-95	55 43	25 30	30.13	ND	FG	FG	06-05-95	<130*	<0.5	<0.5	<0 5	<0 5	--	--	--	--
MW-5	08-29-95	55 43	28 21	27.22	ND	FG	FG	08-29-95	<120*	<0.5	<0 5	<0 5	<0 5	--	<5	--	--
MW-5	11-16-95	55.43	30.63	24.80	ND	SW	0 003	11-16-95	<500*	<0 5	<0 5	<0 5	0 7	<20^	--	--	--
MW-5	02-28-96	55.43	24.07	31 36	ND	NNE	0 004	02-28-96	<400*	<0.5	<0 5	<0.5	<0.5	--	--	--	--
MW-5	*05-28-96*	*55.43*	*24 42*	*31 01*	*ND*	*FG*	*FG*	*05-28-96*	*<100**	*<0.5*	*<0 5*	*<0 5*	*<0 5*	*11*	--	--	--
MW-5	08-19-96	55 43	27.82	27.61	ND	FG	FG	08-21-96	<50	<0.5	<0 5	<0 5	<0 5	29	--	--	--
MW-5	11-21-96	55 43	29.92	25 51	ND	FG	FG	11-21-96	<600*	<1^	<1^	<1^	<1^	<20^	--	--	--
MW-5	03-26-97	55 43	24.22	31.21	ND	FG	FG	03-26-97	<200*	<0 5	<0.5	<0 5	<0.5	20	--	--	--
MW-5	05-20-97	55.43	26 60	28.83	ND	FG	FG	05-20-97	<200*	<0.5	<0 5	<0 5	<0.5	26	--	--	--
MW-5	08-18-97	55.43	NR	NR	ND	SW	0.003	08-18-97	--	--	--	--	--	--	--	--	--
MW-6	03-10-95	61 21	31 54	29.67	ND	NNE	0 003	03-11-95	<390*	<0.5	<0 5	<0 5	<0 5	--	--	--	--
MW-6	06-05-95	61.21	31.15	30.06	ND	FG	FG	06-05-95	<750*	<0.5	<0 5	<0 5	<0.5	--	--	--	--
MW-6	08-29-95	61.21	34.03	27 18	ND	FG	FG	08-29-95	<600*	<0.5	<0 5	<0 5	<0.5	--	<20	--	--
MW-6	11-16-95	61.21	36 40	24 81	ND	SW	0 003	11-16-95	<500*	<0.5	<0 5	<0 5	<0.5	<3	--	--	--
MW-6	02-28-96	61.21	30.18	31 03	ND	NNE	0.004	02-28-96	<500*	<0.5	<0 5	<0 5	<0.5	--	--	--	--
MW-6	05-28-96	61.21	30.29	30 92	ND	FG	FG	05-28-96	<400*	<0.5	<0 5	<0 5	<0.5	<3	--	--	--
MW-6	08-19-96	61 21	33.54	27.67	ND	FG	FG	08-19-96	<300*	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-6	11-21-96	61 21	35.70	25 51	ND	FG	FG	11-21-96	<300*	<0 5	<0.5	<0 5	<0 5	<3	--	--	--
MW-6	03-26-97	61 21	30.15	31.06	ND	FG	FG	03-26-97	<400*	<0 5	<0 5	<0 5	<0.5	<5^	--	--	--
MW-6	05-20-97	61.21	32 40	28.81	ND	FG	FG	05-20-97	<200*	<0 5	<0.5	<0 5	<0 5	<3	--	--	--
MW-6	08-18-97	61 21	35.47	25.74	ND	SW	0 003	08-18-97	170"	<0.5	<0.5	<0 5	<0 5	4	--	--	--

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

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date 11-25-97

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	TRPH EPA 418 1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-7	03-10-95	58 22	17.69	40 53	ND^^	NNE	0.003	03-11-95	Not sampled: floating product entered the well during purging								
MW-7	06-05-95	58.22	19.68	38.54	ND	FG	FG	06-05-95	36000	90	51	450	2000	--	--	--	--
MW-7	08-29-95	58 22	21.70	36 52	ND	FG	FG	08-29-95	86000	380	260	1100	5000	--	<10	--	--
MW-7	11-16-95	58.22	23 02	35 20	ND	SW	0 003	11-16-95	1400000	610	590	7800	3300	<4000^	--	--	--
MW-7	02-28-96	58.22	16 54	41 68	ND	NNE	0.004	02-28-96	29000	<20^	<20^	180	1000	--	--	--	--
MW-7	05-28-96	58.22	19 29	38 93	ND	FG	FG	05-28-96	50000	<100^	100	510	2300	<500^	--	--	--
MW-7	08-19-96	58.22	21 84	36.38	ND	FG	FG	08-21-96	45000	340	200	820	3400	<300^	--	--	--
MW-7	11-21-96	58.22	19.58	38.64	ND	FG	FG	11-21-96	41000	190	150	730	2900	<300^	--	--	--
MW-7	03-26-97	58.22	19.67	38.55	ND	FG	FG	03-26-97	6400	60	25	160	300	190	--	--	--
MW-7	05-20-97	58.22	20 18	38.04	ND	FG	FG	05-20-97	13000	110	56	590	1800	720	--	--	--
MW-7	08-18-97	58.22	22 21	36.01	ND	SW	0.003	08-18-97	9500	220	25	610	690	310	--	--	--
MW-8	03-10-95	53.65	23 60	30.05	ND	NNE	0.003	03-10-95	<50	<0 5	<0.5	<0 5	<0 5	--	--	--	--
MW-8	06-05-95	53 65	23 48	30.17	ND	FG	FG	06-05-95	<50	<0 5	<0 5	<0 5	<0 5	--	--	--	--
MW-8	08-29-95	53.65	26.44	27.21	ND	FG	FG	08-29-95	<50	<0 5	<0 5	<0.5	<0.5	--	3	--	--
MW-8	11-16-95	53.65	28 90	24.75	ND	SW	0.003	11-16-95	<50	<0 5	<0 5	<0 5	<0.5	6	9	--	--
MW-8	02-28-96	53.65	22 16	31.49	ND	NNE	0.004	02-28-96	<50	<0 5	<0 5	<0 5	<0 5	--	--	--	--
MW-8	05-28-96	53.65	22 62	31.03	ND	FG	FG	05-28-96	<50	<0 5	<0 5	<0 5	<0.5	5	--	--	--
MW-8	08-19-96	53.65	26.70	26.95	ND	FG	FG	08-21-96	<50	<0.5	<0 5	<0 5	<0.5	18	--	--	--
MW-8	11-21-96	53.65	28 16	25.49	ND	FG	FG	11-21-96	<50	<0.5	<0 5	<0 5	<0.5	19	--	--	--
MW-8	03-26-97	53.65	22 42	31.23	ND	FG	FG	03-26-97	<50	<0 5	<0.5	<0 5	<0 5	44	--	--	--
MW-8	05-20-97	53.65	24 84	28.81	ND	FG	FG	05-20-97	<50	<0 5	<0.5	<0 5	<0 5	21	--	--	--
MW-8	08-18-97	53 65	28.03	25.62	ND	SW	0 003	08-18-97	<50	<0.5	<0.5	<0.5	<0 5	41	--	--	--

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

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

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	TRPH EPA 418 1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
RW-1	03-10-95	56.32	26.48	29 84	Sheen	NNE	0.003	03-10-95	<180*	<0.5	<0 5	<0.5	<0 5	--	--	--	--
RW-1	06-05-95	56.32	26.20	30 12	ND	FG	FG	06-05-95	<50	<0.5	<0.5	<0 5	<0 5	--	--	--	--
RW-1	08-29-95	56.32	28.98	27 34	ND	FG	FG	08-29-95	<200*	<0.5	<0 5	<0 5	<0.5	--	<5	--	--
RW-1	11-16-95	56.32	31.34	24 98	ND	SW	0.003	11-16-95	<50	<0 5	<0 5	<0 5	<0 5	<3	--	--	--
RW-1	02-28-96	56 32	25 12	31.20	ND	NNE	0 004	02-28-96	<50	<0 5	<0.5	<0 5	<0.5	--	--	--	--
RW-1	05-28-96	56 32	25.26	31.06	ND	FG	FG	05-28-96	<50	<0 5	<0 5	<0 5	<0.5	<3	--	--	--
RW-1	08-19-96	56 32	28.51	27.81	ND	FG	FG	08-21-96	<50	<0 5	<0.5	<0 5	<0 5	<3	--	--	--
RW-1	11-21-96	56 32	30 65	25.67	ND	FG	FG	11-21-96	<70*	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
RW-1	03-26-97	56.32	25 15	31.17	ND	FG	FG	03-26-97	<50	<0 5	<0.5	<0 5	<0 5	<3	--	--	--
RW-1	05-20-97	56 32	27.44	28 88	ND	FG	FG	05-20-97	<50	<0.5	<0.5	<0.5	<0 5	<3	--	--	--
RW-1	08-18-97	56 32	30 46	25 86	ND	SW	0.003	08-18-97	<50	<0.5	<0.5	<0.5	<0 5	<3	--	--	--
WGR-3	03-10-95	NR	15.20	NR	ND	NR	NR	03-11-95	<50	<0.5	<0 5	<0 5	<0 5	--	--	--	--
WGR-3	06-05-95	NR	19.25	NR	ND	NR	NR	06-05-95	<50	<0.5	<0 5	<0 5	<0 5	--	--	--	--
WGR-3	08-29-95	NR	21.41	NR	ND	NR	NR	08-29-95	<50	<0.5	<0 5	<0 5	<0 5	--	10	--	--
WGR-3	11-16-95	NR	22 50	NR	ND	SW	0 003	11-16-95	<50	<0 5	<0 5	<0 5	<0 5	3	--	--	--
WGR-3	02-28-96	NR	14 90	NR	ND	NNE	0 004	02-28-96	<50	<0.5	<0 5	I 5	I 6	--	--	--	--
WGR-3	05-28-96	NR	18.33	NR	ND	FG	FG	05-28-96	<50	<0 5	<0 5	<0 5	<0 5	20	--	--	--
WGR-3	08-19-96	NR	21.38	NR	ND	FG	FG	08-19-96	<50	<0.5	<0 5	<0 5	<0 5	17	--	--	--
WGR-3	11-21-96	NR	18.70	NR	ND	FG	FG	11-21-96	<50	<0 5	<0 5	0 6	<0 5	10	--	--	--
WGR-3	03-26-97	NR	18.98	NR	ND	FG	FG	03-26-97	<200^	<2^	<2^	<2^	<2^	240	--	--	--
WGR-3	05-20-97	NR	19.70	NR	ND	FG	FG	05-20-97	<100^	<1^	<1^	<1^	<1^	130	--	--	--
WGR-3	08-18-97	NR	21.81	NR	ND	SW	0 003	08-18-97	<100^	<1^	<1^	<1^	<1^	120	--	--	--

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

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date. 11-25-97

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	**TRPH** EPA 418 1	**TPHD** LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	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, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United States Environmental Protection Agency
MTBE: Methyl tert-butyl ether
TRPH: total recoverable petroleum hydrocarbons
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
ND none detected
NR: not reported, data not available or not measurable
SW. southwest
NNE: north-northeast
FG flat gradient; the groundwater gradient over the local area was nearly flat
^^: floating product entered the well during purging
* raised method reporting limit due to matrix interference, the sample contains a single non-fuel component eluting in the gasoline range and quantitated as gasoline (possibly PCE), and the chromatogram does not match the typical gasoline fingerprint
^· raised method reporting limit due to (1) matrix interference requiring sample dilution or (2) high analyte concentration
- -. not analyzed or not applicable
**: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Retail Service Station 10600 and 10700 MacArthur Boulevard, Oakland, California, (EMCON, March 22, 1996).*
": sample contains a single non-fuel component eluting in the gasoline range, and quntitated as gasoline; chromatogram does not match the typical gasoline range

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

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

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	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	03-10-95	170	<1	--	<1	--	<1	<1	<1	<5
MW-1	06-05-95	210	<5	--	<5	--	<5	<5	<5	<25
MW-1	08-29-95	130	<1	--	<1	--	<1	<1	<1	<5
MW-1	11-16-95	45	<1	--	<1	<1	<1	<1	<1	<5
MW-1	02-28-96	97	<1	<1	<1	--	<1	<1	<1	<5
MW-1	05-28-96	160	<5	<5	<5	--	<5	<5	<5	<25
MW-1	08-19-96	77	<1	<1	<1	--	<1	<1	<1	<5
MW-1	11-21-96	30	<1	<1	<1	--	<1	<1	<1	<5
MW-1	03-26-97	66	<1	<1	<1	--	<1	<1	<1	<5
MW-1	05-20-97	36	<0.5	<0 5	<0.5	--	<0 5	<0 5	<0.5	<0 5
MW-1	08-18-97	11	<0 5	<0 5	<0 5	--	<0 5	<0.5	<0 5	<0 5
MW-2	03-11-95	<1	<1	--	<1	--	110	12	15	240
MW-2	06-05-95	<1	<1	--	<1	--	83	14	72	190
MW-2	08-29-95	<5	<5	--	<5	--	220	26	210	450
MW-2	11-16-95	Not surveyed: well was inaccessible								
MW-2	02-28-96	<1	<1	<1	<1	--	18	<1	13	14
MW-2	05-28-96	<1	<1	<1	<1	--	44	<1	22	62
MW-2	08-21-96	<1	<1	<1	<1	--	49	<1	17	40
MW-2	11-21-96	<1	<1	<1	<1	--	49	3	7	180
MW-2	03-26-97	<10^	<10^	<10^	<10^	--	10	<10^	<10^	<50^
MW-2	05-20-97	<1^	<1^	<1^	<1^	--	<1^	<1^	<1^	<1^
MW-2	08-18-97	<5^	<5^	<5^	<5^	--	<5^	<5^	<5^	<5^

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-3	03-11-95	1700	<10	--	<10	--	<10	<10	<10	<50
MW-3	06-05-95	2500	<20	--	<20	--	<20	<20	<20	<100
MW-3	08-29-95	1600	<20	--	<20	--	<20	<20	<20	<100
MW-3	11-16-95	1100	<20	--	<20	<20	<20	<20	<20	<100
MW-3	02-28-96	1100	<10	<10	<10	--	<10	<10	<10	<50
MW-3	05-28-96	1700	<20	<20	<20	--	<20	<20	<20	<100
MW-3	08-19-96	1200	<20	<20	<20	--	<20	<20	<20	<100
MW-3	11-21-96	710	<20^	<20^	<20^	--	<20^	<20^	<20^	<100^
MW-3	03-26-97	710	<40^	<40^	<40^	--	<40^	<40^	<40^	<200^
MW-3	05-20-97	800	<25^	<25^	<25^	--	<25^	<25^	<25^	<25^
MW-3	08-18-97	420	<5^	<5^	<5^	--	<5^	<5^	<5^	<5^
MW-4	03-11-95	2600	<20	--	<20	--	<20	<20	<20	<100
MW-4	06-05-95	3100	<20	--	<20	--	<20	<20	<20	<100
MW-4	08-29-95	2900	<20	--	<20	--	<20	<20	<20	<100
MW-4	11-16-95	2100	<20	--	<20	<20	<20	<20	<20	<100
MW-4	02-28-96	2400	<20	<20	<20	--	<20	<20	<20	<100
MW-4	05-28-96	2700	<20	<20	<20	--	<20	<20	<20	<100
MW-4	08-19-96	2600	<20	<20	<20	--	<20	<20	<20	<100
MW-4	11-21-96	1100	<20^	<20^	<20^	--	<20^	<20^	<20^	<100^
MW-4	03-26-97	1900	<40^	<40^	<40^	--	<40^	<40^	<40^	<200^
MW-4	05-20-97	1600	<50^	<50^	<50^	--	<50^	<50^	<50^	<50^
MW-4	08-18-97	600	<125^	<125^	--	--	<125^	<125^	<125^	<125^

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-5	03-10-95	270	<5	--	<5	--	<5	<5	<5	<25
MW-5	06-05-95	310	<5	--	<5	--	<5	<5	<5	<25
MW-5	08-29-95	240	<5	--	<5	--	<5	<5	<5	<25
MW-5	11-16-95	940	<5	--	<5	<5	<5	<5	<5	<25
MW-5	02-28-96	1100	<10	<10	<10	--	<10	<10	<10	<50
MW-5	05-28-96	360	<5	<5	<5	--	<5	<5	<5	<25
MW-5	08-21-96	150	<1	<1	2	--	<1	<1	<1	<5
MW-5	11-21-96	1900	<20^	<20^	<20^	--	<20^	<20^	<20^	<100^
MW-5	03-26-97	270	<10^	<10^	<10^	--	<10^	<10^	<10^	<50^
MW-5	05-20-97	290	<5^	<5^	<5^	--	<5^	<5^	<5^	<5^
MW-5	08-18-97	--	--	--	--	--	--	--	--	--
MW-6	03-11-95	1300	<20	--	<20	--	<20	<20	<20	<100
MW-6	06-05-95	2000	<20	--	<20	--	<20	<20	<20	<100
MW-6	08-29-95	1300	<20	--	<20	--	<20	<20	<20	<100
MW-6	11-16-95	1300	<20	--	<20	<20	<20	<20	<20	<100
MW-6	02-28-96	960	<20	<20	<20	--	<20	<20	<20	<100
MW-6	05-28-96	970	<20	<20	<20	--	<20	<20	<20	<100
MW-6	08-19-96	820	<20	<20	<20	--	<20	<20	<20	<100
MW-6	11-21-96	680	<20^	<20^	<20^	--	<20^	<20^	<20^	<100^
MW-6	03-26-97	830	<40^	<40^	<40^	--	<40^	<40^	<40^	<200^
MW-6	05-20-97	270	<5^	<5^	<5^	--	<5^	<5^	<5^	<5^
MW-6	08-18-97	420	<62.5^	<62.5^	--	--	<62.5^	<62.5^	<62.5^	<62.5^

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-7	03-11-95	Not sampled: floating product entered the well during purging								
MW-7	06-05-95	<10	<10	--	<10	--	86	27	420	1400
MW-7	08-29-95	<10	<10	--	<10	--	410	230	1100	5000
MW-7	11-16-95	<20	<20	--	<20	<20	360	220	1700	10000
MW-7	02-28-96	<10	<10	<10	<10	--	<10	<10	87	760
MW-7	05-28-96	<10	<10	<10	<10	--	74	36	340	1600
MW-7	08-21-96	<1	<1	<1	<1	--	260	200	800	3200
MW-7	11-21-96	<10^	<10^	<10^	<10^	--	180	120	640	2900
MW-7	03-26-97	<20^	<20^	<20^	<20^	--	37	<20^	210	410
MW-7	05-20-97	<10^	<10^	<10^	<10^	--	140	77	700	2200
MW-7	08-18-97	<10^	<10^	<10^	<10^	--	150	13	500	540
MW-8	03-10-95	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	06-05-95	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	08-29-95	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	11-16-95	<1	<1	--	<1	<1	<1	<1	<1	<5
MW-8	02-28-96	3	<1	<1	<1	--	<1	<1	<1	<5
MW-8	05-28-96	<1	<1	<1	<1	--	<1	<1	<1	<5
MW-8	08-21-96	<1	<1	<1	<1	--	<1	<1	<1	<5
MW-8	11-21-96	7	<1	<1	<1	--	<1	<1	<1	<5
MW-8	03-26-97	<1	<1	<1	<1	--	<1	<1	<1	<5
MW-8	05-20-97	<0 5	<0.5	<0 5	<0.5	--	<0 5	<0.5	<0 5	<0.5
MW-8	08-18-97	<5	<5	<5	--	--	<5	<5	<5	<5

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
RW-1	03-10-95	260	<5	--	<5	--	<5	<5	<5	<25
RW-1	06-05-95	59	<1	--	<1	--	<1	<1	<1	<5
RW-1	08-29-95	570	<5	--	<5	--	<5	<5	<5	<25
RW-1	11-16-95	140	<1	--	<1	<1	<1	<1	<1	<5
RW-1	02-28-96	6	<1	<1	<1	--	<1	<1	<1	<5
RW-1	05-28-96	12	<1	<1	<1	--	<1	<1	<1	<5
RW-1	08-21-96	100	<1	<1	<1	--	<1	<1	<1	<5
RW-1	11-21-96	190	1	<1	<1	--	<1	<1	<1	<5
RW-1	03-26-97	6	<1	<1	<1	--	<1	<1	<1	<5
RW-1	05-20-97	5.3	<0 5	<0 5	<0.5	--	<0 5	<0.5	<0 5	<0.5
RW-1	08-18-97	46	<5	<5	--	--	<5	<5	<5	<5

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WGR-3	03-11-95	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	06-05-95	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	08-29-95	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	11-16-95	<1	<1	--	<1	<1	<1	<1	<1	<5
WGR-3	02-28-96	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	05-28-96	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	08-19-96	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	11-21-96	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	03-26-97	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	05-20-97	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5
WGR-3	08-18-97	<5	<5	<5	--	--	<5	<5	<5	<5

µg/L: micrograms per liter
- - : not analyzed or not reported
^ method reporting limit was raised due to (1) high analyte concentration requiring sample dilution, or (2) matrix interference
* For previous historical analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Retail Service Station 10600 and 10700 MacArthur Boulevard, Oakland, California, (EMCON, March 22, 1996)*

Table 4
Approximate Cumulative Floating Product Recovered

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date 11-25-97

Well Designation	Date	Floating Product Recovered gallons
MW-2 and MW-7	1991	18.15
MW-2 and MW-7	1992	0 39
MW-2 and MW-7	1993	0 00
MW-2 and MW-7	1994	0 00
MW-2 and MW-7	1995	0.00
MW-2 and MW-7	1996	0.00
MW-2 and MW-7	1997	0 00
	1991 to 1997 Total:	18 54

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 276
Location: 10600 MacArthur Boulevard
Oakland, California

Consultant. EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Start-Up Date: 09-06-90
Operation and Performance Data From: 09-06-90
To: 10-01-97
System was shut down on 3-26-96.

Date Begin:		09-06-90	12-22-94	01-01-95	02-01-95	03-01-95
Date End:		12-22-94	01-01-95	02-01-95	03-01-95	04-01-95
Mode of Oxidation:		Catalytic (14)	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		0.0	4.9	26.4	28.0	31.0
Days of Downtime:		0.0	26.2	4.6	0.0	0.0
Average Vapor Concentrations (1)						
On-site WF Influent:	ppmv (2) as gasoline	NA (15)	32	<15	<15	1.2
	mg/m3 (3) as gasoline	NA	116	<60	<60	4.4
	ppmv as benzene	NA	<0.1	<0.1	<0.1	<0.05
	mg/m3 as benzene	NA	<0.3	<0.5	<0.5	<0.16
Off-site WF Influent:	ppmv as gasoline	NA	closed	closed	<15	1.4
	mg/m3 as gasoline	NA	closed	closed	<60	4.9
	ppmv as benzene	NA	closed	closed	<0.1	<0.05
	mg/m3 as benzene	NA	closed	closed	<0.5	<0 16
System Influent:	ppmv as gasoline	NA	32	<15	<15	<1.0
	mg/m3 as gasoline	NA	116	<60	<60	<3.6
	ppmv as benzene	NA	<0.1	<0.1	<0.1	<0.05
	mg/m3 as benzene	NA	<0.3	<0.5	<0.5	<0.16
System Effluent:	ppmv as gasoline	NA	<15	<15	<15	1.3
	mg/m3 as gasoline	NA	<54	<60	<60	4.6
	ppmv as benzene	NA	<0 1	<0.1	<0.1	<0.05
	mg/m3 as benzene	NA	<0.3	<0.5	<0.5	<0.16
Average On-site Well Field Flow Rate (4), scfm (5)		NA	81.6	53.7	62.0	71.3
Average Off-site Well Field Flow Rate (4), scfm:		NA	closed	closed	17.6	47.8
Average System Influent Flow Rate (4), scfm:		NA	81.6	53.7	79.6	119.1
Total Process Flow Rate, scfm.		NA	500.0	500.0	500.0	500.0
Average Destruction Efficiency (6), percent (7):		NA	53.4 (16)	NA	NA	NA
Average Emission Rates (8), pounds per day (9)						
Gasoline:		NA	0.40	0.29	0.43	0.05
Benzene:		NA	0.00	0.00	0.00	0.00
Operating Hours This Period:		NA	116.5	633.4	672.0	744.0
Operating Hours To Date.		NA	116.5	749.9	1421.9	2165.9
Pounds/ Hour Removal Rate, as gasoline (10).		NA	0.035	0.012	0.018	0.004
Pounds Removed This Period, as gasoline (11)		NA	4.13	7.64	12.01	3 08
Pounds Removed To Date, as gasoline (12):		7665 5	7669.6	7677 3	7689.3	7692.4
Gallons Removed This Period, as gasoline (13):		NA	0.67	1.23	1 94	0.50
Gallons Removed To Date, as gasoline:		1236.4	1237.1	1238.3	1240.3	1240.8

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 276
Location: 10600 MacArthur Boulevard
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Start-Up Date: 09-06-90
Operation and Performance Data From: 09-06-90
To: 10-01-97
System was shut down on 3-26-96.

Date Begin:		04-01-95	05-01-95	08-01-95	09-01-95	10-01-95
Date End:		05-01-95	08-01-95	09-01-95	10-01-95	01-01-96
Mode of Oxidation:		Catalytic	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		30.0	18.7	17.9	0.0	0.0
Days of Downtime:		0.0	73.3	13.1	30.0	92.0
Average Vapor Concentrations (1)						
On-site WF Influent:	ppmv (2) as gasoline	<15	<15	95	NA	NA
	mg/m3 (3) as gasoline	<60	<60	350	NA	NA
	ppmv as benzene	<0.1	<0.1	1.1	NA	NA
	mg/m3 as benzene	<0.5	<0.5	3.6	NA	NA
Off-site WF Influent:	ppmv as gasoline	<15	<15	<15	NA	NA
	mg/m3 as gasoline	<60	<60	<60	NA	NA
	ppmv as benzene	<0.1	<0 1	<0.1	NA	NA
	mg/m3 as benzene	<0.5	<0.5	<0.5	NA	NA
System Influent:	ppmv as gasoline	<15	<15	93	NA	NA
	mg/m3 as gasoline	<60	<60	340	NA	NA
	ppmv as benzene	<0.1	<0.1	1	NA	NA
	mg/m3 as benzene	<0.5	<0.5	3 3	NA	NA
System Effluent:	ppmv as gasoline	<15	<15	<15	NA	NA
	mg/m3 as gasoline	<60	<60	<60	NA	NA
	ppmv as benzene	<0.1	<0.1	<0.1	NA	NA
	mg/m3 as benzene	<0.5	<0.5	<0.5	NA	NA
Average On-site Well Field Flow Rate (4), scfm (5):		74.5	79.6	83.5	0.0	0.0
Average Off-site Well Field Flow Rate (4), scfm:		37.1	33.6	34.2	0.0	0.0
Average System Influent Flow Rate (4), scfm:		111.6	113.3	117.7	0.0	0.0
Total Process Flow Rate, scfm:		500.0	500.0	500.0	0.0	0.0
Average Destruction Efficiency (6), percent (7):		NA	NA	82.4 (16)	NA	NA
Average Emission Rates (8), pounds per day (9)						
Gasoline:		0.60	0.61	0.63	NA	NA
Benzene:		0.01	0.01	0 01	NA	NA
Operating Hours This Period:		720.0	447.9	428.8	0 0	0.0
Operating Hours To Date:		2885.9	3333.8	3762.6	3762.6	3762.6
Pounds/ Hour Removal Rate, as gasoline (10):		0.025	0 025	0.154	0.000	0.000
Pounds Removed This Period, as gasoline (11):		18.04	11.39	66.11	0.00	0 00
Pounds Removed To Date, as gasoline (12):		7710.4	7721.8	7787.9	7787.9	7787.9
Gallons Removed This Period, as gasoline (13):		2.91	1.84	10.66	0.00	0.00
Gallons Removed To Date, as gasoline:		1243.7	1245.5	1256.2	1256.2	1256.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 276
Location: 10600 MacArthur Boulevard
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Start-Up Date: 09-06-90
Operation and Performance Data From: 09-06-90
To: 10-01-97
System was shut down on 3-26-96

Date Begin		01-01-96	02-01-96	03-01-96	04-01-96	07-01-96
Date End:		02-01-96	03-01-96	04-01-96	07-01-96	10-01-96
Mode of Oxidation:		Catalytic	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation		12.8	1.5	7.4	0.0	0.0
Days of Downtime:		18.2	27.5	23.6	91.0	92.0
Average Vapor Concentrations (1)						
On-site WF Influent:	ppmv (2) as gasoline	<15	NA	NA	NA	NA
	mg/m3 (3) as gasoline	<60	NA	NA	NA	NA
	ppmv as benzene	<0.1	NA	NA	NA	NA
	mg/m3 as benzene	<0.5	NA	NA	NA	NA
Off-site WF Influent:	ppmv as gasoline	<15	NA	NA	NA	NA
	mg/m3 as gasoline	<60	NA	NA	NA	NA
	ppmv as benzene	<0.1	NA	NA	NA	NA
	mg/m3 as benzene	<0.5	NA	NA	NA	NA
System Influent	ppmv as gasoline	<15	NA	NA	NA	NA
	mg/m3 as gasoline	<60	NA	NA	NA	NA
	ppmv as benzene	<0.1	NA	NA	NA	NA
	mg/m3 as benzene	<0.5	NA	NA	NA	NA
System Effluent:	ppmv as gasoline	<15	NA	NA	NA	NA
	mg/m3 as gasoline	<60	NA	NA	NA	NA
	ppmv as benzene	<0.1	NA	NA	NA	NA
	mg/m3 as benzene	<0.5	NA	NA	NA	NA
Average On-site Well Field Flow Rate (4), scfm (5).		174.1	178.4	178.4	0.0	0.0
Average Off-site Well Field Flow Rate (4), scfm:		17.2	19.4	19.4	0.0	0.0
Average System Influent Flow Rate (4), scfm:		191.3	197.8	197.8	0.0	0.0
Total Process Flow Rate, scfm:		500.0	500.0	500.0	0.0	0.0
Average Destruction Efficiency (6), percent (7):		82.4 (16)	NA	NA	NA	NA
Average Emission Rates (8), pounds per day (9)						
Gasoline:		1.03	NA	NA	NA	NA
Benzene:		0.01	NA	NA	NA	NA
Operating Hours This Period:		306.9	35.5	177.8	0.0	0.0
Operating Hours To Date:		4069.5	4105.0	4282.8	4282.8	4282.8
Pounds/ Hour Removal Rate, as gasoline (10).		0.043	0.000	0 000	0.000	0.000
Pounds Removed This Period, as gasoline (11).		13.18	0 00	0.00	0.00	0.00
Pounds Removed To Date, as gasoline (12):		7801.1	7801.1	7801.1	7801.1	7801.1
Gallons Removed This Period, as gasoline (13):		2.13	0.00	0.00	0.00	0.00
Gallons Removed To Date, as gasoline:		1258.3	1258.3	1258.3	1258.3	1258.3

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 276
Location: 10600 MacArthur Boulevard
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Start-Up Date: 09-06-90
Operation and Performance Data From: 09-06-90
To: 10-01-97
System was shut down on 3-26-96.

Date Begin.		10-01-96	01-01-97	05-01-97	07-01-97
Date End:		01-01-97	04-01-97	07-01-97	10-01-97
Mode of Oxidation:		Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		0 0	0.0	0.0	0 0
Days of Downtime:		92 0	90 0	91.0	92 0
Average Vapor Concentrations (1)					
On-site WF Influent:	ppmv (2) as gasoline	NA	NA	NA	NA
	mg/m3 (3) as gasoline	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA
Off-site WF Influent:	ppmv as gasoline	NA	NA	NA	NA
	mg/m3 as gasoline	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA
System Influent:	ppmv as gasoline	NA	NA	NA	NA
	mg/m3 as gasoline	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA
System Effluent:	ppmv as gasoline	NA	NA	NA	NA
	mg/m3 as gasoline	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA
Average On-site Well Field Flow Rate (4), scfm (5):		0.0	0.0	0.0	0.0
Average Off-site Well Field Flow Rate (4), scfm:		0.0	0.0	0.0	0.0
Average System Influent Flow Rate (4), scfm:		0.0	0.0	0.0	0.0
Total Process Flow Rate, scfm:		0.0	0.0	0.0	0.0
Average Destruction Efficiency (6), percent (7):		NA	NA	NA	NA
Average Emission Rates (8), pounds per day (9)					
Gasoline:		NA	NA	NA	NA
Benzene:		NA	NA	NA	NA
Operating Hours This Period.		0.0	0 0	0.0	0.0
Operating Hours To Date:		4282.8	4282.8	4282.8	4282 8
Pounds/ Hour Removal Rate, as gasoline (10):		0.000	0.000	0.000	0.000
Pounds Removed This Period, as gasoline (11):		0.00	0.00	0.00	0.00
Pounds Removed To Date, as gasoline (12):		7801 1	7801.1	7801.1	7801.1
Gallons Removed This Period, as gasoline (13):		0.00	0.00	0.00	0 00
Gallons Removed To Date, as gasoline:		1258.3	1258.3	1258.3	1258.3

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 276
Location: 10600 MacArthur Boulevard
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Start-Up Date: 09-06-90
Operation and Performance Data From: 09-06-90
To: 10-01-97
System was shut down on 3-26-96.

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 276
Location: 10600 MacArthur Boulevard
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Start-Up Date: 09-06-90
Operation and Performance Data From: 09-06-90
To: 10-01-97
System was shut down on 3-26-96.

CURRENT REPORTING PERIOD:	07-01-97	to	10-01-97
DAYS / HOURS IN PERIOD:	92	2208.0	
DAYS / HOURS OF OPERATION:	0	0.0	
DAYS / HOURS OF DOWN TIME:	92	2208.0	
PERCENT OPERATIONAL:		0.0	%
PERIOD POUNDS REMOVED:	0.0		
PERIOD GALLONS REMOVED:	0.0		
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):		0.0	

1. Average concentrations are based on discrete sample results reported during the month, refer to Appendix B for discrete sample results.
2. ppmv: parts per million by volume
3. mg/m3: milligrams per cubic meter
4. Average flow rates (time weighted average) are based on instantaneous flow rates recorded during the month; refer to Appendix B for instantaneous flow data
5. scfm: flow in standard cubic feet per minute at one atmosphere and 70 degrees Fahrenheit
6. Average destruction efficiencies are calculated using monthly average concentrations; refer to Appendix B for instantaneous destruction efficiency data.
7. destruction efficiency, percent = ([system influent concentration (as gasoline in mg/m3) - system effluent concentration (as gasoline in mg/m3)] / system influent concentration (as gasoline in mg/m3)) x 100 percent
8. Average emission rates are calculated using monthly average concentrations and flow rates, refer to Appendix B for instantaneous emission rate data
9. emission rates (pounds per day) = system effluent concentration (as gasoline or benzene in mg/m3) x system influent flow rate (scfm) x 0 02832 m3/ft3 x 1440 minutes/day x 1 pound/454,000 mg
10. pounds/ hour removal rate (as gasoline) = well field influent concentration (as gasoline in mg/m3) x well field influent flow rate (scfm) x 0.02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
11. pounds removed this period (as gasoline) = pounds/ hour removal rate x hours of operation
12. Pounds removed data for the period from September 6, 1990 through December 22, 1994, were reported by EVAX, PEG, and RESNA Please refer to *Fourth Quarter 1994 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, EMCON March 1995, for additional data for system operation before December 1994.*
13. gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0 1613 gallons/pound of gasoline
14. The existing catalytic oxidation unit was used as the off-gas abatement device for the site, with the exception of the period from September 6, 1990 to March 21, 1991, when EVAX used an internal combustion engine as the abatement device
15. NA: not analyzed, not available, or not applicable
16. Although the destruction efficiency appeared to be less than 90 percent, laboratory analytical results collected during this period indicate the effluent TVHG and benzene concentrations in off-gas discharged to the atmosphere were below laboratory detection limits, indicating compliance with BAAQMD discharge requirements

Table 6
Soil-Vapor Extraction Well Data

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-26-97
Project Number: 0805-120 04

Date	Well Identification											
	VW-1			VW-2			VW-3			VW-4		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-22-94	open	<15 LAB	13 1	open	68 LAB	13 0	open	28 LAB	12 0	open	<15 LAB	13.1
01-17-95	closed	NA	NA	open	NA	NA	open	NA	NA	closed	NA	NA
02-16-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
03-27-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
05-24-95	System was shut doun											
08-01-95	System was restarted											
08-01-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
08-23-95	System was shut doun											
01-16-96	System was restarted											
01-16-96	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
03-26-96	System was shut doun											

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open: open to the system
passive: open to the atmosphere
closed: closed to the system and atmosphere
NA: not analyzed or not measured
FID: TVHG concentration was measured with a portable flame ionization detector
LAB: TVHG concentration was analyzed in the laboratory
PID: TVHG concentration was measured with a portable photoionization detector

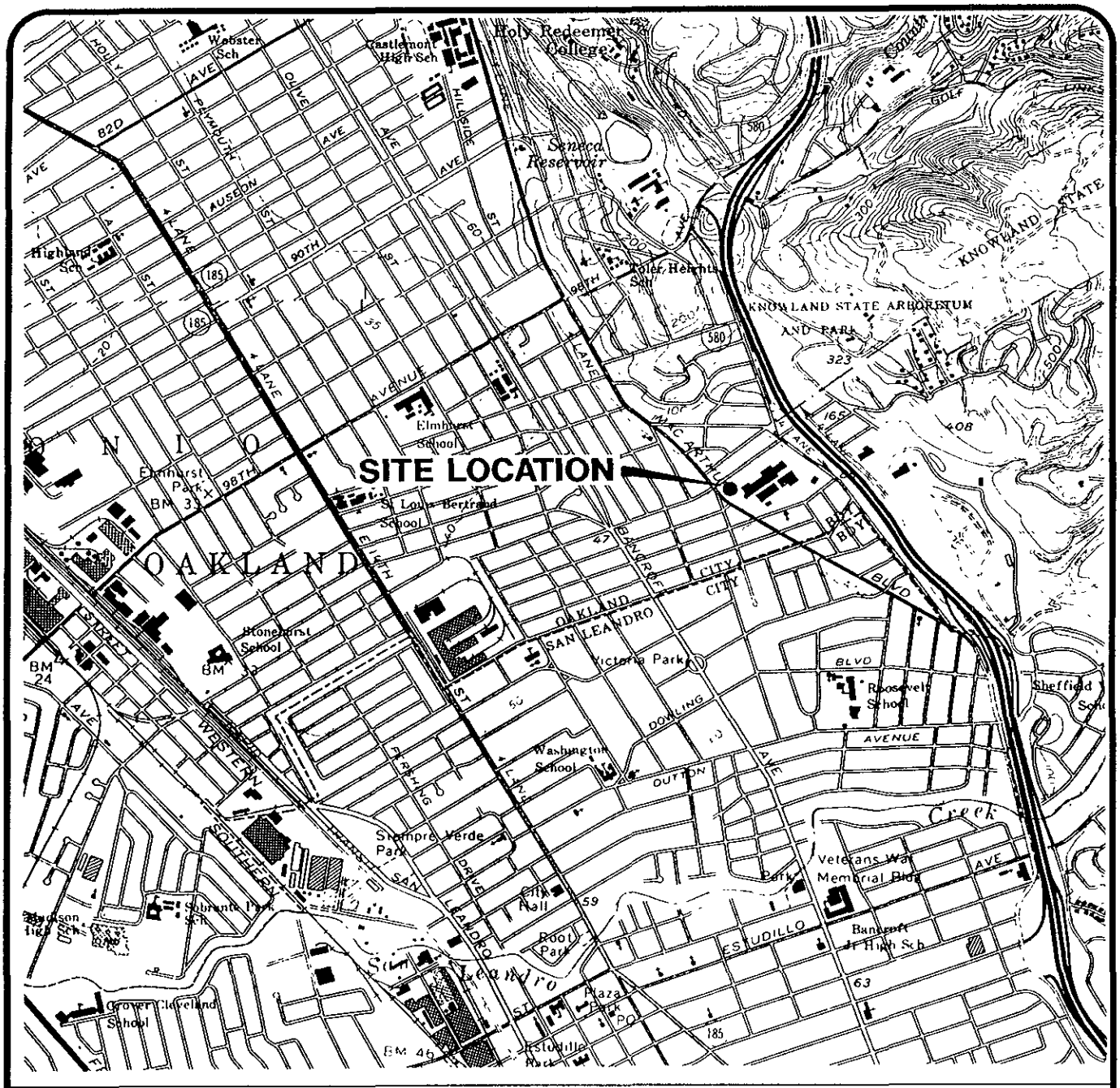
Table 6
Soil-Vapor Extraction Well Data

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

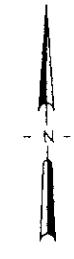
Date: 11-26-97
Project Number 0805-120.04

Date	Well Identification									
	VW-5			VW-7			MW-2			
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	
12-22-94	open	<15 LAB	13 0	open	<15 LAB	13.1	open	<15 LAB	7 0	
01-17-95	closed	NA	NA	closed	NA	NA	open	NA	NA	
02-16-95	open	NA	NA	open	NA	NA	open	NA	NA	
03-27-95	open	NA	NA	open	NA	NA	open	NA	NA	
05-24-95	System was shut doun									
08-01-95	System was restarted									
08-01-95	open	NA	NA	open	NA	NA	open	NA	NA	
08-23-95	System was shut doun									
01-16-96	System was restarted									
01-16-96	open	NA	NA	open	NA	NA	open	NA	NA	
03-26-96	System was shut doun									

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open, open to the system
passive: open to the atmosphere
closed, closed to the system and atmosphere
NA not analyzed or not measured
FID: TVHG concentration was measured with a portable flame ionization detector
LAB: TVHG concentration was analyzed in the laboratory
PID: TVHG concentration was measured with a portable photoionization detector



Base map from USGS 7.5' Quad. Maps:
Oakland East and San Leandro, California.
Photorevised 1980.



0 2000 4000

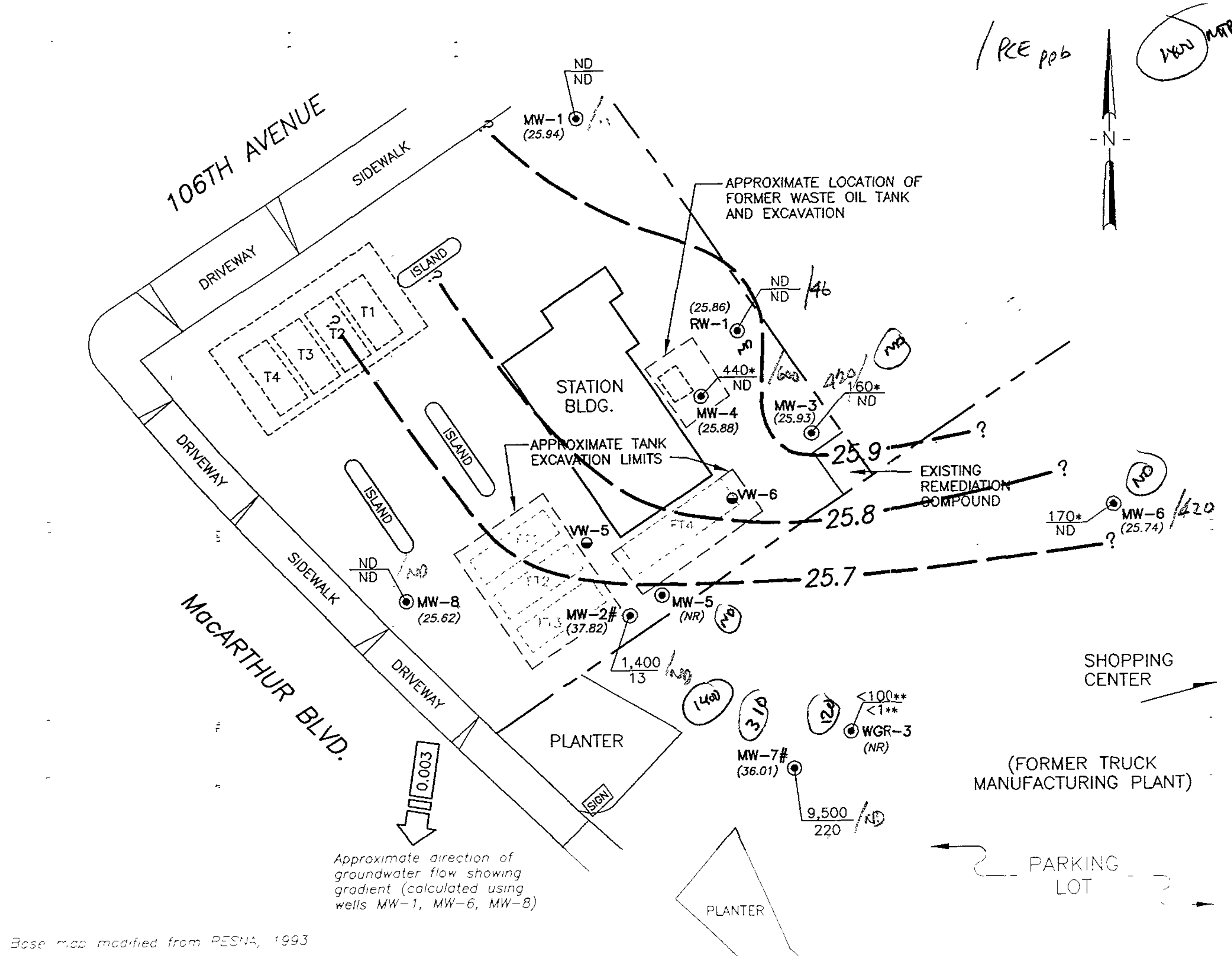
SCALE IN FEET

EMCON

DATE NOV. 1997
DWN KAJ
APP
REV
PROJECT NO.
805-120.008

FIGURE 1
ARCO PRODUCTS COMPANY
SERVICE STATION 276, 10600 MACARTHUR BLVD.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
SITE LOCATION

EA-SANJOSE-CAD/DRAWINGS: G:\805-120\SITELOC.dwg Xrefs: <NONE>
Scale: 1 = 1.00 DimScale: 1 = 1.00 Date: 12/1/97 Time: 5:23 PM Operator: KAJ



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Existing underground storage tank
- Former underground storage tank
- (25.74) Groundwater elevation (Ft.–MSL); measured 8/18/97
- 1,400 / 13 — TPHG concentration in groundwater (ug/L); sampled 8/18/97 / Benzene concentration in groundwater (ug/L); sampled 8/18/97
- * The sample contains a single non-fuel component eluting in the gasoline range and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.
- ** Raised method reporting limit due to matrix interference or high analyte concentration requiring sample dilution
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)
- NR Not recorded; inaccessible
- \# Well screened in shallow water-bearing zone; not used in contouring

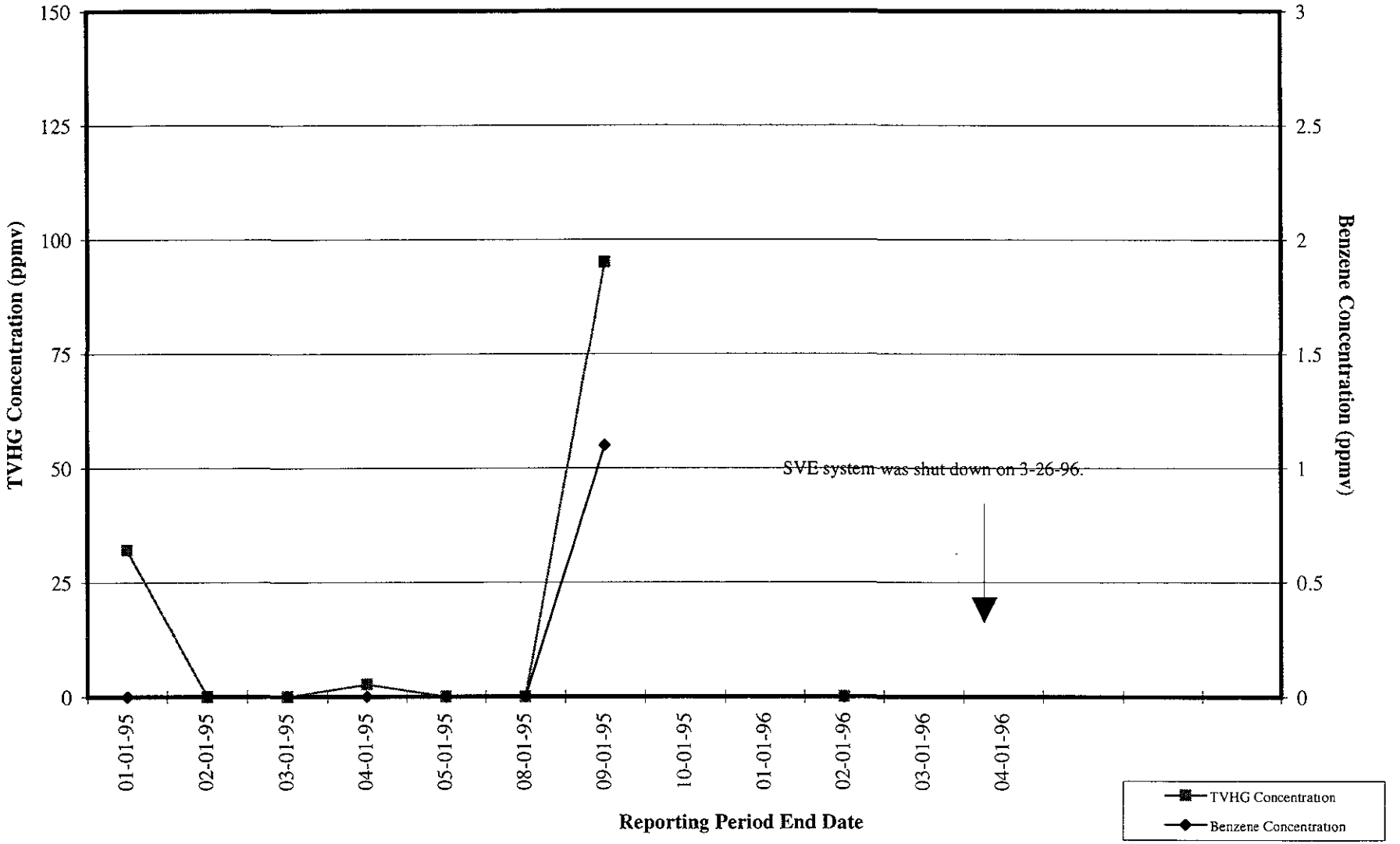
EMCON

DATE AUG 1997
DWN. KAJ
APP.
REV.
PROJECT NO. 805-120.008

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 276, 10600 MACARTHUR BLVD.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
GROUNDWATER DATA - 3RD QUARTER 1997

Figure 3

Station #0276, 10600 MacArthur Boulevard
Soil-Vapor Extraction and Treatment System
Historical Well Field Influent TVHG and Benzene Concentrations

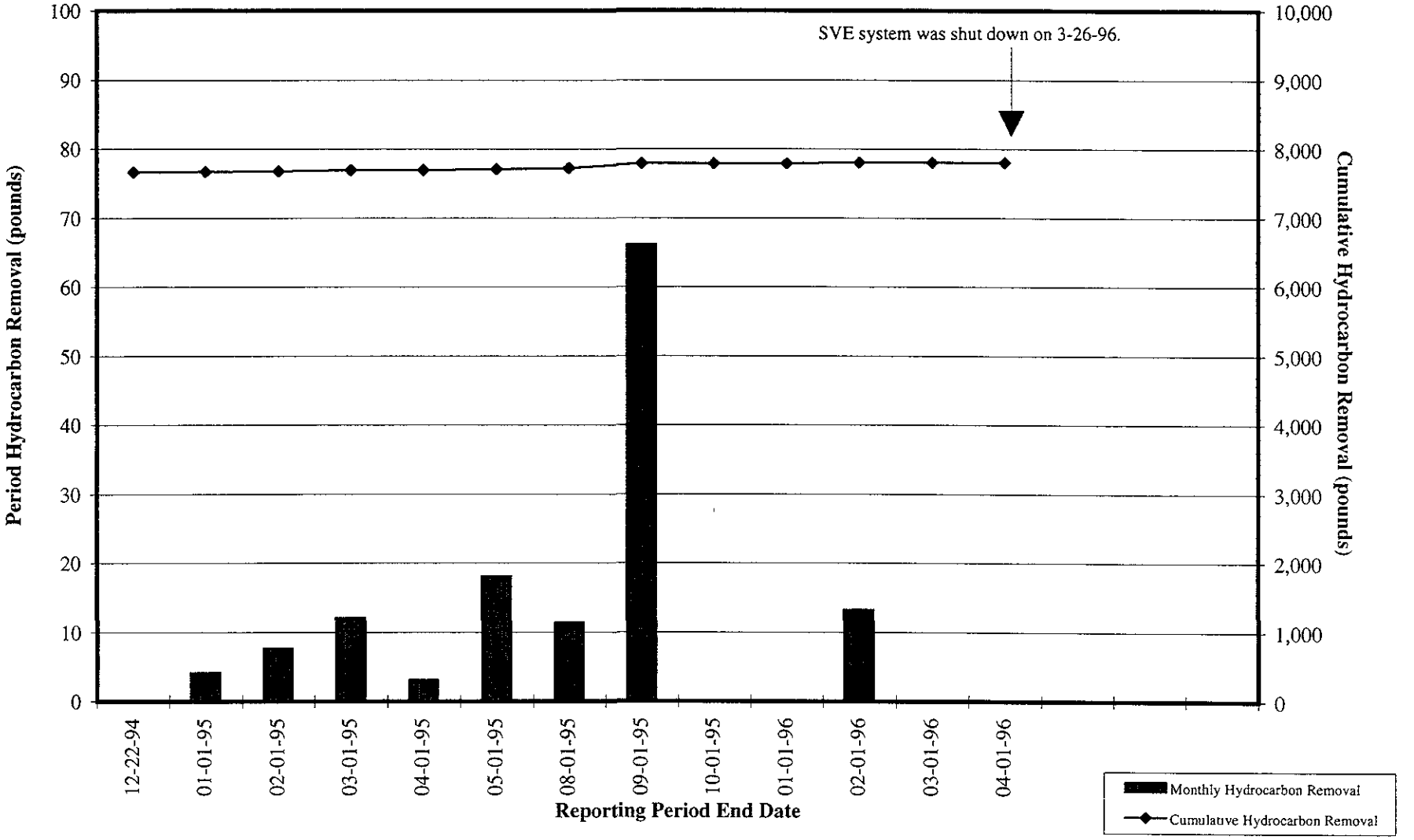


TVHG: total volatile hydrocarbons as gasoline
ppmv: parts per million by volume

esj/j \qtr_rpts\0276\0276tdb.xls\SVE Model:1mi
20805-120.008

Figure 4

Station #0276, 10600 MacArthur Boulevard
On-Site Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates



Based on data from EVAX, PEG, and RESNA, approximately 7,666 pounds of hydrocarbon were removed between September 6, 1990 and December 22, 1994

esj/j:\qtr_rpts\0276\0276tdb.xls\SVE Model:imi
20805-120 008

APPENDIX A

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, THIRD QUARTER 1997 GROUNDWATER MONITORING EVENT

Columbia Analytical Services, Inc.

September 15, 1997 Service Request No.: S9701582

Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-170.008/TO#21133.00/0276 OAKLAND

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on August 19, 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 35, 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.
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:	EMCON	**Service Request:**	L9702785
Project:	ARCO Products Company #0276/#20805-170.008	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Petroleum Hydrocarbons, Total Recoverable (TRPH)

Prep Method:	METHOD	Units:	mg/L (ppm)
Analysis Method:	418.1	*Basis:*	*NA*
Test Notes:			

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
MW-4 (31)	L9702785-001	0.5	1	8/20/97	8/20/97	1.6	
Method Blank	L970820-MB	0.5	1	8/20/97	8/20/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-1 (30)	Units:	ug/L (ppb)
Lab Code:	S9701582-001	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	8/22/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	8/22/97	ND	

1S21/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-2 (18)	Units:	ug/L (ppb)
Lab Code:	S9701582-002	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	20	NA	8/22/97	1400	
Benzene	EPA 5030	8020	0.5	20	NA	8/22/97	13	
Toluene	EPA 5030	8020	0.5	20	NA	8/22/97	<10	
Ethylbenzene	EPA 5030	8020	0.5	20	NA	8/22/97	20	
Xylenes, Total	EPA 5030	8020	0.5	20	NA	8/22/97	75	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	20	NA	8/22/97	1400	

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

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3 (31)	Units:	ug/L (ppb)
Lab Code:	S9701582-003	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	8/22/97	160	G2
Benzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	8/22/97	ND	

G2 The sample contains a single non-fuel component eluting in the gasoline range, and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-4 (31)	Units:	ug/L (ppb)
Lab Code:	S9701582-004	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	8/25/97	440	G2
Benzene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	8/25/97	ND	

G2 The sample contains a single non-fuel component eluting in the gasoline range, and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-6 (49)	Units:	ug/L (ppb)
Lab Code:	S9701582-005	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	1	NA	8/22/97	170	G2
Benzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	8/22/97	4	

G2 The sample contains a single non-fuel component eluting in the gasoline range, and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-7 (25)	Units:	ug/L (ppb)
Lab Code:	S9701582-006	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	20	NA	8/22/97	9500	
Benzene	EPA 5030	8020	0.5	20	NA	8/22/97	220	
Toluene	EPA 5030	8020	0.5	20	NA	8/22/97	25	
Ethylbenzene	EPA 5030	8020	0.5	20	NA	8/22/97	610	
Xylenes, Total	EPA 5030	8020	0.5	20	NA	8/22/97	690	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	20	NA	8/22/97	310	

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

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-8 (46)	Units:	ug/L (ppb)
Lab Code:	S9701582-007	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	8/22/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	8/22/97	41	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	RW-1 (49)	Units:	ug/L (ppb)
Lab Code:	S9701582-008	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	8/23/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/23/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/23/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/23/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/23/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	8/23/97	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	WGR-3 (27)	Units:	ug/L (ppb)
Lab Code:	S9701582-009	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	2	NA	8/23/97	<100	
Benzene	EPA 5030	8020	0.5	2	NA	8/23/97	<1	
Toluene	EPA 5030	8020	0.5	2	NA	8/23/97	<1	
Ethylbenzene	EPA 5030	8020	0.5	2	NA	8/23/97	<1	
Xylenes, Total	EPA 5030	8020	0.5	2	NA	8/23/97	<1	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	2	NA	8/23/97	120	

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

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-170.008/TO#21133.00/0276 OAKLAND
Sample Matrix: Water

Service Request: S9701582
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970822-WB1
Test Notes:

Units: ug/L (ppb)
Basis: NA

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	8/22/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/22/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	8/22/97	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-170.008/TO#21133.00/0276 OAKLAND
Sample Matrix: Water

Service Request: S9701582
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970825-WB1
Test Notes:

Units: ug/L (ppb)
Basis: NA

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	8/25/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	8/25/97	ND	

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	MW-1 (30)	Units:	ug/L (ppb)
Lab Code:	S9701582-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	0.5	1	NA	8/29/97	ND	
Vinyl Chloride	NONE	624	0.5	1	NA	8/29/97	ND	
Bromomethane	NONE	624	0.5	1	NA	8/29/97	ND	
Chloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
Trichlorofluoromethane (CFC 11)	NONE	624	0.5	1	NA	8/29/97	ND	
Trichlorotrifluoroethane (CFC 113)	NONE	624	1	1	NA	8/29/97	ND	
1,1-Dichloroethene	NONE	624	0.5	1	NA	8/29/97	ND	
Acetone	NONE	624	5	1	NA	8/29/97	ND	
Carbon Disulfide	NONE	624	0.5	1	NA	8/29/97	ND	
Dichloromethane (Methylene Chloride)	NONE	624	1	1	NA	8/29/97	ND	
trans-1,2-Dichloroethene	NONE	624	0.5	1	NA	8/29/97	ND	
cis-1,2-Dichloroethene	NONE	624	0.5	1	NA	8/29/97	ND	
2-Butanone (MEK)	NONE	624	5	1	NA	8/29/97	ND	
1,1-Dichloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
Chloroform	NONE	624	0.5	1	NA	8/29/97	ND	
1,1,1-Trichloroethane (TCA)	NONE	624	0.5	1	NA	8/29/97	ND	
Carbon Tetrachloride	NONE	624	0.5	1	NA	8/29/97	ND	
Benzene	NONE	624	0.5	1	NA	8/29/97	ND	
1,2-Dichloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
Vinyl Acetate	NONE	624	5	1	NA	8/29/97	ND	
Trichloroethene (TCE)	NONE	624	0.5	1	NA	8/29/97	ND	
1,2-Dichloropropane	NONE	624	0.5	1	NA	8/29/97	ND	
Bromodichloromethane	NONE	624	0.5	1	NA	8/29/97	ND	
2-Chloroethyl Vinyl Ether	NONE	624	5	1	NA	8/29/97	ND	
trans-1,3-Dichloropropene	NONE	624	0.5	1	NA	8/29/97	ND	
4-Methyl-2-pentanone (MIBK)	NONE	624	5	1	NA	8/29/97	ND	
2-Hexanone	NONE	624	5	1	NA	8/29/97	ND	
Toluene	NONE	624	0.5	1	NA	8/29/97	ND	
cis-1,3-Dichloropropene	NONE	624	0.5	1	NA	8/29/97	ND	
1,1,2-Trichloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
Tetrachloroethene (PCE)	NONE	624	0.5	1	NA	8/29/97	11	
Dibromochloromethane	NONE	624	0.5	1	NA	8/29/97	ND	
Chlorobenzene	NONE	624	0.5	1	NA	8/29/97	ND	
Ethylbenzene	NONE	624	0.5	1	NA	8/29/97	ND	
Styrene	NONE	624	0.5	1	NA	8/29/97	ND	
Total Xylenes	NONE	624	0.5	1	NA	8/29/97	ND	
Bromoform	NONE	624	0.5	1	NA	8/29/97	ND	
1,1,2,2-Tetrachloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
1,3-Dichlorobenzene	NONE	624	0.5	1	NA	8/29/97	ND	
1,4-Dichlorobenzene	NONE	624	0.5	1	NA	8/29/97	ND	
1,2-Dichlorobenzene	NONE	624	0.5	1	NA	8/29/97	ND	

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	MW-2 (18)	Units:	ug/L (ppb)
Lab Code:	S9701582-002	Basis:	NA
Test Notes:	M1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	0.5	10	NA	8/29/97	<5	
Vinyl Chloride	NONE	624	0.5	10	NA	8/29/97	<5	
Bromomethane	NONE	624	0.5	10	NA	8/29/97	<5	
Chloroethane	NONE	624	0.5	10	NA	8/29/97	<5	
Trichlorofluoromethane (CFC 11)	NONE	624	0.5	10	NA	8/29/97	<5	
Trichlorotrifluoroethane (CFC 113)	NONE	624	1	10	NA	8/29/97	<10	
1,1-Dichloroethene	NONE	624	0.5	10	NA	8/29/97	<5	
Acetone	NONE	624	5	10	NA	8/29/97	<50	
Carbon Disulfide	NONE	624	0.5	10	NA	8/29/97	<5	
Dichloromethane (Methylene Chloride)	NONE	624	1	10	NA	8/29/97	<10	
trans-1,2-Dichloroethene	NONE	624	0.5	10	NA	8/29/97	<5	
cis-1,2-Dichloroethene	NONE	624	0.5	10	NA	8/29/97	<5	
2-Butanone (MEK)	NONE	624	5	10	NA	8/29/97	<50	
1,1-Dichloroethane	NONE	624	0.5	10	NA	8/29/97	<5	
Chloroform	NONE	624	0.5	10	NA	8/29/97	<5	
1,1,1-Trichloroethane (TCA)	NONE	624	0.5	10	NA	8/29/97	<5	
Carbon Tetrachloride	NONE	624	0.5	10	NA	8/29/97	<5	
Benzene	NONE	624	0.5	10	NA	8/29/97	8	
1,2-Dichloroethane	NONE	624	0.5	10	NA	8/29/97	<5	
Vinyl Acetate	NONE	624	5	10	NA	8/29/97	<50	
Trichloroethene (TCE)	NONE	624	0.5	10	NA	8/29/97	<5	
1,2-Dichloropropane	NONE	624	0.5	10	NA	8/29/97	<5	
Bromodichloromethane	NONE	624	0.5	10	NA	8/29/97	<5	
2-Chloroethyl Vinyl Ether	NONE	624	5	10	NA	8/29/97	<50	
trans-1,3-Dichloropropene	NONE	624	0.5	10	NA	8/29/97	<5	
4-Methyl-2-pentanone (MIBK)	NONE	624	5	10	NA	8/29/97	<50	
2-Hexanone	NONE	624	5	10	NA	8/29/97	<50	
Toluene	NONE	624	0.5	10	NA	8/29/97	<5	
cis-1,3-Dichloropropene	NONE	624	0.5	10	NA	8/29/97	<5	
1,1,2-Trichloroethane	NONE	624	0.5	10	NA	8/29/97	<5	
Tetrachloroethene (PCE)	NONE	624	0.5	10	NA	8/29/97	<5	
Dibromochloromethane	NONE	624	0.5	10	NA	8/29/97	<5	
Chlorobenzene	NONE	624	0.5	10	NA	8/29/97	<5	
Ethylbenzene	NONE	624	0.5	10	NA	8/29/97	<5	
Styrene	NONE	624	0.5	10	NA	8/29/97	<5	
Total Xylenes	NONE	624	0.5	10	NA	8/29/97	<5	
Bromoform	NONE	624	0.5	10	NA	8/29/97	<5	
1,1,2,2-Tetrachloroethane	NONE	624	0.5	10	NA	8/29/97	<5	
1,3-Dichlorobenzene	NONE	624	0.5	10	NA	8/29/97	<5	
1,4-Dichlorobenzene	NONE	624	0.5	10	NA	8/29/97	<5	
1,2-Dichlorobenzene	NONE	624	0.5	10	NA	8/29/97	<5	

M1 The MRL was elevated because of matrix interferences.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-170.008/TO#21133.00/0276 OAKLAND
Sample Matrix: Water

Service Request: S9701582
Date Collected: 8/18/97
Date Received: 8/19/97

Volatile Organic Compounds

Sample Name: MW-3 (31)
Lab Code: S9701582-003
Test Notes: C1

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	0.5	10	NA	8/28/97	<5	
Vinyl Chloride	NONE	624	0.5	10	NA	8/28/97	<5	
Bromomethane	NONE	624	0.5	10	NA	8/28/97	<5	
Chloroethane	NONE	624	0.5	10	NA	8/28/97	<5	
Trichlorofluoromethane (CFC 11)	NONE	624	0.5	10	NA	8/28/97	<5	
Trichlorotrifluoroethane (CFC 113)	NONE	624	1	10	NA	8/28/97	<10	
1,1-Dichloroethene	NONE	624	0.5	10	NA	8/28/97	<5	
Acetone	NONE	624	5	10	NA	8/28/97	<50	
Carbon Disulfide	NONE	624	0.5	10	NA	8/28/97	<5	
Dichloromethane (Methylene Chloride)	NONE	624	1	10	NA	8/28/97	<10	
trans-1,2-Dichloroethene	NONE	624	0.5	10	NA	8/28/97	<5	
cis-1,2-Dichloroethene	NONE	624	0.5	10	NA	8/28/97	<5	
2-Butanone (MEK)	NONE	624	5	10	NA	8/28/97	<50	
1,1-Dichloroethane	NONE	624	0.5	10	NA	8/28/97	<5	
Chloroform	NONE	624	0.5	10	NA	8/28/97	<5	
1,1,1-Trichloroethane (TCA)	NONE	624	0.5	10	NA	8/28/97	<5	
Carbon Tetrachloride	NONE	624	0.5	10	NA	8/28/97	<5	
Benzene	NONE	624	0.5	10	NA	8/28/97	<5	
1,2-Dichloroethane	NONE	624	0.5	10	NA	8/28/97	<5	
Vinyl Acetate	NONE	624	5	10	NA	8/28/97	<50	
Trichloroethene (TCE)	NONE	624	0.5	10	NA	8/28/97	<5	
1,2-Dichloropropane	NONE	624	0.5	10	NA	8/28/97	<5	
Bromodichloromethane	NONE	624	0.5	10	NA	8/28/97	<5	
2-Chloroethyl Vinyl Ether	NONE	624	5	10	NA	8/28/97	<50	
trans-1,3-Dichloropropene	NONE	624	0.5	10	NA	8/28/97	<5	
4-Methyl-2-pentanone (MIBK)	NONE	624	5	10	NA	8/28/97	<50	
2-Hexanone	NONE	624	5	10	NA	8/28/97	<50	
Toluene	NONE	624	0.5	10	NA	8/28/97	<5	
cis-1,3-Dichloropropene	NONE	624	0.5	10	NA	8/28/97	<5	
1,1,2-Trichloroethane	NONE	624	0.5	10	NA	8/28/97	<5	
Tetrachloroethene (PCE)	NONE	624	0.5	10	NA	8/28/97	420	
Dibromochloromethane	NONE	624	0.5	10	NA	8/28/97	<5	
Chlorobenzene	NONE	624	0.5	10	NA	8/28/97	<5	
Ethylbenzene	NONE	624	0.5	10	NA	8/28/97	<5	
Styrene	NONE	624	0 5	10	NA	8/28/97	<5	
Total Xylenes	NONE	624	0.5	10	NA	8/28/97	<5	
Bromoform	NONE	624	0.5	10	NA	8/28/97	<5	
1,1,2,2-Tetrachloroethane	NONE	624	0.5	10	NA	8/28/97	<5	
1,3-Dichlorobenzene	NONE	624	0.5	10	NA	8/28/97	<5	
1,4-Dichlorobenzene	NONE	624	0.5	10	NA	8/28/97	<5	
1,2-Dichlorobenzene	NONE	624	0.5	10	NA	8/28/97	<5	

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	MW-7 (25)	Units:	ug/L (ppb)
Lab Code:	S9701582-006	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	0.5	20	NA	8/29/97	<10	
Vinyl Chloride	NONE	624	0.5	20	NA	8/29/97	<10	
Bromomethane	NONE	624	0.5	20	NA	8/29/97	<10	
Chloroethane	NONE	624	0.5	20	NA	8/29/97	<10	
Trichlorofluoromethane (CFC 11)	NONE	624	0.5	20	NA	8/29/97	<10	
Trichlorotrifluoroethane (CFC 113)	NONE	624	1	20	NA	8/29/97	<20	
1,1-Dichloroethene	NONE	624	0.5	20	NA	8/29/97	<10	
Acetone	NONE	624	5	20	NA	8/29/97	<100	
Carbon Disulfide	NONE	624	0.5	20	NA	8/29/97	<10	
Dichloromethane (Methylene Chloride)	NONE	624	1	20	NA	8/29/97	<20	
trans-1,2-Dichloroethene	NONE	624	0.5	20	NA	8/29/97	<10	
cis-1,2-Dichloroethene	NONE	624	0.5	20	NA	8/29/97	<10	
2-Butanone (MEK)	NONE	624	5	20	NA	8/29/97	<100	
1,1-Dichloroethane	NONE	624	0.5	20	NA	8/29/97	<10	
Chloroform	NONE	624	0.5	20	NA	8/29/97	<10	
1,1,1-Trichloroethane (TCA)	NONE	624	0.5	20	NA	8/29/97	<10	
Carbon Tetrachloride	NONE	624	0.5	20	NA	8/29/97	<10	
Benzene	NONE	624	0.5	20	NA	8/29/97	150	
1,2-Dichloroethane	NONE	624	0.5	20	NA	8/29/97	<10	
Vinyl Acetate	NONE	624	5	20	NA	8/29/97	<100	
Trichloroethene (TCE)	NONE	624	0.5	20	NA	8/29/97	<10	
1,2-Dichloropropane	NONE	624	0.5	20	NA	8/29/97	<10	
Bromodichloromethane	NONE	624	0.5	20	NA	8/29/97	<10	
2-Chloroethyl Vinyl Ether	NONE	624	5	20	NA	8/29/97	<100	
trans-1,3-Dichloropropene	NONE	624	0.5	20	NA	8/29/97	<10	
4-Methyl-2-pentanone (MIBK)	NONE	624	5	20	NA	8/29/97	<100	
2-Hexanone	NONE	624	5	20	NA	8/29/97	<100	
Toluene	NONE	624	0.5	20	NA	8/29/97	13	
cis-1,3-Dichloropropene	NONE	624	0.5	20	NA	8/29/97	<10	
1,1,2-Trichloroethane	NONE	624	0.5	20	NA	8/29/97	<10	
Tetrachloroethene (PCE)	NONE	624	0.5	20	NA	8/29/97	<10	
Dibromochloromethane	NONE	624	0.5	20	NA	8/29/97	<10	
Chlorobenzene	NONE	624	0.5	20	NA	8/29/97	<10	
Ethylbenzene	NONE	624	0.5	20	NA	8/29/97	500	
Styrene	NONE	624	0.5	20	NA	8/29/97	<10	
Total Xylenes	NONE	624	0.5	20	NA	8/29/97	540	
Bromoform	NONE	624	0.5	20	NA	8/29/97	<10	
1,1,2,2-Tetrachloroethane	NONE	624	0.5	20	NA	8/29/97	<10	
1,3-Dichlorobenzene	NONE	624	0.5	20	NA	8/29/97	<10	
1,4-Dichlorobenzene	NONE	624	0.5	20	NA	8/29/97	<10	
1,2-Dichlorobenzene	NONE	624	0.5	20	NA	8/29/97	<10	

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

TBE

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Volatile Organic Compounds

Sample Name:	*Method Blank*	Units:	ug/L (ppb)
Lab Code:	S970829-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	0.5	1	NA	8/29/97	ND	
Vinyl Chloride	NONE	624	0.5	1	NA	8/29/97	ND	
Bromomethane	NONE	624	0.5	1	NA	8/29/97	ND	
Chloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
Trichlorofluoromethane (CFC 11)	NONE	624	0.5	1	NA	8/29/97	ND	
Trichlorotrifluoroethane (CFC 113)	NONE	624	1	1	NA	8/29/97	ND	
1,1-Dichloroethene	NONE	624	0.5	1	NA	8/29/97	ND	
Acetone	NONE	624	5	1	NA	8/29/97	ND	
Carbon Disulfide	NONE	624	0.5	1	NA	8/29/97	ND	
Dichloromethane (Methylene Chloride)	NONE	624	1	1	NA	8/29/97	ND	
trans-1,2-Dichloroethene	NONE	624	0.5	1	NA	8/29/97	ND	
cis-1,2-Dichloroethene	NONE	624	0.5	1	NA	8/29/97	ND	
2-Butanone (MEK)	NONE	624	5	1	NA	8/29/97	ND	
1,1-Dichloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
Chloroform	NONE	624	0.5	1	NA	8/29/97	ND	
1,1,1-Trichloroethane (TCA)	NONE	624	0.5	1	NA	8/29/97	ND	
Carbon Tetrachloride	NONE	624	0.5	1	NA	8/29/97	ND	
Benzene	NONE	624	0.5	1	NA	8/29/97	ND	
1,2-Dichloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
Vinyl Acetate	NONE	624	5	1	NA	8/29/97	ND	
Trichloroethene (TCE)	NONE	624	0.5	1	NA	8/29/97	ND	
1,2-Dichloropropane	NONE	624	0.5	1	NA	8/29/97	ND	
Bromodichloromethane	NONE	624	0.5	1	NA	8/29/97	ND	
2-Chloroethyl Vinyl Ether	NONE	624	5	1	NA	8/29/97	ND	
trans-1,3-Dichloropropene	NONE	624	0.5	1	NA	8/29/97	ND	
4-Methyl-2-pentanone (MIBK)	NONE	624	5	1	NA	8/29/97	ND	
2-Hexanone	NONE	624	5	1	NA	8/29/97	ND	
Toluene	NONE	624	0.5	1	NA	8/29/97	ND	
cis-1,3-Dichloropropene	NONE	624	0.5	1	NA	8/29/97	ND	
1,1,2-Trichloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
Tetrachloroethene (PCE)	NONE	624	0.5	1	NA	8/29/97	ND	
Dibromochloromethane	NONE	624	0.5	1	NA	8/29/97	ND	
Chlorobenzene	NONE	624	0.5	1	NA	8/29/97	ND	
Ethylbenzene	NONE	624	0.5	1	NA	8/29/97	ND	
Styrene	NONE	624	0.5	1	NA	8/29/97	ND	
Total Xylenes	NONE	624	0.5	1	NA	8/29/97	ND	
Bromoform	NONE	624	0.5	1	NA	8/29/97	ND	
1,1,2,2-Tetrachloroethane	NONE	624	0.5	1	NA	8/29/97	ND	
1,3-Dichlorobenzene	NONE	624	0.5	1	NA	8/29/97	ND	
1,4-Dichlorobenzene	NONE	624	0.5	1	NA	8/29/97	ND	
1,2-Dichlorobenzene	NONE	624	0.5	1	NA	8/29/97	ND	

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Volatile Organic Compounds

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S970825-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	0.5	1	NA	8/25/97	ND	
Vinyl Chloride	NONE	624	0.5	1	NA	8/25/97	ND	
Bromomethane	NONE	624	0.5	1	NA	8/25/97	ND	
Chloroethane	NONE	624	0.5	1	NA	8/25/97	ND	
Trichlorofluoromethane (CFC 11)	NONE	624	0.5	1	NA	8/25/97	ND	
Trichlorotrifluoroethane (CFC 113)	NONE	624	1	1	NA	8/25/97	ND	
1,1-Dichloroethene	NONE	624	0.5	1	NA	8/25/97	ND	
Acetone	NONE	624	5	1	NA	8/25/97	ND	
Carbon Disulfide	NONE	624	0.5	1	NA	8/25/97	ND	
Dichloromethane (Methylene Chloride)	NONE	624	1	1	NA	8/25/97	ND	
trans-1,2-Dichloroethene	NONE	624	0.5	1	NA	8/25/97	ND	
cis-1,2-Dichloroethene	NONE	624	0.5	1	NA	8/25/97	ND	
2-Butanone (MEK)	NONE	624	5	1	NA	8/25/97	ND	
1,1-Dichloroethane	NONE	624	0.5	1	NA	8/25/97	ND	
Chloroform	NONE	624	0.5	1	NA	8/25/97	ND	
1,1,1-Trichloroethane (TCA)	NONE	624	0.5	1	NA	8/25/97	ND	
Carbon Tetrachloride	NONE	624	0.5	1	NA	8/25/97	ND	
Benzene	NONE	624	0.5	1	NA	8/25/97	ND	
1,2-Dichloroethane	NONE	624	0.5	1	NA	8/25/97	ND	
Vinyl Acetate	NONE	624	5	1	NA	8/25/97	ND	
Trichloroethene (TCE)	NONE	624	0.5	1	NA	8/25/97	ND	
1,2-Dichloropropane	NONE	624	0.5	1	NA	8/25/97	ND	
Bromodichloromethane	NONE	624	0.5	1	NA	8/25/97	ND	
2-Chloroethyl Vinyl Ether	NONE	624	5	1	NA	8/25/97	ND	
trans-1,3-Dichloropropene	NONE	624	0.5	1	NA	8/25/97	ND	
4-Methyl-2-pentanone (MIBK)	NONE	624	5	1	NA	8/25/97	ND	
2-Hexanone	NONE	624	5	1	NA	8/25/97	ND	
Toluene	NONE	624	0.5	1	NA	8/25/97	ND	
cis-1,3-Dichloropropene	NONE	624	0.5	1	NA	8/25/97	ND	
1,1,2-Trichloroethane	NONE	624	0.5	1	NA	8/25/97	ND	
Tetrachloroethene (PCE)	NONE	624	0.5	1	NA	8/25/97	ND	
Dibromochloromethane	NONE	624	0.5	1	NA	8/25/97	ND	
Chlorobenzene	NONE	624	0.5	1	NA	8/25/97	ND	
Ethylbenzene	NONE	624	0.5	1	NA	8/25/97	ND	
Styrene	NONE	624	0.5	1	NA	8/25/97	ND	
Total Xylenes	NONE	624	0.5	1	NA	8/25/97	ND	
Bromoform	NONE	624	0.5	1	NA	8/25/97	ND	
1,1,2,2-Tetrachloroethane	NONE	624	0.5	1	NA	8/25/97	ND	
1,3-Dichlorobenzene	NONE	624	0.5	1	NA	8/25/97	ND	
1,4-Dichlorobenzene	NONE	624	0.5	1	NA	8/25/97	ND	
1,2-Dichlorobenzene	NONE	624	0.5	1	NA	8/25/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

Volatile Organic Compounds

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S870828-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	0.5	1	NA	8/28/97	ND	
Vinyl Chloride	NONE	624	0.5	1	NA	8/28/97	ND	
Bromomethane	NONE	624	0.5	1	NA	8/28/97	ND	
Chloroethane	NONE	624	0.5	1	NA	8/28/97	ND	
Trichlorofluoromethane (CFC 11)	NONE	624	0.5	1	NA	8/28/97	ND	
Trichlorotrifluoroethane (CFC 113)	NONE	624	1	1	NA	8/28/97	ND	
1,1-Dichloroethene	NONE	624	0.5	1	NA	8/28/97	ND	
Acetone	NONE	624	5	1	NA	8/28/97	ND	
Carbon Disulfide	NONE	624	0.5	1	NA	8/28/97	ND	
Dichloromethane (Methylene Chloride)	NONE	624	1	1	NA	8/28/97	ND	
trans-1,2-Dichloroethene	NONE	624	0.5	1	NA	8/28/97	ND	
cis-1,2-Dichloroethene	NONE	624	0.5	1	NA	8/28/97	ND	
2-Butanone (MEK)	NONE	624	5	1	NA	8/28/97	ND	
1,1-Dichloroethane	NONE	624	0.5	1	NA	8/28/97	ND	
Chloroform	NONE	624	0.5	1	NA	8/28/97	ND	
1,1,1-Trichloroethane (TCA)	NONE	624	0.5	1	NA	8/28/97	ND	
Carbon Tetrachloride	NONE	624	0.5	1	NA	8/28/97	ND	
Benzene	NONE	624	0.5	1	NA	8/28/97	ND	
1,2-Dichloroethane	NONE	624	0.5	1	NA	8/28/97	ND	
Vinyl Acetate	NONE	624	5	1	NA	8/28/97	ND	
Trichloroethene (TCE)	NONE	624	0.5	1	NA	8/28/97	ND	
1,2-Dichloropropane	NONE	624	0.5	1	NA	8/28/97	ND	
Bromodichloromethane	NONE	624	0.5	1	NA	8/28/97	ND	
2-Chloroethyl Vinyl Ether	NONE	624	5	1	NA	8/28/97	ND	
trans-1,3-Dichloropropene	NONE	624	0.5	1	NA	8/28/97	ND	
4-Methyl-2-pentanone (MIBK)	NONE	624	5	1	NA	8/28/97	ND	
2-Hexanone	NONE	624	5	1	NA	8/28/97	ND	
Toluene	NONE	624	0.5	1	NA	8/28/97	ND	
cis-1,3-Dichloropropene	NONE	624	0.5	1	NA	8/28/97	ND	
1,1,2-Trichloroethane	NONE	624	0.5	1	NA	8/28/97	ND	
Tetrachloroethene (PCE)	NONE	624	0.5	1	NA	8/28/97	ND	
Dibromochloromethane	NONE	624	0.5	1	NA	8/28/97	ND	
Chlorobenzene	NONE	624	0.5	1	NA	8/28/97	ND	
Ethylbenzene	NONE	624	0.5	1	NA	8/28/97	ND	
Styrene	NONE	624	0.5	1	NA	8/28/97	ND	
Total Xylenes	NONE	624	0.5	1	NA	8/28/97	ND	
Bromoform	NONE	624	0.5	1	NA	8/28/97	ND	
1,1,2,2-Tetrachloroethane	NONE	624	0.5	1	NA	8/28/97	ND	
1,3-Dichlorobenzene	NONE	624	0.5	1	NA	8/28/97	ND	
1,4-Dichlorobenzene	NONE	624	0.5	1	NA	8/28/97	ND	
1,2-Dichlorobenzene	NONE	624	0.5	1	NA	8/28/97	ND	

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	MW-4 (31)	Units:	ug/L (ppb)
Lab Code:	S9701582-004	Basis:	NA
Test Notes:	C1, X		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	5	25	NA	8/29/97	<125	
Vinyl Chloride	NONE	624	5	25	NA	8/29/97	<125	
Bromomethane	NONE	624	5	25	NA	8/29/97	<125	
Chloroethane	NONE	624	5	25	NA	8/29/97	<125	
Trichlorofluoromethane (CFC 11)	NONE	624	5	25	NA	8/29/97	<125	
1,1-Dichloroethene	NONE	624	5	25	NA	8/29/97	<125	
Acetone	NONE	624	50	25	NA	8/29/97	<1250	
Carbon Disulfide	NONE	624	5	25	NA	8/29/97	<125	
Dichloromethane (Methylene Chloride)	NONE	624	5	25	NA	8/29/97	<125	
trans-1,2-Dichloroethene	NONE	624	5	25	NA	8/29/97	<125	
2-Butanone (MEK)	NONE	624	50	25	NA	8/29/97	<1250	
1,1-Dichloroethane	NONE	624	5	25	NA	8/29/97	<125	
Chloroform	NONE	624	5	25	NA	8/29/97	<125	
1,1,1-Trichloroethane (TCA)	NONE	624	5	25	NA	8/29/97	<125	
Carbon Tetrachloride	NONE	624	5	25	NA	8/29/97	<125	
Benzene	NONE	624	5	25	NA	8/29/97	<125	
1,2-Dichloroethane	NONE	624	5	25	NA	8/29/97	<125	
Vinyl Acetate	NONE	624	5	25	NA	8/29/97	<125	
Trichloroethene (TCE)	NONE	624	5	25	NA	8/29/97	<125	
1,2-Dichloropropane	NONE	624	5	25	NA	8/29/97	<125	
Bromodichloromethane	NONE	624	5	25	NA	8/29/97	<125	
trans-1,3-Dichloropropene	NONE	624	5	25	NA	8/29/97	<125	
4-Methyl-2-pentanone (MIBK)	NONE	624	50	25	NA	8/29/97	<1250	
2-Hexanone	NONE	624	50	25	NA	8/29/97	<1250	
Toluene	NONE	624	5	25	NA	8/29/97	<125	
cis-1,3-Dichloropropene	NONE	624	5	25	NA	8/29/97	<125	
1,1,2-Trichloroethane	NONE	624	5	25	NA	8/29/97	<125	
Tetrachloroethene (PCE)	NONE	624	5	25	NA	8/29/97	600	
Dibromochloromethane	NONE	624	5	25	NA	8/29/97	<125	
Chlorobenzene	NONE	624	5	25	NA	8/29/97	<125	
Ethylbenzene	NONE	624	5	25	NA	8/29/97	<125	
Styrene	NONE	624	5	25	NA	8/29/97	<125	
Total Xylenes	NONE	624	5	25	NA	8/29/97	<125	
Bromoform	NONE	624	5	25	NA	8/29/97	<125	
1,1,2,2-Tetrachloroethane	NONE	624	5	25	NA	8/29/97	<125	
1,3-Dichlorobenzene	NONE	624	5	25	NA	8/29/97	<125	
1,4-Dichlorobenzene	NONE	624	5	25	NA	8/29/97	<125	
1,2-Dichlorobenzene	NONE	624	5	25	NA	8/29/97	<125	

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

X Due to instrument problems, the analysis was performed by Entech Analytical Labs, Inc. CA ELAP #2224.

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	MW-6 (49)	Units:	ug/L (ppb)
Lab Code:	S9701582-005	Basis:	NA
Test Notes:	C1, X		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
Vinyl Chloride	NONE	624	5	12.5	NA	8/29/97	<62.5	
Bromomethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
Chloroethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
Trichlorofluoromethane (CFC 11)	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,1-Dichloroethene	NONE	624	5	12.5	NA	8/29/97	<62.5	
Acetone	NONE	624	50	12.5	NA	8/29/97	<625	
Carbon Disulfide	NONE	624	5	12.5	NA	8/29/97	<62.5	
Dichloromethane (Methylene Chloride)	NONE	624	5	12.5	NA	8/29/97	<62.5	
trans-1,2-Dichloroethene	NONE	624	5	12.5	NA	8/29/97	<62.5	
2-Butanone (MEK)	NONE	624	50	12.5	NA	8/29/97	<625	
1,1-Dichloroethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
Chloroform	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,1,1-Trichloroethane (TCA)	NONE	624	5	12.5	NA	8/29/97	<62.5	
Carbon Tetrachloride	NONE	624	5	12.5	NA	8/29/97	<62.5	
Benzene	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,2-Dichloroethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
Vinyl Acetate	NONE	624	5	12.5	NA	8/29/97	<62.5	
Trichloroethene (TCE)	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,2-Dichloropropane	NONE	624	5	12.5	NA	8/29/97	<62.5	
Bromodichloromethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
trans-1,3-Dichloropropene	NONE	624	5	12.5	NA	8/29/97	<62.5	
4-Methyl-2-pentanone (MIBK)	NONE	624	50	12.5	NA	8/29/97	<625	
2-Hexanone	NONE	624	50	12.5	NA	8/29/97	<625	
Toluene	NONE	624	5	12.5	NA	8/29/97	<62.5	
cis-1,3-Dichloropropene	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,1,2-Trichloroethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
Tetrachloroethene (PCE)	NONE	624	5	12.5	NA	8/29/97	420	
Dibromochloromethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
Chlorobenzene	NONE	624	5	12.5	NA	8/29/97	<62.5	
Ethylbenzene	NONE	624	5	12.5	NA	8/29/97	<62.5	
Styrene	NONE	624	5	12.5	NA	8/29/97	<62.5	
Total Xylenes	NONE	624	5	12.5	NA	8/29/97	<62.5	
Bromoform	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,1,2,2-Tetrachloroethane	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,3-Dichlorobenzene	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,4-Dichlorobenzene	NONE	624	5	12.5	NA	8/29/97	<62.5	
1,2-Dichlorobenzene	NONE	624	5	12.5	NA	8/29/97	<62.5	

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

X Due to instrument problems, the analysis was performed by Entech Analytical Labs, Inc. CA ELAP #2224.

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	MW-8 (46)	Units:	ug/L (ppb)
Lab Code:	S9701582-007	Basis:	NA
Test Notes:	X		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	5	1	NA	8/29/97	ND	
Vinyl Chloride	NONE	624	5	1	NA	8/29/97	ND	
Bromomethane	NONE	624	5	1	NA	8/29/97	ND	
Chloroethane	NONE	624	5	1	NA	8/29/97	ND	
Trichlorofluoromethane (CFC 11)	NONE	624	5	1	NA	8/29/97	ND	
1,1-Dichloroethene	NONE	624	5	1	NA	8/29/97	ND	
Acetone	NONE	624	50	1	NA	8/29/97	ND	
Carbon Disulfide	NONE	624	5	1	NA	8/29/97	ND	
Dichloromethane (Methylene Chloride)	NONE	624	5	1	NA	8/29/97	ND	
trans-1,2-Dichloroethene	NONE	624	5	1	NA	8/29/97	ND	
2-Butanone (MEK)	NONE	624	50	1	NA	8/29/97	ND	
1,1-Dichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Chloroform	NONE	624	5	1	NA	8/29/97	ND	
1,1,1-Trichloroethane (TCA)	NONE	624	5	1	NA	8/29/97	ND	
Carbon Tetrachloride	NONE	624	5	1	NA	8/29/97	ND	
Benzene	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Vinyl Acetate	NONE	624	5	1	NA	8/29/97	ND	
Trichloroethene (TCE)	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichloropropane	NONE	624	5	1	NA	8/29/97	ND	
Bromodichloromethane	NONE	624	5	1	NA	8/29/97	ND	
trans-1,3-Dichloropropene	NONE	624	5	1	NA	8/29/97	ND	
4-Methyl-2-pentanone (MIBK)	NONE	624	50	1	NA	8/29/97	ND	
2-Hexanone	NONE	624	50	1	NA	8/29/97	ND	
Toluene	NONE	624	5	1	NA	8/29/97	ND	
cis-1,3-Dichloropropene	NONE	624	5	1	NA	8/29/97	ND	
1,1,2-Trichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Tetrachloroethene (PCE)	NONE	624	5	1	NA	8/29/97	ND	
Dibromochloromethane	NONE	624	5	1	NA	8/29/97	ND	
Chlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
Ethylbenzene	NONE	624	5	1	NA	8/29/97	ND	
Styrene	NONE	624	5	1	NA	8/29/97	ND	
Total Xylenes	NONE	624	5	1	NA	8/29/97	ND	
Bromoform	NONE	624	5	1	NA	8/29/97	ND	
1,1,2,2-Tetrachloroethane	NONE	624	5	1	NA	8/29/97	ND	
1,3-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
1,4-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	

X Due to instrument problems, the analysis was performed by Entech Analytical Labs, Inc. CA ELAP #2224.

IS44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	RW-1 (49)	Units:	ug/L (ppb)
Lab Code:	S9701582-008	Basis:	NA
Test Notes:	X		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	5	1	NA	8/29/97	ND	
Vinyl Chloride	NONE	624	5	1	NA	8/29/97	ND	
Bromomethane	NONE	624	5	1	NA	8/29/97	ND	
Chloroethane	NONE	624	5	1	NA	8/29/97	ND	
Trichlorofluoromethane (CFC 11)	NONE	624	5	1	NA	8/29/97	ND	
1,1-Dichloroethene	NONE	624	5	1	NA	8/29/97	ND	
Acetone	NONE	624	50	1	NA	8/29/97	ND	
Carbon Disulfide	NONE	624	5	1	NA	8/29/97	ND	
Dichloromethane (Methylene Chloride)	NONE	624	5	1	NA	8/29/97	ND	
trans-1,2-Dichloroethene	NONE	624	5	1	NA	8/29/97	ND	
2-Butanone (MEK)	NONE	624	50	1	NA	8/29/97	ND	
1,1-Dichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Chloroform	NONE	624	5	1	NA	8/29/97	ND	
1,1,1-Trichloroethane (TCA)	NONE	624	5	1	NA	8/29/97	ND	
Carbon Tetrachloride	NONE	624	5	1	NA	8/29/97	ND	
Benzene	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Vinyl Acetate	NONE	624	5	1	NA	8/29/97	ND	
Trichloroethene (TCE)	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichloropropane	NONE	624	5	1	NA	8/29/97	ND	
Bromodichloromethane	NONE	624	5	1	NA	8/29/97	ND	
trans-1,3-Dichloropropene	NONE	624	5	1	NA	8/29/97	ND	
4-Methyl-2-pentanone (MIBK)	NONE	624	50	1	NA	8/29/97	ND	
2-Hexanone	NONE	624	50	1	NA	8/29/97	ND	
Toluene	NONE	624	5	1	NA	8/29/97	ND	
cis-1,3-Dichloropropene	NONE	624	5	1	NA	8/29/97	ND	
1,1,2-Trichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Tetrachloroethene (PCE)	NONE	624	5	1	NA	8/29/97	46	
Dibromochloromethane	NONE	624	5	1	NA	8/29/97	ND	
Chlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
Ethylbenzene	NONE	624	5	1	NA	8/29/97	ND	
Styrene	NONE	624	5	1	NA	8/29/97	ND	
Total Xylenes	NONE	624	5	1	NA	8/29/97	ND	
Bromoform	NONE	624	5	1	NA	8/29/97	ND	
1,1,2,2-Tetrachloroethane	NONE	624	5	1	NA	8/29/97	ND	
1,3-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
1,4-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	

X Due to instrument problems, the analysis was performed by Entech Analytical Labs, Inc. CA ELAP #2224.

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	WGR-3 (27)	Units:	ug/L (ppb)
Lab Code:	S9701582-009	Basis:	NA
Test Notes:	X		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	5	1	NA	8/29/97	ND	
Vinyl Chloride	NONE	624	5	1	NA	8/29/97	ND	
Bromomethane	NONE	624	5	1	NA	8/29/97	ND	
Chloroethane	NONE	624	5	1	NA	8/29/97	ND	
Trichlorofluoromethane (CFC 11)	NONE	624	5	1	NA	8/29/97	ND	
1,1-Dichloroethene	NONE	624	5	1	NA	8/29/97	ND	
Acetone	NONE	624	50	1	NA	8/29/97	ND	
Carbon Disulfide	NONE	624	5	1	NA	8/29/97	ND	
Dichloromethane (Methylene Chloride)	NONE	624	5	1	NA	8/29/97	ND	
trans-1,2-Dichloroethene	NONE	624	5	1	NA	8/29/97	ND	
2-Butanone (MEK)	NONE	624	50	1	NA	8/29/97	ND	
1,1-Dichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Chloroform	NONE	624	5	1	NA	8/29/97	ND	
1,1,1-Trichloroethane (TCA)	NONE	624	5	1	NA	8/29/97	ND	
Carbon Tetrachloride	NONE	624	5	1	NA	8/29/97	ND	
Benzene	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Vinyl Acetate	NONE	624	5	1	NA	8/29/97	ND	
Trichloroethene (TCE)	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichloropropane	NONE	624	5	1	NA	8/29/97	ND	
Bromodichloromethane	NONE	624	5	1	NA	8/29/97	ND	
trans-1,3-Dichloropropene	NONE	624	5	1	NA	8/29/97	ND	
4-Methyl-2-pentanone (MIBK)	NONE	624	50	1	NA	8/29/97	ND	
2-Hexanone	NONE	624	50	1	NA	8/29/97	ND	
Toluene	NONE	624	5	1	NA	8/29/97	ND	
cis-1,3-Dichloropropene	NONE	624	5	1	NA	8/29/97	ND	
1,1,2-Trichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Tetrachloroethene (PCE)	NONE	624	5	1	NA	8/29/97	ND	
Dibromochloromethane	NONE	624	5	1	NA	8/29/97	ND	
Chlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
Ethylbenzene	NONE	624	5	1	NA	8/29/97	ND	
Styrene	NONE	624	5	1	NA	8/29/97	ND	
Total Xylenes	NONE	624	5	1	NA	8/29/97	ND	
Bromoform	NONE	624	5	1	NA	8/29/97	ND	
1,1,2,2-Tetrachloroethane	NONE	624	5	1	NA	8/29/97	ND	
1,3-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
1,4-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	

X Due to instrument problems, the analysis was performed by Entech Analytical Labs, Inc. CA ELAP #2224.

1S44/021397p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	8/18/97
Sample Matrix:	Water	**Date Received:**	8/19/97

Volatile Organic Compounds

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S970829-WB2	Basis:	NA
Test Notes:	X		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Chloromethane	NONE	624	5	1	NA	8/29/97	ND	
Vinyl Chloride	NONE	624	5	1	NA	8/29/97	ND	
Bromomethane	NONE	624	5	1	NA	8/29/97	ND	
Chloroethane	NONE	624	5	1	NA	8/29/97	ND	
Trichlorofluoromethane (CFC 11)	NONE	624	5	1	NA	8/29/97	ND	
1,1-Dichloroethene	NONE	624	5	1	NA	8/29/97	ND	
Acetone	NONE	624	50	1	NA	8/29/97	ND	
Carbon Disulfide	NONE	624	5	1	NA	8/29/97	ND	
Dichloromethane (Methylene Chloride)	NONE	624	5	1	NA	8/29/97	ND	
trans-1,2-Dichloroethene	NONE	624	5	1	NA	8/29/97	ND	
2-Butanone (MEK)	NONE	624	50	1	NA	8/29/97	ND	
1,1-Dichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Chloroform	NONE	624	5	1	NA	8/29/97	ND	
1,1,1-Trichloroethane (TCA)	NONE	624	5	1	NA	8/29/97	ND	
Carbon Tetrachloride	NONE	624	5	1	NA	8/29/97	ND	
Benzene	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Vinyl Acetate	NONE	624	5	1	NA	8/29/97	ND	
Trichloroethene (TCE)	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichloropropane	NONE	624	5	1	NA	8/29/97	ND	
Bromodichloromethane	NONE	624	5	1	NA	8/29/97	ND	
trans-1,3-Dichloropropene	NONE	624	5	1	NA	8/29/97	ND	
4-Methyl-2-pentanone (MIBK)	NONE	624	50	1	NA	8/29/97	ND	
2-Hexanone	NONE	624	50	1	NA	8/29/97	ND	
Toluene	NONE	624	5	1	NA	8/29/97	ND	
cis-1,3-Dichloropropene	NONE	624	5	1	NA	8/29/97	ND	
1,1,2-Trichloroethane	NONE	624	5	1	NA	8/29/97	ND	
Tetrachloroethene (PCE)	NONE	624	5	1	NA	8/29/97	ND	
Dibromochloromethane	NONE	624	5	1	NA	8/29/97	ND	
Chlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
Ethylbenzene	NONE	624	5	1	NA	8/29/97	ND	
Styrene	NONE	624	5	1	NA	8/29/97	ND	
Total Xylenes	NONE	624	5	1	NA	8/29/97	ND	
Bromoform	NONE	624	5	1	NA	8/29/97	ND	
1,1,2,2-Tetrachloroethane	NONE	624	5	1	NA	8/29/97	ND	
1,3-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
1,4-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	
1,2-Dichlorobenzene	NONE	624	5	1	NA	8/29/97	ND	

X The analysis was performed by Entech Analytical Labs, Inc. CA ELAP #2224.

1S44/021397p

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	L9702785
Project:	ARCO Products Company #0276/#20805-170.008	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	8/20/97
		Date Analyzed:	8/20/97

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
Petroleum Hydrocarbons, Total Recoverable (TRPH)

Sample Name:	Duplicate Lab Control Sample	Units:	mg/L (ppm)
Lab Code:	L970820-LCS, L970820-DLCS	Basis:	NA
Test Notes:	*		

Analyte	Prep Method	Analysis Method	True Value LCS	True Value DLCS	Result LCS	Result DLCS	Percent Recovery LCS	Percent Recovery DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
TRPH	METHOD	418.1	1.83	1.83	1.86	1.86	102	102	75-125	<1	

* Sample quantity was insufficient to perform matrix spike and matrix spike duplicate. Three separate, replicate one liter samples are required to analyze sample and spikes.

DLCS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 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-1 (30)	S9701582-001		95	86
MW-2 (18)	S9701582-002		91	92
MW-3 (31)	S9701582-003		91	91
MW-4 (31)	S9701582-004		100	102
MW-6 (49)	S9701582-005		93	91
MW-7 (25)	S9701582-006		96	84
MW-8 (46)	S9701582-007		94	85
RW-1 (49)	S9701582-008		94	88
WGR-3 (27)	S9701582-009		92	94
MW-1 (30)	S9701582-001MS		101	89
MW-1 (30)	S9701582-001DMS		97	80
Method Blank	S970822-WB1		94	80
Method Blank	S970825-WB1		102	94
CAS Acceptance Limits:			69-116	69-116

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-170.008/TO#21133.00/0276 OAKLAND
Sample Matrix: Water

Service Request: S9701582
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 8/22/97

Matrix Spike/Duplicate Matrix Spike Summary
BTE

Sample Name: MW-1 (30)
Lab Code: S9701582-001MS, S9701582-001DMS
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
Benzene	EPA 5030	8020	0.5	25	25	ND	25	26	100	104	75-135	4
Toluene	EPA 5030	8020	0.5	25	25	ND	26	27	104	108	73-136	4
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	30	27	120	108	69-142	11

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-170.008/TO#21133.00/0276 OAKLAND

Service Request: S9701582
Date Analyzed: 8/22/97

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	250	90-110	100	
Benzene	EPA 5030	8020	25	26	85-115	104	
Toluene	EPA 5030	8020	25	27	85-115	108	
Ethylbenzene	EPA 5030	8020	25	27	85-115	108	
Xylenes, Total	EPA 5030	8020	75	81	85-115	108	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	27	85-115	108	

ICV032196

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-170.008/TO#21133.00/0276 OAKLAND
Sample Matrix: Water

Service Request: S9701582
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
Volatile Organic Compounds

Prep Method: NONE
Analysis Method: 624

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery		
			Pentafluorobenzene	Toluene-D8	4-Bromofluorobenzene
MW-1 (30)	S9701582-001		102	96	92
MW-2 (18)	S9701582-002		101	102	93
MW-3 (31)	S9701582-003		100	90	91
MW-7 (25)	S9701582-006		106	100	100
BATCH QC	S9701542-003MS		96	98	89
BATCH QC	S9701542-003DMS		94	98	88
Method Blank	S970825-WB1		100	97	91
Method Blank	S970828-WB1		105	91	89
Method Blank	S970829-WB1		104	98	92

CAS Acceptance Limits:	82-119	88-112	86-114

SUR3/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-170.008/TO#21133.00/0276 OAKLAND
Sample Matrix: Water

Service Request: S9701582
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 8/25/97

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

Sample Name: BATCH QC
Lab Code: S9701542-003MS, S9701542-003DMS
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
1,1-Dichloroethene	NONE	624	0.5	100	100	ND	92	95	92	95	62-145	3	
Trichloroethene (TCE)	NONE	624	0.5	100	100	2	88	91	86	89	71-119	3	
Chlorobenzene	NONE	624	0.5	100	100	ND	86	89	86	89	75-127	3	
Toluene	NONE	624	0.5	100	100	ND	86	93	86	93	76-124	8	
Benzene	NONE	624	0.5	100	100	ND	93	94	93	94	77-127	1	

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9701582
Project:	20805-170.008/TO#21133.00/0276 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	NA

Surrogate Recovery Summary
Volatile Organic Compounds

Prep Method:	NONE	Units:	PERCENT
Analysis Method:	624	Basis:	NA

Sample Name	Lab Code	Test Notes	Percent Recovery		
			1,2-Dichloroethane-d4	Toluene-D8	4-Bromofluorobenzene
MW-4 (31)	S9701582-004		95	109	107
MW-6 (49)	S9701582-005		94	97	89
MW-8 (46)	S9701582-007		107	96	94
RW-1 (49)	S9701582-008		93	94	90
WGR-3 (27)	S9701582-009		94	94	92
Method Blank	S970829-WB2		98	95	91
CAS Acceptance Limits:			82-119	88-112	86-114

SUR3/020597p

GCMS-VOA TPH-VOA F

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. ~~[illegible]~~ 21133.00

Chain of Custody

ARCO Facility no.	0276
City (Facility)	Oakland
Project manager (Consultant)	Gary Messerotes
ARCO 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
Laboratory name	CAS
Contract number	
Method of shipment	Sampler will deliver
Special detection Limit/reporting	Lowest Possible
Special QA/QC	As Normal
Remarks	#20805-120.00
Lab number	S9701582

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 includes MTBE 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 no MTBE	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-1(30)	1	4		X		X	HCL	8/18/97	1120		X					X						
MW-2(18)	2	4		X		X	HCL	8/18/97	1245		X					X						
MW-3(31)	3	4		X		X	HCL	8/18/97	1315		X					X						
MW-4(31)	4	~~4~~ 6 KWC 8/19		X		X	HCL	8/18/97	1340		X			X		X						
MW-6(49)	5	4		X		X	HCL	8/18/97	1440		X					X						
MW-7(25)	6	4		X		X	HCL	8/18/97	1450		X					X						
MW-8(46)	7	4		X		X	HCL	8/18/97	1420		X					X						
RW-1(49)	8	4		X		X	HCL	8/18/97	1335		X					X						
WGR-3(27)	9	4		X		X	HCL	8/18/97	1510		X					X						

Condition of sample:			Temperature received:			
Relinquished by sampler: [signature]	Date 8/19/97	Time 0850	Received by [signature] CAS	Date 8/19/97		
Relinquished by	Date	Time	Received by			
Relinquished by	Date	Time	Received by laboratory	Date	Time	

Turnaround time

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

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

R8, R9, R20 / S12

25

Entech Analytical Labs, Inc.

525 Del Rey Avenue, Suite E • Sunnyvale, CA 94086 • Telephone: (408) 735-1550 (800) 287-1799 • Fax: (408) 735-1554

Chain of Custody/Analysis Work Order

Client: COLUMBIA ANALYTICAL

Address:

Contact:

Telephone #:

Date Received:

Turn Around:

Project ID:

Purchase Order #:

Sampler/Company:	Telephone #:
Special Instructions/Comments	

LAB USE ONLY

Samples arrived chilled and intact:

Yes No

Notes:

Sample Information								Requested Analysis								
					Received											
013705	S-01582-4			8/18/97	13:40											
013706	S-01582-5			8/18/97	14:40											
013707	S-01582-7			8/18/97	14:20											
013708	S-01582-8			8/18/97	1335											
013709	S-0152-9			8/18/97	1510											

Relinq By:	Received By: YTSRW 8/29/97	Date 5:10 pm	Time
Relinq By	Received By	Date	Time
Relinq/ By	Received By:	Date	Time

APPENDIX B

SVE SYSTEM MONITORING DATA LOG SHEETS

ARCO 276
SVE SYSTEM
MONITORING DATA

Reporting Period:
07/01/97 00.00
08/01/97 00.00

Hours in Period: 744.0
Days in Period: 31.00

Operation + Down Hours: 744.0
Operation + Down Days: 31.00

	Field Monitoring Data									Laboratory Monitoring Data																		
	Flow Rates			FID or PID Results						On-site Well Field Influent		Off-site Well Field Influent		System Influent		System Effluent												
Reading Date & Time	On-site Well Field Flow Rate	Off-site Well Field Flow Rate	System Influent Flow Rate	On-site Well Field	Off-site Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	scfm	ppm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	ppd	ppd						
07/01/97 00 00																						1216 20					
08/01/97 00.00	0 0	0.0	0 0																		744.00	1216 20	0 00	0 00	744 00	31 00
Period Totals:																					744 00		0.00	0 00	744 00	31 00
Averages:	0.0	0 0	0 0																							

ARCO 276
SVE SYSTEM
MONITORING DATA

Reporting Period:
08/01/97 00 00
09/01/97 00 00

Hours in Period. 744 0
Days in Period. 31 00

Operation + Down Hours. 744 0
Operation + Down Days. 31 00

	Field Monitoring Data									Laboratory Monitoring Data																	
	Flow Rates			FID or PID Results						On-site Well Field Influent		Off-site Well Field Influent		System Influent		System Effluent											
Reading Date & Time	On-site Well Field Flow Rate	Off-site Well Field Flow Rate	System Influent Flow Rate	On-site Well Field	Off-site Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	scfm	ppm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	ppd	ppd						
08/01/97 00:00																						1216 20					
09/01/97 00 00	0 0	0 0	0 0																		744.00	1216.20	0.00	0.00	744 00	31 00
Period Totals:																					744 00		0 00	0.00	744 00	31 00
Averages:	0 0	0 0	0 0																							

ARCO 276
SVE SYSTEM
MONITORING DATA

Reporting Period:
09/01/97 00:00
10/01/97 00 00

Hours in Period 720.0
Days in Period 30 00

Operation + Down Hours: 720.0
Operation + Down Days: 30 00

	Field Monitoring Data									Laboratory Monitoring Data																		
	Flow Rates			FID or PID Results						On-site Well Field Influent		Off-site Well Field Influent		System Influent		System Effluent												
Reading Date & Time	On-site Well Field Flow Rate	Off-site Well Field Flow Rate	System Influent Flow Rate	On-site Well Field	Off-site Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	scfm	ppm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	ppd	ppd						
09/01/97 00.00																						1216 20					
10/01/97 00 00	0 0	0.0	0 0																		720 00	1216 20	0.00	0 00	720 00	30 00
Period Totals.																					720 00		0 00	0 00	720 00	30 00
Averages:	0 0	0 0	0 0																							