



EMCON

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

ENVIRONMENTAL
PROTECTION
96 OCT -1 PM 1:30

Date September 26, 1996
Project 20805-123.003

To:

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harborbay Parkway, Suite 250
Alameda, California 94502-6577

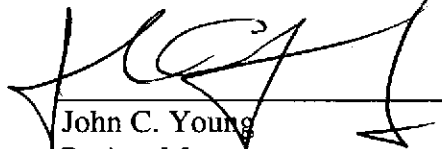
We are enclosing:

Copies	Description
<u>1</u>	<u>Second quarter 1996 groundwater monitoring results and</u> <u>remediation system performance evaluation report,</u> <u>ARCO service station 2035, Albany, California</u>
_____	_____
_____	_____

For your:	<u> X </u>	Use	Sent by:	<u> X </u>	Regular Mail
	_____	Approval		_____	Standard Air
	_____	Review		_____	Courier
	_____	Information		_____	Other:

Comments:

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


John C. Young
Project Manager

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





Date: September 26, 1996

Re: ARCO Station #

2035 • 1001 San Pablo Avenue • Albany, CA
Second Quarter 1996 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:

A handwritten signature in cursive script that reads "Paul Supple". The signature is written in black ink and is positioned above the printed name and title.

Paul Supple
Environmental Engineer



EMCON

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

September 25, 1996
Project 20805-123.003

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

Re: Second quarter 1996 groundwater monitoring program results and remediation system performance evaluation report, ARCO service station 2035, Albany, California

Dear Mr. Supple:

This letter presents the results of the second quarter 1996 groundwater monitoring program at ARCO Products Company (ARCO) service station 2035, 1001 San Pablo Avenue, Albany, California (Figure 1). Operation and performance data for the site's soil-vapor extraction (SVE) and groundwater extraction remediation systems 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, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the site, but rather as the result of the scope, limitations, and cost of work performed during the monitoring event.

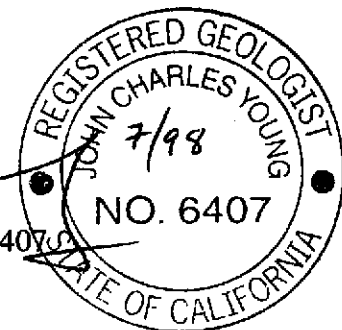
Please call if you have questions.

Sincerely,

EMCON

Sailaja Yelamanchili
Staff Engineer

John C. Young, R.G. 6407
Project Manager



ARCO QUARTERLY REPORT

Station No.: 2035 Address: 1001 San Pablo Avenue, San Pablo, California
 EMCON Project No.: 20805-123.003
 ARCO Environmental Engineer/Phone No.: Paul Supple /(510) 299-8891
 EMCON Project Manager/Phone No.: John C. Young /(408) 453-7300
 Primary Agency/Regulatory ID No.: ACHCSA /Barney Chan
 Reporting Period: April 1, 1996 to July 1, 1996

WORK PERFORMED THIS QUARTER (Second- 1996):

1. Conducted quarterly groundwater monitoring and sampling for second quarter 1996.
2. Prepared and submitted quarterly report for first quarter 1996.
3. Operated soil-vapor extraction (SVE) and air-bubbling systems.

WORK PROPOSED FOR NEXT QUARTER (Third- 1996):

1. Perform quarterly groundwater monitoring and sampling for third quarter 1996.
2. Restart SVE and air-bubbling systems.
3. Prepare and submit quarterly report for second quarter 1996.

QUARTERLY MONITORING:

Current Phase of Project: Quarterly Groundwater Monitoring and Operation and Maintenance of Remediation Systems
 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 : 27.9 gallons, Wells AS-1V, AS-2V, RW-1, VW-1, VW-2, and VW-7
 FP Recovered This Quarter : None
 Bulk Soil Removed to Date : 605 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 and Air-Bubbling Systems
 Approximate Depth to Groundwater: 9.44 feet
 Groundwater Gradient (Average): 0.014 ft/ft toward west-southwest (consistent with past events)

SVE QUARTERLY OPERATION AND PERFORMANCE:

Equipment Inventory: Therm Tech Model VAC-10 Thermal/Catalytic Oxidizer
SVE system was shut down on 5-22-96.
 Operating Mode: Catalytic Oxidation
 BAAQMD Permit #: 10931
 TPH Conc. End of Period (lab): NA (Not Available)
 Benzene Conc. End of Period (lab): NA
 SVE Flowrate End of Period: NA
 Total HC Recovered This Period: 0.0 pounds
 Total HC Recovered to Date: 2997.4 pounds

Utility Usage	
Electric (KWH):	594
Gas (Therms):	47
Operating Hours This Period (SVE):	122.6 hours
Operating Hours to Date (SVE):	6272.2 hours
Percent Operational (SVE):	5.6% (See Discussion)
Operating Hours This Period (GWE):	GWE system was shut down on 3-25-96.
Percent Operational (GWE):	0.0% (See Discussion)
Unit Maintenance:	NA
Number of Auto Shut Downs:	0
Destruction Efficiency Permit Requirement:	90%
Percent TPH Conversion:	NA
Stack Temperature:	NA
SVE Source Flow:	32.5 scfm (5-17-96)
SVE Process Flow:	41.3 scfm (5-17-96)
Source Vacuum:	30 inches of water (5-17-96)

DISCUSSION:

The groundwater treatment system was shut down on March 25, 1996 because of substantial fuel costs being incurred to operate the ThermTech unit for the abatement of off-gas from the groundwater treatment system (aeration tank), and because TPHG concentrations in extracted groundwater decreased from 49,000 µg/L on February 8, 1995 to 70 µg/L on January 30, 1996. The SVE system was restarted on May 17, 1996. The field PID reading of TPH concentration in extracted soil vapor was only 59.6 ppmv. Therefore, the SVE system was shut down on May 22, 1996.

ATTACHED:

- Table 1 - Groundwater Monitoring Data, Second Quarter 1996
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 3 - Historical Groundwater Analytical Data, Well MW-3
- Table 4 - Approximate Cumulative Floating Product Recovered, Wells AS-1, AS-2, RW-1, VW-1, VW-2, and VW-7
- Table 5 - Soil-Vapor Extraction System Operation and Performance Data
- Table 6 - Soil-Vapor Extraction Well Data
- Table 7 - Influent and Effluent Groundwater Analyses Summary Report
- Table 8 - Estimated Total Dissolved TPHG and Benzene Removed, Summary Report
- Figure 1 - Site Location
- Figure 2 - Site Plan
- Figure 3 - Groundwater Data, Second Quarter 1996
- Figure 4 - Soil-Vapor Extraction and Treatment System, Historical System Influent TVHG and Benzene Concentrations
- Figure 5 - Soil-Vapor Extraction and Treatment System, Historical Hydrocarbon Removal Rates
- Figure 6 - Groundwater Treatment System, Historical System Influent TPHG and Benzene Concentrations
- Figure 7 - Groundwater Treatment System, Historical Hydrocarbon Removal Rates
- Appendix A - Field Data Sheets, Second Quarter 1996 Groundwater Monitoring Event
- Appendix B - Analytical Results and Chain of Custody Documentation, Second Quarter 1996 Groundwater Monitoring Event
- Appendix C - SVE System Monitoring Data Log Sheets

- Appendix D - Field Data Sheets, Operation and Maintenance Visits, SVE System,
Second Quarter 1996

cc: Barney Chan, ACHCSA
Kevin Graves, RWQCB-SFBR

Table 1
Groundwater Monitoring Data
Second Quarter 1996

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-15-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient ft/ft	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L	Oil and Grease SM 5520B&F µg/L	Oil and Grease SM 5520C µg/L	Oil and Grease SM 5520F µg/L	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L
MW-1	04-22-96	41.41	9.11	32.30	ND	WSW	0.014	04-22-96	2700	1000	<10	22	<10	<60	--	--	--	--	--	--
MW-2	04-22-96	40.38	9.98	30.40	ND	WSW	0.014	04-22-96	Not sampled: not scheduled for chemical analysis											
MW-3	04-22-96	41.44	9.63	31.81	ND	WSW	0.014	04-22-96	<50	<0.5	<0.5	<0.5	<0.5	90	--	--	--	--	--	--
MW-4	04-22-96	40.33	9.15	31.18	ND	WSW	0.014	04-22-96	Not sampled: not scheduled for chemical analysis											
MW-5	04-22-96	41.84	9.44	32.40	ND	WSW	0.014	04-22-96	Not sampled: not scheduled for chemical analysis											
MW-6	04-22-96	40.13	12.35	27.78	ND	WSW	0.014	04-22-96	Not sampled: not scheduled for chemical analysis											
RW-1	04-22-96	40.33	9.65	30.68	ND	WSW	0.014	04-22-96	36000	7400	3700	580	3400	<300	--	--	--	--	--	--

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

SM: standard method

TRPH: total recoverable petroleum hydrocarbons

TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method

ND: none detected

WSW: west-southwest

--: not analyzed or not applicable

Table 2
 Historical Groundwater Elevation and Analytical Data
 Petroleum Hydrocarbons and Their Constituents
 1994 - Present*

ARCO Service Station 2035
 1001 San Pablo Avenue, Albany, California

Date: 07-15-96

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	TPHC LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	Oil and Grease SM 5520B&F	Oil and Grease SM 5520C	Oil and Grease SM 5520F	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	02-01-94	41.41	9.29	32.12	ND	NR	NR	02-01-94	<50	13	<0.5	0.5	0.6	--	--	--	--	--	--	--
MW-1	04-26-94	41.41	9.25	32.16	ND	NR	NR	04-26-94	990	290	3.5	18	14	--	--	--	--	--	--	--
MW-1	07-29-94	41.41	9.87	31.54	ND	WSW	0.016	07-29-94	760	280	<2.5	7.1	<2.5	--	--	--	--	--	--	--
MW-1	11-15-94	41.41	8.76	32.65	ND	WSW	0.019	11-15-94	570	150	7.3	<2.5	30	--	--	--	--	--	--	--
MW-1	03-24-95	41.41	6.21	35.20	ND	NW	0.037	03-24-95	8800	3600	<50	62	99	--	--	--	--	--	--	--
MW-1	05-24-95	41.41	9.37	32.04	ND	WNW	0.013	05-24-95	4800	2000	<20	52	<20	--	--	--	--	--	--	--
MW-1	08-22-95	41.41	10.30	31.11	ND	SW	0.012	08-22-95	780	310	<2.5	12	<2.5	14	--	--	--	--	--	--
MW-1	11-09-95	41.41	12.25	29.16	ND	WSW	0.01	11-09-95	58	14	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-1	02-27-96	41.41	9.08	32.33	ND	SW	0.009	02-27-96	2700	930	12	18	32	51	--	--	--	--	--	--
MW-1	04-22-96	41.41	9.11	32.30	ND	WSW	0.014	04-22-96	2700	1000	<10	22	<10	<60	--	--	--	--	--	--
MW-2	02-01-94	40.38	9.66	30.72	ND	NR	NR	02-01-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	04-26-94	40.38	9.60	30.78	ND	NR	NR	04-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	07-29-94	40.38	10.61	29.77	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	11-15-94	40.38	9.23	31.15	ND	WSW	0.019	11-15-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	03-24-95	40.38	6.96	33.42	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	05-24-95	40.38	10.02	30.36	ND	WNW	0.013	05-24-95	Not sampled: not scheduled for chemical analysis											
MW-2	08-22-95	40.38	10.87	29.51	ND	SW	0.012	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-2	11-09-95	40.38	13.12	27.26	ND	WSW	0.01	11-09-95	Not sampled: not scheduled for chemical analysis											
MW-2	02-27-96	40.38	10.25	30.13	ND	SW	0.009	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-2	04-22-96	40.38	9.98	30.40	ND	WSW	0.014	04-22-96	Not sampled: not scheduled for chemical analysis											

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 2035
 1001 San Pablo Avenue, Albany, California

Date: 07-15-96

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	Oil and Grease SM 5520B&F	Oil and Grease SM 5520C	Oil and Grease SM 5520F	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-3	02-01-94	41.44	9.71	31.73	ND	NR	NR	02-01-94	<50	1.9	<0.5	2.1	<0.5	--	--	--	<500	<500	--	--
MW-3	04-26-94	41.44	9.56	31.88	ND	NR	NR	04-26-94	<50	1.1	<0.5	2.4	0.9	--	--	--	--	--	<600	--
MW-3	07-29-94	41.44	10.65	30.79	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	600	--
MW-3	11-15-94	41.44	9.25	32.19	ND	WSW	0.019	11-15-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	<500	--
MW-3	03-24-95	41.44	7.29	34.15	ND	NW	0.037	03-24-95	51	0.8	<0.5	2.4	<0.5	--	--	--	--	--	<500	--
MW-3	05-24-95	41.44	9.53	31.91	ND	WNW	0.013	05-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	<500	--
MW-3	08-22-95	41.44	11.19	30.25	ND	SW	0.012	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	79	--	--	--	--	<500	--
MW-3	11-09-95	41.44	12.77	28.67	ND	WSW	0.01	11-09-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	600	--
MW-3	02-27-96	41.44	9.41	32.03	ND	SW	0.009	02-27-96	120	3.6	<0.5	2.2	3.7	90	--	--	--	--	<0.5	--
MW-3	04-22-96	41.44	9.63	31.81	ND	WSW	0.014	04-22-96	<50	<0.5	<0.5	<0.5	<0.5	90	--	--	--	--	--	--
MW-4	02-01-94	40.33	9.10	31.23	ND	NR	NR	02-01-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	04-26-94	40.33	8.94	31.39	ND	NR	NR	04-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	07-29-94	40.33	10.02	30.31	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	11-15-94	40.33	8.47	31.86	ND	WSW	0.019	11-15-94	220	12	19	0.9	39	--	--	--	--	--	--	--
MW-4	03-24-95	40.33	5.92	34.41	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	05-24-95	40.33	9.23	31.10	ND	WNW	0.013	05-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	08-22-95	40.33	10.61	29.72	ND	SW	0.012	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	99	--	--	--	--	--	--
MW-4	11-09-95	40.33	11.97	28.36	ND	WSW	0.01	11-09-95	<50	<0.5	<0.5	<0.5	<0.5	--	89	--	--	--	--	--
MW-4	02-27-96	40.33	8.84	31.49	ND	SW	0.009	02-27-96	<50	0.8	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-4	04-22-96	40.33	9.15	31.18	ND	WSW	0.014	04-22-96	Not sampled: not scheduled for chemical analysis											

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 2035
 1001 San Pablo Avenue, Albany, California

Date: 07-15-96

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	Oil and Grease SM 5520B&F	Oil and Grease SM 5520C	Oil and Grease SM 5520F	TRPH EPA 418.1	TPHD LUFT Method	
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
MW-5	02-01-94	41.84	9.74	32.10	ND	NR	NR	02-01-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-5	04-26-94	41.84	9.51	32.33	ND	NR	NR	04-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-5	07-29-94	41.84	10.54	31.30	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-5	11-15-94	41.84	9.10	32.74	ND	WSW	0.019	11-15-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-5	03-24-95	41.84	6.23	35.61	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-5	05-24-95	41.84	9.61	32.23	ND	WNW	0.013	05-24-95	Not sampled: not scheduled for chemical analysis												
MW-5	08-22-95	41.84	11.12	30.72	ND	SW	0.012	08-22-95	Not sampled: not scheduled for chemical analysis												
MW-5	11-09-95	41.84	12.52	29.32	ND	WSW	0.01	11-09-95	Not sampled: not scheduled for chemical analysis												
MW-5	02-27-96	41.84	9.52	32.32	ND	SW	0.009	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--	
MW-5	04-22-96	41.84	9.44	32.40	ND	WSW	0.014	04-22-96	Not sampled: not scheduled for chemical analysis												
MW-6	02-01-94	40.13	11.80	28.33	ND	NR	NR	02-01-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-6	04-26-94	40.13	11.33	28.80	ND	NR	NR	04-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-6	07-29-94	40.13	12.16	27.97	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-6	11-15-94	40.13	11.01	29.12	ND	WSW	0.019	11-15-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-6	03-24-95	40.13	9.03	31.10	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-6	05-24-95	40.13	12.45	27.68	ND	WNW	0.013	05-24-95	Not sampled: not scheduled for chemical analysis												
MW-6	08-22-95	40.13	13.32	26.81	ND	SW	0.012	08-22-95	Not sampled: not scheduled for chemical analysis												
MW-6	11-09-95	40.13	14.13	26.00	ND	WSW	0.01	11-09-95	Not sampled: not scheduled for chemical analysis												
MW-6	02-27-96	40.13	11.86	28.27	ND	SW	0.009	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--	
MW-6	04-22-96	40.13	12.35	27.78	ND	WSW	0.014	04-22-96	Not sampled: not scheduled for chemical analysis												

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 2035
 1001 San Pablo Avenue, Albany, California

Date: 07-15-96

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	Oil and Grease SM 5520B&F	Oil and Grease SM 5520C	Oil and Grease SM 5520F	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
RW-1	02-01-94	40.33	1.00	39.33	ND	NR	NR	02-01-94	Not sampled: well connected to the remediation system											
RW-1	04-26-94	40.33	9.30	** 31.06	0.04	NR	NR	04-26-94	Not sampled: well contained floating product											
RW-1	07-29-94	40.33	9.91	** 30.43	0.02	WSW	0.016	07-29-94	Not sampled: well contained floating product											
RW-1	11-15-94	40.33	8.89	** 31.51	0.10	WSW	0.019	11-15-94	Not sampled: well contained floating product											
RW-1	03-24-95	40.33	9.32	** 31.02	0.01	NW	0.037	03-24-95	11000	560	660	150	1700	--	--	--	--	--	--	--
RW-1	05-24-95	40.33	9.75	** 30.60	0.03	WNW	0.013	05-24-95	Not sampled: well contained floating product											
RW-1	08-22-95	40.33	10.86	** 29.48	0.02	SW	0.012	08-22-95	Not sampled: well contained floating product											
RW-1	11-09-95	40.33	20.61	19.72	ND	WSW	0.01	11-09-95	1600	79	46	13	240	--	--	--	--	--	--	--
RW-1	02-27-96	40.33	16.56	23.77	ND	SW	0.009	02-27-96	210	44	7.5	2.5	24	29	--	--	--	--	--	--
RW-1	04-22-96	40.33	9.65	30.68	ND	WSW	0.014	04-22-96	36000	7400	3700	580	3400	<300	--	--	--	--	--	--

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

SM: standard method

TRPH: total recoverable petroleum hydrocarbons

TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method

ND: none detected

NR: not reported; data not available

WSW: west-southwest

NW: northwest

WNW: west-northwest

SW: southwest

--: not analyzed or not applicable

*: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results and Remediation System Performance Evaluation Report, ARCO Service Station 2035, Albany, California*, (EMCON, March 25, 1996).

** : [corrected elevation (Z')] = Z + (h * 0.73); where Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

Table 3
Historical Groundwater Analytical Data
Additional Parameters

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-15-96

Well Designation	Water Sample Field Date	Total VOCs EPA 624 µg/L	Total SVOCs EPA 3510/8270 µg/L	Total PCBs EPA 3510/8080 µg/L	Cadmium EPA 6010 µg/L	Chromium EPA 6010 µg/L	Lead EPA 7421 µg/L	Zinc EPA 6010 µg/L	Nickel EPA 6010 µg/L
MW-3	10-29-91	ND(a)	--	--	<10	<10	<5	45	<50
MW-3	03-19-92	--	--	--	--	--	--	--	--
MW-3	06-12-92	--	--	--	--	--	--	--	--
MW-3	09-08-92	--	--	--	--	--	--	--	--
MW-3	10-26-92	ND(b)	--	--	--	--	--	--	--
MW-3	12-01-92	--	ND(c)	ND(d)	--	--	--	--	--
MW-3	01-13-93	Not analyzed: sampling for additional parameters was discontinued							

VOCs: volatile organic compounds

EPA: United States Environmental Protection Agency

µg/L: micrograms per liter

SVOCs: semi-volatile organic compounds

PCBs: polychlorinated biphenyls analyzed

ND: not detected (31 compounds tested for VOCs were nondetectable)

(a): all 37 compounds analyzed were nondetectable except for toluene (3.0 ppb)

(b): all 41 compounds analyzed were nondetectable

(c): all 34 compounds analyzed were nondetectable

(d): all 7 compounds analyzed were nondetectable

-- : not analyzed

Table 4
Approximate Cumulative Floating Product Recovered

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-15-96

Well Designations	Date	Floating Product Recovered gallons
RW-1	1992	22.3
RW-1	1993	1.0
RW-1	1994	0.0
AS-1, AS-2, RW-1, VW-1, VW-2, and VW-7	1995	4.6
VW-7	1996	0.003
1992 to 1996 Total:		27.9

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035 Location: 1001 San Pablo Avenue Albany, California Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 07-01-96
---	--

SVE system was shut down on 5-22-96.
Groundwater treatment system was shut down on 3-25-96.

	12-07-93	12-08-93	12-09-93	12-10-93	12-15-93
Date Begin:	12-07-93	12-08-93	12-09-93	12-10-93	12-15-93
Date End:	12-08-93	12-09-93	12-10-93	12-15-93	12-16-93
Mode of Oxidation:	Therm-Ox (17)	Therm-Ox	Therm-Ox	Therm-Ox	Therm-Ox
Days of Operation:	1	0	1	5	1
Days of Downtime:	0	1	0	0	0
Average Vapor Concentrations (1)					
Well Field Influent: ppmv (2) as gasoline (3)	2800	NA (18)	NA	NA	NA
mg/m3 (4) as gasoline	10000	NA	NA	NA	NA
ppmv as benzene (5)	170	NA	NA	NA	NA
mg/m3 as benzene	540	NA	NA	NA	NA
System Influent: ppmv as gasoline	390	NA	390	410	500
mg/m3 as gasoline	1400	NA	1400	1500	1800
ppmv as benzene	12	NA	19	31	24
mg/m3 as benzene	38	NA	60	100	79
System Effluent: ppmv as gasoline	21	NA	36	6	NA
mg/m3 as gasoline	76	NA	130	21	NA
ppmv as benzene	0.7	NA	1	<0.01	NA
mg/m3 as benzene	2.3	NA	3.1	<0.05	NA
Average Well Field Flow Rate (6), scfm (7):	10.0	0.0	10.0	5.0	45.0
Average System Influent Flow Rate (6), scfm:	100.0	0.0	100.0	87.0	100.0
Average Destruction Efficiency (8), percent (9):	94.6	NA	90.7	98.6	NA
Average Emission Rates (10), pounds per day (11)					
Gasoline:	0.68	0.00	1.17	0.16	NA
Benzene:	0.02	0.00	0.03	<0.00	NA
Operating Hours This Period:	<u>21.00</u>	<u>0.00</u>	<u>23.00</u>	<u>121.00</u>	<u>18.00</u>
Operating Hours To Date:	21.0	21.0	44.0	165.0	183.0
SVE Pounds/ Hour Removal Rate, as gasoline (12):	0.52	0.00	0.52	0.49	0.67
SVE Pounds Removed This Period, as gasoline (13):	11.00	0.00	12.05	59.10	12.13
GWE Pounds Removed This Period, as gasoline (14):	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total Pounds Removed This Period, as gasoline (15):	11.00	0.00	12.05	59.10	12.13
Total Pounds Removed To Date, as gasoline:	11.0	11.0	23.1	82.2	94.3
Total Gallons Removed This Period, as gasoline (16):	<u>1.77</u>	<u>0.00</u>	<u>1.94</u>	<u>9.53</u>	<u>1.96</u>
Total Gallons Removed To Date, as gasoline:	1.8	1.8	3.7	13.3	15.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035 Location: 1001 San Pablo Avenue Albany, California Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 07-01-96
---	--

SVE system was shut down on 5-22-96.
 Groundwater treatment system was shut down on 3-25-96.

	12-16-93	12-21-93	12-25-93	12-29-93	12-31-93
Date Begin:	12-16-93	12-21-93	12-25-93	12-29-93	12-31-93
Date End:	12-21-93	12-25-93	12-29-93	12-31-93	01-07-94
Mode of Oxidation:	Therm-Ox	Therm-Ox	Therm-Ox	Therm-Ox	Therm-Ox
Days of Operation:	0	4	0	2	0
Days of Downtime:	5	0	4	0	7
Average Vapor Concentrations (1)					
Well Field Influent: ppmv (2) as gasoline (3)	NA	NA	NA	NA	NA
mg/m3 (4) as gasoline	NA	NA	NA	NA	NA
ppmv as benzene (5)	NA	NA	NA	NA	NA
mg/m3 as benzene	NA	NA	NA	NA	NA
System Influent: ppmv as gasoline	NA	NA	NA	NA	NA
mg/m3 as gasoline	NA	NA	NA	NA	NA
ppmv as benzene	NA	NA	NA	NA	NA
mg/m3 as benzene	NA	NA	NA	NA	NA
System Effluent: ppmv as gasoline	NA	NA	NA	NA	NA
mg/m3 as gasoline	NA	NA	NA	NA	NA
ppmv as benzene	NA	NA	NA	NA	NA
mg/m3 as benzene	NA	NA	NA	NA	NA
Average Well Field Flow Rate (6), scfm (7):	0.0	20.0	0.0	54.0	0.0
Average System Influent Flow Rate (6), scfm:	0.0	100.0	0.0	78.0	0.0
Average Destruction Efficiency (8), percent (9):	NA	NA	NA	NA	NA
Average Emission Rates (10), pounds per day (11)					
Gasoline:	0.00	0.00	0.00	0.00	0.00
Benzene:	0.00	0.00	0.00	0.00	0.00
Operating Hours This Period:	<u>0.00</u>	<u>104.00</u>	<u>0.00</u>	<u>43.00</u>	<u>0.00</u>
Operating Hours To Date:	183.0	287.0	287.0	330.0	330.0
SVE Pounds/ Hour Removal Rate, as gasoline (12):	0.00	0.00	0.00	0.00	0.00
SVE Pounds Removed This Period, as gasoline (13):	0.00	0.00	0.00	0.00	0.00
GWE Pounds Removed This Period, as gasoline (14):	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total Pounds Removed This Period, as gasoline (15):	0.00	0.00	0.00	0.00	0.00
Total Pounds Removed To Date, as gasoline:	94.3	94.3	94.3	94.3	94.3
Total Gallons Removed This Period, as gasoline (16):	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total Gallons Removed To Date, as gasoline:	15.2	15.2	15.2	15.2	15.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035 Location: 1001 San Pablo Avenue Albany, California Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 07-01-96
---	---

SVE system was shut down on 5-22-96.
Groundwater treatment system was shut down on 3-25-96.

	01-07-94	01-12-94	01-24-94	03-31-94	12-31-94
Date Begin:	01-07-94	01-12-94	01-24-94	03-31-94	12-31-94
Date End:	01-12-94	01-24-94	03-31-94	12-31-94	02-06-95
Mode of Oxidation:	Therm-Ox	Therm-Ox	Therm-Ox	Therm-Ox	Therm-Ox
Days of Operation:	5	12	0	0	0
Days of Downtime:	0	0	66	275	37
<u>Average Vapor Concentrations (1)</u>					
Well Field Influent: ppmv (2) as gasoline (3)	NA	NA	NA	NA	NA
mg/m3 (4) as gasoline	NA	NA	NA	NA	NA
ppmv as benzene (5)	NA	NA	NA	NA	NA
mg/m3 as benzene	NA	NA	NA	NA	NA
System Influent: ppmv as gasoline	NA	690	NA	NA	NA
mg/m3 as gasoline	NA	2500	NA	NA	NA
ppmv as benzene	NA	11	NA	NA	NA
mg/m3 as benzene	NA	37	NA	NA	NA
System Effluent: ppmv as gasoline	NA	14	NA	NA	NA
mg/m3 as gasoline	NA	52	NA	NA	NA
ppmv as benzene	NA	0.29	NA	NA	NA
mg/m3 as benzene	NA	0.93	NA	NA	NA
Average Well Field Flow Rate (6), scfm (7):	37.0	41.0	0.0	0.0	0.0
Average System Influent Flow Rate (6), scfm:	60.0	64.0	0.0	0.0	0.0
Average Destruction Efficiency (8), percent (9):	97.9	97.9	NA	NA	NA
<u>Average Emission Rates (10), pounds per day (11)</u>					
Gasoline:	0.30	0.30	0.00	0.00	0.00
Benzene:	0.01	0.01	0.00	0.00	0.00
Operating Hours This Period:	<u>123.00</u>	<u>285.00</u>	<u>0.00</u>	<u>0.00</u>	<u>8.90</u>
Operating Hours To Date:	453.0	738.0	738.0	738.0	746.9
SVE Pounds/ Hour Removal Rate, as gasoline (12):	0.48	0.60	0.00	0.00	0.00
SVE Pounds Removed This Period, as gasoline (13):	59.40	170.67	0.00	0.00	0.00
GWE Pounds Removed This Period, as gasoline (14):	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total Pounds Removed This Period, as gasoline (15):	59.40	170.67	0.00	0.00	0.00
Total Pounds Removed To Date, as gasoline:	153.7	324.3	324.3	324.3	324.3
Total Gallons Removed This Period, as gasoline (16):	<u>9.58</u>	<u>27.53</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total Gallons Removed To Date, as gasoline:	24.8	52.3	52.3	52.3	52.3

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035 Location: 1001 San Pablo Avenue Albany, California Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 07-01-96
---	--

SVE system was shut down on 5-22-96.
 Groundwater treatment system was shut down on 3-25-96.

	02-06-95	03-01-95	04-01-95	06-01-95	07-01-95
Date Begin:	02-06-95	03-01-95	04-01-95	06-01-95	07-01-95
Date End:	03-01-95	04-01-95	06-01-95	07-01-95	08-01-95
Mode of Oxidation:	Therm-Ox	Therm-Ox	Therm-Ox	Cat-Ox (19)	Cat-Ox
Days of Operation:	21	7	0	5	26
Days of Downtime:	2	24	61	25	5
Average Vapor Concentrations (1)					
Well Field Influent: ppmv (2) as gasoline (3)	1800	2500	NA	3300	130
mg/m3 (4) as gasoline	6650	8900	NA	12000	480
ppmv as benzene (5)	17	31	NA	50	4
mg/m3 as benzene	62	99	NA	170	14
System Influent: ppmv as gasoline	240	<15	NA	600	130
mg/m3 as gasoline	880	<60	NA	2200	480
ppmv as benzene	6	<0.1	NA	10	4
mg/m3 as benzene	21	<0.5	NA	34	14
System Effluent: ppmv as gasoline	<15	<15	NA	<15	<15
mg/m3 as gasoline	<60	<60	NA	<60	<60
ppmv as benzene	<0.1	<0.1	NA	0.5	<0.1
mg/m3 as benzene	<0.5	<0.5	NA	1.5	<0.5
Average Well Field Flow Rate (6), scfm (7):	4.7	4.1	1.2	20.9	25.2
Average System Influent Flow Rate (6), scfm:	35.6	32.7	25.3	33.8	33.6
Average Destruction Efficiency (8), percent (9):	93.2	NA	NA	97.3	87.5
Average Emission Rates (10), pounds per day (11)					
Gasoline:	0.19	0.18	NA	0.18	0.18
Benzene:	0.00	0.00	NA	0.00	0.00
Operating Hours This Period:	<u>501.95</u>	<u>162.83</u>	<u>3.02</u>	<u>112.33</u>	<u>614.38</u>
Operating Hours To Date:	1248.9	1411.7	1414.7	1527.0	2141.4
SVE Pounds/ Hour Removal Rate, as gasoline (12):	0.12	0.14	0.00	0.94	0.05
SVE Pounds Removed This Period, as gasoline (13):	58.72	22.24	0.00	105.44	27.81
GWE Pounds Removed This Period, as gasoline (14):	<u>4.28</u>	<u>0.31</u>	<u>0.00</u>	<u>1.42</u>	<u>0.00</u>
Total Pounds Removed This Period, as gasoline (15):	63.00	22.55	0.00	106.86	27.81
Total Pounds Removed To Date, as gasoline:	387.3	409.9	409.9	516.8	544.6
Total Gallons Removed This Period, as gasoline (16):	<u>10.16</u>	<u>3.64</u>	<u>0.00</u>	<u>17.24</u>	<u>4.49</u>
Total Gallons Removed To Date, as gasoline:	62.5	66.1	66.1	83.4	87.8

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035 Location: 1001 San Pablo Avenue Albany, California Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 07-01-96
---	--

SVE system was shut down on 5-22-96.
 Groundwater treatment system was shut down on 3-25-96.

	08-01-95	09-01-95	10-01-95	11-01-95	12-01-95
Date Begin:	08-01-95	09-01-95	10-01-95	11-01-95	12-01-95
Date End:	09-01-95	10-01-95	11-01-95	12-01-95	01-01-96
Mode of Oxidation:	Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:	23	30	26	30	21
Days of Downtime:	8	0	5	1	10
Average Vapor Concentrations (1)					
Well Field Influent: ppmv (2) as gasoline (3)	1850	617	425	850	940
mg/m3 (4) as gasoline	7800	2233	1535	3100	3385
ppmv as benzene (5)	17.5	5.9	4.7	11	7.4
mg/m3 as benzene	56	19	15	36	23
System Influent: ppmv as gasoline	1950	457	320	570	310
mg/m3 as gasoline	8300	1667	1165	2100	1300
ppmv as benzene	20	4.6	3.9	7	4.1
mg/m3 as benzene	63	15	12	23	13
System Effluent: ppmv as gasoline	54	<15	<15	<15	17
mg/m3 as gasoline	155	<60	<60	<60	63
ppmv as benzene	1	0.2	0.2	0.4	0.3
mg/m3 as benzene	3.2	0.6	0.5	1.2	0.9
Average Well Field Flow Rate (6), scfm (7):	27.7	139.7	91.2	68.0	39.5
Average System Influent Flow Rate (6), scfm:	76.5	114.7	88.4	73.4	57.8
Average Destruction Efficiency (8), percent (9):	98.1	96.4	94.8	97.1	95.2
Average Emission Rates (10), pounds per day (11)					
Gasoline:	1.07	0.62	0.48	0.40	0.33
Benzene:	0.02	0.01	0.00	0.01	0.00
Operating Hours This Period:	<u>562.61</u>	<u>717.42</u>	<u>624.47</u>	<u>708.09</u>	<u>493.54</u>
Operating Hours To Date:	2704.0	3421.4	4045.9	4754.0	5247.5
SVE Pounds/ Hour Removal Rate, as gasoline (12):	0.81	1.17	0.52	0.79	0.50
SVE Pounds Removed This Period, as gasoline (13):	454.96	837.62	327.19	558.66	246.98
GWE Pounds Removed This Period, as gasoline (14):	<u>0.49</u>	<u>0.24</u>	<u>0.07</u>	<u>11.02</u>	<u>5.51</u>
Total Pounds Removed This Period, as gasoline (15):	455.45	837.86	327.26	569.68	252.49
Total Pounds Removed To Date, as gasoline:	1000.0	1837.9	2165.1	2734.8	2987.3
Total Gallons Removed This Period, as gasoline (16):	<u>73.46</u>	<u>135.15</u>	<u>52.79</u>	<u>91.89</u>	<u>40.73</u>
Total Gallons Removed To Date, as gasoline:	161.3	296.5	349.2	441.1	481.9

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035 Location: 1001 San Pablo Avenue Albany, California Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 07-01-96
---	--

SVE system was shut down on 5-22-96.
Groundwater treatment system was shut down on 3-25-96.

Date Begin:	01-01-96	02-01-96 (20)	03-01-96
Date End:	02-01-96	03-01-96	04-01-96
Mode of Oxidation:	Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:	31	29	24
Days of Downtime:	0	0	7
Average Vapor Concentrations (1)			
Well Field Influent: ppmv (2) as gasoline (3)	<15	<15	NA
mg/m3 (4) as gasoline	<60	<60	NA
ppmv as benzene (5)	<0.1	<0.1	NA
mg/m3 as benzene	<0.5	<0.5	NA
System Influent: ppmv as gasoline	<15	<15	NA
mg/m3 as gasoline	<60	<60	NA
ppmv as benzene	0.3	0.3	NA
mg/m3 as benzene	0.9	0.9	NA
System Effluent: ppmv as gasoline	<15	<15	NA
mg/m3 as gasoline	<60	<60	NA
ppmv as benzene	<0.1	<0.1	NA
mg/m3 as benzene	<0.5	<0.5	NA
Average Well Field Flow Rate (6), scfm (7):	24.8	28.6	0.0
Average System Influent Flow Rate (6), scfm:	51.2	53.1	0.0
Average Destruction Efficiency (8), percent (9):	NA	NA	NA
Average Emission Rates (10), pounds per day (11)			
Gasoline:	0.28	0.29	NA
Benzene:	0.00	0.00	NA
Operating Hours This Period:	<u>744.00</u>	<u>158.00</u>	<u>0.00</u>
Operating Hours To Date:	5991.5	6149.5	6149.5
SVE Pounds/ Hour Removal Rate, as gasoline (12):	0.01	0.01	0.00
SVE Pounds Removed This Period, as gasoline (13):	4.14	1.01	0.00
GWE Pounds Removed This Period, as gasoline (14):	<u>3.99</u>	<u>0.00</u>	<u>0.01</u>
Total Pounds Removed This Period, as gasoline (15):	8.13	1.01	0.01
Total Pounds Removed To Date, as gasoline:	2995.5	2996.5	2996.5
Total Gallons Removed This Period, as gasoline (16):	<u>1.31</u>	<u>0.16</u>	<u>0.00</u>
Total Gallons Removed To Date, as gasoline:	483.2	483.3	483.3

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035 Location: 1001 San Pablo Avenue Albany, California Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 07-01-96
---	--

SVE system was shut down on 5-22-96.
 Groundwater treatment system was shut down on 3-25-96.

Date Begin:	04-01-96	05-01-96	06-01-96
Date End:	05-01-96	06-01-96	07-01-96
Mode of Oxidation:	Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:	0	5	0
Days of Downtime:	30	26	30
Average Vapor Concentrations (1)			
Well Field Influent: ppmv (2) as gasoline (3)	NA	NA	NA
mg/m3 (4) as gasoline	NA	NA	NA
ppmv as benzene (5)	NA	NA	NA
mg/m3 as benzene	NA	NA	NA
System Influent: ppmv as gasoline	NA	NA	NA
mg/m3 as gasoline	NA	NA	NA
ppmv as benzene	NA	NA	NA
mg/m3 as benzene	NA	NA	NA
System Effluent: ppmv as gasoline	NA	NA	NA
mg/m3 as gasoline	NA	NA	NA
ppmv as benzene	NA	NA	NA
mg/m3 as benzene	NA	NA	NA
Average Well Field Flow Rate (6), scfm (7):	0.0	32.5	0.0
Average System Influent Flow Rate (6), scfm:	0.0	41.3	0.0
Average Destruction Efficiency (8), percent (9):	NA	NA	NA
Average Emission Rates (10), pounds per day (11)			
Gasoline:	NA	NA	NA
Benzene:	NA	NA	NA
Operating Hours This Period:	<u>2.38</u>	<u>120.25</u>	<u>0.00</u>
Operating Hours To Date:	6151.9	6272.2	6272.2
SVE Pounds/ Hour Removal Rate, as gasoline (12):	0.00	0.01	0.00
SVE Pounds Removed This Period, as gasoline (13):	0.00	0.88	0.00
GWE Pounds Removed This Period, as gasoline (14):	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total Pounds Removed This Period, as gasoline (15):	0.00	0.88	0.00
Total Pounds Removed To Date, as gasoline:	2996.5	2997.4	2997.4
Total Gallons Removed This Period, as gasoline (16):	<u>0.00</u>	<u>0.14</u>	<u>0.00</u>
Total Gallons Removed To Date, as gasoline:	483.3	483.5	483.5

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035 Location: 1001 San Pablo Avenue Albany, California Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 07-01-96
---	--

SVE system was shut down on 5-22-96.
Groundwater treatment system was shut down on 3-25-96.

CURRENT REPORTING PERIOD:	04-01-96	to	07-01-96
DAYS / HOURS IN PERIOD:	91		2184.0
DAYS / HOURS OF OPERATION:	5		122.6
DAYS / HOURS OF DOWN TIME:	86		2061.4
PERCENT OPERATIONAL:			5.6 %
PERIOD POUNDS REMOVED:	0.9		
PERIOD GALLONS REMOVED:	0.1		
AVERAGE WELL FIELD FLOW RATE (scfm):			31.9
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):			40.5

1. Average vapor monitoring concentrations were calculated for all periods after February 6, 1995. Average concentrations are based on discrete sample results reported during the month; refer to Appendix C for discrete sample results.
2. ppmv: parts per million by volume
3. Between December 7, 1993, and February 6, 1995:
Concentration (as gasoline in ppmv) = [concentration (as gasoline in mg/m³) x 24.05 (lb/m³/lb-mole of air)/mg] / 87 lb/lb-mole
4. mg/m³: milligrams per cubic meter
5. Between December 7, 1993, and February 6, 1995:
Concentration (as benzene in ppmv) = [concentration (as benzene in mg/m³) x 24.05 (lb/m³/lb-mole of air)/mg] / 78 lb/lb-mole
6. Average flow rates (time weighted average) are based on instantaneous flow rates recorded during the month; refer to Appendix C for instantaneous flow data.
7. scfm: flow in standard cubic feet per minute at one atmosphere and 70 degrees Fahrenheit
8. Average destruction efficiencies are calculated using monthly average concentrations; refer to Appendix C for instantaneous destruction efficiency data.
9. 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
10. Average emission rates are calculated using monthly average concentrations and flow rates; refer to Appendix C for instantaneous emission rate data.
11. 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
12. 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
13. Soil-vapor extraction (SVE) pounds removed this period (as gasoline) = pounds/ hour removal rate (SVE) x hours of operation (SVE)
14. Groundwater extraction (GWE); refer to Table 9 for GWE system performance data
15. Represents the total mass recovered by the SVE and GWE systems, and the total mass abated by the thermal/catalytic oxidizer
16. gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0.1613 gallons/pound of gasoline
17. Therm-Ox: thermal oxidation
18. NA: not analyzed, not applicable, or not available
19. Cat-Ox: catalytic oxidation; the SVE system's abatement unit was converted to the Cat-Ox mode of operation on June 20, 1995
20. On February 7, 1996 the SVE wells were taken off-line; however, the therm tech unit remained on for the groundwater extraction system.
21. The utility costs for February and March were \$694.00 and \$649.00, respectively. The SVE system was shut down on February 7, 1996, therefore cost per pound was not calculated for these periods. The utility costs incurred during February and March are associated with the off gas abatement for the aeration tank.

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-23-96

Date	Well Identification											
	VW-1			VW-2			VW-3			VW-4		
	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response
		ppmv	in-H2O		ppmv	in-H2O		ppmv	in-H2O		ppmv	in-H2O
For SVE well monitoring data prior to January 1, 1995, please refer to the third quarter 1995 groundwater monitoring report for this site.												
02-08-95	open	<17 LAB	20.0	open	<17 LAB	20.0	open	0.0 PID	20.0	open	0.0 PID	20.0
02-14-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	11.0	open	NA	NA	open	NA	NA	open	NA	NA
03-08-95	open	NA	28.0	closed	NA	17.0	closed	NA	0.0	closed	NA	26.0
03-08-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
06-20-95	open	NA	9.0	open	NA	10.0	closed	NA	NA	closed	NA	NA
06-26-95	open	59000 LAB	17.0	open	56000 LAB	15.0	closed	NA	0.0	closed	NA	14.0
07-10-95	open	NA	NA	open	NA	NA	closed	NA	NA	closed	NA	NA
08-08-95	open	NA	47.0	open	NA	46.0	open	NA	47.0	open	NA	47.0
09-12-95	open	3390 PID	26.7	open	2332 PID	26.5	open	263 PID	25.0	open	1736 PID	26.3
09-28-95	open	1498 PID	30.0	open	1075 PID	29.0	open	235 PID	26.0	open	911 PID	30.0
09-28-95	open	1800 LAB	NA	open	1500 LAB	NA	open	180 LAB	NA	open	990 LAB	NA
09-28-95	open	NA	NA	open	NA	NA	closed	NA	NA	open	NA	NA
09-29-95	open	NA	NA	open	NA	NA	closed	NA	NA	open	NA	NA
10-26-95	open	NA	25.5	open	NA	25.5	closed	NA	0.0	open	NA	25.3
12-05-95	open	NA	54.0	open	NA	54.0	closed	NA	NA	closed	NA	NA
02-07-96	open	698 PID	NA	open	390 PID	NA	open	501 PID	NA	open	610 PID	NA
03-25-96	System was manually shut down.											
05-17-96	open	1945 PID	30.0	closed	101 PID	18.0	closed	50.1 PID	18.0	open	197 PID	25.0
05-22-96	System was manually shut down.											
TVHG: concentration of total volatile hydrocarbons as gasoline ppmv: parts per million by volume in-H2O: inches of water open: open to the system open(b): open to the system and bubbling air passive: open to the atmosphere closed: closed to the system and atmosphere NA: not analyzed or not measured PID: TVHG concentration was measured with a portable photo-ionization detector LAB: TVHG concentration was analyzed in the laboratory												

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-23-96

Date	Well Identification											
	VW-5			VW-6			VW-7			VW-8		
	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response
		ppmv	in-H2O		ppmv	in-H2O		ppmv	in-H2O		ppmv	in-H2O
For SVE well monitoring data prior to January 1, 1995, please refer to the third quarter 1995 groundwater monitoring report for this site.												
02-08-95	open	0.0 PID	24.0	open	<17 LAB	10.0	open	0.0 PID	24.0	open	<17 LAB	20.0
02-14-95	open	NA	NA	closed	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	NA	closed	NA	16.0	open	NA	NA	open	NA	NA
03-08-95	closed	NA	1.0	closed	NA	8.0	closed	NA	22.0	closed	NA	0.0
03-08-95	closed	NA	NA	open	NA	NA	closed	NA	NA	closed	NA	NA
06-20-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
06-26-95	closed	NA	7.0	closed	NA	34.0	closed	NA	16.0	closed	NA	2.0
07-10-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-08-95	open	NA	46.0	open	NA	36.0	open	NA	47.0	open	NA	43.0
09-12-95	open	243 PID	26.2	open	587 PID	27.7	open	1297 PID	25.5	open	830 PID	26.2
09-28-95	open	301 PID	30.0	open	230 PID	32.0	open	941 PID	30.0	open	956 PID	29.0
09-28-95	open	280 LAB	NA	open	250 LAB	NA	open	1400 LAB	NA	open	2000 LAB	NA
09-28-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
09-29-95	open	NA	NA	closed	NA	NA	open	NA	NA	open	NA	NA
10-26-95	open	NA	25.3	closed	NA	0.0	open	NA	19.0	open	NA	21.9
12-05-95	closed	NA	NA	closed	NA	NA	open	NA	54.0	closed	NA	NA
02-07-96	open	47.2 PID	NA	open	840 PID	NA	open	102 PID	NA	open	780 PID	NA
03-25-96	System was manually shut down.											
05-17-96	closed	80.6 PID	20.0	open	195 PID	22.0	open	419 PID	28.0	closed	116 PID	18.0
05-22-96	System was manually shut down.											
TVHG: concentration of total volatile hydrocarbons as gasoline ppmv: parts per million by volume in-H2O: inches of water open: open to the system open(b): open to the system and bubbling air passive: open to the atmosphere closed: closed to the system and atmosphere NA: not analyzed or not measured PID: TVHG concentration was measured with a portable photo-ionization detector LAB: TVHG concentration was analyzed in the laboratory												

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-23-96

Date	Well Identification											
	VW-9			RW-1			AS-1V			AS-2V		
	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response	Valve Position	TVHG	Vacuum Response
		ppmv	in-H2O		ppmv	in-H2O		ppmv	in-H2O		ppmv	in-H2O
For SVE well monitoring data prior to January 1, 1995, please refer to the third quarter 1995 groundwater monitoring report for this site.												
02-08-95	open	0.0 PID	23.0	open	13.7 PID	20.0	open	<17 LAB	24.0	open	<17 LAB	24.0
02-14-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	NA	open	NA	13.0	passive	NA	5.0	passive	NA	1.0
03-08-95	closed	NA	8.0	open	NA	28.0	passive	NA	0.0	passive	NA	0.0
03-08-95	closed	NA	NA	closed	NA	NA	open	NA	NA	open	NA	NA
06-20-95	closed	NA	NA	open	NA	10.0	open	NA	10.0	open	NA	10.0
06-26-95	closed	NA	8.0	open	4800 LAB	19.0	open	40000 LAB	15.0	open	40000 LAB	15.0
07-10-95	closed	NA	NA	open(b)	NA	NA	open	NA	NA	open	NA	NA
08-08-95	open	NA	44.5	open	NA	49.0	open	NA	44.5	open	NA	44.5
09-12-95	open	566 PID	25.3	open	1072 PID	26.3	open	2522 PID	26.6	open	2522 PID	26.6
09-28-95	open	393 PID	25.0	open	921 PID	31.0	open	1213 PID	26.5	open	1183 PID	26.0
09-28-95	open	500 LAB	NA	open	1100 LAB	NA	open	1400 LAB	NA	open	1500 LAB	NA
09-28-95	open	NA	NA	open	NA	NA	open	NA	NA	closed	NA	NA
09-29-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
10-26-95	open	NA	22.4	open	NA	23.9	open	NA	25.7	open	NA	25.7
12-05-95	closed	NA	NA	closed	NA	NA	open	NA	54.0	closed	NA	NA
02-07-96	open	1110 PID	NA	open	57 PID	NA	open	465 PID	NA	open	465 PID	NA
03-25-96	System was manually shut down.											
05-17-96	open	384 PID	28.0	closed	118 PID	25.0	open	146 PID	30.0	open	208 PID	30.0
05-22-96	System was manually shut down.											

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

Table 7
Influent and Effluent Groundwater Analyses

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-23-96

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L
I-1	02-08-95	NA	NA	NA	NA	NA
I-1	02-08-95	49000	4300	4900	1000	5200
I-1	02-14-95	33000	4300	5800	970	5600
I-1	02-21-95	21000	940	1500	360	4000
I-1	02-28-95	15000	430	290	54	2000
I-1	03-08-95	15000	430	290	54	2000
I-1	06-20-95	20000	1500	1200	220	2300
I-1	08-08-95	11000	970	1100	210	1800
I-1	09-12-95	2700	200	150	29	290
I-1	10-11-95	1000	97	38	7	69
I-1	11-08-95	2500	38	27	8	240
I-1	11-30-95	29000	190	530	300	3100
I-1	01-30-96	70	4.5	1.8	<0.5	8.3
I-2	02-08-95	NA	NA	NA	NA	NA
I-2	02-08-95	1500	59	70	14	86
I-2	02-14-95	1500	59	70	14	86
I-2	02-21-95	340	7.2	8.8	1.9	37
I-2	02-28-95	390	3.9	2.5	0.9	16
I-2	03-08-95	390	3.9	2.5	0.9	16
I-2	06-20-95	2200	30	27	11	77
I-2	08-08-95	330	17	18	3.5	36
I-2	09-12-95	78	4.1	3	<0.5	8.9
I-2	10-11-95	<50	0.9	<0.5	<0.5	1
I-2	11-08-95	1800	2.5	2.7	3.8	35
I-2	11-30-95	220	5	7.4	1.7	22
I-2	01-30-96	<50	<0.5	<0.5	<0.5	<0.5

Table 7
Influent and Effluent Groundwater Analyses

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-23-96

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L
I-3	02-08-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	02-14-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	02-21-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	02-28-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	06-20-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	08-08-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	09-12-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	10-11-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	11-08-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	11-30-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	01-30-96	<50	<0.5	<0.5	<0.5	<0.5
E-1	02-08-95	<50	0.7	<0.5	<0.5	<0.5
E-1	02-14-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	02-21-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	02-28-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	06-20-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	08-08-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	09-12-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	10-11-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	11-08-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	11-30-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	01-30-96	<50	<0.5	<0.5	<0.5	<0.5

TPHG: total petroleum hydrocarbons as gasoline
µg/L: micrograms per liter
NA: not analyzed

Table 8
Estimated Total Dissolved TPHG Removed

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-23-96

Sample Designation	Sample Date	Groundwater Extraction			TPHG Removal Data					Benzene Removal Data				
		Total Volume Extracted gallons	Period Volume Extracted gallons	Period Flow Rate gpd	Period Influent Concentration µg/L	Period Removal Rate lbs/day	Period Pounds Removed ¹ pounds	Total Pounds Removed pounds	Total Gallons Removed ² gallons	Period Influent Concentration µg/L	Period Removal Rate lbs/day	Period Pounds Removed ³ pounds	Total Pounds Removed pounds	Total Gallons Removed ⁴ gallons
I-1	02-08-95	628	0	0	NA	0.000	0.000	0.000	0.000	NA	0.0000	0.0000	0.0000	0.0000
I-1	02-08-95	880	252	2,520	49,000	1.031	0.103	0.103	0.017	4,300	0.0904	0.0090	0.0090	0.0012
I-1	02-14-95	1,329	449	76	33,000	0.021	0.124	0.227	0.037	4,300	0.0027	0.0161	0.0251	0.0035
I-1	02-21-95	15,499	14,170	2,051	21,000	0.360	2.484	2.710	0.437	940	0.0161	0.1112	0.1363	0.0188
I-1	02-28-95	28,788	13,289	1,894	15,000	0.237	1.664	4.374	0.706	430	0.0068	0.0477	0.1840	0.0254
I-1	03-08-95	31,358	2,570	316	15,000	0.040	0.322	4.696	0.757	430	0.0011	0.0092	0.1932	0.0266
I-1	06-20-95	31,695	337	3	20,000	0.001	0.056	4.752	0.767	1,500	0.0000	0.0042	0.1975	0.0272
I-1	06-30-95	40,933	9,238	924	20,000	0.154	1.542	6.294	1.015	1,500	0.0116	0.1157	0.3131	0.0432
I-1	08-08-95	46,416	5,483	141	11,000	0.013	0.503	6.798	1.097	970	0.0011	0.0444	0.3575	0.0493
I-1	09-12-95	57,434	11,018	315	2,700	0.007	0.248	7.046	1.137	200	0.0005	0.0184	0.3759	0.0518
I-1	10-11-95	66,534	9,100	314	1,000	0.003	0.076	7.122	1.149	97	0.0003	0.0074	0.3833	0.0529
I-1	11-08-95	106,654	40,120	1,433	2,500	0.030	0.837	7.959	1.284	38	0.0005	0.0127	0.3960	0.0546
I-1	11-30-95	151,566	44,912	2,041	29,000	0.494	10.871	18.831	3.037	190	0.0032	0.0712	0.4672	0.0644
I-1	12-22-95	174,511	22,945	1,043	29,000	0.252	5.554	24.385	3.933	190	0.0017	0.0364	0.5036	0.0695
I-1	01-01-96	191063*	16,552	1,655	29000**	0.401	4.007	28.391	4.580	190**	0.0026	0.0262	0.5299	0.0731
I-1	01-30-96	251,187	60,124	2,073	70	0.001	0.035	28.426	4.585	4.5	0.0001	0.0023	0.5321	0.0734
I-1	04-01-96	296826*	45,639	736	70**	0.000	0.027	28.453	4.589	4.5**	0.0000	0.0017	0.5339	0.0736

Groundwater treatment system was shut down on 3-25-96.

Table 8
Estimated Total Dissolved TPHG Removed

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 07-23-96

Sample Designation	Sample Date	Groundwater Extraction			TPHG Removal Data					Benzene Removal Data				
		Total Volume Extracted gallons	Period Volume Extracted gallons	Period Flow Rate gpd	Period Influent Concentration µg/L	Period Removal Rate lbs/day	Period Pounds Removed ¹ pounds	Total Pounds Removed pounds	Total Gallons Removed ² gallons	Period Influent Concentration µg/L	Period Removal Rate lbs/day	Period Pounds Removed ³ pounds	Total Pounds Removed pounds	Total Gallons Removed ⁴ gallons
I-2	02-08-95	628	0	0	NA	0.000	0.000	0.000	0.000	NA	0.0000	0.0000	0.0000	0.0000
I-2	02-08-95	880	252	2,520	1,500	0.032	0.003	0.003	0.001	59	0.0012	0.0001	0.0001	0.0000
I-2	02-14-95	1,329	449	85	1,500	0.001	0.006	0.009	0.001	59	0.0000	0.0002	0.0003	0.0000
I-2	02-21-95	15,499	14,170	2,024	340	0.006	0.040	0.049	0.008	7	0.0001	0.0009	0.0012	0.0002
I-2	02-28-95	28,788	13,289	1,898	390	0.006	0.043	0.092	0.015	4	0.0001	0.0004	0.0016	0.0002
I-2	03-08-95	31,358	2,570	321	390	0.001	0.008	0.101	0.016	4	0.0000	0.0001	0.0017	0.0002
I-2	06-20-95	31,695	337	3	2,200	0.000	0.006	0.107	0.017	30	0.0000	0.0001	0.0018	0.0002
I-2	06-30-95	40,933	9,238	924	2,200	0.017	0.170	0.276	0.045	30	0.0002	0.0023	0.0041	0.0006
I-2	08-08-95	46,416	5,483	141	330	0.000	0.015	0.292	0.047	17	0.0000	0.0008	0.0049	0.0007
I-2	09-12-95	57,434	11,018	315	78	0.000	0.007	0.299	0.048	4	0.0000	0.0004	0.0053	0.0007
I-2	10-11-95	66,534	9,100	314	<50	0.000	0.004	0.303	0.049	1	0.0000	0.0001	0.0053	0.0007
I-2	11-08-95	106,654	40,120	1,433	1,800	0.022	0.603	0.905	0.146	3	0.0000	0.0008	0.0062	0.0009
I-2	11-30-95	151,566	44,912	2,041	220	0.004	0.082	0.988	0.159	5	0.0001	0.0019	0.0080	0.0011
I-2	12-22-95	174,511	22,945	1,043	220	0.002	0.042	1.030	0.166	5	0.0000	0.0010	0.0090	0.0012
I-2	01-01-96	191063*	16,552	1,655	220**	0.003	0.030	1.060	0.171	5**	0.0001	0.0007	0.0097	0.0013
I-2	01-30-96	251,187	60,124	2,073	<50	0.001	0.025	1.085	0.175	<0.5	0.0000	0.0003	0.0099	0.0014
I-2	04-01-96	296826*	45,639	736	<50**	0.000	0.019	1.104	0.178	<0.5**	0.0000	0.0002	0.0101	0.0014
Groundwater treatment system was shut down on 3-25-96.														

Table 8
Estimated Total Dissolved TPHG Removed

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

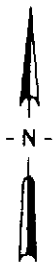
Date: 07-23-96

Sample Designation	Sample Date	Groundwater Extraction			TPHG Removal Data					Benzene Removal Data				
		Total Volume Extracted gallons	Period Volume Extracted gallons	Period Flow Rate gpd	Period Influent Concentration µg/L	Period Removal Rate lbs/day	Period Pounds Removed ¹ pounds	Total Pounds Removed pounds	Total Gallons Removed ² gallons	Period Influent Concentration µg/L	Period Removal Rate lbs/day	Period Pounds Removed ³ pounds	Total Pounds Removed pounds	Total Gallons Removed ⁴ gallons
CURRENT REPORTING PERIOD:		04-01-96 to 07-01-96												
DAYS / HOURS IN PERIOD:		91 2,184.0												
DAYS / HOURS OF OPERATION:		0 0.0												
DAYS / HOURS OF DOWN TIME:		91 2,184.0												
PERCENT OPERATIONAL:		0%												
PERIOD GROUNDWATER EXTRACTED (gallons):		0												
PERIOD HYDROCARBON REMOVAL (TOTAL):		0.000 pounds			0.000 gallons		0.0302 pounds			0.0042 gallons				
HYDROCARBONS REMOVED BY AERATION TANK:		0.000 pounds			0.000 gallons		0.0291 pounds			0.0040 gallons				
HYDROCARBONS REMOVED BY CARBON:		0.000 pounds			0.000 gallons		0.0011 pounds			0.0002 gallons				
PERCENT PRIMARY CARBON LOADING: ⁵		0%												
PERIOD AVERAGE FLOW RATE (gpd):		0.0 (includes down time)												
PERIOD AVERAGE FLOW RATE (gpd):		0.0 (excludes down time)												
PERIOD AVERAGE FLOW RATE (gpm):		0.0 (excludes down time)												
<p>TPHG: total petroleum hydrocarbons as gasoline gpd: gallons per day µg/L: micrograms per liter lbs/day: pounds per day NA: not analyzed gpm: gallons per minute</p> <p>*: The totalizer reading of the groundwater system was estimated from two consecutive monitoring events. **: The TPHG and benzene concentrations were assumed to be equal to the previous sampling event.</p> <p>1. Period TPHG removed (pounds) = period influent TPHG concentration (µg/L) x period volume of groundwater extracted (gallons) x 3.7854 (liters/gallon) x 0.000000002205 (pounds/µg) 2. Total TPHG removed (gallons) = total TPHG removed (pounds) x 0.1613 (gallons/pound) 3. Period benzene removed (pounds) = period influent benzene concentration (µg/L) x period volume of groundwater extracted (gallons) x 3.7854 (liters/gallon) x 0.000000002205 (pounds/µg) 4. Total benzene removed (gallons) = total benzene removed (pounds) x 0.1379 (gallons/pound) 5. Percent carbon loading = (total TPHG removed (1.030 pounds) / 10 pounds of TPH-G) x 100 The percent carbon loading calculation assumes a 5% by weight carbon adsorption efficiency. The treatment system uses two 200 pound carbon canisters. Carbon Loading (10 lbs TPHG) = 1 canister x 200 lbs carbon/canister x 1 lb TPHG/20 lb carbon</p> <p>6. Assumption that the BTEX and TPHG concentrations in the groundwater treatment system samples are the same as the previous sampling event on 11-30-95. System sampling schedule was reduced from monthly to quarterly by EBMUD during the third quarter 1995, therefore samples were not collected in December 1995.</p>														



Base map from USGS 7.5' Quad. Maps:
Oakland West and Richmond, California.
Photorevised 1980.

Scale : 0 2000 4000 Feet



EMCON

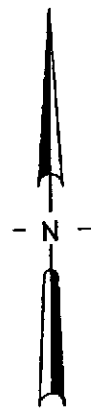
ARCO PRODUCTS COMPANY
SERVICE STATION 2035, 1001 SAN PABLO AVENUE
QUARTERLY GROUNDWATER MONITORING
ALBANY, CALIFORNIA

SITE LOCATION

FIGURE

1

PROJECT NO.
805-123.03



SHELL
STATION

SIDEWALK

MARIN AVENUE

SAN PABLO AVENUE

SIDEWALK

MW-6

Manhole

Manhole

DRIVEWAY

VW-1

MW-1

RW-1

AS-1

VW-2

Former gasoline
storage tank pit

AS-2

VW-7

VW-4

VW-8

MW-2

VW-5

VW-6

Remediation compound

VW-9

STATION
BUILDING

MW-3

Service
island
(Typ.)

Former
waste-oil
tank

MW-5

MW-4

NEW TANK PIT

APPROXIMATE PROPERTY LINE

EXPLANATION

⊙ Groundwater monitoring well

⊗ Recovery well

● Vapor extraction well

⊕ Air sparge well

co Existing sewer cleanout

----- Subgrade groundwater remediation piping route



SCALE: 0 30 60 FEET

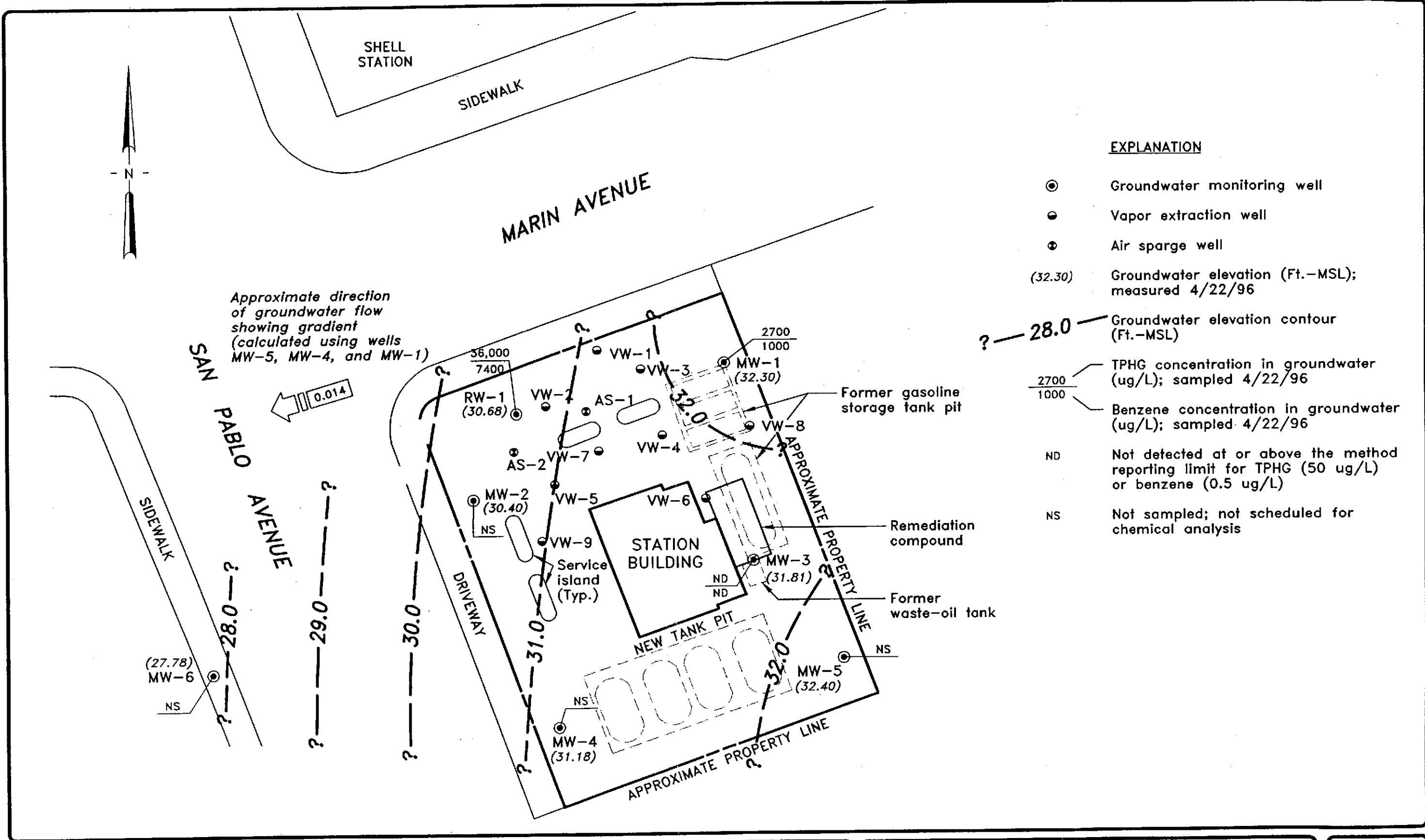
ARCO PRODUCTS COMPANY
SERVICE STATION 2035, 1001 SAN PABLO AVENUE
QUARTERLY GROUNDWATER MONITORING
ALBANY, CALIFORNIA

SITE PLAN

FIGURE NO.

2

PROJECT NO.
805-123.03



EXPLANATION

- ⊙ Groundwater monitoring well
- Vapor extraction well
- ⊕ Air sparge well
- (32.30) Groundwater elevation (Ft.-MSL); measured 4/22/96
- ?—28.0— Groundwater elevation contour (Ft.-MSL)
- 2700 / 1000 — TPHG concentration in groundwater (ug/L); sampled 4/22/96
- 2700 / 1000 — Benzene concentration in groundwater (ug/L); sampled 4/22/96
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)
- NS Not sampled; not scheduled for chemical analysis



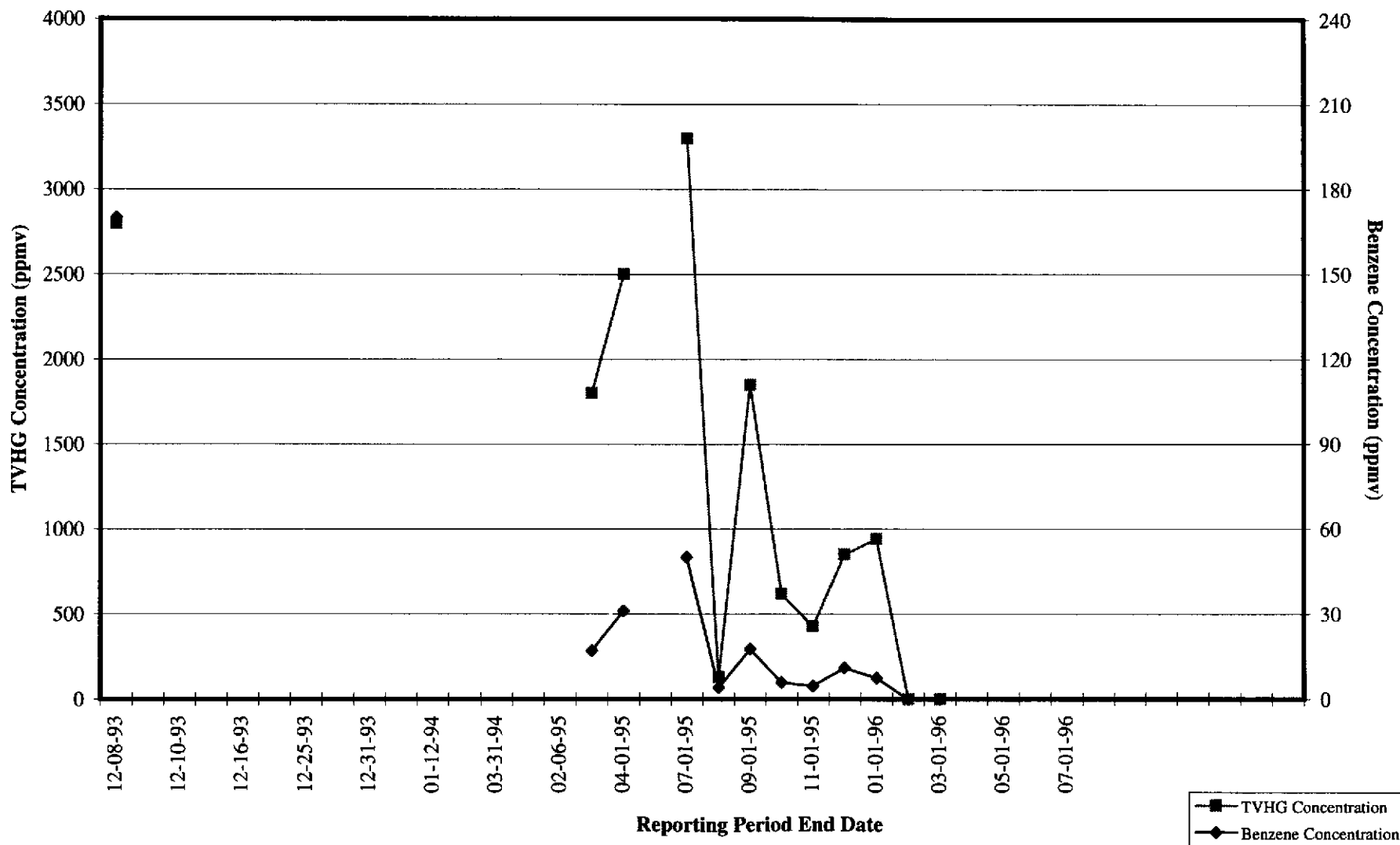
SCALE: 0 30 60 FEET

ARCO PRODUCTS COMPANY
 SERVICE STATION 2035, 1001 SAN PABLO AVENUE
 QUARTERLY GROUNDWATER MONITORING
 ALBANY, CALIFORNIA,
 GROUNDWATER DATA
 SECOND QUARTER 1996

FIGURE NO.
3
 PROJECT NO.
 805-123.003

Figure 4

ARCO Service Station 2035
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

Figure 5

ARCO Service Station 2035
Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates

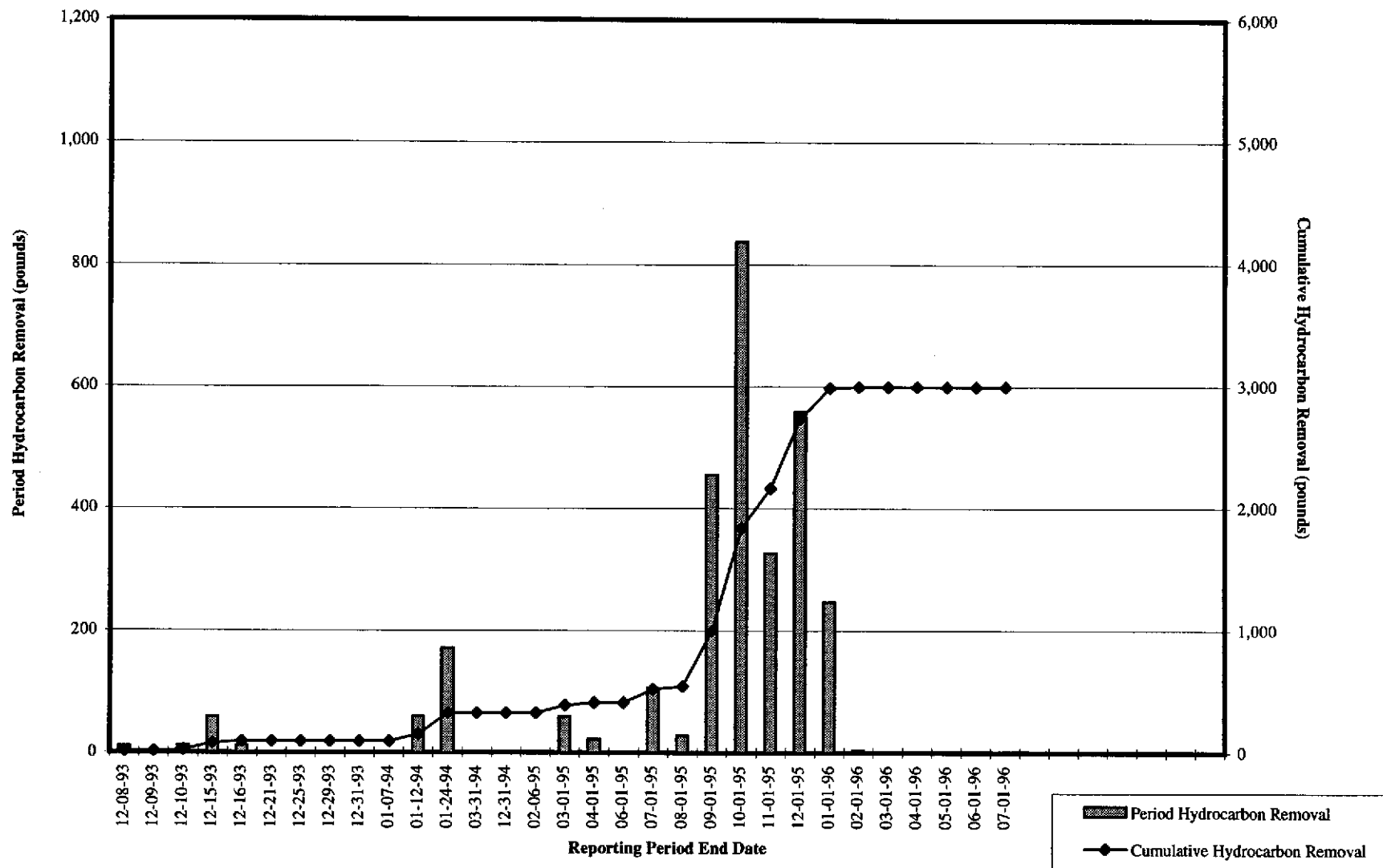
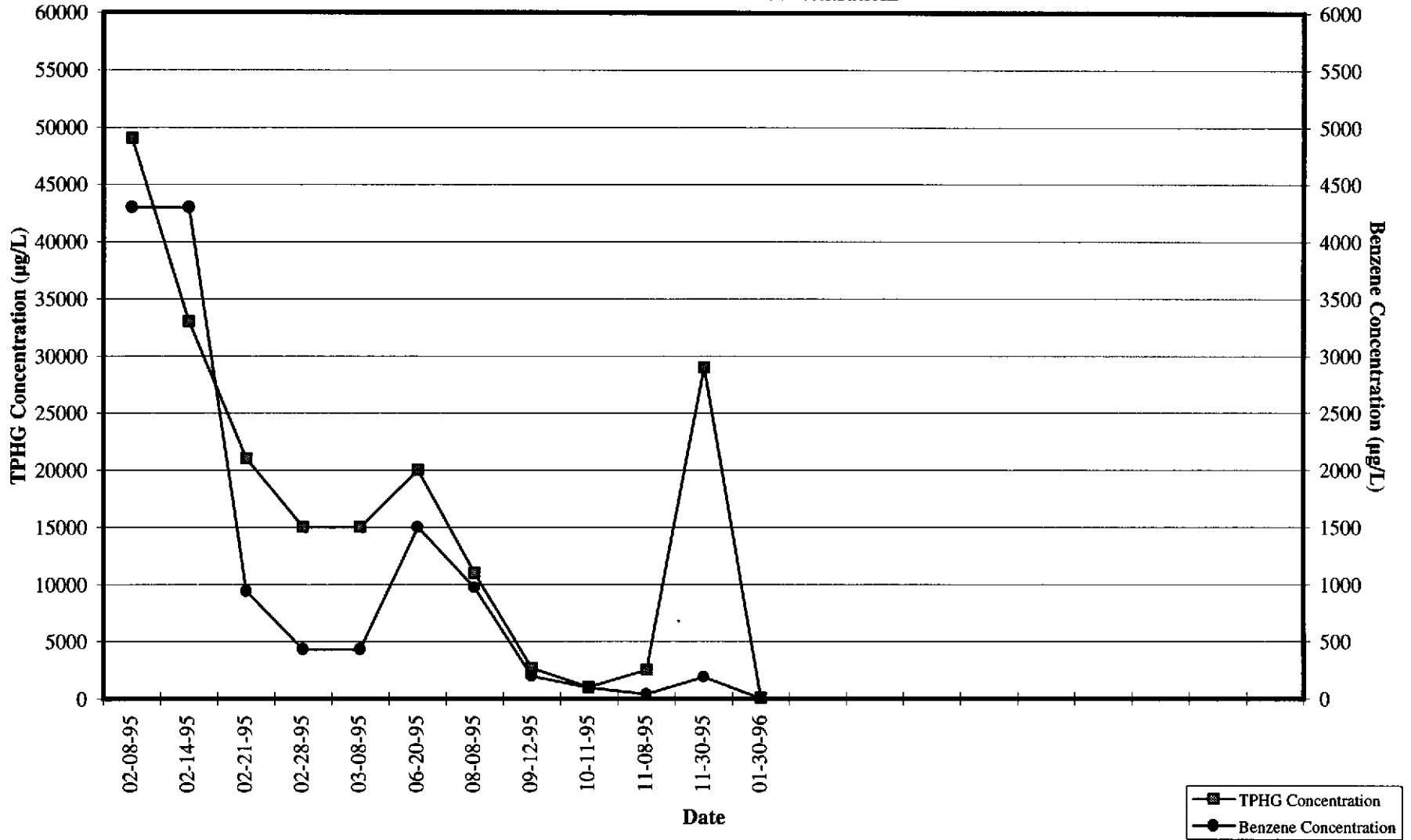


Figure 6

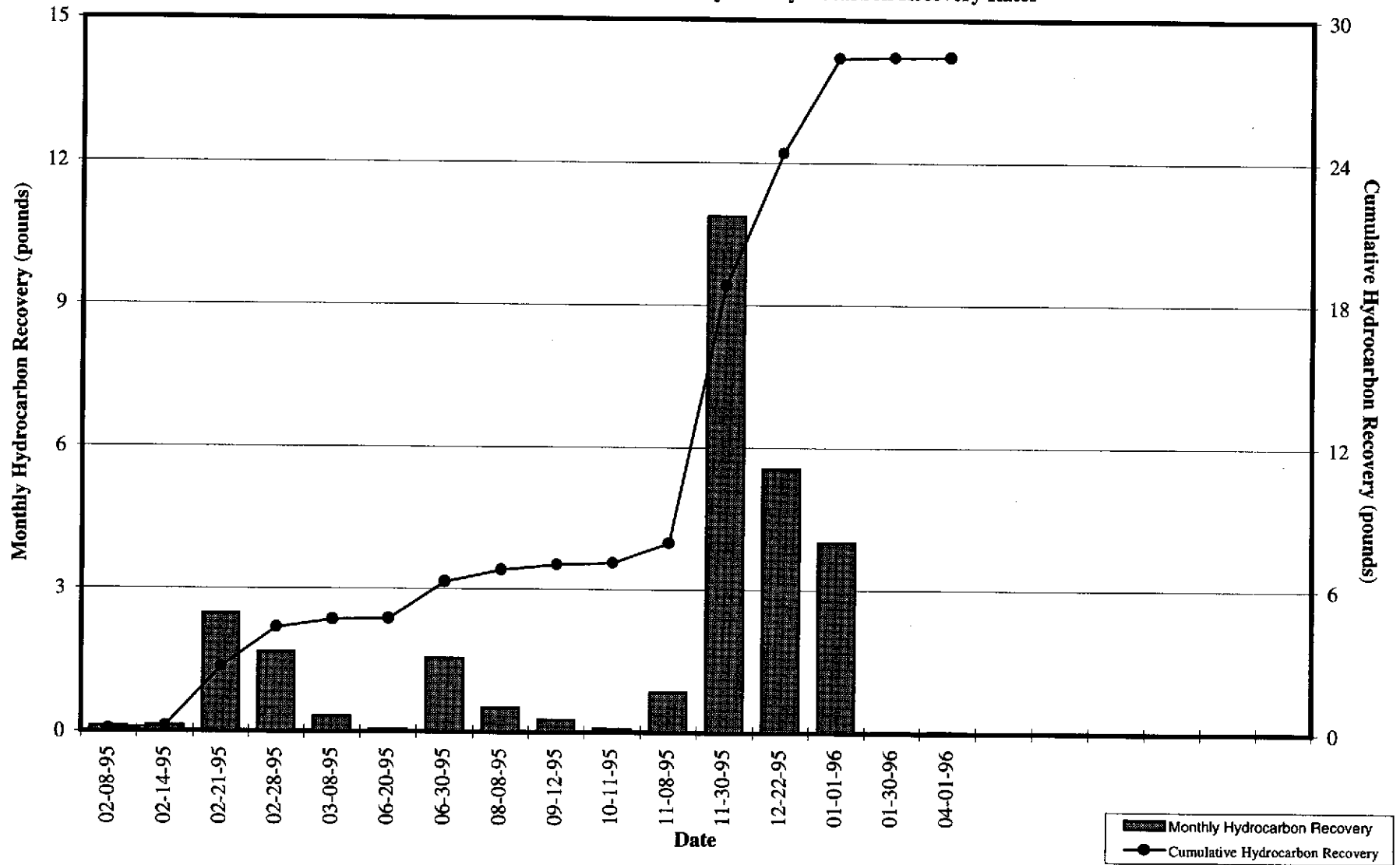
ARCO Service Station 2035
Historical Groundwater Treatment System
Influent TPHG and Benzene Concentrations



TPHG: total petroleum hydrocarbons as gasoline
µg/L: micrograms per liter

Figure 7

ARCO Service Station 2035
Historical Groundwater Treatment System Hydrocarbon Recovery Rates



APPENDIX A

**FIELD DATA SHEETS, SECOND QUARTER 1996
GROUNDWATER MONITORING EVENT**

**FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY**

PROJECT # : 21775-217.002 STATION ADDRESS : 101 San Pablo Avenue, Albany

DATE : 4-22-96

ARCO STATION # : 2035

FIELD TECHNICIAN : M. ROSS

DAY : Monday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-2	OK	Yes	Yes	Yes	Yes	9.98	9.93	NA	NA	29.1	
2	MW-4	OK	Yes	Yes	Yes	Yes	9.15	9.15	NA	NA	25.1	Water in Box
3	MW-5	OK	Yes	Yes	Yes	Yes	9.44	9.44	NA	NA	24.3	WELL CAP WAS NOT ON WELL
4	MW-6	OK	Yes	Yes	Yes	Yes	12.35	12.35	NA	NA	24.2	
5	MW-3	OK	Yes	Yes	Yes	Yes	9.63	9.63	NA	NA	33.0	
6	RW-1	OK	Yes	NO	NO	NO	9.65	9.65	NA	NA	25.4	
7	MW-1	OK	Yes	Yes	Yes	Yes	9.11	9.11	NA	NA	29.6	Water in Box

SURVEY POINTS ARE TOP OF WELL CASINGS



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev 3.2/94

PROJECT NO: 21775-217.002
PURGED BY: M. Ross
SAMPLED BY: M. Ross

SAMPLE ID: MW-1(29)
CLIENT NAME: ARCO 2035
LOCATION: Alhambra, CA

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

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 13.38
DEPTH TO WATER (feet): 9.11 CALCULATED PURGE (gal.): 40.10
DEPTH OF WELL (feet): 29.6 ACTUAL PURGE VOL (gal.): 40.5

DATE PURGED: 4-22-96 Start (2400 Hr) 1225 End (2400 Hr) 1237
DATE SAMPLED: 4-22-96 Start (2400 Hr) 1245 End (2400 Hr)

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1229</u>	<u>13.5</u>	<u>6.53</u>	<u>776</u>	<u>67.7</u>	<u>Green</u>	<u>MOD</u>
<u>1233</u>	<u>27.0</u>	<u>6.48</u>	<u>734</u>	<u>66.6</u>	<u>Dark Green</u>	<u>Trace</u>
<u>1237</u>	<u>40.5</u>	<u>6.49</u>	<u>784</u>	<u>67.4</u>	<u>Dark Green</u>	<u>Trace</u>

D. O. (ppm): NA ODCR: None
Field QC samples collected at this well: NA Parameters field filtered at this well: NA
(CCBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

PURGING EQUIPMENT

- 2" Bladder Pump
- Centrifugal Pump
- Submersible Pump
- Well Wizard™
- Other:

SAMPLING EQUIPMENT

- 2" Bladder Pump
- Bailer (Teflon)
- Bailer (PVC)
- Bailer (Stainless Steel)
- Dipper
- Well Wizard™
- Dedicated
- Other:

WELL INTEGRITY: Good LOCK #: ARCO

REMARKS:

Meter Calibration: Date 4-22-96 Time 1100 Meter Serial #: 9210 Temperature (°F):
(EC : 1000) (Cl :) (pH :) (pH 4 :)
Location of previous calibration: RW-1

Signature: M. Ross Reviewed By: GH Page 1 of 3



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev 3.2/94

PROJECT NO: 21775-217.002
PURGED BY: M. ROSS
SAMPLED BY: M. ROSS

SAMPLE ID: MW-3(33)
CLIENT NAME: ARCO 2035
LOCATION: ALBANY, CA

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

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 15.26
DEPTH TO WATER (feet): 9.63 CALCULATED PURGE (gal.): 45.30
DEPTH OF WELL (feet): 33.0 ACTUAL PURGE VOL (gal.): 46.0

DATE PURGED: 4-22-96 Start (2400 Hr) 1156 End (2400 Hr) 1209
DATE SAMPLED: 4-22-96 Start (2400 Hr) 1215 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	EC. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1157</u>	<u>15.5</u>	<u>6.76</u>	<u>773</u>	<u>65.6</u>	<u>Brown</u>	<u>Heavy</u>
<u>1200</u>	<u>31.0</u>	<u>6.60</u>	<u>735</u>	<u>66.3</u>	<u>Brown</u>	<u>Heavy</u>
<u>1209</u>	<u>46.0</u>	<u>6.67</u>	<u>697</u>	<u>66.9</u>	<u>Brown</u>	<u>Heavy</u>
—	—	—	—	—	—	—
—	—	—	—	—	—	—

D. O. (ppm): NA ODCR: NONE (CCBALT 0 - 500) NA (NTU 0 - 200 or 0 - 1000) NA

Field QC samples collected at this well: NA Parameters field filtered at this well: NA

PURGING EQUIPMENT

- 2" Bladder Pump
- Centrifugal Pump
- Submersible Pump
- Well Wizard™
- Other: _____

SAMPLING EQUIPMENT

- 2" Bladder Pump
- Bailor (Teflon)
- Bailor (PVC)
- Bailor (Stainless Steel)
- Dipper
- Well Wizard™
- Bailor (Stainless Steel)
- Submersible Pump
- Dedicated
- Other: _____

WELL INTEGRITY: Good LOCK #: ARCO

REMARKS: _____

Meter Calibration: Date 4-22-96 Time 1100 Meter Serial #: 9210 Temperature: 66.8
(EC: 1000 1031 NO: — CI: — ON 76.39 200) (PH 10 906 1000) (PH 403 —)
Location of previous calibration: RW-1

Signature: Mike Ross Reviewed By: git Page 2 of 3



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev 3.2/94

PROJECT NO: 21775-217.002

SAMPLE ID: RW-1(25)

PURGED BY: _____

CLIENT NAME: ARCO 2035

SAMPLED BY: M. ROSS

LOCATION: Albany, CA

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

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

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

DEPTH TO WATER (feet): 9.65 CALCULATED PURGE (gal.): NA

DEPTH OF WELL (feet): 25.4 ACTUAL PURGE VOL. (gal.): NA

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

DATE SAMPLED: 4-22-96 Start (2400 Hr) 1130 End (2400 Hr) _____

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1130</u>	<u>6 GRAB</u>	<u>6.54</u>	<u>1311</u>	<u>59.8</u>	<u>clr</u>	<u>TRACE</u>

D. O. (ppm): NA ODCR: SLIGHT _____

Field QC samples collected at this well: NA Parameters field filtered at this well: NA

PURGING EQUIPMENT

- 2" Bladder Pump
 - Centrifugal Pump
 - Submersible Pump
 - Well Wizard™
 - Bailor (Teflon)
 - Bailor (PVC)
 - Bailor (Stainless Steel)
 - Dedicated
- Other: NA

SAMPLING EQUIPMENT

- 2" Bladder Pump
 - ODL Sampler
 - Dipper
 - Well Wizard™
 - Bailor (Teflon)
 - Bailor (Stainless Steel)
 - Submersible Pump
 - Dedicated
- Other: _____

WELL INTEGRITY: GOOD LOCK #: NONE

REMARKS: GRAB SAMPLE TAKEN

Meter Calibration: Date: 4-22-96 Time: 1100 Meter Serial #: 9210 Temperature: 16.8
(EC: 1000/631 1000) (pH: 679 700) (pH: 996 1000) (pH: 403)

Signature: M. Ross Reviewed By: Git Page 3 of 3

APPENDIX B

**ANALYTICAL RESULTS AND CHAIN OF CUSTODY
DOCUMENTATION, SECOND QUARTER 1996
GROUNDWATER MONITORING EVENT**

**Columbia
Analytical
Services^{inc.}**

May 6, 1996

Service Request No: S9600660

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

Re: **2035 Albany / Project No. 20805-123.003 / TO#19350.00**

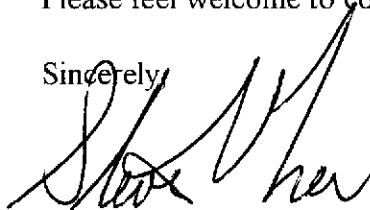
Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on April 22, 1996. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. Listed above -- to help expedite our service please refer to this number when contacting the laboratory.

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

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

Sincerely,



Steven L. Green
Project Chemist



Greg Anderson
Regional QA Coordinator

SLG/jk

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
TTLIC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 2035 ALBANY/20805-123.003/TO#19350.00
Sample Matrix: Water

Service Request: S9600660
Date Collected: 4/22/96
Date Received: 4/22/96
Date Extracted: NA

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

Sample Name:	MW-3(33)	RW-1(25)	MW-1(29)
Lab Code:	S9600660-001	S9600660-002	S9600660-003
Date Analyzed:	4/26/96	4/26/96	4/29/96

Analyte	MRL			
TPH as Gasoline	50	ND	36,000	2,700
Benzene	0.5	ND	7,400	1,000
Toluene	0.5	ND	3,700	<10*
Ethylbenzene	0.5	ND	580	22
Total Xylenes	0.5	ND	3,400	<10*
Methyl <i>tert</i> -Butyl Ether	3	90	<300*	<60**

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 2035 ALBANY/20805-123.003/TO#19350.00
Sample Matrix: Water

Service Request: S9600660
Date Collected: 4/22/96
Date Received: 4/22/96
Date Extracted: NA

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

Sample Name:	Method Blank	Method Blank
Lab Code:	S960426-WB1	S960429-WB1
Date Analyzed:	4/26/96	4/29/96

Analyte	MRL		
TPH as Gasoline	50	ND	ND
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
Methyl <i>tert</i> -Butyl Ether	3	ND	ND

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 2035 ALBANY/20805-123.003/TO#19350.00
Sample Matrix: Water

Service Request: S9600660
Date Collected: 4/22/96
Date Received: 4/22/96
Date Extracted: NA
Date Analyzed: 4/26,29/96

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

Sample Name	Lab Code	PID Detector	FID Detector
		Percent Recovery 4-Bromofluorobenzene	Percent Recovery α,α,α -Trifluorotoluene
MW-3(33)	S9600660-001	93	103
RW-1(25)	S9600660-002	92	98
MW-1(29)	S9600660-003	94	102
Batch QC (MS)	S960650-001MS	94	97
Batch QC(DMS)	S960650-001DMS	94	102
Method Blank	S960426-WB1	92	98
Method Blank	S960429-WB1	92	97

CAS Acceptance Limits: 69-116 69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 2035 ALBANY/20805-123.003/TO#19350.00
Sample Matrix: Water

Service Request: S9600660
Date Collected: 4/22/96
Date Received: 4/22/96
Date Extracted: NA
Date Analyzed: 4/26/96

Matrix Spike/Duplicate Matrix Spike Summary

BTE

EPA Methods 5030/8020

Units: ug/L (ppb)

Sample Name: Batch QC
Lab Code: S960650-001

Analyte	Spike Level		Sample Result	Spike Result		Percent Recovery				Relative Percent Difference
	MS	DMS		MS	DMS	CAS		Limits		
						MS	DMS			
Benzene	25	25	ND	24.3	23.6	97	94	75-135		3
Toluene	25	25	ND	24.3	23.6	97	94	73-136		3
Ethylbenzene	25	25	ND	23.9	23.3	96	93	69-142		3

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 2035 ALBANY/20805-123.003/TO#19350.00

Service Request: S9600660
Date Analyzed: 4/26/96

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.3	101	85-115
Toluene	25	25.1	100	85-115
Ethylbenzene	25	24.9	100	85-115
Xylenes, Total	75	75.9	101	85-115
Gasoline	250	260	104	90-110
Methyl <i>tert</i> -Butyl Ether	50	53	106	85-115

APPENDIX C
SVE SYSTEM MONITORING DATA LOG SHEETS

APPENDIX D

**FIELD DATA SHEETS, OPERATION AND MAINTENANCE VISITS,
SVE SYSTEM, SECOND QUARTER 1996**

Remarks: Started unit - water level in #NW-1 = 8.49'
 Turned water side onto test - then shut off (low VOCs 33.00ppm)

Unscheduled site visit Scheduled site visit

SYSTEM PARAMETERS (Therm Tech Model VAC-10 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	1002	Effluent (E-1) (12"x12")	-
System Status (on or off)	off	Stack Temperature (°F)	766
Shutdown Time (24:00 hour)	-	SYSTEM	-
Restart Time (24:00 hour)	1200	Total Flow (3") (cfm) (before blower-same as Para-Fax)	80
Reading Time (24:00 hour)	1530	Fire Box Temperature (°F)	707
Well Field WF-1 (3")	-	Set Point (°F)	710
Vacuum (in. of H2O)	30	TOTAL HOURS	10428.72
Velocity (ft/min)	700	Electric Meter (kwh)	-
Temperature (°F)	64	Natural Gas (cf)	-

Aeration Tank AT-1 (2")		AIR MONITORING						
Vacuum (in. of H2O)	-	FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Velocity (ft/min)	-	Date:						
Flow (scfm)	-	PID (ppm)		CAL GAS: I50 (100ppm)				
After Blower I-2 (4") (AFTER DILUTION)	-	Date: 5-17-96	413	OFF	413	413		22.3
Total Pressure (in. of H2O)	.5	Date:						
Total Flow (in. of H2O)	.015	Lab samples taken for analysis at: NONE						
Influent I-1 (3") (BEFORE DILUTION)	-	PARA-FAX on/off		OK				
Vacuum (in. of H2O)	30	Cleaned K.O. pump pre-filter? yes/no						
Velocity (ft/min)	700	yes						

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H2O)	Velocity (fpm)	Product Recovered (ml)	PID (ppm)	Bubbler (on/off)
VW-1	4"	5'-17'			100	30			1945	NA
VW-2	4"	5'-17'			0	18			101	NA
VW-3	4"	4.5'-9.5'			0	18			501	NA
VW-4	4"	5'-17'			100	25			197	NA
VW-5	4"	4.5'-14.5'			0	20			806	NA
VW-6	4"	5'-12.5'			100	22			195	NA
VW-7	4"	5'-15'			100	28			419	NA
VW-8	4"	5'-15'			0	18			116	NA
VW-9	4"	5'-15'			100	28			384	NA
RW-1	6"	11'-26'			0	25			118	off
AS-1 (vent)	2"	5'-15'			100	30			146	off
AS-2 (vent)	2"	5'-15'			100	30			208	off

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (ppm)	REMARKS
AS-1	2"	28.3'-30.3'			off				
AS-2	2"	28.8'-30.8'			off				

Total Sparge Data

Total Air Sparge Pressure(psi)=	Total Air Sparge Flow Rate(scfm)=	Total Air Sparge Temp(F)=
---------------------------------	-----------------------------------	---------------------------

Special Instructions:
 Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG, BTEX, and Benzene results in mg/m³. Report O₂ and CO₂ in % by volume.

Project# 20805-123.003 Work Authorization # 19289

Operator: *V. W. Hoffman* Date: *5-17-96* ARCO 2035 Soil Vapor Extraction System



Remarks: *Shut system down due to Low VOCs at I-1 = 59.6 PPM (Per S-Yalimanchili)*

Unscheduled site visit Scheduled site visit

SYSTEM PARAMETERS (Therm Tech Model VAC-10 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	<i>1130</i>	Effluent (E-1) (12"x12")	
System Status (on or off)	<i>ON</i>	Stack Temperature (°F)	
Shutdown Time (24:00 hour)	<i>1215</i>	SYSTEM	
Restart Time (24:00 hour)	<i>-</i>	Total Flow (3" (cfm) (before blower-same as Para-Fax)	
Reading Time (24:00 hour)	<i>1200</i>	Fire Box Temperature (°F)	
Well Field WF-1 (3")		Set Point (°F)	
Vacuum (in. of H2O)		TOTAL HOURS	
Velocity (ft/min)		Electric Meter (kwh)	
Temperature (°F)		Natural Gas (cf)	
Aeration Tank AT-1 (2")		AIR MONITORING	
Vacuum (in. of H2O)		FID (ppm)	Amb WF-1 AT-1 I-1 I-2 E-1
Velocity (ft/min)		Date:	
Flow (scfm)			
After Blower I-2 (4") (AFTER DILUTION)		PID (ppm)	CAL GAS: <i>ISO C10000M</i>
Total Pressure (in. of H2O)		Date: <i>5-22</i>	<i>0 59.6 - 59.6 59.6 -</i>
Total Flow (in. of H2O)		Date:	
Influent I-1 (3") (BEFORE DILUTION)		Lab samples taken for analysis at:	
Vacuum (in. of H2O)		PARA-FAX on/off	
Velocity (ft/min)		Cleaned K.O. pump pre-filter ? yes/no	

WELL FIELD


SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H2O)	Velocity (fpm)	Product Recovered (ml)	PID (ppm)	Bubbler (on/off)
VW-1	4"	5'-17'								NA
VW-2	4"	5'-17'								NA
VW-3	4"	4.5'-9.5'								NA
VW-4	4"	5'-17'								NA
VW-5	4"	4.5'-14.5'								NA
VW-6	4"	5'-12.5'								NA
VW-7	4"	5'-15'								NA
VW-8	4"	5'-15'								NA
VW-9	4"	5'-15'								NA
RW-1	6"	11'-26'								
AS-1 (vent)	2"	5'-15'								
AS-2 (vent)	2"	5'-15'								

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (ppm)	REMARKS
AS-1	2"	28.3'-30.3'							
AS-2	2"	28.8'-30.8'							

Total Sparge Data

Total Air Sparge Pressure(psi)= _____ Total Air Sparge Flow Rate(scfm)= _____ Total Air Sparge Temp(F)= _____

Special Instructions: Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG, BTEX, and Benzene results in mg/m³. Report O₂ and CO₂ in % by volume.



Project# 20805-123.003 Work Authorization # 19289

Operator: *V. Whitten* Date: *5-22-96* ARCO 2035 Soil Vapor Extraction System