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

Date March 31, 1998
Project 20805-123.004
3858

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	Fourth quarter 1997 groundwater monitoring results and remediation system performance evaluation report, ARCO service station 2035, Albany, California

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

Gary P. Messerotes
Project Manager

cc: Paul Supple, ARCO Products Company
File

ARCO Products Company

Date: March 31, 1998

Re: ARCO Station #

2035 • 1001 San Pablo Avenue • Albany, CA
Fourth 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:

Paul Supple
Environmental Engineer

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

March 13, 1998
Project 20805-123.004

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

Re: Fourth quarter 1997 groundwater monitoring results and remediation system performance evaluation report, ARCO service station 2035, Albany, California

Dear Mr. Supple:

This letter presents the results of the fourth quarter 1997 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, 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.

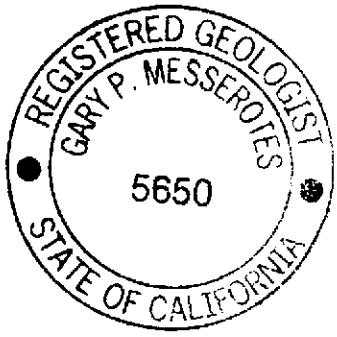
Please call if you have questions.

Sincerely,

EMCON

Valli Voruganti, P.E.
Project Engineer

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



March 13, 1998

ARCO QUARTERLY REPORT

Station No.: 2035	Address: 1001 San Pablo Avenue, San Pablo, California
EMCON Project No.:	20805-123.004
ARCO Environmental Engineer/Phone No.:	Paul Supple /(510) 299-8891
EMCON Project Manager/Phone No.:	Gary P. Messerotes /(408) 453-7300
Primary Agency/Regulatory ID No.:	ACHCSA /Barney Chan
Reporting Period:	October 1, 1997 to January 1, 1998

WORK PERFORMED THIS QUARTER (Fourth- 1997):

1. Prepared and submitted quarterly report for third quarter 1997.
2. Conducted quarterly groundwater monitoring and sampling for fourth quarter 1997.
3. SVE system was pulsed on in November 1997 for approximately 2 weeks. System was shut down due to low hydrocarbon in extracted vapor.
4. Continued air bubbling at RW-1.

WORK PROPOSED FOR NEXT QUARTER (First- 1998):

1. Prepare and submit quarterly report for fourth quarter 1997.
2. Perform quarterly groundwater monitoring and sampling for first quarter 1998.
3. Continue air bubbling at RW-1.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring and Operation and Maintenance of Remediation Systems The SVE system was shut down on August 12, 1996, because of low TVHg and benzene concentrations in extracted soil vapor. System pulsed on occasionally to see if hydrocarbon concentrations in extracted vapor warrant continued operation. The groundwater treatment system was shut down on August 8, 1996, because of low TPHG concentrations in extracted groundwater.
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-1, AS-2, RW-1, VW-1, VW-2, and VW-7
FP Recovered This Quarter :	None (FP was last recovered in 1996)
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:	Air-Bubbling in RW-1
Average Depth to Groundwater:	11.23 feet
Groundwater Gradient (Average):	0.038 ft/ft toward southwest

SVE QUARTERLY OPERATION AND PERFORMANCE:

Equipment Inventory: Therm Tech Model VAC-10 Thermal/Catalytic Oxidizer

	The SVE system was shut down on August 12, 1996, because of low TVHg and benzene concentrations in extracted soil vapor. The groundwater treatment system was shut down on August 8, 1996, because of low TPHG concentrations in extracted groundwater.
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:	9.0 pounds
Total HC Recovered to Date:	3016.5 pounds
Utility Usage	
Electric (KWH):	1775.1 KWH
Gas (Therms):	446 Therm
Operating Hours This Period (SVE):	337.9 hours
Operating Hours to Date (SVE):	7211.1 hours
Percent Operational (SVE):	15.3%
Operating Hours This Period (GWE):	0.0 hours
Percent Operational (GWE):	0.0%
Unit Maintenance:	Routine monthly maintenance
Number of Auto Shut Downs:	0
Destruction Efficiency Permit Requirement:	90% if POC concentrations are less than 200 ppmv
Percent TPH Conversion:	94.7%
Average Stack Temperature:	732°F
Average SVE Source Flow:	118.7 scfm
Average SVE Process Flow:	221.4 scfm
Average Source Vacuum:	21.5 inches of water

DISCUSSION:

The SVE system has been shut down since August 12, 1996, because of relatively low gasoline concentrations in the influent vapor stream. The SVE system was restarted for two weeks during the fourth quarter, and was shut down again because of low hydrocarbons concentrations in extracted vapor. Currently bubbling air at low flow rates of less than 2 cfm in well RW-1 to introduce dissolved oxygen into groundwater to promote biodegradation of hydrocarbons in the vicinity of RW-1.

ATTACHED:

- Table 1 - Groundwater Monitoring Data, Fourth Quarter 1997
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 3 - Historical Groundwater Elevation Data, Shell Station
- 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, Fourth Quarter 1997
- 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 - Analytical Results and Chain of Custody Documentation, Fourth Quarter 1997 Groundwater Monitoring Event
- Appendix B - SVE System Monitoring Data Log Sheets
- Appendix C - Analytical Results and Chain-of-Custody Documentation for Soil Vapor Extraction System, Fourth Quarter 1997

cc: Barney Chan, ACHCSA

Table 1
Groundwater Monitoring Data
Fourth Quarter 1997

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

Date: 03-10-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**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	11-03-97	41.41	10.68	30.73	ND	SW	0.038	11-03-97	83	8	<0.5	<0.5	<0.5	13	--	--	--	--	--	--
MW-2	11-03-97	40.38	11.25	29.13	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	18	--	--	--	--	--	--
MW-3	11-03-97	41.44	11.44	30.00	ND	SW	0.038	11-03-97	<200^	<2^	<2^	<2^	<2^	130	--	--	--	--	--	--
MW-4	11-03-97	40.33	10.79	29.54	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-5	11-03-97	41.84	11.23	30.61	ND	SW	0.038	11-03-97	Not sampled: well sampled annually, during the first quarter											
MW-6	11-03-97	40.13	13.42	26.71	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	19	--	--	--	--	--	--
RW-1	11-03-97	40.33	9.10	31.23	ND	SW	0.038	11-03-97	<200^	14	19	3	19	140	--	--	--	--	--	--

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
W: west
^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference
- -: not analyzed or not applicable

esj/j:\qtr_rpts\2035\2035mdb.xls\Table 1:imi
20805-123.004

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

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

Date: 03-09-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**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	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-1	08-15-96	41.41	10.37	31.04	ND	SW	0.011	08-15-96	300	52	<0.5	0.9	<0.5	22	--	--	--	--	--	--
MW-1	12-10-96	41.41	8.79	32.62	ND	WSW	0.023	12-10-96	270	63	0.7	<0.5	1	25	--	--	--	--	--	--
MW-1	03-27-97	41.41	9.80	31.61	ND	WSW	0.026	03-27-97	1500	610	<5^	15	7	56	--	--	--	--	--	--
MW-1	05-22-97	41.41	9.65	31.76	ND	WSW	0.024	05-22-97	110	5.5	<0.5	<0.5	0.7	10	--	--	--	--	--	--
MW-1	09-04-97	41.41	10.22	31.19	ND	W	0.019	09-04-97	180	40	<0.5	1.2	0.5	26	--	--	--	--	--	--
MW-1	11-03-97	41.41	10.68	30.73	ND	SW	0.038	11-03-97	83	8	<0.5	<0.5	<0.5	13	--	--	--	--	--	--
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: well sampled semi-annually, during the first and third quarters											
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: well sampled semi-annually, during the first and third quarters											
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: well sampled semi-annually, during the first and third quarters											
MW-2	08-15-96	40.38	11.10	29.28	ND	SW	0.011	08-15-96	<50	<0.5	<0.5	<0.5	<0.5	4	--	--	--	--	--	--
MW-2	12-10-96	40.38	10.00	30.38	ND	WSW	0.023	12-10-96	Not sampled: well sampled semi-annually, during the first and third quarters											
MW-2	03-27-97	40.38	10.38	30.00	ND	WSW	0.026	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	12	--	--	--	--	--	--
MW-2	05-22-97	40.38	10.65	29.73	ND	WSW	0.024	05-22-97	Not sampled: well sampled semi-annually, during the first and third quarters											
MW-2	09-04-97	40.38	10.87	29.51	ND	W	0.019	09-04-97	<50	<0.5	<0.5	<0.5	<0.5	19	--					
MW-2	11-03-97	40.38	11.25	29.13	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	18	--	--	--	--	--	--

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

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

Date: 03-09-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**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	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-3	08-15-96	41.44	11.12	30.32	ND	SW	0.011	08-15-96	<50	<0.5	<0.5	<0.5	<0.5	54	--	--	--	--	--	--
MW-3	12-10-96	41.44	10.34	31.10	ND	WSW	0.023	12-10-96	71	<0.5	<0.5	<0.5	<0.5	130	--	--	--	--	--	--
MW-3	03-27-97	41.44	10.28	31.16	ND	WSW	0.026	03-27-97	<100^	<1^	<1^	<1^	<1^	170	--	--	--	--	--	--
MW-3	05-22-97	41.44	10.40	31.04	ND	WSW	0.024	05-22-97	<100^	<1^	<1^	<1^	<1^	95	--	--	--	--	--	--
MW-3	09-04-97	41.44	10.75	30.69	ND	W	0.019	09-04-97	<50	<0.5	<0.5	<0.5	<0.5	37	--	--	--	--	--	--
MW-3	11-03-97	41.44	11.44	30.00	ND	SW	0.038	11-03-97	<200^	<2^	<2^	<2^	<2^	130	--	--	--	--	--	--
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: well sampled annually, during the first quarter											
MW-4	08-15-96	40.33	10.35	29.98	ND	SW	0.011	08-15-96	Not sampled: well sampled annually, during the first quarter											
MW-4	12-10-96	40.33	8.70	31.63	ND	WSW	0.023	12-10-96	Not sampled: well sampled annually, during the first quarter											
MW-4	03-27-97	40.33	9.75	30.58	ND	WSW	0.026	03-27-97	<5000^	<50^	<50^	<50^	<50^	4200	--	--	--	--	--	--
MW-4	05-22-97	40.33	9.91	30.42	ND	WSW	0.024	05-22-97	Not sampled: well sampled annually, during the first quarter											
MW-4	09-04-97	40.33	10.25	30.08	ND	W	0.019	09-04-97	Not sampled: well sampled annually, during the first quarter											
MW-4	11-03-97	40.33	10.79	29.54	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--

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

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

Date: 03-09-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**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	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: well sampled annually, during the first quarter											
MW-5	08-22-95	41.84	11.12	30.72	ND	SW	0.012	08-22-95	Not sampled: well sampled annually, during the first quarter											
MW-5	11-09-95	41.84	12.52	29.32	ND	WSW	0.01	11-09-95	Not sampled: well sampled annually, during the first quarter											
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: well sampled annually, during the first quarter											
MW-5	08-15-96	41.84	10.83	31.01	ND	SW	0.011	08-15-96	Not sampled: well sampled annually, during the first quarter											
MW-5	12-10-96	41.84	9.20	32.64	ND	WSW	0.023	12-10-96	Not sampled: well sampled annually, during the first quarter											
MW-5	03-27-97	41.84	10.10	31.74	ND	WSW	0.026	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-5	05-22-97	41.84	10.28	31.56	ND	WSW	0.024	05-22-97	Not sampled: well sampled annually, during the first quarter											
MW-5	09-04-97	41.84	10.73	31.11	ND	W	0.019	09-04-97	Not sampled: well sampled annually, during the first quarter											
MW-5	11-03-97	41.84	11.23	30.61	ND	SW	0.038	11-03-97	Not sampled: well sampled annually, during the first quarter											
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: well sampled annually, during the first quarter											
MW-6	08-22-95	40.13	13.32	26.81	ND	SW	0.012	08-22-95	Not sampled: well sampled annually, during the first quarter											
MW-6	11-09-95	40.13	14.13	26.00	ND	WSW	0.01	11-09-95	Not sampled: well sampled annually, during the first quarter											
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: well sampled annually, during the first quarter											
MW-6	08-15-96	40.13	13.18	26.95	ND	SW	0.011	08-15-96	Not sampled: well sampled annually, during the first quarter											
MW-6	12-10-96	40.13	11.94	28.19	ND	WSW	0.023	12-10-96	Not sampled: well sampled annually, during the first quarter											
MW-6	03-27-97	40.13	13.10	27.03	ND	WSW	0.026	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-6	05-22-97	40.13	13.00	27.13	ND	WSW	0.024	05-22-97	Not sampled: well sampled annually, during the first quarter											
MW-6	09-04-97	40.13	13.30	26.83	ND	W	0.019	09-04-97	Not sampled: well sampled annually, during the first quarter											
MW-6	11-03-97	40.13	13.42	26.71	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	19	--	--	--	--	--	--

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

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

Date: 03-09-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**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	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	--	--	--	--	--	--
RW-1	08-15-96	40.33	10.60	29.73	ND	SW	0.011	08-15-96	1800	31	38	15	150	<30^	--	--	--	--	--	--
RW-1	12-10-96	40.33	8.72	31.61	ND	WSW	0.023	12-10-96	25000	1900	1000	330	3200	<100^	--	--	--	--	--	--
RW-1	03-27-97	40.33	10.33	30.00	ND	WSW	0.026	03-27-97	7200	1900	59	95	240	480	--	--	--	--	--	--
RW-1	05-22-97	40.33	10.10	30.23	ND	WSW	0.024	05-22-97	3000	630	84	45	340	<60^	--	--	--	--	--	--
RW-1	09-04-97	40.33	10.42	29.91	ND	W	0.019	09-04-97	7100	120	55	14	160	<60^	--	--	--	--	--	--
RW-1	11-03-97	40.33	9.10	31.23	ND	SW	0.038	11-03-97	<200^	14	19	3	19	140	--	--	--	--	--	--

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

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

Date: 03-09-98

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**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

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
NW: northwest
WNW: west-northwest
SW: southwest
WSW: west-southwest
^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference
- -: not analyzed or not applicable
*: 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 Elevation Data

Shell Station, 999 San Pablo Avenue — Date: 03-10-98

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet
Shell Station					
S-1	12-10-96	42.73	7.56	35.17	ND
S-1	02-20-97	42.73	7.95	34.78	ND
S-1	05-22-97	42.73	8.11	34.62	ND
S-2	12-10-96	40.73	8.57	32.16	ND
S-2	02-20-97	40.73	8.15	32.58	ND
S-2	05-22-97	40.73	8.79	31.94	ND
S-3	12-10-96	41.46	7.96	33.50	ND
S-3	02-20-97	41.46	7.44	34.02	ND
S-3	05-22-97	41.46	7.13	34.33	ND
S-4	12-10-96	41.10	7.04	34.06	ND
S-4	02-20-97	41.10	7.07	34.03	ND
S-4	05-22-97	41.10	6.63	34.47	ND
S-5	12-10-96	39.99	9.10	30.89	ND
S-5	02-20-97	39.99	8.93	31.06	ND
S-5	05-22-97	39.99	10.07	29.93**	0.02
S-6	12-10-96	40.12	6.68	33.44	ND
S-6	02-20-97	40.12	5.70	34.42	ND
S-6	05-22-97	40.12	5.49	34.63	ND
S-7	12-10-96	40.10	9.04	31.06	ND
S-7	02-20-97	40.10	9.60	30.50	ND
S-7	05-22-97	40.10	10.63	29.47	ND

TOC: top of casing
ft-MSL: elevation in feet, relative to mean sea level
ND: none detected
**: [corrected elevation (Z')] = Z + (h * 0.73); where Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

Table 4
Approximate Cumulative Floating Product Recovered

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

Date: 01-19-98

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
VW-7	1997	0.0
	1992 to 1997 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: 01-01-98
System shut down on 8-12-96.

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:		21.00	0.00	23.00	121.00	18.00
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):		0.00	0.00	0.00	0.00	0.00
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):		1.77	0.00	1.94	9.53	1.96
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: 01-01-98
System shut down on 8-12-96.

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:		0.00	104.00	0.00	43.00	0.00
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):		0.00	0.00	0.00	0.00	0.00
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):		0.00	0.00	0.00	0.00	0.00
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: 01-01-98
System shut down on 8-12-96.

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
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	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
Average Emission Rates (10), pounds per day (11)						
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:		123.00	285.00	0.00	0.00	8.90
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):		0.00	0.00	0.00	0.00	0.00
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):		9.58	27.53	0.00	0.00	0.00
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: 01-01-98
System shut down on 8-12-96.

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:		501.95	162.83	3.02	112.33	614.38
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):		4.28	0.31	0.00	1.42	0.00
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):		10.16	3.64	0.00	17.24	4.49
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: 01-01-98
System shut down on 8-12-96.

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:		562.61	717.42	624.47	708.09	493.54
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):		0.49	0.24	0.07	11.02	5.51
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):		73.46	135.15	52.79	91.89	40.73
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: 01-01-98
System shut down on 8-12-96.

Date Begin:		01-01-96	02-01-96 (20)	03-01-96	04-01-96	05-01-96
Date End:		02-01-96	03-01-96	04-01-96	05-01-96	06-01-96
Mode of Oxidation:		Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:		31	29	24	0	5
Days of Downtime:		0	0	7	30	26
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline (3)	<15	<15	NA	NA	NA
	mg/m3 (4) as gasoline	<60	<60	NA	NA	NA
	ppmv as benzene (5)	<0.1	<0.1	NA	NA	NA
	mg/m3 as benzene	<0.5	<0.5	NA	NA	NA
System Influent:	ppmv as gasoline	<15	<15	NA	NA	NA
	mg/m3 as gasoline	<60	<60	NA	NA	NA
	ppmv as benzene	0.3	0.3	NA	NA	NA
	mg/m3 as benzene	0.9	0.9	NA	NA	NA
System Effluent:	ppmv as gasoline	<15	<15	NA	NA	NA
	mg/m3 as gasoline	<60	<60	NA	NA	NA
	ppmv as benzene	<0.1	<0.1	NA	NA	NA
	mg/m3 as benzene	<0.5	<0.5	NA	NA	NA
Average Well Field Flow Rate (6), scfm (7):		24.8	28.6	0.0	0.0	32.5
Average System Influent Flow Rate (6), scfm:		51.2	53.1	0.0	0.0	41.3
Average Destruction Efficiency (8), percent (9):		NA	NA	NA	NA	NA
Average Emission Rates (10), pounds per day (11)						
Gasoline:		0.28	0.29	NA	NA	NA
Benzene:		0.00	0.00	NA	NA	NA
Operating Hours This Period:		744.00	158.00	0.00	2.38	120.25
Operating Hours To Date:		5991.5	6149.5	6149.5	6151.9	6272.2
SVE Pounds/ Hour Removal Rate, as gasoline (12):		0.01	0.01	0.00	0.00	0.01
SVE Pounds Removed This Period, as gasoline (13):		4.14	1.01	0.00	0.00	0.88
GWE Pounds Removed This Period, as gasoline (14):		3.99	0.00	0.01	0.00	0.00
Total Pounds Removed This Period, as gasoline (15):		8.13	1.01	0.01	0.00	0.88
Total Pounds Removed To Date, as gasoline:		2995.5	2996.5	2996.5	2996.5	2997.4
Total Gallons Removed This Period, as gasoline (16):		1.31	0.16	0.00	0.00	0.14
Total Gallons Removed To Date, as gasoline:		483.2	483.3	483.3	483.3	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: 01-01-98
System shut down on 8-12-96.

Date Begin:		06-01-96	07-01-96	08-01-96	09-01-96	10-01-96
Date End:		07-01-96	08-01-96	09-01-96	10-01-96	01-01-97
Mode of Oxidation:		Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:		0	16	10	0	0
Days of Downtime:		30	15	21	30	92
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline (3)	NA	160	16	NA	NA
	mg/m3 (4) as gasoline	NA	660	67	NA	NA
	ppmv as benzene (5)	NA	0.8	<0.2	NA	NA
	mg/m3 as benzene	NA	2.5	<0.5	NA	NA
System Influent:	ppmv as gasoline	NA	160	16	NA	NA
	mg/m3 as gasoline	NA	660	67	NA	NA
	ppmv as benzene	NA	0.8	<0.2	NA	NA
	mg/m3 as benzene	NA	2.5	<0.5	NA	NA
System Effluent:	ppmv as gasoline	NA	<5	<5	NA	NA
	mg/m3 as gasoline	NA	<20	<20	NA	NA
	ppmv as benzene	NA	<0.2	<0.2	NA	NA
	mg/m3 as benzene	NA	<0.5	<0.5	NA	NA
Average Well Field Flow Rate (6), scfm (7):		0.0	52.4	52.6	0.0	0.0
Average System Influent Flow Rate (6), scfm:		0.0	95.1	95.4	0.0	0.0
Average Destruction Efficiency (8), percent (9):		NA	97.0	70.1 (22)	NA	NA
Average Emission Rates (10), pounds per day (11)						
Gasoline:		NA	0.17	0.17	NA	NA
Benzene:		NA	0.00	0.00	NA	NA
Operating Hours This Period:		0.00	372.17	228.86	0.00	0.00
Operating Hours To Date:		6272.2	6644.3	6873.2	6873.2	6873.2
SVE Pounds/ Hour Removal Rate, as gasoline (12):		0.00	0.01	0.01	0.00	0.00
SVE Pounds Removed This Period, as gasoline (13):		0.00	4.38	2.70	0.00	0.00
GWE Pounds Removed This Period, as gasoline (14):		0.00	3.07	0.00	0.00	0.00
Total Pounds Removed This Period, as gasoline (15):		0.00	7.45	2.70	0.00	0.00
Total Pounds Removed To Date, as gasoline:		2997.4	3004.8	3007.5	3007.5	3007.5
Total Gallons Removed This Period, as gasoline (16):		0.00	1.20	0.44	0.00	0.00
Total Gallons Removed To Date, as gasoline:		483.5	484.7	485.1	485.1	485.1

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: 01-01-98
System shut down on 8-12-96.

Date Begin:		01-01-97	04-01-97	07-01-97	10-01-97	11-01-97
Date End:		04-01-97	07-01-97	10-01-97	11-01-97	12-01-97
Mode of Oxidation:		Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:		0	0	0	0	14
Days of Downtime:		90	91	92	31	16
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline (3)	NA	NA	NA	NA	160
	mg/m3 (4) as gasoline	NA	NA	NA	NA	640
	ppmv as benzene (5)	NA	NA	NA	NA	0.6
	mg/m3 as benzene	NA	NA	NA	NA	2
System Influent:	ppmv as gasoline	NA	NA	NA	NA	160
	mg/m3 as gasoline	NA	NA	NA	NA	640
	ppmv as benzene	NA	NA	NA	NA	0.6
	mg/m3 as benzene	NA	NA	NA	NA	2
System Effluent:	ppmv as gasoline	NA	NA	NA	NA	8
	mg/m3 as gasoline	NA	NA	NA	NA	34
	ppmv as benzene	NA	NA	NA	NA	<0.1
	mg/m3 as benzene	NA	NA	NA	NA	<0.4
Average Well Field Flow Rate (6), scfm (7):		0.0	0.0	0.0	0.0	118.7
Average System Influent Flow Rate (6), scfm:		0.0	0.0	0.0	0.0	221.4
Average Destruction Efficiency (8), percent (9):		NA	NA	NA	NA	94.7
Average Emission Rates (10), pounds per day (11)						
Gasoline:		NA	NA	NA	NA	0.68
Benzene:		NA	NA	NA	NA	NR
Operating Hours This Period:		0.00	0.00	0.00	0.00	337.86
Operating Hours To Date:		6873.2	6873.2	6873.2	6873.2	7211.1
SVE Pounds/ Hour Removal Rate, as gasoline (12):		0.00	0.00	0.00	0.00	0.03
SVE Pounds Removed This Period, as gasoline (13):		0.00	0.00	0.00	0.00	9.01
GWE Pounds Removed This Period, as gasoline (14):		0.00	0.00	0.00	0.00	0.00
Total Pounds Removed This Period, as gasoline (15):		0.00	0.00	0.00	0.00	9.01
Total Pounds Removed To Date, as gasoline:		3007.5	3007.5	3007.5	3007.5	3016.5
Total Gallons Removed This Period, as gasoline (16):		0.00	0.00	0.00	0.00	1.45
Total Gallons Removed To Date, as gasoline:		485.1	485.1	485.1	485.1	486.6

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: 01-01-98
System shut down on 8-12-96.

Date Begin:		12-01-97
Date End:		01-01-98
Mode of Oxidation:		Cat-Ox
Days of Operation:		0
Days of Downtime:		31
Average Vapor Concentrations (1)		
Well Field Influent:	ppmv (2) as gasoline (3)	NA
	mg/m3 (4) as gasoline	NA
	ppmv as benzene (5)	NA
	mg/m3 as benzene	NA
System Influent:	ppmv as gasoline	NA
	mg/m3 as gasoline	NA
	ppmv as benzene	NA
	mg/m3 as benzene	NA
System Effluent:	ppmv as gasoline	NA
	mg/m3 as gasoline	NA
	ppmv as benzene	NA
	mg/m3 as benzene	NA
Average Well Field Flow Rate (6), scfm (7):		0.0
Average System Influent Flow Rate (6), scfm:		0.0
Average Destruction Efficiency (8), percent (9):		NA
Average Emission Rates (10), pounds per day (11)		
Gasoline:		NA
Benzene:		NA
Operating Hours This Period:		0.07
Operating Hours To Date:		7211.1
SVE Pounds/ Hour Removal Rate, as gasoline (12):		0.00
SVE Pounds Removed This Period, as gasoline (13):		0.00
GWE Pounds Removed This Period, as gasoline (14):		0.00
Total Pounds Removed This Period, as gasoline (15):		0.00
Total Pounds Removed To Date, as gasoline:		3016.5
Total Gallons Removed This Period, as gasoline (16):		0.00
Total Gallons Removed To Date, as gasoline:		486.6

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035	Vapor Treatment Unit: Therm Tech Model
Location: 1001 San Pablo Avenue Albany, California	VAC-10 thermal/catalytic oxidizer
Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date: 12-07-93 Operation and Performance Data From: 12-07-93 To: 01-01-98 System shut down on 8-12-96.

CURRENT REPORTING PERIOD:	10-01-97	to	01-01-98
DAYS / HOURS IN PERIOD:	92	2208.0	
DAYS / HOURS OF OPERATION:	14	337.9	
DAYS / HOURS OF DOWN TIME:	78	1870.1	
PERCENT OPERATIONAL:		15.3	%
PERIOD POUNDS REMOVED:	9.0		
PERIOD GALLONS REMOVED:	1.5		
AVERAGE WELL FIELD FLOW RATE (scfm):		118.7	
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):		221.4	

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 B 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 B 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 B 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 B 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 8 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.
22. 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 2035
1001 San Pablo Avenue, Albany, California

Date: 01-20-98

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
For SVE well monitoring data prior to October 1, 1995, please refer to the fourth quarter 1995 groundwater monitoring report for this site.												
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.											
07-16-96	open	7600 PID	NA	open	3100 PID	NA	open	1450 PID	NA	open	3310 PID	NA
08-08-96	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-04-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
02-18-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
03-07-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
05-23-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
07-23-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-04-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
09-11-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
10-22-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
11-05-97	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
11-19-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
12-15-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA

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
closed (b): closed to the system and atmosphere, but bubbling air
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: 01-20-98

Date	Well Identification											
	VW-5			VW-6			VW-7			VW-8		
	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
For SVE well monitoring data prior to October 1, 1995, please refer to the fourth quarter 1995 groundwater monitoring report for this site.												
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.											
07-16-96	open	300 PID	NA	open	NA	NA	open	590 PID	NA	open	1400 PID	NA
08-08-96	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-04-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
02-18-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
03-07-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
05-23-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
07-23-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-04-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
09-11-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
10-22-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
11-05-97	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
11-19-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
12-15-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA

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
closed (b): closed to the system and atmosphere, but bubbling air
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: 01-20-98

Date	Well Identification											
	VW-9			RW-1			AS-1V			AS-2V		
	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
For SVE well monitoring data prior to October 1, 1995, please refer to the fourth quarter 1995 groundwater monitoring report for this site.												
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.											
07-16-96	open	425 PID	NA	open	1140 PID	NA	open	4600 PID	NA	open	4600 PID	NA
08-08-96	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-04-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
02-18-97	closed	NA	NA	closed (b)	NA	NA	closed	NA	NA	closed	NA	NA
03-07-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
05-23-97	closed	NA	NA	closed (b)	NA	NA	closed	NA	NA	closed	NA	NA
07-23-97	closed	NA	NA	closed (b)	NA	NA	closed	NA	NA	closed	NA	NA
08-04-97	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
09-11-97	closed	NA	NA	closed (b)	NA	NA	closed	NA	NA	closed	NA	NA
10-22-97	closed	NA	NA	closed(b)	NA	NA	closed	NA	NA	closed	NA	NA
11-05-97	open	NA	NA	open(b)	NA	NA	open	NA	NA	open	NA	NA
11-19-97	closed	NA	NA	closed(b)	NA	NA	closed	NA	NA	closed	NA	NA
12-15-97	closed	NA	NA	closed(b)	NA	NA	closed	NA	NA	closed	NA	NA

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
closed (b): closed to the system and atmosphere, but bubbling air
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

Facility Number: 2035
Location: 1001 San Pablo Avenue
Albany, California

Groundwater Treatment Unit: Aeration Tank with Two 200 Pound Liquid-Phase Carbon Polish Units

Groundwater treatment system was shut down on 8-8-96.

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene 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	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-1	07-16-96	4300	530	210	110	550
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	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
I-2	07-16-96	230	23	7.6	4.5	21

Table 7
Influent and Effluent Groundwater Analyses

Facility Number: 2035
Location: 1001 San Pablo Avenue
Albany, California

Groundwater Treatment Unit: Aeration Tank with Two 200 Pound Liquid-Phase Carbon Polish Units

Groundwater treatment system was shut down on 8-8-96.

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene 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
I-3	07-16-96	<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
E-1	07-16-96	<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

Groundwater Treatment Unit: Aeration Tank with Two 200 Pound Liquid-Phase Carbon Polish Units

Sample Desig-nation	Sample Date	Groundwater Extraction			TPHG Removal Data					Benzene Removal Data				
		Total Volume Extracted	Period Volume Extracted	Period Flow Rate	Period Influent Concentration	Period Removal Rate	Period Pounds Removed [1]	Total Pounds Removed	Total Gallons Removed [2]	Period Influent Concentration	Period Removal Rate	Period Pounds Removed [3]	Total Pounds Removed	Total Gallons Removed [4]
		gallons	gallons	gpd	µg/L	lbs/day	pounds	pounds	gallons	µg/L	lbs/day	pounds	pounds	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 (6)	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 (6)	01-01-96	191,063	16,552	1,655	29,000	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 (6)	04-01-96	296,826	45,639	736	70	0.000	0.027	28.453	4.589	4.5	0.0000	0.0017	0.5339	0.0736
I-1	07-16-96	331,575	34,749	328	4,300	0.012	1.247	29.700	4.791	530	0.0015	0.1537	0.6876	0.0948
I-1 (6)	08-08-96	382,464	50,889	2,213	4,300	0.079	1.826	31.527	5.085	530	0.0098	0.2251	0.9127	0.1259

Groundwater treatment system was shut down on 8-8-96.

Table 8
Estimated Total Dissolved TPHG Removed

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

Groundwater Treatment Unit: Aeration Tank with Two 200 Pound Liquid-Phase Carbon Polish Units

		Groundwater Extraction			TPHG Removal Data					Benzene Removal Data				
Sample Desig-nation	Sample Date	Total Volume Extracted	Period Volume Extracted	Period Flow Rate	Period Influent Concentration	Period Removal Rate	Period Pounds Removed [1]	Total Pounds Removed	Total Gallons Removed [2]	Period Influent Concentration	Period Removal Rate	Period Pounds Removed [3]	Total Pounds Removed	Total Gallons Removed [4]
		gallons	gallons	gpd	µg/L	lbs/day	pounds	pounds	gallons	µg/L	lbs/day	pounds	pounds	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 (6)	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 (6)	01-01-96	191,063	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 (6)	04-01-96	296,826	45,639	736	<50	0.000	0.019	1.104	0.178	<0.5	0.0000	0.0002	0.0101	0.0014
I-2	07-16-96	331,575	34,749	328	230	0.000	0.015	1.119	0.180	23	0.0000	0.0001	0.0103	0.0014
I-2 (6)	08-08-96	382,464	50,889	2,213	230	0.001	0.021	1.140	0.184	23	0.0000	0.0002	0.0105	0.0014

Groundwater treatment system was shut down on 8-8-96.

Table 8
Estimated Total Dissolved TPHG Removed

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

Groundwater Treatment Unit: Aeration Tank with Two 200 Pound Liquid-Phase Carbon Polish Units

Sample Designation	Sample Date	Groundwater Extraction: Total Volume Extracted (gallons)	Groundwater Extraction: Period Volume Extracted (gallons)	Groundwater Extraction: Period Flow Rate (gpd)	TPHG Removal Data: Period Influent Concentration (µg/L)	TPHG Removal Data: Period Removal Rate (lbs/day)	TPHG Removal Data: Period Pounds Removed [1] (pounds)	TPHG Removal Data: Total Pounds Removed (pounds)	TPHG Removal Data: Total Gallons Removed [2] (gallons)	Benzene Removal Data: Period Influent Concentration (µg/L)	Benzene Removal Data: Period Removal Rate (lbs/day)	Benzene Removal Data: Period Pounds Removed [3] (pounds)	Benzene Removal Data: Total Pounds Removed (pounds)	Benzene Removal Data: Total Gallons Removed [4] (gallons)
CURRENT REPORTING PERIOD:		07-01-97	to	10-01-97										
DAYS / HOURS IN PERIOD:		92	2,208.0											
DAYS / HOURS OF OPERATION:		0	0.0											
DAYS / HOURS OF DOWN TIME:		92	2,208.0											
PERCENT OPERATIONAL:			0%											
PERIOD GROUNDWATER EXTRACTED (gallons):				0										
PERIOD HYDROCARBON REMOVAL (TOTAL):				0	pounds	0.000	gallons			0.0000	pounds	0.0000	gallons	
HYDROCARBONS REMOVED BY AERATION TANK:				0	pounds	0.000	gallons			0.0000	pounds	0.0000	gallons	
HYDROCARBONS REMOVED BY CARBON:				0	pounds	0.000	gallons			0.0000	pounds	0.0000	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)									

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
*: 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.

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 by carbon / 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
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.

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

0 2000 4000

SCALE IN FEET

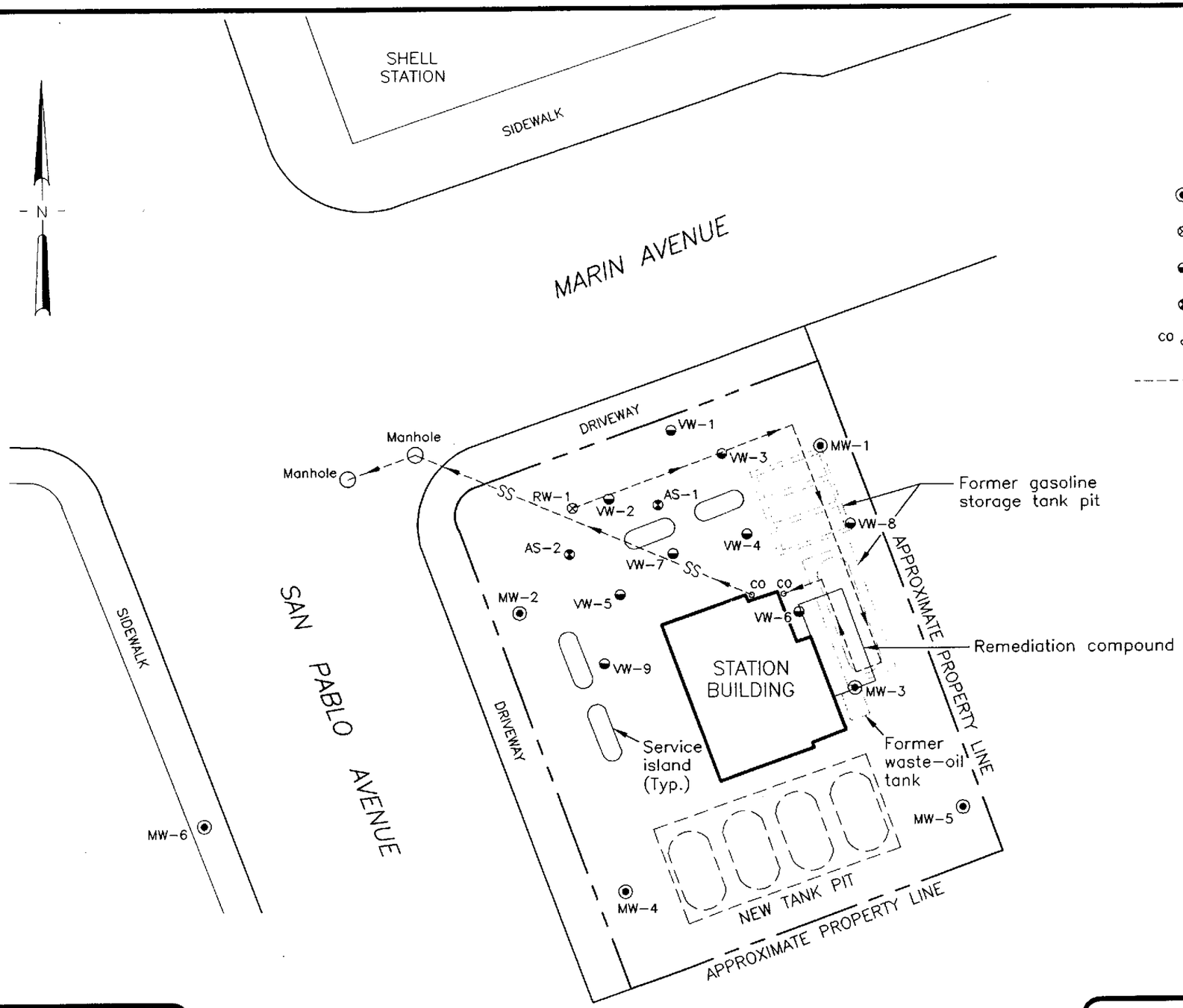
N

EMCON

DATE	NOV. 1997
DWN	KAJ
APP	
REV	
PROJECT NO.	805-123.004

FIGURE 1
ARCO PRODUCTS COMPANY
SERVICE STATION 2035, 1001 SAN PABLO AVE.
ALBANY, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
SITE LOCATION

EA-SANJOSE-CAD/DRAWINGS: I:\0Z002\SITELOC.dwg Xrefs: <NONE>
Scale: 1 = 1.00 DimScale: 1 = 1.00 Date: 3/12/97 Time: 5:19 PM Operator: KAJ

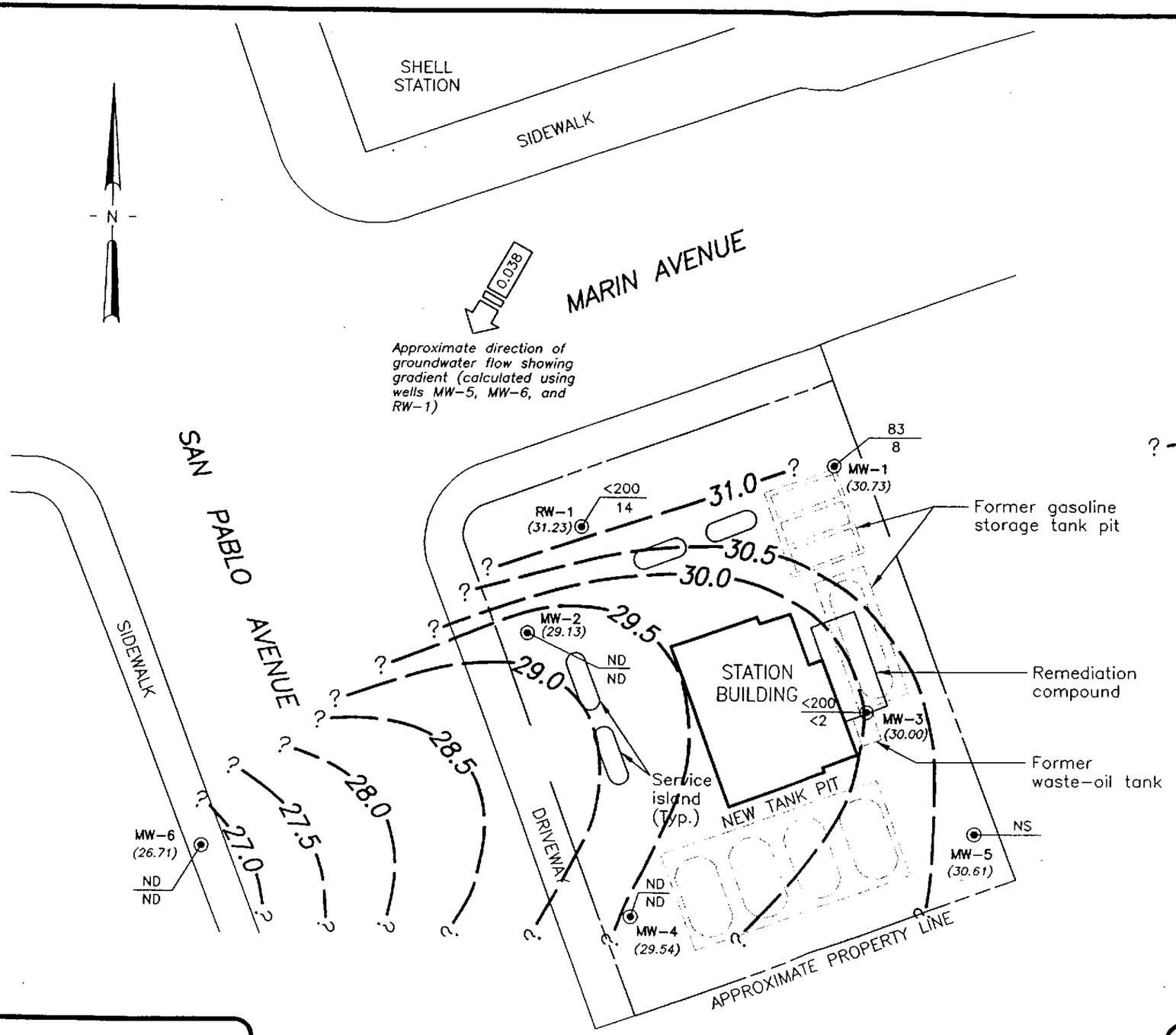


EA-SANJOSE-CAD/DRAWINGS: G:\805-123\SJSITE.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 5/5/97 Time: 3:09 PM Operator: KAJ

emcon

DATE	NOV. 1997
DWN	KAJ
APP	
REV	
PROJECT NO.	805-123.004

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 2035, 1001 SAN PABLO AVE.
ALBANY, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING SITE PLAN



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Air sparge well
- (29.54) Groundwater elevation (Ft.–MSL); measured 11/3/97
- ? Groundwater elevation contour (Ft.–MSL)
- 83 / 8 TPHG concentration in groundwater (ug/L); sampled 11/3/97 / Benzene concentration in groundwater (ug/L); sampled 11/3/97
- 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
- < Method reporting limit raised due to high analyte concentration or matrix interference requiring sample dilution

0 30 60
SCALE IN FEET

EMCON

DATE MAR. 1998
DWN KAJ
APP
REV
PROJECT NO. 805-123.004

FIGURE 3
ARCO PRODUCTS COMPANY
SERVICE STA. 2035, 1001 SAN PABLO AVE.
ALBANY, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
GROUNDWATER DATA - 4TH QUARTER 1997

EA-SANJOSE-CAD/DRAWINGS: R:\805-123\SJGWELEV.dwg Xrefs: <NONE>
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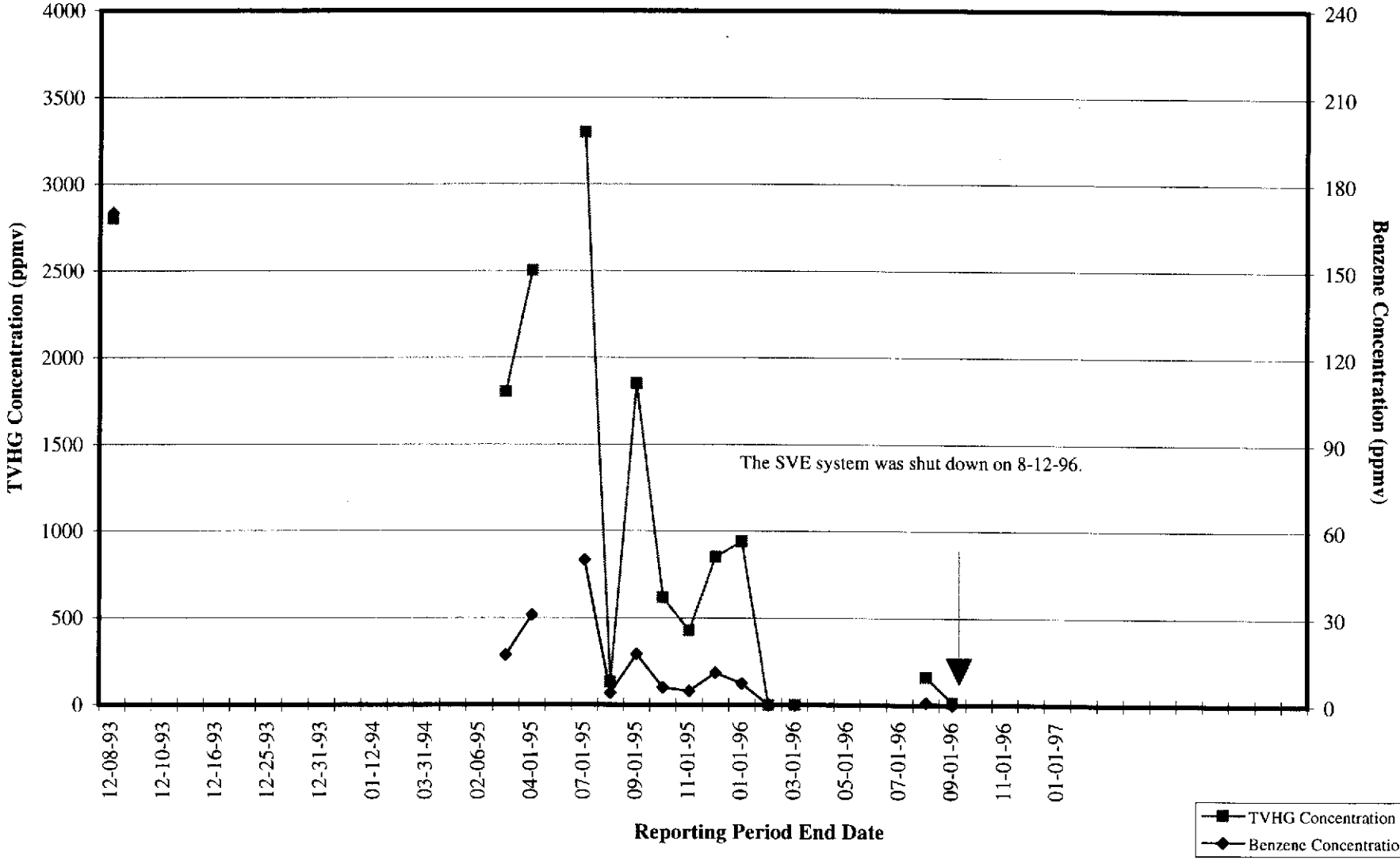
Figure 4

ARCO Service Station 2035
Soil-Vapor Extraction and Treatment System
Historical Well Field Influent TVHG and Benzene Concentrations

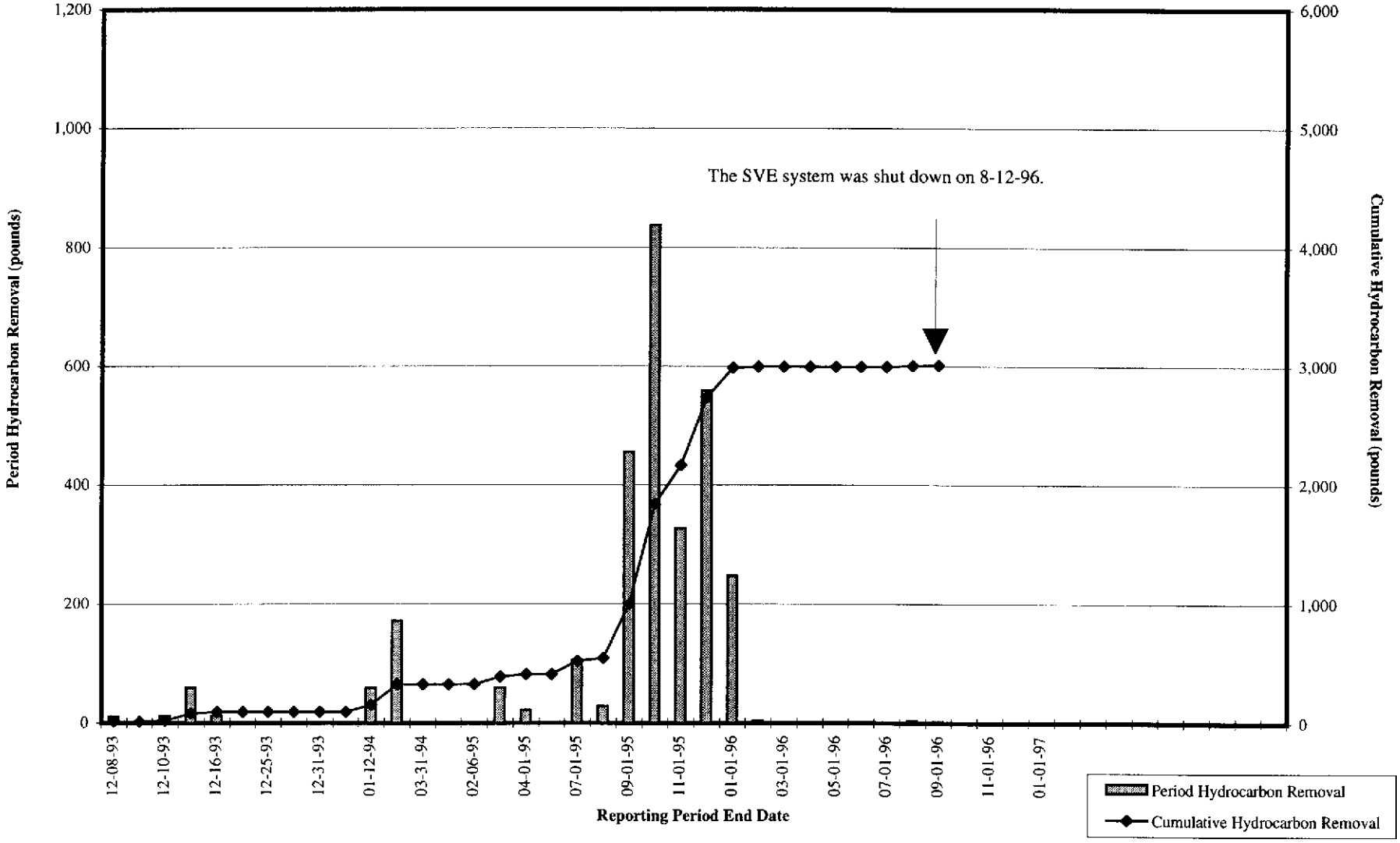


TVHG: total volatile hydrocarbons as gasoline
ppmv: parts per million by volume

esj/j:\qtr_rpts\2035\2035tdb.xls\SVE Model:imi
20805-123.004

Figure 5

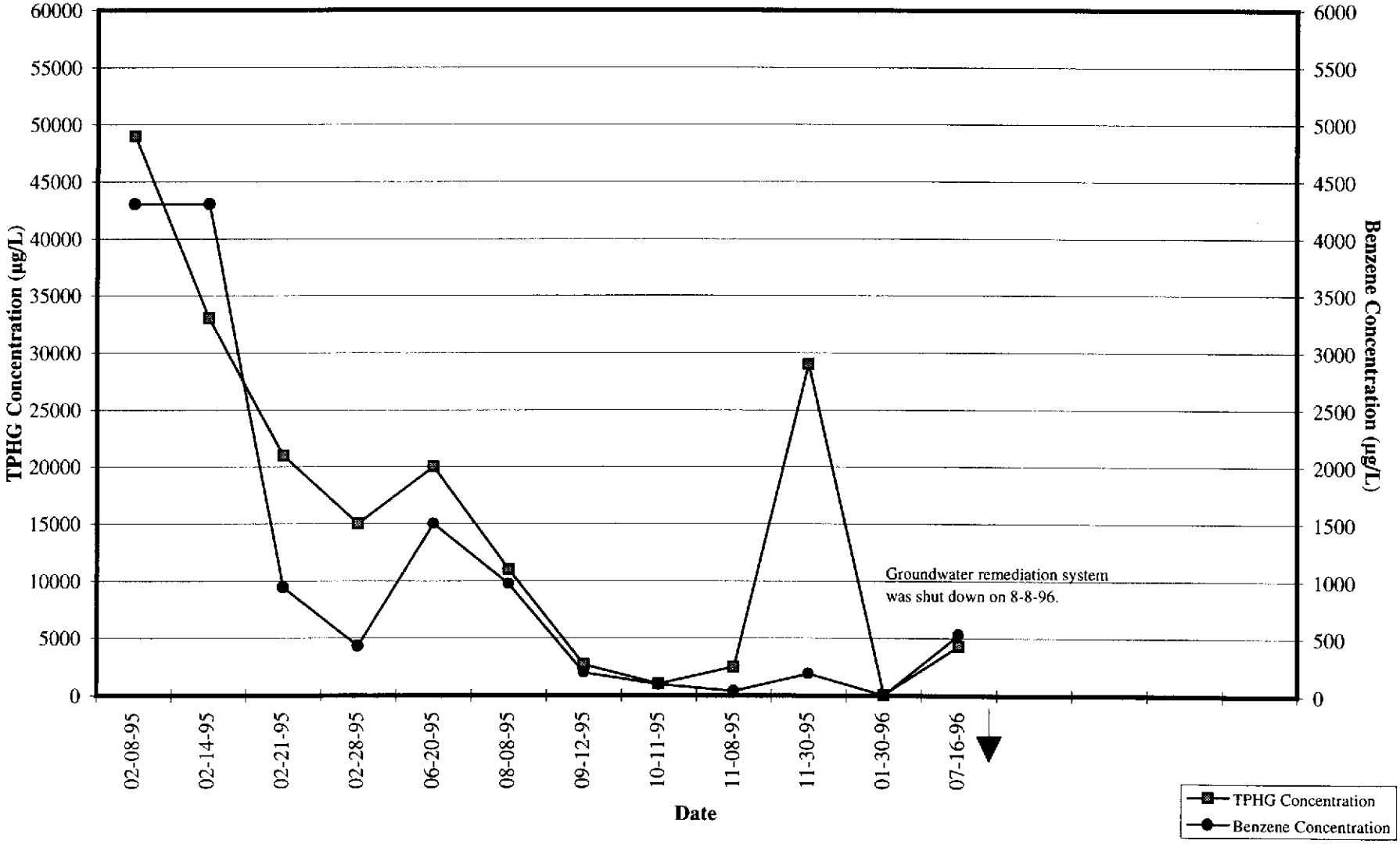
ARCO Service Station 2035
Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates



esj/j:\qtr_rpts\2035\2035tdb.xls\SVE Model:imi
20805-123.004

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

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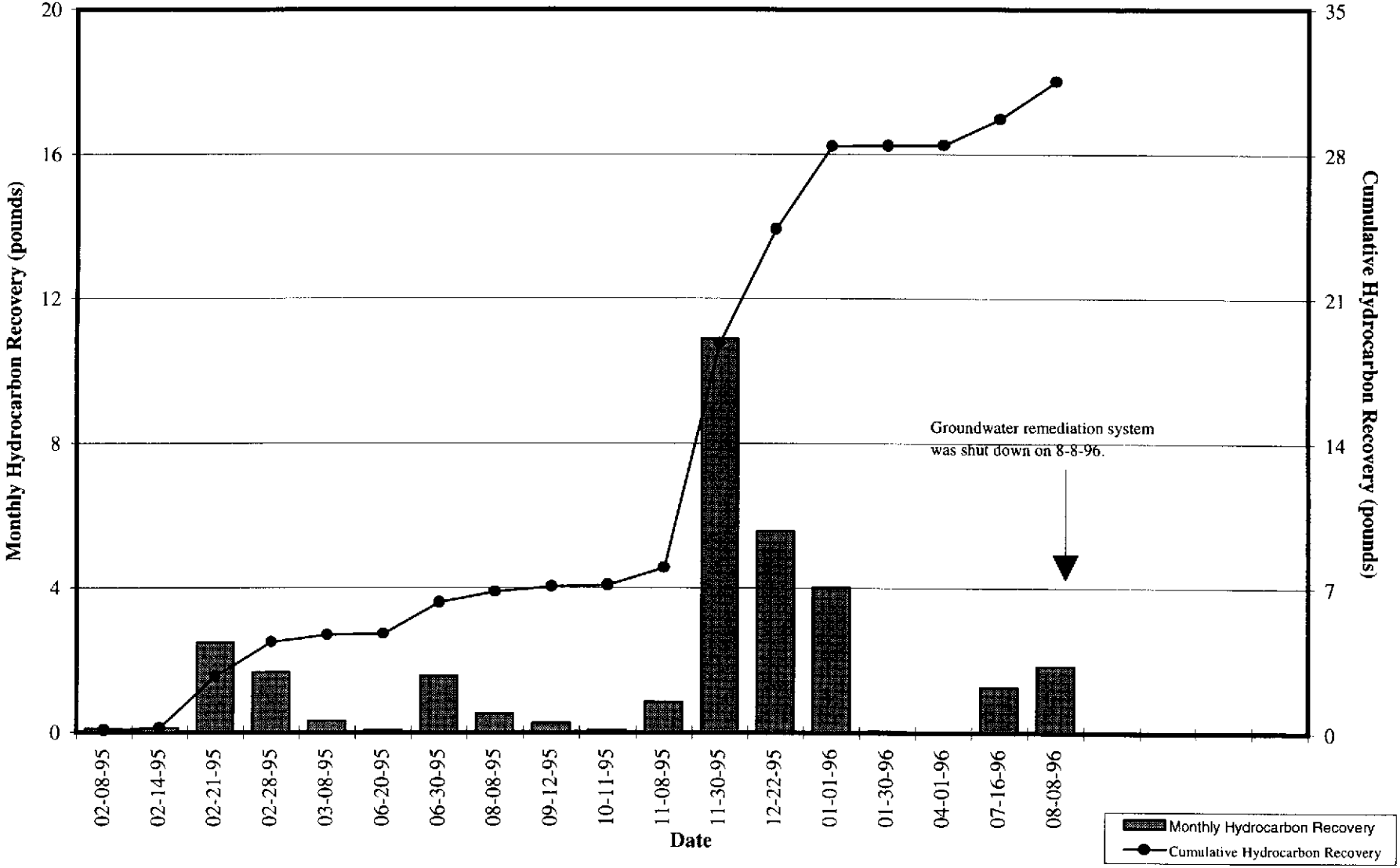
20805-123.004

Figure 7

ARCO Service Station 2035
Historical Groundwater Treatment System Hydrocarbon Recovery Rates



esj/h:\2035\2035tdb.xls\Table 9:imi
20805-123.004

APPENDIX A

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

Columbia Analytical Services, Inc.

November 17, 1997 Service Request No.: S9702252

Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-123.004/TO#21133.00/2035 ALBANY

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on November 4, 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 13, 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)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702252
Project:	20805-123.004 TO#21133.00 2035 ALBANY	**Date Collected:**	11/3/97
Sample Matrix:	Water	**Date Received:**	11/4/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-6(15)	Units:	ug/L (ppb)
Lab Code:	S9702252-001	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	11/14/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/14/97	19	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702252
Project:	20805-123.004/TO#21133.00/2035 ALBANY	**Date Collected:**	11/3/97
Sample Matrix:	Water	**Date Received:**	11/4/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-2(28)	Units:	ug/L (ppb)
Lab Code:	S9702252-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA LUFT	50	1	NA	11/14/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/14/97	18	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702252
Project:	20805-123.004;TO#21133.00;2035 ALBANY	**Date Collected:**	11/3/97
Sample Matrix:	Water	**Date Received:**	11/4/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	RW-1(11)	Units:	ug/L (ppb)
Lab Code:	S9702252-003	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	4	NA	11/14/97	<200	C1
Benzene	EPA 5030	8020	0.5	4	NA	11/14/97	14	
Toluene	EPA 5030	8020	0.5	4	NA	11/14/97	19	
Ethylbenzene	EPA 5030	8020	0.5	4	NA	11/14/97	3	
Xylenes, Total	EPA 5030	8020	0.5	4	NA	11/14/97	19	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	4	NA	11/14/97	140	

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:**	S9702252
Project:	20805-123.004/TO#21133.00/2035 ALBANY	**Date Collected:**	11/3/97
Sample Matrix:	Water	**Date Received:**	11/4/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-1(28)	Units:	ug/L (ppb)
Lab Code:	S9702252-004	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	11/14/97	83	
Benzene	EPA 5030	8020	0.5	1	NA	11/14/97	8.0	
Toluene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/14/97	13	

1822/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702252
Project:	6805-123.004 TO#21133.00#2035 ALBANY	**Date Collected:**	11/3/97
Sample Matrix:	Water	**Date Received:**	11/4/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3(32)	Units:	ug/L (ppb)
Lab Code:	S9702252-005	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	4	NA	11/14/97	<200	C1
Benzene	EPA 5030	8020	0.5	4	NA	11/14/97	<2	C1
Toluene	EPA 5030	8020	0.5	4	NA	11/14/97	<2	C1
Ethylbenzene	EPA 5030	8020	0.5	4	NA	11/14/97	<2	C1
Xylenes, Total	EPA 5030	8020	0.5	4	NA	11/14/97	<2	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	4	NA	11/14/97	130	

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:**	S9702252
Project:	20805-123.004/TO#21133.00/2035 ALBANY	**Date Collected:**	11/3/97
Sample Matrix:	Water	**Date Received:**	11/4/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-4(12)	Units:	ug/L (ppb)
Lab Code:	S9702252-006	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA LUFT	50	1	NA	11/14/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/14/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/14/97	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702252
Project:	7805-123.004 TO#21133.00.2035 ALBANY	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S971113-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/13/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/13/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/13/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/13/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/13/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/13/97	ND	

1S22/020597p

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.004/TO#21133.00/2035 ALBANY
Sample Matrix: Water

Service Request: S9702252
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

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

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 4-Bromofluorobenzene	Percent Recovery a,a,a-Trifluorotoluene
MW-6(15)	S9702252-001		98	105
MW-2(28)	S9702252-002		100	99
RW-1(11)	S9702252-003		100	81
MW-1(28)	S9702252-004		97	101
MW-3(32)	S9702252-005		105	80
MW-4(12)	S9702252-006		100	93
MW-6 (15)	S9702252-001MS		99	97
MW-6 (15)	S9702252-001DMS		99	98
Method Blank	S971113-WB1		100	99
CAS Acceptance Limits:			69-116	69-116

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.004/TO#21133.00/2035 ALBANY
Sample Matrix: Water

Service Request: S9702252
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 11/14/97

Matrix Spike/Duplicate Matrix Spike Summary
BTE

Sample Name: MW-6 (15)
Lab Code: S9702252-001MS, S9702252-001DMS
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	23	24	92	96	75-135	4
Toluene	EPA 5030	8020	0.5	25	25	ND	23	22	92	88	73-136	4
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	23	22	92	88	69-142	4

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.004 TO#21133.00.2035 ALBANY

Service Request: S9702252
Date Analyzed: 11/13/97

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	260	90-110	104	
Benzene	EPA 5030	8020	25	26	85-115	104	
Toluene	EPA 5030	8020	25	26	85-115	104	
Ethylbenzene	EPA 5030	8020	25	26	85-115	104	
Xylenes, Total	EPA 5030	8020	75	79	85-115	105	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	26	85-115	104	

ICV/032196

1+1 MVOA F

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 21133.00

Chain of Custody

ARCO Facility no. 2035 | City (Facility) Albany | Project manager (Consultant) ~~Paul Supple~~ 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:

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals☐ VOA☐ Semi VOA☐	CAM Metals EPA 6010/7000 TTLC☐ STLC☐	Lead Org/DHS☐ Lead EPA 7420/7421☐		
MW-6(13)	1	2		X		X	HCL	11/3/97	11:20		X											
MW-2(28)	2	2		X		X	HCL	↓	11:55		X											
RW-1(11)	3	2		X		X	HCL	↓	13:05		X											
MW-1(28)	4	2		X		X	HCL	↓	13:52		X											
MW-3(32)	5	2		X		X	HCL	↓	14:40		X											
MW-4(12)	6	2		X		X	HCL	↓	15:00		X											

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40ml HCL VOAs

#20805-123.00

Lab Number: S9702252

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

Condition of sample: | Temperature received:

Relinquished by sampler [signature]	Date 11-4-97	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory [signature] CAS — Date 11/4/97 — Time 1555

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

R20/590

APPENDIX B

SVE SYSTEM MONITORING DATA LOG SHEETS

ARCO 2035
SVE SYSTEM
MONITORING DATA

Reporting Period:
10/01/97 00:00
11/01/97 00:00

Hours in Period: 744.00
Days in Period: 31.00

Operation + Down Hours: 744.00
Operation + Down Days: 31.00

	Field Monitoring Data							Laboratory Monitoring Data														
	Flow Rates		FID or PID Results					Well Field Influent		System Influent		System Effluent										
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	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	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	lb/day	lb/day						
10/01/97 00:00																		11146.50				
10/22/97 12:05	0.0	0.0															516.08	11146.50	0.00	0.00	516.08	21.50
11/01/97 00:00	0.0	0.0															227.92	11146.50	0.00	0.00	227.92	9.50
Period Totals:																	744.00		0.00	0.00	744.00	31.00
Period Averages:	0.0	0.0																				

ARCO 2035
SVE SYSTEM
MONITORING DATA

Reporting Period:
11/01/97 00:00
12/01/97 00:00

Hours in Period: 720.00
Days in Period: 30.00

Operation + Down Hours: 720.00
Operation + Down Days: 30.00

	Field Monitoring Data							Laboratory Monitoring Data														
	Flow Rates		FID or PID Results					Well Field Influent				System Influent				System Effluent						
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	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	ppm	ppm	ppm	%		ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	%	lb/day	lb/day						
11/01/97 00:00																								11146.50				
11/05/97 10:32	118.7	221.4		294			12:00	160	640	0.6	2	160	640	0.6	2	8	34	<0.1	<0.4	94.7	0.68	NR	106.53	11146.50	0.00	0.00	106.53	4.44
11/19/97 12:30	118.4	221.4		12.2																			337.97	11484.08	337.58	14.07	0.39	0.02
12/01/97 00:00	0.0	0.0																					275.50	11484.36	0.28	0.01	275.22	11.47
Period Totals:																							720.00		337.86	14.08	382.14	15.92
Period Averages:	118.3	221.2																										

ARCO 2035
SVE SYSTEM
MONITORING DATA

Reporting Period:
12/01/97 00:00
01/01/98 00:00

Hours in Period: 744.00
Days in Period: 31.00

Operation + Down Hours: 744.00
Operation + Down Days: 31.00

	Field Monitoring Data							Laboratory Monitoring Data														
	Flow Rates		FID or PID Results					Well Field Influent		System Influent		System Effluent										
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	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	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	lb/day	lb/day						
12/01/97 00:00																		11484.36				
12/15/97 12:30	0.0	0.0															348.50	11484.43	0.07	0.00	348.43	14.52
01/01/98 00:00	0.0	0.0															395.50	11484.43	0.00	0.00	395.50	16.48
Period Totals:																	744.00		0.07	0.00	743.93	31.00
Period Averages:	0.0	0.0																				

APPENDIX C

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION FOR SVE SYSTEM, FOURTH QUARTER 1997

Columbia Analytical Services, Inc.

November 18, 1997 Service Request No.: S9702267

Valli Voruganti
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-123.004/TO#20815.00/2035 ALBANY

Dear Ms. Voruganti:

The following pages contain analytical results for sample(s) received by the laboratory on November 5, 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 12, 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

Cristina V. Rayburn for

Greg Anderson
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702267
Project:	20805-123.004/TO#20815.00/2035 ALBANY	**Date Collected:**	11/5/97
Sample Matrix:	Air	**Date Received:**	11/5/97

BTEX and Total Volatile Hydrocarbons

Sample Name:	I-1	Units:	mg/m3
Lab Code:	S9702267-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.4	1	NA	11/7/97	2.0	
Toluene	5030	8020	0.4	1	NA	11/7/97	ND	
Ethylbenzene	5030	8020	0.5	1	NA	11/7/97	7.0	
Xylenes, Total	5030	8020	0.9	1	NA	11/7/97	11	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	12	1	NA	11/7/97	230	
C6 - C12	5030	8015M	20	1	NA	11/7/97	640	
TPH as Gasoline*	5030	8015M	20	1	NA	11/7/97	640	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702267
Project:	20805-123.004/TO#20815.00/2035 ALBANY	**Date Collected:**	11/5/97
Sample Matrix:	Air	**Date Received:**	11/5/97

BTEX and Total Volatile Hydrocarbons

Sample Name:	I-1	Units:	ppmV
Lab Code:	S9702267-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.1	1	NA	11/7/97	0.6	
Toluene	5030	8020	0.1	1	NA	11/7/97	ND	
Ethylbenzene	5030	8020	0.1	1	NA	11/7/97	1.6	
Xylenes, Total	5030	8020	0.2	1	NA	11/7/97	2.5	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	5	1	NA	11/7/97	97	
C6 - C12	5030	8015M	5	1	NA	11/7/97	160	
TPH as Gasoline*	5030	8015M	5	1	NA	11/7/97	160	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702267
Project:	20805-123.004/TO#20815.00/2035 ALBANY	**Date Collected:**	11/5/97
Sample Matrix:	Air	**Date Received:**	11/5/97

BTEX and Total Volatile Hydrocarbons

Sample Name:	E-1	Units:	mg/m3
Lab Code:	S9702267-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.4	1	NA	11/7/97	ND	
Toluene	5030	8020	0.4	1	NA	11/7/97	0.5	
Ethylbenzene	5030	8020	0.5	1	NA	11/7/97	ND	
Xylenes, Total	5030	8020	0.9	1	NA	11/7/97	1.5	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	12	1	NA	11/7/97	ND	
C6 - C12	5030	8015M	20	1	NA	11/7/97	34	
TPH as Gasoline*	5030	8015M	20	1	NA	11/7/97	34	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702267
Project:	20805-123.004/TO#20815.00/2035 ALBANY	**Date Collected:**	11/5/97
Sample Matrix:	Air	**Date Received:**	11/5/97

BTEX and Total Volatile Hydrocarbons

Sample Name:	E-1	Units:	ppmV
Lab Code:	S9702267-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.1	1	NA	11/7/97	ND	
Toluene	5030	8020	0.1	1	NA	11/7/97	0.1	
Ethylbenzene	5030	8020	0.1	1	NA	11/7/97	ND	
Xylenes, Total	5030	8020	0.2	1	NA	11/7/97	0.3	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	5	1	NA	11/7/97	ND	
C6 - C12	5030	8015M	5	1	NA	11/7/97	8	
TPH as Gasoline*	5030	8015M	5	1	NA	11/7/97	8	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702267
Project:	20805-123.004/TO#20815.00/2035 ALBANY	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA

BTEX and Total Volatile Hydrocarbons

Sample Name:	Method Blank	Units:	mg/m3
Lab Code:	S971106-VB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.4	1	NA	11/6/97	ND	
Toluene	5030	8020	0.4	1	NA	11/6/97	ND	
Ethylbenzene	5030	8020	0.5	1	NA	11/6/97	ND	
Xylenes, Total	5030	8020	0.9	1	NA	11/6/97	ND	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	12	1	NA	11/6/97	ND	
C6 - C12	5030	8015M	20	1	NA	11/6/97	ND	
TPH as Gasoline*	5030	8015M	20	1	NA	11/6/97	ND	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9702267
Project:	20805-123.004/TO#20815.00/2035 ALBANY	**Date Collected:**	NA
Sample Matrix:	Air	**Date Received:**	NA

BTEX and Total Volatile Hydrocarbons

Sample Name:	Method Blank	Units:	ppmV
Lab Code:	S971106-VB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	5030	8020	0.1	1	NA	11/6/97	ND	
Toluene	5030	8020	0.1	1	NA	11/6/97	ND	
Ethylbenzene	5030	8020	0.1	1	NA	11/6/97	ND	
Xylenes, Total	5030	8020	0.2	1	NA	11/6/97	ND	
Total Volatile Hydrocarbons:								
C1 - C5	5030	8015M	5	1	NA	11/6/97	ND	
C6 - C12	5030	8015M	5	1	NA	11/6/97	ND	
TPH as Gasoline*	5030	8015M	5	1	NA	11/6/97	ND	

* TPH as gasoline is defined as C6 (benzene) through C12 (dodecane) and uses a molecular weight of 100 to calculate the ppmv.

1S22/020597p

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.004/TO#20815.00/2035 ALBANY
Sample Matrix: Air

Service Request: S9702267
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 11/7/97

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Sample Name: I-1
Lab Code: S9702267-001DUP
Test Notes:

Units: mg/m3
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	5030	8020	0.4	2.0	1.7	1.7	16	
Toluene	5030	8020	0.4	ND	ND	ND	<1	
Ethylbenzene	5030	8020	0.5	7.0	7.0	7.0	<1	
Xylenes, Total	5030	8020	0.9	11	11	11	<1	
Total Volatile Hydrocarbons								
C1 - C5	5030	8015M	12	230	230	230	<1	
C6 - C12	5030	8015M	20	640	660	650	3	
TPH as Gasoline*	5030	8015M	20	640	660	650	3	

DUP/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.004/TO#20815.00/2035 ALBANY
Sample Matrix: Air

Service Request: S9702267
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 11/7/97

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Sample Name: I-1
Lab Code: S9702267-001DUP
Test Notes:

Units: ppmV
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Benzene	5030	8020	0.1	0.6	0.5	0.6	17	
Toluene	5030	8020	0.1	ND	ND	ND	ND	
Ethylbenzene	5030	8020	0.1	1.6	1.6	1.6	<1	
Xylenes, Total	5030	8020	0.2	2.5	2.5	2.5	<1	
Total Volatile Hydrocarbons								
C1 - C5	5030	8015M	5	97	97	97	<1	
C6 - C12	5030	8015M	5	160	160	160	<1	
TPH as Gasoline*	5030	8015M	5	160	160	160	<1	

DUP/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-123.004/TO#20815.00/2035 ALBANY

Service Request: S9702267
Date Analyzed: 11/6/97

Initial Calibration Verification (ICV) Summary
BTEX and Total Volatile Hydrocarbons

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: mg/m3
Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Acceptance Limits
Benzene	5030	8020	25	28	112	80-120
Toluene	5030	8020	25	28	112	80-120
Ethylbenzene	5030	8020	25	28	112	80-120
Xylenes, Total	5030	8020	75	86	115	80-120
Gasoline	5030	8015M	250	260	104	80-120

ICV/032196

TPHNOA F

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No. 20815.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) V. Vorvgant;	Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant)	Fax no. (Consultant)
Consultant name Emcon	Address (Consultant)		Contract Number

Method of shipment: Tech

Special Detection Limit/reporting: Report in PPMV mg/m3

Special QA/QC

Remarks: 20805-123-004

Lab Number 597022167

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐			
E-1	1				AIR			11/5	1210		X												
E-1	2				AIR			11/5	1200		X												

Condition of sample:

Temperature received:

Relinquished by sampler Lee Reath	Date 11/5/97	Time 1440	Received by
Relinquished by	Date	Time	Received by

Turnaround Time:

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