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

December 21, 1995
Project 20805-123.002

Mr. Michael Whelan
ARCO Products Company
P.O. Box 612530
San Jose, California 95161

Re: Third quarter 1995 groundwater monitoring program results and remediation system performance evaluation report, ARCO service station 2035, Albany, California

Dear Mr. Whelan:

This letter presents the results of the third quarter 1995 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 interim soil-vapor extraction (SVE) and groundwater extraction remediation systems at the site are also presented. The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

BACKGROUND

Five on-site monitoring wells (MW-1 through MW-5), one off-site monitoring well (MW-6), one on-site groundwater extraction well (RW-1), nine on-site vapor extraction wells (VW-1 through VW-9), and two dual air-sparge/vapor extraction wells (AS-1 and AS-2) were installed as part of a comprehensive site assessment conducted at this site from October 1991 through August 1993 (Figure 2). Please refer to *Report of Findings, Air Sparge Pilot Test at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California* (RESNA Industries [RESNA], April 1994), and *Fourth Quarter 1994 Groundwater Monitoring Program Results, ARCO Service Station 2035, Albany, California* (EMCON, May 1995) for more details.

MONITORING PROGRAM FIELD PROCEDURES

A program of quarterly groundwater monitoring was initiated during the fourth quarter of 1991 to provide information concerning water quality, flow direction, and gradient, and to meet ACHCSA and Regional Water Quality Control Board (RWQCB) requirements regarding underground fuel tank investigations. Water levels are measured quarterly in wells MW-1 through MW-6 and RW-1. Wells MW-5 and MW-6 are sampled annually, during the first quarter of the year. Well MW-2 is sampled semiannually, during the first and third quarters. Wells MW-1, MW-3, MW-4, and RW-1 are sampled quarterly.

EMCON performed the third quarter 1995 groundwater monitoring event on August 22, 1995. Field work this quarter included (1) measuring depths to groundwater and subjectively analyzing groundwater for the presence of floating product in wells MW-1 through MW-6 and RW-1, (2) purging and subsequently sampling groundwater

monitoring wells MW-1 through MW-4 for laboratory analysis, and (3) directing a state-certified laboratory to analyze the groundwater samples. Well RW-1 contained 0.02 foot of floating product on August 22, 1995; therefore, the well was not sampled during third quarter 1995. Copies of all field data sheets from the third quarter 1995 groundwater monitoring event are included in Appendix A.

MONITORING PROGRAM RESULTS

Results of the third quarter 1995 groundwater monitoring event are summarized in Table 1 and illustrated in Figure 3. Historical groundwater elevation data, including top-of-casing elevations, depth-to-water measurements, calculated groundwater elevations, floating-product thickness measurements, and groundwater flow direction and gradient data, are summarized in Table 2. Table 3 summarizes historical laboratory data for analysis of petroleum hydrocarbons and their constituents. Additional historical laboratory data for well MW-3 are summarized in Table 4. Historical floating-product recovery data for the site are summarized in Table 5. Copies of the third quarter 1995 analytical results and chain-of-custody documentation are included in Appendix B.

Groundwater elevation data collected on August 22, 1995, indicate that groundwater beneath the site flows southwest with an approximate hydraulic gradient of 0.012 foot per foot (calculated using data from wells MW-1, MW-4, and MW-5). Figure 3 illustrates groundwater contours and analytical data for the third quarter of 1995.

Groundwater samples collected from wells MW-2, MW-3, and MW-4 did not contain detectable concentrations of TPHG or BTEX. Samples from well MW-1 contained 780 micrograms per liter (µg/L) of TPHG, and 310 µg/L of benzene. Samples from wells MW-1, MW-3, and MW-4 contained concentrations of MTBE from 14 to 99 µg/L. Samples from well MW-2 did not contain detectable concentrations of MTBE (<3 µg/L). Additional samples from well MW-3 did not contain detectable concentrations of TRPH (<500 µg/L). Well RW-1 contained 0.02 foot of floating product on August 22, 1995, and therefore the well was not sampled during third quarter 1995.

REMEDIATION SYSTEM PERFORMANCE EVALUATION

Floating-Product Recovery

EMCON recovered approximately 0.66 gallon of floating product from wells AS-1, AS-2, RW-1, VW-1, VW-2, and VW-7 during third quarter 1995. The cumulative total of floating product recovered at this site is approximately 27.9 gallons (Table 5).

Soil-Vapor Extraction System

Table 6 summarizes SVE system operation and performance data from startup on December 7, 1993, to the end of the third quarter 1995 reporting period. The SVE system operated for a total of 79.2 days during the 92.2-day reporting period for the third quarter 1995 from June 28 to September 28, 1995 (85.8 percent operational). Table 6 also summarizes hydrocarbon removal rates, pounds of hydrocarbons removed this period, and cumulative pounds of hydrocarbons removed from SVE system startup on December 7, 1993, to the end of the third quarter 1995 reporting period. Approximately 2,551.8 pounds (411.6 gallons) of hydrocarbons were recovered by the SVE and groundwater extraction systems during the 92.2-day reporting period from June 28 to September 28, 1995; a total of approximately 2,953.9 pounds (476.5 gallons) of hydrocarbons has been recovered since system startup on December 7, 1993. The calculations and assumptions made for estimating hydrocarbon removal rates for the SVE system are explained in the footnotes for Table 6. Historical TVHG and benzene concentrations for the SVE system are graphically illustrated in Figure 4; Figure 5 depicts historical SVE system hydrocarbon removal rates.

Table 7 summarizes the operating status of the individual vapor extraction wells since startup of the SVE system on December 7, 1993, to the end of the third quarter 1995 reporting period. To maximize hydrocarbon removal rates, vapor extraction wells were typically brought on-line or closed depending on the TVHG concentrations of the vapor extracted from the well.

Copies of all field monitoring data sheets for the SVE system for the third quarter 1995 are provided in Appendix C. Copies of the laboratory analytical results for all air samples collected during the third quarter 1995 are provided in Appendix D.

Air-Sparge System

The AS system was not operational during the third quarter 1995 and is anticipated to be activated during the fourth quarter 1995.

Groundwater Remediation System

Table 8 summarizes groundwater remediation system sampling results from system startup to the end of the third quarter 1995 reporting period. Table 9 summarizes groundwater remediation system operation and performance data from startup on February 8, 1995, to the end of the third quarter 1995 reporting period. The groundwater remediation system operated for a total of 10 days during the 103.2-day reporting period for the third quarter 1995 from June 30 to October 11, 1995 (10 percent operational). After extensive troubleshooting it was discovered that frequent automatic shutdowns of the system were

being caused by faulty relays installed for system controls. The relays were replaced on October 11, 1995.

Table 9 also summarizes hydrocarbon removal rates, pounds of hydrocarbons removed this period, and cumulative pounds of hydrocarbons removed, from system startup on February 8, 1995, to the end of the third quarter 1995 reporting period. A total of approximately 0.83 pound (0.13 gallon) of dissolved-phase hydrocarbons was recovered by the groundwater extraction system during the third quarter 1995 reporting period; a total of approximately 7.1 pounds (1.15 gallons) of hydrocarbons has been recovered from the site from system startup on February 8, 1995. The calculations and assumptions made for estimating hydrocarbon removal rates for the groundwater remediation system are explained in the footnotes for Table 9.

Historical TPHG and benzene concentrations for the groundwater extraction system are graphically illustrated in Figure 6; Figure 7 depicts historical groundwater extraction system hydrocarbon removal rates.

Copies of all field monitoring data sheets, and laboratory analytical results for all water samples collected for the groundwater remediation system during the third quarter 1995 are provided in Appendices E, and F, respectively.

LIMITATIONS

No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the site, but rather as the result of the scope, limitations, and cost of work performed during the monitoring event.

SITE STATUS UPDATE

This update reports site activities performed during the third quarter of 1995, and the anticipated site activities for the fourth quarter of 1995.

Third Quarter 1995 Activities

- Prepared and submitted quarterly groundwater monitoring results and remediation system performance evaluation report for second quarter 1995.
- Performed quarterly groundwater monitoring for third quarter 1995.
- Performed operation and maintenance activities for the SVE and groundwater extraction systems during third quarter 1995.

Work Anticipated for Fourth Quarter 1995

- Prepare and submit quarterly groundwater monitoring results and remediation system performance evaluation report for third quarter 1995.
- Perform quarterly groundwater monitoring for fourth quarter 1995.
- Perform startup of AS system.
- Perform operation and maintenance activities for the SVE and groundwater extraction systems during fourth quarter 1995.

Please call if you have questions.

Sincerely,

EMCON

David Larsen
Project Coordinator

Sailaja Yelamanchili
Staff Engineer

Lynn A. Gallagher, R.G. 6090
Project Geologist

REGISTERED GEOLOGIST
LYNN A. GALLAGHER
RG6090
STATE OF CALIFORNIA

Attachments:

Table 1 -	Groundwater Monitoring Data, Third Quarter 1995
Table 2 -	Historical Groundwater Elevation Data
Table 3 -	Historical Groundwater Analytical Data, Petroleum Hydrocarbons and Their Constituents
Table 4 -	Historical Groundwater Analytical Data, Well MW-3
Table 5 -	Approximate Cumulative Floating Product Recovered, Wells AS-1, AS-2, RW-1, VW-1, VW-2, and VW-7
Table 6 -	Soil-Vapor Extraction System Operation and Performance Data
Table 7 -	Soil-Vapor Extraction Well Data
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Figure 1 -	Site Location
Figure 2 -	Site Plan
Figure 3 -	Groundwater Data, Third Quarter 1995
Figure 4 -	Historical SVE System TVHG and Benzene Concentrations
Figure 5 -	Historical SVE System Hydrocarbon Removal Rates
Figure 6 -	Historical Groundwater Treatment System Influent TPHG and Benzene Concentrations
Figure 7 -	Historical Groundwater Treatment System Hydrocarbon Removal Rates
Appendix A -	Field Data Sheets, Third Quarter 1995 Groundwater Monitoring Event
Appendix B -	Analytical Results and Chain-of-Custody Documentation, Third Quarter 1995 Groundwater Monitoring Event
Appendix C -	Field Data Sheets, SVE System Operation and Maintenance Visits, Third Quarter 1995
Appendix D -	Analytical Results and Chain-of-Custody Documentation, SVE System Air Samples, Third Quarter 1995
Appendix E -	Field Data Sheets, Groundwater Treatment System, Operation and Maintenance Visits, Third Quarter 1995
Appendix F -	Analytical Results and Chain-of-Custody Documentation, Groundwater Treatment System, Third Quarter 1995

cc: Barney Chan ACHCSA
Kevin Graves, RWQCB-SFBR

Table 1
Groundwater Monitoring Data
Third Quarter 1995

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

Date: 12-21-95

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	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-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-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-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-5	08-22-95	41.84	11.12	30.72	ND	SW	0.012	08-22-95	Not sampled: not scheduled for chemical analysis											
MW-6	08-22-95	40.13	13.32	26.81	ND	SW	0.012	08-22-95	Not sampled: not scheduled for chemical analysis											
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											

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 Statest 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
SW: southwest
-- : not analyzed
**: [corrected elevation (Z')] = Z + (h * 0.73); where Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

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Table 2
Historical Groundwater Elevation Data

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

Date: 12-21-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-1	10-29-91	41.41	11.86	29.55	ND	NR	NR
MW-1	11-07-91	41.41	10.94	30.47	ND	NR	NR
MW-1	11-14-91	41.41	10.97	30.44	ND	NR	NR
MW-1	01-19-92	41.41	10.06	31.35	ND	NR	NR
MW-1	02-19-92	41.41	8.65	32.76	ND	NR	NR
MW-1	03-19-92	41.41	8.33	33.08	ND	NR	NR
MW-1	04-21-92	41.41	9.32	32.09	ND	NR	NR
MW-1	05-12-92	41.41	9.82	31.59	ND	NR	NR
MW-1	06-12-92	41.41	10.50	30.91	ND	NR	NR
MW-1	07-15-92	41.41	10.69	30.72	ND	NR	NR
MW-1	08-07-92	41.41	10.53	30.88	ND	NR	NR
MW-1	09-08-92	41.41	11.04	30.37	ND	NR	NR
MW-1	10-26-92	41.41	11.24	30.17	ND	NR	NR
MW-1	11-23-92	41.41	10.90	30.51	ND	NR	NR
MW-1	12-16-92	41.41	9.40	32.01	ND	NR	NR
MW-1	01-13-93	41.41	7.73	33.68	ND	NR	NR
MW-1	02-22-93	41.41	7.56	33.85	ND	NR	NR
MW-1	03-25-93	41.41	8.48	32.93	ND	NR	NR
MW-1	04-13-93	41.41	8.91	32.50	ND	NR	NR
MW-1	05-22-93	41.41	9.68	31.73	ND	NR	NR
MW-1	06-17-93	41.41	9.68	31.73	ND	NR	NR
MW-1	07-27-93	41.41	10.09	31.32	ND	NR	NR
MW-1	08-24-93	41.41	10.51	30.90	ND	NR	NR
MW-1	12-08-93	41.41	10.39	31.02	ND	NR	NR
MW-1	02-01-94	41.41	9.29	32.12	ND	NR	NR
MW-1	04-26-94	41.41	9.25	32.16	ND	NR	NR
MW-1	07-29-94	41.41	9.87	31.54	ND	WSW	0.016
MW-1	11-15-94	41.41	8.76	32.65	ND	WSW	0.019
MW-1	03-24-95	41.41	6.21	35.20	ND	NW	0.037
MW-1	05-24-95	41.41	9.37	32.04	ND	WNW	0.013
MW-1	08-22-95	41.41	10.30	31.11	ND	SW	0.012

Table 2
Historical Groundwater Elevation Data

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

Date: 12-21-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-2	10-29-91	40.38	11.10	29.28	ND	NR	NR
MW-2	11-07-91	40.38	11.20	29.18	ND	NR	NR
MW-2	11-14-91	40.38	11.21	29.17	ND	NR	NR
MW-2	01-19-92	40.38	10.44	29.94	ND	NR	NR
MW-2	02-19-92	40.38	8.70	31.68	ND	NR	NR
MW-2	03-19-92	40.38	8.84	31.54	ND	NR	NR
MW-2	04-21-92	40.38	9.80	30.58	ND	NR	NR
MW-2	05-12-92	40.38	10.29	30.09	ND	NR	NR
MW-2	06-12-92	40.38	10.95	29.43	ND	NR	NR
MW-2	07-15-92	40.38	11.15	29.23	ND	NR	NR
MW-2	08-07-92	40.38	11.01	29.37	ND	NR	NR
MW-2	09-08-92	40.38	11.41	28.97	ND	NR	NR
MW-2	10-26-92	40.38	11.60	28.78	ND	NR	NR
MW-2	11-23-92	40.38	7.31	33.07	ND	NR	NR
MW-2	12-16-92	40.38	9.82	30.56	ND	NR	NR
MW-2	01-13-93	40.38	8.25	32.13	ND	NR	NR
MW-2	02-22-93	40.38	8.25	32.13	ND	NR	NR
MW-2	03-25-93	40.38	8.82	31.56	ND	NR	NR
MW-2	04-13-93	40.38	9.30	31.08	ND	NR	NR
MW-2	05-22-93	40.38	10.57	29.81	ND	NR	NR
MW-2	06-17-93	40.38	10.25	30.13	ND	NR	NR
MW-2	07-27-93	40.38	10.48	29.90	ND	NR	NR
MW-2	08-24-93	40.38	10.82	29.56	ND	NR	NR
MW-2	12-08-93	40.38	10.68	29.70	ND	NR	NR
MW-2	02-01-94	40.38	9.66	30.72	ND	NR	NR
MW-2	04-26-94	40.38	9.60	30.78	ND	NR	NR
MW-2	07-29-94	40.38	10.61	29.77	ND	WSW	0.016
MW-2	11-15-94	40.38	9.23	31.15	ND	WSW	0.019
MW-2	03-24-95	40.38	6.96	33.42	ND	NW	0.037
MW-2	05-24-95	40.38	10.02	30.36	ND	WNW	0.013
MW-2	08-22-95	40.38	10.87	29.51	ND	SW	0.012

Table 2
Historical Groundwater Elevation Data

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

Date: 12-21-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-3	10-29-91	41.44	11.62	29.82	ND	NR	NR
MW-3	11-07-91	41.44	11.52	29.92	ND	NR	NR
MW-3	11-14-91	41.44	11.50	29.94	ND	NR	NR
MW-3	01-19-92	41.44	10.56	30.88	ND	NR	NR
MW-3	02-19-92	41.44	9.52	31.92	ND	NR	NR
MW-3	03-19-92	41.44	9.01	32.43	ND	NR	NR
MW-3	04-21-92	41.44	9.70	31.74	ND	NR	NR
MW-3	05-12-92	41.44	10.29	31.15	ND	NR	NR
MW-3	06-12-92	41.44	11.26	30.18	ND	NR	NR
MW-3	07-15-92	41.44	11.28	30.16	ND	NR	NR
MW-3	08-07-92	41.44	11.15	30.29	ND	NR	NR
MW-3	09-08-92	41.44	11.70	29.74	ND	NR	NR
MW-3	10-26-92	41.44	12.15	29.29	ND	NR	NR
MW-3	11-23-92	41.44	12.55	28.89	ND	NR	NR
MW-3	12-16-92	41.44	10.15	31.29	ND	NR	NR
MW-3	01-13-93	41.44	9.12	32.32	ND	NR	NR
MW-3	02-22-93	41.44	8.18	33.26	ND	NR	NR
MW-3	03-25-93	41.44	8.57	32.87	ND	NR	NR
MW-3	04-13-93	41.44	9.55	31.89	ND	NR	NR
MW-3	05-22-93	41.44	10.56	30.88	ND	NR	NR
MW-3	06-17-93	41.44	10.41	31.03	ND	NR	NR
MW-3	07-27-93	41.44	10.53	30.91	ND	NR	NR
MW-3	08-24-93	41.44	10.86	30.58	ND	NR	NR
MW-3	12-08-93	41.44	10.91	30.53	ND	NR	NR
MW-3	02-01-94	41.44	9.71	31.73	ND	NR	NR
MW-3	04-26-94	41.44	9.56	31.88	ND	NR	NR
MW-3	07-29-94	41.44	10.65	30.79	ND	WSW	0.016
MW-3	11-15-94	41.44	9.25	32.19	ND	WSW	0.019
MW-3	03-24-95	41.44	7.29	34.15	ND	NW	0.037
MW-3	05-24-95	41.44	9.53	31.91	ND	WNW	0.013
MW-3	08-22-95	41.44	11.19	30.25	ND	SW	0.012

Table 2
Historical Groundwater Elevation Data

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

Date: 12-21-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-4	01-13-93	40.33	8.05	32.28	ND	NR	NR
MW-4	02-22-93	40.33	7.58	32.75	ND	NR	NR
MW-4	03-25-93	40.33	8.27	32.06	ND	NR	NR
MW-4	04-13-93	40.33	8.54	31.79	ND	NR	NR
MW-4	05-22-93	40.33	9.52	30.81	ND	NR	NR
MW-4	06-17-93	40.33	9.53	30.80	ND	NR	NR
MW-4	07-27-93	40.33	10.14	30.19	ND	NR	NR
MW-4	08-24-93	40.33	10.42	29.91	ND	NR	NR
MW-4	12-08-93	40.33	10.31	30.02	ND	NR	NR
MW-4	02-01-94	40.33	9.10	31.23	ND	NR	NR
MW-4	04-26-94	40.33	8.94	31.39	ND	NR	NR
MW-4	07-29-94	40.33	10.02	30.31	ND	WSW	0.016
MW-4	11-15-94	40.33	8.47	31.86	ND	WSW	0.019
MW-4	03-24-95	40.33	5.92	34.41	ND	NW	0.037
MW-4	05-24-95	40.33	9.23	31.10	ND	WNW	0.013
MW-4	08-22-95	40.33	10.61	29.72	ND	SW	0.012
MW-5	01-13-93	41.84	8.22	33.62	ND	NR	NR
MW-5	02-22-93	41.84	7.92	33.92	ND	NR	NR
MW-5	03-25-93	41.84	8.67	33.17	ND	NR	NR
MW-5	04-13-93	41.84	9.18	32.66	ND	NR	NR
MW-5	05-22-93	41.84	10.12	31.72	ND	NR	NR
MW-5	06-17-93	41.84	10.03	31.81	ND	NR	NR
MW-5	07-27-93	41.84	10.74	31.10	ND	NR	NR
MW-5	08-24-93	41.84	11.02	30.82	ND	NR	NR
MW-5	12-08-93	41.84	10.92	30.92	ND	NR	NR
MW-5	02-01-94	41.84	9.74	32.10	ND	NR	NR
MW-5	04-26-94	41.84	9.51	32.33	ND	NR	NR
MW-5	07-29-94	41.84	10.54	31.30	ND	WSW	0.016
MW-5	11-15-94	41.84	9.10	32.74	ND	WSW	0.019
MW-5	03-24-95	41.84	6.23	35.61	ND	NW	0.037
MW-5	05-24-95	41.84	9.61	32.23	ND	WNW	0.013
MW-5	08-22-95	41.84	11.12	30.72	ND	SW	0.012

Table 2
Historical Groundwater Elevation Data

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

Date: 12-21-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-6	01-13-93	40.13	9.84	30.29	ND	NR	NR
MW-6	02-22-93	40.13	9.94	30.19	ND	NR	NR
MW-6	03-25-93	40.13	10.68	29.45	ND	NR	NR
MW-6	04-13-93	40.13	11.12	29.01	ND	NR	NR
MW-6	05-22-93	40.13	11.74	28.39	ND	NR	NR
MW-6	06-17-93	40.13	11.75	28.38	ND	NR	NR
MW-6	07-27-93	40.13	12.20	27.93	ND	NR	NR
MW-6	08-24-93	40.13	12.41	27.72	ND	NR	NR
MW-6	12-08-93	40.13	10.11	30.02	ND	NR	NR
MW-6	02-01-94	40.13	11.80	28.33	ND	NR	NR
MW-6	04-26-94	40.13	11.33	28.80	ND	NR	NR
MW-6	07-29-94	40.13	12.16	27.97	ND	WSW	0.016
MW-6	11-15-94	40.13	11.01	29.12	ND	WSW	0.019
MW-6	03-24-95	40.13	9.03	31.10	ND	NW	0.037
MW-6	05-24-95	40.13	12.45	27.68	ND	WNW	0.013
MW-6	08-22-95	40.13	13.32	26.81	ND	SW	0.012

Table 2
Historical Groundwater Elevation Data

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

Date: 12-21-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
RW-1	10-29-91	40.33	10.85	29.48	Sheen	NR	NR
RW-1	11-07-91	40.33	11.97	28.36	0.01	NR	NR
RW-1	11-14-91	40.33	11.03	29.30	0.01	NR	NR
RW-1	01-19-92	40.33	^10.22	^30.11	3.26	NR	NR
RW-1	02-19-92	40.33	^8.49	^31.84	2.14	NR	NR
RW-1	03-19-92	40.33	^8.50	^31.83	0.50	NR	NR
RW-1	04-21-92	40.33	^9.68	^30.65	0.03	NR	NR
RW-1	05-12-92	40.33	10.47	29.86	NR	NR	NR
RW-1	06-12-92	40.33	11.41	28.92	NR	NR	NR
RW-1	07-15-92	40.33	11.35	28.98	ND	NR	NR
RW-1	08-07-92	40.33	^10.80	^29.53	0.02	NR	NR
RW-1	09-08-92	40.33	^10.80	^29.53	0.62	NR	NR
RW-1	10-26-92	40.33	^11.42	^28.91	0.04	NR	NR
RW-1	11-23-92	40.33	10.94	29.39	Sheen	NR	NR
RW-1	12-16-92	40.33	^9.78	^30.55	0.51	NR	NR
RW-1	01-13-93	40.33	8.35	31.98	Skimmer	NR	NR
RW-1	02-22-93	40.33	^7.94	^32.39	0.01	NR	NR
RW-1	03-25-93	40.33	8.81	31.52	ND	NR	NR
RW-1	04-13-93	40.33	^9.67	NR	NR	NR	NR
RW-1	05-22-93	40.33	10.04	30.29	Sheen	NR	NR
RW-1	06-17-93	40.33	^10.26	^30.07	0.01	NR	NR
RW-1	07-27-93	40.33	10.58	29.75	Sheen	NR	NR
RW-1	08-24-93	40.33	^10.80	^29.53	0.05	NR	NR
RW-1	12-08-93	40.33	^10.46	^29.87	0.30	NR	NR
RW-1	02-01-94	40.33	1.00	39.33	ND	NR	NR
RW-1	04-26-94	40.33	9.30	** 31.06	0.04	NR	NR
RW-1	07-29-94	40.33	9.91	** 30.43	0.02	WSW	0.016
RW-1	11-15-94	40.33	8.89	** 31.51	0.10	WSW	0.019
RW-1	03-24-95	40.33	9.32	** 31.02	0.01	NW	0.037
RW-1	05-24-95	40.33	9.75	** 30.60	0.03	WNW	0.013
RW-1	08-22-95	40.33	10.86	** 29.48	0.02	SW	0.012

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ND: none detected
NR: not reported; data not available
WSW: west-southwest
NW: northwest
WNW: west-northwest
SW: southwest
^ : groundwater elevation (GWE) and depth to water (DTW) adjusted to include 80 percent of the floating product thickness (FPT):
[GWE = (TOC - DTW) + (FPT x 0.8)]
**: [corrected elevation (Z')] = Z + (h * 0.73); where Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

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

Date: 11-29-95

Well Designation	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
		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	10-29-91	620	76	69	15	60	--	--	--	--	--	--	--
MW-1	03-19-92	6500	2600	89	42	290	--	--	--	--	--	--	--
MW-1	06-12-92	2900	1100	2.5	21	15	--	--	--	--	--	--	--
MW-1	09-08-92	820	350	<5	<5	<5	--	--	--	--	--	--	--
MW-1	10-26-92	190	68	<0.5	0.6	<0.5	--	--	--	--	--	--	--
MW-1	01-13-93	430	130	5.3	5	9	--	--	--	--	--	--	--
MW-1	04-13-93	5300	2100	<20	63	36	--	--	--	--	--	--	--
MW-1	08-24-93	630	230	<2.5	3.1	3.3	--	--	--	--	--	--	--
MW-1	12-08-93	81	20	<0.5	0.9	<0.5	--	--	--	--	--	--	--
MW-1	02-01-94	<50	13	<0.5	0.5	0.6	--	--	--	--	--	--	--
MW-1	04-26-94	990	290	3.5	18	14	--	--	--	--	--	--	--
MW-1	07-29-94	760	280	<2.5	7.1	<2.5	--	--	--	--	--	--	--
MW-1	11-15-94	570	150	7.3	<2.5	30	--	--	--	--	--	--	--
MW-1	03-24-95	8800	3600	<50	62	99	--	--	--	--	--	--	--
MW-1	05-24-95	4800	2000	<20	52	<20	--	--	--	--	--	--	--
MW-1	08-22-95	780	310	<2.5	12	<2.5	14	--	--	--	--	--	--
MW-2	10-29-91	<60	2.4	4.6	0.48	2.3	--	--	--	--	--	--	--
MW-2	03-19-92	<50	6.8	0.9	<0.5	1.1	--	--	--	--	--	--	--
MW-2	06-12-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	09-08-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	10-26-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	01-13-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	04-13-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	08-24-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	12-08-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	02-01-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	04-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	11-15-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-2	05-24-95	Not sampled: not scheduled for chemical analysis											
MW-2	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

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

Date: 11-29-95

Well Designation	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
		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	10-29-91	32	2.1	2.8	0.35	1.8	--	--	<5000	--	--	--	--
MW-3	03-19-92	2100	780	8.8	16	58	--	--	--	--	--	--	--
MW-3	06-12-92	720	210	<2.5	23	4	--	--	--	--	--	--	--
MW-3	09-08-92	<50	5.3	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	10-26-92	<50	0.6	<0.5	<0.5	<0.5	--	--	--	600	600	--	<50
MW-3	01-13-93	<50	1.1	<0.5	<0.5	<0.5	--	--	--	780	1100	--	--
MW-3	04-13-93	68	13	<0.5	1.6	1.1	--	--	--	<500	<500	--	--
MW-3	08-24-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	<500	<500	--	--
MW-3	12-08-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	900	500	--	--
MW-3	02-01-94	<50	1.9	<0.5	2.1	<0.5	--	--	--	<500	<500	--	--
MW-3	04-26-94	<50	1.1	<0.5	2.4	0.9	--	--	--	--	--	<600	--
MW-3	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	600	--
MW-3	11-15-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	<500	--
MW-3	03-24-95	51	0.8	<0.5	2.4	<0.5	--	--	--	--	--	<500	--
MW-3	05-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	<500	--
MW-3	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	79	--	--	--	--	<500	--
MW-4	01-13-93	<50	<0.5	1.3	<0.5	1.6	--	--	--	--	--	--	--
MW-4	04-13-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	08-24-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	12-08-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	02-01-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	04-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	11-15-94	220	12	19	0.9	39	--	--	--	--	--	--	--
MW-4	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	05-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	99	--	--	--	--	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

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

Date: 11-29-95

Well Designation	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
		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	01-13-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	04-13-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	08-24-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	12-08-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	02-01-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	04-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	11-15-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-5	05-24-95	Not sampled: not scheduled for chemical analysis											
MW-5	08-22-95	Not sampled: not scheduled for chemical analysis											
MW-6	01-13-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	04-13-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	08-24-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	12-08-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	02-01-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	04-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	07-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	11-15-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-6	05-24-95	Not sampled: not scheduled for chemical analysis											
MW-6	08-22-95	Not sampled: not scheduled for chemical analysis											

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

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

Date: 11-29-95

Well Designation	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
		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	10-29-91	Not sampled: well contained floating product											
RW-1	03-19-92	Not sampled: well contained floating product											
RW-1	06-12-92	Not sampled: well contained floating product											
RW-1	09-08-92	Not sampled: well contained floating product											
RW-1	10-23-92	Not sampled: well contained floating product											
RW-1	01-13-93	Not sampled: skimmer contained floating product											
RW-1	04-13-93	Not sampled: well contained floating product											
RW-1	08-24-93	Not sampled: well contained floating product											
RW-1	12-08-93	Not sampled: well contained floating product											
RW-1	02-01-94	Not sampled: well connected to the remediation system											
RW-1	04-26-94	Not sampled: well contained floating product											
RW-1	07-29-94	Not sampled: well contained floating product											
RW-1	11-15-94	Not sampled: well contained floating product											
RW-1	03-24-95	11000	560	660	150	1700	--	--	--	--	--	--	--
RW-1	05-24-95	Not sampled: well contained floating product											
RW-1	08-22-95	Not sampled: well contained floating product											

TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United Statest 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
- - : not analyzed

Table 4
Historical Groundwater Analytical Data
Additional Parameters

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

Date: 11-29-95

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

VOCs: volatile organic compounds
EPA: United Statest Environmental Protection Agency
µg/L: micrograms per liter
SVOCs: semi-volatile organic compounds
PCBs: polychlorinated biphenyls analyzed
ND: not detected (31 compounds tested for VOCs were nondetectable)
(a): all 37 compounds analyzed were nondetectable except for toluene (3.0 ppb)
(b): all 41 compounds analyzed were nondetectable
(c): all 34 compounds analyzed were nondetectable
(d): all 7 compounds analyzed were nondetectable
-- : not analyzed

Table 5
Approximate Cumulative Floating Product Recovered

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

Date: 12-15-95

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
1992 to 1995 Total:		27.9

Table 6
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
Reporting Period From: 12-07-93
To: 09-28-95

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 (15)	Therm-Ox	Therm-Ox	Therm-Ox	Therm-Ox
Days of Operation:		0.9	0.0	1.0	5.0	0.8
Days of Downtime:		0.1	0.9	0.0	0.0	0.0
Vapor Monitoring Concentrations						
Well Field Influent:	mg/m3 as gasoline (1)	10000	NA (16)	NA	NA	NA
	ppmv as gasoline (2) (3)	2800	NA	NA	NA	NA
	mg/m3 as benzene	540	NA	NA	NA	NA
	ppmv as benzene (4)	150	NA	NA	NA	NA
System Influent:	mg/m3 as gasoline	1400	NA	1400	1500	1800
	ppmv as gasoline	390	NA	390	410	500
	mg/m3 as benzene	38	NA	60	100	79
	ppmv as benzene	11	NA	17	28	22
System Effluent:	mg/m3 as gasoline	76	NA	130	21	NA
	ppmv as gasoline	21	NA	36	6	NA
	mg/m3 as benzene	2.3	NA	3.1	<0.05	NA
	ppmv as benzene	0.6	NA	0.9	<0.01	NA
Well Field Flow Rate, scfm (5):		10	0	10	5	45
System Influent Flow Rate, scfm:		100	0	100	87	100
Destruction Efficiency, percent (6):		94.6	NA	90.7	98.6	NA
Emission Rates (pounds per day) (7)						
Gasoline:		0.68	0.00	1.17	0.16	NA
Benzene:		0.02	0.00	0.03	<0.00	NA
Operating Hours This Period:		21.0	0.0	23.0	121.0	18.0
Operating Hours To Date:		21.0	21.0	44.0	165.0	183.0
SVE Pounds/ Hour Removal Rate, as gasoline (8) (9):		0.52	0.00	0.52	0.49	0.67
SVE Pounds Removed This Period, as gasoline (10):		11.004	0.000	12.052	59.100	12.126
GWE Pounds Removed This Period, as gasoline (11) (12):		0.000	0.000	0.000	0.000	0.000
Total Pounds Removed This Period, as gasoline (13):		11.004	0.000	12.052	59.100	12.126
Total Pounds Removed To Date, as gasoline:		11.0	11.0	23.1	82.2	94.3
Total Gallons Removed This Period, as gasoline (14):		1.8	0.0	1.9	9.5	2.0
Total Gallons Removed To Date, as gasoline:		1.8	1.8	3.7	13.3	15.2

Table 6
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
Reporting Period From: 12-07-93
To: 09-28-95

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:		0.0	4.3	0.0	1.8	0.0
Days of Downtime:		5.0	0.0	4.0	0.0	6.6
Vapor Monitoring Concentrations						
Well Field Influent:	mg/m3 as gasoline	NA	NA	NA	NA	NA
	ppmv as gasoline	NA	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA	NA
System Influent:	mg/m3 as gasoline	NA	NA	NA	NA	NA
	ppmv as gasoline	NA	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA	NA
System Effluent:	mg/m3 as gasoline	NA	NA	NA	NA	NA
	ppmv as gasoline	NA	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA	NA
Well Field Flow Rate, scfm:		0	20	0	54	0
System Influent Flow Rate, scfm:		0	100	0	78	0
Destruction Efficiency, percent (6):		NA	NA	NA	NA	NA
Emission Rates (pounds per day) (7)						
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:		0.0	104.0	0.0	43.0	0.0
Operating Hours To Date:		183.0	287.0	287.0	330.0	330.0
SVE Pounds/ Hour Removal Rate, as gasoline (9):		0.00	0.00	0.00	0.00	0.00
SVE Pounds Removed This Period, as gasoline (10):		0.000	0.000	0.000	0.000	0.000
GWE Pounds Removed This Period, as gasoline (12):		0.000	0.000	0.000	0.000	0.000
Total Pounds Removed This Period, as gasoline (13):		0.000	0.000	0.000	0.000	0.000
Total Pounds Removed To Date, as gasoline:		94.3	94.3	94.3	94.3	94.3
Total Gallons Removed This Period, as gasoline (14):		0.0	0.0	0.0	0.0	0.0
Total Gallons Removed To Date, as gasoline:		15.2	15.2	15.2	15.2	15.2

Table 6
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
Reporting Period From: 12-07-93
To: 09-28-95

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:		5.1	11.9	0.0	0.0	0.4
Days of Downtime:		0.0	0.1	66.3	275.0	36.6
Vapor Monitoring Concentrations						
Well Field Influent:	mg/m3 as gasoline	NA	NA	NA	NA	NA
	ppmv as gasoline	NA	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA	NA
System Influent:	mg/m3 as gasoline	NA	2500	NA	NA	NA
	ppmv as gasoline	NA	690	NA	NA	NA
	mg/m3 as benzene	NA	37	NA	NA	NA
	ppmv as benzene	NA	10	NA	NA	NA
System Effluent:	mg/m3 as gasoline	NA	52	NA	NA	NA
	ppmv as gasoline	NA	14	NA	NA	NA
	mg/m3 as benzene	NA	0.93	NA	NA	NA
	ppmv as benzene	NA	0.26	NA	NA	NA
Well Field Flow Rate, scfm:		37	41	0	0	0
System Influent Flow Rate, scfm:		60	64	0	0	0
Destruction Efficiency, percent (6):		97.9	97.9	NA	NA	NA
Emission Rates (pounds per day) (7)						
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:		123.0	285.0	0.0	0.0	8.9
Operating Hours To Date:		453.0	738.0	738.0	738.0	746.9
SVE Pounds/ Hour Removal Rate, as gasoline (9):		0.48	0.60	0.00	0.00	0.00
SVE Pounds Removed This Period, as gasoline (10):		59.399	170.669	0.000	0.000	0.000
GWE Pounds Removed This Period, as gasoline (12):		0.000	0.000	0.000	0.000	0.000
Total Pounds Removed This Period, as gasoline (13):		59.399	170.669	0.000	0.000	0.000
Total Pounds Removed To Date, as gasoline:		153.7	324.3	324.3	324.3	324.3
Total Gallons Removed This Period, as gasoline (14):		9.6	27.5	0.0	0.0	0.0
Total Gallons Removed To Date, as gasoline:		24.8	52.3	52.3	52.3	52.3

Table 6
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
Reporting Period From: 12-07-93
To: 09-28-95

Date Begin:		02-06-95	03-03-95	03-31-95	04-27-95	05-26-95
Date End:		03-03-95	03-31-95	04-27-95	05-26-95	06-28-95
Mode of Oxidation:		Therm-Ox	Therm-Ox	Therm-Ox	Therm-Ox	Cat-Ox (17)
Days of Operation:		21.4	6.0	0.3	0.0	2.0
Days of Downtime:		3.6	22.1	26.7	29.0	31.0
Vapor Monitoring Concentrations						
Well Field Influent:	mg/m3 as gasoline	11000	8900	8900	NA	12000
	ppmv as gasoline	3000	2500	2500	NA	3300
	mg/m3 as benzene	110	99	99	NA	170
	ppmv as benzene	30	30	30	NA	50
System Influent:	mg/m3 as gasoline	880	<60	<60	NA	2200
	ppmv as gasoline	240	<17	<17	NA	610
	mg/m3 as benzene	21	<0.5	<0.5	NA	34
	ppmv as benzene	6	<0.2	<0.2	NA	9
System Effluent:	mg/m3 as gasoline	<60	<60	<60	NA	<60
	ppmv as gasoline	<17	<17	<17	NA	<17
	mg/m3 as benzene	<0.5	<0.5	<0.5	NA	1.5
	ppmv as benzene	<0.2	<0.2	<0.2	NA	0.4
Well Field Flow Rate, scfm:		5	6	19	0	17
System Influent Flow Rate, scfm:		36	33	37	0	25
Destruction Efficiency, percent (6):		96.6	NA	NA	NA	97.3
Emission Rates (pounds per day) (7)						
Gasoline:		<0.19	<0.18	<0.02	0.00	<0.13
Benzene:		<0.00	<0.00	<0.00	0.00	0.00
Operating Hours This Period:		512.5	143.3	7.2	0.0	48.0
Operating Hours To Date:		1259.4	1402.7	1409.9	1409.9	1457.9
SVE Pounds/ Hour Removal Rate, as gasoline (9):		0.12	0.01	0.01	0.00	0.21
SVE Pounds Removed This Period, as gasoline (10):		60.767	1.062	0.060	0.000	9.881
GWE Pounds Removed This Period, as gasoline (12):		4.282	0.313	0.000	0.000	1.423
Total Pounds Removed This Period, as gasoline (13):		65.049	1.375	0.060	0.000	11.304
Total Pounds Removed To Date, as gasoline:		389.4	390.8	390.8	390.8	402.1
Total Gallons Removed This Period, as gasoline (14):		10.5	0.2	0.0	0.0	1.8
Total Gallons Removed To Date, as gasoline:		62.8	63.0	63.0	63.0	64.9

Table 6
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
Reporting Period From: 12-07-93
To: 09-28-95

Date Begin:		06-28-95	07-28-95	08-25-95
Date End:		07-28-95	08-25-95	09-28-95
Mode of Oxidation:		Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:		28.1	17.0	34.1
Days of Downtime:		1.9	11.0	0.1
Vapor Monitoring Concentrations				
Well Field Influent:	mg/m3 as gasoline	480	4600	11000
	ppmv as gasoline	130	1300	2400
	mg/m3 as benzene	14	55	57
	ppmv as benzene	4	17	18
System Influent:	mg/m3 as gasoline	480	5600	11000
	ppmv as gasoline	130	1500	2400
	mg/m3 as benzene	14	69	57
	ppmv as benzene	4	22	18
System Effluent:	mg/m3 as gasoline	<60	170	140
	ppmv as gasoline	<17	47	61
	mg/m3 as benzene	<0.5	3.2	<0.5
	ppmv as benzene	<0.2	1	<0.1
Well Field Flow Rate, scfm:		24	71	54
System Influent Flow Rate, scfm:		33	81	54
Destruction Efficiency, percent (6):		87.5	97.0	98.7
Emission Rates (pounds per day) (7)				
Gasoline:		<0.18	1.24	0.68
Benzene:		<0.00	0.02	<0.00
Operating Hours This Period:		674.5	406.8	818.8
Operating Hours To Date:		2132.4	2539.2	3358.0
SVE Pounds/ Hour Removal Rate, as gasoline (9):		0.06	1.70	2.22
SVE Pounds Removed This Period, as gasoline (10):		39.988	690.626	1820.342
GWE Pounds Removed This Period, as gasoline (12):		0.488	0.241	0.072
Total Pounds Removed This Period, as gasoline (13):		40.476	690.867	1820.414
Total Pounds Removed To Date, as gasoline:		442.6	1133.5	2953.9
Total Gallons Removed This Period, as gasoline (14):		6.5	111.4	293.6
Total Gallons Removed To Date, as gasoline:		71.4	182.8	476.5

Table 6
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer
Location: 1001 San Pablo Avenue Albany, California	
Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date: 12-07-93 Reporting Period From: 12-07-93 To: 09-28-95

CURRENT REPORTING PERIOD:	06-28-95	to	09-28-95
DAYS / HOURS IN PERIOD:	92.2	2213.6	
DAYS / HOURS OF OPERATION:	79.2	1900.1	
DAYS / HOURS OF DOWN TIME:	13.0	313.5	
PERCENT OPERATIONAL:		85.8	%
PERIOD POUNDS REMOVED:	2551.8		
PERIOD GALLONS REMOVED:	411.6		
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):		52.3	

1. mg/m3: milligrams per cubic meter
2. ppmv: parts per million by volume
3. 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. 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
5. scfm: flow in standard cubic feet per minute at one atmosphere and 70 degrees Farenheit
6. 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
7. 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
8. SVE: soil-vapor extraction system
9. SVE pounds/ hour removal rate (as gasoline) = SVE system influent concentration (as gasoline in mg/m3) x SVE system influent flow rate (scfm) x 0.02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
10. SVE pounds removed this period (as gasoline) = pounds/ hour removal rate (SVE) x hours of operation (SVE)
11. GWE: groundwater extraction system
12. Refer to Table 8 for GWE system performance data (system was started during the second quarter of 1995
13. Represents the total mass recovered by the SVE and GWE systems, and the total mass abated by the thermal/catalytic oxidizer
14. Total gallons removed this period (as gasoline) = total pounds removed this period (as gasoline) x 0.1613 gallons/pound of gasoline
15. Therm-Ox: thermal oxidation
16. NA: not analyzed, not applicable, or not available
17. Cat-Ox: catalytic oxidation; the SVE system's abatement unit was converted to the Cat-Ox mode of operation on June 20, 1995

Table 7
Soil-Vapor Extraction Well Data

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

Date: 12-21-95

Date	Well Identification											
	VW-1			VW-2			VW-3			VW-4		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-07-93	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
12-09-93	open	2455 LAB	NA	open	5316 LAB	NA	open	2025 LAB	NA	open	2278 LAB	NA
12-15-93	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
01-12-94	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
01-24-94		* System shut down			System shut down			System shut down			System shut down	
02-08-95	open	<17 LAB	20	open	<17 LAB	20	open	0.0 PID	20	open	0.0 PID	20
02-14-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	11	open	NA	NA	open	NA	NA	open	NA	NA
03-08-95	open	NA	28	closed	NA	17	closed	NA	0	closed	NA	26
03-08-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
06-20-95	open	NA	9	open	NA	10	closed	NA	NA	closed	NA	NA
06-26-95	open	59000 LAB	17	open	56000 LAB	15	closed	NA	0	closed	NA	14
07-10-95	open	NA	NA	open	NA	NA	closed	NA	NA	closed	NA	NA
08-08-95	open	NA	47	open	NA	46	open	NA	47	open	NA	47
09-12-95	open	3390 PID	27	open	2332 PID	27	open	263 PID	25	open	1736 PID	26
09-28-95	open	1498 PID	30	open	1075 PID	29	open	235 PID	26	open	911 PID	30
09-28-95	open	1800 LAB	NA	open	1500 LAB	NA	open	180 LAB	NA	open	990 LAB	NA
09-28-95	open	NA	NA	open	NA	NA	closed	NA	NA	open	NA	NA

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open: open to the system
open(b): open to the system and bubbling air
passive: open to the atmosphere
closed: closed to the system and atmosphere
NA: not analyzed or not measured
PID: TVHG concentration was measured with a portable photo-ionization detector
LAB: TVHG concentration was analyzed in the laboratory
*: The SVE system was shut down manually because of no available well screens in the soil-vapor extraction wells

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Table 7
Soil-Vapor Extraction Well Data

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

Date: 12-21-95

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
12-07-93	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
12-09-93	open	532 LAB	NA	open	2430 LAB	NA	open	3038 LAB	NA	open	1240 LAB	NA
12-15-93	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
01-12-94	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
01-24-94		* System shut down			System shut down			System shut down			System shut down	
02-08-95	open	0.0 PID	24	open	<17 LAB	10	open	0.0 PID	24	open	<17 LAB	20
02-14-95	open	NA	NA	closed	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	NA	closed	NA	16	open	NA	NA	open	NA	NA
03-08-95	closed	NA	1	closed	NA	8	closed	NA	22	closed	NA	0
03-08-95	closed	NA	NA	open	NA	NA	closed	NA	NA	closed	NA	NA
06-20-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
06-26-95	closed	NA	7	closed	NA	34	closed	NA	16	closed	NA	2
07-10-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-08-95	open	NA	46	open	NA	36	open	NA	47	open	NA	43
09-12-95	open	243 PID	26	open	587 PID	28	open	1297 PID	26	open	830 PID	26
09-28-95	open	301 PID	30	open	230 PID	32	open	941 PID	30	open	956 PID	29
09-28-95	open	280 LAB	NA	open	250 LAB	NA	open	1400 LAB	NA	open	2000 LAB	NA
09-28-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open: open to the system
open(b): open to the system and bubbling air
passive: open to the atmosphere
closed: closed to the system and atmosphere
NA: not analyzed or not measured
PID: TVHG concentration was measured with a portable photo-ionization detector
LAB: TVHG concentration was analyzed in the laboratory
*: The SVE system was shut down manually because of no available well screens in the soil-vapor extraction wells

Table 7
Soil-Vapor Extraction Well Data

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

Date: 12-21-95

Date	Well Identification											
	VW-9			RW-1			AS-1 (vent)			AS-2 (vent)		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-07-93	open	NA	NA	open	NA	NA						
12-09-93	open	1671 LAB	NA	open	1721 LAB	NA						
12-15-93	open	NA	NA	closed	NA	NA						
01-12-94	open	NA	NA	closed	NA	NA						
01-24-94		* System shut down			System shut down							
02-08-95	open	0.0 PID	23	open	13.7 PID	20	open	<17 LAB	24	open	<17 LAB	24
02-14-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	NA	open	NA	13	passive	NA	5	passive	NA	1
03-08-95	closed	NA	8	open	NA	28	passive	NA	0	passive	NA	0
03-08-95	closed	NA	NA	closed	NA	NA	open	NA	NA	open	NA	NA
06-20-95	closed	NA	NA	open	NA	10	open	NA	10	open	NA	10
06-26-95	closed	NA	8	open	4800 LAB	19	open	40000 LAB	15	open	40000 LAB	15
07-10-95	closed	NA	NA	open(b)	NA	NA	open	NA	NA	open	NA	NA
08-08-95	open	NA	45	open	NA	49	open	NA	45	open	NA	45
09-12-95	open	566 PID	25	open	1072 PID	26	open	2522 PID	27	open	2522 PID	27
09-28-95	open	393 PID	25	open	921 PID	31	open	1213 PID	27	open	1183 PID	26
09-28-95	open	500 LAB	NA	open	1100 LAB	NA	open	1400 LAB	NA	open	1500 LAB	NA
09-28-95	open	NA	NA	open	NA	NA	open	NA	NA	closed	NA	NA

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open: open to the system
open(b): open to the system and bubbling air
passive: open to the atmosphere
closed: closed to the system and atmosphere
NA: not analyzed or not measured
PID: TVHG concentration was measured with a portable photo-ionization detector
LAB: TVHG concentration was analyzed in the laboratory
*: The SVE system was shut down manually because of no available well screens in the soil-vapor extraction wells

Table 8
Influent and Effluent Groundwater Analyses

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

Date: 12-21-95

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	03-08-95	15000	430	290	54	2000
I-1	06-20-95	20000	1500	1200	220	2300
I-1	08-08-95	11000	970	1100	210	1800
I-1	09-12-95	2700	200	150	29	290
I-1	10-11-95	1000	97	38	7	69
I-2	02-08-95	NA	NA	NA	NA	NA
I-2	02-08-95	1500	59	70	14	86
I-2	02-14-95	1500	59	70	14	86
I-2	02-21-95	340	7.2	8.8	1.9	37
I-2	02-28-95	390	3.9	2.5	0.9	16
I-2	03-08-95	390	3.9	2.5	0.9	16
I-2	06-20-95	2200	30	27	11	77
I-2	08-08-95	330	17	18	3.5	36
I-2	09-12-95	78	4.1	3	<0.5	8.9
I-2	10-11-95	<50	0.9	<0.5	<0.5	1

Table 8
Influent and Effluent Groundwater Analyses

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

Date: 12-21-95

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
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

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

Table 9
Estimated Total Dissolved TPHG Removed

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

Date: 12-21-95

Sample Designation	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-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

Table 9
Estimated Total Dissolved TPHG Removed

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

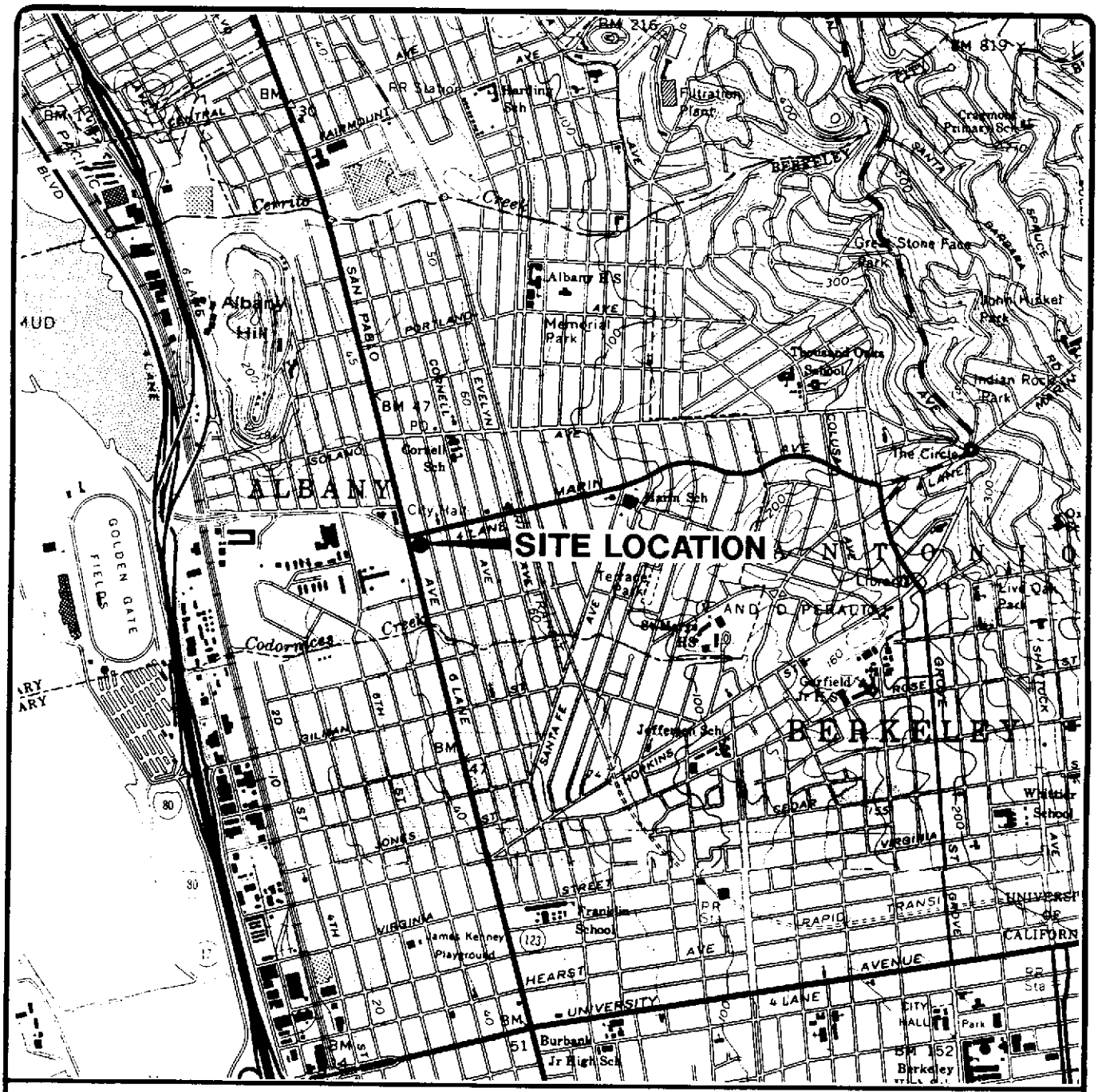
Date: 12-21-95

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:		06-30-95	to	10-11-95										
DAYS / HOURS IN PERIOD:		103.2		2,475.9										
DAYS / HOURS OF OPERATION:		10.0		240.3										
DAYS / HOURS OF DOWN TIME:		93.1		2,235.6										
PERCENT OPERATIONAL:				10%										
PERIOD GROUNDWATER EXTRACTED:				25,601										
PERIOD HYDROCARBON REMOVAL (TOTAL):							0.828		0.134			0.0702		0.0097
HYDROCARBONS REMOVED BY AERATION TANK:							0.802		0.129			0.0689		0.0095
HYDROCARBONS REMOVED BY CARBON:							0.026		0.004			0.0012		0.0002
PERCENT PRIMARY CARBON LOADING: [5]						3%								
PERIOD AVERAGE FLOW RATE (gpd):						248	(includes down time)							
PERIOD AVERAGE FLOW RATE (gpd):						2,557	(excludes down time)							
PERIOD AVERAGE FLOW RATE (gpm):						1.8	(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

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 (0.303 pounds) / 10 pounds of TPH-G) x 100
   The percent carbon loading calculation assumes a 5% by weight carbon adsorption efficiency. The treatment system uses two 200 pound carbon canisters.
   Carbon Loading (10 lbs TPHG) = 1 canister x 200 lbs carbon/canister x 1 lb TPHG/20 lb carbon

152753



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

Scale : 0 2000 4000 Feet

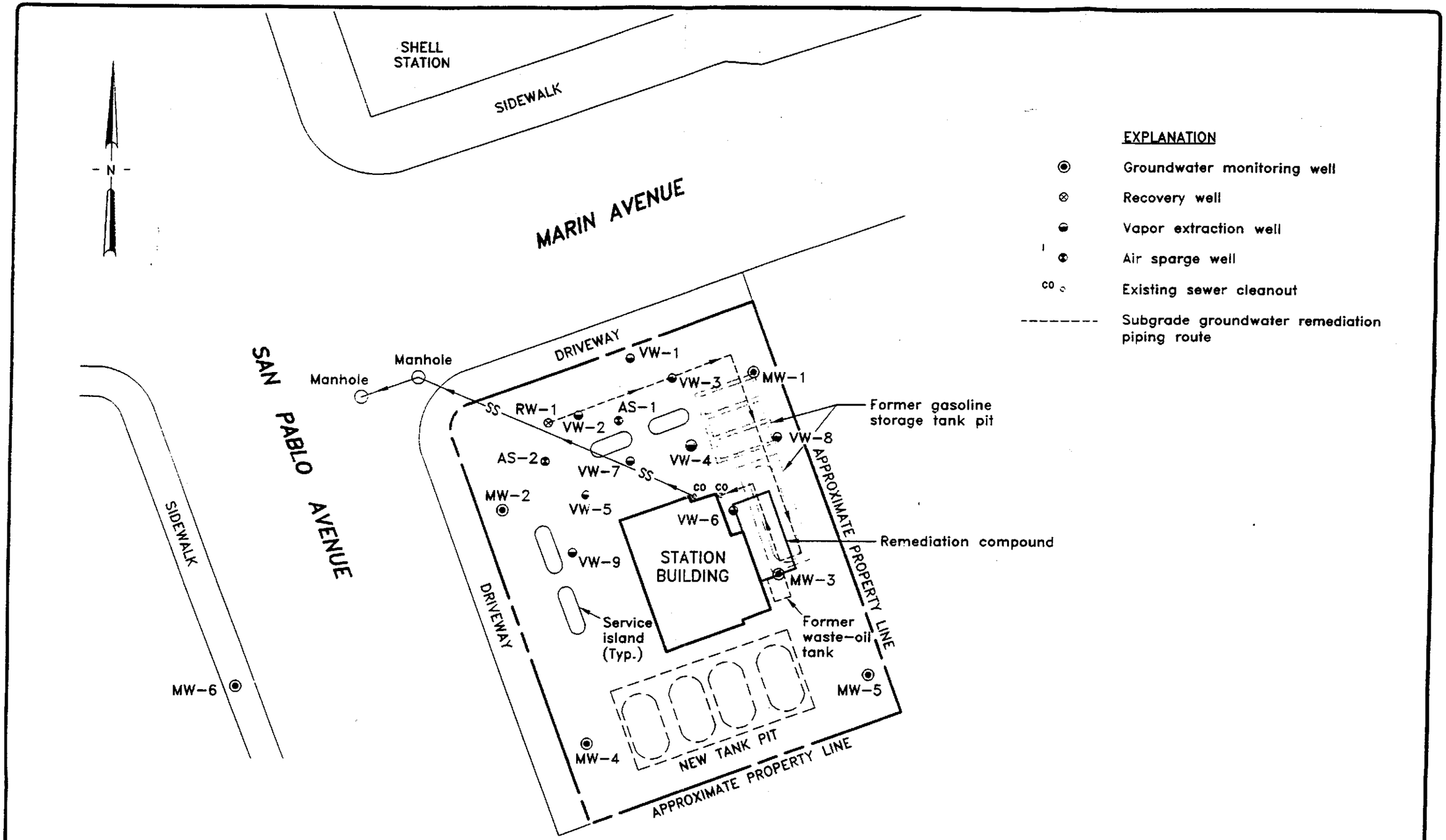
N

EMCON

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

SITE LOCATION

FIGURE
1
PROJECT NO.
805-123.02



EMCON

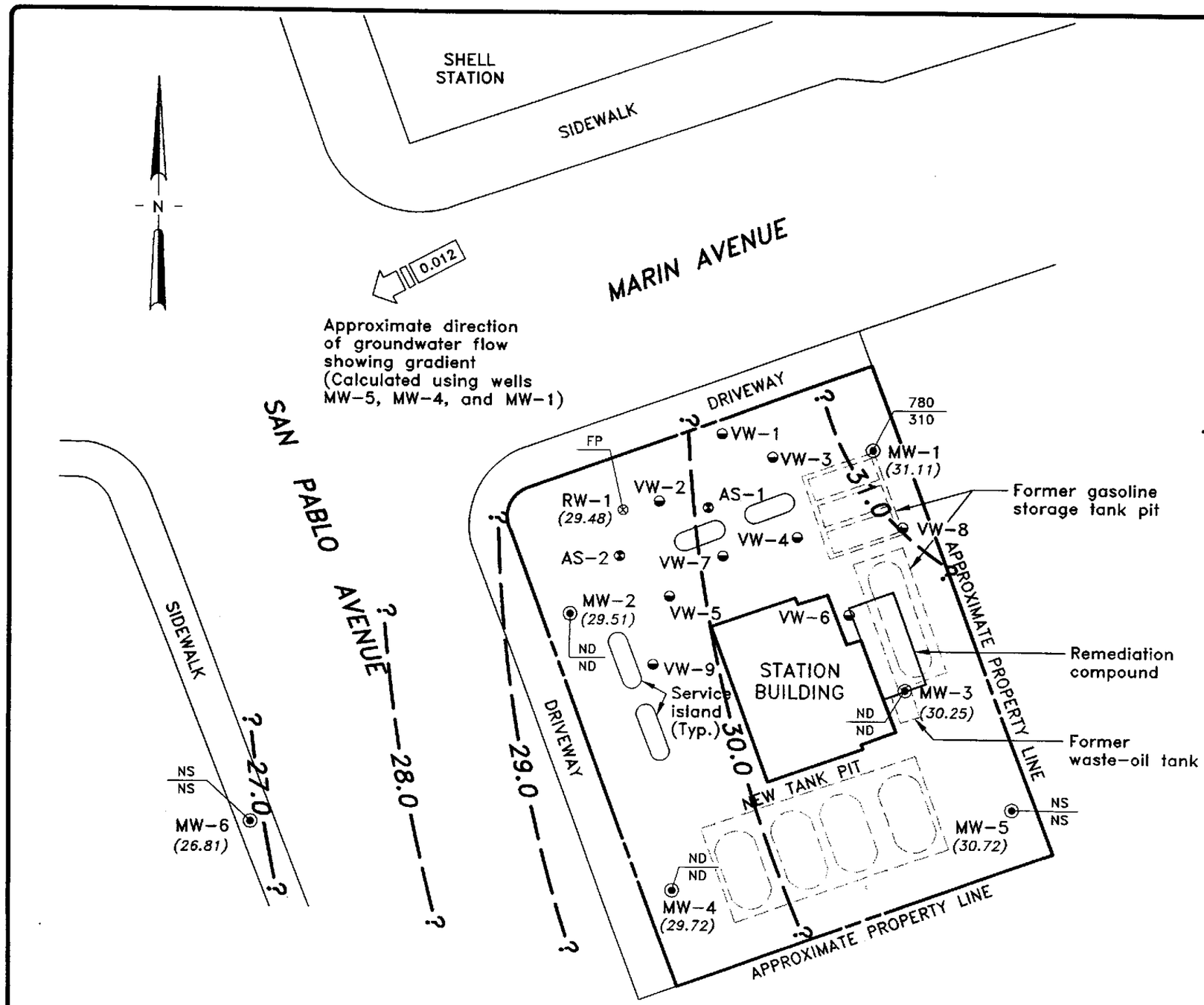
SCALE: 0 30 60 FEET

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

SITE PLAN

FIGURE NO.
2

PROJECT NO.
805-123.02



EXPLANATION

- ◉ Groundwater monitoring well
- ⊗ Recovery well
- ◒ Vapor extraction well
- ◒ Air sparge well
- (30.25) Groundwater elevation (Ft.–MSL); measured 8/22/95
- —30.0— Groundwater elevation contour (Ft.–MSL)
- 780 / 310 TPHG concentration in groundwater (ug/L); sampled 8/22/95 / Benzene concentration in groundwater (ug/L); sampled 8/22/95
- 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
- FP Well was not sampled due to the presence of floating product

EMCON

SCALE: 0 30 60 FEET

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

GROUNDWATER DATA
THIRD QUARTER 1995

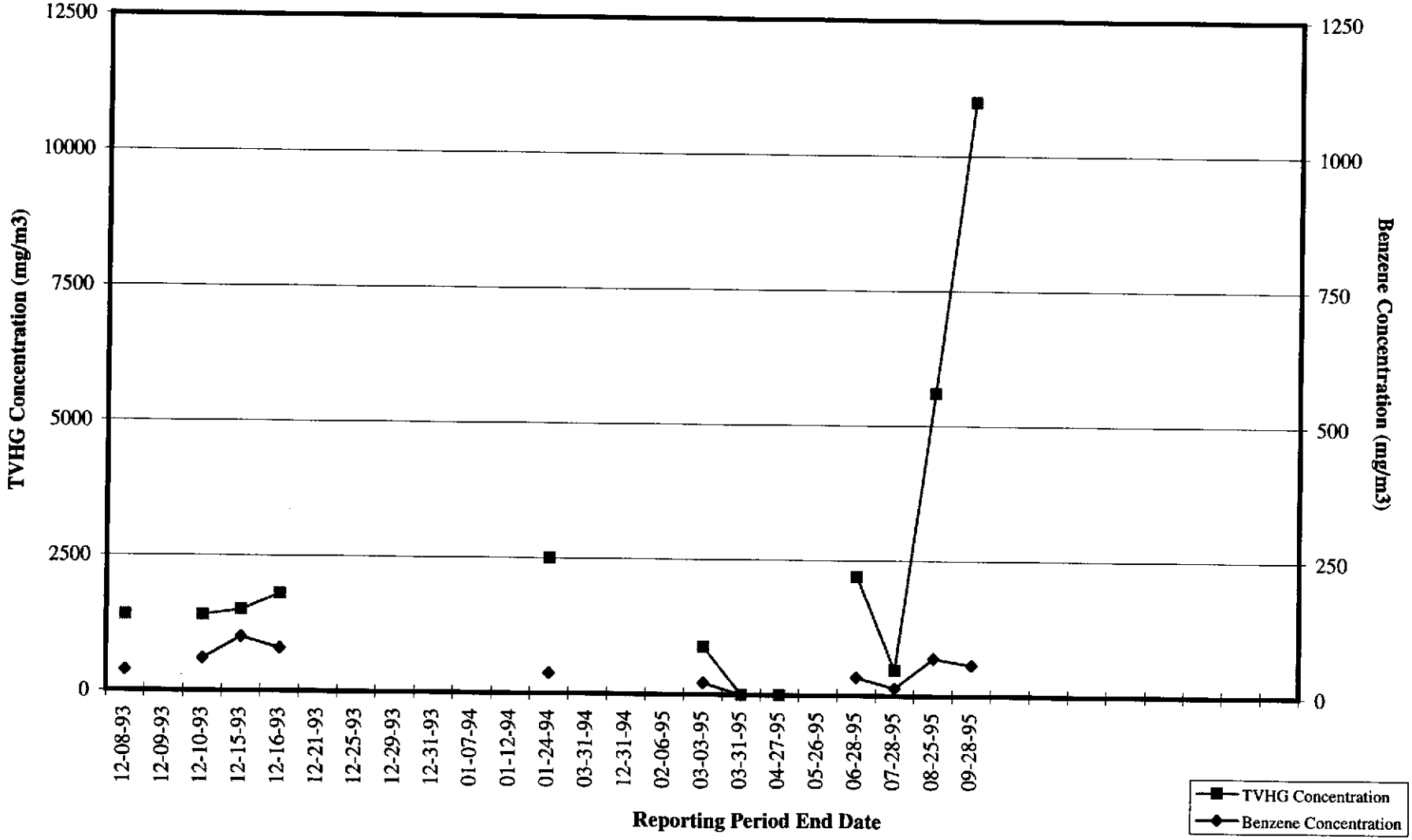
FIGURE NO. 3

PROJECT NO. 805-123.02

G:\805-123\G00 REV 0 12/21/95 11:31:09 DD DJ

Figure 4

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



TVHG = total volatile hydrocarbons as gasoline
mg/m3 = milligrams per cubic meter

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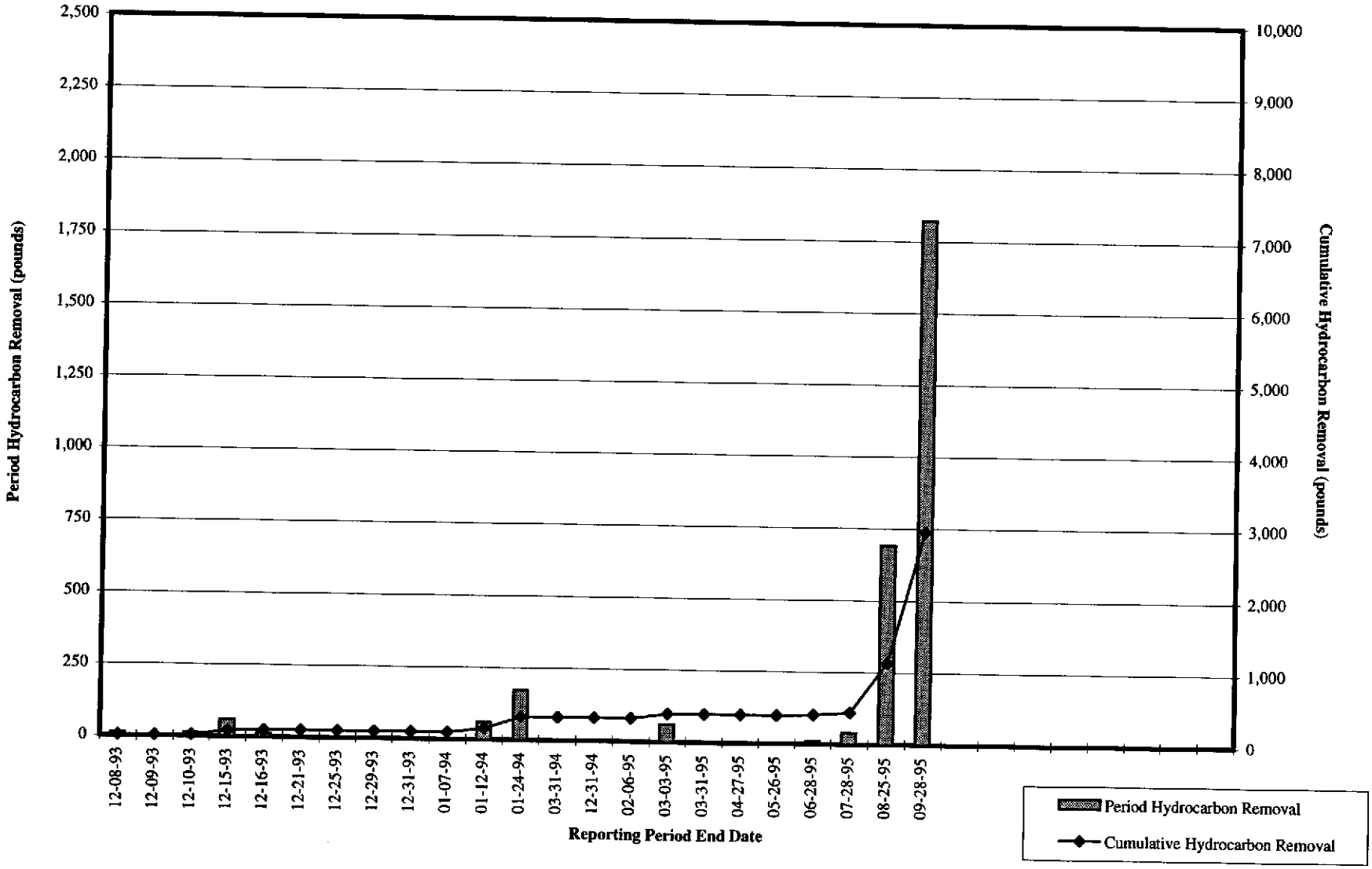
20805-123.002

Figure 5

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



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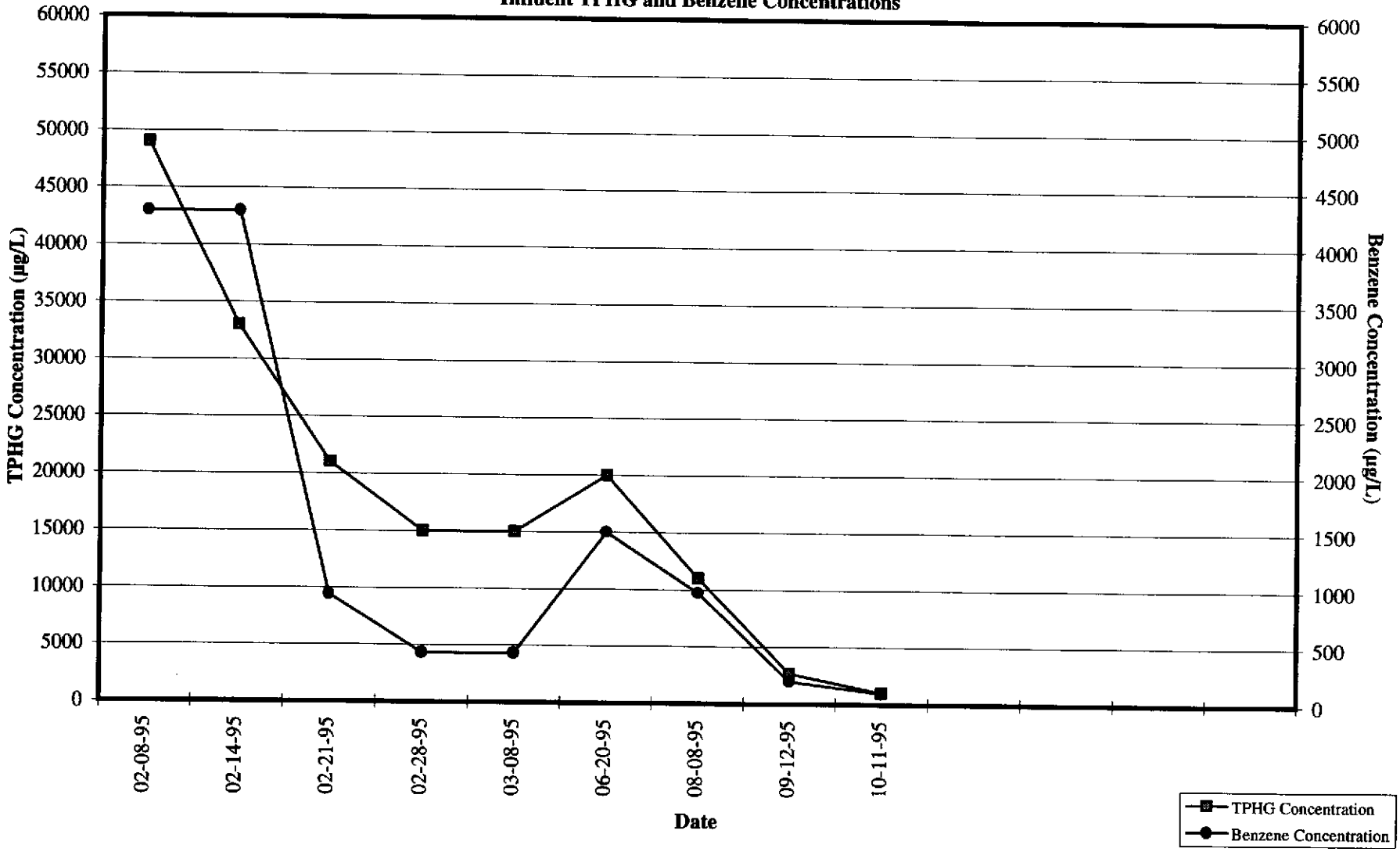
20805-123.002

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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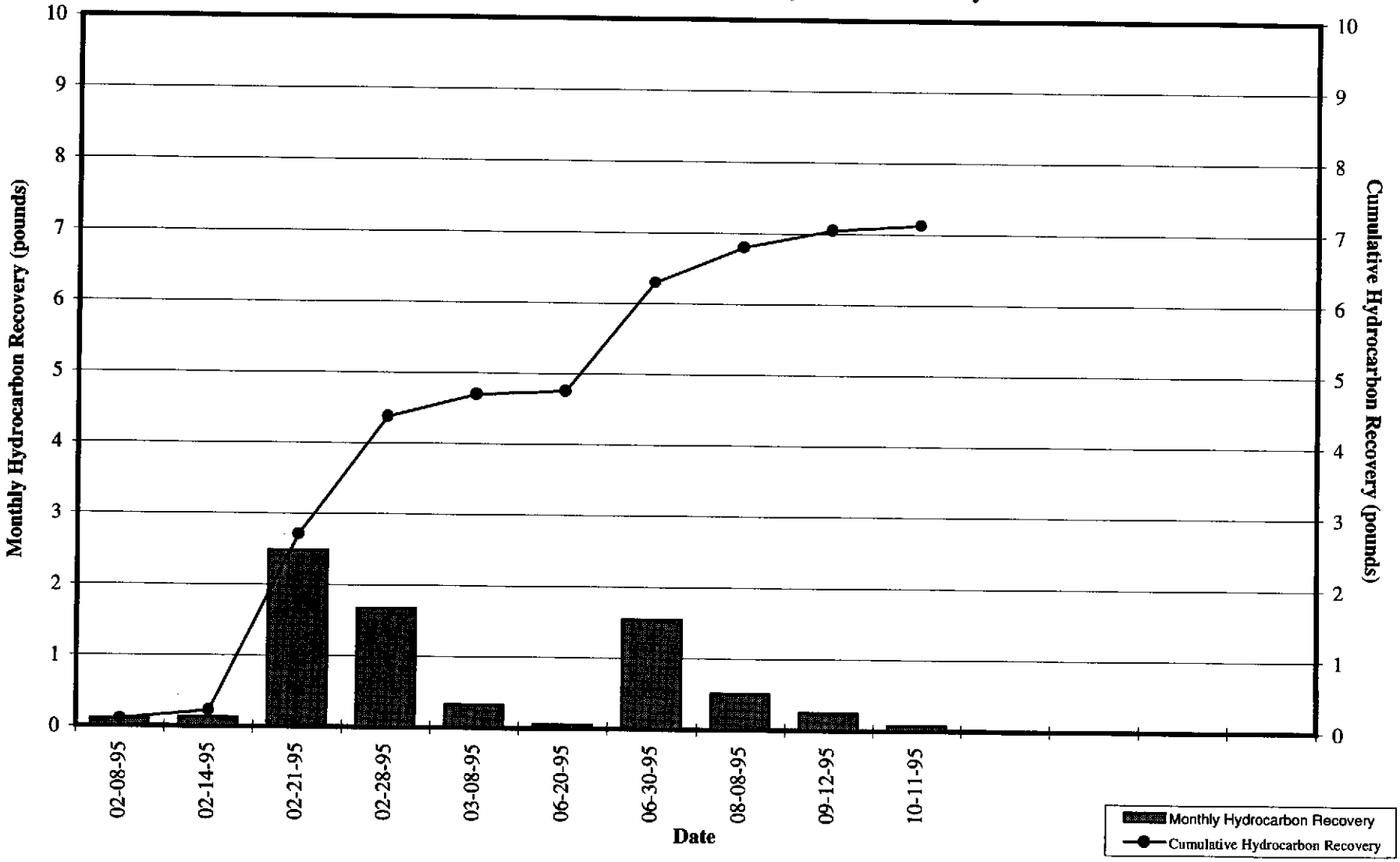
20805-123.002

Figure 7

ARCO Service Station 2035
Historical Groundwater Treatment System Hydrocarbon Recovery Rates



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20805-123.002

APPENDIX A

FIELD DATA SHEETS, THIRD QUARTER 1995 GROUNDWATER MONITORING EVENT

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 1775-217.01 STATION ADDRESS : 101 San Pablo Avenue DATE : 8-22-95

ARCO STATION # : 2035 FIELD TECHNICIAN : Joe [signature] DAY :

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	**MW-2**	BAD	YES	OK	ARCO	OK	10.87	10.87	ND	ND	28.7	
2	**MW-3**	BAD	YES	OK	ARCO	OK	11.19	11.19	ND	ND	33.0	
3	**MW-5**	OK	YES	OK	ARCO	OK	11.12	11.12	ND	ND	24.3	
4	**MW-6**	OK	YES	OK	ARCO	OK	13.32	13.32	ND	ND	21.3	
5	**MW-4**	BAD	YES	OK	ARCO	OK	10.61	10.61	ND	ND	25.0	
6	**MW-1**	OK	YES	BAD	ARCO	OK	10.30	10.30	ND	NR	29.7	
7	**RW-1**	OK	YES	OK	BOY	BOY	10.86	10.86	.02	.02	NR	

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217-01 SAMPLE ID: MW-1 (295)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2085

SAMPLED BY: J WILLIAMS LOCATION: ALBANY, CA,

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 12.67

DEPTH TO WATER (feet): 10.30 CALCULATED PURGE (gal.): 38.02

DEPTH OF WELL (feet): 29.7 ACTUAL PURGE VOL. (gal.): 39

DATE PURGED: 08-22-95 Start (2400 Hr) 1551 End (2400 Hr) 1604

DATE SAMPLED: 08-22-95 Start (2400 Hr) — End (2400 Hr) 1608

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1555	13	6.44	698	69.4	CLEAR	TRACE
1558	26	6.43	769	67.6	CLEAR	TRACE
1604	39	6.48	778	67.9	CLEAR	TRACE

D. O. (ppm): NR ODOR: Slight

COLOR (COBALT 0 - 500): NR

TURBIDITY (NTU 0 - 200 or 0 - 1000): NR

Field QC samples collected at this well: No

Parameters field filtered at this well: No

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
✓ Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: Well-2

Signature: [signature] Reviewed By: SHF

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217-01 SAMPLE ID: MW-2 (28)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2035

SAMPLED BY: J WILLIAMS LOCATION: ALBANY, CA.

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 11.64

DEPTH TO WATER (feet): 10.87 CALCULATED PURGE (gal.): 34.92

DEPTH OF WELL (feet): 28.3 ACTUAL PURGE VOL. (gal.): 35

DATE PURGED: 08-22-95 Start (2400 Hr) 1327 End (2400 Hr) 1337

DATE SAMPLED: 08-22-95 Start (2400 Hr) ___ End (2400 Hr) 1342

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1331	12	6.49	756	70.0	BROWN	MOD
1334	24	6.52	751	69.1	CLEAR	TRACE
1337	35	6.53	749	68.7	CLEAR	TRACE

D. O. (ppm): NR ODOR: None

COLOR (visual): NR (COBALT 0 - 500)

TURBIDITY (visual): NR (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

✓ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
✓ Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: 08-22-95 Time: 1235 Meter Serial #: 9020 Temperature °F: 78

(EC 1000 1003/1000) (DI ___) (pH 7 6.98/7.00) (pH 10 9.93/10.00) (pH 4 3.99/—)

Location of previous calibration: ___

Signature: ___ Reviewed By: SH Page 2 of 5

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217-01 SAMPLE ID: MW-3 (32)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2035

SAMPLED BY: J WILLIAMS LOCATION: ALBANY, CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 14.24

DEPTH TO WATER (feet): 11.19 CALCULATED PURGE (gal.): 42.74

DEPTH OF WELL (feet): 33.6 ACTUAL PURGE VOL. (gal.): 43

DATE PURGED: 08-22-95 Start (2400 Hr) 1419 End (2400 Hr) 1454

DATE SAMPLED: 08-22-95 Start (2400 Hr) — End (2400 Hr) 1458

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1422	15	6.49	802	65.8	BROWN	HEAVY
1426	29	6.59	807	66.2	BROWN	HEAVY
1434	43	6.62	802	66.9	BROWN	HEAVY

D. O. (ppm): NR ODOR: None NR (COBALT 0 - 500) NR (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
✓ Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: 8-22-95 Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-2

Signature: [signature] Reviewed By: [signature] Page 3 of 5

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-917-01 SAMPLE ID: MW-4 (24)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2035

SAMPLED BY: J WILLIAMS LOCATION: ALBANY, CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 5.40

DEPTH TO WATER (feet): 10.61 CALCULATED PURGE (gal.): 2820

DEPTH OF WELL (feet): 25.0 ACTUAL PURGE VOL. (gal.): 29

DATE PURGED: 08-22-95 Start (2400 Hr) 1516 End (2400 Hr) 1526

DATE SAMPLED: 08-22-95 Start (2400 Hr) — End (2400 Hr) 1531

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1519	9.5	6.29	386	72.3	BROWN	HEAVY
1523	19	6.34	533	70.2	BROWN	HEAVY
1526	29	6.40	528	70.1	BROWN	HEAVY

D. O. (ppm): NR ODOR: Hydrocarbon

COLOR (COBALT 0 - 500): NA

TURBIDITY (NTU 0 - 200 or 0 - 1000): NA

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
✓ Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: SD Page 4 of 5

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217.01 SAMPLE ID: RW-1

PURGED BY: J. Williams CLIENT NAME: ARCO #2035

SAMPLED BY: J. Williams LOCATION: Albany, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

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

DEPTH TO WATER (feet): 10.86 CALCULATED PURGE (gal.): ___

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

DATE PURGED: 8/22/95 Start (2400 Hr) ___ End (2400 Hr) ___

DATE SAMPLED: 8/22/95 Start (2400 Hr) ___ End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
		No Sample				
		Well Contained	Product			

D. O. (ppm): NR ODOR: ___ COLOR (COBALT 0 - 500): NR TURBIDITY (NTU 0 - 200 or 0 - 1000): NR

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)
___ Centrifugal Pump ___ Bailer (PVC)
___ Submersible Pump ___ Bailer (Stainless Steel)
___ Well Wizard™ ___ Dedicated
Other: NA

SAMPLING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)
___ DDL Sampler ___ Bailer (Stainless Steel)
___ Dipper ___ Submersible Pump
___ Well Wizard™ ___ Dedicated
Other: NA

WELL INTEGRITY: Good LOCK #: ___

REMARKS: .02' of product

Meter Calibration: Date: 8/22/95 Time: 12:35 Meter Serial #: 9020 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: Stu Potter for Joe Williams Reviewed By: ___ Page 5 of 5

APPENDIX B

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, THIRD QUARTER 1995, GROUNDWATER MONITORING EVENT

Columbia Analytical Services, Inc.

September 7, 1995

Service Request No: S951041

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-123.002 / TO# 17075.00 / 2035 Albany**

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on August 23, 1995. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above - to help expedite our service please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 10, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely:

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

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
Project: 0805-123.002 / TO #17075.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951041
Date Collected: 8/22/95
Date Received: 8/23/95
Date Extracted: NA

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

Sample Name:		**MW-2 (28)**	**MW-3 (32)**	**MW-4 (24)**
Lab Code:		S951041-001	S951041-002	S951041-003
Date Analyzed:		8/31/95	8/31/95	8/31/95
Analyte	**MRL**			
TPH as Gasoline	50	ND	ND	ND
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
Methyl-tert-butyl ether	3	ND	79	99

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.002 / TO #17075.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951041
Date Collected: 8/22/95
Date Received: 8/23/95
Date Extracted: NA

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

	Sample Name:	MW-1 (29)	Method Blank	Method Blank
	Lab Code:	S951041-004	S950830-WB	S950901-WB
	Date Analyzed:	9/1/95	8/30/95	9/1/95
Analyte	**MRL**			
TPH as Gasoline	50	780	ND	ND
Benzene	0.5	310	ND	ND
Toluene	0.5	<2.5 *	ND	ND
Ethylbenzene	0.5	12	ND	ND
Total Xylenes	0.5	<2.5 *	ND	ND
Methyl-tert-butyl ether	3	14	ND	ND

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON
Project: ARCO Products Company #2035/#17075.00
Sample Matrix: Water

Service Request: L953261
Date Collected: 8/22/95
Date Received: 8/23/95
Date Extracted: 8/24/95
Date Analyzed: 8/24/95

Total Recoverable Petroleum Hydrocarbons (TRPH)
EPA Method 418.1
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Result
MW-3	L953261-001	0.5	ND
Method Blank	L953261-MB	0.5	ND

1AMRL/120594

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.002 / TO #17075.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951041
Date Collected: 8/22/95
Date Received: 8/23/95
Date Extracted: NA
Date Analyzed: 8/30-9/1/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (28)	S951041-001	88
MW-3 (32)	S951041-002	91
MW-4 (24)	S951041-003	88
MW-1 (29)	S951041-004	96
MW-2 (28) MS	S951041-001MS	97
MW-2 (28) DMS	S951041-001DMS	98
Method Blank	S950830-WB	88
Method Blank	S950901-WB	92

CAS Acceptance Limits: 69-116

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.002 / TO #17075.00 / 2035 Albany

Service Request: S951041
Date Analyzed: 8/30/95

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.8	103	85-115
Toluene	25	24.7	99	85-115
Ethylbenzene	25	24.8	99	85-115
Xylenes, Total	75	72.1	96	85-115
Gasoline	250	232	93	90-110
Methyl-tert-butyl Ether	50	48.5	97	85-115

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.002 / TO #17075.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951041
Date Collected: 8/22/95
Date Received: 8/23/95
Date Extracted: NA
Date Analyzed: 8/30-9/1/95

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

Sample Name: MW-2 (28)
Lab Code: S051041-001

Analyte	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
Gasoline	250	250	ND	226	231	90	92	67-121	2

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Products Company #2035/#17075.00
LCS Matrix: Water

Service Request: L953261
Date Collected: NA
Date Received: NA
Date Extracted: 8/24/95
Date Analyzed: 8/24/95

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary*
Total Recoverable Petroleum Hydrocarbons (TRPH)
EPA Method 418.1
Units: mg/L (ppm)

Analyte	True Value		Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference
	LCS	DLCS	LCS	DLCS	LCS	DLCS		
TRPH	2.10	2.10	1.89	2.03	90	97	75-125	7

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

DLCS/032395

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 17015.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 453-0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood San Jose, CA 95131		Contract number

Method of shipment: Sampler will deliver

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 + MTBE	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-2(28)	1	2		X		X	HCl		1342		X									
MW-3(32)	2	4		X		X	HCl	8-22	1438		X			X						
MW-4(24)	3	2		X		X	HCl		1531		X									
MW-1(29)	4	2		X		X	HCl		1608		X									
RW-1( )		2		X		X	HCl	NO SAMPLE			X									

Special detection Limit/reporting: Lowest Possible
MTBE by 8020

Special QA/QC: As Normal

Remarks: 2 40ml HCL VOAs
2 1 liter HCL Glass (MW-3)

#0805-173.002

Lab number: 2953261 / 5950104 /

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

Condition of sample: Intact

Temperature received: Cool

	Date	Time		Date	Time
Relinquished by sampler: Joe Ruh	8-23	0922	Received by: Joanne Brown CAS-SG		
Relinquished by:			Received by:		
Relinquished by: Joanne Brown	8-23-95	1700	Received by laboratory:	8-24-95	0900

CAS-S: 6 BTEX CAS-L: 418.1

Due 9/7

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

APPC-3292 (2-91)

APPENDIX C

FIELD DATA SHEETS, SVE SYSTEM OPERATION AND MAINTENANCE VISITS, THIRD QUARTER 1995

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Soil Vapor Extraction System . EMCON Project # 0805-123.02

Remarks: System on & running fault readings changed temp. chart Para-Fax hasn't been sending faxes – light shows its on – sent Sent Test FAX – OK

Unscheduled site visit [X] Scheduled site visit []

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

Arrival Time (24:00 hour)	1050	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	701
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Total Flow (3") (cfm) (before blower-same as Para-Fax)	50-58
Reading Time (24:00 hour)	1159	Fire Box Temperature (°F)	654
Well Field WF-1 (3")		Set Point (°F)	650
Vacuum (in. of H2O)	33.2-33.6	TOTAL HOURS	4663.56
Velocity (ft/min)	300-600	Electric Meter (kwh)	07854
Temperature (°F)	71	Natural Gas (cf)	1775
Aeration Tank AT-1 (2")			
Vacuum (in. of H2O)	20		
Velocity (ft/min)	1700		
Flow (scfm)	46-47		
After Blower I-2 (4") (AFTER DILUTION)			
Total Pressure (in. of H2O)	.25		
Total Flow (in. of H2O)	.01		
Influent I-1 (3") (BEFORE DILUTION)			
Vacuum (in. of H2O)	33.2-33.6		
Velocity (ft/min)	850-900		

AIR MONITORING

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:						

PID (ppm)	CAL GAS:					
Date:						
Date:						

Lab samples taken for analysis at: none

PARA-FAX on/off ON

Cleaned K.O. pump pre-filter ? yes/no NO

WELL FIELD

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

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

Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m^3. Report O_2 and CO_2 in % by volume.

Operator: Middleton Date: 6/30/95

Project# 0805-123.02

ARCO 2035 Soil Vapor Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Soil Vapor Extraction System . EMCON Project # 0805-123.02

Remarks: System on & running upon arrival . Took readings . Took samples of E-1 & I-1 System is running OK No changes made to well field

Unscheduled site visit [] Scheduled site visit [X]

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

Arrival Time (24:00 hour)	1630	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	659
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Total Flow (3") (cfm) (before blower-same as Para-Fax)	48-54
Reading Time (24:00 hour)	1744	Fire Box Temperature (°F)	648
Well Field WF-1 (3")		Set Point (°F)	650
Vacuum (in. of H2O)	33.6	TOTAL HOURS	4909.27
Velocity (ft/min)	400-700	Electric Meter (kwh)	08791
Temperature (°F)	80	Natural Gas (cf)	1852
Aeration Tank AT-1 (2")		**AIR MONITORING**	
Vacuum (in. of H2O)	20.7		
Velocity (ft/min)	1750		
Flow (scfm)	48		
After Blower I-2 (4") (AFTER DILUTION)	Dilution closed	**PID (ppm)** CAL GAS:	
Total Pressure (in. of H2O)	.25		
Total Flow (in. of H2O)	.01		
Influent I-1 (3") (BEFORE DILUTION)		**Lab samples taken for analysis at:**	I-1 & E-1
Vacuum (in. of H2O)	33.6	**PARA-FAX on/off**	ON
Velocity (ft/min)	1200-1600	**Cleaned K.O. pump pre-filter ? yes/no**	No

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:						
Date:						
Date:						

WELL FIELD

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

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

Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m³. Report O_2 and CO_2 in % by volume.

Operator: MHeller Date: 7/10/95

Project# 0805-123.02

ARCO 2035 Soil Vapor Extraction System

Remarks: * System on upon arrival but there was no flow thru system. Auto dilution valve was open but showed closed on the control panel. Closed valve but still no flow - Unit went down with blower failure - It would not restart

Unscheduled site visit [] Scheduled site visit [X]

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

Arrival Time (24:00 hour)	1259	**Effluent (E-1) (12"x12")**	
System Status (on or off) *	ON	Stack Temperature (°F)	
Shutdown Time (24:00 hour)	1400	**SYSTEM**	
Restart Time (24:00 hour)	—	Total Flow (3") (cfm) (before blower-same as Para-Fax)	
Reading Time (24:00 hour)	1332	Fire Box Temperature (°F)	
Well Field WF-1 (3")		Set Point (°F)	
Vacuum (in. of H2O)		TOTAL HOURS	5288.82
Velocity (ft/min)		Electric Meter (kwh)	10160
Temperature (°F)		Natural Gas (cf)	1990
Aeration Tank AT-1 (2")		**AIR MONITORING**	
Vacuum (in. of H2O)			
Velocity (ft/min)			
Flow (scfm)			
After Blower I-2 (4") (AFTER DILUTION)			
Total Pressure (in. of H2O)			
Total Flow (in. of H2O)			
Influent I-1 (3") (BEFORE DILUTION)			
Vacuum (in. of H2O)			
Velocity (ft/min)			

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:						

PID (ppm)	CAL GAS:					
Date:						
Date:						

Lab samples taken for analysis at:

PARA-FAX on/off

Cleaned K.O. pump pre-filter ? yes/no

WELL FIELD

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

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

Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m^3. Report O_2 and CO_2 in % by volume.

Operator: Miller Date: 7/26/95

Project# 0805-123.02

ARCO 2035 Soil Vapor Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Soil Vapor Extraction System . EMCON Project # 0805-123.02

The problem with the unit is that the manual locktight valve shows open when its actually closed - OK now

Remarks: Restarted system at 1311 Total HRS = 5289.96 Ran up vacuum to 60" wtr at WF-1 500-600 FPM (3") Both inlet & stack temps rise quickly opened all wells WF-1 = 1000 FPM @ 40" wtr & Aeration Tank off unit shutdown High Temp 1250°. Adjusted & restarted WF-1 = 1200 FPM @ 50-52" wtr Aeration Tank = 320F. After 1hr. readjusted WF-1 = 1250 FPM @ 56" wtr Aear. Tank = 320 F

Unscheduled site visit [] Scheduled site visit [X]

SYSTEM PARAMETERS (Therm Tech Model VAC-10 thermal/catalytic oxidizer) Δ Temp = 420°

Arrival Time (24:00 hour)	1159	**Effluent (E-1) (12"x12")**	
System Status (on or off)	OFF	Stack Temperature (°F)	1011
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	1311	Total Flow (3") (cfm) (before blower-same as Para-Fax)	90-96
Reading Time (24:00 hour)	1451	Fire Box Temperature (°F)	625
Well Field WF-1 (3")		Set Point (°F) Changed from 650° to 625°	625
Vacuum (in. of H2O)	50.9-52.1	TOTAL HOURS	5291.58
Velocity (ft/min)	1400-1500	Electric Meter (kwh)	10223
Temperature (°F)	79	Natural Gas (cf)	1998
Aeration Tank AT-1 (2")			
Vacuum (in. of H2O)	18.3		
Velocity (ft/min)	1500		
Flow (scfm)	31-32		
After Blower I-2 (4") (AFTER DILUTION)	Dilution closed		
Total Pressure (in. of H2O)	.60		
Total Flow (in. of H2O)	.05		
Influent I-1 (3") (BEFORE DILUTION)	Dilution Closed		
Vacuum (in. of H2O)	53.3		
Velocity (ft/min)	1900-2000		

AIR MONITORING

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:						
PID (ppm)	CAL GAS:					
Date:						
Date:						

Lab samples taken for analysis at: WF-1 I-1 AT-1 E-1

PARA-FAX on/off: ON

Cleaned K.O. pump pre-filter ? yes/no: Yes

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H2O)	FID (ppm)	PID (ppm)	Bubbler (on/off)	Remarks
VW-1	4"	5'-17'			Full Open	47.0			NA	
VW-2	4"	5'-17'			↓	46.0			NA	
VW-3	4"	4.5'-9.5'			↓	47.0			NA	
VW-4	4"	5'-17'			↓	47.0			NA	
VW-5	4"	4.5'-14.5'			↓	45-47			NA	
VW-6	4"	5'-12.5'			↓	35-36			NA	
VW-7	4"	5'-15'			↓	46-47			NA	
VW-8	4"	5'-15'			↓	47.0			NA	
VW-9	4"	5'-15'			↓	44.5			NA	
RW-1	6"	11'-26'			↓	49.0			OFF	
AS-1 (vent)	2"	5'-15'			↓	44.5			OFF	
AS-2 (vent)	2"	5'-15'			↓				OFF	

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (ppm)	REMARKS
AS-1	2"	28.3'-30.3'			CLOSED	0	0		
AS-2	2"	28.8'-30.8'			CLOSED	0	0		

Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m³. Report O_2 and CO_2 in % by volume.

Operator: MAdler Date: 9/8/95

Project# 0805-123.02

ARCO 2035 Soil Vapor Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Soil Vapor Extraction System . EMCON Project # 0805-123.02

Remarks: System on & running upon arrival Total HRS = 5840.16 @ 11:36
Turned Well field back on @ 12:00 Sampled E-1 & I-1
Removed Dwyer gauge on WF-1 line - gauge damaged by moisture

Unscheduled site visit [] Scheduled site visit [X]

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

Arrival Time (24:00 hour)	1059	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	950
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Total Flow (3") (cfm) (before blower-same as Para-Fax)	7100
Reading Time (24:00 hour)	~~1256~~ 1256	Fire Box Temperature (°F)	625
Well Field WF-1 (3")		Set Point (°F)	625
Vacuum (in. of H2O)	42.0	TOTAL HOURS	5841.50
Velocity (ft/min)	1700	Electric Meter (kwh)	12385
Temperature (°F)	73	Natural Gas (cf)	2352
Aeration Tank AT-1 (2")		**AIR MONITORING**	
Vacuum (in. of H2O)	19.3		
Velocity (ft/min)	1500		
Flow (scfm)	30		
After Blower I-2 (4") (AFTER DILUTION)	Dilution Closed		
Total Pressure (in. of H2O)	1.0		
Total Flow (in. of H2O)	.065		
Influent I-1 (3") (BEFORE DILUTION)			
Vacuum (in. of H2O)	42.8-43.0		
Velocity (ft/min)	2600		

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:						

PID (ppm) CAL GAS:

Date:						
Date:						

Lab samples taken for analysis at: I-1 E-1

PARA-FAX on/off ON

Cleaned K.O. pump pre-filter ? yes/no NO

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H2O)	FID (ppm)	PID (ppm)	Bubbler (on/off)	Remarks
VW-1	4"	5'-17'							NA	
VW-2	4"	5'-17'							NA	
VW-3	4"	4.5'-9.5'	Will check for product						NA	
VW-4	4"	5'-17'							NA	
VW-5	4"	4.5'-14.5'	on next visit. Were gal						NA	
VW-6	4"	5'-12.5'							NA	
VW-7	4"	5'-15'	Some good flow now. I						NA	
VW-8	4"	5'-15'							NA	
VW-9	4"	5'-15'	Called Sailaja and she						NA	
RW-1	6"	11'-26'	wanted to make changes after next							
AS-1 (vent)	2"	5'-15'								
AS-2 (vent)	2"	5'-15'	Weeks.							

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

Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m^3. Report O_2 and CO_2 in % by volume.

Operator: MAHler Date: 5/31/95

Project# 0805-123.02
ARCO 2035 Soil Vapor Extraction System

Remarks: System on upon arrival • Took readings • Took product & water level in vapor & sparge wells. Put ports in well piping in vault box to take velocity readings. Took well PID readings Changed chart paper. Bailed product + (See Field Report)

Unscheduled site visit [] Scheduled site visit [X]

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

Arrival Time (24:00 hour)	0828	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	683
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Total Flow (3") (cfm) (before blower-same as Para-Fax)	>100
Reading Time (24:00 hour)	0902	Fire Box Temperature (°F)	633
Well Field WF-1 (3")		Set Point (°F)	625.
Vacuum (in. of H2O) 28.5	[illegible]	TOTAL HOURS	6125.60
Velocity (ft/min)	2800	Electric Meter (kwh)	13557
Temperature (°F)	70	Natural Gas (cf)	2517
Aeration Tank AT-1 (2")			
Vacuum (in. of H2O)	14.7		
Velocity (ft/min)	1500		
Flow (scfm)	28		
After Blower I-2 (4") (AFTER DILUTION)			
Total Pressure (in. of H2O)	140		
Total Flow (in. of H2O)	.095-.10		
Influent I-1 (3") (BEFORE DILUTION)			
Vacuum (in. of H2O)	30.7-31.0		
Velocity (ft/min)	3500		

AIR MONITORING

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:		499				

PID (ppm)	CAL GAS:					
Date:						
Date:						

Lab samples taken for analysis at:	
PARA-FAX on/off	ON
Cleaned K.O. pump pre-filter ? yes/no	No

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW[1] (feet)	Valve Position (% open)	Vacuum (in. of H2O)	FID (ppm)	PID (ppm)	Bubbler (on/off)	Remarks
VW-1	4"	5'-17'	8.89	9.10	Full on	26.7		3390	NA	Velocity (FPM) 2½" 100
VW-2	4"	5'-17'	10.07	10.37	↓	26.5		2332	NA	150-200
6.95 VW-3	4"	4.5'-9.5'	ND	DRY		25.6		263	NA	2500
VW-4	4"	5'-17'	Sheen	8.19		26.3		1736	NA	50-75
VW-5	4"	4.5'-14.5'	ND	9.70	↓	26.2		243	NA	400-450
VW-6	4"	5'-12.5'	ND	6.90	Full on	27.7		587	NA	25 (2½")
VW-7	4"	5'-15'	9.34	9.85	↓	25.5		1297	NA	75-100
VW-8	4"	5'-15'	ND	8.96	Full on	26.2		830	NA	<25
VW-9	4"	5'-15'	ND Sheen	6.24	↓	25.3		566	NA	950-1000
RW-1	6"	11'-26'	18.09	18.10	↓	26.3		1072		500
AS-1 (vent)	2"	5'-15'	9.01	9.18	Full on	26.6		2522	oily	Dark, thick product
8.17 AS-2 (vent)	2"	5'-15'	ND	DRY						150-200

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (ppm)	REMARKS
AS-1	2"	28.3'-30.3'	ND	12.64	CLOSED	0	0		
9.10 AS-2	2"	28.8'-30.8'	ND	DRY	CLOSED	0	0		

12.35 Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m³. Report O_2 and CO_2 in % by volume.

Operator: MAdler Date: 9/12/95

Project# 0805-123.02

ARCO 2035 Soil Vapor Extraction System

EMCON

Operation and Maintenance Field Report

Bailed product from all wells containing Product except RW-1 & VW-4

Well ID	Product thickness (ft.)	Product recovered (ml.)
VW-1	.21	500 ml.
RW-2	.30	690
VW-7	.51	1190
AS-1 (vent)	.17	100
RW-1	.01	0
VW-4	Sheen	0

All product was dark brown in color, thick & slightly oily it sticks to the bailer sides.

Wells VW-3 & AS-2 (vent) are dry - they have a tan very fine clayish silt in them

VW-3 T.D. = 6.95' AS-2 (vent) = 8.17'

NAME Mark Adler

DATE 9/12/95

PROJECT NAME AACO 2035

PROJECT NUMBER 0805-123.02

emcon

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Soil Vapor Extraction System . EMCON Project # 0805-123.02

Remarks: ON upon arrival but unit had 0 flow. Found manual well field lock tight valve showing open but it was closed. Influent gauges all showed no vacuum. Inlet temp = 1200° Reset lock tight and confirmed flow - OK now but and's pressure switch did Unscheduled site visit [X] shut down Scheduled site visit [] the system.

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

Arrival Time (24:00 hour)	1435
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	1440
Reading Time (24:00 hour)	1443
Well Field WF-1 (3")	
Vacuum (in. of H2O)	32.5
Velocity (ft/min)	3400
Temperature (°F)	73
Aeration Tank AT-1 (2")	
Vacuum (in. of H2O)	17.4
Velocity (ft/min)	1400
Flow (scfm)	29
After Blower I-2 (4") (AFTER DILUTION)	Dilution Closed
Total Pressure (in. of H2O)	1.5
Total Flow (in. of H2O)	.13 - .135
Influent I-1 (3") (BEFORE DILUTION)	
Vacuum (in. of H2O)	35.7
Velocity (ft/min)	3500

Effluent (E-1) (12"x12")	
Stack Temperature (°F)	~~608~~ 746
SYSTEM	
Total Flow (3") (cfm) (before blower-same as Para-Fax)	>100
Fire Box Temperature (°F)	625
Set Point (°F)	625
TOTAL HOURS	6298.56
Electric Meter (kwh)	
Natural Gas (cf)	

AIR MONITORING

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:						
PID (ppm)	CAL GAS:					
Date:						
Date:						

Lab samples taken for analysis at:	
PARA-FAX on/off	ON
Cleaned K.O. pump pre-filter ? yes/no	

WELL FIELD

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

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

Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m^3. Report O_2 and CO_2 in % by volume.

Operator: M Adler Date: 9/19/95

Project# 0805-123.02

ARCO 2035 Soil Vapor Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Soil Vapor Extraction System . EMCON Project # 0805-123.02

Remarks: Clean System on upon arrival . Therm Tech (Greg Prado) arrived & repaired Well field lock tight valve : He couldnt repair pressure switch (He brought the wrong one) AS-1 AS-2 vent common = 26" wtr at 150-200 FPM

Unscheduled site visit [] Scheduled site visit [X] Took PID's & samples at wells

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

Arrival Time (24:00 hour)	1405	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	673
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Total Flow (3") (cfm) (before blower-same as Para-Fax)	>100
Reading Time (24:00 hour)	1735	Fire Box Temperature (°F)	620
Well Field WF-1 (3")		Set Point (°F)	620
Vacuum (in. of H2O)	34	TOTAL HOURS	6515.57
Velocity (ft/min)	3400	Electric Meter (kwh)	15290
Temperature (°F)	70	Natural Gas (cf)	2801
Aeration Tank AT-1 (2")		**AIR MONITORING**	
Vacuum (in. of H2O)	19.5		
Velocity (ft/min)	1400		
Flow (scfm)	27		
After Blower I-2 (4") (AFTER DILUTION)		**PID (ppm)** CAL GAS:	
Total Pressure (in. of H2O)	1.5		
Total Flow (in. of H2O)	.14		
Influent I-1 (3") (BEFORE DILUTION)		**Lab samples taken for analysis at:** I-1 E-1 WF-1 All wells	
Vacuum (in. of H2O)	39.0	**PARA-FAX on/off**	ON
Velocity (ft/min)	3600	**Cleaned K.O. pump pre-filter ? yes/no**	NC

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:						

PID (ppm)	CAL GAS:				
Date:					
Date:					

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (In. of H2O)	FID (ppm)	PID (ppm)	Bubbler (on/off)	Remarks Flow FPM 2½"
VW-1	4"	5'-17'			ON	30		1498	NA	150
VW-2	4"	5'-17'			ON	29		1075	NA	200-350
VW-3	4"	4.5'-9.5'			ON	26		235	NA	3900
VW-4	4"	5'-17'				30		911	NA	25
VW-5	4"	4.5'-14.5'				30		301	NA	75
VW-6	4"	5'-12.5'				32		230	NA	25 (2½")
VW-7	4"	5'-15'				30		941	NA	25
VW-8	4"	5'-15'				29		956	NA	25
VW-9	4"	5'-15'				25		393	NA	150
RW-1	6"	11'-26'				31		921		50-150
AS-1 (vent)	2"	5'-15'				26.5		1213		75-125
* AS-2 (vent)	2"	5'-15'				26		1183		50-75

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

Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m³. Report O_2 and CO_2 in % by volume.

Operator: MAdlun Date: 9/28/95

Project# 0805-123.02
ARCO 2035 Soil Vapor Extraction System

Remarks: Took readings again after readjusting the system. Closed AS-2 vent & VW-3 - Readjusted System.

Unscheduled site visit [] Scheduled site visit []

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

Arrival Time (24:00 hour)		**Effluent (E-1) (12"x12")**	
System Status (on or off)		Stack Temperature (°F)	750
Shutdown Time (24:00 hour)		**SYSTEM**	
Restart Time (24:00 hour)		Total Flow (3") (cfm) (before blower-same as Para-Fax)	98-100
Reading Time (24:00 hour)	19:35	Fire Box Temperature (°F)	620
Well Field WF-1 (3")		Set Point (°F)	620
Vacuum (in. of H2O)	43	TOTAL HOURS	6517.57
Velocity (ft/min)	1400	Electric Meter (kwh)	
Temperature (°F)	68	Natural Gas (cf)	
Aeration Tank AT-1 (2")			
Vacuum (in. of H2O)	20		
Velocity (ft/min)	1500		
Flow (scfm)	30		
After Blower I-2 (4") (AFTER DILUTION)			
Total Pressure (in. of H2O)	.5		
Total Flow (in. of H2O)	.05		
Influent I-1 (3") (BEFORE DILUTION)			
Vacuum (in. of H2O)	44		
Velocity (ft/min)	1900		

AIR MONITORING

FID (ppm)	Amb	WF-1	AT-1	I-1	I-2	E-1
Date:						

PID (ppm)	CAL GAS:					
Date:						
Date:						

Lab samples taken for analysis at:

PARA-FAX on/off CW

Cleaned K.O. pump pre-filter ? yes/no

WELL FIELD

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

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

Total Sparge Data

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

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form. Request all TPHG,BTEX, and Benzene results in mg/m³. Report O_2 and CO_2 in % by volume.

Operator: MAdler Date: 9/28/95

Project# 0805-123.02

ARCO 2035 Soil Vapor Extraction System

APPENDIX D

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, SVE SYSTEM AIR SAMPLES, THIRD QUARTER 1995

Columbia
Analytical
Services inc.

July 25, 1995

Service Request No. S950866

Ms. Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **ARCO Facility No. 2035 / EMCON Project No. 0805-123.02**

Dear Ms. Yelamanchili:

Attached are the results of the vapor sample(s) submitted to our lab on July 11, 1995. For your reference, these analyses have been assigned our service request number S950866.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

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:	EMCON	**Service Request:**	S950866
Project:	ARCO Facility No. 2035/EMCON Project No. 0805-123.02	**Date Collected:**	7/10/95
Sample Matrix:	Vapor	**Date Received:**	7/11/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**E-1**	**I-1**	**Method Blank**
Lab Code:	S950866-001	S950866-002	S950712-VB1
Date Analyzed:	7/12/95	7/12/95	7/12/95

Analyte	**MRL**			
Benzene	0.5	ND	14	ND
Toluene	0.5	0.7	23	ND
Ethylbenzene	0.5	ND	8.1	ND
Total Xylenes	1	2	56	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	ND	ND	ND
C_5 - C_8 Hydrocarbons	20	ND	280	ND
C_9 - C_{12} Hydrocarbons	20	ND	200	ND
Gasoline Fraction (C_5-C_{12})	60	ND	480	ND

Approved By: _____ Date: 7/25/95

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Facility No. 2035/EMCON Project No. 0805-123.02
Sample Matrix: Vapor

Service Request: S950866
Date Collected: 7/10/95
Date Received: 7/11/95
Date Extracted: NA
Date Analyzed: 7/12/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: I-1
Lab Code: S950866-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	13.8	14.6	14.2	6
Toluene	0.5	22.9	24.3	23.6	6
Ethylbenzene	0.5	8.1	8.5	8.3	5
Xylenes, Total	1	56.3	59.2	57.8	5
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	ND	ND	ND	<1
C_5 - C_8 Hydrocarbons	20	282	300	291	6
C_9 - C_{12} Hydrocarbons	20	197	212	204	7
Gasoline Fraction (C_5-C_{12})	60	479	512	496	7

Approved By: Steve Green Date: 7/25/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Facility No. 2035/EMCON Project No. 0805-123.02

Service Request: S950866
Date Analyzed: 7/12/95

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

Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	16	17.0	106	85-115
Toluene	16	16.9	106	85-115
Ethylbenzene	16	16.6	104	85-115
Xylenes, Total	48	50.2	105	85-115
Gasoline	200	199	100	90-110

Approved By: Steve Green Date: 7/25/95

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) S. Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 377-8697	Telephone no. (Consultant) 4084537300	Fax no. (Consultant) 4084530452
Consultant name EMCON	Address (Consultant) 1921 Ringwood San JOSE, CA.		Contract number 07077

Method of shipment: Tech

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other (Vapor)	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 Gas	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
E-1	1	1			X			7/10/95	1755		X											
I-1	2	1			X			7/10/95	1801		X											

Special detection Limit/reporting: please report results in mg/m³

Special QA/QC

Remarks: 0805-123.02

Lab number: 5950866

Turnaround time

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

Condition of sample: Iced		Temperature received: RT	
Relinquished by sampler	Date 7/11/95 Time 0825	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory Joanne Brown	Date 7-11-95 Time 0825

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

APPC-3292 (2-91)

Due 7/25

Columbia Analytical Services inc.

August 24, 1995

Service Request No: S950983

Ms. Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-123.02 / TO# 8121.00 / 2035 Albany**

Dear Ms. Yelamanchili:

The following pages contain analytical results for sample(s) received by the laboratory on August 9, 1995. 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 Service Request No. S950983 - to help expedite our service please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 10, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely:

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

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
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S950983
Date Collected: 8/8/95
Date Received: 8/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

	Sample Name:	E-1	AT-1	I-1
	Lab Code:	S950983-001	S950983-002	S950983-003
	Date Analyzed:	8/10/95	8/10/95	8/10/95
Analyte	**MRL**			
Benzene	0.5	3.2	6.1	69
Toluene	0.5	5.7	5.6	150
Ethylbenzene	0.5	2.1	0.8	66
Total Xylenes	1	13	8.2	360
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	ND	ND	<1,200 *
C_5 - C_8 Hydrocarbons	20	130	ND	4,300
C_9 - C_{12} Hydrocarbons	20	41	ND	1,300
Gasoline Fraction (C_5-C_{12})	60	170	ND	5,600

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S950983
Date Collected: 8/8/95
Date Received: 8/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

		Sample Name:	**WF-1**	**Method Blank**
		Lab Code:	S950983-004	S950810-VB
		Date Analyzed:	8/10/95	8/10/95
Analyte	**MRL**			
Benzene	0.5		55	ND
Toluene	0.5		110	ND
Ethylbenzene	0.5		43	ND
Total Xylenes	1		210	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20		<200 *	ND
C_5 - C_8 Hydrocarbons	20		3,700	ND
C_9 - C_{12} Hydrocarbons	20		890	ND
Gasoline Fraction (C_5-C_{12})	60		4,600	ND

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S950983
Date Collected: 8/8/95
Date Received: 8/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

	Sample Name:	E-1	AT-1	I-1
	Lab Code:	S950983-001	S950983-002	S950983-003
	Date Analyzed:	8/10/95	8/10/95	8/10/95
Analyte	**MRL**			
Benzene	0.1	1.0	1.9	22
Toluene	0.1	1.5	1.5	40
Ethylbenzene	0.1	0.5	0.2	15
Total Xylenes	0.2	3.1	1.9	83
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	ND	ND	<160 *
C_5 - C_8 Hydrocarbons	5	35	ND	1,200
C_9 - C_{12} Hydrocarbons	5	11	ND	360
Gasoline Fraction (C_5-C_{12})	15	47	ND	1,500

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S950983
Date Collected: 8/8/95
Date Received: 8/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

		Sample Name:	WF-1	Method Blank
		Lab Code:	S950983-004	S950810-VB
		Date Analyzed:	8/10/95	8/10/95
Analyte	**MRL**			
Benzene	0.1		17	ND
Toluene	0.1		30	ND
Ethylbenzene	0.1		9.9	ND
Total Xylenes	0.2		49	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5		<50 *	ND
C_5 - C_8 Hydrocarbons	5		1,000	ND
C_9 - C_{12} Hydrocarbons	5		240	ND
Gasoline Fraction (C_5-C_{12})	15		1,300	ND

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

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S950983
Date Collected: 8/8/95
Date Received: 8/9/95
Date Extracted: NA
Date Analyzed: 8/10/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: I-1
Lab Code: S950983-003

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	69.2	76.7	73.0	10
Toluene	0.5	150	159	154	6
Ethylbenzene	0.5	66.2	68.0	67.1	3
Xylenes, Total	1	359	375	367	4
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<1,200 *	<1,200 *	<1,200 *	<1
C_5 - C_8 Hydrocarbons	20	4,300	4,640	4470	8
C_9 - C_{12} Hydrocarbons	20	1,330	1,380	1355	4
Gasoline Fraction (C_5-C_{12})	60	5,630	6,020	5825	7

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

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S950983
Date Collected: 8/8/95
Date Received: 8/9/95
Date Extracted: NA
Date Analyzed: 8/10/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: I-1
Lab Code: S950983-003

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	21.7	24.0	22.8	11
Toluene	0.1	39.8	42.1	41.0	6
Ethylbenzene	0.1	15.2	15.6	15.4	3
Xylenes, Total	0.2	82.6	86.3	84.4	4
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	<100 *	<100 *	<100 *	<1
C_5 - C_8 Hydrocarbons	5	1,180	1,280	1230	8
C_9 - C_{12} Hydrocarbons	5	366	380	373	4
Gasoline Fraction (C_5-C_{12})	15	1,550	1,660	1,600	7

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

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany

Service Request: S950983
Date Analyzed: 8/10/95

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

Units: mg/m^3

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	16	16.2	101	85-115
Toluene	16	15.7	98	85-115
Ethylbenzene	16	14.7	92	85-115
Xylenes, Total	48	44.4	93	85-115
Gasoline	200	206	103	90-110

Note: ppmV = mg/m^3 x 24.45 (gas constant) / molecular weight (MW)]
MW Benzene = 78, Toluene = 92, Ethylbenzene = 106, Total Xylenes = 106
MW Gasoline = 89

[redacted] Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) S. Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 4083778697	Telephone no. (Consultant) 4084537300	Fax no. (Consultant) 4084530452
Consultant name EMCON	Address (Consultant) 1921 Ringwood San Jose, CA.		Contract number 07077

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 Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
E-1		1			X (Vapor)			8/8/95	1540		X											
AT-1		1			X				1545		X											
I-1		1			X				1550		X											
WF-1		1			X				1555		X											

Special detection Limit/reporting: please report all results in ppmv and mg/m³

Special QA/QC

Remarks: 0805-123.02

Lab number: 595-0983.

Turnaround time

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

Method of shipment: Tech

Condition of sample:		Temperature received: Room Temp	
Relinquished by sampler	Date 8/9/95 Time 8:40	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date 8/9/95 Time 8:40

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

APPC-3292 (2-91)

Due 8/22

Columbia Analytical Services inc.

September 19, 1995

Service Request No: S951133

Ms. Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-123.02 / TO# 8121.00 / 2035 Albany**

Dear Ms. Yelamanchili:

The following pages contain analytical results for sample(s) received by the laboratory on September 13, 1995. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above - to help expedite our service please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 10, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely:

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

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
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951133
Date Collected: 9/12/95
Date Received: 9/13/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**E-1**	**WF-1**	**I-1**
Lab Code:	S951133-001	S951133-002	S951133-003
Date Analyzed:	9/13/95	9/13/95	9/13/95

Analyte	**MRL**			
Benzene	0.5	ND	8.0	9.9
Toluene	0.5	0.6	23	28
Ethylbenzene	0.5	ND	13	16
Total Xylenes	1	2.3	100	120
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	ND	<100*	<100*
C_5 - C_8 Hydrocarbons	20	ND	610	760
C_9 - C_{12} Hydrocarbons	20	ND	410	540
Gasoline Fraction (C_5-C_{12})	60	ND	1,000	1,300

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951133
Date Collected: 9/12/95
Date Received: 9/13/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**Method Blank**
Lab Code:	S951133-VB
Date Analyzed:	9/13/95

Analyte	**MRL**	
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	1	ND
Total Volatile Hydrocarbons		
C_1 - C_4 Hydrocarbons	20	ND
C_5 - C_8 Hydrocarbons	20	ND
C_9 - C_{12} Hydrocarbons	20	ND
Gasoline Fraction (C_5-C_{12})	60	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951133
Date Collected: 9/12/95
Date Received: 9/13/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**E-1**	**WF-1**	**I-1**
Lab Code:	S951133-001	S951133-002	S951133-003
Date Analyzed:	9/13/95	9/13/95	9/13/95

Analyte	**MRL**			
Benzene	0.1	ND	2.5	3.1
Toluene	0.1	0.2	6.1	7.4
Ethylbenzene	0.1	ND	3.0	3.7
Total Xylenes	0.2	0.5	23	28
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	ND	<25*	<25*
C_5 - C_8 Hydrocarbons	5	ND	170	210
C_9 - C_{12} Hydrocarbons	5	ND	110	150
Gasoline Fraction (C_5-C_{12})	15	ND	280	360

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951133
Project:	0805-123.02 / TO# 8121.00 / 2035 Albany	**Date Collected:**	9/12/95
Sample Matrix:	Vapor	**Date Received:**	9/13/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**Method Blank**
Lab Code:	S951133-VB
Date Analyzed:	9/13/95

Analyte	**MRL**	
Benzene	0.1	ND
Toluene	0.1	ND
Ethylbenzene	0.1	ND
Total Xylenes	0.2	ND
Total Volatile Hydrocarbons		
C_1 - C_4 Hydrocarbons	5	ND
C_5 - C_8 Hydrocarbons	5	ND
C_9 - C_{12} Hydrocarbons	5	ND
Gasoline Fraction (C_5-C_{12})	15	ND

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951133
Date Collected: 9/12/95
Date Received: 9/13/95
Date Extracted: NA
Date Analyzed: 9/13/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: Batch QC
Lab Code: S951138-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	53	50	52	6
Toluene	0.5	190	190	190	<1
Ethylbenzene	0.5	43	42	42	2
Xylenes, Total	1	250	240	240	4
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<200 *	<200 *	<200 *	<1
C_5 - C_8 Hydrocarbons	20	1,900	1,800	1,800	5
C_9 - C_{12} Hydrocarbons	20	780	750	760	4
Gasoline Fraction (C_5-C_{12})	60	2,600	2,600	2,600	<1

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

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951133
Date Collected: 9/12/95
Date Received: 9/13/95
Date Extracted: NA
Date Analyzed: 9/13/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: Batch QC
Lab Code: S951138-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	17	16	16	6
Toluene	0.1	50	50	50	<1
Ethylbenzene	0.1	9.9	9.7	9.8	2
Xylenes, Total	0.2	58	55	56.5	5
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	<50 *	<50 *	<50 *	<1
C_5 - C_8 Hydrocarbons	5	520	500	510	4
C_9 - C_{12} Hydrocarbons	5	210	210	210	<1
Gasoline Fraction (C_5-C_{12})	15	720	720	720	<1

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

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany

Service Request: S951133
Date Analyzed: 9/13/95

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

Units: mg/m^3

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	16	18.4	115	85-115
Toluene	16	17.7	111	85-115
Ethylbenzene	16	16.2	101	85-115
Xylenes, Total	48	49.5	103	85-115
Gasoline	200	194	97	90-110

Note: ppmV = mg/m^3 x [24.45 (gas constant)/ molecular weight (MW)]
MW Benzene = 78, Toluene = 92, Ethylbenzene = 106, Total Xylenes = 106
MW Gasoline = 89

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) S. Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 4083778697	Telephone no. (Consultant) 4084537300	Fax no. (Consultant) 4084530452
Consultant name EMCON	Address (Consultant) 1921 Ringwood San Jose, CA.		Contract number 07077

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 M8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
E-1	1	1			X (Vapor)			9/12/95	1703		X											
WF-1	2	1			X			↓	1715		X											
I-1	3	1			X			↓	1708		X											

Method of shipment: Tech

Special detection Limit/reporting: please report results in mg/kg & ppmv

Special QA/QC

Remarks: 0805-12302

Lab number: S9501133

Turnaround time

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

Condition of sample:		Temperature received: Room Temp.	
Relinquished by sampler	Date 9/13/95 Time 0806	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

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

Due 9/27

Columbia Analytical Services, Inc.

September 28, 1995

Service Request No: S951089

Ms. Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-123.02 / TO# 8121.00 / 2035 Albany**

Dear Ms. Yelamanchili:

The following pages contain analytical results for sample(s) received by the laboratory on September 1, 1995. 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 6, 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

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

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: EMCON
Project: ARCO Products Company #2035/#0805-123.02
Sample Matrix: Air

Service Request: L953355
Date Collected: 8/31/95
Date Received: 9/1/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons*
Units: uL/L (ppmV)

	Sample Name:	E-1	I-1	Method Blank
	Lab Code:	L953355-001	L953355-002	L953355-MB
	Date Analyzed:	9/1/95	9/1/95	9/1/95
Analyte	**MRL**			
Benzene[1]	0.1	ND	18	ND
Toluene[1]	0.1	1.2	43	ND
Ethylbenzene[2]	0.1	0.3	16	ND
Total Xylenes[2]	0.2	2.7	110	ND
Total Volatile Hydrocarbons**	15	120	2500	ND
C1-C4 Hydrocarbons*	5	62	100	ND
C5-C8 Hydrocarbons*	5	48	1900	ND
C9-C12 Hydrocarbons*	5	13	540	ND
Total Volatile Hydrocarbons**[a]	15	61	2400	ND

1 Benzene and Toluene are included in the C_5-C_8 hydrocarbon fraction.

2 Ethylbenzene and Total Xylenes are included in the C_9-C_{12} hydrocarbon fraction due to the use of C_1-C_8 n-paraffins as the standard for Total Volatile Hydrocarbons.

* Total Volatile Hydrocarbons quantified using n-paraffins with a range of C_1-C_8.

** Result is rounded to two significant figures.

a Gasoline Fraction (C_5-C_{12})

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON
Project: ARCO Products Company #2035/#0805-123.02
Sample Matrix: Air

Service Request: L953355
Date Collected: 8/31/95
Date Received: 9/1/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons*
Units: mg/m^3

	Sample Name:	**E-1**	**I-1**	**Method Blank**
	Lab Code:	L953355-001	L953355-002	L953355-MB
	Date Analyzed:	9/1/95	9/1/95	9/1/95
Analyte	**MRL**			
Benzene[1]	0.5	ND	57	ND
Toluene[1]	0.5	4.5	160	ND
Ethylbenzene[2]	0.5	1.4	72	ND
Total Xylenes[2]	1.0	12	470	ND
Total Volatile Hydrocarbons**	60	260	12000	ND
C1-C4 Hydrocarbons*	20	120	400	ND
C5-C8 Hydrocarbons*	20	110	8800	ND
C9-C12 Hydrocarbons*	20	30	2500	ND
Total Volatile Hydrocarbons**[a]	60	140	11000	ND

1 Benzene and Toluene are included in the C_5-C_8 hydrocarbon fraction.

2 Ethylbenzene and Total Xylenes are included in the C_9-C_{12} hydrocarbon fraction due to the use of C_1-C_8 n-paraffins as the standard for Total Volatile Hydrocarbons.

* Total Volatile Hydrocarbons quantified using n-paraffins with a range of C_1-C_8.

** Result is rounded to two significant figures.

a Gasoline Fraction (C_5-C_{12})

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Products Company #2035/#0805-123.02
Sample Matrix: Air

Service Request: L953355
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/1/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons*
Units: uL/L (ppmV)

Sample Name: Batch QC
Lab Code: L953348-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	94.3	105	99.6	11
Toluene	0.1	446	495	470	10
Ethylbenzene	0.1	48.7	52.1	50.4	7
Total Xylenes	0.2	219	235	227	7
Total Volatile Hydrocarbon**	15	6900	8000	7400	15
C1-C4 Hydrocarbons*	5	175	201	188	14
C5-C8 Hydrocarbons*	5	5740	6560	6150	13
C9-C12 Hydrocarbons*	5	1020	1250	1140	20

* Total Volatile Hydrocarbons quantified using n-paraffins with a range of C1-C8.
** Result is rounded to two significant figures.

DUP1S/120594

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no.	2035
City (Facility)	Albany
Project manager (Consultant)	S. Yelamanchili
Laboratory name	CAS
ARCO engineer	Mike Whelan
Telephone no. (ARCO)	408 3778697
Telephone no. (Consultant)	408 4537300
Fax no. (Consultant)	408 4530452
Contract number	07077
Consultant name	Emcon
Address (Consultant)	1921 Ringwood San Jose, CA.
Method of shipment	Tech

2953355

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other (Vapor)	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 (Gas)	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐		
1 E-1		1			X			8/31/95	1306		X											
2 I-1		1			X			8/31/95	1311		X											

Special detection Limit/reporting
please report results in mg/m^3 & ppmV.

Special QA/QC

Remarks
0805-123.02

Lab number
2953355
S9501089

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

Condition of sample: Inflated
Temperature received: Ambient

	Date	Time		Date	Time
Relinquished by sampler: [signature]	9-1-95	0830	Received by: Joanne Brown		
Relinquished by			Received by		
Relinquished by: Joanne Brown	9-1-95	10:00	Received by laboratory: [signature]	9/1/95	4:00 pm

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

CAS-L: G BTEX   Due 9/18

Columbia Analytical Services, Inc.

October 12, 1995

Service Request No: S951222

Ms. Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-123.002 / TO# 8121.00 / 2035 Albany**

Dear Ms. Yelamanchili:

The following pages contain analytical results for sample(s) received by the laboratory on September 29, 1995. 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 17, 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

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

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
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

		Sample Name:	VW-1	VW-2	VW-3
		Lab Code:	S951222-001	S951222-002	S951222-003
		Date Analyzed:	9/30/95	9/30/95	9/29/95
Analyte	**MRL**				
Benzene	0.5		53	30	2
Toluene	0.5		100	59	10
Ethylbenzene	0.5		66	33	7
Total Xylenes	1		580	250	93
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20		<400 *	<400 *	<40 *
C_5 - C_8 Hydrocarbons	20		4,500	4,200	150
C_9 - C_{12} Hydrocarbons	20		1,900	1,400	500
Gasoline Fraction (C_5-C_{12})	60		6,400	5,500	650

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

		Sample Name:	VW-4	VW-5	VW-6
		Lab Code:	S951222-004	S951222-005	S951222-006
		Date Analyzed:	9/29/95	9/29/95	9/29/95
Analyte	**MRL**				
Benzene	0.5		41	11	5.9
Toluene	0.5		160	39	17
Ethylbenzene	0.5		45	13	8.5
Total Xylenes	1		400	130	68
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20		<200 *	<40 *	<40 *
C_5 - C_8 Hydrocarbons	20		2,300	500	550
C_9 - C_{12} Hydrocarbons	20		1,400	530	360
Gasoline Fraction (C_5-C_{12})	60		3,600	1,000	920

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	VW-7	VW-8	VW-9
Lab Code:	S951222-007	S951222-008	S951222-009
Date Analyzed:	9/29/95	9/29/95	9/29/95

Analyte	MRL			
Benzene	0.5	79	19	7
Toluene	0.5	130	27	38
Ethylbenzene	0.5	47	20	18
Total Xylenes	1	340	230	130
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	<200 *	<200 *	<100 *
C_5 - C_8 Hydrocarbons	20	3,700	6,200	1,100
C_9 - C_{12} Hydrocarbons	20	1,500	1,100	680
Gasoline Fraction (C_5-C_{12})	60	5,200	7,300	1,800

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951222
Project:	0805-123.02 / TO# 8121.00 / 2035 Albany	**Date Collected:**	9/28/95
Sample Matrix:	Vapor	**Date Received:**	9/29/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

		Sample Name:	**RW-1**	**AS-1(Vent)**	**AS-2(Vent)**
		Lab Code:	S951222-010	S951222-011	S951222-012
		Date Analyzed:	9/29/95	9/29/95	9/29/95
Analyte	**MRL**				
Benzene	0.5		33	51	50
Toluene	0.5		110	120	130
Ethylbenzene	0.5		46	61	47
Total Xylenes	1		350	510	360
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20		<200 *	<400 *	<400 *
C_5 - C_8 Hydrocarbons	20		2,500	3,500	4,200
C_9 - C_{12} Hydrocarbons	20		1,300	1,700	1,300
Gasoline Fraction (C_5-C_{12})	60		3,900	5,200	5,500

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**AS-1 & 2 Vent (Common)**
Lab Code:	S951222-013
Date Analyzed:	9/29/95

Analyte	**MRL**	
Benzene	0.5	53
Toluene	0.5	130
Ethylbenzene	0.5	56
Total Xylenes	1	440
Total Volatile Hydrocarbons		
C_1 - C_4 Hydrocarbons	20	<400 *
C_5 - C_8 Hydrocarbons	20	3,900
C_9 - C_{12} Hydrocarbons	20	1,500
Gasoline Fraction (C_5-C_{12})	60	5,400

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**Method Blank**	**Method Blank**
Lab Code:	S950929-VB	S950930-VB
Date Analyzed:	9/29/95	9/30/95

Analyte	**MRL**		
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	1	ND	ND
Total Volatile Hydrocarbons			
C_1 - C_4 Hydrocarbons	20	ND	ND
C_5 - C_8 Hydrocarbons	20	ND	ND
C_9 - C_{12} Hydrocarbons	20	ND	ND
Gasoline Fraction (C_5-C_{12})	60	ND	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

	Sample Name:	VW-1	VW-2	VW-3
	Lab Code:	S951222-001	S951222-002	S951222-003
	Date Analyzed:	9/30/95	9/30/95	9/29/95
Analyte	**MRL**			
Benzene	0.1	17	9	0.6
Toluene	0.1	27	16	2.7
Ethylbenzene	0.1	15	8	1.6
Total Xylenes	0.2	130	58	21
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	<100 *	<100 *	<10 *
C_5 - C_8 Hydrocarbons	5	1,200	1,200	41
C_9 - C_{12} Hydrocarbons	5	520	380	140
Gasoline Fraction (C_5-C_{12})	15	1,800	1,500	180

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

		Sample Name:	VW-4	VW-5	VW-6
		Lab Code:	S951222-004	S951222-005	S951222-006
		Date Analyzed:	9/30/95	9/30/95	9/29/95
Analyte	**MRL**				
Benzene	0.1		13	3	1.9
Toluene	0.1		42	10	4.5
Ethylbenzene	0.1		10	3	2.1
Total Xylenes	0.2		92	30	16
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5		<50 *	<10 *	<10 *
C_5 - C_8 Hydrocarbons	5		630	140	150
C_9 - C_{12} Hydrocarbons	5		380	150	99
Gasoline Fraction (C_5-C_{12})	15		990	280	250

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	VW-7	VW-8	VW-9
Lab Code:	S951222-007	S951222-008	S951222-009
Date Analyzed:	9/29/95	9/29/95	9/29/95

Analyte	MRL			
Benzene	0.1	25	6	2
Toluene	0.1	34	7	10
Ethylbenzene	0.1	11	5	4
Total Xylenes	0.2	78	53	30
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	<50 *	<50 *	<30 *
C_5 - C_8 Hydrocarbons	5	1,000	1,700	300
C_9 - C_{12} Hydrocarbons	5	410	300	190
Gasoline Fraction (C_5-C_{12})	15	1,400	2,000	500

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**RW-1**	**AS-1(Vent)**	**AS-2(Vent)**
Lab Code:	S951222-010	S951222-011	S951222-012
Date Analyzed:	9/29/95	9/29/95	9/29/95

Analyte	**MRL**			
Benzene	0.1	10	16	16
Toluene	0.1	29	32	34
Ethylbenzene	0.1	11	14	11
Total Xylenes	0.2	81	120	83
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	<50 *	<100 *	<100 *
C_5 - C_8 Hydrocarbons	5	690	960	1,200
C_9 - C_{12} Hydrocarbons	5	360	470	360
Gasoline Fraction (C_5-C_{12})	15	1,100	1,400	1,500

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**AS-1 & 2 Vent (Common)**
Lab Code:	S951222-013
Date Analyzed:	9/29/95

Analyte	**MRL**	
Benzene	0.1	17
Toluene	0.1	34
Ethylbenzene	0.1	16
Total Xylenes	0.2	100
Total Volatile Hydrocarbons		
C_1 - C_4 Hydrocarbons	5	<100 *
C_5 - C_8 Hydrocarbons	5	1,100
C_9 - C_{12} Hydrocarbons	5	410
Gasoline Fraction (C_5-C_{12})	15	1,500

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**Method Blank**	**Method Blank**
Lab Code:	S950929-VB	S950930-VB
Date Analyzed:	9/29/95	9/30/95

Analyte	**MRL**		
Benzene	0.1	ND	ND
Toluene	0.1	ND	ND
Ethylbenzene	0.1	ND	ND
Total Xylenes	0.2	ND	ND
Total Volatile Hydrocarbons			
C_1 - C_4 Hydrocarbons	5	ND	ND
C_5 - C_8 Hydrocarbons	5	ND	ND
C_9 - C_{12} Hydrocarbons	5	ND	ND
Gasoline Fraction (C_5-C_{12})	15	ND	ND

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA
Date Analyzed: 9/29,30/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: VW-6
Lab Code: S951222-006

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	5.9	6.0	6.0	2
Toluene	0.5	17	17	17	<1
Ethylbenzene	0.5	8.5	8.0	8	6
Xylenes, Total	1	68	67	68	1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<40 *	<40 *	<40 *	<1
C_5 - C_8 Hydrocarbons	20	550	550	550	<1
C_9 - C_{12} Hydrocarbons	20	350	350	350	<1
Gasoline Fraction (C_5-C_{12})	60	920	900	910	2

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

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Vapor

Service Request: S951222
Date Collected: 9/28/95
Date Received: 9/29/95
Date Extracted: NA
Date Analyzed: 9/29,30/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: VW-6
Lab Code: S951222-006

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	1.9	1.9	1.9	<1
Toluene	0.1	4.5	4.5	4.5	<1
Ethylbenzene	0.1	2.1	1.8	2.0	15
Xylenes, Total	0.2	16	15	16	6
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	<10 *	<10 *	<10 *	<1
C_5 - C_8 Hydrocarbons	5	150	150	150	<1
C_9 - C_{12} Hydrocarbons	5	96	96	96	<1
Gasoline Fraction (C_5-C_{12})	15	250	250	250	<1

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

DUP1S/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) S. Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408-3778697	Telephone no. (Consultant) 408 453 7300	Fax no. (Consultant) 408 453 0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood	San Jose, CA.	Contract number 07077

Method of shipment: Tech

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other (Vapor)	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH Gas EPA Method 8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
VW-1		1			X			9/28/95	1849		X											
VW-2		1			X				1855		X											
VW-3		1			X				1858		X											
VW-4		1			X				1901		X											
VW-5		1			X				1907		X											
VW-6		1			X				1804		X											
VW-7		1			X				1904		X											
VW-8		1			X				1845		X											
VW-9		1			X				19:11		X											
RW-1		1			X				18:53		X											
AS-1 (vent)		1			X				18:42		X											
AS-2 (vent)		1			X				18:36		X											
AS-1&2 vent (Common)		1			X				18:28		X											
~~E-1~~		1			X						X											
~~I-1~~		1			X						X											
~~WF-1~~		1			X						X											

Special detection Limit/reporting: please report result in mg/m^3 & ppmv

Special QA/QC

Remarks: 20805-123.002

Lab number: 595-01222

Turnaround time

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

Condition of sample:

Temperature received:

	Date	Time	
Relinquished by sampler	9/29/95	8:15	Received by
Relinquished by			Received by
Relinquished by			Received by laboratory

Date: ____ Time: ____

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

Due 10/13

APPENDIX E

FIELD DATA SHEETS, GROUNDWATER TREATMENT SYSTEM, OPERATION AND MAINTENANCE VISITS, THIRD QUARTER 1995

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: System off upon arrival - Turned on by hitting reset switch - all OK Dont Knows why air was off
Met EBMUD on site sampled E-1 for EPA 624 & 625
EBMUD sampled for those parameters. No paper work was checked. He asked some general questions about the aeration Tank only

Unscheduled site visit [X] Scheduled site visit []

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1050
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	
Restart Time (24:00 hour)	1051
Reading Time (24:00 hour)	1100
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	
GAC-1 Pressure (psi)	21.0
GAC-2 Pressure (psi)	11.0
#1 Filter IN (psi)	4.0
#1 Filter OUT (psi)	3.0
#2 Filter IN (psi)	3.0
#2 Filter OUT (psi)	2.5
Air compressor run time (hrs)	64.7
Air compressor discharge (psi)	100
Regulated discharge (psi)	72
RW-1 RUN TIME (hrs)	94.7
TOTALIZER (gal)	40932.5

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?	X		
Change Bag Filters ?		X	
Check Scale Control Unit ?		X	
Check Aeration Tank Baffles ?		X	
Clean Pad ?		X	
Backwash Carbon Drums ?		X	

Notes:

SAMPLE PARAMETERS

SAMPLE LOCATION	TEMP (°F)	EC (umhos/cm)	pH (units)
E-1 (E) effluent	69.5	1105	7.16
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: [signature] Date: 6/30/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: System off upon arrival Down - High aeration tank . Back washed #1 carbon changed #2 filter

Had some trouble with #1 carbon leaking some - OK now - Carbon had air bubbles in it.

Restarted system at 17:09

Unscheduled site visit ☐ Scheduled site visit ☒

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	~~0830~~ 1630
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	17:09
Reading Time (24:00 hour)	17:09
RW-1 Ejection Pressure (psi)	NA
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	
GAC-1 Pressure (psi)	6.5
GAC-2 Pressure (psi)	4.5
#1 Filter IN (psi)	5.5
#1 Filter OUT (psi)	2.0
#2 Filter IN (psi)	~~10.0~~ 10.0
#2 Filter OUT (psi)	~~11.0~~ 11.0
Air compressor run time (hrs)	77.2
Air compressor discharge (psi)	140
Regulated discharge (psi)	60
RW-1 RUN TIME (hrs)	54.2
TOTALIZER (gal)	44810.6

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?	X	Aeration tank high	
Change Bag Filters ?	X	#2 only	
Check Scale Control Unit ?		X	
Check Aeration Tank Baffles ?		X	
Clean Pad ?		X	
Backwash Carbon Drums ?	X		

Notes:

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (°F)	EC (umhos/cm)	pH (units)
E-1 (E) effluent			
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: MAd/w Date: 7/10/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: System off on arrival to the site. Aeration Tank vac. Low

2 bumper posts rap into - one is slightly bent and one was out of the ground - I put it back in. Grommet for lock was broken & lock broken. Also 3 others had the locks broken off.

Unscheduled site visit ☐ Scheduled site visit ☒

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1259
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1303
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	
GAC-1 Pressure (psi)	
GAC-2 Pressure (psi)	
#1 Filter IN (psi)	
#1 Filter OUT (psi)	
#2 Filter IN (psi)	
#2 Filter OUT (psi)	
Air compressor run time (hrs)	
Air compressor discharge (psi)	
Regulated discharge (psi)	
RW-1 RUN TIME (hrs)	76.6
TOTALIZER (gal)	47039.2

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?	X		
Change Bag Filters ?			
Check Scale Control Unit ?			
Check Aeration Tank Baffles ?			
Clean Pad ?			
Backwash Carbon Drums ?			

Notes:

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (°F)	EC (umhos/cm)	pH (units)
E-1 (E) effluent			
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: MAdler Date: 7/26/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: System off on arrival
STARTED at Total HRS = 76.7
Total gallons = 47044.4
at 1423
Restarted after starting Thermo Tech.
Checked filter bags - OK
Took readings - Let system run
Took samples at E-1 I-3 I-2 I-1
System air supply Solenoid shut down once while I was on site. No alarms showed - I hit start and it opened up. I have no a clue what made it do that.

Unscheduled site visit [] Scheduled site visit [X]

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1157
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	1423
Reading Time (24:00 hour)	1438
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	5.5
GAC-1 Pressure (psi)	8
GAC-2 Pressure (psi)	4
#1 Filter IN (psi)	5
#1 Filter OUT (psi)	2
#2 Filter IN (psi)	12
#2 Filter OUT (psi)	12
Air compressor run time (hrs)	84.6
Air compressor discharge (psi)	100
Regulated discharge (psi)	50
RW-1 RUN TIME (hrs)	76.9
TOTALIZER (gal)	47044.4

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?		X	
Change Bag Filters ?		X	Used OK
Check Scale Control Unit ?		X	
Check Aeration Tank Baffles ?		X	
Clean Pad ?	X		
Backwash Carbon Drums ?		X	

Notes:
Groundwater system has been down because SVE unit was being repaired by Thermo Tech

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (°F)	EC (umhos/cm)	pH (units)
E-1 (E) effluent	74.5	852	7.10
I-3 (D) between carbon drums	72.8	865	7.31
I-2 after aeration tank	71.2	835	8.03
I-1 (A) influent	69.6	883	6.69

Special Instructions:
Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: MAdler Date: 8/8/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: Therm Tech on + running but Groundwater down - Alarm says high aeration Tank.

Total gallons = 47582 80.8 Total Hrs before startup

Cleaned leaves + Trash from pad.

System shut down 4 times during visit - absolute unknown reason - no alarms seen (all bubblers on pumps OK) Hit start button without hitting Reset fault condition + system came back on? Backwashing did increase flowrate thru carbon - now 10 gpm

Unscheduled site visit ☐ Scheduled site visit ☒

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1059
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	-
Restart Time (24:00 hour)	~~1229~~ 1159
Reading Time (24:00 hour)	~~0859~~ 1425
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	10.0
GAC-1 Pressure (psi)	9.0
GAC-2 Pressure (psi)	3.0
#1 Filter IN (psi)	4.5
#1 Filter OUT (psi)	2.0
#2 Filter IN (psi)	10
#2 Filter OUT (psi)	9.5
Air compressor run time (hrs)	85.6
Air compressor discharge (psi)	95
Regulated discharge (psi)	85
RW-1 RUN TIME (hrs)	82.9
TOTALIZER (gal)	47839

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?	✓	High	Tank
Change Bag Filters ?	✓	Changed	both
Check Scale Control Unit ?		✓	
Check Aeration Tank Baffles ?		✓	
Clean Pad ?	✓		
Backwash Carbon Drums ?	✓		

Notes:

Bag filters looked OK but I changed them anyway - Backwashed both carbon beds.

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (°F)	EC (umhos/cm)	pH (units)
E-1 (E) effluent			
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: MMoller Date: 8/31/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks:

System is off - No alarm seen air solenoid closed Compressor is on - 102 psi I will leave until Greg gets here so he can see it. *See Field Report*

Turned system back on at 10:20 but we were tuning it on + off till 13:30. System has kept running - only time will tell.

Sampled F-1(E) I-3(D) I-2 & I-1(A)

Total gallons = 58971 @ 17:57 Total HRS = 183.6

Unscheduled site visit ☐ Scheduled site visit ☒

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	0828
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	~~—~~ 10:20
Reading Time (24:00 hour)	0847
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	716921
RW-1 DTFP (ft)	18.09
RW-1 DTW (ft)	18.10
Transfer pump flow rate (gpm)	10.0
GAC-1 Pressure (psi)	6.0
GAC-2 Pressure (psi)	4.5
#1 Filter IN (psi)	~~10.0~~ 5.0
#1 Filter OUT (psi)	2.0
#2 Filter IN (psi)	~~11.0~~ 11.0
#2 Filter OUT (psi)	~~9.5~~ 9.5
Air compressor run time (hrs)	97.4
Air compressor discharge (psi)	105
Regulated discharge (psi)	80
RW-1 RUN TIME (hrs)	175.7
TOTALIZER (gal)	58062

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?		X	
Change Bag Filters ?		X	
Check Scale Control Unit ?		X	
Check Aeration Tank Baffles ?		X	
Clean Pad ?		X	
Backwash Carbon Drums ?		X	

Notes:

SAMPLE PARAMETERS

SAMPLE LOCATION	TEMP (°F)	EC (umhos/cm)	pH (units)
E-1 (E) effluent	65.7	881	7.88
I-3 (D) between carbon drums	66.5	821	7.88
I-2 after aeration tank	66.6	823	~~7.85~~ 7.75
I-1 (A) influent	68.5	839	7.65

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: MAdler Date: 9/12/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

EMCON

Operation and Maintenance Field Report

Ground water system was down again - Air solenoid closed
No alarms on
We found 2 ways to duplicate this scenario

1) Turn off power to system & turn back on.

2) Drop vacuum in aeration tank to trip pressure switch
The low aeration in vacuum alarm comes on & closes the air solenoid valve. But it shows alarm - then bring vacuum back up in aeration tank & alarm light turns off but air solenoid valve stays closed.

Everything appeared normal. - We opened up wiring junction boxes & sprayed with WD-40 to disperse any moisture.
Then taped over junction box.

I'll have to take up some silicone & seal around junction box/conduit entry points.

The containment switch needs replaced also - moisture in bulb.

Changed location of #4 Digital alarm on para-fax
It was low aeration tank Vac. - Now its across the ~~the~~ system control relay - So for what ever reason system shuts down it will call us. But its a N/C switch so the software will need to be changed.

The Thermal couple wires in place for ThermTech Temps can be used to take controller input-pins. - I'll need to get 20' of 20 or 18 gauge PVC jacketed wire (Twisted pair)

NAME Mark Adler

DATE 9/12/95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0805-123.02

emcon

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: System off upon arrival - Total HRS = 191.9
Met Brian Meador on site. Total gallons = 59,900

System in same condition as before - solenoid closed & no alarms on - We may have to eliminate the gem packs and go to something else.

Sent Test Fax

Unscheduled site visit [X] Scheduled site visit []

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1435
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	1455
Reading Time (24:00 hour)	1504
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	8.0
GAC-1 Pressure (psi)	6.25
GAC-2 Pressure (psi)	4.75
#1 Filter IN (psi)	5.0
#1 Filter OUT (psi)	2.0
#2 Filter IN (psi)	11.0
#2 Filter OUT (psi)	10.0
Air compressor run time (hrs)	98.5
Air compressor discharge (psi)	95
Regulated discharge (psi)	50
RW-1 RUN TIME (hrs)	192.1
TOTALIZER (gal)	59918

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?	X	No Alarms on	
Change Bag Filters ?		X	
Check Scale Control Unit ?		X	
Check Aeration Tank Baffles ?		X	
Clean Pad ?		X	
Backwash Carbon Drums ?		X	

Notes:

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (°F)	EC (umhos/cm)	pH (units)
E-1 (E) effluent			
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: MAdler Date: 9/19/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo A. .,Albany,Ca. Groundwater Extraction Syste.. . EMCON Project # 0805-123.02

Remarks:

Arrive system - system down = High Aeration Tank Level - Thought pump air locked (only doing 0.8 GPM) Spring loaded check valve stuck - Pump doing 9.5 GPM,

Unscheduled site visit [] Scheduled site visit []

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1330
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	1355
Reading Time (24:00 hour)	1407
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	—
RW-1 Strokes per minute	—
RW-1 Stroke counter	—
RW-1 DTFP (ft)	—
RW-1 DTW (ft)	—
Transfer pump flow rate (gpm)	9.5
GAC-1 Pressure (psi)	~~6~~ 6.5
GAC-2 Pressure (psi)	5.0
#1 Filter IN (psi)	~~7~~ 5.5
#1 Filter OUT (psi)	~~5~~ 3.0
#2 Filter IN (psi)	12
#2 Filter OUT (psi)	~~5~~ 10
Air compressor run time (hrs)	
Air compressor discharge (psi)	95
Regulated discharge (psi)	90
RW-1 RUN TIME (hrs)	
TOTALIZER (gal)	60503.8

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?	✓		
Change Bag Filters ?		✓	
Check Scale Control Unit ?	✓		
Check Aeration Tank Baffles ?		✓	
Clean Pad ?		✓	
Backwash Carbon Drums ?		✓	

Notes:

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (F)	EC	pH (units)
E-1 (E) effluent			
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: V. Whitten/E. Rath Date: 9-20-95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: System off upon arrival - Aeration Tank level High
Removed check valve after aeration tank & cleaned - found a wad of green "biogrowth" and the magnatek sticker off the level control float bulb blocking the check! Reinstalled OK now sent fax at 14:59

Unscheduled site visit X Scheduled site visit ☐

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1430
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	-
Restart Time (24:00 hour)	1445
Reading Time (24:00 hour)	1445
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	9.0
GAC-1 Pressure (psi)	6.0
GAC-2 Pressure (psi)	4.75
#1 Filter IN (psi)	5.0
#1 Filter OUT (psi)	2.0
#2 Filter IN (psi)	11.5
#2 Filter OUT (psi)	10.0
Air compressor run time (hrs)	99.3
Air compressor discharge (psi)	95
Regulated discharge (psi)	80
RW-1 RUN TIME (hrs)	198.6
TOTALIZER (gal)	60705

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?	✓	high level in aeration tank	
Change Bag Filters ?		X	
Check Scale Control Unit ?		X	
Check Aeration Tank Baffles ?		X	
Clean Pad ?		X	
Backwash Carbon Drums ?		X	

Notes:

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (F)	EC	pH (units)
E-1 (E) effluent			
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: Miller Date: 9/21/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: System off upon arrival. Grey installed chart recorder to record vacuum in aeration tank, changed (switched timer). Turned system on & let run in LOW VAC override.

Noticed low vac light flashing on very briefly and would flash on according to seconds set on timer.
Flash on then 10 secs OFF - with timer set at 10 sec

Left system in override with vac recorder ON

Unscheduled site visit [] Scheduled site visit [X]

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	
Restart Time (24:00 hour)	
Reading Time (24:00 hour)	17:06
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	8.0
GAC-1 Pressure (psi)	
GAC-2 Pressure (psi)	
#1 Filter IN (psi)	5.5
#1 Filter OUT (psi)	2.0
#2 Filter IN (psi)	12.0
#2 Filter OUT (psi)	9.5
Air compressor run time (hrs)	99.8
Air compressor discharge (psi)	105
Regulated discharge (psi)	75
RW-1 RUN TIME (hrs)	202.4
TOTALIZER (gal)	61161

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?	X	Unknown	
Change Bag Filters ?	X		
Check Scale Control Unit ?		X	
Check Aeration Tank Baffles ?		X	
Clean Pad ?		X	
Backwash Carbon Drums ?		X	

Notes:

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (F)	EC	pH (units)
E-1 (E) effluent			
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: MAdler Date: 9/28/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 0805-123.02

Remarks: System OFF upon arrival. * System shows no alarms but is off. The timer is out for 11 sec's & the aeration tank low vacuum light is flashing on for an instant every 11 sec. I left the low pressure override switch on but system still shut down. I removed Grego's vacuum chart recorder & brought chart back it showed no loss of vacuums.

Restarted system at 13:35

Unscheduled site visit [X] Scheduled site visit []

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	12:46
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	13:34
Reading Time (24:00 hour)	13:35
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	8.0
GAC-1 Pressure (psi)	6.0
GAC-2 Pressure (psi)	4.0
#1 Filter IN (psi)	5.0
#1 Filter OUT (psi)	1.5
#2 Filter IN (psi)	13.0
#2 Filter OUT (psi)	9.5
Air compressor run time (hrs)	100.2
Air compressor discharge (psi)	110
Regulated discharge (psi)	70
RW-1 RUN TIME (hrs)	205.6
TOTALIZER (gal)	61536

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip? * See note	X		
Change Bag Filters ?			
Check Scale Control Unit ?			
Check Aeration Tank Baffles ?			
Clean Pad ?			
Backwash Carbon Drums ?			

Notes:

SAMPLE PARAMETERS			
SAMPLE LOCATION	TEMP (F)	EC	pH (units)
E-1 (E) effluent			
I-3 (D) between carbon drums			
I-2 after aeration tank			
I-1 (A) influent			

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: MAellen Date: 9/29/95

Project # 0805-123.02
ARCO 2035 Groundwater Extraction System

ARCO 2035 . 1001 San Pablo Ave.,Albany,Ca. Groundwater Extraction System . EMCON Project # 20805-123.002

Remarks: System on upon arrival . Greg changed relays – looks good and is running good.

Regulator after Comp is fluctuating between 40-80 psi –

Speedaire 4Z546

Took readings & Took samples

Biogrowth (Green) found in bag after ~~Diesel~~ Aeration Tank

Unscheduled site visit ☐ Scheduled site visit ☒

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	14:45
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	14:54
RW-1 Ejection Pressure (psi)	
RW-1 Stroke volume (ml)	
RW-1 Strokes per minute	
RW-1 Stroke counter	
RW-1 DTFP (ft)	
RW-1 DTW (ft)	
Transfer pump flow rate (gpm)	8.0
GAC-1 Pressure (psi)	5.5
GAC-2 Pressure (psi)	3.0
#1 Filter IN (psi)	6.0
#1 Filter OUT (psi)	2.0
#2 Filter IN (psi)	19.0
#2 Filter OUT (psi)	7.5
Air compressor run time (hrs)	105.8
Air compressor discharge (psi)	110
Regulated discharge (psi)	50
RW-1 RUN TIME (hrs)	254.0
TOTALIZER (gal)	67161.6

SYSTEM CHECKLIST	Yes	No	Other
Alarm Trip?		X	
Change Bag Filters ?	X	Both changed	
Check Scale Control Unit ?		X	
Check Aeration Tank Baffles ?		X	
Clean Pad ?		X	
Backwash Carbon Drums ?		X	

Notes:

SAMPLE PARAMETERS

SAMPLE LOCATION	TEMP (°F)	EC (umhos/cm)	pH (units)
E-1 (E) effluent	66.7	652	7.99
I-3 (D) between carbon drums	66.8	652	7.93
I-2 after aeration tank	67.1	653	8.16
I-1 (A) influent	68.5	669	6.54

Special Instructions:

Use only ARCO chain-of-custody forms. Please include all analytical method numbers as requested on the chain-of-custody form.

Operator: Miller Date: 10/11/95

Project #20805-123.002
ARCO 2035 Groundwater Extraction System

APPENDIX F

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, GROUNDWATER TREATMENT SYSTEM, THIRD QUARTER 1995

Columbia Analytical Services INC.

August 21, 1995

Service Request No: S950984

Ms. Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-123.02 /TO# 8121.00 / 2035 Albany**

Dear Ms. Yelamanchili:

The following pages contain analytical results for sample(s) received by the laboratory on August 9, 1995. 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 Service Request No. S950984 - 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 7, 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

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

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:**	S950984
Project:	0805-123.02 / TO# 8121.00/ 2035 Albany	**Date Collected:**	8/8/95
Sample Matrix:	Water	**Date Received:**	8/9/95
		Date Extracted:	NA
		Date Analyzed:	8/15/95

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name / **Lab Code**					
E-1(E) S950984-001	ND	ND	ND	ND	ND
I-1(A) S950984-002	11,000	970	1,100	210	1,800
I-2 S950984-003	330	17	18	3.5	36
I-3(D) S950984-004	ND	ND	ND	ND	ND
Method Blank S950815-WB	ND	ND	ND	ND	ND

5ABTXGAS/061694

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00/ 2035 Albany
Sample Matrix: Water

Service Request: S950984
Date Collected: 8/8/95
Date Received: 8/9/95
Date Extracted: NA
Date Analyzed: 8/15/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
E-1(E)	S950984-001	94
I-1(A)	S950984-002	96
I-2	S950984-003	92
I-3(D)	S950984-004	92
MS	S950980-001MS	98
DMS	S950980-001DMS	100
Method Blank	S950815-WB	89

CAS Acceptance Limits: 69-116

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S950984
Project:	0805-123.02 / TO# 8121.00/ 2035 Albany	**Date Collected:**	8/8/95
Sample Matrix:	Water	**Date Received:**	8/9/95
		Date Extracted:	NA
		Date Analyzed:	8/15/95

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

Sample Name: Batch QC
Lab Code: S950980-001

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	250	250	ND	220	230	88	92	67-121	4

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00/ 2035 Albany

Service Request: S950984
Date Analyzed: 8/15/95

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.3	101	85-115
Toluene	25	24.2	97	85-115
Ethylbenzene	25	24.4	98	85-115
Xylenes, Total	75	71.0	95	85-115
Gasoline	250	227	91	90-110

ICV25AL/060194

[redacted] Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) S. Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 378697	Telephone no. (Consultant) 408 453 7300	Fax no. (Consultant) 408 453 0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood	San Jose, CA.	Contract number 07077

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
E-1(E)		2		X		X	X	8/8/95	1620		X											
I-1(A)		2		X		X	X		1634		X											
I-2		2		X		X	X		1629		X											
I-3(D)		2		X		X	X	↓	1624		X											

Method of shipment: Tech

Special detection Limit/reporting:

Special QA/QC:

Remarks: 0805-123.02

Lab number: S95-0984

Condition of sample: No bubbles

Temperature received: 6.0°

	Date	Time
Relinquished by sampler: [signature]	8/9/95	0838
Relinquished by		
Relinquished by		

	Date	Time
Received by		
Received by		
Received by laboratory: [signature]	8/9/95	0838

Turnaround time

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

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

APPC-3292 (2-91)

Due 8/23

Columbia Analytical Services, Inc.

September 25, 1995

Service Request No: S951134

Ms. Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-123.02/ TO#8121.00 / 2035 Albany**

Dear Ms. Yelamanchili:

The following pages contain analytical results for sample(s) received by the laboratory on September 13, 1995. 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 7, 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

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

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
Project: 0805-123.02 / TO#8121.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951134
Date Collected: 9/12/95
Date Received: 9/13/95
Date Extracted: NA
Date Analyzed: 9/20,21/95

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Analyte:	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes, Total
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name	**Lab Code**				
E-1 (E)	S951134-001	ND	ND	ND	ND	ND
I-3 (D)	S951134-002	ND	ND	ND	ND	ND
I-2	S951134-003	78	4.1	3.0	ND	8.9
I-1 (A)	S951134-004	2,700	200	150	29	290
Method Blank	S950920-WB	ND	ND	ND	ND	ND
Method Blank	S950921-WB	ND	ND	ND	ND	ND

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO#8121.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951134
Date Collected: 9/12/95
Date Received: 9/13/95
Date Extracted: NA
Date Analyzed: 9/20,21/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
E-1 (E)	S951134-001	94
I-3 (D)	S951134-002	95
I-2	S951134-003	94
I-1 (A)	S951134-004	102
MS	S951126-001MS	96
DMS	S951126-001DMS	95
Method Blank	S950920-WB	94
Method Blank	S950921-WB	95

CAS Acceptance Limits: 69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO#8121.00 / 2035 Albany

Service Request: S951134
Date Analyzed: 9/20/95

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.5	102	85-115
Toluene	25	25.1	100	85-115
Ethylbenzene	25	24.9	100	85-115
Xylenes, Total	75	75.4	101	85-115
Gasoline	250	247	99	90-110

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO#8121.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951134
Date Collected: 9/12/95
Date Received: 9/13/95
Date Extracted: NA
Date Analyzed: 9/20.21/95

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
Units: ug/L (ppb)

Sample Name: Batch QC
Lab Code: S951126-001

Analyte	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	25	25	ND	24.9	24.7	100	99	75-135	1
Toluene	25	25	ND	24.8	24.6	99	98	73-136	1
Ethylbenzene	25	25	ND	24.4	24.1	98	96	69-142	1

DMS1S/060194

[redacted]ARC[redacted]rod[redacted]s C[redacted]pany[redacted]
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035 | City (Facility) Albany | Project manager (Consultant) S. Yelamanchili

ARCO engineer Mike Whelan | Telephone no. (ARCO) 408 ~~88~~78697 | Telephone no. (Consultant) 408 453 7300 | Fax no. (Consultant) 408 453 0452

Consultant name Emcon | Address (Consultant) 1921 Ringwood San Jose, CA.

Laboratory name: CAS

Contract number: 07077

Method of shipment: Tech

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 Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
E-1(E)	1	2		X				9/12/95	1722		X											
I-3(D)	2	2		X				↓	1725		X											
I-2	3	2		X				↓	1734		X											
I-1(A)	4	2		X				↓	1729		X											

Special detection Limit/reporting: ~~please expedite results on these [illegible]~~

Special QA/QC

Remarks

0805-123.02

Lab number: S9501134

Turnaround time

Priority Rush 1 Business Day ☐

Rush 2 Business Days ☐

Expedited 5 Business Days ☐

Standard 10 Business Days ☒

Condition of sample: M. Bubble.

Temperature received: cool

Relinquished by sampler	Date	Time	Received by
[signature]	9/13/95	0810	
Relinquished by	**Date**	**Time**	**Received by** [signature]
Relinquished by	**Date**	**Time**	**Received by laboratory** [signature] — Date 9/13/95 — Time 0810

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

Due 9/27

Columbia Analytical Services, Inc.

October 26, 1995

Service Request No: S951277

Ms. Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-123.02 / TO #8121.00 / 2035 Albany**

Dear Ms. Yelamanchili:

The following pages contain analytical results for sample(s) received by the laboratory on October 12, 1995. 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 7, 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

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, Inc.

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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.
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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
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951277
Date Collected: 10/11/95
Date Received: 10/12/95
Date Extracted: NA
Date Analyzed: 10/20/95

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Analyte:		**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:		ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:		50	0.5	0.5	0.5	0.5
Sample Name	**Lab Code**					
E-1 (E)	S951277-001	ND	ND	ND	ND	ND
I-3 (D)	S951277-002	ND	ND	ND	ND	ND
I-2	S951277-003	ND	0.9	ND	ND	1.0
I-1 (A)	S951277-004	1,000	97	38	7	69
Method Blank	S951020-WB	ND	ND	ND	ND	ND

5ABTXGAS/061694

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951277
Date Collected: 10/11/95
Date Received: 10/12/95
Date Extracted: NA
Date Analyzed: 10/20/95

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α–Trifluorotoluene
E-1 (E)	S951277-001	87	93
I-3 (D)	S951277-002	92	90
I-2	S951277-003	93	93
I-1 (A)	S951277-004	89	100
E-1 (E) MS	S951277-001MS	89	97
E-1 (E) DMS	S951277-001DMS	89	99
Method Blank	S951020-WB	92	91
	CAS Acceptance Limits:	69-116	69-116

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany

Service Request: S951277
Date Analyzed: 10/20/95

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	24.4	98	85-115
Toluene	25	24.5	98	85-115
Ethylbenzene	25	24.4	98	85-115
Xylenes, Total	75	73.4	98	85-115
Gasoline	250	237	95	90-110

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-123.02 / TO# 8121.00 / 2035 Albany
Sample Matrix: Water

Service Request: S951277
Date Collected: 10/11/95
Date Received: 10/12/95
Date Extracted: NA
Date Analyzed: 10/20/95

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

Sample Name: E-1 (E)
Lab Code: S951277-001

Analyte	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
Gasoline	250	250	ND	230	230	92	92	67-121	<1

DMS1S/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no.	2035
City (Facility)	Albany
Project manager (Consultant)	S. Yelamanchili
Laboratory name	CAS
ARCO engineer	Mike Whelan
Telephone no. (ARCO)	4083778697
Telephone no. (Consultant)	4084537300
Fax no. (Consultant)	4084530452
Consultant name	EMCON
Address (Consultant)	1921 Ringwood San JOSE, CA.
Contract number	07077
Method of shipment	Tech
Special detection Limit/reporting	[illegible]
Special QA/QC	
Remarks	0805-~~T35.04~~ 123.02
Lab number	S9501277

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 (Gas)	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
E-1(E)	1	2		X		X	X	10/11/95	15:18		X											
I-3 (D)	2	↓		X		X	X	↓	15:21		X											
I-2	3	↓		X		X	X	↓	15:23		X											
I-1(A)	4	↓		X		X	X	↓	15:27		X											

Condition of sample: ok

Temperature received: Cool

Relinquished by	Date	Time	Received by	Date	Time
Relinquished by sampler: [signature]	10/12/95	0948	Received by		
Relinquished by			Received by		
Relinquished by			Received by laboratory: Joanne Brown	10/12/95	0948

Turnaround time

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

Due 10/26

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