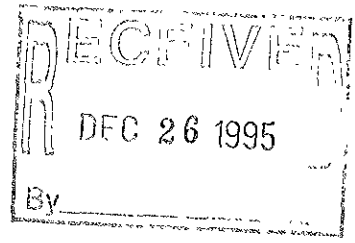
EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • (408) 453-7300 • Fax (408) 437-9526

Date December 22, 1995
Project 20805-129.002

To:



Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harborbay Parkway, Suite 250
Alameda, California 94502-6577

We are enclosing:

Copies	Description
1	Third quarter 1995 groundwater monitoring results and remediation system performance evaluation report, ARCO Service Station 2169, Oakland, California

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

Comments:

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

David Larsen
Project Coordinator

cc: Kevin Graves, RWQCB - SFBR
Michael Whelan - ARCO Products Company
David Larsen, EMCON
File

ARCO Products Company

Date: December 22, 1995

Re: ARCO Station # 2169 • 889 West Grand Avenue • Oakland, CA
Third Quarter 1995 Groundwater Monitoring Results and
Remediation System Performance Evaluation Report

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

Submitted by:

Michael R. Whelan

Michael R. Whelan
Environmental Engineer

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

December 19, 1995
Project 20805-129.002

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 2169, 889 West Grand Avenue, Oakland, California

Dear Mr. Whelan:

This letter presents the results of the third quarter 1995 groundwater monitoring program at ARCO Products Company (ARCO) service station 2169, 889 West Grand Avenue, Oakland, California (Figure 1). Operation and performance data for the interim soil-vapor extraction (SVE) and air sparge (AS) 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. Pertinent site features, including existing on-site monitoring and vapor extraction wells, are shown in Figure 2.

BACKGROUND

Six on-site groundwater monitoring wells (A-1 through A-4, AR-1, and AR-2), two off-site groundwater monitoring wells (A-5 and A-6) seven on-site vapor extraction wells (AV-1 through AV-7), two dual groundwater/vapor extraction wells (ADR-1 and ADR-2), and three AS wells (AS-1, AS-2, and AS-3) were installed as part of a comprehensive site assessment conducted at this site from May 1991 through January 1994 (Figure 2). Please refer to *Fourth Quarter 1994 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Interim SVE and AS Remediation Systems, ARCO Service Station 2169, Oakland, California* (EMCON, March 1995) for more details.

MONITORING PROGRAM FIELD PROCEDURES

A program of quarterly groundwater monitoring was initiated during the second quarter of 1992 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 A-1 through A-6, AR-1, AR-2, ADR-1, and ADR-2. Wells A-3 and A-4 are sampled annually during the first quarter of the year. Wells A-1, A-2, A-5, A-6, AR-1, AR-2, ADR-1, and ADR-2 are sampled quarterly.

EMCON performed the third quarter 1995 groundwater monitoring event on August 17 and 18, 1995. Field work this quarter included (1) measuring depths to groundwater and subjectively analyzing groundwater for the presence of floating product in wells A-1 through A-6, AR-1, AR-2, ADR-1, and ADR-2; (2) purging and subsequently sampling groundwater monitoring wells A-1, A-2, A-5, A-6, AR-1, AR-2, and ADR-1 for laboratory analysis; and (3) directing a state-certified laboratory to analyze the groundwater samples. Floating product was observed in well ADR-2 on August 17, 1995; therefore, this 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. Copies of the analytical results and chain-of-custody documentation for third quarter 1995 are included in Appendix B.

Groundwater elevation data collected on August 17, 1995, indicate that groundwater beneath the site flows west with an approximate hydraulic gradient of 0.001 foot per foot (calculated using data from wells AR-2, A-3, and A-5). Figure 3 illustrates groundwater contours and analytical data for third quarter 1995.

FLOATING PRODUCT RECOVERY

EMCON began recovering floating product on January 13, 1995. Floating product is measured and manually bailed biweekly from wells ADR-1 and ADR-2. Approximately 4.8 gallons of product were recovered during first quarter 1995. Table 4 summarizes floating product recovery data. No floating product was recovered during the second or third quarters of 1995.

REMEDIATION SYSTEM PERFORMANCE EVALUATION

Soil-Vapor Extraction System

The system was restarted on July 17, 1995 after observing that water levels had receded exposing screen in the SVE wells. Table 5 summarizes SVE system operation and performance data from initial system startup to the end of this reporting period, September 27, 1995.

Table 5 also summarizes hydrocarbon removal rates, pounds of hydrocarbons removed this period, and cumulative pounds of hydrocarbons removed from system startup to the end of the third quarter 1995 reporting period September 27, 1995. Approximately 888.3 pounds (148.1 gallons) of hydrocarbons were recovered by SVE system operation from system restartup on July 17, 1995, to the end of the third quarter 1995 reporting period. A total of approximately 6,456.5 pounds (or 1,076.3 gallons) of hydrocarbons was recovered from the site from system startup to September 27, 1995. Figure 4 depicts changes in TVHG and benzene concentrations with time from initial startup of the SVE system to the end of the third quarter 1995 reporting period. Figure 5 depicts historical hydrocarbon removal rates since system startup. The calculations and assumptions made for estimating hydrocarbon removal rates for the SVE system are explained in the footnotes for Table 5.

Table 6 summarizes the operating status of individual vapor extraction wells from startup to the end of this reporting period, September 27, 1995. To maximize hydrocarbon removal rates, each vapor extraction well was brought on-line or closed depending on the TVHG concentrations in extracted vapor from the well.

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

Air-Sparge System

EMCON restarted the modified AS system on July 25, 1995. Operation and performance data for the AS system, from initial startup on July 15, 1994, to September 27, 1995 are summarized in Table 7.

Field monitoring data sheets provided in Appendix C for the SVE system operation include operation and maintenance data for the AS system during the third quarter 1995.

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 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 the 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

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

Work Anticipated for Fourth Quarter 1995

- Perform quarterly groundwater monitoring for fourth quarter 1995.
- Prepare the quarterly groundwater monitoring results and remediation system performance evaluation report for third quarter 1995.
- Perform floating product recovery from wells ADR-1 and ADR-2 for fourth quarter 1995.
- Perform operation and maintenance of the SVE and AS systems for fourth quarter 1995.

Sincerely,

EMCON

David Larsen
Project Coordinator

Valli Voruganti
Project Engineer

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

REGISTERED GEOLOGIST
LYNN A. GALLAGHER
RG6090
STATE OF CALIFORNIA

cc: Kevin Graves, RWQCB
Susan Hugo, ACHCSA

Attachments:

Table 1 -	Groundwater Monitoring Data, Third Quarter 1995
Table 2 -	Historical Groundwater Elevation Data
Table 3 -	Historical Groundwater Analytical Data
Table 4 -	Approximate Cumulative Floating Product Recovery Data
Table 5 -	Soil-Vapor Extraction System Operation and Performance Data
Table 6 -	Soil-Vapor Extraction Well Data
Table 7 -	Air-Sparge System Operation and Performance Data
Figure 1 -	Site Location
Figure 2 -	Site Plan
Figure 3 -	Groundwater Data, Third Quarter 1995
Figure 4 -	Historical SVE System Influent TPHG and Benzene Concentrations
Figure 5 -	Historical SVE System Hydrocarbon Removal Rates
Appendix A -	Field Data Sheets, Third Quarter 1995 Groundwater Monitoring Event
Appendix B -	Analytical Results and Chain-of-Custody Documentation for Groundwater Monitoring Samples, Third Quarter 1995
Appendix C -	Operation and Maintenance Field Data Sheets, SVE and Air-Sparge Systems, Third Quarter 1995
Appendix D -	Analytical Results and Chain-of-Custody Documentation for SVE System Air Samples, Third Quarter 1995

Table 1
Groundwater Monitoring Data
Third Quarter 1995

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-19-95

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	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
A-1	08-17-95	14.16	11.71	2.45	ND	W	0.001	08-18-95	1600	470	35	48	110	120	--	^240
A-2	08-17-95	14 55	12.35	2.20	ND	W	0.001	08-17-95	<50	<0.5	<0.5	<0.5	<0.5	12	--	--
A-3	08-17-95	15.75	13.04	2.71	ND	W	0.001	08-17-95	Not sampled. not scheduled for chemical analysis							
A-4	08-17-95	15.25	12.28	2.97	ND	W	0.001	08-17-95	Not sampled: not scheduled for chemical analysis							
A-5	08-17-95	13.51	11.15	2.36	ND	W	0.001	08-18-95	34000	1600	2700	1100	5100	<28	--	--
A-6	08-17-95	13.51	11.10	2.41	ND	W	0.001	08-18-95	530	<0.5	<0.5	<2.4	<4.2	6	--	--
AR-1	08-17-95	15.61	12.40	3.21	ND	W	0.001	08-17-95	960	110	12	4.5	150	14	--	<50
AR-2	08-17-95	15.28	12.78	2 50	ND	W	0.001	08-18-95	<50	<0.5	<0 5	<0.5	<0.5	4	--	<50
ADR-1	08-17-95	13.95	11.86	2.09	ND	W	0 001	08-18-95	4400	150	120	95	620	120	--	^4500
ADR-2	08-17-95	14.64	12.10	** 2.56	0.03	W	0.001	08-17-95	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
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
ND: none detected
W. west
-- : not analyzed
^: sample contains a lower boiling point hydrocarbon quantitated as diesel; chromatogram does not match the typical diesel fingerprint
**: [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 2169
889 West Grand Avenue, Oakland, CA

Date: 12-19-95

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
A-1	04-03-92	14.75	10.35	4.40	ND	NR	NR
A-1	05-20-92	14.75	11.66	3.09	ND	NR	NR
A-1	06-16-92	14.75	11.95	2.80	ND	NR	NR
A-1	07-17-92	14.75	12.23	2.52	ND	NR	NR
A-1	08-07-92	14.75	12.16	2.59	ND	NR	NR
A-1	09-22-92	14.75	12.42	2.33	ND	NR	NR
A-1	10-13-92	14.75	12.47	2.28	ND	NR	NR
A-1	11-23-92	14.75	11.83	2.92	ND	NR	NR
A-1	12-16-92	14.75	11.03	3.72	ND	NR	NR
A-1	01-28-93	14 75	9.08	5.67	ND	NR	NR
A-1	02-22-93	14.75	9.46	5.29	ND	NR	NR
A-1	03-25-93	14.75	10.02	4 73	ND	NR	NR
A-1	04-15-93	14.75	10.50	4.25	ND	NR	NR
A-1	05-22-93	14.75	11.33	3.42	ND	NR	NR
A-1	06-16-93	14.75	11.51	3.24	ND	NR	NR
A-1	07-27-93	14.75	11.91	2.84	ND	NR	NR
A-1	08-26-93	14.75	12.11	2.64	ND	NR	NR
A-1	09-27-93	14.75	12.21	2 54	ND	NR	NR
A-1	10-08-93	14.75	12.21	2.54	ND	NR	NR
A-1	02-09-94	14.16	10.09	4.07	ND	NR	NR
A-1	05-04-94	14.16	10.68	3.48	ND	NW	0.004
A-1	08-10-94	14.16	10.28	3.88	ND	WNW	0.007
A-1	11-16-94	14.16	9.75	4.41	ND	NW	0.005
A-1	03-24-95	14.16	8.10	6.06	ND	NW	0.009
A-1	06-05-95	14.16	11.13	3.03	ND	NW	0.002
A-1	08-17-95	14.16	11.71	2.45	ND	W	0.001

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date. 12-19-95

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
A-2	04-03-92	15.16	10.97	4.19	ND	NR	NR
A-2	05-20-92	15.16	12.17	2.99	ND	NR	NR
A-2	06-16-92	15.16	12.43	2.73	ND	NR	NR
A-2	07-17-92	15.16	12.64	2.52	ND	NR	NR
A-2	08-07-92	15.16	12.75	2.41	ND	NR	NR
A-2	09-22-92	15.16	12.88	2.28	ND	NR	NR
A-2	10-13-92	15.16	12.92	2.24	ND	NR	NR
A-2	11-23-92	15.16	12.18	2.98	ND	NR	NR
A-2	12-16-92	15.16	11.52	3.64	ND	NR	NR
A-2	01-28-93	15.16	9.73	5.43	ND	NR	NR
A-2	02-22-93	15.16	9.28	5.88	ND	NR	NR
A-2	03-25-93	15.16	10.57	4.59	ND	NR	NR
A-2	04-15-93	15.16	11.20	3.96	ND	NR	NR
A-2	05-22-93	15.16	11.91	3.25	ND	NR	NR
A-2	06-16-93	15.16	12.04	3.12	ND	NR	NR
A-2	07-27-93	15.16	12.41	2.75	ND	NR	NR
A-2	08-25-93	15.16	12 54	2.62	ND	NR	NR
A-2	09-27-93	15.16	12.66	2.50	ND	NR	NR
A-2	10-08-93	15.16	12.65	2.51	ND	NR	NR
A-2	02-09-94	14.55	10.67	3.88	ND	NR	NR
A-2	05-04-94	14.55	11.25	3.30	ND	NW	0.004
A-2	08-10-94	14.55	11.56	2.99	ND	WNW	0.007
A-2	11-16-94	14.55	10.31	4.24	ND	NW	0.005
A-2	03-24-95	14.55	8.64	5.91	ND	NW	0.009
A-2	06-05-95	14.55	11.72	2.83	ND	NW	0.002
A-2	08-17-95	14.55	12.35	2.20	ND	W	0.001

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-19-95

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
A-3	04-03-92	16 38	11.70	4.68	ND	NR	NR
A-3	05-20-92	16.38	13.00	3.38	ND	NR	NR
A-3	06-16-92	16 38	13.46	2.92	ND	NR	NR
A-3	07-17-92	16.38	13.45	2.93	ND	NR	NR
A-3	08-07-92	16.38	12.37	4.01	ND	NR	NR
A-3	09-22-92	16.38	13.71	2.67	ND	NR	NR
A-3	10-13-92	16.38	13.76	2.62	ND	NR	NR
A-3	11-23-92	16.38	13.60	2.78	ND	NR	NR
A-3	12-16-92	16.38	12.31	4.07	ND	NR	NR
A-3	01-28-93	16.38	10.33	6.05	ND	NR	NR
A-3	02-22-93	16 38	10.44	5.94	ND	NR	NR
A-3	03-25-93	16.38	11.27	5.11	ND	NR	NR
A-3	04-15-93	16.38	11.98	4.40	ND	NR	NR
A-3	05-22-93	16.38	12.70	3.68	ND	NR	NR
A-3	06-16-93	16.38	12.84	3.54	ND	NR	NR
A-3	07-27-93	16.38	13.22	3.16	ND	NR	NR
A-3	08-25-93	16.38	13.35	3.03	ND	NR	NR
A-3	09-27-93	16.38	13.50	2.88	ND	NR	NR
A-3	10-08-93	16.38	13.48	2.90	ND	NR	NR
A-3	02-09-94	15.75	11.32	4.43	ND	NR	NR
A-3	05-04-94	15.75	11.99	3.76	ND	NW	0.004
A-3	08-10-94	15.75	11.12	4.63	ND	WNW	0.007
A-3	11-16-94	15.75	11.02	4.73	ND	NW	0.005
A-3	03-24-95	15.75	8.83	6.92	ND	NW	0.009
A-3	06-05-95	15.75	12.44	3.31	ND	NW	0.002
A-3	08-17-95	15.75	13.04	2.71	ND	W	0.001

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date. 12-19-95

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
A-4	04-03-92	15.89	10.84	5.05	ND	NR	NR
A-4	05-20-92	15.89	12.13	3.76	ND	NR	NR
A-4	06-16-92	15.89	12.33	3.56	ND	NR	NR
A-4	07-17-92	15.89	12.60	3.29	ND	NR	NR
A-4	08-07-92	15.89	12.56	3 33	ND	NR	NR
A-4	09-22-92	15.89	12.87	3.02	ND	NR	NR
A-4	10-13-92	15.89	12.87	3.02	ND	NR	NR
A-4	11-23-92	15.89	12.63	3.26	ND	NR	NR
A-4	12-16-92	15 89	11.34	4.55	ND	NR	NR
A-4	01-28-93	15.89	9.40	6.49	ND	NR	NR
A-4	02-22-93	15.89	9.35	6.54	ND	NR	NR
A-4	03-25-93	15.89	10.32	5 57	ND	NR	NR
A-4	04-15-93	15.89	11.15	4.74	ND	NR	NR
A-4	05-22-93	15.89	11.84	4.05	ND	NR	NR
A-4	06-16-93	15.89	12.01	3.88	ND	NR	NR
A-4	07-27-93	15.89	12.33	3.56	ND	NR	NR
A-4	08-25-93	15.89	12.48	3.41	ND	NR	NR
A-4	09-27-93	15.89	12.60	3.29	ND	NR	NR
A-4	10-08-93	15.89	12.57	3.32	ND	NR	NR
A-4	02-09-94	15.25	10.01	5.24	ND	NR	NR
A-4	05-04-94	15.25	11.08	4.17	ND	NW	0.004
A-4	08-10-94	15.25	11.75	3.50	ND	WNW	0.007
A-4	11-16-94	15.25	9.78	5.47	ND	NW	0.005
A-4	03-24-95	15.25	7.20	8.05	ND	NW	0.009
A-4	06-05-95	15.25	11.70	3.55	ND	NW	0.002
A-4	08-17-95	15.25	12.28	2.97	ND	W	0.001
A-5	02-11-93	14.14	9.15	4.99	ND	NR	NR
A-5	03-25-93	14.14	9 33	4.81	ND	NR	NR
A-5	04-15-93	14.14	10.11	4.03	ND	NR	NR
A-5	05-22-93	14.14	10.71	3.43	ND	NR	NR
A-5	06-16-93	14.14	10.84	3.30	ND	NR	NR
A-5	07-27-93	14.14	11.22	2.92	ND	NR	NR
A-5	08-26-93	14.14	11.44	2.70	ND	NR	NR
A-5	09-27-93	14.14	11.51	2.63	ND	NR	NR
A-5	10-08-93	14.14	11.68	2.46	ND	NR	NR
A-5	02-09-94	13.51	9.44	4.07	ND	NR	NR
A-5	05-04-94	13.51	10.00	3.51	ND	NW	0.004
A-5	08-10-94	13.51	10.76	2.75	ND	WNW	0.007
A-5	11-16-94	13.51	9.09	4.42	ND	NW	0.005
A-5	03-24-95	13.51	7.40	6.11	ND	NW	0.009
A-5	06-05-95	13.51	10.43	3.08	ND	NW	0.002
A-5	08-17-95	13.51	11.15	2.36	ND	W	0.001

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-19-95

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
A-6	02-11-93	14.17	9.35	4.82	ND	NR	NR
A-6	03-25-93	14.17	Not surveyed: well was inaccessible				
A-6	04-16-93	14.17	9.36	4.81	ND	NR	NR
A-6	05-22-93	14.17	10.86	3.31	ND	NR	NR
A-6	06-16-93	14.17	10.98	3.19	ND	NR	NR
A-6	07-27-93	14.17	Not surveyed: well was inaccessible				
A-6	08-25-93	14.17	Not surveyed: well was inaccessible				
A-6	09-27-93	14.17	11.65	2.52	ND	NR	NR
A-6	10-08-93	14.17	11 80	2.37	ND	NR	NR
A-6	02-09-94	13.51	9.48	4.03	ND	NR	NR
A-6	05-04-94	13.51	10.07	3.44	ND	NW	0.004
A-6	08-10-94	13.51	10.77	2.74	ND	WNW	0.007
A-6	11-16-94	13.51	9.14	4.37	ND	NW	0.005
A-6	03-24-95	13 51	7.89	5.62	ND	NW	0.009
A-6	06-05-95	13.51	10.06	3.45	ND	NW	0.002
A-6	08-17-95	13.51	11.10	2.41	ND	W	0.001
AR-1	04-03-92	15.71	11.07	4.64	ND	NR	NR
AR-1	05-20-92	15.71	12.37	3.34	ND	NR	NR
AR-1	06-16-92	15.71	12.47	3.24	ND	NR	NR
AR-1	07-17-92	15.71	13.00	2.71	ND	NR	NR
AR-1	08-07-92	15.71	12.87	2.84	ND	NR	NR
AR-1	09-22-92	15.71	12.99	2.72	ND	NR	NR
AR-1	10-13-92	15.71	13.05	2.66	ND	NR	NR
AR-1	11-23-92	15.71	12.80	2.91	ND	NR	NR
AR-1	12-16-92	15.71	11.49	4.22	ND	NR	NR
AR-1	01-28-93	15.71	9.46	6.25	ND	NR	NR
AR-1	02-22-93	15.71	10.05	5.66	ND	NR	NR
AR-1	03-25-93	15.71	10.75	4.96	ND	NR	NR
AR-1	04-15-93	15.71	11.26	4.45	ND	NR	NR
AR-1	05-22-93	15.71	12.07	3.64	ND	NR	NR
AR-1	06-16-93	15.71	12.21	3.50	ND	NR	NR
AR-1	07-27-93	15.71	12.60	3.11	ND	NR	NR
AR-1	08-25-93	15.71	12.78	2.93	ND	NR	NR
AR-1	09-27-93	15.71	12.89	2.82	ND	NR	NR
AR-1	10-08-93	15.71	12.84	2.87	ND	NR	NR
AR-1	02-09-94	15.61	11.08	4.53	ND	NR	NR
AR-1	05-04-94	15.61	11.83	3.78	ND	NW	0.004
AR-1	08-10-94	15.61	11.09	4.52	ND	WNW	0.007
AR-1	11-16-94	15.61	10.19	5.42	ND	NW	0.005
AR-1	03-24-95	15.61	7.25	8.36	ND	NW	0.009
AR-1	06-05-95	15.61	11.37	4.24	ND	NW	0.002
AR-1	08-17-95	15.61	12.40	3.21	ND	W	0.001

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-19-95

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
AR-2	07-17-92	15.79	13.14	2.65	ND	NR	NR
AR-2	08-07-92	15.79	13.25	2.54	ND	NR	NR
AR-2	09-22-92	15.79	13 58	2.21	ND	NR	NR
AR-2	10-13-92	15.79	13.65	2.14	ND	NR	NR
AR-2	11-23-92	15.79	Not surveyed: could not located well				
AR-2	12-16-92	15.79	12.16	3.63	ND	NR	NR
AR-2	01-28-93	15.79	10.26	5.53	ND	NR	NR
AR-2	02-22-93	15.79	10.52	5.27	ND	NR	NR
AR-2	03-25-93	15.79	11.18	4 61	ND	NR	NR
AR-2	04-15-93	15.79	11.81	3.98	ND	NR	NR
AR-2	05-22-93	15.79	12.46	3 33	ND	NR	NR
AR-2	06-16-93	15.79	12.53	3.26	ND	NR	NR
AR-2	07-27-93	15.79	12.77	3.02	ND	NR	NR
AR-2	08-26-93	15.79	13.23	2.56	ND	NR	NR
AR-2	09-27-93	15.79	13.16	2.63	ND	NR	NR
AR-2	10-08-93	15.79	13.32	2.47	ND	NR	NR
AR-2	02-09-94	15.28	11.33	3.95	ND	NR	NR
AR-2	05-04-94	15.28	11.88	3.40	ND	NW	0.004
AR-2	*08-10-94*	*15.28*	*12.48*	*2.80*	*ND*	*WNW*	*0.007*
AR-2	11-16-94	15.28	10.95	4.33	ND	NW	0.005
AR-2	03-24-95	15.28	9.13	6.15	ND	NW	0.009
AR-2	06-05-95	15.28	12.09	3.19	ND	NW	0 002
AR-2	08-17-95	15.28	12.78	2.50	ND	W	0.001
ADR-1	02-09-94	13.95	9.90	4.05	ND	NR	NR
ADR-1	05-04-94	13.95	10.50	3.45	ND	NW	0.004
ADR-1	08-10-94	13.95	10.36	3.59	ND	WNW	0.007
ADR-1	11-16-94	13.95	9.64	4.31	Sheen	NW	0.005
ADR-1	03-24-95	13.95	8.04	** 5.92	0.01	NW	0.009
ADR-1	06-05-95	13.95	11.02	2.93	ND	NW	0.002
ADR-1	08-17-95	13.95	11.86	2.09	ND	W	0.001
ADR-2	02-09-94	14.64	10.73	3 91	ND	NR	NR
ADR-2	05-04-94	14.64	11.31	3.33	ND	NW	0.004
ADR-2	08-10-94	14.64	9.81	** 4.90	0.10	WNW	0.007
ADR-2	11-16-94	14 64	9.84	** 4.87	0.09	NW	0.005
ADR-2	03-24-95	14.64	8.41	NR*	>3.00*	NR*	NR*
ADR-2	06-05-95	14.64	11.45	NR*	>3.00*	NR*	NR*
ADR-2	08-17-95	14.64	12.10	** 2.56	0.03	W	0.001

ft-MSL: elevation in feet, relative to mean sea level
MWN: groundwater flow direction and gradient apply to the entire monitoring well network
ND: none detected
NR: not reported; data not available or not measurable
NW: northwest
WNW: west-northwest
W: west
**: [corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water
*: well contained more than 3 feet of floating product; exact product thickness and groundwater elevation could not be measured

Table 3
Historical Groundwater Analytical Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-11-95

Well Designation	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L	TPHD LUFT Method µg/L
A-1	04-03-92	34000	6200	3900	410	3100	--	--	6100
A-1	07-17-92	5600	3000	500	<100	<100	--	--	--
A-1	10-13-92	5600	980	590	85	910	--	--	--
A-1	01-28-93	3700	780	360	130	460	--	--	^620
A-1	04-15-93	210	34	11	7.1	20	--	--	^420
A-1	08-26-93	2000	370	35	50	220	--	--	^1500
A-1	10-08-93	2600	430	65	64	99	--	--	^1200
A-1	02-09-94	3000	560	150	66	190	--	--	^650
A-1	05-04-94	1300	250	61	27	110	--	--	^2100
A-1	08-10-94	27000	3700	1100	540	3000	--	--	^3000
A-1	11-16-94	2100	460	6.4	62	120	--	--	^^^^640
A-1	03-24-95	1200	230	39	34	66	--	--	^^^^160
A-1	06-05-95	1500	310	27	36	76	--	--	^710
A-1	08-18-95	1600	470	35	48	110	120	--	^240
A-2	04-03-92	<30	<0.3	<0.3	<0.3	<0.3	--	--	<50
A-2	07-17-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	10-13-92	<50	0.57	<0.5	<0.5	<0.5	--	--	--
A-2	01-28-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	04-15-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	08-25-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	10-08-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	02-09-94	^^260	<0.6	<0.5	<0.5	<0.5	--	--	--
A-2	05-04-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-2	08-10-94	690	47	25	3.9	86	--	--	--
A-2	11-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	06-05-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	08-17-95	<50	<0.5	<0.5	<0.5	<0.5	12	--	--
A-3	04-03-92	200	0.79	0.65	4.4	<0 3	--	--	130
A-3	07-17-92	<50	<0.5	<0.5	1.3	2.3	--	--	--
A-3	10-13-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	01-28-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	04-15-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	08-25-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	10-08-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	02-09-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	05-04-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	08-10-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	11-16-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-3	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-3	06-05-95	Not sampled: not scheduled for chemical analysis							
A-3	08-17-95	Not sampled: not scheduled for chemical analysis							

Table 3
Historical Groundwater Analytical Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-11-95

Well Designation	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L	TPHD LUFT Method µg/L
A-4	04-03-92	35	<0.3	<0.3	<0.3	<0.3	--	--	85
A-4	07-17-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-4	10-13-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-4	01-28-93	<50	<0.5	<0 5	<0.5	<0.5	--	--	--
A-4	04-15-93	<50	<0.5	<0 5	<0.5	<0.5	--	--	--
A-4	08-25-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-4	10-08-93	<50	<0.5	<0 5	<0.5	<0.5	--	--	--
A-4	02-09-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-4	05-04-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-4	08-10-94	<50	<0.5	<0.5	<0 5	<0.5	--	--	--
A-4	11-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-4	03-24-95	<50	<0 5	<0.5	<0.5	<0.5	--	--	--
A-4	06-05-95	Not sampled: not scheduled for chemical analysis							
A-4	08-17-95	Not sampled: not scheduled for chemical analysis							
A-5	02-11-93	4900	380	640	140	970	--	--	--
A-5	04-15-93	27000	3100	4000	1100	4600	--	--	--
A-5	08-26-93	13000	1100	1400	480	1800	--	--	--
A-5	10-08-93	6800	490	620	280	980	--	--	--
A-5	02-09-94	2200	190	130	130	310	--	--	--
A-5	05-09-94	13000	1000	1500	490	2000	--	--	--
A-5	08-10-94	11000	730	930	310	1300	--	--	--
A-5	11-16-94	2600	160	220	130	400	--	--	--
A-5	03-24-95	3300	200	310	130	460	--	--	--
A-5	06-05-95	57000	2700	4600	1500	6800	--	--	--
A-5	08-18-95	34000	1600	2700	1100	5100	<28	--	--
A-6	02-11-93	990	1.8	5.1	17	7.2	--	--	--
A-6	04-16-93	390	1.3	1.6	1.7	7.7	--	--	--
A-6	08-25-93	Not sampled: well was inaccessible							
A-6	10-08-93	220	0.73	<0.5	0 82	0.65	--	--	--
A-6	02-09-94	640	<2.9	<3.7	<2.4	<8.2	--	--	--
A-6	05-04-94	260	<0.5	<1.5	<1 5	<0.5	--	--	--
A-6	08-10-94	300	<0.6	<2.5	<0.8	<1	--	--	--
A-6	11-16-94	250	<0.5	<1.5	<0.6	<1.5	--	--	--
A-6	03-24-95	120	<0.5	<1	<0.5	<1.5	--	--	--
A-6	06-05-95	160	<0.5	<0.6	<0.5	<0.5	--	--	--
A-6	08-18-95	530	<0.5	<0.5	<2.4	<4.2	6	--	--

Table 3
Historical Groundwater Analytical Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date. 12-11-95

Well Designation	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L	TPHD LUFT Method µg/L
AR-1	04-03-92	17000	310	1400	320	3000	--	--	12000
AR-1	07-17-92	44000	4300	1800	1800	10000	--	--	--
AR-1	10-13-92	32000	310	730	570	3100	--	--	^22000
AR-1	01-28-93	15000	1200	510	510	2600	--	--	^5300
AR-1	04-15-93	17000	1800	360	520	1600	--	--	^5400
AR-1	08-25-93	2900	260	54	80	160	--	--	^2800
AR-1	10-08-93	3500	200	85	120	290	--	--	^4100
AR-1	02-09-94	26000	2900	450	920	3000	--	--	^4200
AR-1	05-04-94	36000	3400	360	1400	3700	--	--	^7200
AR-1	08-10-94	6100	120	66	65	530	--	--	^2900
AR-1	11-16-94	1200	66	20	34	210	--	--	^^^^560
AR-1	03-24-95	270	14	0.6	2.5	2 1	--	--	^^^^130
AR-1	06-05-95	190	10	<0.5	0.8	0.5	--	--	^580
AR-1	08-17-95	960	110	12	4.5	150	14	--	<50
AR-2	07-17-92	150	6.6	24	6.6	39	--	--	--
AR-2	10-13-92	<50	2	0.86	0.51	3.8	--	--	^58
AR-2	01-28-93	2000	570	13	<10	380	--	--	^290
AR-2	04-15-93	85	15	<0.5	<0.5	2.4	--	--	<50
AR-2	08-26-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	<50
AR-2	10-08-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	<50
AR-2	02-09-94	^^82	<0.5	<0.5	<0.5	<0.5	--	--	<50
AR-2	05-04-94	<50	<0.5	<0 5	<0 5	<0.5	--	--	<50
AR-2	08-10-94	200	5	1.7	2.7	38	--	--	^55
AR-2	11-16-94	<50	0.8	<0.5	<0.5	<0 5	--	--	<50
AR-2	03-24-95	<50	6.2	<0.5	<0.5	0.6	--	--	<50
AR-2	06-05-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	<50
AR-2	08-18-95	<50	<0.5	<0.5	<0.5	<0.5	4	--	<50

Table 3
Historical Groundwater Analytical Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-11-95

Well Designation	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L	TPHD LUFT Method µg/L
ADR-1	02-09-94	3000	380	140	59	240	--	--	^110
ADR-1	05-04-94	2100	490	93	68	140	--	--	^60
ADR-1	08-10-94	150000	5400	15000	3600	24000	--	--	^^^4800
ADR-1	11-16-94	Not sampled: well contained floating product							
ADR-1	03-24-95	Not sampled: well contained floating product							
ADR-1	06-05-95	23000	310	420	300	1900	--	--	^13000
ADR-1	08-18-95	4400	150	120	95	620	120	--	^4500
ADR-2	02-09-94	83000	6300	6100	2000	11000	--	--	12000
ADR-2	05-04-94	36000	4600	2600	930	4500	--	--	^4200
ADR-2	08-10-94	Not sampled: well contained floating product							
ADR-2	11-16-94	Not sampled: well contained floating product							
ADR-2	03-24-95	Not sampled: well contained floating product							
ADR-2	06-05-95	Not sampled: well contained floating product							
ADR-2	08-17-95	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
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
- - : not analyzed
^: sample contains a lower boiling point hydrocarbon quantitated as diesel; chromatogram does not match the typical diesel fingerprint
^^: sample contains a single non-fuel component eluting in the gasoline range, and quantified as gasoline
^^^: sample contains a mixture of diesel and a lower boiling point hydrocarbon quantitated as diesel; chromatogram does not match the typical diesel fingerprint
^^^^: sample contains components eluting in the diesel range, quantified as diesel, chromatogram does not match the typical diesel fingerprint

Table 4
Approximate Cumulative Floating Product Recovered

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-14-95

Well Designation	Date	Floating Product Recovered gallons
ADR-1	1994	0.0
ADR-2		0.0
ADR-1	1995	0.0
ADR-2		4.8
	1994 to 1995 Total:	4.8

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Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2169			Vapor Treatment Unit: ThermTech Model VAC-25, 250cfm Thermal/ Catalytic Oxidizer		
Location: 889 West Grand Avenue Oakland, California					
Consultant: EMCON 1921 Ringwood Avenue San Jose, California			Start-Up Date: 06-02-94 Reporting Period From: 06-02-94 To: 09-27-95		
Beginning Date:	06-02-94	06-02-94	06-07-94	06-16-94	06-22-94
Ending Date:	06-02-94	06-07-94	06-16-94	06-22-94	06-30-94
Down-time (days):	0.00	0.00	0.93	0.00	3.57
Total Operation (days):	0.07	5.05	8.07	6.05	4.43
Total Operation (hours):	1.7	121.3	193.7	145.2	106.3
Operation Hours to Date:	1.7	123.0	316.7	462.0	568.2
TPH Concentrations					
Average Influent (ppmv):	18,000	16,000	830	1,100	230
Average Effluent (ppmv):	ND	45	ND	4.9	75.0
Benzene Concentrations					
Average Influent (ppmv):	250	420	17	24	3.8
Average Effluent (ppmv):	ND	0.30	ND	0.08	0.78
Flow Rates					
Average Influent (scfm):	61.1	131.5	145.3	194.1	176.7
Average Dilution (scfm):	184.2	97.8	69.9	0.0	0.0
Average Effluent (scfm):	268.6	252.3	289.7	264.4	288.9
TPH-G Recovery Data					
Recovery Rate (lbs/hr):	11.12	21.26	1.22	2.16	0.41
Recovery Rate (lbs/day):	266.80	510.34	29.25	51.77	9.86
Destruction Efficiency (%):	100.00	99.46	100.00	99.39	46.70
Product Recovered (lbs):	18.68	2579.35	236.08	313.27	43.64
Product Recovered to Date (lbs):	18.68	2598.02	2834.10	3147.37	3191.01
Product Recovered to Date (gal):	3.11	433.00	472.35	524.56	531.83
Benzene Recovery Data					
Recovery Rate (lbs/hr):	0.185	0.670	0.030	0.056	0.008
Recovery Rate (lbs/day):	4.447	16.076	0.719	1.355	0.195
Destruction Efficiency (%):	100.00	99.86	100.00	99.56	66.45
Product Recovered (lbs):	0.311	81.249	5.802	8.202	0.865
Product Recovered to Date (lbs):	0.311	81.561	87.363	95.565	96.430
Product Recovered to Date (gal):	0.043	11.250	12.050	13.181	13.301

Page 1 Footnotes

ppmv: parts per million by volume
scfm: standard cubic feet per minute
lbs/hr: pounds per operational hour
lbs/day: pounds per day
lbs: pounds
gal: gallons
ND: None Detected; Recovery data calculated using laboratory detection limits
Notes:

1. Molecular weights used in recovery calculations are 65 for TPH and 78 for benzene.
2. Densities used in recovery calculations are 6.0 lbs/gal for TPH and 7.25 lbs/gal for benzene.
3. All data and calculations on this page were prepared by GeoStrategies, Inc. (GSI), as presented in *Letter Report, Vapor Extraction Start Up and Quarterly Groundwater Monitoring, Second Quarter 1994,* (GSI, September 1994).

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2169	Vapor Treatment Unit: ThermTech Model
Location: 889 West Grand Avenue	VAC-25, 250cfm Thermal/
Oakland, California	Catalytic Oxidizer
Consultant: EMCON	Start-Up Date: 06-02-94
1921 Ringwood Avenue	Reporting Period From: 06-02-94
San Jose, California	To: 09-27-95

Date Begin:		06-30-94	07-15-94	07-20-94	08-01-94	08-15-94
Date End:		07-15-94	07-20-94	08-01-94	08-15-94	09-13-94
Mode of Oxidation:		Thermal	Thermal	Thermal	Catalytic	Catalytic
Days of Operation:		6.9	3.8	0.3	7.2	10.0
Days of Downtime:		7.8	1.5	11.7	6.8	18.7
Vapor Monitoring Concentrations						
Well Field Influent:	mg/m3 as gasoline (1) (2)	NA (11)	NA	NA	NA	NA
	ppmv as gasoline (3)	NA	NA	NA	NA	NA
	mg/m3 as benzene (4)	NA	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA	NA
System Influent:	mg/m3 as gasoline	5410	2030	1840	1840	1220
	ppmv as gasoline	2000	750	680	680	450
	mg/m3 as benzene	101	32	19	29.5	9.4
	ppmv as benzene	31	10	6	9.1	2.9
System Effluent:	mg/m3 as gasoline	29.7	ND	141	95	11.1
	ppmv as gasoline	11	ND	52	35	4.1
	mg/m3 as benzene	ND (12)	ND	3.6	1.01	0.143
	ppmv as benzene	ND	ND	1.1	0.31	0.044
Well Field Flow Rate, scfm (5):		164.4	197.7	183.9	206.4	211.7
System Influent Flow Rate, scfm:		169.5	195.2	186.7	195.6	212.8
Destruction Efficiency, percent (6):		99.5	98.5	92.3	94.8	99.1
Emission Rates (pounds per day) (7)						
Gasoline:		0.45	<1.05	2.36	1.67	0.21
Benzene:		*<0.01*	*<0.01*	*0.06*	*0.02*	*0.00*
Operating Hours This Period:		165.1	90.1	8.3	173.3	241.0
Operating Hours To Date:		733.3	823.4	831.7	1005.0	1246.0
Pounds/ Hour Removal Rate, as gasoline (8):		3.43	1.48	1.29	1.35	0.97
Pounds Removed This Period, as gasoline (9):		566.6	133.6	10.7	233.4	234.2
Pounds Removed To Date, as gasoline:		3757.7	3891.3	3902.0	4135.4	4369.6
Gallons Removed This Period, as gasoline (10):		94.5	22.3	1.8	38.9	39.0
Gallons Removed To Date, as gasoline:		626.4	648.7	650.5	689.4	728.4

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2169	Vapor Treatment Unit: ThermTech Model VAC-25, 250cfm Thermal/ Catalytic Oxidizer
Location: 889 West Grand Avenue, Oakland, California	
Consultant: EMCON, 1921 Ringwood Avenue, San Jose, California	Start-Up Date: 06-02-94
	Reporting Period From: 06-02-94
	To: 09-27-95

Date Begin:		09-13-94	10-27-94	11-29-94	01-03-95	02-01-95
Date End:		10-27-94	11-29-94	01-03-95	02-01-95	03-03-95
Mode of Oxidation:		Catalytic	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		34.5	0.3	18.5	23.0	0.0
Days of Downtime:		9.6	32.7	16.5	6.0	30.0
Vapor Monitoring Concentrations						
Well Field Influent:	mg/m3 as gasoline (1)	NA	NA (15)	5600	<60	NA
	ppmv as gasoline (3) (13)	NA	NA	1500	<17	NA
	mg/m3 as benzene (4)	NA	NA	22	<0.5	NA
	ppmv as benzene (14)	NA	NA	7	<0.1	NA
System Influent:	mg/m3 as gasoline	1220	NA	1600	<60	NA
	ppmv as gasoline	450	NA	440	<17	NA
	mg/m3 as benzene	9.4	NA	6	<0.5	NA
	ppmv as benzene	2.9	NA	1.9	<0.1	NA
System Effluent:	mg/m3 as gasoline	11.1	NA	<60	<60	NA
	ppmv as gasoline	4.1	NA	<17	<17	NA
	mg/m3 as benzene	0.143	NA	<0.5	<0.5	NA
	ppmv as benzene	0.044	NA	<0.1	<0.1	NA
Well Field Flow Rate, scfm (5):		213.6	36.6	24.3	19.5	0.0
System Influent Flow Rate, scfm:		213.6	126.9	139.3	163.5	0.0
Destruction Efficiency, percen (6):		99.1	NA	96.3	NA	NA
Emission Rates (pounds per day (7)						
Gasoline:		0.21	NA	<0.75	<0.88	0.00
Benzene:		0.00	NA	<0.01	<0.01	0.00
Operating Hours This Period:		828.7	7.1	443.7	552.2	0.0
Operating Hours To Date:		2074.7	2081.8	2525.5	3077.7	3077.7
Pounds/ Hour Removal Rate, as gasoline (8):		0.98	0.00	0.83	0.04	0.00
Pounds Removed This Period, as gasoline (9):		808.3	0.0	370.1	20.3	0.0
Pounds Removed To Date, as gasoline:		5177.8	5177.8	5547.9	5568.2	5568.2
Gallons Removed This Period, as gasoline (10):		134.7	0.0	61.7	3.4	0.0
Gallons Removed To Date, as gasoline:		863.1	863.1	924.8	928.2	928.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2169
Location: 889 West Grand Avenue
Oakland, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: ThermTech Model VAC-25, 250cfm Thermal/ Catalytic Oxidizer

Start-Up Date: 06-02-94
Reporting Period From: 06-02-94
To: 09-27-95

Date Begin:	03-03-95	03-31-95	04-28-95	05-30-95
Date End:	03-31-95	04-28-95	05-30-95	06-28-95
Mode of Oxidation:	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:	0.0	0.0	0.0	0.1
Days of Downtime:	28.0	28.0	32.0	28.9
Vapor Monitoring Concentrations				
Well Field Influent: mg/m3 as gasoline (1)	NA	NA	NA	NA
ppmv as gasoline (3) (13)	NA	NA	NA	NA
mg/m3 as benzene	NA	NA	NA	NA
ppmv as benzene (14)	NA	NA	NA	NA
System Influent: mg/m3 as gasoline	NA	NA	NA	NA
ppmv as gasoline	NA	NA	NA	NA
mg/m3 as benzene	NA	NA	NA	NA
ppmv as benzene	NA	NA	NA	NA
System Effluent: mg/m3 as gasoline	NA	NA	NA	NA
ppmv as gasoline	NA	NA	NA	NA
mg/m3 as benzene	NA	NA	NA	NA
ppmv as benzene	NA	NA	NA	NA
Well Field Flow Rate, scfm (5):	0.0	0.0	0.0	0.0
System Influent Flow Rate, scfm:	0.0	0.0	0.0	0.0
Destruction Efficiency, percent (6):	NA	NA	NA	NA
Emission Rates (pounds per day) (7)				
Gasoline:	0.00	0.00	0.00	0.00
Benzene:	0.00	0.00	0.00	0.00
Operating Hours This Period:	0.0	0.0	0.0	1.8
Operating Hours To Date:	3077.7	3077.7	3077.7	3079.5
Pounds/ Hour Removal Rate, as gasoline (8):	0.00	0.00	0.00	0.00
Pounds Removed This Period, as gasoline (9):	0.0	0.0	0.0	0.0
Pounds Removed To Date, as gasoline:	5568.2	5568.2	5568.2	5568.2
Gallons Removed This Period, as gasoline (10):	0.0	0.0	0.0	0.0
Gallons Removed To Date, as gasoline:	928.2	928.2	928.2	928.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2169	Vapor Treatment Unit: ThermTech Model VAC-25, 250cfm Thermal/ Catalytic Oxidizer
Location: 889 West Grand Avenue, Oakland, California	
Consultant: EMCON, 1921 Ringwood Avenue, San Jose, California	Start-Up Date: 06-02-94
	Reporting Period From: 06-02-94
	To: 09-27-95

Date Begin:		06-28-95	07-28-95	08-28-95
Date End:		07-28-95	08-28-95	09-27-95
Mode of Oxidation:		Catalytic	Catalytic	Catalytic
Days of Operation:		11.0	19.2	27.2
Days of Downtime:		19.0	11.8	2.8
Vapor Monitoring Concentrations				
Well Field Influent:	mg/m3 as gasoline (1) (16)	8000	8800	5200
	ppmv as gasoline (3)	2200	2400	1400
	mg/m3 as benzene	59	32	10
	ppmv as benzene	18	10	3.1
System Influent:	mg/m3 as gasoline	740	1200	920
	ppmv as gasoline	200	340	230
	mg/m3 as benzene	5.2	4.6	1.8
	ppmv as benzene	1.6	1.4	0.6
System Effluent:	mg/m3 as gasoline	83	<60	<60
	ppmv as gasoline	23	<15	<15
	mg/m3 as benzene	<0.5	<0.5	<0.5
	ppmv as benzene	0.1	<0.1	<0.1
Well Field Flow Rate, scfm (5):		24.0	44.2	54.0
System Influent Flow Rate, scfm:		200.3	172.1	171.4
Destruction Efficiency, percent (6):		88.8	95.0	93.5
Emission Rates (pounds per day) (7)				
Gasoline:		1.49	<0.93	<0.92
Benzene:		<0.01	<0.01	<0.01
Operating Hours This Period:		263.0	462.4	652.3
Operating Hours To Date:		3342.5	3804.9	4457.2
Pounds/ Hour Removal Rate, as gasoline (8):		0.55	0.77	0.59
Pounds Removed This Period, as gasoline (9):		145.9	357.4	385.0
Pounds Removed To Date, as gasoline:		5714.1	6071.5	6456.5
Gallons Removed This Period, as gasoline (10):		24.3	59.6	64.2
Gallons Removed To Date, as gasoline:		952.5	1012.1	1076.3

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number:	2169	Vapor Treatment Unit:	ThermTech Model VAC-25, 250cfm Thermal/ Catalytic Oxidizer
Location:	889 West Grand Avenue Oakland, California		
Consultant:	EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date:	06-02-94
		Reporting Period From:	06-02-94
		To:	09-27-95

CURRENT REPORTING PERIOD:	06-28-95	to	09-27-95
DAYS / HOURS IN PERIOD:	91.0		2184.0
DAYS / HOURS OF OPERATION:	57.4		1377.7
DAYS / HOURS OF DOWN TIME:	33.6		806.3
PERCENT OPERATIONAL:			63.1 %
PERIOD POUNDS REMOVED:	888.3		
PERIOD GALLONS REMOVED:	148.1		
AVERAGE WELL FIELD FLOW RATE (scfm):			45.0
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):			177.2

1. mg/m3: milligrams per cubic meter
2. Concentration (as gasoline in mg/m3) = [concentration (as gasoline in ppmv) x 65 lb/lb-mole / 24.05 (lb/m3/lb-mole of air)/mg] (rounded as appropriate)
3. ppmv: parts per million by volume
4. Concentration (as benzene in mg/m3) = [concentration (as benzene in ppmv) x 78 lb/lb-mole / 24.05 (lb/m3/lb-mole of air)/mg] (rounded as appropriate)
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. Pounds/ hour removal rate (as gasoline) = system influent concentration (as gasoline in mg/m3) x system influent flow rate (scfm) x 0.02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
9. Pounds removed this period (as gasoline) = pounds/ hour removal rate x hours of operation
10. *Gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0.1667 gallons/pound of gasoline*
11. NA: not analyzed
12. ND: Not detected at or above the method reporting limit
13. Beginning November 29, 1994:
    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 (rounded as appropriate)
14. Beginning November 29, 1994:
    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 (rounded as appropriate)
15. System was down for this entire period. The system was operated for 7.1 hour on fresh air for check system operation. No samples were collected.
16. During the period beginning June 28, 1995, the laboratory started reporting gasoline and benzene vapor monitoring results in both mg/m3 and ppmv.

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-14-95

Date	Well Identification											
	A-1			A-2			A-3			A-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
06-02-94	open	12,300 FID	12	open	560 FID	10	open	90 FID	14	open	0 FID	9
06-07-94	open	8,200 FID	68	closed	600 FID	NA	closed	10 FID	NA	closed	0 FID	NA
06-16-94	open	3,600 FID	54	closed	70 FID	0	closed	0 FID	0	closed	0 FID	0
06-22-94	open	1,800 FID	81	open	260 FID	6	open	0 FID	12	open	0 FID	2
06-30-94	open	2,800 FID	67	open	450 FID	14	open	10 FID	NA	closed	0 FID	0
07-15-94	open	1,350 FID	64	open	160 FID	62	closed	50 FID	NA	closed	20 FID	NA
07-15-94	open	2,860 FID	72	open	510 FID	71	closed	80 FID	NA	closed	30 FID	NA
07-20-94	open	2,300 FID	76	open	1,200 FID	78	closed	0 FID	NA	closed	20 FID	NA
08-01-94	open	3,000 FID	68 - 73	open	700 FID	68 - 73	closed	20 FID	68 - 73	closed	4,300 FID	68 - 73
08-15-94	open	1,200 FID	73	open	400 FID	71	open	20 FID	4	open	0 FID	2
09-13-94	open	410 FID	57	open	400 FID	62	closed	400 FID	NA	closed	0 FID	NA
11-02-94	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
12-15-94	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
12-30-94	passive	NA	NA	passive	NA	NA	passive	NA	NA	passive	NA	NA
01-13-95	passive	NA	0	passive	NA	0	passive	NA	0	passive	NA	0
01-26-95	passive	NA	0	passive	NA	0	passive	NA	0	passive	NA	0
07-17-95	System was shut down on January 26, 1995.			System was restarted on July 17, 1995.								
07-17-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
07-25-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-22-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
09-21-95	closed	NA	0	closed	NA	0	closed	NA	0	closed	NA	0
09-21-95	open	NA	46	closed	NA	0	closed	NA	0	closed	NA	0

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

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-14-95

Date	Well Identification											
	AV-1			AV-2			AV-3			AV-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
06-02-94	open	3,000 FID	8	open	13,470 FID	12	open	13,670 FID	12	open	13,680 FID	9
06-07-94	closed	2,800 FID	NA	open	4,100 FID	38	open	12,600 FID	74	open	14,110 FID	74
06-16-94	closed	0 FID	40	open	1,250 FID	55	open	2,400 FID	57	open	9,000 FID	55
06-22-94	open	0 FID	80	open	750 FID	80	open	1,100 FID	82	open	4,400 FID	83
06-30-94	open	0 FID	56	open	1,000 FID	55	open	900 FID	69	open	6,300 FID	68
07-15-94	closed	100 FID	NA	open	750 FID	64	open	570 FID	64	open	7,160 FID	64
07-15-94	closed	130 FID	NA	open	4,500 FID	74	open	1,470 FID	74	open	12,780 FID	73
07-20-94	closed	30 FID	NA	open	1,200 FID	78	open	2,300 FID	79	open	3,200 FID	75
08-01-94	closed	80 FID	68 - 73	open	1,000 FID	68 - 73	open	800 FID	68 - 73	open	4,300 FID	68 - 73
08-15-94	open	80 FID	80	open	1,900 FID	74	open	500 FID	73	open	2,100 FID	73
09-13-94	closed	10 FID	NA	open	300 FID	65	open	230 FID	65	open	440 FID	64
11-02-94	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
12-15-95	open	NA	32	open	2.1 FID	35	closed	NA	NA	open	>1000 FID	34
12-30-94	passive	NA	NA	passive	NA	NA	passive	NA	NA	open	679 PID	16
01-13-95	passive	NA	15	passive	NA	0	passive	NA	0	open	463 PID	16
01-26-95	passive	NA	27	passive	NA	0	passive	NA	0	open	1.8 FID	30
07-17-95	System was shut down on January 26, 1995.			System was restarted on July 17, 1995.								
07-17-95	open	NA	NA	open	NA	NA	open	NA	NA	closed	NA	NA
07-25-95	open	1026 PID	42	open	1364 PID	42	open	869 PID	42	closed	NA	NA
07-25-95	open	1200 LAB	NA	open	1600 LAB	NA	open	980 LAB	NA	closed	NA	NA
08-22-95	open	NA	42	open	NA	44	open	NA	44	closed	NA	NA
09-21-95	open	NA	43	open	NA	47	open	NA	47	closed	NA	0
09-21-95	open	NA	46	open	NA	46	open	NA	46	closed	NA	1

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

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-14-95

Date	Well Identification											
	AV-5			AV-6			AV-7			AR-2		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG *ppmv*	Vacuum Response *in-H2O*
06-02-94	open	13,680 FID	11	open	13,650 FID	12	open	13,690 FID	10	open	10 FID	11
06-07-94	open	13,400 FID	74	closed	40 FID	NA	open	13,800 FID	74	closed	30 FID	NA
06-16-94	open	1,250 FID	56	closed	240 FID	0	open	3,200 FID	56	closed	0 FID	0
06-22-94	open	600 FID	82	open	70 FID	26	open	1,800 FID	82	open	20 FID	22
06-30-94	open	1,180 FID	33	open	10 FID	20	*open*	*2,200 FID*	69	open	*0 FID*	13
07-15-94	open	2,120 FID	64	closed	200 FID	NA	open	2,000 FID	64	closed	15 FID	NA
07-15-94	open	9,150 FID	72	closed	760 FID	NA	open	8,200 FID	74	closed	20 FID	NA
07-20-94	open	1,200 FID	78	closed	20 FID	NA	open	2,100 FID	78	closed	200 FID	NA
08-01-94	open	2,560 FID	68 - 73	closed	160 FID	68 - 73	open	800 FID	68 - 73	closed	30 FID	68 - 73
08-15-94	open	1,100 FID	72	open	160 FID	26	open	80 FID	73	open	130 FID	30
09-13-94	open	40 FID	59	open	10 FID	20	open	20 FID	50	*closed*	*500 FID*	*66*
11-02-94	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
12-15-94	closed	NA	NA	open	310 FID	11	closed	NA	NA	closed	NA	NA
12-30-94	passive	NA	NA	open	42 PID	16	passive	NA	NA	passive	NA	NA
01-13-95	passive	NA	1	open	46 PID	16	passive	NA	0	passive	NA	0
01-26-95	open	2.2 FID	30	open	2.3 FID	30	passive	NA	0	passive	NA	0
07-17-95	System was shut down on January 26, 1995.			System was restarted on July 17, 1995.								
07-17-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
07-25-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-22-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	open	NA	44
09-21-95	closed	NA	0	closed	NA	0	closed	NA	0	open	NA	48
09-21-95	closed	NA	0	open	NA	46	closed	NA	0	open	NA	46

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

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 2169
889 West Grand Avenue, Oakland, CA

Date: 12-14-95

Date	Well Identification											
	ADR-1			ADR-2								
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
06-02-94	open	7,000 FID	11	open	460 FID	13						
06-07-94	open	14,160 FID	73	open	11,910 FID	75						
06-16-94	open	5,400 FID	54	open	5,400 FID	57						
06-22-94	open	2,550 FID	80	open	2,700 FID	83						
06-30-94	open	4,000 FID	67	open	4,300 FID	69						
07-15-94	open	4,010 FID	64	open	2,150 FID	64						
07-15-94	open	7,850 FID	72	open	9,530 FID	93						
07-20-94	open	2,800 FID	78	open	3,500 FID	75						
08-01-94	open	5,100 FID	68 - 73	open	4,250 FID	68 - 73						
08-15-94	open	1,500 FID	72	open	1,800 FID	75						
09-13-94	open	250 FID	58	open	440 FID	66						
11-02-94	closed	NA	NA	closed	NA	NA						
12-15-94	open	>1000 FID	35	open	>1000 FID	36						
12-30-94	open	39 PID	16	open	273 PID	16						
01-13-95	open	58 PID	16	open	160 PID	16						
01-26-95	open	2.2 FID	30	open	4.4 FID	30						
07-17-95	System was shut down on January 26, 1995.			System was restarted on July 17, 1995.								
07-17-95	open	NA	NA	open	NA	NA						
07-25-95	open	1184 PID	42	open	1057 PID	42						
07-25-95	open	1400 LAB	NA	open	1300 LAB	NA						
08-22-95	open	NA	44	open	NA	44						
09-21-95	open	NA	48	open	NA	47						
09-21-95	open	NA	45	open	NA	46						

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

Table 7
Air-Sparge System
Operation and Performance Data

Facility Number: 2169
Location: 889 West Grand Avenue
Oakland, California

Air-Sparge Unit: 3-horse power
Conde blower

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Start-Up Date: 07-15-94
Reporting Period From: 07-15-94
To: 09-21-95

Date Begin:	07-15-94	08-01-94	08-01-94	08-01-94	08-15-94
Date End:	08-01-94	08-01-94	08-01-94	08-15-94	09-13-94
Days of Operation:	5.5	0.0	0.1	7.2	10.0
Days of Downtime:	10.5	0.0	0.0	6.8	18.7
Air-Sparge Well Status:					
AS-1	open	open	open	open	open
AS-2	open	open	open	open	open
AS-3	open	open	open	open	open
AS-4	open	open	open	open	open
AS-5	open	open	open	open	open
Air-Sparge Well Pressure (psig) (1):					
AS-1	2.8	2.8	3.0	2.0	2.4
AS-2	3.0	3.0	2.8	2.2	2.4
AS-3	3.6	3.6	3.8	3.1	2.2
AS-4	3.1	3.1	3.4	3.0	2.8
AS-5	2.8	2.8	3.2	2.8	3.2
Total Air-Sparge Flow Rate (scfm) (2):	25.0	29.0	29.0	27.0	29.0
Total Air-Sparge Pressure (psig):	5.0	2.8	2.8	2.6	3.0
Dissolved Oxygen (mg/L) (3):					
Air-Sparge Wells:					
AS-1	NA (4)	NA	NA	NA	NA
AS-2	NA	NA	NA	NA	NA
AS-3	NA	NA	NA	NA	NA
AS-4	NA	NA	NA	NA	NA
AS-5	NA	NA	NA	NA	NA
Depth to Water (ft-BGS) (5):					
Air-Sparge Wells:					
AS-1	NA	NA	NA	NA	NA
AS-2	NA	NA	NA	NA	NA
AS-3	NA	NA	NA	NA	NA
AS-4	NA	NA	NA	NA	NA
AS-5	NA	NA	NA	NA	NA

Table 7
Air-Sparge System
Operation and Performance Data

Facility Number: 2169
Location: 889 West Grand Avenue
Oakland, California

Air-Sparge Unit: 3-horse power
Conde blower

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Start-Up Date: 07-15-94
Reporting Period From: 07-15-94
To: 09-21-95

Date Begin:	09-13-94	11-28-94	01-03-95	02-03-95	03-31-95
Date End:	11-28-94	01-03-95	02-03-95	03-31-95	06-28-95
Days of Operation:	0.0	0.0	0.0	0.0	0.0
Days of Downtime:	76.0	36.0	31.0	56.0	89.0
Air-Sparge Well Status:					
AS-1	closed	closed	closed	closed	closed
AS-2	closed	closed	closed	closed	closed
AS-3	closed	closed	closed	closed	closed
AS-4	closed	closed	closed	closed	closed
AS-5	closed	closed	closed	closed	closed
Air-Sparge Well Pressure (psig) (1):					
AS-1	0.0	0.0	0.0	0.0	0.0
AS-2	0.0	0.0	0.0	0.0	0.0
AS-3	0.0	0.0	0.0	0.0	0.0
AS-4	0.0	0.0	0.0	0.0	0.0
AS-5	0.0	0.0	0.0	0.0	0.0
Total Air-Sparge Flow Rate (scfm) (2):	0.0	0.0	0.0	0.0	0.0
Total Air-Sparge Pressure (psig):	0.0	0.0	0.0	0.0	0.0
Dissolved Oxygen (mg/L) (3):					
Air-Sparge Wells:					
AS-1	1.4	NA	NA	NA	NA
AS-2	1.2	NA	NA	NA	NA
AS-3	1.2	NA	NA	NA	NA
AS-4	0.8	NA	NA	NA	NA
AS-5	1.4	NA	NA	NA	NA
Depth to Water (ft-BGS) (5):					
Air-Sparge Wells:					
AS-1	10.55	NA	NA	8.79	NA
AS-2	11.29	NA	NA	9.37	NA
AS-3	10.78	NA	NA	8.93	NA
AS-4	10.27	NA	NA	8.43	NA
AS-5	10.65	NA	NA	8.80	NA

Table 7
Air-Sparge System
Operation and Performance Data

Facility Number: 2169
Location: 889 West Grand Avenue
Oakland, California

Air-Sparge Unit: 3-horse power
Conde blower

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Start-Up Date: 07-15-94
Reporting Period From: 07-15-94
To: 09-21-95

Date Begin:	07-25-95	08-10-95	08-22-95
Date End:	08-10-95	08-22-95	09-21-95
Days of Operation:	2.1	0.0	10.9
Days of Downtime:	14.0	12.0	18.6
Air-Sparge Well Status:			
AS-1	open	open	open
AS-2	closed	closed	closed
AS-3	closed	closed	closed
AS-4	open	open	open
AS-5	closed	closed	open
Air-Sparge Well Pressure (psig) (1):			
AS-1	8.9	5.5	7.0
AS-2	0.0	0.0	0.0
AS-3	0.0	0.0	0.0
AS-4	2.0	2.3	1.5
AS-5	0.0	0.0	1.0
Total Air-Sparge Flow Rate (scfm) (2):	2.0	2.0	6.0
Total Air-Sparge Pressure (psig):	50	45	45
Dissolved Oxygen (mg/L) (3):			
Air-Sparge Wells:			
AS-1	1.1	NA	NA
AS-2	NA	NA	NA
AS-3	NA	NA	NA
AS-4	1.4	NA	NA
AS-5	1.0	NA	NA
Depth to Water (ft-BGS) (5):			
Air-Sparge Wells:			
AS-1	11.75	NA	NA
AS-2	NA	NA	NA
AS-3	NA	NA	NA
AS-4	11.31	NA	NA
AS-5	11.62	NA	NA

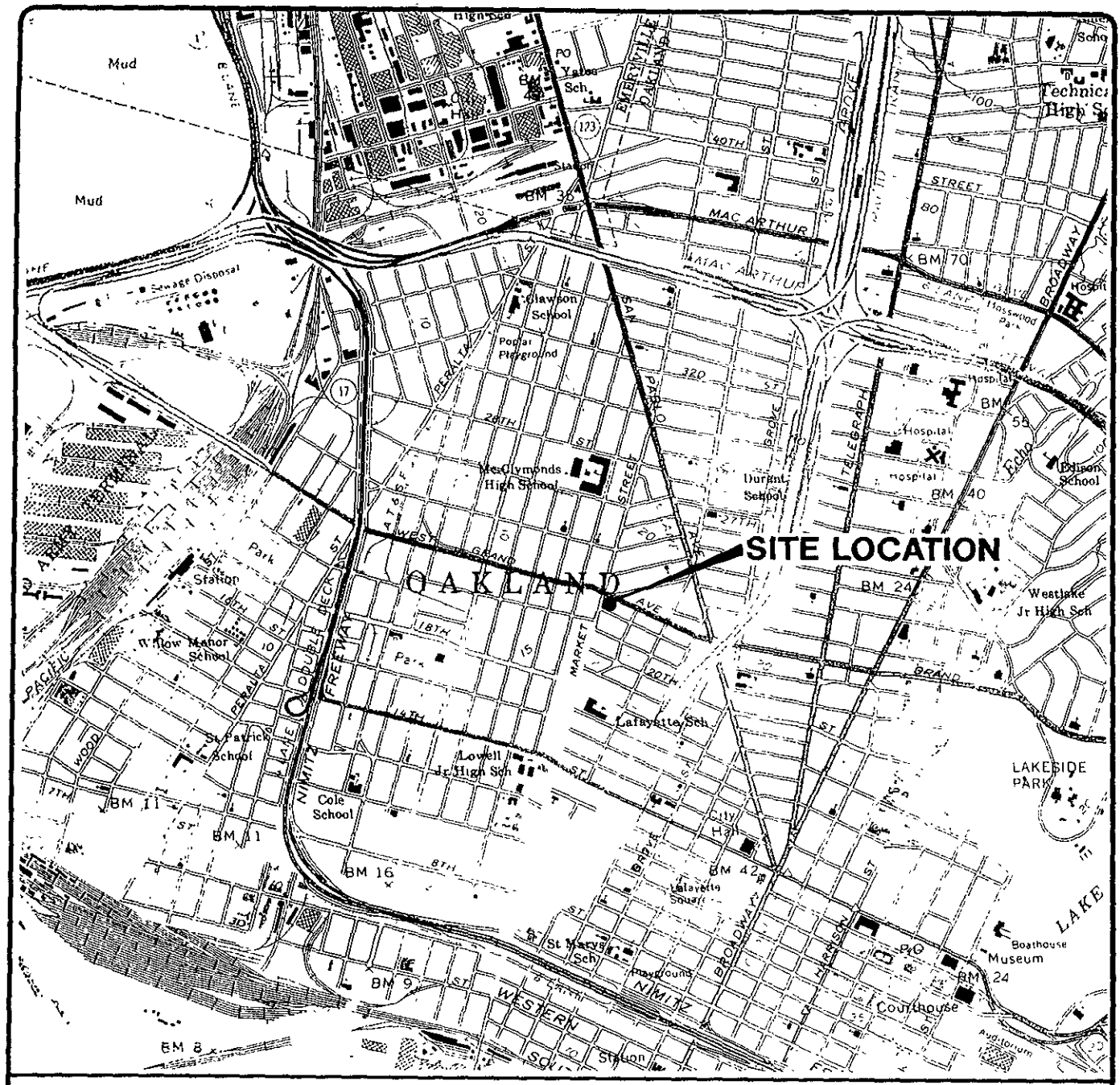
Table 7
Air-Sparge System
Operation and Performance Data

Facility Number:	2169	Air-Sparge Unit:	3-horse power Conde blower
Location:	889 West Grand Avenue Oakland, California		
Consultant:	EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date:	07-15-94
		Reporting Period From:	07-15-94
		To:	09-21-95

CURRENT REPORTING PERIOD:	07-25-95	to	09-21-95
DAYS / HOURS IN PERIOD:	58.0		1392
DAYS / HOURS OF OPERATION:	13.0		312
DAYS / HOURS OF DOWN TIME:	45.0		1080
PERCENT OPERATIONAL:			22.4%

1. psig: pounds per square inch gauge
2. scfm: standard cubic feet per minute at 14.7 psi and 70° F
3. mg/L: milligrams per liter
4. NA: not available or not analyzed
5. ft-BGS: feet below grade surface

152753

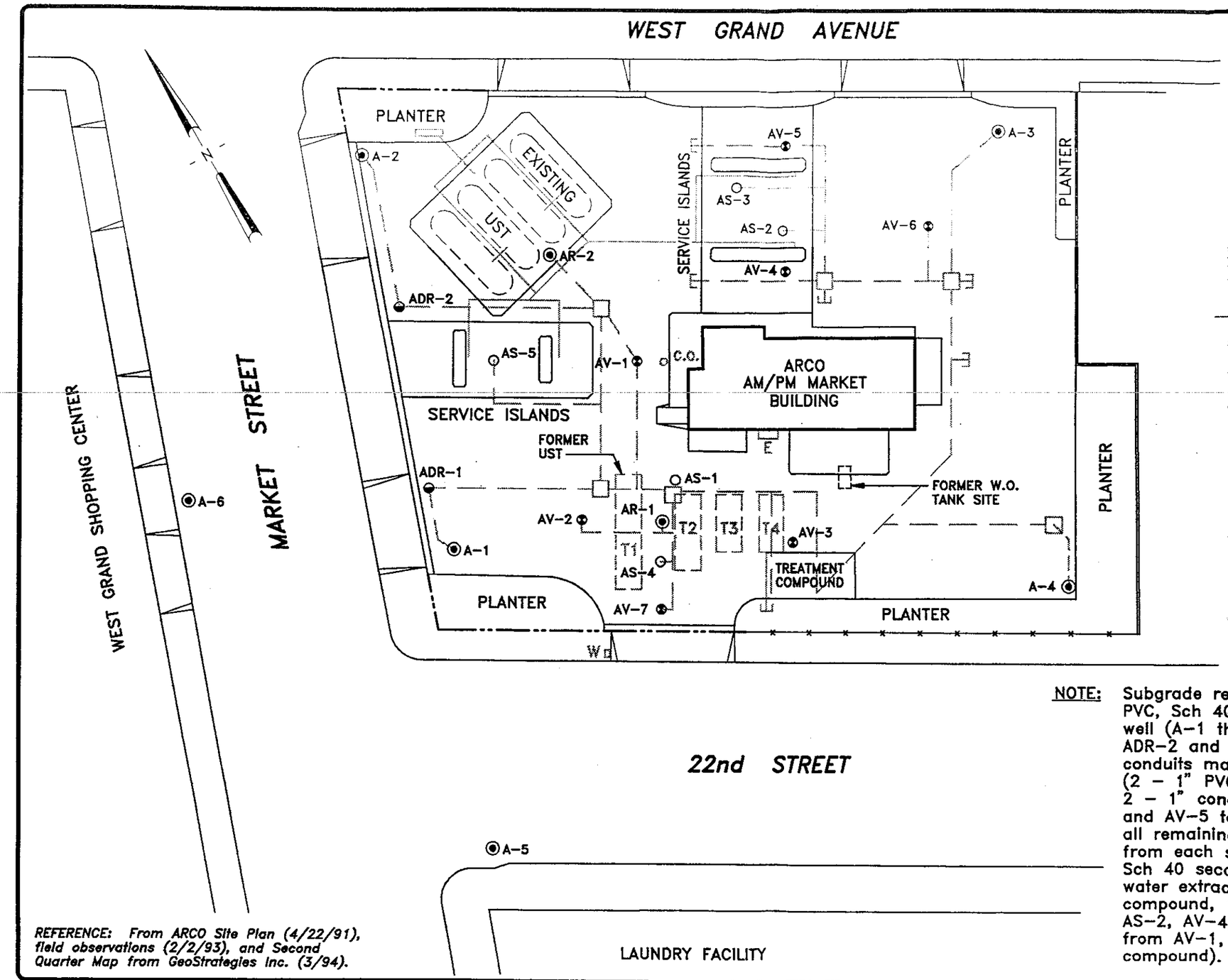


EMCON

ARCO PRODUCTS COMPANY
SERVICE STATION 2169, 889 WEST GRAND AVE.
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

SITE LOCATION

FIGURE
1
PROJECT NO.
805-129.02



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Groundwater monitoring/vapor extraction well
- Air sparging well
- Junction box
- Centerline of trench carrying subgrade remediation piping (See note below)
- Stub-out (pipes capped below grade). A brass monument marker exists above the stub-out location
- C.O. Sewer clean out
- E Existing electrical panel
- W D Water meter
- Wells A-1, A-2, A-3, A-4, and AR-2 also serve as vapor extraction wells.

NOTE: Subgrade remediation piping consists of individual 2" PVC, Sch 40 vapor lines from each vapor extraction well (A-1 through A-4, AV-1 through AV-7, ADR-1, ADR-2 and AR-2), two 1" PVC Sch 40 electrical conduits manifolded to each well and stubout location (2 - 1" PVC elec. conduits from A-4 to compound, 2 - 1" conduits from A-3, AV-6, AV-4, AS-2, AS-3 and AV-5 to compound, and 2 - 1" conduits connecting all remaining wells), a 2" Sch 80 PVC air sparge pipe from each sparge well to the compound and a 4" PVC Sch 40 secondary containment pipe for future groundwater extraction (1 - 4" pipe from A-4 to manifold compound, 1 - 4" manifold pipe from AV-5, AS-3, AS-2, AV-4, AV-6 and A-3 to compound, 1 - 4" pipe from AV-1, AS-1, AV-3 and one from other wells to compound).

REFERENCE: From ARCO Site Plan (4/22/91), field observations (2/2/93), and Second Quarter Map from GeoStrategies Inc. (3/94).

EMCON

SCALE: 0 40 80 FEET

ARCO PRODUCTS COMPANY
SERVICE STATION 2169, 889 WEST GRAND AVENUE
OAKLAND, CALIFORNIA

SITE PLAN

FIGURE NO. 2

PROJECT NO. 805-129.02

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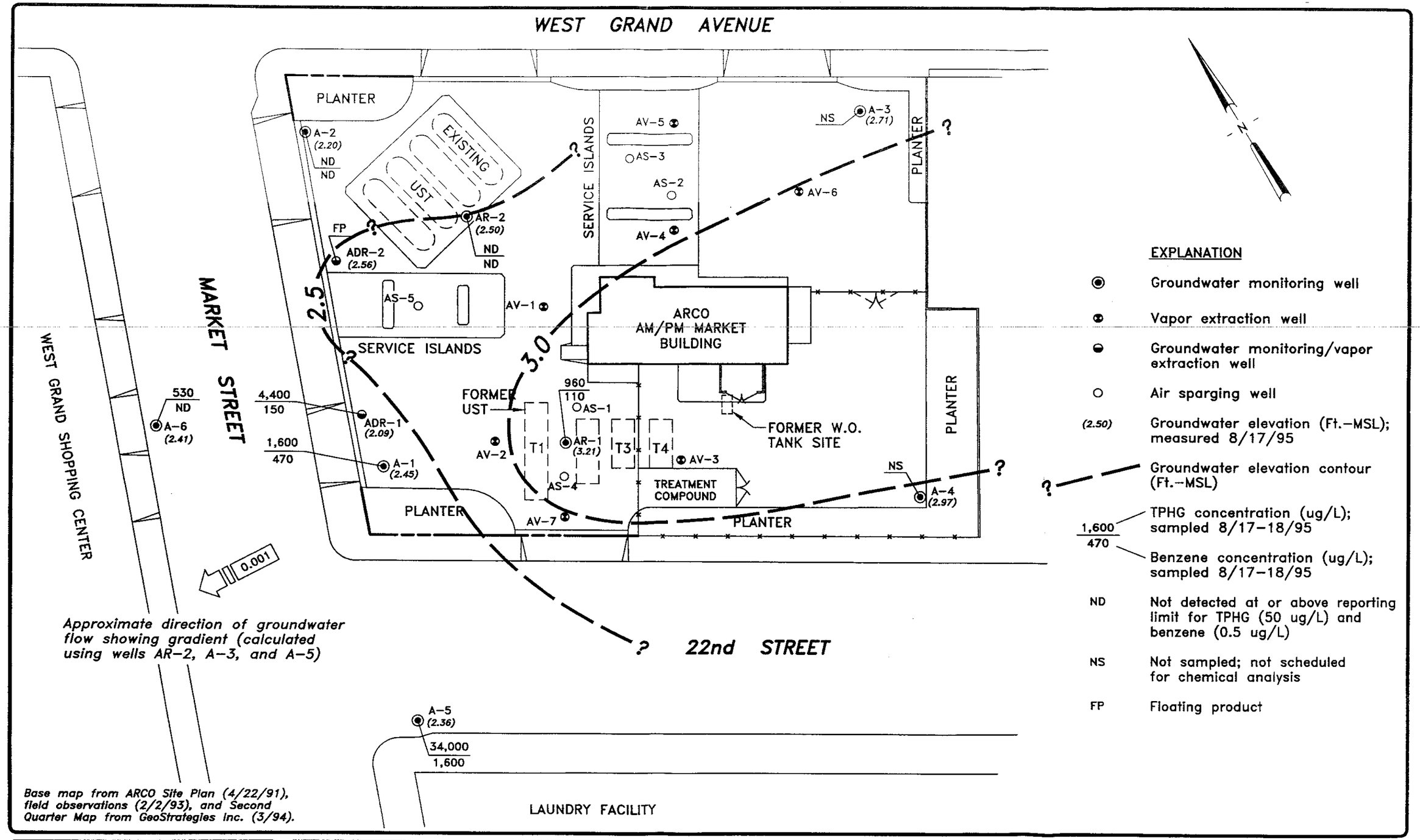

EMCON

SCALE: 0 40 80 FEET

ARCO PRODUCTS COMPANY
SERVICE STATION 2169, 889 WEST GRAND AVENUE
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

GROUNDWATER DATA
THIRD QUARTER 1995

FIGURE NO.
3
PROJECT NO.
805-129.02

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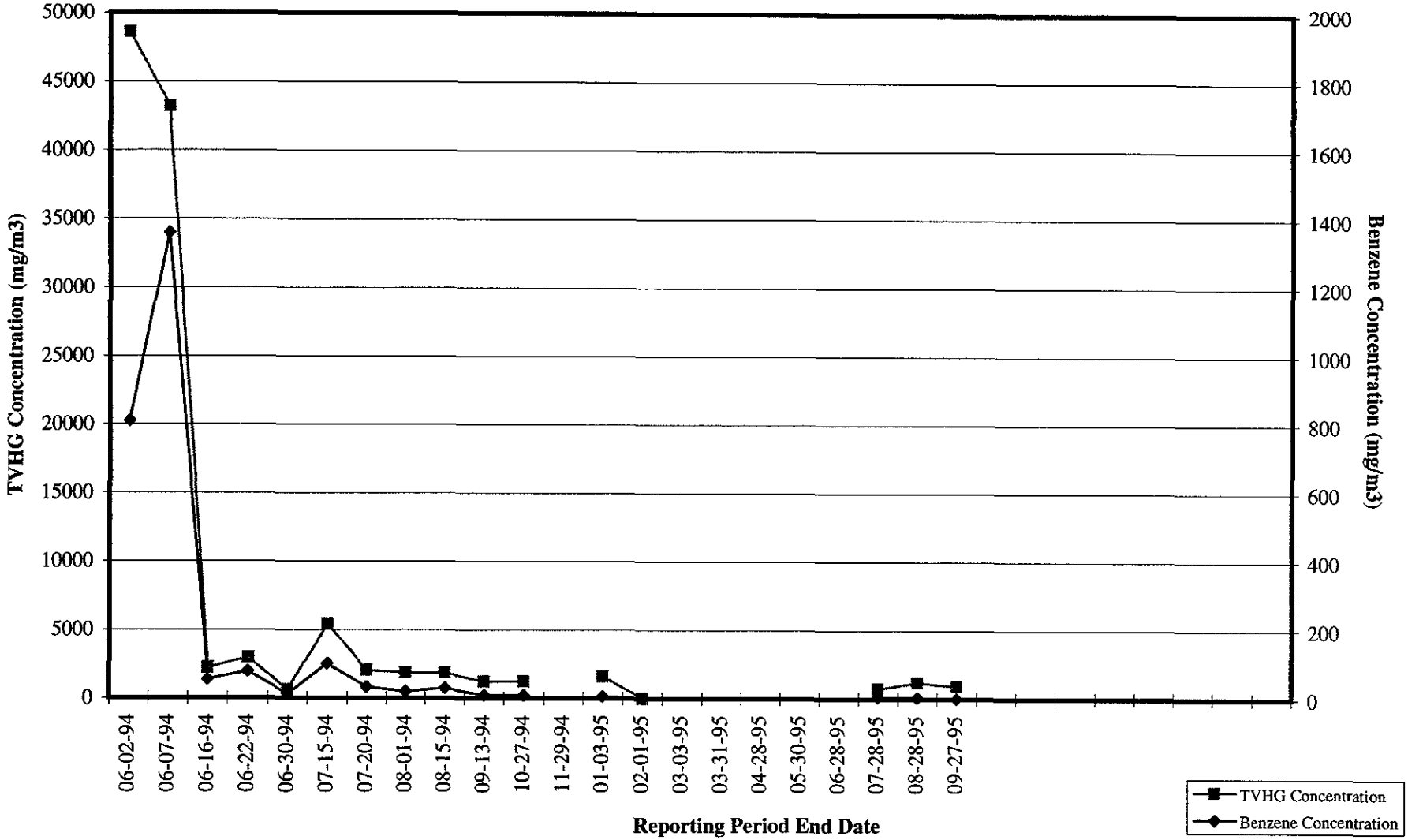
Figure 4

ARCO Service Station 2169
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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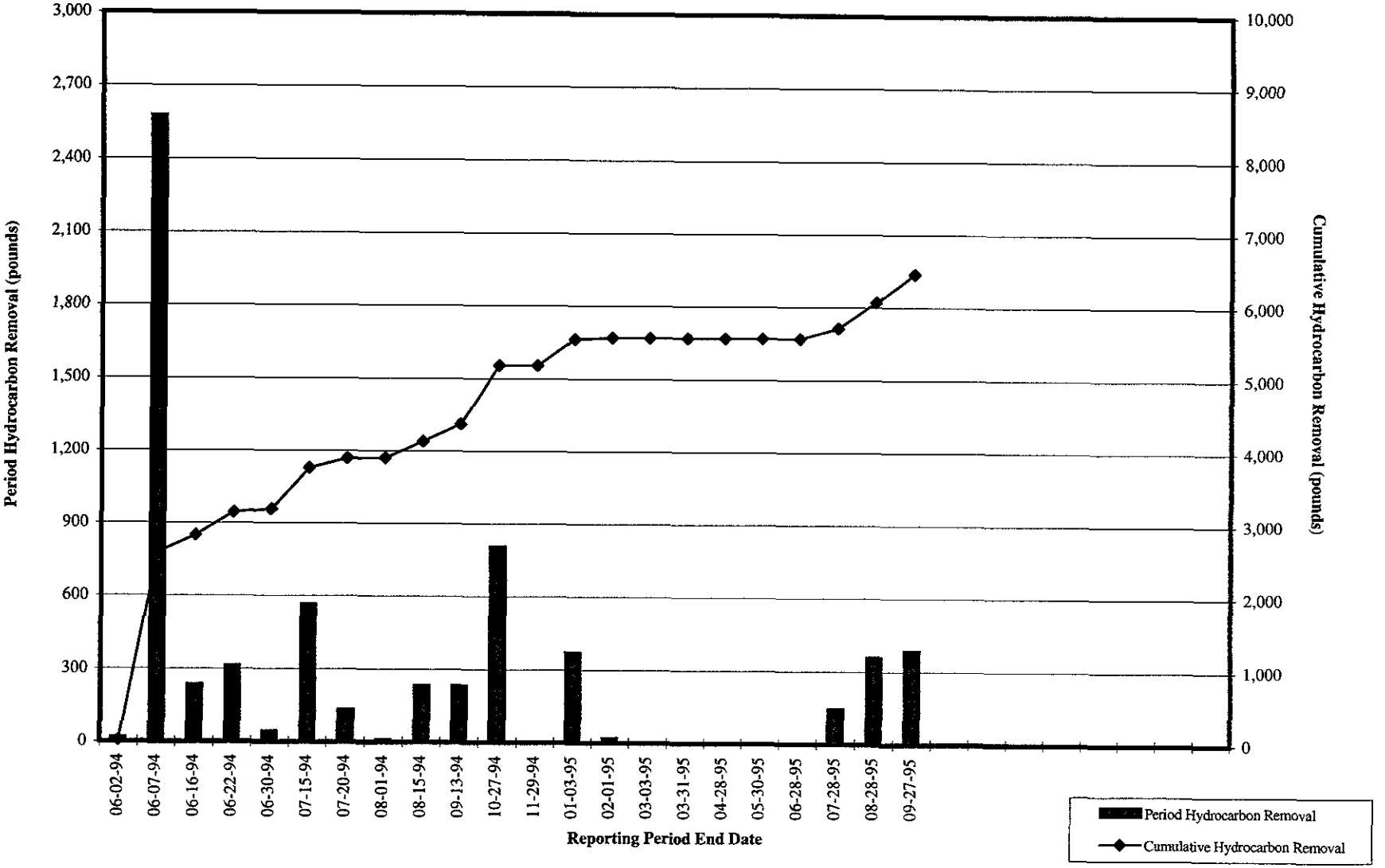
20805-129.002

Figure 5

ARCO Service Station 2169
Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates



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20805-129.002

APPENDIX A

FIELD DATA SHEETS, SECOND QUARTER 1995 GROUNDWATER MONITORING EVENT

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 1775-235.01 STATION ADDRESS : 899 West Grand Avenue DATE : 8-17-95

ARCO STATION # : 2169 FIELD TECHNICIAN : [signature] DAY : THURSDAY

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	A-2	OK	YES	BAD	BOX	BOX	[illegible]	[illegible]	ND	ND	26.2	WATER IN BOX
2	A-3	OK	YES	BAD	BOX	BOX	13.04	13.04	ND	ND	29.1	"
3	A-4	OK	YES	OK	BOX	BOX	12.28	12.28	ND	ND	28.4	
4	AR-2	OK	YES	OK	LID	LID	12.78	12.78	ND	ND	29.2	
5	A-6	OK	YES	G-S	ARCO	YES	11.10	11.10	ND	ND	27.7	CAR
6	AR-1	OK	YES	BAD	BOX	BOX	12.40	12.40	ND	ND	27.9	WATER IN BOX
7	A-1	OK	YES	BAD	BOX	BOX	11.71	11.71	ND	ND	24.4	WATER IN BOX
8	A-5	OK	YES	NONE G-S	ARCO	YES	11.15	11.15	ND	ND	30.3	WATER IN BOX
9	ADR-1	OK	YES	OK	LID	LID	11.86	11.86	ND	ND	21.7	
10	ADR-2	OK	YES	OK	LID	LID	12.10	12.10	12.07	.03	NR	
									[illegible]	.03		

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-235-01 SAMPLE ID: A-1

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2169

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND 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.): 4.65 ~~8.29~~

DEPTH TO WATER (feet): 11.71 11.61 CALCULATED PURGE (gal.): ~~13.95 23.87~~

DEPTH OF WELL (feet): 24.4 ACTUAL PURGE VOL. (gal.): 15

DATE PURGED: 08-18-95 Start (2400 Hr) 1153 End (2400 Hr) 1205

DATE SAMPLED: 08-18-95 Start (2400 Hr) ___ End (2400 Hr) 1209

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1159	5	6.92	1455	77.8	GRAY	HEAVY
1200	10	6.90	1445	75.5	GRAY	HEAVY
1203	15	6.89	1440	74.8	GRAY	MOD

D. O. (ppm): NA ODOR: STRONG NA (COBALT 0 - 500) NA (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK LOCK #: BOX

REMARKS: ___

Meter Calibration: Date: 8-18-95 Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 1 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-235-01 SAMPLE ID: A-2 (26)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2169

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND 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.): 5.07

DEPTH TO WATER (feet): 12.35 1.1 CALCULATED PURGE (gal.): 15.23

DEPTH OF WELL (feet): 26.2 ACTUAL PURGE VOL. (gal.): 15.5

DATE PURGED: 08-17-95 Start (2400 Hr) 1404 End (2400 Hr) 1417

DATE SAMPLED: 08-17-95 Start (2400 Hr) — End (2400 Hr) 1418

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1408	5.5	6.96	1055	78.2	BROWN	HEAVY
1410	10.5	6.96	1027	74.6	CLEAR	TRACE
1417	16.5	6.93	1027	73.9	CLEAR	TRACE

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

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
- ✓ 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 #: BOX ½ NUT

REMARKS: ___

Meter Calibration: Date: 8-17-95 Time: ___ Meter Serial #: 9020 Temperature °F: 86.2

(EC 1000 1028 / 1000) (DI ___) (pH 7 6.99 / 7.00) (pH 10 9.92 / 10.00) (pH 4 3.93 / —)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 2 of 8

1-21

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-235.01 SAMPLE ID: A-5(30)

PURGED BY: M. ROSS CLIENT NAME: ARCO 2169

SAMPLED BY: M. ROSS LOCATION: OAKLAND

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.): 3.12

DEPTH TO WATER (feet): 11.15 CALCULATED PURGE (gal.): 9.38

DEPTH OF WELL (feet): 30.3 ACTUAL PURGE VOL. (gal.): 9.5

DATE PURGED: 8-18-95 Start (2400 Hr) 1200 End (2400 Hr) 1225

DATE SAMPLED: 8-18-95 Start (2400 Hr) 1240 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1205	3.5	6.50	986	73.9	GREY	HEAVY
1220	6.5	7.36	970	73.3	LIGHT GREY	MUD
1225	9.5	7.28	966	72.4	"	"

D. O. (ppm): NA ODOR: NONE

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

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

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

WELL INTEGRITY: GOOD LOCK #: ___

REMARKS: ___

Meter Calibration: Date: 8-18-95 Time: 1150 Meter Serial #: 9210 Temperature °F: 72.6

(EC 1000 1024 / 1000) (DI —) (pH 7 705 / 700) (pH 10 991 / 1000) (pH 4 391 / —)

Location of previous calibration: —

Signature: Mike Ross Reviewed By: [signature] Page 3 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-235-01 SAMPLE ID: MW-6 (27)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2169

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND CA

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

CASING DIAMETER (inches): 2 4/.49 3 ___ 4 ___ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 2.71

DEPTH TO WATER (feet): 11.10 CALCULATED PURGE (gal.): 8.13

DEPTH OF WELL (feet): 27.7 ACTUAL PURGE VOL. (gal.): 9

DATE PURGED: 08-18-95 Start (2400 Hr) 1115 End (2400 Hr) 1127

DATE SAMPLED: 08-18-95 Start (2400 Hr) — End (2400 Hr) 1130

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1120	3	6.97	1109	75.0	GRAY	HEAVY
1124	6	6.93	1198	72.7	GRAY	HEAVY
1127	9	6.98	1190	72.7	GRAY	HEAVY

D. O. (ppm): NA ODOR: STRONG

NA (COBALT 0 - 500) NA (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)

✓ Centrifugal Pump ___ Bailer (PVC)

___ Submersible Pump ___ Bailer (Stainless Steel)

___ Well Wizard™ ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)

___ DDL Sampler ___ Bailer (Stainless Steel)

___ Dipper ___ Submersible Pump

___ Well Wizard™ ___ Dedicated

Other: ___

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: ___ Time: 1014 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 4 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-235-01 SAMPLE ID: ~~MW-1~~ AR-1 (95)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2169

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND 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.): 22.78

DEPTH TO WATER (feet): 12.40 4.41 CALCULATED PURGE (gal.): 68.35

DEPTH OF WELL (feet): 27.9 ACTUAL PURGE VOL. (gal.): 69

DATE PURGED: 08-17-95 Start (2400 Hr) 1450 End (2400 Hr) 1514

DATE SAMPLED: 08-17-95 Start (2400 Hr) ✓ End (2400 Hr) 1520

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1457	23	7.64	1243	75.1	GRAY	MOD
1505	46	7.67	1284	74.3	GRAY	MOD
1514	69	7.70	1280	73.9	CLEAR	CLEAR

D. O. (ppm): NR ODOR: STRONG 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		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: BOX ✓ NOT

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: [signature] Page 5 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-235-01 SAMPLE ID: MW-2 (29)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2169

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND 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.):	10.72
DEPTH TO WATER (feet):	12.78	CALCULATED PURGE (gal.):	32.18
DEPTH OF WELL (feet):	28.2	ACTUAL PURGE VOL. (gal.):	33

DATE PURGED: 08-18-95 Start (2400 Hr) 1032 End (2400 Hr) 1043

DATE SAMPLED: 08-18-95 Start (2400 Hr) — End (2400 Hr) 1048

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1036	11	7.85	963	71.2	GRAY	HEAVY
1039	22	~~7.82~~ 7.62	916	70.7	CLEAR	TRACE
1043	33	7.64	920	70.1	CLEAR	CLEAR

D. O. (ppm): NR ODOR: Slight 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: N/A

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

WELL INTEGRITY: OK LOCK #: LIP

REMARKS: ___

Meter Calibration: Date: 8-18-95 Time: 10:14 Meter Serial #: 9020 Temperature °F: ___

(EC 1000 1.25 / 1000) (DI ___) (pH 7 7.00 / 7.00) (pH 10 10.09 / 10.00) (pH 4 4.00 / —)

Location of previous calibration: ___

Signature: ___ Reviewed By: ___ Page 6 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-235-01 SAMPLE ID: MOR-1

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 2165

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND 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.):	6.47
DEPTH TO WATER (feet):	11.86	CALCULATED PURGE (gal.):	19.28
DEPTH OF WELL (feet):	21.7	ACTUAL PURGE VOL. (gal.):	19.5

DATE PURGED: 08-18-95 Start (2400 Hr) 1240 End (2400 Hr) 1249

DATE SAMPLED: 08-18-95 Start (2400 Hr) ← End (2400 Hr) 1254

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1244	6.5	6.85	1459	76.5	GRAY	HEAVY
1247	13	6.83	1481	74.4	GRAY	HEAVY
1249	19.5	6.83	1475	73.3	GRAY	HEAVY

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

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
✓ 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 #: LID

REMARKS: ___

Meter Calibration: Date: ___ 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 7 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-235.01 SAMPLE ID: ADR-2

PURGED BY: J. Williams CLIENT NAME: ARCO 7169

SAMPLED BY: J. Williams LOCATION: OAKLAND, 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.): NR

DEPTH TO WATER (feet): 12.10 CALCULATED PURGE (gal.): NR

DEPTH OF WELL (feet): 26.3 ACTUAL PURGE VOL. (gal.): NR

DATE PURGED: 6/18/95 Start (2400 Hr) NR End (2400 Hr) NR

DATE SAMPLED: 6/18/95 Start (2400 Hr) NR End (2400 Hr) NR

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: NR COLOR (visual): NR (COBALT 0 - 500) TURBIDITY (visual): NR (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NO

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: ___

Meter Calibration: Date: 6-18-95 Time: ___ Meter Serial #: 9210 Temperature °F: ___

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

Location of previous calibration: AR-2

Signature: [signature] for Joe Williams Reviewed By: SM Page 8 of 8

APPENDIX B

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION FOR GROUNDWATER MONITORING SAMPLES, SECOND QUARTER 1995

Columbia Analytical Services, Inc.

September 1, 1995

Service Request No: S951033

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-129.02 / TO# 9382.00 / 2169 Oakland**

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on August 18, 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 13, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely:

Steven L. Green
Project Chemist

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:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/17,18/95
Sample Matrix:	Water	**Date Received:**	8/18/95
		Date Extracted:	NA

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

		Sample Name:	**A-2 (26)**	**AR-2 (29)**	**A-6 (27)**
		Lab Code:	S951033-001	S951033-002	S951033-003
		Date Analyzed:	8/28/95	8/28/95	8/28/95
Analyte	**MRL**				
TPH as Gasoline	50		ND	ND	530
Benzene	0.5		ND	ND	ND
Toluene	0.5		ND	ND	ND
Ethylbenzene	0.5		ND	ND	<2.4 *
Total Xylenes	0.5		ND	ND	<4.2*
Methyl-tert-butyl ether	3		12	4	6

* Raised MRL due to matrix interference.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/17,18/95
Sample Matrix:	Water	**Date Received:**	8/18/95
		Date Extracted:	NA

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

		Sample Name:	**AR-1 (27)**	**A-1 (24)**	**A-5 (30)**
		Lab Code:	S951033-004	S951033-005	S951033-006
		Date Analyzed:	8/30/95	8/28/95	8/30/95
Analyte	**MRL**				
TPH as Gasoline	50		960	1,600	34,000
Benzene	0.5		110	470	1,600
Toluene	0.5		12	35	2,700
Ethylbenzene	0.5		4.5	48	1,100
Total Xylenes	0.5		150	110	5,100
Methyl-tert-butyl ether	3		14	120	<28 *

* Raised MRL due to matrix interference.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/17,18/95
Sample Matrix:	Water	**Date Received:**	8/18/95
		Date Extracted:	NA

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

	Sample Name:	**ADR-1 (21)**	**Method Blank**	**Method Blank**
	Lab Code:	S951033-007	S950828-WB	S950830-WB
	Date Analyzed:	8/30/95	8/28/95	8/30/95
Analyte	**MRL**			
TPH as Gasoline	50	4,400	ND	ND
Benzene	0.5	150	ND	ND
Toluene	0.5	120	ND	ND
Ethylbenzene	0.5	95	ND	ND
Total Xylenes	0.5	620	ND	ND
Methyl-tert-butyl ether	3	120	ND	ND

* Raised MRL due to matrix interference.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/17,18/95
Sample Matrix:	Water	**Date Received:**	8/18/95
		Date Extracted:	8/25/95
		Date Analyzed:	8/30/95

TPH as Diesel
EPA Method 3510/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name	Lab Code	MRL	Result
AR-2 (29)	S951033-002	50	ND
AR-1 (27)	S951033-004	50	ND
A-1 (24)	S951033-005	50	240 *
ADR-1 (21)	S951033-007	50	4,500 *
Method Blank	S950825-WB	50	ND

* This sample contains a lower boiling point hydrocarbon mixture, quantified as diesel. The chromatogram does not match the typical diesel fingerprint.

1AMRL/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/17,18/95
Sample Matrix:	Water	**Date Received:**	8/18/95
		Date Extracted:	NA
		Date Analyzed:	8/28-30/95

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
A-2 (26)	S951033-001	91
AR-2 (29)	S951033-002	91
A-6 (27)	S951033-003	97
AR-1 (27)	S951033-004	94
A-1 (24)	S951033-005	92
A-5 (30)	S951033-006	98
ADR-1 (21)	S951033-007	90
A-2 (26) MS	S951033-001MS	99
A-2 (26) DMS	S951033-001DMS	98
Method Blank	S950828-WB	93
Method Blank	S950830-WB	88

CAS Acceptance Limits: 69-116

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-129.02 /TO# 9382.00 / 2169 Oakland

Service Request: S951033
Date Analyzed: 8/28/95

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	26.9	108	85-115
Toluene	25	25.5	102	85-115
Ethylbenzene	25	25.7	103	85-115
Xylenes, Total	75	73.1	97	85-115
Gasoline	250	239	96	90-110
Methyl-tert-butyl Ether	50	53.6	107	85-115

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/17,18/95
Sample Matrix:	Water	**Date Received:**	8/18/95
		Date Extracted:	NA
		Date Analyzed:	8/28-30/95

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

Sample Name: A-2 (26)
Lab Code: S951033-001

	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	224	224	90	90	67-121	<1

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/17,18/95
Sample Matrix:	Water	**Date Received:**	8/18/95
		Date Extracted:	8/25/95
		Date Analyzed:	8/30/95

Surrogate Recovery Summary
TPH as Diesel
EPA Method 3510/California DHS LUFT Method

Sample Name	Lab Code	Percent Recovery p-Terphenyl
AR-2 (29)	S951033-002	69
AR-1 (27)	S951033-004	77
A-1 (24)	S951033-005	72
ADR-1 (21)	S951033-007	69
LCS	S950825-MS	74
DLCS	S950825-DMS	78
Method Blank	S950825-WB	80

CAS Acceptance Limits: 66-123

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Analyzed:**	8/30/95

Initial Calibration Verification (ICV) Summary
TPH as Diesel
California DHS LUFT Method
Units: ppm

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
TPH as Diesel	1,000	925	93	90-110

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951033
Project:	0805-129.02 /TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/17,18/95
Sample Matrix:	Water	**Date Received:**	8/18/95
		Date Extracted:	8/25/95
		Date Analyzed:	8/30/95

Laboratory Control Spike/Duplicate Laboratory Control Spike Summary
TPH as Diesel
EPA Method 3510/California DHS LUFT Method
Units: ug/L (ppb)

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
TPH as Diesel	4,000	4,000	ND	3,490	3,480	87	87	61-141	<1

DMS1S/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 17075.00

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	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 Ave 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 (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 ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
A-2(20)	1	2		X		X	HCL	8-17-95	1418		X											
AR-2(24)	2	4		X		X	HCL	8-18-95	1048		X	X										
A-6(27)	3	2		X		X	HCL	8-18-95	1130		X											
AR-1(27)	4	4		X		X	HCL	8-17-95	1520		X	X										
A-1(21)	5	4		X		X	HCL	8-18-95	1209		X	X										
A-5(30)	6	2		X		X	HCL	8-18-95	1240		X											
ADR-1(21)	7	4		X		X	HCL	8-18-95	1254		X	X										
ADR-2( )		4		X		X	HCL	No Samples			X	X										

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks:
2 - 40ml HCL VOAs
2 - 1 Liter NP Glass
AR-2, 1, A-1, ADR-1, 2
Add: MTBE by 8020

Lab number: 595-01033

Turnaround time

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

Condition of sample: ok		Temperature received: cool	
Relinquished by sampler: Joe Williams	Date: 8-18-95 Time: 1915	Received by: Steve Shen	
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 9/1

APPENDIX C

OPERATION AND MAINTENANCE FIELD DATA SHEETS, SVE AND AIR-SPARGE SYSTEMS, THIRD QUARTER 1995

ARCO 2169 . 889 W.Grand Ave., Oak . CA . Operation Maintenance Log Sheet for . . EMCON Project: 0805-129.01

REMARKS: STARTED system on fresh air at 12:40 . Total HRS. = 2958.10
System runs fine but ATI unit is missing top circuit board on ATI door. Called Valli's Sailaja . They called Therm Tech. Unknown why they took circuit - I thought it worked fine.

Unscheduled site visit ☐ / or Scheduled site visit no. _____ of 14

THERMAL/CATALYTIC OXIDIZER	
Arrival Time (24:00 hour)	
System Status (on or off)	System is still OFF
Shutdown Time (24:00 hour)	
Alarm Lights on ?	
Restart Time (24:00 hour)	
Reading Time (24:00 hour)	
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	
Flow (velocity: ft/min) **(pipe dia. 3")**	
Temperature (°F)	
Dilution Air (pipe dia. 3")	
Dilution Air Flow (In. of H2O)	
Temperature (°F)	

THERMAL/CATALYTIC OXDIZER	
After Blower (system) (I2) (pipe dia. 4")	
Total Pressure (In. of H2O)	
System Total Influent Flow to THOX (in. of H2O)	
Temperature (°F)	
Effluent (E-1) (Stack)	
Effluent flow (In. of H2O)	
Stack Temperature (°F)	
System	
Fire Box Temperature (°F)	
Set Point (°F)	
Total Hours	
Electric Meter (kwh)	
Gas Meter (cubic feet)	

Do once every 2 weeks for the first 3 months; monthly thereafter

FID READINGS (ppm)	I-1	I-2	E-1
Date:			
Date:			

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Vacuum (in. of H2O)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	Depth (feet) DTW	Depth (feet) TD	FID/PID Reading(ppm)	DO (ppm)
AV-1	2"	5-14	2"								N/A
AV-2	2"	5-14	2"								N/A
AV-3	2"	5-14	2"								N/A
AV-4	4"	5-14	2"	dry							N/A
AV-5	4"	5-14	2"	dry							N/A
AV-6	4"	5-14	2"								N/A
AV-7	4"	5-14	2"								N/A
A-1	3"	9-25	2"	11:13							
A-2	3"	10-25	2"	11:72							
A-3	3"	9-29.5	2"	12:44							
A-4	3"	8-28	2"	11:70							
AR-2	4"	8.5-28.5	2"	12:01							
ADR-1	4"	5-22	2"	11:02							
ADR-2	4"	5-22	2"	11:45							

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Pressure (psig)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	DTW (feet)	FID/PID Reading(ppm)	DO (ppm)
AS-3	2"	26-29	2"						N/A	
AS-2	2"	21-23	2"						N/A	
AS-1	2"	27-29	2"						N/A	
AS-5	2"	20.5-22.5	2"						N/A	
AS-4	2"	20-22	2"						N/A	

Total Air Sparge Press. (psi)= | **Total Air Sparge Flow Rate (cfm)=** | **Total Air Sparge Temp. (°F)=**

Special Instructions:
Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: MAdler Date: 7/7/95

EMCON Project: 0805-129.01

Start 1259 HRS hr

ARCO 2169 . 889 W.Grand Ave., Oakland . CA . Operation Maintenance Log Sheet for 1[illegible] . EMCON Project: 0805-129.01

REMARKS: Arrived on site at 1221 HRS System OFF upon arrival. Heavy Rain in area today. unplug Battery Pack on telemetry System 2958.91 HRS upon starting Call valli at 1309 HRS Telemetry unit is OK. Turn on wells ADR 1 and 2. Samples taken at I-1, I-2, E-1 FOR TPH-GAS BTXE. System on upon Departure

Unscheduled site visit ☐ or Scheduled site visit no. _____ of 14

THERMAL/CATALYTIC OXIDIZER	
Arrival Time (24:00 hour)	1221
System Status (on or off)	OFF 1221 HRS
Shutdown Time (24:00 hour)	—
Alarm Lights on ?	High temp + cont. Fault
Restart Time (24:00 hour)	1259
Reading Time (24:00 hour)	1415
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	54.21
Flow (velocity: ft/min) (pipe dia. 3")	6000+
Temperature (°F)	75
Dilution Air (pipe dia. 3")	
Dilution Air Flow (In. of H2O)	0.10
Temperature (°F)	68

THERMAL/CATALYTIC OXDIZER	
After Blower (system) (I2) (pipe dia. 4")	
Total Pressure (In. of H2O)	12
System Total Influent Flow to THOX (In. of H2O)	4000 FPM 1.0 H2O
Temperature (°F)	
Effluent (E-1) (Stack)	
Effluent flow (In. of H2O)	
Stack Temperature (°F)	646
System	
Fire Box Temperature (°F)	624
Set Point (°F)	625
Total Hours	2960.28 1426 HRS
Electric Meter (kwh)	52988
Gas Meter (cubic feet)	

Do once every 2 weeks for the first 3 months; monthly thereafter

FID READINGS (ppm)	I-1	I-2	E-1
Date: 7-17-95	150	20	5
Date:			

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Vacuum (in. of H2O)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	Depth (feet) DTW	Depth (feet) TD	FID/PID Reading(ppm)	DO (ppm)
AV-1	2"	5-14	2"			100		12.05	13.10		N/A
AV-2	2"	5-14	2"			100		11.37	12.18		N/A
AV-3	2"	5-14	2"			10		8.43	13.73		N/A
AV-4	4"	5-14	2"			0					N/A
AV-5	4"	5-14	2"			0		ORY	7.85		N/A
AV-6	4"	5-14	2"			0					N/A
AV-7	4"	5-14	2"			0					N/A
A-1	3"	9-25	2"			0					
A-2	3"	10-25	2"			0					
A-3	3"	9-29.5	2"			0					
A-4	3"	8-28	2"			0					
AR-2	4"	8.5-28.5	2"			0					
ADR-1	4"	5-22	2"			100					
ADR-2	4"	5-22	2"			100					

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Pressure (psig)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	DTW (feet)	FID/PID Reading(ppm)	DO (ppm)
AS-3	2"	26-29	2"						N/A	
AS-2	2"	21-23	2"						N/A	
AS-1	2"	27-29	2"						N/A	
AS-5	2"	20.5-22.5	2"						N/A	
AS-4	2"	20-22	2"						N/A	

Total Air Sparge Press. (psi)=	Total Air Sparge Flow Rate (cfm)=	Total Air Sparge Temp. (°F)=

Special Instructions:

Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: L. RATH Date: 7-17-95 **EMCON Project: 0805-129.01**

ARCO 2169 . 889 W.Grand Ave., Oal J . CA . Operation Maintenance Log Sheet for ; . EMCON Project: 0805-129.01

REMARKS: Systems on & running upon arrival. Greg Prada of Thermo Tech on site. Unit Checked out OK. He made adjustments to flow programming & programming. Pressurized up & adjusted pressure on sparge manifold & Compressor - OK. Zeroed Dilution Air Dwyer gauge - moisture in line. There is moisture in the 3" influent line also Unscheduled site visit ☐ or Scheduled site visit no. _____ of 14

THERMAL/CATALYTIC OXIDIZER	
Arrival Time (24:00 hour)	1200
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Alarm Lights on ?	NONE
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1330
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	14.2
Flow (velocity: ft/min) **(pipe dia. 3")**	400
Temperature (°F)	77
Dilution Air (pipe dia. 3")	
Dilution Air Flow (In. of H2O)	.16
Temperature (°F)	69

THERMAL/CATALYTIC OXDIZER	
After Blower (system) (I2) (pipe dia. 4")	
Total Pressure (In. of H2O)	4.6
System Total Influent Flow to THOX (in. of H2O)	.38
Temperature (°F)	170
Effluent (E-1) (Stack)	
Effluent flow (In. of H2O)	
Stack Temperature (°F)	621
System	
Fire Box Temperature (°F)	613
Set Point (°F)	625
Total Hours	3150.62
Electric Meter (kwh)	54927
Gas Meter (cubic feet)	

Do once every 2 weeks for the first 3 months; monthly thereafter

FID READINGS (ppm)	I-1	I-2	E-1
Date:			
Date:			

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Vacuum (in. of H2O)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	Depth (feet) DTW	TD	FID/PID Reading(ppm)	DO (ppm)
AV-1	2"	5-14	2"								N/A
AV-2	2"	5-14	2"								N/A
AV-3	2"	5-14	2"								N/A
AV-4	4"	5-14	2"								N/A
AV-5	4"	5-14	2"								N/A
AV-6	4"	5-14	2"								N/A
AV-7	4"	5-14	2"								N/A
A-1	3"	9-25	2"								
A-2	3"	10-25	2"								
A-3	3"	9-29.5	2"								
A-4	3"	8-28	2"								
AR-2	4"	8.5-28.5	2"								
ADR-1	4"	5-22	2"								
ADR-2	4"	5-22	2"								

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Pressure (psig)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	DTW (feet)	FID/PID Reading(ppm)	DO (ppm)
AS-3	2"	26-29	2"						N/A	
AS-2	2"	21-23	2"						N/A	
AS-1	2"	27-29	2"						N/A	
AS-5	2"	20.5-22.5	2"						N/A	
AS-4	2"	20-22	2"						N/A	

Total Air Sparge Press. (psi)=	Total Air Sparge Flow Rate (cfm)=	Total Air Sparge Temp. (°F)=

Special Instructions:
Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: MA/Ka Date: 7/25/95 **EMCON Project: 0805-129.01**

ARCO 2169 . 889 W.Grand Ave., Oak. .d . CA . Operation Maintenance Log Sheet for 5 . EMCON Project: 0805-129.01

REMARKS: Took PTW's & DO's in certain wells (See Attached sheet) Took well measurements with no wells running. Then turned on ADR-1, ADR-2, AV-1, AV-3, and AV-2 at 1600. Started sampling wells after 45 min of Run time (prior to starting sparge)

Need 14 lab cocks for more accurate readings of induced vacuum. Unscheduled site visit ☐ or Scheduled site visit no. ____ of 14

THERMAL/CATALYTIC OXIDIZER	
Arrival Time (24:00 hour)	1200
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Alarm Lights on ?	NONE
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1634
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	420 – 424
Flow (velocity: ft/min) (pipe dia. 3")	850 – 1000
Temperature (°F)	78
Dilution Air (pipe dia. 3")	Open
Dilution Air Flow (In. of H2O)	.10
Temperature (°F)	75

THERMAL/CATALYTIC OXDIZER	
After Blower (system) (I2) (pipe dia. 4")	
Total Pressure (In. of H2O)	3.5
System Total Influent Flow to THOX (in. of H2O)	.28 – .29
Temperature (°F)	205 – 210
Effluent (E-1) (Stack)	
Effluent flow (In. of H2O)	
Stack Temperature (°F)	634
System	
Fire Box Temperature (°F)	628
Set Point (°F)	625
Total Hours	3153.67
Electric Meter (kwh)	
Gas Meter (cubic feet)	

Do once every 2 weeks for the first 3 months; monthly thereafter

FID READINGS (ppm)	I-1	I-2	E-1
Date: 7/25/95	1266	NA	NA
Date:			

AIR COMP HRS = 0.32

Cal gas = Isobutylene

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Vacuum (in. of H2O)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	Depth (feet) DTW	TD	FID/PID Reading(ppm)	DO (ppm)
AV-1	2"	5-14	2"	41.3 – 42.0	25	Full ON	ND	12.14		1026	1.3 N/A
AV-2	2"	5-14	2"	41.2 – 41.6	550 – 600	Full ON	ND	10.65		1364	1.0 N/A
AV-3	2"	5-14	2"	41.4 – 41.6	100	Full ON	ND	9.31		865	1.6 N/A
AV-4	4"	5-14	2"			CLOSED					N/A
AV-5	4"	5-14	2"								N/A
AV-6	4"	5-14	2"								N/A
AV-7	4"	5-14	2"				ND	4.33			0.9 N/A
A-1	3"	9-25	2"				ND	10.75			1.4
A-2	3"	10-25	2"								
A-3	3"	9-29.5	2"								
A-4	3"	8-28	2"								
AR-2	4"	8.5-28.5	2"								
ADR-1	4"	5-22	2"	41.3 – 41.8	300 – 400	Full ON	ND	10.60		1184	0.9
ADR-2	4"	5-22	2"	41.3 – 41.5	100 – 700	Full ON	11.36	11.61		1057	NA

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Pressure (psig)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	DTW (feet)	FID/PID Reading(ppm)	DO (ppm)
AS-3	2"	26-29	2"			Closed			N/A	
AS-2	2"	21-23	2"						N/A	
AS-1	2"	27-29	2"				ND	11.75	N/A	1.1
AS-5	2"	20.5-22.5	2"				NO	11.62	N/A	1.0
AS-4	2"	20-22	2"				ND	11.31	N/A	1.4

Total Air Sparge Press. (psi)=	Total Air Sparge Flow Rate (cfm)=	Total Air Sparge Temp. (°F)=

Special Instructions:

Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: MAdler Date: 7/25/95 **EMCON Project: 0805-129.01**

EMCON

Operation and Maintenance Field Report

Well ID	DTFP	DTW (ft)	DO mg/l
AV-7	ND	4.33	0.9
AS-4	ND	11.31	1.4
AR-1	ND	11.90	1.2
AV-2	ND	10.65	1.0
A-1	ND	10.75	1.4
AS-1	ND	11.75	1.1
AV-1	ND	12.14	1.3
AS-5	ND	11.62	1.0
ADR-1	ND	10.60	0.9
ADR-2	11.36	11.61	NA
AV-3	ND	9.31	1.6

NAME MAdler

DATE 7/25/95

PROJECT NAME ARCO 2169

PROJECT NUMBER 0805-129.01

emcon

ARCO 2169 . 889 W.Grand Ave., Oak[redacted] . CA . Operation Maintenance Log Sheet for [redacted] . EMCON Project: 0805-129.01

REMARKS: STARTED Sparging at 17:24 . Took readings at 1809

Took PID at I-1(a) and Took lab sample at I-1(a) at 18:15

Unscheduled site visit ☐ or (Scheduled site visit no. _____ of 14

THERMAL/CATALYTIC OXIDIZER	
Arrival Time (24:00 hour)	1200
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Alarm Lights on ?	NONE
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1807
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	42.1 - 42.6
Flow (velocity: ft/min) **(pipe dia. 3")**	850-1000
Temperature (°F)	77
Dilution Air (pipe dia. 3")	
Dilution Air Flow (In. of H2O)	.10
Temperature (°F)	75

THERMAL/CATALYTIC OXDIZER	
After Blower (system) (I2) (pipe dia. 4")	
Total Pressure (In. of H2O)	3.5
System Total Influent Flow to THOX (in. of H2O)	.28
Temperature (°F)	205
Effluent (E-1) (Stack)	
Effluent flow (In. of H2O)	—
Stack Temperature (°F)	640
System	
Fire Box Temperature (°F)	615
Set Point (°F)	625
Total Hours	3155.20
Electric Meter (kwh)	
Gas Meter (cubic feet)	

Do once every 2 weeks for the first 3 months; monthly thereafter

FID READINGS (ppm)	I-1	I-2	E-1
Date:		NA	NA
Date:			

AIR Comp HRS = .49 HRS.

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Vacuum (in. of H2O)	Air Flow (in. of H2O or fpm)	Valve Position (% open)	DTFP (feet)	Depth (feet) DTW	Depth (feet) TD	FID/PID Reading(ppm)	DO (ppm)
[redacted]-1	2"	5-14	2"								N/A
[redacted]-2	2"	5-14	2"								N/A
AV-3	2"	5-14	2"								N/A
[redacted]4	4"	5-14	2"								N/A
[redacted]5	4"	5-14	2"								N/A
AV-6	4"	5-14	2"								N/A
[redacted]7	4"	5-14	2"								N/A
[redacted]	3"	9-25	2"								
A-2	3"	10-25	2"								
A-3	3"	9-29.5	2"								
[redacted]	3"	8-28	2"								
AR-2	4"	8.5-28.5	2"								
ADR-1	4"	5-22	2"								
[redacted]-2	4"	5-22	2"								

Well ID	Well Dia.	Screen interval	Pipe Dia (in compound)	Pressure (psig)	Air Flow (in. of H2O or fpm) SCFM	Valve Position (% open)	DTFP (feet)	DTW (feet)	FID/PID Reading(ppm)	DO (ppm)
[redacted]3	2"	26-29	2"			Closed			N/A	
[redacted]2	2"	21-23	2"			Closed			N/A	
AS-1	2"	27-29	2"	8.9	1	Open			N/A	
AS-5	2"	20.5-22.5	2"			Closed			N/A	
[redacted]	2"	20-22	2"	2.0	2	Open			N/A	

Total Air Sparge Press. (psi)= 5.0 | **Total Air Sparge Flow Rate (cfm)=** 4 2 | **Total Air Sparge Temp. (°F)=** NA

Special Instructions:

Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: M Adler Date: 7/25/95

EMCON Project: 0805-129.01

Remarks: System on & running upon arrival. Took reading. Changed Set point from 610 to 750°. Allowed unit to ramp up to temp before sampling.

AIR Comp HRS = 22 55

Unscheduled site visit [] Scheduled site visit [X]

SYSTEM PARAMETERS (Therm Tech Model VAC-25 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	1030	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	664 / 764
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Fire Box Temperature (°F)	612 / 750
Reading Time (24:00 hour)	1039	Set Point (°F)	610 / 750
Well Field I-1 (3")		**TOTAL HOURS**	3315.75
Vacuum (in. of H_2O)	38.6-39.1	Electric Meter (kwh)	56917
Velocity (ft/min)	700-550	Natural Gas (cf)	35177
Temperature (°F)	86	**AIR MONITORING**	
After Blower I-2 (4")		**FID (ppm)**	Amb / I-1 / I-2 / E-1
Total Pressure (in. of H_2O)	35	Date: (WITHOUT CARBON FILTER)	0.0 / 4001 / 259 / 25.1
Total Flow (in. of H_2O)	128	Date: (WITH CARBON FILTER)	/ / 324 /
Temperature (°F)	215	**PID (ppm)**	CAL GAS:
***Dilution Air* (3") *Temperature* (°F)**	73	Date:	
Dilution Air Flow (in of H_2O)	.12	Date:	
ATI operating properly: yes/no		**Lab samples taken for analysis at:**	I-2 E-1

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H_2O)	Velocity (ft/min)	DO (mg/l)	PID (ppm)
AV-1	2"	5'-14'					(2")		
AV-2	2"	5'-14'					(2")		
AV-3	2"	5'-14'					(2")		
AV-4	4"	5'-14'					(2")		
AV-5	4"	5'-14'					(2")		
AV-6	4"	5'-14'					(2")		
AV-7	4"	5'-14'					(2")		
A-1	3"	9'-25'					(2")		
A-2	3"	10'-25'					(2")		
A-3	3"	9'-29.5'					(2")		
A-4	3"	8'-28'					(2")		
AR-2	4"	8.5'-28.5'					(2")		
ADR-1	4"	5'-22'					(2")		
ADR-2	4"	5'-22'					(2")		

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (mg/l)	REMARKS
AS-1	2"	27'-29'							
AS-2	2"	21'-23'							
AS-3	2"	26'-29'							
AS-4	2"	20'-22'							
AS-5	2"	20.5'-22.5'							

Total Sparge Data Compressor Hours= 22.55

Air Sparge Pressure(psi)= 50 | Total Air Sparge Flow Rate(scfm)= 5 | Total Air Sparge Temp(F)= N/A

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: Mueller Date: 8-1-95

Project# 0805-129.01

ARCO 2169 Soil Vapor Extraction System

Remarks:

Adjusted unit for a little less dilution air

1 drum bunghole type black - full 3 drums soil & trash no lid

Unscheduled site visit [] Scheduled site visit []

SYSTEM PARAMETERS (Therm Tech Model VAC-25 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	1030	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	782
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Fire Box Temperature (°F)	754
Reading Time (24:00 hour)	1133	Set Point (°F)	750
Well Field I-1 (3")		**TOTAL HOURS**	3316.6
Vacuum (in. of H_2O)	42.2-42.4	Electric Meter (kwh)	
Velocity (ft/min)	800-900	Natural Gas (cf)	
Temperature (°F)	81	**AIR MONITORING**	
After Blower I-2 (4")		**FID (ppm)**	Amb / I-1 / I-2 / E-1
Total Pressure (in. of H_2O)	3.5	Date: (WITHOUT CARBON FILTER)	
Total Flow (in. of H_2O)	.23	Date: (WITH CARBON FILTER)	
Temperature (°F)	225	**PID (ppm)**	CAL GAS:
Dilution Air (3") Temperature (°F)	77	Date:	
Dilution Air Flow (in of H_2O)	.09	Date:	
ATI operating properly: yes/no		**Lab samples taken for analysis at:**	

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H_2O)	Velocity (ft/min)	DO (mg/l)	PID (ppm)
AV-1	2"	5'-14'					(2")		
AV-2	2"	5'-14'					(2")		
AV-3	2"	5'-14'					(2")		
AV-4	4"	5'-14'					(2")		
AV-5	4"	5'-14'					(2")		
AV-6	4"	5'-14'					(2")		
AV-7	4"	5'-14'					(2")		
A-1	3"	9'-25'					(2")		
A-2	3"	10'-25'					(2")		
A-3	3"	9'-29.5'					(2")		
A-4	3"	8'-28'					(2")		
AR-2	4"	8.5'-28.5'					(2")		
ADR-1	4"	5'-22'					(2")		
ADR-2	4"	5'-22'					(2")		

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (mg/l)	REMARKS
AS-1	2"	27'-29'							
AS-2	2"	21'-23'							
AS-3	2"	26'-29'							
AS-4	2"	20'-22'							
AS-5	2"	20.5'-22.5'							

Total Sparge Data Compressor Hours=

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: M. Miller Date: 8-1-05

Project# 0805-129.01

ARCO 2169 Soil Vapor Extraction System

Remarks: System on upon arrival - Took readings
Took samples at I-1 & E-1 & I-2
shut off systems for sampling of QGM
Total HRS = 3541.18 at shutdown at 20:05 20 gallons of condensate

Unscheduled site visit [] Scheduled site visit [X]

SYSTEM PARAMETERS (Therm Tech Model VAC-25 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	1925	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	758
Shutdown Time (24:00 hour)	20:05	**SYSTEM**	
Restart Time (24:00 hour)	—	Fire Box Temperature (°F)	750
Reading Time (24:00 hour)	1932	Set Point (°F)	750
Well Field I-1 (3")		**TOTAL HOURS**	3540.64
Vacuum (in. of H_2O)	45.3-45.8	Electric Meter (kwh)	59599
Velocity (ft/min)	800-900	Natural Gas (cf)	3826
Temperature (°F)	72	**AIR MONITORING**	
After Blower I-2 (4")		**FID (ppm)**	Amb / I-1 / I-2 / E-1
Total Pressure (in. of H_2O)	3.2	Date: (WITHOUT CARBON FILTER)	
Total Flow (in. of H_2O)	.24	Date: (WITH CARBON FILTER)	
Temperature (°F)	215	**PID (ppm)**	CAL GAS:
Dilution Air (3") Temperature (°F)	67	Date:	
Dilution Air Flow (in of H_2O)	.09	Date:	
ATI operating properly: yes/no	Yes	**Lab samples taken for analysis at:**	E-1 I-1 I-2

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H_2O)	Velocity (ft/min)	DO (mg/l)	PID (ppm)
AV-1	2"	5'-14'			ON	39.4-40.2	(2") air to much		
AV-2	2"	5'-14'			ON	45.5-45.8	(2") 450-500		
AV-3	2"	5'-14'				45.5-45.6	(2") 75-100		
AV-4	4"	5'-14'					(2")		
AV-5	4"	5'-14'					(2")		
AV-6	4"	5'-14'					(2")		
AV-7	4"	5'-14'					(2")		
A-1	3"	9'-25'					(2")		
A-2	3"	10'-25'					(2")		
A-3	3"	9'-29.5'					(2")		
A-4	3"	8'-28'					(2")		
AR-2	4"	8.5'-28.5'					(2")		
ADR-1	4"	5'-22'			ON	45.5-45.6	(2") 250-300		
ADR-2	4"	5'-22'			ON	45.5-45.7	(2") 200-250		

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (mg/l)	REMARKS
AS-1	2"	27'-29'			ON	5.5			
AS-2	2"	21'-23'			OFF				
AS-3	2"	26'-29'			OFF				
AS-4	2"	20'-22'			ON	2.3			
AS-5	2"	20.5'-22.5'			OFF				

Total Sparge Data Compressor Hours= 51.17

Air Sparge Pressure(psi)= 45 | Total Air Sparge Flow Rate(scfm)= 2 | Total Air Sparge Temp(F)= NA

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: MAdlen Date: 8/10/95

Project# 0805-129.01
ARCO 2169 Soil Vapor Extraction System

Remarks: Site had been sampled. Turned System back on Today. Total HR at Restart = 3541.31 Took readings after starting Sparging at AS-1 & AS-4 All values same as last visit but slightly increased Sparge rate. Took sample at I-1(a) before changes in well field

Unscheduled site visit [] Scheduled site visit []

SYSTEM PARAMETERS (Therm Tech Model VAC-25 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	1329	**Effluent (E-1) (12"x12")**	
System Status (on or off)	OFF	Stack Temperature (°F)	751
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	1347	Fire Box Temperature (°F)	750
Reading Time (24:00 hour)	1358	Set Point (°F)	750
Well Field I-1 (3")		**TOTAL HOURS**	3541.46
Vacuum (in. of H_2O)	45.0-45.4	Electric Meter (kwh)	59877
Velocity (ft/min)	1100	Natural Gas (cf)	3827
Temperature (°F)	77	**AIR MONITORING**	
After Blower I-2 (4")		**FID (ppm)**	Amb / I-1 / I-2 / E-1
Total Pressure (in. of H_2O)	3.5	Date: (WITHOUT CARBON FILTER)	
Total Flow (in. of H_2O)	.25	Date: (WITH CARBON FILTER)	
Temperature (°F)	190	**PID (ppm)**	CAL GAS:
Dilution Air (3") Temperature (°F)	77	Date:	
Dilution Air Flow (in of H_2O)	.15	Date:	
ATI operating properly: yes/no	YES	**Lab samples taken for analysis at:**	I-1(a)

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H_2O)	Velocity (ft/min)	DO (mg/l)	PID (ppm)
AV-1	2"	5'-14'			ON		(2")		
AV-2	2"	5'-14'			ON		(2")		
AV-3	2"	5'-14'			ON		(2")		
AV-4	4"	5'-14'					(2")		
AV-5	4"	5'-14'					(2")		
AV-6	4"	5'-14'					(2")		
AV-7	4"	5'-14'					(2")		
A-1	3"	9'-25'					(2")		
A-2	3"	10'-25'					(2")		
A-3	3"	9'-29.5'					(2")		
A-4	3"	8'-28'					(2")		
AR-2	4"	8.5'-28.5'					(2")		
ADR-1	4"	5'-22'			ON		(2")		
ADR-2	4"	5'-22'			ON		(2")		

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (mg/l)	REMARKS
AS-1	2"	27'-29'			ON	7.6	1.5		
AS-2	2"	21'-23'			OFF	0	0		
AS-3	2"	26'-29'			OFF	0	0		
AS-4	2"	20'-22'			ON	1.5	1.5		
AS-5	2"	20.5'-22.5'			OFF	0	0		

Total Sparge Data Compressor Hours=

Air Sparge Pressure(psi)= 4.5 | Total Air Sparge Flow Rate(scfm)= 3 | Total Air Sparge Temp(F)= NA

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: MAller Date: 8/23/95

Project# 0805-129.01

ARCO 2169 Soil Vapor Extraction System

Remarks: Turned on AR-2 and started sparging at AS-5 at 14:17
Sampled I-1(6) after 45 min of running at 15:02
Could not open AV-7 (No screen) DTW = 3.60'
AV-5 T.D. = 7.8' AV-4 T.D. = Wells have a tan fine silt/clay in the
Knock has drained 7 gallons of condensate
Unscheduled site visit [] Scheduled site visit []

SYSTEM PARAMETERS (Therm Tech Model VAC-25 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	1329	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	772
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	1343	Fire Box Temperature (°F)	745
Reading Time (24:00 hour)	1452	Set Point (°F)	750
Well Field I-1 (3")		**TOTAL HOURS**	3542.35
Vacuum (in. of H,O)	43.9 - 44.4	Electric Meter (kwh)	—
Velocity (ft/min)	1300	Natural Gas (cf)	—
Temperature (°F)	77	**AIR MONITORING**	
After Blower I-2 (4")		**FID (ppm)**	Amb / I-1 / I-2 / E-1
Total Pressure (in. of H,O)	3.5	Date: (WITHOUT CARBON FILTER)	
Total Flow (in. of H,O)	.26	Date: (WITH CARBON FILTER)	
Temperature (°F)	210	**PID (ppm)**	CAL GAS:
Dilution Air (3") Temperature (°F)	78	Date:	
Dilution Air Flow (in of H,O)	.10	Date:	
ATI operating properly: yes/no		**Lab samples taken for analysis at:** I-1(6)	

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H,O)	Velocity (ft/min)	DO (mg/l)	PID (ppm)
AV-1	2"	5'-14'			open	41.5 - 42.2	(2") NA (moisture)		
AV-2	2"	5'-14'			open	43.5 - 43.6	(2") 750 - 800		
AV-3	2"	5'-14'			open	43.6 - 44.0	(2") 150		
AV-4	4"	5'-14'			closed		(2")		
AV-5	4"	5'-14'			↓		(2")		
AV-6	4"	5'-14'			↓		(2")		
AV-7	4"	5'-14'	NP	3.60	closed		(2")		
A-1	3"	9'-25'					(2")		
A-2	3"	10'-25'					(2")		
A-3	3"	9'-29.5'					(2")		
A-4	3"	8'-28'			↓		(2")		
AR-2	4"	8.5'-28.5'			open	43.5 - 44.0	(2") 250 - 350		
ADR-1	4"	5'-22'			OPEN	43.7 - 44.1	(2") 350 - 400		
ADR-2	4"	5'-22'			OPEN	43.6 - 44.1	(2") 300 - 350		

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (mg/l)	REMARKS
AS-1	2"	27'-29'			ON	7.0	2		
AS-2	2"	21'-23'			OFF	0	0		
AS-3	2"	26'-29'			OFF	0	0		
AS-4	2"	20'-22'			ON	1.5	2		
AS-5	2"	20.5'-22.5'			ON	1.0	2		

Total Sparge Data Compressor Hours=

Air Sparge Pressure(psi)= 45 | Total Air Sparge Flow Rate(scfm)= 6 | Total Air Sparge Temp(F)= NA

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: MAllen Date: 5/23/95

Project# 0805-129.01
ARCO 2169 Soil Vapor Extraction System

Remarks: Sparge Compressor OFF upon arrival - Probably because of the power interruption. Turned ON at 09:46 . Met BAARMD Inspector Mike Bostick on site for Inspection - Showed him the Therm Tech, went over all the data for compliance to the permit. His Supervisor will be looking at the Aug. exceedance of the destruction eff. He was pleased with all of our documentation & the actions taken by us for the Aug exceedance

Unscheduled site visit [] Scheduled site visit [X]

SYSTEM PARAMETERS (Therm Tech Model VAC-25 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	09:40	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	744
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Fire Box Temperature (°F)	752
Reading Time (24:00 hour)	09:49	Set Point (°F)	750
Well Field I-1 (3")		**TOTAL HOURS**	4189.57
Vacuum (in. of H,O)	47.8-48.0	Electric Meter (kwh)	68496
Velocity (ft/min)	1000-1100	Natural Gas (cf)	4576
Temperature (°F)	72	**AIR MONITORING**	
After Blower I-2 (4")		**FID (ppm)**	Amb / I-1 / I-2 / E-1
Total Pressure (in. of H,O)	3.5	Date: (WITHOUT CARBON FILTER)	
Total Flow (in. of H,O)	.24	Date: (WITH CARBON FILTER)	
Temperature (°F)	200-205	**PID (ppm)** CAL GAS:	
Dilution Air (3") Temperature (°F)	64	Date:	
Dilution Air Flow (in of H,O)	.10	Date:	
ATI operating properly: yes/no	yes	**Lab samples taken for analysis at:** NONE	

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H,O)	Velocity (ft/min)	DO (mg/l)	PID (ppm)
AV-1	2"	5'-14'			Open	42.3-43.0	(2") N/A - moisture		
AV-2	2"	5'-14'			Open	46.6-47.3	(2") 500-700		
AV-3	2"	5'-14'			Open	46.6-47.1	(2") 125-225		
AV-4	4"	5'-14'			Closed	-.25	(2") 0		
AV-5	4"	5'-14'				0	(2") 0		
AV-6	4"	5'-14'				-.01	(2") 0		
AV-7	4"	5'-14'				-.05	(2") 0		
A-1	3"	9'-25'				.09	(2") 0		
A-2	3"	10'-25'				.08-.12	(2") 0		
A-3	3"	9'-29.5'				0	(2") 0		
A-4	3"	8'-28'				0	(2") 0		
AR-2	4"	8.5'-28.5'			Open	46.5-47.7	(2") 100-200		
ADR-1	4"	5'-22'			Open	46.2-47.7	(2") 200-700		
ADR-2	4"	5'-22'			Open	46.5-47.1	(2") 200-600		

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (mg/l)	REMARKS
AS-1	2"	27'-29'			Open	8.5	~2		
AS-2	2"	21'-23'			Closed	0	0		
AS-3	2"	26'-29'			Closed	0	0		
AS-4	2"	20'-22'			Open	2.4	~2		
AS-5	2"	20.5'-22.5'			Open	1.4	~2		

Total Sparge Data Compressor Hours= 312.42

Air Sparge Pressure(psi)= 45 | Total Air Sparge Flow Rate(scfm)= 6 | Total Air Sparge Temp(F)= NA

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: 9/21/95

Project# 0805-129.01

ARCO 2169 Soil Vapor Extraction System

Remarks: Turned on wells AV-6 & A-1 @ 12:34 and turned AS-4 sparge well off after several minutes stack temp. went to 782°F but started going down after 4-5 minutes. Took readings and sampled I-1 I-2 E-1 AV-6 & A-1 There's still not enough flow from the well field to run unit without the added dilution air. Cleaned Pad of leaves, trash & broken Unscheduled site visit [] been Scheduled site visit # bottles.

SYSTEM PARAMETERS (Therm Tech Model VAC-25 thermal/catalytic oxidizer)

Arrival Time (24:00 hour)	09:40	**Effluent (E-1) (12"x12")**	
System Status (on or off)	ON	Stack Temperature (°F)	771
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Fire Box Temperature (°F)	759
Reading Time (24:00 hour)	13:14	Set Point (°F)	750
Well Field I-1 (3")		**TOTAL HOURS**	4192.99
Vacuum (in. of H_2O)	45.3-46.2	Electric Meter (kwh)	
Velocity (ft/min)	1000-1400	Natural Gas (cf)	
Temperature (°F)	75	**AIR MONITORING**	
After Blower I-2 (4")		**FID (ppm)**	Amb / I-1 / I-2 / E-1
Total Pressure (in. of H_2O)	3.0-3.25	Date: (WITHOUT CARBON FILTER)	
Total Flow (in. of H_2O)	.23-.24	Date: (WITH CARBON FILTER)	
Temperature (°F)	215	**PID (ppm)**	CAL GAS:
Dilution Air (3") Temperature (°F)	72	Date:	
Dilution Air Flow (in of H_2O)	.10	Date:	
ATI operating properly: yes/no	yes	**Lab samples taken for analysis at:** I-1 E-1 I-2 A-1 AV-6	

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H_2O)	Velocity (ft/min)	DO (mg/l)	PID (ppm)
AV-1	2"	5'-14'			Open	44.9-46.0	(2") NA - Moisture		
AV-2	2"	5'-14'			Open	44.1-45.6	(2") 300-900		
AV-3	2"	5'-14'			Open	44.4-45.7	(2") 100-200		
AV-4	4"	5'-14'			Closed	.51	(2") 0		
AV-5	4"	5'-14'			Closed	.03	(2") 0		
AV-6	4"	5'-14'			Open	44.4-45.6	(2") 400-800		
AV-7	4"	5'-14'			Closed	-.33	(2") 0		
A-1	3"	9'-25'			Open	44.2-45.7	(2") 50-75		
A-2	3"	10'-25'			Closed	.24-.26	(2") 0		
A-3	3"	9'-29.5'			"	.01	(2") 0		
A-4	3"	8'-28'			"	0	(2") 0		
AR-2	4"	8.5'-28.5'			Open	44.2-46.0	(2") 100-250		
ADR-1	4"	5'-22'			Open	44.4-45.2	(2") 100-700		
ADR-2	4"	5'-22'			Open	44.8-45.6	(2") 100-520		

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (mg/l)	REMARKS
AS-1	2"	27'-29'			Open	5.0	~2		
AS-2	2"	21'-23'			Closed	0	0		
AS-3	2"	26'-29'			Closed	0	0		
AS-4	2"	20'-22'			Closed	0	0		
AS-5	2"	20.5'-22.5'			Open	1.4	~2		

Total Sparge Data Compressor Hours=

Air Sparge Pressure(psi)= 45 | Total Air Sparge Flow Rate(scfm)= 4 | Total Air Sparge Temp(F)= NA

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: MHdler Date: 9/21/95

APPENDIX D

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

Columbia Analytical Services, Inc.

July 28, 1995

Service Request No. S950905

Ms. Valli Voruganti
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-129.01 / TO# 09382.00 / 2169 - Oakland**

Dear Ms. Voruganti:

Attached are the results of the vapor sample(s) submitted to our lab on July 17, 1995. For your reference, these analyses have been assigned our service request number S950905.

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)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Co.	**Service Request:**	S950905
Project:	0805-129.01/TO# 09382.00/2169 Oakland	**Date Collected:**	7/17/95
Sample Matrix:	Vapor	**Date Received:**	7/17/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**I-1**	**I-2**	**E-1**
Lab Code:	S950905-001	S950905-002	S950905-003
Date Analyzed:	7/18/95	7/18/95	7/18/95

Analyte	**MRL**			
Benzene	0.5	59	5.2	ND
Toluene	0.5	68	6.5	0.6
Ethylbenzene	0.5	45	4.9	ND
Total Xylenes	1	220	24	2.8
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	<400*	<40*	ND
C_5 - C_8 Hydrocarbons	20	6,900	610	68
C_9 - C_{12} Hydrocarbons	20	1,100	130	ND
Gasoline Fraction (C_5-C_{12})	60	8,000	740	83

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

Approved By: _____ Date: 7/28/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Co.	**Service Request:**	S950905
Project:	0805-129.01/TO# 09382.00/2169 Oakland	**Date Collected:**	7/17/95
Sample Matrix:	Vapor	**Date Received:**	7/17/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	***Method Blank***
Lab Code:	S950718-VB1
Date Analyzed:	7/18/95

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

Approved By: Steve Wheeler Date: 7/28/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Co.
Project: 0805-129.01/TO# 09382.00/2169 Oakland
Sample Matrix: Vapor

Service Request: S950905
Date Collected: 7/17/95
Date Received: 7/17/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	MRL	I-1	I-2	E-1
Lab Code:		S950905-001	S950905-002	S950905-003
Date Analyzed:		7/18/95	7/18/95	7/18/95
Analyte				
Benzene	0.1	18	1.6	0.1
Toluene	0.1	18	1.7	0.2
Ethylbenzene	0.1	10	1.1	ND
Total Xylenes	0.2	50	5.6	0.6
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	<100*	<10*	ND
C_5 - C_8 Hydrocarbons	5	1,900	170	19
C_9 - C_{12} Hydrocarbons	5	300	36	ND
Gasoline Fraction (C_5-C_{12})	15	2,200	200	23

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

Approved By: Steven Green Date: 7/28/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Co.	**Service Request:**	S950905
Project:	0805-129.01/TO# 09382.00/2169 Oakland	**Date Collected:**	7/17/95
Sample Matrix:	Vapor	**Date Received:**	7/17/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**Method Blank**
Lab Code:	S950718-VB1
Date Analyzed:	7/18/95

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

Approved By: _____ Date: 7/28/95

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Co.
Project: 0805-129.01/TO# 09382.00/2169 Oakland
Sample Matrix: Vapor

Service Request: S950905
Date Collected: 7/17/95
Date Received: 7/17/95
Date Extracted: NA
Date Analyzed: 7/18/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: I-2
Lab Code: S950905-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	5.21	5.26	5.24	1
Toluene	0.5	6.51	6.58	6.55	1
Ethylbenzene	0.5	4.89	4.83	4.86	1
Xylenes, Total	1	24.3	24.0	24.2	1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<40*	<40*	ND	<1
C_5 - C_8 Hydrocarbons	20	609	547	578	11
C_9 - C_{12} Hydrocarbons	20	130	129	130	1
Gasoline Fraction (C_5-C_{12})	60	739	676	708	9

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

Approved By: Steve Green Date: 7/28/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Co.
Project: 0805-129.01/TO# 09382.00/2169 Oakland
Sample Matrix: Vapor

Service Request: S950905
Date Collected: 7/17/95
Date Received: 7/17/95
Date Extracted: NA
Date Analyzed: 7/18/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: I-2
Lab Code: S950905-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	1.63	1.65	1.64	1
Toluene	0.1	1.73	1.74	1.74	1
Ethylbenzene	0.1	1.12	1.11	1.12	1
Xylenes, Total	0.2	5.59	5.52	5.56	1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	<10*	<10*	ND	<1
C_5 - C_8 Hydrocarbons	5	167	150	159	11
C_9 - C_{12} Hydrocarbons	5	35.8	35.5	35.7	1
Gasoline Fraction (C_5-C_{12})	15	203	186	195	9

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

Approved By: _____ Date: 7/28/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Co.
Project: 0805-129.01/TO# 09382.00/2169 Oakland

Service Request: S950905
Date Analyzed: 7/18/95

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	15.2	95	85-115
Toluene	16	15.8	99	85-115
Ethylbenzene	16	16.3	102	85-115
Xylenes, Total	48	50.4	105	85-115
Gasoline	200	206	103	90-110

Approved By: _____ Date: 7/28/95

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. ~~2169-94-5~~ 09382.00

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) Valli Voruganti	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) 408 453 7300	Fax no. (Consultant)
Consultant name Emcon	Address (Consultant) 1921 Ringwood Ave San Jose CA		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/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 ☐	
I-1	1	1			AIR			7/17/95	1445		+										
I-2	2	1			↓				1500		+										
E-1	3	1			↓			↓	1505		+										

Special detection Limit/reporting: Report in mg/m³ & ppmV

Special QA/QC

Remarks: 0805 129 01

Lab number: 9509025

Turnaround time

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

Condition of sample: Hydrated		Temperature received: RT	
Relinquished by sampler: Joel Reuter	Date: 7-17-95 Time: 1600	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory: Jane Brown	Date: 7-17-95 Time: 1600

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

APPC-3292 (2-91)

Columbia Analytical Services, Inc.

August 3, 1995

Service Request No. S950957

Ms. Valli Voruganti
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-129.02 / TO# 9382.00 / 2169 Oakland**

Dear Ms. Voruganti:

Attached are the results of the vapor sample(s) submitted to our lab on August 1, 1995. For your reference, these analyses have been assigned our service request number S950957.

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:	ARCO Products Company	**Service Request:**	S950957
Project:	0805-129.02/TO# 9382.00/2169 Oakland	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**E-1**	**I-2**	**I-1**
Lab Code:	S950957-001	S950957-002	S950957-003
Date Analyzed:	8/2/95	8/2/95	8/2/95

Analyte	**MRL**			
Benzene	0.5	ND	4.6	32
Toluene	0.5	0.5	9.9	67
Ethylbenzene	0.5	ND	5.5	31
Total Xylenes	1	ND	61	350
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	ND	<40*	<200*
C_5 - C_8 Hydrocarbons	20	ND	1,000	7,600
C_9 - C_{12} Hydrocarbons	20	ND	240	1,200
Gasoline Fraction (C_5-C_{12})	60	ND	1,200	8,800

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

Approved By: _____ Date: 8/3/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	*ARCO Products Company*	**Service Request:**	S950957
Project:	0805-129.02/TO# 9382.00/2169 Oakland	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**Method Blank**
Lab Code:	S950802-VB1
Date Analyzed:	8/2/95

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

Approved By: _____ Date: 8/3/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950957
Project:	0805-129.02/TO# 9382.00/2169 Oakland	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

	Sample Name:	**E-1**	**I-2**	**I-1**
	Lab Code:	S950957-001	S950957-002	S950957-003
	Date Analyzed:	8/2/95	8/2/95	8/2/95
Analyte	**MRL**			
Benzene	0.1	ND	1.4	10
Toluene	0.1	0.1	2.6	18
Ethylbenzene	0.1	ND	1.3	7.2
Total Xylenes	0.2	ND	14	80
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	ND	<10*	<50*
C_5 - C_8 Hydrocarbons	5	ND	280	2,100
C_9 - C_{12} Hydrocarbons	5	ND	65	320
Gasoline Fraction (C_5-C_{12})	15	ND	340	2,400

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

Approved By: _____ Date: 8/3/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: *ARCO Products Company*
Project: 0805-129.02/TO# 9382.00/2169 Oakland
Sample Matrix: Vapor

Service Request: S950957
Date Collected: 8/1/95
Date Received: 8/1/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**Method Blank**
Lab Code:	S950802-VB1
Date Analyzed:	8/2/95

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

Approved By: _____ Date: 8/3/95

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-129.02/TO# 9382.00/2169 Oakland
Sample Matrix: Vapor

Service Request: S950957
Date Collected: 8/1/95
Date Received: 8/1/95
Date Extracted: NA
Date Analyzed: 8/2/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: E-1
Lab Code: S950957-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	ND	ND	ND	<1
Toluene	0.5	0.54	0.50	0.52	8
Ethylbenzene	0.5	ND	ND	ND	<1
Xylenes, Total	1	ND	ND	ND	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	ND	ND	ND	<1
C_5 - C_8 Hydrocarbons	20	ND	ND	ND	<1
C_9 - C_{12} Hydrocarbons	20	ND	ND	ND	<1
Gasoline Fraction (C_5-C_{12})	60	ND	ND	ND	<1

Approved By: _____ Date: 8/3/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S950957
Project:	0805-129.02/TO# 9382.00/2169 Oakland	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA
		Date Analyzed:	8/2/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: E-1
Lab Code: S950957-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	ND	ND	ND	<1
Toluene	0.1	0.14	0.13	0.14	7
Ethylbenzene	0.1	ND	ND	ND	<1
Xylenes, Total	0.2	ND	ND	ND	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	ND	ND	ND	<1
C_5 - C_8 Hydrocarbons	5	ND	ND	ND	<1
C_9 - C_{12} Hydrocarbons	5	ND	ND	ND	<1
Gasoline Fraction (C_5-C_{12})	15	ND	ND	ND	<1

Approved By: _____ Date: 8/3/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-129.02/TO# 9382.00/2169 Oakland

Service Request: S950957
Date Analyzed: 8/2/95

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	17.8	111	85-115
Toluene	16	17.3	108	85-115
Ethylbenzene	16	16.4	102	85-115
Xylenes, Total	48	49.6	103	85-115
Gasoline	200	210	105	90-110

Note: ppmV = mg/M3 x [24.45 (gas constant) / molecular weight (MW)]
MW Benzene = 78, Toluene = 92, Ethylbenzene = 106, Total Xylenes = 106
MW Gasoline = 89

Approved By: _____ Date: 8/3/95

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 9382.00

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) V. Vorugunti	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 377 8697	Telephone no. (Consultant) 408 453 7300	Fax no. (Consultant) 408 453 0452	Contract number 07077
Consultant name EMCON	Address (Consultant) 1921 Ringwood San Jose, CA.		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 ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
E-1	1	1			X			8-1-95	1110		X									
I-2	2	1			X			↓	1115		X									
I-1	3	1			X			↓	1120		X									

Special detection Limit/reporting: please report in mg/m³ > ppmV

Special QA/QC

Remarks: 0805-129.02

Lab number: 595095 1

Turnaround time

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

Condition of sample: Isolated

Temperature received: RT

Relinquished by sampler	Date 8-1-95	Time 1705	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Joanne Brown — Date 8/1/95 — Time 1705

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

APPC-3292 (2-91)

Due 8/3 a.m.

Columbia
Analytical
Services inc.

August 7, 1995

Service Request No. S950931

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

Re: **0805-129.02 / TO# 9382.00 / 2169 Oakland**

Dear Ms. Yelamanchili:

Attached are the results of the vapor sample(s) submitted to our lab on July 26, 1995. For your reference, these analyses have been assigned our service request number S950931.

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)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	*ARCO Products Company*	**Service Request:**	S950931
Project:	0805-129.02/T0# 9382.00/2169 Oakland	**Date Collected:**	7/25/95
Sample Matrix:	Vapor	**Date Received:**	7/26/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

	Sample Name:	**ADR-2**	**ADR-1**	**AV-1**
	Lab Code:	S950931-001	S950931-002	S950931-003
	Date Analyzed:	7/26/95	7/26/95	7/26/95
Analyte	**MRL**			
Benzene	0.5	26	41	25
Toluene	0.5	76	120	78
Ethylbenzene	0.5	33	41	40
Total Xylenes	1	380	370	410
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	<200*	<200*	<200*
C_5 - C_8 Hydrocarbons	20	3,100	3,500	2,900
C_9 - C_{12} Hydrocarbons	20	1,500	1,400	1,300
Gasoline Fraction (C_5-C_{12})	60	4,600	5,000	4,300

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

Approved By: _____ Date: 8/7/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950931
Project:	0805-129.02/T0# 9382.00/2169 Oakland	**Date Collected:**	7/25/95
Sample Matrix:	Vapor	**Date Received:**	7/26/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**AV-2**	**AV-3**	**I-1**
Lab Code:	S950931-004	S950931-005	S050931-006
Date Analyzed:	7/26/95	7/26/95	7/26/95

Analyte	**MRL**			
Benzene	0.5	20	15	28
Toluene	0.5	80	11	82
Ethylbenzene	0.5	60	22	44
Total Xylenes	1	680	180	450
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	<200*	<100*	<200*
C_5 - C_8 Hydrocarbons	20	3,600	2,400	3,000
C_9 - C_{12} Hydrocarbons	20	2,100	1,200	1,400
Gasoline Fraction (C_5-C_{12})	60	5,700	3,600	4,400

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

Approved By: _____ Date: 8/7/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950931
Project:	0805-129.02/T0# 9382.00/2169 Oakland	**Date Collected:**	7/25/95
Sample Matrix:	Vapor	**Date Received:**	7/26/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

	Sample Name:	**I-1(a)**	**Method Blank**
	Lab Code:	S950931-007	S950726-VB1
	Date Analyzed:	7/26/95	7/26/95
Analyte	**MRL**		
Benzene	0.5	33	ND
Toluene	0.5	90	ND
Ethylbenzene	0.5	48	ND
Total Xylenes	1	500	ND
Total Volatile Hydrocarbons			
C_1 - C_4 Hydrocarbons	20	<200*	ND
C_5 - C_8 Hydrocarbons	20	3,100	ND
C_9 - C_{12} Hydrocarbons	20	1,700	ND
Gasoline Fraction (C_5-C_{12})	60	4,900	ND

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

Approved By: _____ Date: 8/7/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950931
Project:	0805-129.02/T0# 9382.00/2169 Oakland	**Date Collected:**	7/25/95
Sample Matrix:	Vapor	**Date Received:**	7/26/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

		Sample Name:	**ADR-2**	**ADR-1**	**AV-1**
		Lab Code:	S950931-001	S950931-002	S950931-003
		Date Analyzed:	7/26/95	7/26/95	7/26/95
Analyte	**MRL**				
Benzene	0.1		8.1	13	8.0
Toluene	0.1		20	32	21
Ethylbenzene	0.1		7.5	9.5	9.2
Total Xylenes	0.2		87	85	94
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5		<50*	<50*	<50*
C_5 - C_8 Hydrocarbons	5		840	980	810
C_9 - C_{12} Hydrocarbons	5		420	390	350
Gasoline Fraction (C_5-C_{12})	15		1,300	1,400	1,200

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

Approved By: G A Date: 8/7/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	*ARCO Products Company*	**Service Request:**	S950931
Project:	0805-129.02/T0# 9382.00/2169 Oakland	**Date Collected:**	7/25/95
Sample Matrix:	Vapor	**Date Received:**	7/26/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

		Sample Name:	**AV-2**	**AV-3**	**I-1**
		Lab Code:	S950931-004	S950931-005	S050931-006
		Date Analyzed:	7/26/95	7/26/95	7/26/95
Analyte	**MRL**				
Benzene	0.1		6.4	4.7	8.6
Toluene	0.1		21	2.9	22
Ethylbenzene	0.1		14	5.0	10
Total Xylenes	0.2		160	42	100
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5		<50*	<25*	<50*
C_5 - C_8 Hydrocarbons	5		990	660	810
C_9 - C_{12} Hydrocarbons	5		590	320	380
Gasoline Fraction (C_5-C_{12})	15		1,600	980	1,200

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

Approved By: _____ Date: 8/7/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950931
Project:	0805-129.02/T0# 9382.00/2169 Oakland	**Date Collected:**	7/25/95
Sample Matrix:	Vapor	**Date Received:**	7/26/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:		**I-1(a)**	**Method Blank**
Lab Code:		S950931-007	S950726-VB1
Date Analyzed:		7/26/95	7/26/95
Analyte	**MRL**		
Benzene	0.1	10	ND
Toluene	0.1	24	ND
Ethylbenzene	0.1	11	ND
Total Xylenes	0.2	120	ND
Total Volatile Hydrocarbons			
C_1 - C_4 Hydrocarbons	5	<50*	ND
C_5 - C_8 Hydrocarbons	5	860	ND
C_9 - C_{12} Hydrocarbons	5	450	ND
Gasoline Fraction (C_5-C_{12})	15	1,300	ND

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

Approved By: _____ Date: 8/7/95

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-129.02/T0# 9382.00/2169 Oakland
Sample Matrix: Vapor

Service Request: S950931
Date Collected: 7/25/95
Date Received: 7/26/95
Date Extracted: NA
Date Analyzed: 7/26/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: Batch QC
Lab Code: S950926-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	ND	ND	ND	<1
Toluene	0.5	3.98	3.95	3.96	1
Ethylbenzene	0.5	9.66	9.69	9.68	<1
Xylenes, Total	1	77.2	80.8	79.0	5
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	ND	ND	ND	<1
C_5 - C_8 Hydrocarbons	20	112	113	113	1
C_9 - C_{12} Hydrocarbons	20	358	381	370	6
Gasoline Fraction (C_5-C_{12})	60	470	494	482	5

Approved By: _____ Date: 8/7/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S950931
Project:	0805-129.02/T0# 9382.00/2169 Oakland	**Date Collected:**	7/25/95
Sample Matrix:	Vapor	**Date Received:**	7/26/95
		Date Extracted:	NA
		Date Analyzed:	7/26/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: Batch QC
Lab Code: S950926-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	ND	ND	ND	<1
Toluene	0.1	1.05	1.05	1.05	1
Ethylbenzene	0.1	2.22	2.23	2.22	<1
Xylenes, Total	0.2	17.8	18.6	18.2	5
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	ND	ND	ND	<1
C_5 - C_8 Hydrocarbons	5	30.9	31.1	31.0	1
C_9 - C_{12} Hydrocarbons	5	98.4	105	102	6
Gasoline Fraction (C_5-C_{12})	15	129	136	132	5

Approved By: G A Date: 8/7/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-129.02/T0# 9382.00/2169 Oakland

Service Request: S950931
Date Analyzed: 7/26/95

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	14.7	92	85-115
Toluene	16	15.2	95	85-115
Ethylbenzene	16	15.6	98	85-115
Xylenes, Total	48	47.4	99	85-115
Gasoline	200	217	109	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

Approved By: _____ Date: 8/7/95

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 7382.00

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) S. Yekmanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 377 8697	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	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 ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
ADR-2	1	1			X Vapor			7-25-95	1647		X Gas									
ADR-1	2	1			X				1652		X									
AV-1	3	1			X				1657		X									
AV-2	4	1			X				1700		X									
AV-3	5	1			X				1708		X									
I-1	6	1			X				1716		X									
I-1(a)	7	1			X				1815		X									

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

Special QA/QC

Remarks: 0805-129.02

Lab number: 9505931

Turnaround time

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

Condition of sample: Isolated		Temperature received: RT	
Relinquished by sampler	Date 7/26/95	Time 0903	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Joanne Brown — Date 7/26/95 — Time 9:08

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

Due 8/9

Columbia
Analytical
Services inc.

August 30, 1995 Service Request No: S951039

Ms. Valli Voruganti
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-129.02 / TO# 9382.00 / 2169 Oakland**

Dear Ms. Voruganti:

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 8, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely:

Steven L. Green
Project Chemist

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:**	S951039
Project:	0805-129.02 / TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/22/95
Sample Matrix:	Vapor	**Date Received:**	8/23/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

		Sample Name:	**I-1 (a)**	**I-1 (b)**	**Method Blank**
		Lab Code:	S951039-001	S951039-002	S950824-VB
		Date Analyzed:	8/24/95	8/24/95	8/24/95
Analyte	**MRL**				
Benzene	0.5		43	36	ND
Toluene	0.5		74	77	ND
Ethylbenzene	0.5		27	29	ND
Total Xylenes	1		280	290	ND
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20		<200 *	<200 *	ND
C_5 - C_8 Hydrocarbons	20		6,500	4,900	ND
C_9 - C_{12} Hydrocarbons	20		1,100	1,100	ND
Gasoline Fraction (C_5-C_{12})	60		7,700	6,000	ND

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951039
Project:	0805-129.02 / TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/22/95
Sample Matrix:	Vapor	**Date Received:**	8/23/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**I-1 (a)**	**I-1 (b)**	**Method Blank**
Lab Code:	S951039-001	S951039-002	S950824-VB
Date Analyzed:	8/24/95	8/24/95	8/24/95

Analyte	**MRL**			
Benzene	0.1	14	11	ND
Toluene	0.1	20	20	ND
Ethylbenzene	0.1	6.2	6.6	ND
Total Xylenes	0.2	64	68	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	<50 *	<50 *	ND
C_5 - C_8 Hydrocarbons	5	1,800	1,300	ND
C_9 - C_{12} Hydrocarbons	5	310	310	ND
Gasoline Fraction (C_5-C_{12})	15	2,100	1,700	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	**Service Request:**	S951039
Project:	0805-129.02 / TO# 9382.00 / 2169 Oakland	**Date Collected:**	8/22/95
Sample Matrix:	Vapor	**Date Received:**	8/23/95
		Date Extracted:	NA
		Date Analyzed:	8/24/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: I-1 (b)
Lab Code: S951039-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	36.0	35.6	35.8	1
Toluene	0.5	76.5	75.6	76.1	1
Ethylbenzene	0.5	28.7	28.5	28.6	1
Xylenes, Total	1	294	295	295	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<200 *	<200 *	<200 *	<1
C_5 - C_8 Hydrocarbons	20	4,890	4,870	4,880	<1
C_9 - C_{12} Hydrocarbons	20	1,130	1,120	1,125	1
Gasoline Fraction (C_5-C_{12})	60	6,020	6,000	6,010	<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: 0805-129.02 / TO# 9382.00 / 2169 Oakland
Sample Matrix: Vapor

Service Request: S951039
Date Collected: 8/22/95
Date Received: 8/23/95
Date Extracted: NA
Date Analyzed: 8/24/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: I-1 (b)
Lab Code: S951039-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	11.3	11.1	11.2	2
Toluene	0.1	20.3	20.0	20.2	1
Ethylbenzene	0.1	6.60	6.56	6.58	1
Xylenes, Total	0.2	67.6	67.8	67.7	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	<50 *	<50 *	<50 *	<1
C_5 - C_8 Hydrocarbons	5	1,340	1,340	1,340	<1
C_9 - C_{12} Hydrocarbons	5	310	308	309	1
Gasoline Fraction (C_5-C_{12})	15	1,660	1,650	1,660	1

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

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951039
Project:	0805-129.02 / TO# 9382.00 / 2169 Oakland	**Date Analyzed:**	8/24/95

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	15.7	98	85-115
Toluene	16	15.6	98	85-115
Ethylbenzene	16	15.4	96	85-115
Xylenes, Total	48	46.1	96	85-115
Gasoline	200	190	95	90-110

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

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 9382.00

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) V. Vorugunti	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 4083778697	Telephone no. (Consultant) 4084537300	Fax no. (Consultant) 408 453 0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood	San Jose	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 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 ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
I-1(a)	1	1			X Vapor			8/23/95	1415		X									
I-1(b)	2	1			X			8/22/95	1502		X									

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

Special QA/QC

Remarks: 0805 - [redacted] 129.02

Lab number: 9501039

Turnaround time

		Date	Time
Condition of sample: Inflated	Temperature received: RT		
Relinquished by sampler: [signature]	Received by	8/23/95	0850
Relinquished by	Received by		
Relinquished by	Received by laboratory: Joanne Brown	8-23-95	0850

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 9/7

Columbia
Analytical
Services INC.

September 26, 1995

Service Request No: S951178

Ms. Valli Voruganti
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-129.01 / TO# 9382.00 / 2169 Oakland**

Dear Ms. Voruganti:

The following pages contain analytical results for sample(s) received by the laboratory on September 21, 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	**Service Request:**	S951178
Project:	0805-129.01 / TO# 9382.00 / 2169 Oakland	**Date Collected:**	9/21/95
Sample Matrix:	Vapor	**Date Received:**	9/21/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**E-1**	**I-2**	**I-1**
Lab Code:	S951178-001	S951178-002	S951178-003
Date Analyzed:	9/21/95	9/21/95	9/21/95

Analyte	**MRL**			
Benzene	0.5	ND	1.8	10
Toluene	0.5	ND	6.5	36
Ethylbenzene	0.5	ND	4.9	27
Total Xylenes	1	ND	47	280
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	ND	<40 *	<200 *
C_5 - C_8 Hydrocarbons	20	ND	720	4,000
C_9 - C_{12} Hydrocarbons	20	ND	190	1,200
Gasoline Fraction (C_5-C_{12})	60	ND	920	5,200

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-129.01 / TO# 9382.00 / 2169 Oakland
Sample Matrix: Vapor

Service Request: S951178
Date Collected: 9/21/95
Date Received: 9/21/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

	Sample Name:	AV-6	A-1	Method Blank
	Lab Code:	S951178-004	S951178-005	S950921-VB
	Date Analyzed:	9/21/95	9/21/95	9/21/95
Analyte	**MRL**			
Benzene	0.5	10	15	ND
Toluene	0.5	<9 **	68	ND
Ethylbenzene	0.5	33	23	ND
Total Xylenes	1	110	190	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	<200 *	<100 *	ND
C_5 - C_8 Hydrocarbons	20	6,900	1,500	ND
C_9 - C_{12} Hydrocarbons	20	1,300	680	ND
Gasoline Fraction (C_5-C_{12})	60	8,200	2,200	ND

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

3S22/0e0194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951178
Project:	0805-129.01 / TO# 9382.00 / 2169 Oakland	**Date Collected:**	9/21/95
Sample Matrix:	Vapor	**Date Received:**	9/21/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**E-1**	**I-2**	**I-1**
Lab Code:	S951178-001	S951178-002	S951178-003
Date Analyzed:	9/21/95	9/21/95	9/21/95

Analyte	**MRL**			
Benzene	0.1	ND	0.6	3.1
Toluene	0.1	ND	1.7	9.5
Ethylbenzene	0.1	ND	1.1	6.2
Total Xylenes	0.2	ND	11	64
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	ND	<10 *	<50 *
C_5 - C_8 Hydrocarbons	5	ND	200	1,100
C_9 - C_{12} Hydrocarbons	5	ND	52	330
Gasoline Fraction (C_5-C_{12})	15	ND	230	1,400

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

3522/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951178
Project:	0805-129.01 / TO# 9382.00 / 2169 Oakland	**Date Collected:**	9/21/95
Sample Matrix:	Vapor	**Date Received:**	9/21/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**AV-6**	**A-1**	**Method Blank**
Lab Code:	S951178-004	S951178-005	S950921-VB
Date Analyzed:	9/21/95	9/21/95	9/21/95

Analyte	**MRL**			
Benzene	0.1	3.1	4.7	ND
Toluene	0.1	<3 **	18	ND
Ethylbenzene	0.1	7.6	5.3	ND
Total Xylenes	0.2	25	44	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	<50 *	<30 *	ND
C_5 - C_8 Hydrocarbons	5	1,900	410	ND
C_9 - C_{12} Hydrocarbons	5	360	190	ND
Gasoline Fraction (C_5-C_{12})	15	2,300	600	ND

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

** Raised MRL due to matrix interference.

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-129.01 / TO# 9382.00 / 2169 Oakland

Service Request: S951178
Date Analyzed: 9/21/95

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	14.8	93	85-115
Toluene	16	14.4	90	85-115
Ethylbenzene	16	13.6	85	85-115
Xylenes, Total	48	41.1	86	85-115
Gasoline	200	216	108	90-110

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-129.01 / TO# 9382.00 / 2169 Oakland
Sample Matrix: Vapor

Service Request: S951178
Date Collected: 9/21/95
Date Received: 9/21/95
Date Extracted: NA
Date Analyzed: 9/21/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: Batch QC
Lab Code: S951172-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	120	120	120	<1
Toluene	0.5	130	130	130	<1
Ethylbenzene	0.5	28	28	28	<1
Xylenes, Total	1	160	160	160	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<200 *	<200 *	<200 *	<1
C_5 - C_8 Hydrocarbons	20	6,800	6,800	6,800	<1
C_9 - C_{12} Hydrocarbons	20	710	710	710	<1
Gasoline Fraction (C_5-C_{12})	60	7,500	7,500	7,500	<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: 0805-129.01 / TO# 9382.00 / 2169 Oakland
Sample Matrix: Vapor

Service Request: S951178
Date Collected: 9/21/95
Date Received: 9/21/95
Date Extracted: NA
Date Analyzed: 9/21/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: Batch QC
Lab Code: S951172-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	38	38	38	<1
Toluene	0.1	34	34	34	<1
Ethylbenzene	0.1	6.4	6.4	6.4	<1
Xylenes, Total	0.2	37	37	37	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	<50 *	<50 *	<50 *	<1
C_5 - C_8 Hydrocarbons	5	1,900	1,900	1,900	<1
C_9 - C_{12} Hydrocarbons	5	200	200	200	<1
Gasoline Fraction (C_5-C_{12})	15	2,100	2,100	2,100	<1

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

DUP1S/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 9382.00

Chain of Custody

ARCO Facility no. 2169	City (Facility) Oakland	Project manager (Consultant) V Vorugant.	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 377-8697	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 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 ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
E-1	1	1			X			9/21/95	1334		X									
I-2	2	1			X				1339		X									
I-1	3	1			X				1343		X									
AV-6	4	1			X				1349		X									
A-1	5	1			X				1354		X									

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

Special QA/QC

Remarks: 1805-129.01

Lab number: S9501178

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: RT	
Relinquished by sampler	Date 9/21/95 Time 1608	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory Joanne Brown	Date 9-21-95 Time 1608

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APPC-3292 (2-91)

Due 10/5