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June 28, 1995
Project 0805-123.02

Mr. Michael Whelan
ARCO Products Company
2155 South Bascom Avenue, Suite 202
Campbell, California 95008

Re: First quarter 1995 groundwater monitoring program results, ARCO service station 2035, Albany, California

Dear Mr. Whelan:

This letter presents the results of the first quarter 1995 groundwater monitoring program at ARCO Products Company (ARCO) service station 2035, 1001 San Pablo Avenue, Albany, California (Figure 1). The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

BACKGROUND

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

MONITORING PROGRAM FIELD PROCEDURES

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

during the first quarter of the year. Well MW-2 is sampled semiannually during the first and third quarters. Wells MW-1, MW-3, MW-4, and RW-1 are sampled quarterly.

The first quarter 1995 groundwater monitoring event was performed by EMCON on March 24, 1995. Field work performed this quarter included (1) measuring depths to groundwater and subjectively analyzing groundwater for the presence of floating product in wells MW-1 through MW-6 and RW-1, (2) purging and subsequently sampling groundwater monitoring wells MW-1 through MW-6 and RW-1 for laboratory analysis, and (3) directing a state-certified laboratory to analyze the groundwater samples. Copies of all field data sheets from the first quarter 1995 groundwater monitoring event are included in Appendix A.

ANALYTICAL PROCEDURES

Groundwater samples collected during first quarter 1995 monitoring event were analyzed for total petroleum hydrocarbons as gasoline (TPHG), and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Groundwater samples were prepared for analysis by U.S. Environmental Protection Agency (USEPA) method 5030 (purge and trap). Groundwater was analyzed for TPHG by the methods accepted by the Department of Toxic Substances Control, California Environmental Protection Agency (Cal-EPA), and referenced in the *Leaking Underground Fuel Tank* (LUFT) *Field Manual* (State Water Resources Control Board, October 1989). Samples were analyzed for BTEX by USEPA method 8020, as described in *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (EPA SW-846, November 1986, third edition). Groundwater samples collected from well MW-3 were also analyzed for total recoverable petroleum hydrocarbons (TRPH) by USEPA method 418.1. These methods are recommended in the *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank* Sites (August 10, 1990) for analysis of samples from petroleum-hydrocarbon-impacted sites.

MONITORING PROGRAM RESULTS

Results of the first 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 TPHG and BTEX analyses. Additional historical laboratory data for well MW-3 are summarized in

Table 4. Historical floating-product recovery data for well RW-1 are summarized in Table 5. Copies of the first quarter 1995 analytical results and chain-of-custody documentation are included in Appendix B.

MONITORING PROGRAM EVALUATION

Groundwater elevation data collected on March 24, 1995, illustrate that groundwater beneath the site flows northwest with an approximate hydraulic gradient of 0.037 foot per foot. Figure 3 illustrates groundwater contours and analytical data for the first quarter 1995.

Groundwater samples collected from wells MW-2, MW-4, MW-5, and MW-6 did not contain detectable concentrations of TPHG or BTEX. Groundwater samples collected from wells MW-1, MW-3, and RW-1 contained 8,800, 51, and 11,000 micrograms per liter (µg/L) TPHG, and 3,600, 0.8, and 560 µg/L benzene, respectively. Groundwater samples collected from well MW-3 did not contain detectable concentrations of TRPH.

REMEDIATION SYSTEM PERFORMANCE EVALUATION

Floating-Product Recovery

Floating product was measured and recovered periodically (initially monthly, biweekly thereafter) by RESNA using a skimmer installed in recovery well RW-1. Approximately 22.3 and 1.0 gallons of floating product were recovered by RESNA in 1992 and 1993, respectively. Before startup of the soil-vapor extraction (SVE) system on December 7, 1993, the floating-product recovery skimmer was removed from well RW-1. ARCO began manual recovery of floating product from wells AS-1, AS-2, and RW-1 in February 1995. Approximately 3.8 gallons of floating product was recovered from these wells by EMCON in the first quarter 1995. A total of approximately 27.1 gallons of floating product was recovered through the first quarter 1995. Cumulative floating product recovery from the wells is summarized in Table 5.

Soil-Vapor Extraction System

Description. RESNA completed construction of the SVE system in November 1993. The on-site SVE system extracts hydrocarbon vapor from subsurface soils by applying a

vacuum to 12 vapor extraction wells (VW-1 through VW-9, RW-1, AS-1, and AS-2) and an aeration tank in the remediation compound (installed for the treatment of hydrocarbon-impacted groundwater) using a 5-horsepower (hp) positive-displacement blower. Extracted hydrocarbon vapor from the wells is directed via subgrade remediation piping to an off-gas abatement unit in an enclosed treatment compound. The trailer-mounted off-gas abatement unit for treating the extracted vapor is a ThermTech, Inc., Model VAC 10 oxidizer unit that can operate in the thermal or catalytic oxidation mode. The unit has a nominal operating capacity of 100 standard cubic feet per minute (scfm). Treated off-gas from the unit is discharged to the atmosphere via a 12-inch square stack 15 feet above grade.

Monitoring. The operating temperature of the oxidizer unit is measured and recorded continuously during system operation, consistent with the conditions stipulated in the site-specific air permit issued by the Bay Area Air Quality Management District (BAAQMD). Air samples are collected biweekly at three sampling locations, (1) effluent from the well field and before fresh air dilution (sample port I-1), (2) influent to the oxidizer, after fresh air dilution (sample port I-2), and (3) effluent from the oxidizer unit at the stack (sample port E-1). Air samples collected from sample ports (I-1, I-2, and E-1 are submitted to a state-certified laboratory for chemical analysis. The samples are analyzed for total volatile hydrocarbons as gasoline (TVHG) and BTEX by USEPA methods 8015 and 8020, respectively.

In addition to the above parameters, the SVE system is generally monitored biweekly for (1) TVHG concentrations in extracted vapor from each vapor extraction well with a flame ionization detector (FID) or a photo-ionization detector (PID), (2) applied and induced vacuum on vapor extraction wells, (3) depths to water in extraction wells, and (4) extracted vapor flow rate from individual wells and from the combined well field. Routine maintenance of the SVE and off-gas abatement systems is also performed during these visits.

Copies of all field monitoring data sheets for the SVE system are provided in Appendix C.

Operation. Initial startup of the SVE system was conducted by RESNA on December 7, 1993. The system was operated in the thermal mode from December 7, 1993, to January 24, 1994. RESNA manually shut down the SVE system on January 24, 1994, because rising groundwater levels at the site caused submergence of the well screen in the vapor extraction wells. ARCO transferred the site from RESNA to EMCON in November 1994. Although groundwater levels decreased at the site during fourth quarter 1994, mechanical problems with the oxidizer unit precluded resumption of the SVE system

operation during fourth quarter 1994. After repairs to the system were completed, EMCON restarted the SVE system in the thermal mode on February 8, 1995.

Heavy precipitation in February and March 1995, caused resubmergence of the screen in the vapor extraction wells, resulting in minimal flow from the wells. In addition, the groundwater remediation system at the site was manually shut down on March 3, 1995, because the arsenic level in treated groundwater exceeded the permitted discharge limit. As a result, there was no available flow from the aeration tank to the SVE system (the aeration tank contributes about 30 to 35 scfm to the abatement unit). As a result, the SVE system was manually shut off on March 9, 1995. Table 6 summarizes SVE system operation and performance data from startup on December 7, 1993, to the end of the first quarter 1995 reporting period.

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

Air Sample Results. Copies of the laboratory analytical results for all air samples collected during the first quarter 1995 are provided in Appendix D. Figure 4 depicts changes in TVHG and benzene concentrations with time from initial startup of the SVE system on December 7, 1993, to the end of the first quarter 1995 reporting period.

Destruction Efficiency and Emission Rates. The destruction efficiency of the off-gas abatement unit was in compliance with the destruction efficiencies stipulated in the air permit for different ranges of influent TVHG concentrations during the reporting period from February 8 to March 9, 1995. Emission rates for benzene from the off-gas abatement unit were below the 0.093 pound per day limit specified in the BAAQMD permit.

Hydrocarbon Removal Rates. Table 6 summarizes hydrocarbon removal rates, pounds of hydrocarbons removed this period, and cumulative pounds of hydrocarbons removed from SVE system startup on December 7, 1993, to the end of the first 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 6.

Approximately 66.4 pounds (10.7 gallons) of hydrocarbons were recovered by the SVE and groundwater extraction systems during the 90-day reporting period from December 31, 1994, to March 31, 1995. A total of approximately 390.8 pounds (or 63 gallons) of hydrocarbons was recovered from the site from system startup on December 7, 1993, to the end of the first quarter 1995 reporting period.

Air-Sparge System

RESNA completed construction of an air-sparge (AS) system at the site in November 1993 in conjunction with the SVE system construction. The AS system consists of subgrade piping that directs compressed air from a 5-hp rotary-scroll oil-less air compressor at the remediation compound into two AS wells, AS-1 and AS-2. **The AS system has not been activated as yet, and therefore is not discussed in this report.**

Groundwater Remediation System

Description. In November 1993, RESNA completed construction of a groundwater extraction and treatment system. The groundwater extraction and treatment system consists of a groundwater depression/extraction pump to extract groundwater from recovery well RW-1. Extracted groundwater from RW-1 is routed via subgrade piping to an above-grade 150-gallon diffused aeration tank installed in the treatment compound. Dissolved hydrocarbons in extracted groundwater are volatilized (stripped) in the aeration tank by a diffused air stream, which flows counter-current to the flow of extracted groundwater into the tank using the 5-hp vapor extraction blower installed on the VAC 10 oxidizer unit (off-gas abatement unit). Off-gas from the aeration tank is routed to the oxidizer unit for abatement. The aerated effluent water from the aeration tank is pumped through two 200-pound liquid-phase activated carbon canisters in series. The treated groundwater from the carbon canisters is then discharged to an on-site sewer lateral that discharges to the City of Albany sanitary sewer under a wastewater discharge permit issued by the East Bay Municipal Utility District (EBMUD).

Monitoring and Sampling. The groundwater extraction and treatment system is generally monitored biweekly for (1) depth to water in the extraction well (RW-1); (2) flow rate of extracted groundwater; (3) flow totalizer readings after the second carbon canister, before discharge to the sewer; and (4) pH and temperature in effluent from the carbon canisters, before discharge to the sewer. Routine maintenance of the groundwater extraction and treatment system is also performed during these visits.

EMCON conducted initial startup of the groundwater extraction and treatment system on February 8, 1995. Consistent with the conditions specified in the wastewater discharge permit issued for the system by EBMUD, the system was sampled weekly during the first month of operation. After the first month of operation, water samples are collected monthly at four sampling locations (1) influent to the aeration tank (sample port I-1 or A); (2) effluent from the aeration tank and influent to the first carbon canister (sample port I-2); (3) influent to the second canister and effluent from the first canister (sample port I-3 or D); and finally, (4) effluent from the second canister, before discharge to the sewer (sample port E-1 or E). The collected water samples are submitted to a state-certified laboratory for chemical analysis. The samples are analyzed for TPHG and BTEX by USEPA methods 5030 and 8020, respectively.

Copies of all field monitoring data sheets for the groundwater remediation system are provided in Appendix E.

Operation. Initial startup of the groundwater extraction and treatment system was conducted by EMCON on February 8, 1995. The groundwater remediation system was manually shut down on March 3, 1995, because arsenic levels in treated groundwater exceeded the permitted discharge limit.

EMCON believes that arsenic is naturally present in groundwater beneath the site and is not contributed by the groundwater remediation system. To verify this, EMCON will collect groundwater samples from a monitoring well upgradient from the groundwater remediation system and analyze them for arsenic. Based on the results of the analysis, EMCON will request a variance from EBMUD for an increase in the discharge limit for arsenic. Upon receiving the variance from EBMUD, the system will be restarted. Table 8 summarizes SVE system operation and performance data from startup on February 8, 1995, to the end of the first quarter 1995 reporting period.

Water Sample Results. Copies of the laboratory analytical results for all water samples collected for the groundwater extraction and treatment system during the first quarter 1995 are provided in Appendix E. Figure 6 depicts changes in TVHG and benzene concentrations over time, from initial startup of the SVE system on February 8, 1995, to the end of the first quarter 1995 reporting period. With the exception of arsenic in the effluent from the system, the groundwater remediation system has been operating in compliance with the permit conditions and discharge limits specified in the wastewater discharge permit issued by the EBMUD. Table 8 summarizes groundwater remediation

system sampling results from system startup to the end of the first quarter 1995 reporting period.

Hydrocarbon Removal Rates. Table 9 summarizes hydrocarbon removal rates, pounds of hydrocarbons removed this period, and cumulative pounds of hydrocarbons removed from SVE system startup on February 8, 1995, to the end of the first quarter 1995 reporting period. Figure 7 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 8.

A total of approximately 4.7 pounds (or 0.78 gallon) of dissolved-phase hydrocarbons was recovered from the site by the groundwater extraction system from system startup on December 7, 1993, to the end of the first quarter 1995 reporting period.

LIMITATIONS

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

SITE STATUS UPDATE

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

First Quarter 1995 Activities

- Performed quarterly groundwater monitoring for first quarter 1995. Based on eight or more consecutive quarters of nondetectable TPHG and BTEX analytical results in monitoring wells MW-2, MW-5, and MW-6, ARCO began semiannual sampling at well MW-2 (first and third quarters), and annual sampling at wells MW-5 and MW-6 (first quarter). Wells MW-1, MW-3, MW-4, and RW-1 continue to be sampled quarterly. Water levels are measured quarterly in all wells.

- Restarted the SVE system on February 8, 1995.
- Performed initial startup of the groundwater remediation system on February 8, 1995.
- Performed operation and maintenance of the SVE and groundwater remediation systems.
- Shut down the groundwater remediation system on March 3, 1995, because arsenic levels in treated groundwater exceeded the permitted discharge limit.
- Interacted with EBMUD to negotiate a higher discharge limit for arsenic levels in treated groundwater.

Work Anticipated for Second Quarter 1995

- Prepare and submit quarterly groundwater monitoring report for fourth quarter 1994.
- Prepare and submit quarterly groundwater monitoring report for first quarter 1995.
- Prepare and submit semiannual groundwater remediation system performance report to EBMUD.
- Conduct groundwater sampling for the analysis of arsenic to determine background level of arsenic in groundwater at the sites.
- Submit analytical results of arsenic in groundwater to EBMUD and request a higher discharge limit for arsenic in treated groundwater.
- **Reactivate the SVE and groundwater extraction systems.**
- Perform quarterly groundwater monitoring for second quarter 1995.

Please call if you have questions.

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

Attachments:

Table 1 -	Groundwater Monitoring Data, First Quarter 1995
Table 2 -	Historical Groundwater Elevation Data
Table 3 -	Historical Groundwater Analytical Data (TPHG and BTEX)
Table 4 -	Historical Groundwater Analytical Data (Well MW-3)
Table 5 -	Approximate Cumulative Floating Product Recovered (Well RW-1)
Table 6 -	Soil-Vapor Extraction System Operation and Performance Data
Table 7 -	Soil-Vapor Extraction Well Data
Table 8 -	Influent and Effluent Groundwater Analyses Summary Report
Table 9 -	Estimated Total Dissolved TPHG and Benzene Removed - Summary Report
Figure 1 -	Site Location
Figure 2 -	Site Plan
Figure 3 -	Groundwater Data, First Quarter 1995
Figure 4 -	Historical SVE System Influent - TVHG and Benzene Concentrations
Figure 5 -	Historical SVE System Hydrocarbon Removal Rates
Figure 6 -	Historical Groundwater Treatment System Influent TPHG and Benzene Concentrations
Figure 7 -	Historical Groundwater Treatment System Hydrocarbon Removal Rates
Appendix A -	Field Data Sheets, First Quarter 1995 Groundwater

Monitoring Event

Appendix B - Analytical Results and Chain-of-Custody Documentation, First Quarter 1995

Appendix C - Field Data Sheets SVE System Operation and Maintenance Visits First Quarter 1995

Appendix D - Analytical Results and Chain-of-Custody Documentation, SVE System, first Quarter 1995

Appendix E - Field Data Sheets, Groundwater Treatment System, Operation and Maintenance Visits, First Quarter 1995

Appendix F - Analytical Results and Chain-of-Custody Documentation, Groundwater Treatment System First Quarter 1995

cc: Barney Chan ACHCSA
Kevin Graves, RWQCB-SFBR

Table 1
Groundwater Monitoring Data
First Quarter 1995
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	03-24-95	41.41	6.21	35.20	ND	NW	0.037	03-24-95	8800	3600	<50	62	99
MW-2	03-24-95	40.38	6.96	33.42	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5
MW-3	03-24-95	41.44	7.29	34.15	ND	NW	0.037	03-24-95	51	0.8	<0.5	2.4	<0.5
MW-4	03-24-95	40.33	5.92	34.41	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5
MW-5	03-24-95	41.84	6.23	35.61	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5
MW-6	03-24-95	40.13	9.03	31.10	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5
RW-1	03-24-95	40.33	9.32	** 31.02	0.01	NW	0.037	03-24-95	11000	560	660	150	1700

TOC = Top of casing
ft-MSL = Elevation in feet, relative to mean sea level
MWN = Ground-water flow direction and gradient apply to the entire monitoring well network
TPHG = Total petroleum hydrocarbons as gasoline
µg/L = Micrograms per liter
ND = None detected
WSW = West-southwest
** [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
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

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

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

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

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

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

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-4	01-13-93	40.33	8.05	32.28	ND	NR	NR
MW-4	02-22-93	40.33	7.58	32.75	ND	NR	NR
MW-4	03-25-93	40.33	8.27	32.06	ND	NR	NR
MW-4	04-13-93	40.33	8.54	31.79	ND	NR	NR
MW-4	05-22-93	40.33	9.52	30.81	ND	NR	NR
MW-4	06-17-93	40.33	9.53	30.80	ND	NR	NR
MW-4	07-27-93	40.33	10.14	30.19	ND	NR	NR
MW-4	08-24-93	40.33	10.42	29.91	ND	NR	NR
MW-4	12-08-93	40.33	10.31	30.02	ND	NR	NR
MW-4	02-01-94	40.33	9.10	31.23	ND	NR	NR
MW-4	04-26-94	40.33	8.94	31.39	ND	NR	NR
MW-4	07-29-94	40.33	10.02	30.31	ND	WSW	0.016
MW-4	11-15-94	40.33	8.47	31.86	ND	WSW	0.019
MW-4	03-24-95	40.33	5.92	34.41	ND	NW	0.037
MW-5	01-13-93	41.84	8.22	33.62	ND	NR	NR
MW-5	02-22-93	41.84	7.92	33.92	ND	NR	NR
MW-5	03-25-93	41.84	8.67	33.17	ND	NR	NR
MW-5	04-13-93	41.84	9.18	32.66	ND	NR	NR
MW-5	05-22-93	41.84	10.12	31.72	ND	NR	NR
MW-5	06-17-93	41.84	10.03	31.81	ND	NR	NR
MW-5	07-27-93	41.84	10.74	31.10	ND	NR	NR
MW-5	08-24-93	41.84	11.02	30.82	ND	NR	NR
MW-5	12-08-93	41.84	10.92	30.92	ND	NR	NR
MW-5	02-01-94	41.84	9.74	32.10	ND	NR	NR
MW-5	04-26-94	41.84	9.51	32.33	ND	NR	NR
MW-5	07-29-94	41.84	10.54	31.30	ND	WSW	0.016
MW-5	11-15-94	41.84	9.10	32.74	ND	WSW	0.019
MW-5	03-24-95	41.84	6.23	35.61	ND	NW	0.037
MW-6	01-13-93	40.13	9.84	30.29	ND	NR	NR
MW-6	02-22-93	40.13	9.94	30.19	ND	NR	NR
MW-6	03-25-93	40.13	10.68	29.45	ND	NR	NR
MW-6	04-13-93	40.13	11.12	29.01	ND	NR	NR
MW-6	05-22-93	40.13	11.74	28.39	ND	NR	NR
MW-6	06-17-93	40.13	11.75	28.38	ND	NR	NR
MW-6	07-27-93	40.13	12.20	27.93	ND	NR	NR
MW-6	08-24-93	40.13	12.41	27.72	ND	NR	NR
MW-6	12-08-93	40.13	10.11	30.02	ND	NR	NR
MW-6	02-01-94	40.13	11.80	28.33	ND	NR	NR
MW-6	04-26-94	40.13	11.33	28.80	ND	NR	NR
MW-6	07-29-94	40.13	12.16	27.97	ND	WSW	0.016
MW-6	11-15-94	40.13	11.01	29.12	ND	WSW	0.019
MW-6	03-24-95	40.13	9.03	31.10	ND	NW	0.037

Table 2
Historical Groundwater Elevation Data
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

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

TOC = Top of casing
ft-MSL = Elevation in feet, relative to mean sea level
MWN = Ground-water flow direction and gradient apply to the entire monitoring well network
ND = None detected
NR = Not reported; data not available
WSW = West-southwest
NW = Northwest
^ = Groundwater elevation (GWE) and depth to water (DTW) adjusted to include 80 percent of the floating product thickness (FPT):
[GWE = (TOC - DTW) + (FPT x 0.8)]
** [Corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

Table 3
Historical Groundwater Analytical Data
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L
MW-1	10-29-91	620	76	69	15	60
MW-1	03-19-92	6500	2600	89	42	290
MW-1	06-12-92	2900	1100	2.5	21	15
MW-1	09-08-92	820	350	<5	<5	<5
MW-1	10-26-92	190	68	<0.5	0.6	<0.5
MW-1	01-13-93	430	130	5.3	5	9
MW-1	04-13-93	5300	2100	<20	63	36
MW-1	08-24-93	630	230	<2.5	3.1	3.3
MW-1	12-08-93	81	20	<0.5	0.9	<0.5
MW-1	02-01-94	<50	13	<0.5	0.5	0.6
MW-1	04-26-94	990	290	3.5	18	14
MW-1	07-29-94	760	280	<2.5	7.1	<2.5
MW-1	11-15-94	570	150	7.3	<2.5	30
MW-1	03-24-95	8800	3600	<50	62	99
MW-2	10-29-91	<60	2.4	4.6	0.48	2.3
MW-2	03-19-92	<50	6.8	0.9	<0.5	1.1
MW-2	06-12-92	<50	<0.5	<0.5	<0.5	<0.5
MW-2	09-08-92	<50	<0.5	<0.5	<0.5	<0.5
MW-2	10-26-92	<50	<0.5	<0.5	<0.5	<0.5
MW-2	01-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2	04-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2	02-01-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	04-26-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	11-15-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	03-24-95	<50	<0.5	<0.5	<0.5	<0.5

Table 3
Historical Groundwater Analytical Data
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L
MW-3	10-29-91	32	2.1	2.8	0.35	1.8
MW-3	03-19-92	2100	780	8.8	16	58
MW-3	06-12-92	720	210	<2.5	23	4
MW-3	09-08-92	<50	5.3	<0.5	<0.5	<0.5
MW-3	10-26-92	<50	0.6	<0.5	<0.5	<0.5
MW-3	01-13-93	<50	1.1	<0.5	<0.5	<0.5
MW-3	04-13-93	68	13	<0.5	1.6	1.1
MW-3	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-3	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-3	02-01-94	<50	1.9	<0.5	2.1	<0.5
MW-3	04-26-94	<50	1.1	<0.5	2.4	0.9
MW-3	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-3	11-15-94	<50	<0.5	<0.5	<0.5	<0.5
MW-3	03-24-95	51	0.8	<0.5	2.4	<0.5
MW-4	01-13-93	<50	<0.5	1.3	<0.5	1.6
MW-4	04-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	02-01-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	04-26-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	11-15-94	220	12	19	0.9	39
MW-4	03-24-95	<50	<0.5	<0.5	<0.5	<0.5

Table 3
Historical Groundwater Analytical Data
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L
MW-5	01-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	04-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	02-01-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	04-26-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	11-15-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	03-24-95	<50	<0.5	<0.5	<0.5	<0.5
MW-6	01-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-6	04-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-6	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-6	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-6	02-01-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	04-26-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	11-15-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	03-24-95	<50	<0.5	<0.5	<0.5	<0.5
RW-1	10-29-91	Not sampled: well contained floating product				
RW-1	03-19-92	Not sampled: well contained floating product				
RW-1	06-12-92	Not sampled: well contained floating product				
RW-1	09-08-92	Not sampled: well contained floating product				
RW-1	10-23-92	Not sampled: well contained floating product				
RW-1	01-13-93	Not sampled: skimmer contained floating product				
RW-1	04-13-93	Not sampled: well contained floating product				
RW-1	08-24-93	Not sampled: well contained floating product				
RW-1	12-08-93	Not sampled: well contained floating product				
RW-1	02-01-94	Not sampled: well connected to the remediation system				
RW-1	04-26-94	Not sampled: well contained floating product				
RW-1	07-29-94	Not sampled: well contained floating product				
RW-1	11-15-94	Not sampled: well contained floating product				
RW-1	03-24-95	11000	560	660	150	1700

TPHG = Total petroleum hydrocarbons as gasoline
µg/L = Micrograms per liter

Table 4
Historical Groundwater Analytical Data
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Well Designation	Water Sample Field Date	TPHD µg/L	TOG or TRPH µg/L	VOCs µg/L	BNAs µg/L	PCBs µg/L	Cadmium by EPA 6010 µg/L	Chromium by EPA 6010 µg/L	Lead by EPA 7421 µg/L	Zinc by EPA 6010 µg/L	Nickel by EPA 6010 µg/L
MW-3	10-29-91	NA	<5000(a)	ND(e)	NA	NA	<10	<10	<5	45	<50
MW-3	03-19-92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	06-12-92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	09-08-92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	10-26-92	<50	600(b), 600(c)	ND(f)	NA	NA	NA	NA	NA	NA	NA
MW-3	12-01-92	NA	NA	NA	ND(g)	ND(h)	NA	NA	NA	NA	NA
MW-3	01-13-93	NA	780(b), 1100(c)	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	04-13-93	NA	<500(b), <500(c)	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	08-24-93	NA	<500(b), <500(c)	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	12-08-93	NA	900(b), 500(c)	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	02-01-94	NA	<500(b), <500(c)	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	04-26-94	NA	<600(d)	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	07-29-94	NA	600(d)	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	11-15-94	NA	<500(d)	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	03-24-95	NA	<500(d)	NA	NA	NA	NA	NA	NA	NA	NA

TPHD = Total petroleum hydrocarbons as diesel by EPA Method 3510/California DHS LUFT Method
TOG = Total oil and grease analyzed using Standard Method: (a) 5520B&F or, (b) 5520C and (c) 5520F
TRPH = Total recoverable petroleum hydrocarbons analyzed using: (d) EPA Method 418.1
VOCs = Volatile organic compounds analyzed using EPA Method 624
BNAs = Semi-volatile organic compounds analyzed using EPA Method 3510/8270
PCBs = Polychlorinated biphenyls analyzed using EPA Method 3510/8080
µg/L = Micrograms per liter
NA = Not analyzed
ND = Not detected (31 compounds tested for VOCs were nondetectable)
e = All 37 compounds analyzed were nondetectable except for toluene (3.0 ppb)
f = All 41 compounds analyzed were nondetectable
g = All 34 compounds analyzed were nondetectable
h = All 7 compounds analyzed were nondetectable

Table 5
Approximate Cumulative Floating Product Recovered
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Well Designation	Date	Floating Product Recovered gallons
RW-1	1992	22.3
RW-1	1993	1.0
RW-1	1994	0.0
AS-1, AS-2, and RW-1	1995	3.8
	1992 to 1995 Total:	27.1

Table 6
Soil-Vapor Extraction System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer

Start-Up Date: 12-07-93
Reporting Period From: 12-07-93
To: 03-31-95

Date Begin:		12-07-93	12-08-93	12-09-93	12-10-93	12-15-93
Date End:		12-08-93	12-09-93	12-10-93	12-15-93	12-16-93
Mode of Oxidation:		Thermal	Thermal	Thermal	Thermal	Thermal
Days of Operation:		0.9	0.0	1.0	5.0	0.8
Days of Downtime:		0.1	0.9	0.0	0.0	0.0
Vapor Monitoring Concentrations						
Well Field Influent, as gasoline:	mg/m3 (1)	10000	NA	NA	NA	NA
	ppmv (2) (3)	NA (15)	NA	NA	NA	NA
System Influent, as gasoline:	mg/m3	1400	NA	1400	1500	1800
	ppmv	NA	NA	NA	NA	NA
System Effluent, as gasoline:	mg/m3	76	NA	130	21	NA
	ppmv	NA	NA	NA	NA	NA
Well Field Influent, as benzene:	mg/m3	540	NA	NA	NA	NA
	ppmv (4)	NA	NA	NA	NA	NA
System Influent, as benzene:	mg/m3	38	NA	60	100	79
	ppmv	NA	NA	NA	NA	NA
System Effluent, as benzene:	mg/m3	2.3	NA	3.1	<0.05	NA
	ppmv	NA	NA	NA	NA	NA
Well Field Flow Rate, scfm (5):		10	0	10	5	45
System Influent Flow Rate, scfm:		100	0	100	87	100
Destruction Efficiency, percent (6):		94.6	NA	90.7	98.6	NA
Emission Rates (pounds per day) (7)						
Gasoline:		0.68	0.00	1.17	0.16	NA
Benzene:		0.02	0.00	0.03	<0.00	NA
Operating Hours This Period:		21.0	0.0	23.0	121.0	18.0
Operating Hours To Date:		21.0	21.0	44.0	165.0	183.0
SVE Pounds/ Hour Removal Rate, as gasoline (8) (9):		0.52	0.00	0.52	0.49	0.67
SVE Pounds Removed This Period, as gasoline (10):		11.004	0.000	12.052	59.100	12.126
GWE Pounds Removed This Period, as gasoline (11) (12):		0.000	0.000	0.000	0.000	0.000
Total Pounds Removed This Period, as gasoline (13):		11.004	0.000	12.052	59.100	12.126
Total Pounds Removed To Date, as gasoline:		11.0	11.0	23.1	82.2	94.3
Total Gallons Removed This Period, as gasoline (14):		1.8	0.0	1.9	9.5	2.0
Total Gallons Removed To Date, as gasoline:		1.8	1.8	3.7	13.3	15.2

Table 6
Soil-Vapor Extraction System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer

Start-Up Date: 12-07-93
Reporting Period From: 12-07-93
To: 03-31-95

Date Begin:		12-16-93	12-21-93	12-25-93	12-29-93	12-31-93
Date End:		12-21-93	12-25-93	12-29-93	12-31-93	01-07-94
Mode of Oxidation:		Thermal	Thermal	Thermal	Thermal	Thermal
Days of Operation:		0.0	4.3	0.0	1.8	0.0
Days of Downtime:		5.0	0.0	4.0	0.0	6.6
Vapor Monitoring Concentrations						
Well Field Influent, as gasoline:	mg/m3	NA	NA	NA	NA	NA
	ppmv (3)	NA	NA	NA	NA	NA
System Influent, as gasoline:	mg/m3	NA	NA	NA	NA	NA
	ppmv	NA	NA	NA	NA	NA
System Effluent, as gasoline:	mg/m3	NA	NA	NA	NA	NA
	ppmv	NA	NA	NA	NA	NA
Well Field Influent, as benzene:	mg/m3	NA	NA	NA	NA	NA
	ppmv (4)	NA	NA	NA	NA	NA
System Influent, as benzene:	mg/m3	NA	NA	NA	NA	NA
	ppmv	NA	NA	NA	NA	NA
System Effluent, as benzene:	mg/m3	NA	NA	NA	NA	NA
	ppmv	NA	NA	NA	NA	NA
Well Field Flow Rate, scfm:		0	20	0	54	0
System Influent Flow Rate, scfm:		0	100	0	78	0
Destruction Efficiency, percent (6):		NA	NA	NA	NA	NA
Emission Rates (pounds per day) (7)						
Gasoline:		0.00	0.00	0.00	0.00	0.00
Benzene:		0.00	0.00	0.00	0.00	0.00
Operating Hours This Period:		0.0	104.0	0.0	43.0	0.0
Operating Hours To Date:		183.0	287.0	287.0	330.0	330.0
SVE Pounds/ Hour Removal Rate, as gasoline (9):		0.00	0.00	0.00	0.00	0.00
SVE Pounds Removed This Period, as gasoline (10):		0.000	0.000	0.000	0.000	0.000
GWE Pounds Removed This Period, as gasoline (12):		0.000	0.000	0.000	0.000	0.000
Total Pounds Removed This Period, as gasoline (13):		0.000	0.000	0.000	0.000	0.000
Total Pounds Removed To Date, as gasoline:		94.3	94.3	94.3	94.3	94.3
Total Gallons Removed This Period, as gasoline (14):		0.0	0.0	0.0	0.0	0.0
Total Gallons Removed To Date, as gasoline:		15.2	15.2	15.2	15.2	15.2

Table 6
Soil-Vapor Extraction System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer

Start-Up Date: 12-07-93
Reporting Period From: 12-07-93
To: 03-31-95

Date Begin:		01-07-94	01-12-94	01-24-94	03-31-94
Date End:		01-12-94	01-24-94	03-31-94	12-31-94
Mode of Oxidation:		Thermal	Thermal	Thermal	Thermal
Days of Operation:		5.1	11.9	0.0	0.0
Days of Downtime:		0.0	0.1	66.3	275.0
Vapor Monitoring Concentrations					
Well Field Influent, as gasoline:	mg/m3	NA	NA	NA	NA
	ppmv (3)	NA	NA	NA	NA
System Influent, as gasoline:	mg/m3	NA	2500	NA	NA
	ppmv	NA	NA	NA	NA
System Effluent, as gasoline:	mg/m3	NA	52	NA	NA
	ppmv	NA	NA	NA	NA
Well Field Influent, as benzene:	mg/m3	NA	NA	NA	NA
	ppmv (4)	NA	NA	NA	NA
System Influent, as benzene:	mg/m3	NA	37	NA	NA
	ppmv	NA	NA	NA	NA
System Effluent, as benzene:	mg/m3	NA	0.93	NA	NA
	ppmv	NA	NA	NA	NA
Well Field Flow Rate, scfm:		37	41	0	0
System Influent Flow Rate, scfm:		60	64	0	0
Destruction Efficiency, percent (6):		97.9	97.9	NA	NA
Emission Rates (pounds per day) (7)					
Gasoline:		0.30	0.30	0.00	0.00
Benzene:		0.01	0.01	0.00	0.00
Operating Hours This Period:		123.0	285.0	0.0	0.0
Operating Hours To Date:		453.0	738.0	738.0	738.0
SVE Pounds/ Hour Removal Rate, as gasoline (9):		0.48	0.60	0.00	0.00
SVE Pounds Removed This Period, as gasoline (10):		59.399	170.669	0.000	0.000
GWE Pounds Removed This Period, as gasoline (12):		0.000	0.000	0.000	0.000
Total Pounds Removed This Period, as gasoline (13):		59.399	170.669	0.000	0.000
Total Pounds Removed To Date, as gasoline:		153.7	324.3	324.3	324.3
Total Gallons Removed This Period, as gasoline (14):		9.6	27.5	0.0	0.0
Total Gallons Removed To Date, as gasoline:		24.8	52.3	52.3	52.3

Table 6
Soil-Vapor Extraction System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer

Start-Up Date: 12-07-93
Reporting Period From: 12-07-93
To: 03-31-95

Date Begin:		12-31-94	02-06-95	03-03-95
Date End:		02-06-95	03-03-95	03-31-95
Mode of Oxidation:		Thermal	Thermal	Thermal
Days of Operation:		0.4	21.4	6.0
Days of Downtime:		36.6	3.6	22.1
Vapor Monitoring Concentrations				
Well Field Influent, as gasoline:	mg/m3	NA	11000	8900
	ppmv (3)	NA	3041	2460
System Influent, as gasoline:	mg/m3	NA	880	<60
	ppmv	NA	243	<17
System Effluent, as gasoline:	mg/m3	NA	<60	<60
	ppmv	NA	<17	<17
Well Field Influent, as benzene:	mg/m3	NA	110	99
	ppmv (4)	NA	34	31
System Influent, as benzene:	mg/m3	NA	21	<0.5
	ppmv	NA	6	<0.2
System Effluent, as benzene:	mg/m3	NA	<0.5	<0.5
	ppmv	NA	<0.2	<0.2
Well Field Flow Rate, scfm:		0	5	6
System Influent Flow Rate, scfm:		0	36	33
Destruction Efficiency, percent (6):		NA	96.6	NA
Emission Rates (pounds per day) (7)				
Gasoline:		0.00	<0.19	<0.18
Benzene:		0.00	<0.00	<0.00
Operating Hours This Period:		8.9	512.5	143.3
Operating Hours To Date:		746.9	1259.4	1402.7
SVE Pounds/ Hour Removal Rate, as gasoline (9):		0.00	0.12	0.01
SVE Pounds Removed This Period, as gasoline (10):		0.000	60.767	1.062
GWE Pounds Removed This Period, as gasoline (12):		0.000	4.282	0.313
Total Pounds Removed This Period, as gasoline (13):		0.000	65.049	1.375
Total Pounds Removed To Date, as gasoline:		324.3	389.4	390.8
Total Gallons Removed This Period, as gasoline (14):		0.0	10.5	0.2
Total Gallons Removed To Date, as gasoline:		52.3	62.8	63.0

Table 6
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2035	Vapor Treatment Unit: Therm Tech Model VAC-10 thermal/catalytic oxidizer
Location: 1001 San Pablo Avenue Albany, California	
Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date: 12-07-93 Reporting Period From: 12-07-93 To: 03-31-95

CURRENT REPORTING PERIOD:	12-31-94	to	03-31-95
DAYS / HOURS IN PERIOD:	90.1		2162
DAYS / HOURS OF OPERATION:	27.7		665
DAYS / HOURS OF DOWN TIME:	62.4		1498
PERCENT OPERATIONAL:			30.7 %
PERIOD POUNDS REMOVED:	66.4		
PERIOD GALLONS REMOVED:	10.7		
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):			34.9

1. mg/m3 = milligrams per cubic meter
2. ppmv = parts per million by volume
3. Concentration (as gasoline in ppmv) = [concentration (as gasoline in mg/m3) x 24.05 (lb/m3/lb-mole of air)/mg] / 87 lb/lb-mole
4. Concentration (as benzene in ppmv) = [concentration (as benzene in mg/m3) x 24.05 (lb/m3/lb-mole of air)/mg] / 78 lb/lb-mole
5. scfm = flow in standard cubic feet per minute at one atmosphere and 70 degrees Farenheit
6. Destruction efficiency, percent = ([system influent concentration (as gasoline in mg/m3) - system effluent concentration (as gasoline in mg/m3)] / system influent concentration (as gasoline in mg/m3)) x 100 percent
7. Emission rates (pounds per day) = system effluent concentration (as gasoline or benzene in mg/m3) x system influent flow rate (scfm) x 0.02832 m3/ft3 x 1440 minutes/day x 1 pound/454,000 mg
8. SVE = Soil-vapor extraction system
9. SVE pounds/ hour removal rate (as gasoline) = SVE system influent concentration (as gasoline in mg/m3) x SVE system influent flow rate (scfm) x 0.02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
10. SVE pounds removed this period (as gasoline) = pounds/ hour removal rate (SVE) x hours of operation (SVE)
11. GWE = Groundwater extraction system
12. Refer to Table 8 for GWE system performance data (system was started during the first quarter of 1995
13. Represents the total mass recovered by the SVE and GWE systems, and the total mass abated by the thermal/catalytic oxidizer
14. Total gallons removed this period (as gasoline) = total pounds removed this period (as gasoline) x 0.1667 gallons/pound of gasoline
15. NA = Not analyzed, not applicable, or not available

Table 7
Soil-Vapor Extraction Well Data

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

Date: 06-22-95
Project Number: 0805-123.02

Date	Well Identification											
	VW-1			VW-2			VW-3			VW-4		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-07-93	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
12-09-93	open	2455 LAB	NA	open	5316 LAB	NA	open	2025 LAB	NA	open	2278 LAB	NA
12-15-93	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
01-12-94	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
01-24-94	* System shut down			System shut down			System shut down			System shut down		
02-08-95	open	<17 LAB	20	open	<17 LAB	20	open	0.0 PID	20	open	0.0 PID	20
02-14-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	11	open	NA	NA	open	NA	NA	open	NA	NA
03-08-95	open	NA	28	closed	NA	17	closed	NA	0	closed	NA	26
03-08-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA

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
* = The SVE system was shut down manually because of no available well screens in the soil-vapor extraction wells

Table 7
Soil-Vapor Extraction Well Data

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

Date: 06-22-95
Project Number: 0805-123.02

Date	Well Identification											
	VW-5			VW-6			VW-7			VW-8		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-07-93	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
12-09-93	open	532 LAB	NA	open	2430 LAB	NA	open	3038 LAB	NA	open	1240 LAB	NA
12-15-93	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
01-12-94	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
01-24-94	* System shut down			System shut down			System shut down			System shut down		
02-08-95	open	0.0 PID	24	open	<17 LAB	10	open	0.0 PID	24	open	<17 LAB	20
02-14-95	open	NA	NA	closed	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	NA	closed	NA	16	open	NA	NA	open	NA	NA
03-08-95	closed	NA	1	closed	NA	8	closed	NA	22	closed	NA	0
03-08-95	closed	NA	NA	open	NA	NA	closed	NA	NA	closed	NA	NA

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
* = The SVE system was shut down manually because of no available well screens in the soil-vapor extraction wells

Table 7
Soil-Vapor Extraction Well Data

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

Date: 06-22-95
Project Number: 0805-123.02

Date	Well Identification											
	VW-9			RW-1			AS-1 (vent)			AS-2 (vent)		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-07-93	open	NA	NA	open	NA	NA						
12-09-93	open	1671 LAB	NA	open	1721 LAB	NA						
12-15-93	open	NA	NA	closed	NA	NA						
01-12-94	open	NA	NA	closed	NA	NA						
01-24-94		* System shut down			System shut down							
02-08-95	open	0.0 PID	23	open	13.7 PID	20	open	<17 LAB	24	open	<17 LAB	24
02-14-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
02-15-95	open	NA	NA	open	NA	13	passive	NA	5	passive	NA	1
03-08-95	closed	NA	8	open	NA	28	passive	NA	0	passive	NA	0
03-08-95	closed	NA	NA	closed	NA	NA	open	NA	NA	open	NA	NA

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
* = The SVE system was shut down manually because of no available well screens in the soil-vapor extraction wells

Table 8
Influent and Effluent Groundwater Analyses
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Well Designation	Water Sample Field Date	TPHG µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L
I-1	02-08-95	NA	NA	NA	NA	NA
I-1	02-08-95	49000	4300	4900	1000	5200
I-1	02-14-95	33000	4300	5800	970	5600
I-1	02-21-95	21000	940	1500	360	4000
I-1	02-28-95	15000	430	290	54	2000
I-1	03-08-95	15000	430	290	54	2000
I-2	02-08-95	1500	59	70	14	86
I-2	02-14-95	NA	NA	NA	NA	NA
I-2	02-21-95	340	7.2	8.8	1.9	37
I-2	02-28-95	390	3.9	2.5	0.9	16
I-3	02-08-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	02-14-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	02-21-95	<50	<0.5	<0.5	<0.5	<0.5
I-3	02-28-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	02-08-95	<50	0.7	<0.5	<0.5	<0.5
E-1	02-14-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	02-21-95	<50	<0.5	<0.5	<0.5	<0.5
E-1	02-28-95	<50	<0.5	<0.5	<0.5	<0.5

TPHG = Total petroleum hydrocarbons as gasoline
µg/L = Micrograms per liter
NA = Not analyzed

Table 9
Estimated Total Dissolved TPHG Removed
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

		Groundwater Extraction			TPHG Removal Data					Benzene Removal Data				
Sample Designation	Sample Date	Total Volume Extracted	Period Volume Extracted	Period Flow Rate	Period Influent Concentration	Period Removal Rate	Period Pounds Removed [1]	Total Pounds Removed	Total Gallons Removed [2]	Period Influent Concentration	Period Removal Rate	Period Pounds Removed [3]	Total Pounds Removed	Total Gallons Removed [4]
		gallons	gallons	gpd	µg/L	lbs/day	pounds	pounds	gallons	µg/L	lbs/day	pounds	pounds	gallons
I-1	02-08-95	628	0	0	NA	0.000	0.000	0.000	0.000	NA	0.0000	0.0000	0.0000	0.0000
I-1	02-08-95	880	252	2,520	49,000	1.031	0.103	0.103	0.017	4,300	0.0904	0.0090	0.0090	0.0012
I-1	02-14-95	1,329	449	76	33,000	0.021	0.124	0.227	0.038	4,300	0.0027	0.0161	0.0251	0.0035
I-1	02-21-95	15,499	14,170	2,051	21,000	0.360	2.484	2.710	0.452	940	0.0161	0.1112	0.1363	0.0188
I-1	02-28-95	28,788	13,289	1,894	15,000	0.237	1.664	4.374	0.729	430	0.0068	0.0477	0.1840	0.0254
I-1	03-08-95	31,358	2,570	316	15,000	0.040	0.322	4.696	0.783	430	0.0011	0.0092	0.1932	0.0266
							0.313							
I-2	02-08-95	628	0	0	NA	0.000	0.000	0.000	0.000	NA	0.0000	0.0000	0.0000	0.0000
I-2	02-08-95	880	252	2,520	1,500	0.032	0.003	0.003	0.001	59	0.0012	0.0001	0.0001	0.0000
I-2	02-14-95	1,329	449	85	1,500	0.001	0.006	0.009	0.001	59	0.0000	0.0002	0.0003	0.0000
I-2	02-21-95	15,499	14,170	2,024	340	0.006	0.040	0.049	0.008	7	0.0001	0.0009	0.0012	0.0002
I-2	02-28-95	28,788	13,289	1,898	390	0.006	0.043	0.092	0.015	4	0.0001	0.0004	0.0016	0.0002
I-2	03-08-95	31,358	2,570	321	390	0.001	0.008	0.101	0.017	4	0.0000	0.0001	0.0017	0.0002

Table 9
Estimated Total Dissolved TPHG Removed
Summary Report

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

Date: 06-22-95
Project Number: 0805-123.02

Sample Designation	Sample Date	Groundwater Extraction: Total Volume Extracted (gallons)	Groundwater Extraction: Period Volume Extracted (gallons)	Groundwater Extraction: Period Flow Rate (gpd)	TPHG Removal Data: Period Influent Concentration (µg/L)	TPHG Removal Data: Period Removal Rate (lbs/day)	TPHG Removal Data: Period Pounds Removed [1] (pounds)	TPHG Removal Data: Total Pounds Removed (pounds)	TPHG Removal Data: Total Gallons Removed [2] (gallons)	Benzene Removal Data: Period Influent Concentration (µg/L)	Benzene Removal Data: Period Removal Rate (lbs/day)	Benzene Removal Data: Period Pounds Removed [3] (pounds)	Benzene Removal Data: Total Pounds Removed (pounds)	Benzene Removal Data: Total Gallons Removed [4] (gallons)
CURRENT REPORTING PERIOD:		02-08-95	to	03-08-95										
DAYS / HOURS IN PERIOD:		28.0		673										
DAYS / HOURS OF OPERATION:		15.3		368										
DAYS / HOURS OF DOWN TIME:		12.7		305										
PERCENT OPERATIONAL:				55%										
PERIOD GROUNDWATER EXTRACTED:				30,730										
PERIOD HYDROCARBON REMOVAL (TOTAL):							4.696		0.783			0.1932		0.0266
HYDROCARBONS REMOVED BY AERATION TANK:							4.595		0.766			0.1915		0.0264
HYDROCARBONS REMOVED BY CARBON:							0.101		0.017			0.0017		0.0002
PERCENT PRIMARY CARBON LOADING: [5]						1%								
PERIOD AVERAGE FLOW RATE (gpd):						1,096	(includes down time)							
PERIOD AVERAGE FLOW RATE (gpd):						2,004	(excludes down time)							
PERIOD AVERAGE FLOW RATE (gpm):						1.4	(excludes down time)							

TPHG = total petroleum hydrocarbons as gasoline
gpd = gallons per day
µg/L = micrograms per liter
lbs/day = pounds per day
NA = not analyzed
gpm = gallons per minute

1. Period TPHG removed (pounds) = period influent TPHG concentration (µg/L) x period volume of groundwater extracted (gallons) x 3.7854 (liters/gallon) x 0.000000002205 (pounds/µg)
2. Total TPHG removed (gallons) = total TPHG removed (pounds) x 0.1667 (gallons/pound)
3. Period benzene removed (pounds) = period influent benzene concentration (µg/L) x period volume of groundwater extracted (gallons) x 3.7854 (liters/gallon) x 0.000000002205 (pounds/µg)
4. Total benzene removed (gallons) = total benzene removed (pounds) x 0.1379 (gallons/pound)
5. Percent carbon loading = (total TPHG removed (0.101 pounds) / 10 pounds of TPH-G) x 100
   The percent carbon loading calculation assumes a 5% by weight carbon adsorption efficiency. The treatment system uses two 200 pound carbon canisters.
   Carbon Loading (10 lbs TPHG) = 1 canister x 200 lbs carbon/canister x 1 lb TPHG/20 lb carbon

152753

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

- N -

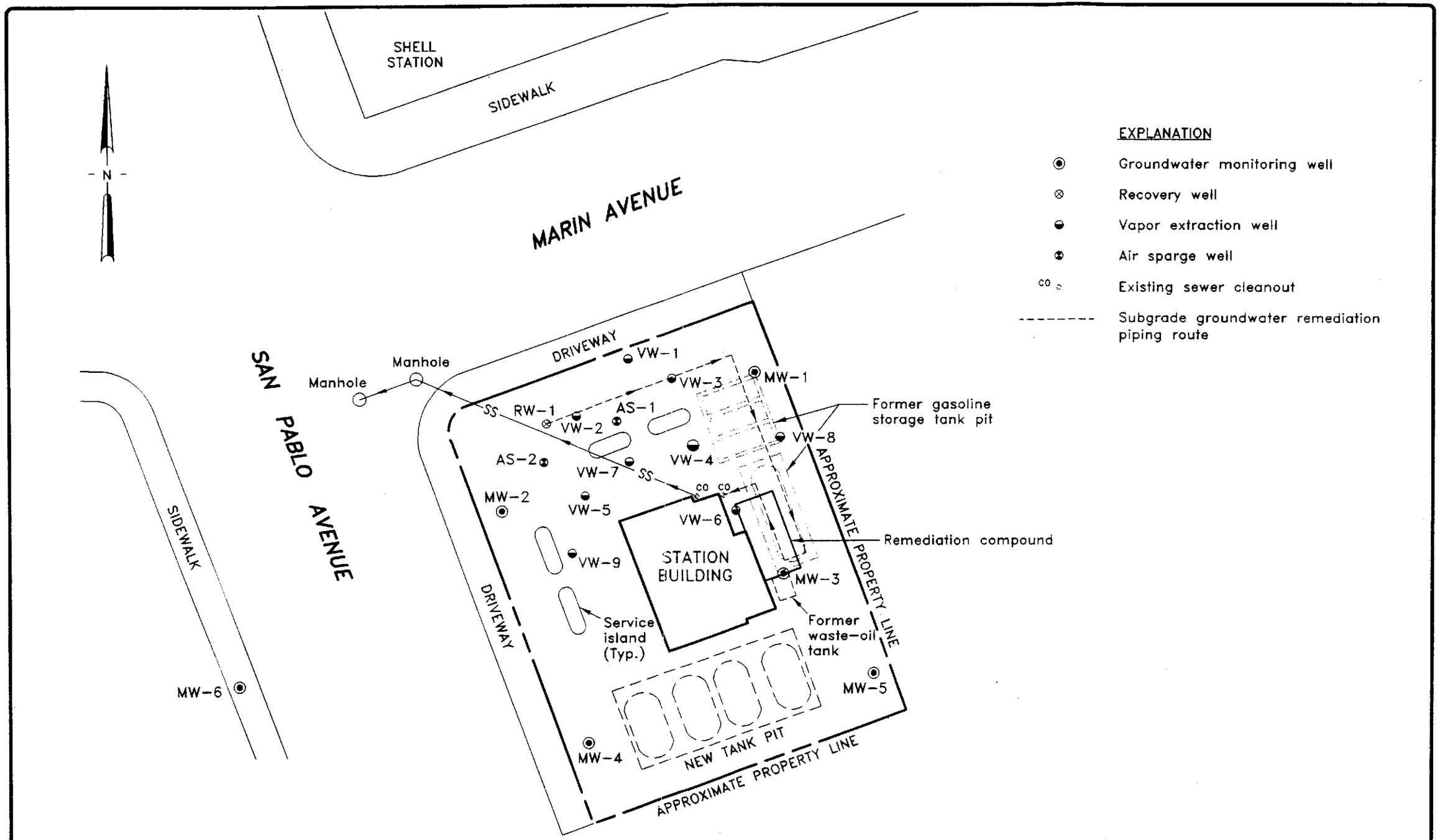
Scale : 0 2000 4000 Feet

EMCON

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

SITE LOCATION

FIGURE
1
PROJECT NO.
805-123.02



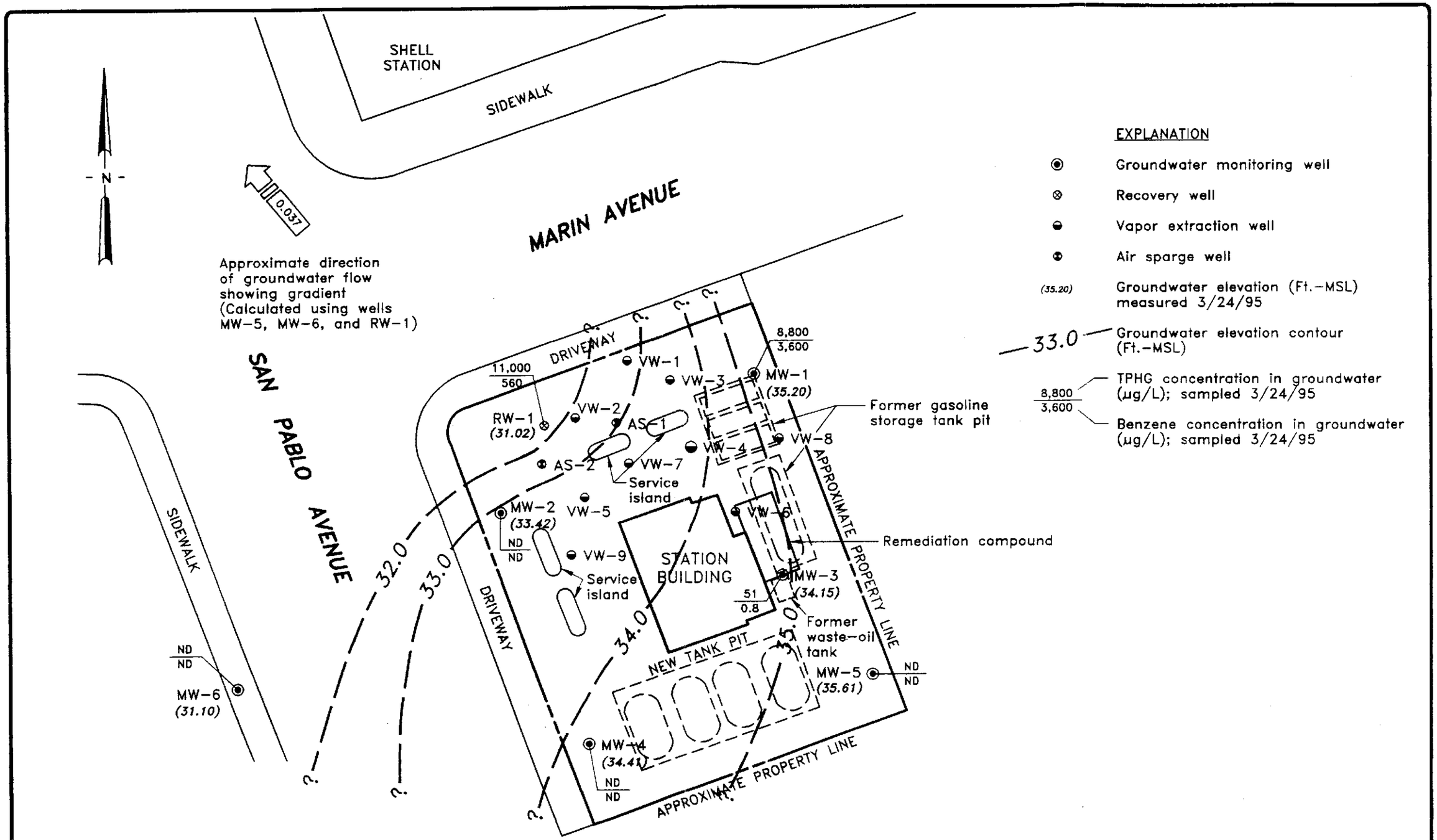
emcon

SCALE: 0 30 60 FEET

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

SITE PLAN

FIGURE NO.
2
PROJECT NO.
805-123.02



EMCON

SCALE: 0 30 60 FEET

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

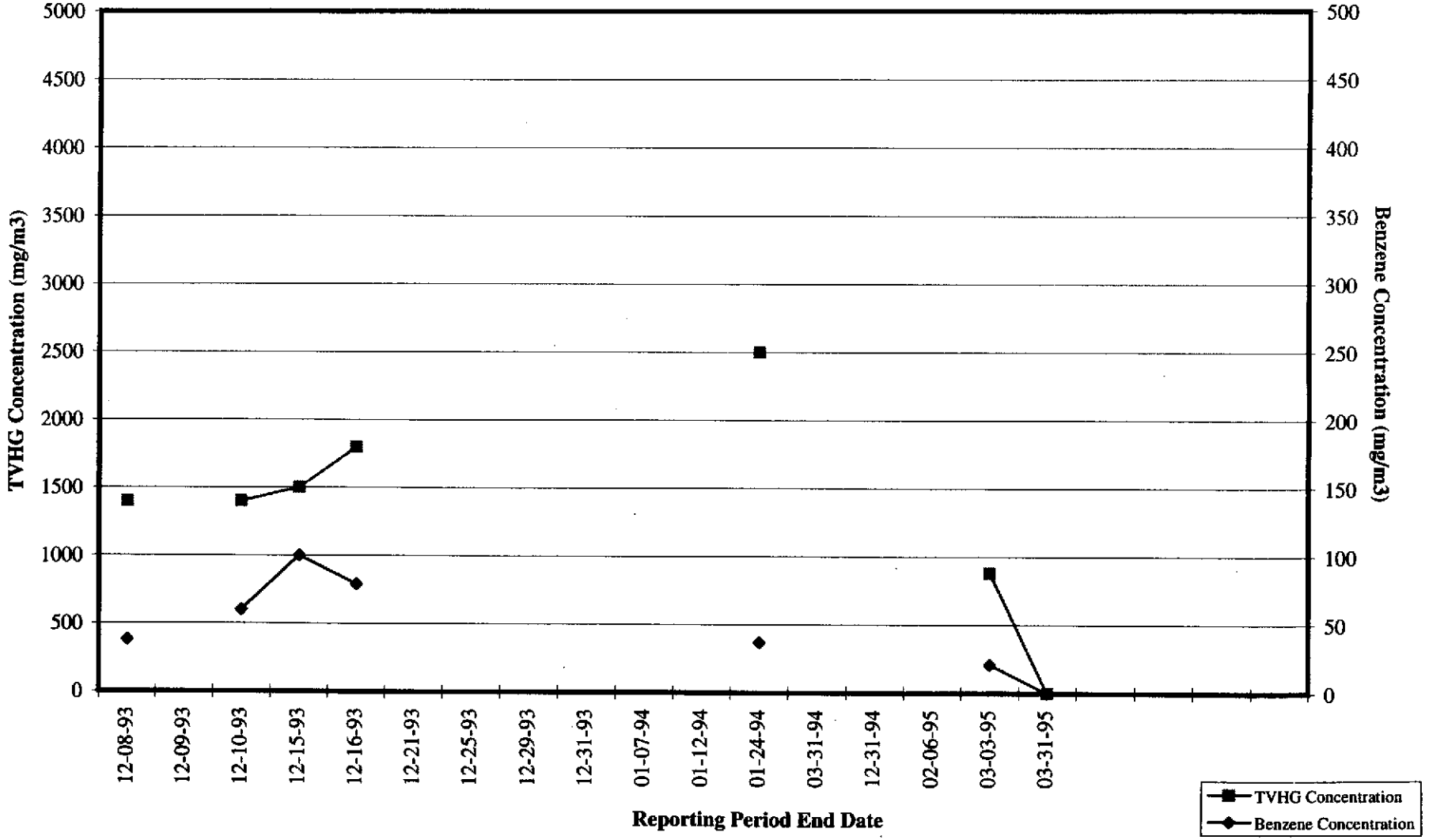
GROUNDWATER DATA
FIRST QUARTER, 1995

FIGURE NO.
3

PROJECT NO.
805-123.02

Figure 4

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

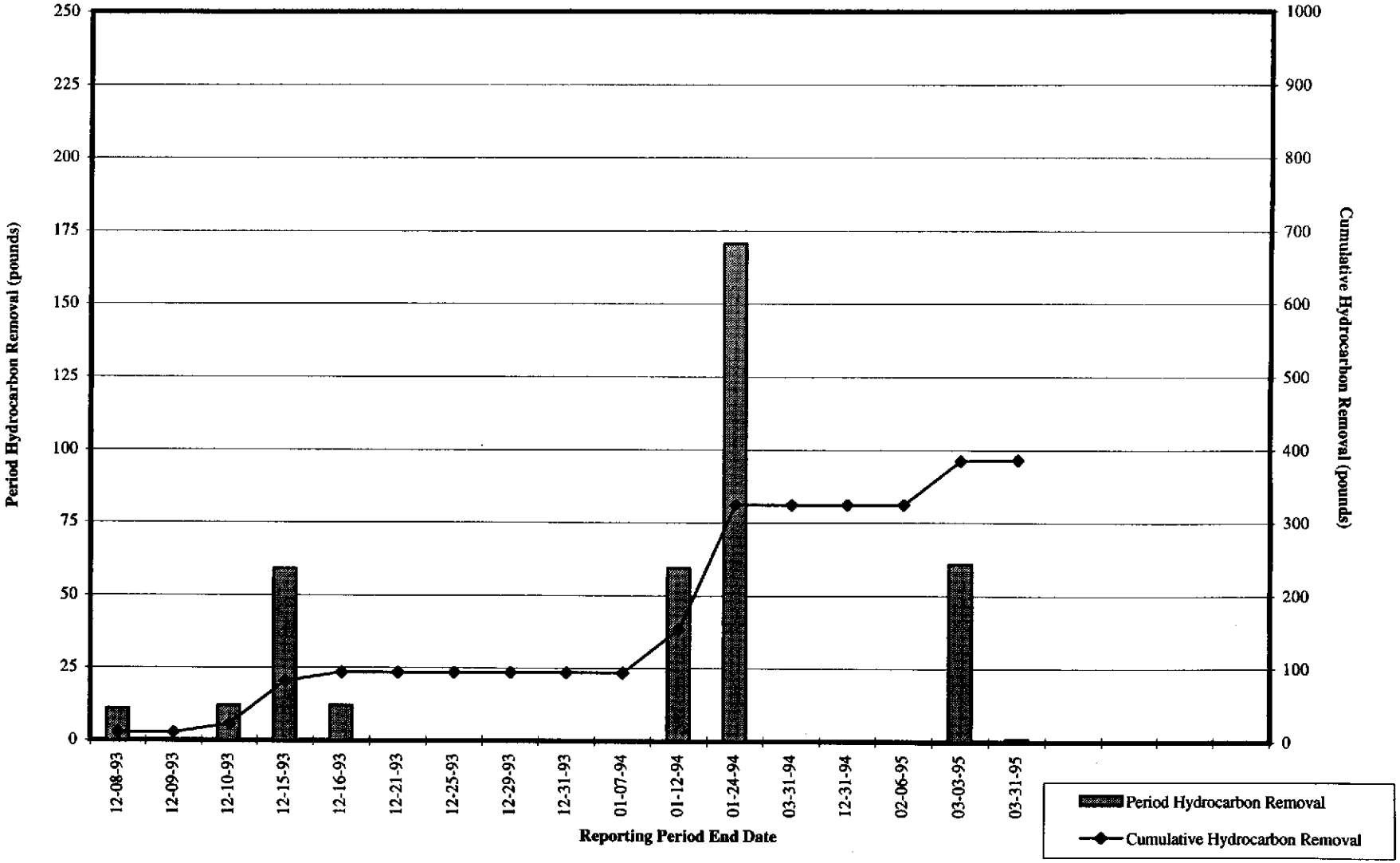


mg/m3 = Milligrams per cubic meter
TVHG = Total volatile hydrocarbons as gasoline

esj/h:\2035\2035tss.xls\2035tss:dcl
0805-123.02

Figure 5

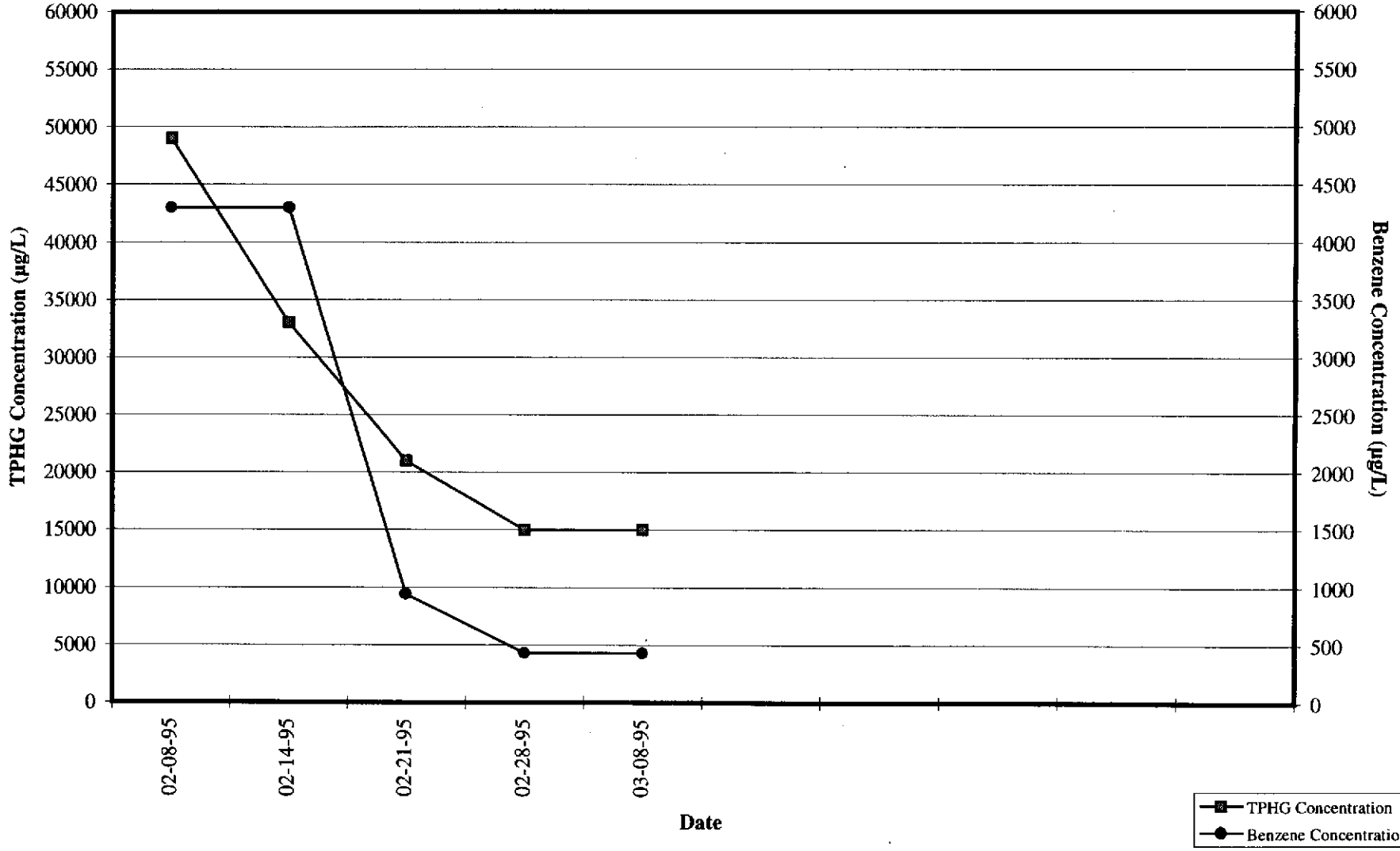
ARCO Service Station 2035
Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates



esj/h:\2035\2035tss.xls\2035tss:dcl
0805-123.02

Figure 6

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

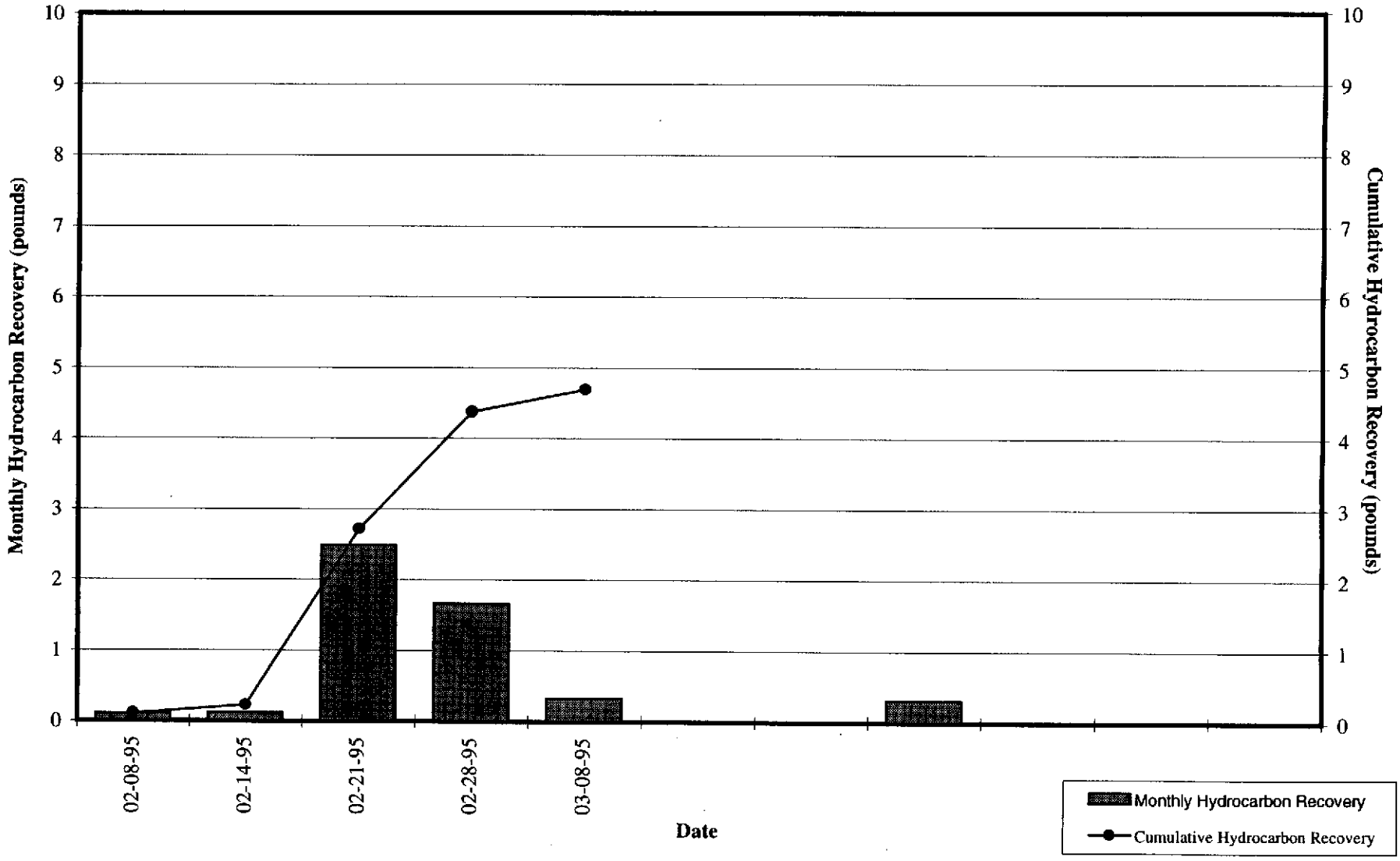


µg/L = Micrograms per liter
TPHG = total petroleum hydrocarbons as gasoline

esj/h:\2035\2035tss.xls\Table 8:dcl
0805-123.02

Figure 7

ARCO Service Station 2035
Historical Groundwater Treatment System Hydrocarbon Recovery Rates



esj/h:\2035\2035tss.xls\Table 9:dcl
0805-123.02

APPENDIX A

FIELD DATA SHEETS, FIRST QUARTER 1995 GROUNDWATER MONITORING EVENT

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 1775-217.01 STATION ADDRESS : 101 San Pablo Avenue DATE : 3/24/95

ARCO STATION # : 2035 FIELD TECHNICIAN : D. Gamble DAY : Fri.

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-2	X	X		2KA	X	6.96	6.96	ND	ND	28.7	
2	MW-4	No	X		2KA	X	5.92	5.92	ND	ND	25.1	Water in Box above TOC
3	MW-5	X	X		2KA	X	6.23	6.23	ND	ND	24.2	
4	MW-6	X	X		2KA	X	9.03	9.03	ND	ND	24.2	
5	MW-3	X	X		2KA	X	7.29	7.29	ND	ND	32.7	
6	MW-1	X	X		2KA	X	6.21	6.21	ND	ND	29.6	
7	RW-1	X	X		None	X	9.32	9.32	9.31	.01	25.4	

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

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

PURGED BY: D. Gambelin CLIENT NAME: ARCO 2035

SAMPLED BY: D. Gambelin LOCATION: Albany, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 15.28

DEPTH TO WATER (feet): ~~29.6~~ 6.21 CALCULATED PURGE (gal.): 4584

DEPTH OF WELL (feet): 29.6 ACTUAL PURGE VOL. (gal.): 46.0

DATE PURGED: 3/24/95 Start (2400 Hr) 1317 End (2400 Hr) 1329

DATE SAMPLED: 3/24/95 Start (2400 Hr) 1334 End (2400 Hr) 1335

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1320	15.5	6.52	930	64.8	Tan	Medium
1324	31.0	6.49	928	65.4	Tan	Medium
1329	46.0	6.51	935	65.2	Tan	Medium

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

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		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X 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 #: 2KA

REMARKS: ___

Meter Calibration: Date: 3/24/95 Time: 1040 Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: MW-5

Signature: [signature] Reviewed By: JB Page 1 of 7

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217.01 SAMPLE ID: MW-2

PURGED BY: D. Gambelin CLIENT NAME: ARCO 2035

SAMPLED BY: D. Gambelin LOCATION: Albany, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 14.20

DEPTH TO WATER (feet): 6.96 CALCULATED PURGE (gal.): 42.61

DEPTH OF WELL (feet): 28.7 ACTUAL PURGE VOL. (gal.): 43.0

DATE PURGED: 3/24/95 Start (2400 Hr) 1204 End (2400 Hr) 1210

DATE SAMPLED: 3/24/95 Start (2400 Hr) 1217 End (2400 Hr) 1219

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1205	14.5	6.57	812	62.1	Tan	Light
1207	29.0	6.60	836	63.8	↓	↓
1210	43.0	6.60	844	64.1		

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

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

Field QC samples collected at this well: ~~NR~~ FB-1

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump
X 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™
X Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: Good LOCK #: 2KA

REMARKS: ___

Meter Calibration: Date: 3/24/95 Time: 1040 Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: MW-5

Signature: [signature] Reviewed By: [signature] Page 2 of 7

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217.01 SAMPLE ID: MW-3

PURGED BY: D. Gambelin CLIENT NAME: ARCO 2035

SAMPLED BY: D. Gambelin LOCATION: Albany, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 16.6

DEPTH TO WATER (feet): 7.29 CALCULATED PURGE (gal.): 49.80

DEPTH OF WELL (feet): 32.7 ACTUAL PURGE VOL. (gal.): 500

DATE PURGED: 3/24/95 Start (2400 Hr) 1233 End (2400 Hr) 1248

DATE SAMPLED: 3/24/95 Start (2400 Hr) 1252 End (2400 Hr) 1253

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1238	17.0	6.52	924	61.4	Tan	Heavy
1243	34.0	6.59	939	61.8	↓	Light
1248	50.0	6.69	945	62.7	↓	↓

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

COLOR: NR (COBALT 0 - 500)

TURBIDITY: 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	X Bailer (Teflon®)
X 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 #: 2KA

REMARKS: ___

Meter Calibration: Date: 3/24/95 Time: 1040 Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: MW-3

Signature: [signature] Reviewed By: [signature] Page 3 of 7

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217.01 SAMPLE ID: MW-4

PURGED BY: D. Gambelin CLIENT NAME: ARCO 2035

SAMPLED BY: D. Gambelin LOCATION: Albany, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 12.53

DEPTH TO WATER (feet): 5.92 CALCULATED PURGE (gal.): 37.59

DEPTH OF WELL (feet): 25.1 ACTUAL PURGE VOL. (gal.): 38.0

DATE PURGED: 3/24/95 Start (2400 Hr) 1103 End (2400 Hr) 1110

DATE SAMPLED: 3/24/95 Start (2400 Hr) 1115 End (2400 Hr) 1116

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (Visual)
1105	13.0	6.33	455	60.1	Tan	Light
1107	25.5	6.37	623	62.1	↓	↓
1110	38.0	6.38	609	62.8		

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		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
X 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: Water in Box above TOC LOCK #: 2KA

REMARKS: ___

Meter Calibration: Date: 3/24/95 Time: 0925 Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: MW-5

Signature: [signature] Reviewed By: JB Page 4 of 7

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217.01 SAMPLE ID: MW-5

PURGED BY: D. Gambelin CLIENT NAME: ARCO 2035

SAMPLED BY: D. Gambelin LOCATION: Albany, CA

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	11.74
DEPTH TO WATER (feet):	6.23	CALCULATED PURGE (gal.):	35.22
DEPTH OF WELL (feet):	24.2	ACTUAL PURGE VOL. (gal.):	35.5

DATE PURGED: 3/24/95 Start (2400 Hr) 1040 End (2400 Hr) 1046

DATE SAMPLED: 3/24/95 Start (2400 Hr) 1050 End (2400 Hr) 1051

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1041	12.0	6.25	657	59.4	Tan	Light
1043	24.0	6.35	661	59.9	Tan	Moderate
1046	35.5	6.37	670	60.4	↓	↓

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

COLOR: NR (COBALT 0 - 500)

TURBIDITY: 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	X Bailer (Teflon®)
X 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 #: 2KA

REMARKS: ___

Meter Calibration: Date: 3/24/95 Time: 1025 Meter Serial #: 9204 Temperature °F: 56.3

(EC 1000 1075 / 1000) (DI ___) (pH 7 7.11 / 7.00) (pH 10 9.97 / 10.00) (pH 4 4.08 / ___)

Location of previous calibration: ___

Signature: Don Gambelin Reviewed By: JB Page 5 of 7

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-217.01 SAMPLE ID: MW-6

PURGED BY: D. Gambelin CLIENT NAME: ARCO 2035

SAMPLED BY: D. Gambelin LOCATION: Albany, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 2.48

DEPTH TO WATER (feet): 9.03 CALCULATED PURGE (gal.): 7.43

DEPTH OF WELL (feet): 24.2 ACTUAL PURGE VOL. (gal.): 7.5

DATE PURGED: 3/24/95 Start (2400 Hr) 1133 End (2400 Hr) 1143

DATE SAMPLED: 3/24/95 Start (2400 Hr) 1148 End (2400 Hr) 1149

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (Visual)
1137	2.5	6.79	831	63.9	Tan	Heavy
1140	5.0	6.80	908	61.6	↓	↓
1143	7.5	6.80	913	64.2	↓	↓

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

COLOR: NR (COBALT 0 - 500)

TURBIDITY: 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	X Bailer (Teflon®)
X 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 #: 2kA

REMARKS: ___

Meter Calibration: Date: 3/24/95 Time: 1025 Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-5

Signature: Dan Gambelin Reviewed By: JB Page 6 of 7

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

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

PURGED BY: D Gambelin CLIENT NAME: ARCO 2035

SAMPLED BY: D. Gambelin LOCATION: Albany, CA

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

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

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

DEPTH TO WATER (feet): 9.32 CALCULATED PURGE (gal.): NA

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

DATE PURGED: 3/24/95 Start (2400 Hr) NA End (2400 Hr) NA

DATE SAMPLED: 3/24/95 Start (2400 Hr) 1347 End (2400 Hr) 1348

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (Visual)
1348	Grab	6.29	984	61.2	Clear	Trace

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump ___ 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™ X Dedicated

Other: Grab

WELL INTEGRITY: Good LOCK #: None

REMARKS: ___

Meter Calibration: Date: 3/24/95 Time: 1040 Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: Rw-1

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

APPENDIX B

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, FIRST QUARTER 1995

File Under 20805-123.002
ARCO 2035

Columbia Analytical Services, Inc.

April 6, 1995 Service Request No. S950367

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **ARCO Facility No. 2035 / EMCON Project No.** ~~1775-217.01~~ 20805-123.002

Dear Mr. Young:

Attached are the results of the water sample(s) submitted to our lab on March 24, 1995. For your reference, these analyses have been assigned our service request number S950367.

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

001

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	S950367
Project:	ARCO Facility No. 2035 / EMCON Project No. 1775-217.01	**Date Collected:**	3/24/95
Sample Matrix:	Water	**Date Received:**	3/24/95
		Date Extracted:	NA
		Date Analyzed:	4/4/95

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

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name / **Lab Code**					
MW-1 (29) S950367-001	8,800	3,600	<50*	62	99
MW-2 (28) S950367-002	ND	ND	ND	ND	ND
MW-3 (32) S950367-003	51	0.8	ND	2.4	ND
MW-4 (25) S950367-004	ND	ND	ND	ND	ND
MW-5 (24) S950367-005	ND	ND	ND	ND	ND
MW-6 (24) S950367-006	ND	ND	ND	ND	ND
RW-1 (25) S950367-007	11,000	560	660	150	1,700
FB-1 S950367-008	ND	ND	ND	ND	ND
Method Blank S950404-WB	ND	ND	ND	ND	ND

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

Approved By: _____ Date: 4/6/95

5ABTXGAS/061694

003

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Products Company / # 1775-217.01
Sample Matrix: Water

Service Request: L951842
Date Collected: 3/24/95
Date Received: 3/27/95
Date Extracted: 3/30/95
Date Analyzed: 3/30/95

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

Sample Name	Lab Code	MRL	Result
MW-3 (32)	L951842-001	0.5	ND
Method Blank	L951842-MB	0.5	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit.

Approved By: Eydie Schwartz Date: 3/31/95

004

1AMRL/060194
L951842.XLS - 418w 3/31/95

Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Facility No. 2035 / EMCON Project No. 1775-217.01
Sample Matrix: Water

Service Request: S950367
Date Collected: 3/24/95
Date Received: 3/24/95
Date Extracted: NA
Date Analyzed: 4/4/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (29)	S950367-001	98
MW-2 (28)	S950367-002	100
MW-3 (32)	S950367-003	100
MW-4 (25)	S950367-004	96
MW-5 (24)	S950367-005	102
MW-6 (24)	S950367-006	95
RW-1 (25)	S950367-007	99
FB-1	S950367-008	98
MW-2 (28) MS	S950367-001MS	110
MW-2 (28) DMS	S950367-001DMS	106
Method Blank	S950404-WB	98

CAS Acceptance Limits: 69-116

Approved By: _____ Date: 4/6/95

SUR1/062994

005

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON **Service Request:** S950367
Project: ARCO Facility No. 2035 / EMCON Project No. 1775-217.01 **Date Analyzed:** 4/4/95

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	24.0	96	85-115
Toluene	25	23.9	96	85-115
Ethylbenzene	25	24.3	97	85-115
Xylenes, Total	75	71.5	95	85-115
Gasoline	250	240	96	90-110

Approved By: _____ Date: 4/6/95

ICV25AL/060194

006

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	S950367
Project:	ARCO Facility No. 2035 / EMCON Project No. 1775-217.01	**Date Collected:**	3/24/95
Sample Matrix:	Water	**Date Received:**	3/24/95
		Date Extracted:	NA
		Date Analyzed:	4/4/95

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

Sample Name: MW-2 (28)
Lab Code: S950367-002

	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	233	235	93	94	67-121	1

Approved By: _____ Date: 4/6/95

DMS1S/060194

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Service Request:**	L951842
Project:	ARCO Products Company / # 1775-217.01	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	3/30/95
		Date Analyzed:	3/30/95

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
Oil & Grease / Total Recoverable Petroleum Hydrocarbons (TRPH)*
EPA Methods 413.2/418.1
Units: mg/L (ppm)

	True Value		Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	LCS	DLCS	LCS	DLCS	LCS	DLCS	Limits	**Difference**
O&G / TRPH	2.12	2.12	1.86	1.93	88	91	75-125	4

NA Not Applicable

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

Approved By: Eydie Schwartz Date: 3/31/95

008

DLCS/060194
L951842.XLS - genlcs3 3/31/95

Page No.:

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 17075.00

Chain of Custody

ARCO Facility no. 2035 | City (Facility) ALBANY | Project manager (Consultant) John Young | Laboratory name CAS

ARCO engineer Michael Whelan | Telephone no. (ARCO) | Telephone no. (Consultant) 453-7300 | Fax no. (Consultant) 453-0452 | Contract number

Consultant name EMCON | Address (Consultant) 1921 Ringwood Avenue San Jose

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 ☐		
MW-1(29)	1			X		X	HCl	3/24	1334		X											
MW-2(28)	2			↓		↓	↓	↓	1217		X											
MW-3(32)	3								1252		X			X								
MW-4(25)	4								1115		X											
MW-5(24)	5								1050		X											
MW-6(24)	6								1148		X											
RW-1(25)	7								1347		X											
FB-1	8			↓		↓	↓	↓	1217		X											

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: Well ID's written as MW-1 (29)

1775-217.01

Lab number: ~~L95184~~ S950367

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	Date	Time	Received by
[signature]	3/24/95	1513	Joanne Brown
Relinquished by: Joanne Brown w/ Custody Seal CAS-SJ	3/24/95	1630	Received by
Relinquished by	Date	Time	Received by laboratory: [signature] — Date 3-27-95 — Time 1300

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant   CAS-SJ: GBTEX   CAS-L: 418.1
APC-3292 (2-91)

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APPENDIX C

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

EMCON

Operation and Maintenance Field Report

Delivered 1 drum w liner & 1 overpack drum for product recovery off to the site.
Installed High level switch in aeration tank.

Installed ½" line from KO pump on Therm Tech to top of aeration tank.

Replaced Shur Flo filter on K.O. pump.

Mike Hedges of Therm Tech arrived on site & replaced the faulty controller. He had some wiring problems at first but we got it work. when I left he was trying to programm it. I asked him to call us when the unit was running & or update as to repair status. I called Sa.laja and let her knows that he was on site & working on the unit.

NAME MARK ADLER

DATE 1/26/95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0805-123.01

EMCON

Operation and Maintenance Field Report

gas meter = 1109 CFM

electric meter = 4334 Kwh

Therm Tech HK meter = 3895.45

Tried to start Therm Tech unit - Unit showed control fault / high Temp. alarm would not clear Called Mike Hedges of Therm Tech - he didn't know what the problem is so he called back after 20 min. He said run High set-point to Zero then start unit & run high temp. back to 1500° - Unit started but limit alarm kept flashing - Then blower failure alarm occured even though blower kept running. Tapping on pressure switch would flicker the light but switch would not latch.

Called & left message to Sai & Bruce that we were leaving the site & that start-up did not occur.

NAME MAdler

DATE 2-1-95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0505-123.01

REMARKS: Took readings before leaving site
(3" pipe) magnahelic shows 55-58 CFM before blower
VAC at unit = 25" w.tr.

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

THERMAL/CATALYTIC OXIDIZER (ThermTech Model Vac10, Serial #

Arrival Time (24:00 hour)		0740
System Status (on or off)		OFF
Shutdown Time (24:00 hour)		—
Alarm Lights on ?		—
Restart Time (24:00 hour)		0750 - Freshair / 1555 adj
Reading Time (24:00 hour)		1759
Well Field	(I1) (before dilution)	
Vacuum (In. of H2O)		2c
Flow (velocity: ft/min)	(pipe dia. 3")	25-50
Temperature (°F)		58
Dilution Air	(pipe dia. 3")	Closed
Dilution Air Flow (In. of H2O)		0
Temperature (°F)		—
Aeration Tank	(pipe dia. 12")	
Vacuum (In. of H2O)		24
Velocity (ft/min)		—
Flow Rate (scfm)		> 50 CFM

After Blower (system)	(I2) (pipe dia. 4")	
Pressure (In. of H2O)		.2
System Influent Flow (in. of H2O)		.01
Temperature (°F)		—
Effluent (E-1) [Stack dimensions:12"x12"]		
Effluent flow (In. of H2O)		—
Stack Temperature (°F)		1378
System		
Fire Box Temperature (°F)		1409
Set Point (°F)		1410
Total Hours		3911.38
Electric Meter (kwh)		
Natural Gas (%)		

FID monitoring & air sampling:every 2 weeks (BAAQMD permit specs)

FID (ppm)	I-1	I-2	Aeration tank ATeff-air	E-1
Date:				

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in vault box)	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (In. of H2O)	Velocity (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-2 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-3 (SVE)	4"	4.5 - 9.5	2.5" or 3" ?							
VW-4 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-5 (SVE)	4"	4.5 - 14.5	2.5" or 3" ?							
VW-6 (SVE)	4"	5 - 12.5	2.5" or 3" ?							
VW-7 (SVE)	4"	5 - 15	2.5" or 3" ?							
VW-8 (SVE)	4"	5 - 15	2.5" or 3" ?							
VW-9 (SVE)	4"	5 - 15	2.5" or 3" ?							
AS-1 (SVE)	2"	5 - 15	2"							
AS-2 (SVE)	2"	5 - 15	2"							
MW-1	4"	15 -30	—			N/A		N/A	N/A	
MW-2	4"	20 - 29	—			N/A		N/A	N/A	
MW-3	4"	12.5 - 32.5	—			N/A		N/A	N/A	
MW-4	4"	8.5 - 25.5	—			N/A		N/A	N/A	
MW-5	4"	8.5 -25	—			N/A		N/A	N/A	
MW-6	2"	8 - 25	—			N/A		N/A	N/A	
RW-1 (SVE)	6"	11 - 26	—							

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-1	2"	28.3-30.3	2"						N/A	
AS-2	2"	28.8-30.8	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: M Adler Date: 2-5-95

EMCON Project: 0805-123.01 -94-5C

EMCON

Operation and Maintenance Field Report

Started System on fresh air at 0750 - System started right up. Lower controller has the wind limit flashing across its screen. While system was running I was checking set points on the controller, when I pushed display on lower controller The unit shut off with Control fault High Temp. I had to run High temp set point to 0°F then back up to 1500° to get faults to clear. Still a controller problem? Restarted unit and it started right up with limit flashing across lower controller display.

Set point high = 1500°
Set point = 1410°

Changed charts & chart recorder pens

RW-1 before system start-up DTW = 8.07' DTFP = 7.94'

gas meter at 1055 - 1129 CF

elect meter at 1056 - 04393 KWH

Therm Tech HIC METER = 3964.37 1055

	PID	VAC "wtr	Flow (EFM)(3")	
VW-1	0.3	20	25	
VW-2	0.2	20	25	
VW-3	0.0	20	<25	No Sample Taken
VW-4	0.0	20	<25	No Sample Taken
VW-5	0.0	24	<25	No Sample Taken
VW-6	50	10	NA	
VW-7	0.0	24	25	No Sample Taken
VW-8	0.6	20	25	
VW-9	0.0	23	<25	No Sample Taken -
AS-1 (vent)	1.3	24	<25	
AS-2 (vent)	6.0	24	25-50	
RW-1	13.7	20	<25	

NAME MAdler

DATE 2-8-95

PROJECT NAME ARCL 2035

PROJECT NUMBER 0365-123.01

REMARKS: System on & running upon arrival

well field = 101 ppm

TOTAL FLOW = 54 CFM

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

THERMAL/CATALYTIC OXIDIZER (ThermTech Model Vac10, Serial #

Arrival Time (24:00 hour)	
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Alarm Lights on ?	—
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1551
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	26
Flow (velocity: ft/min) (pipe dia. 3")	25-30
Temperature (°F)	60°
Dilution Air (pipe dia. 3")	
Dilution Air Flow (In. of H2O)	0
Temperature (°F)	—
Aeration Tank 2" ~~(pipe dia. ?)~~	
Vacuum (In. of H2O)	23
Velocity (ft/min) 2700	2700
Flow Rate (scfm) >50	

After Blower (system) (I2) (pipe dia. 4")	
Pressure (In. of H2O)	.25
System Influent Flow (in. of H2O)	.01
Temperature (°F)	—
Effluent (E-1) [Stack dimensions:12"x12"]	
Effluent flow (In. of H2O)	-
Stack Temperature (°F)	1420
System	
Fire Box Temperature (°F)	1452
Set Point (°F)	1450
Total Hours	4053.26
Electric Meter (kwh)	04802
Natural Gas (%)	1279

FID monitoring & air sampling:every 2 weeks (BAAQMD permit specs)

FID (ppm)	I-1	I-2	Aeration tank ATeff-air	E-1
Date:				

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in vault box)	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (In. of H2O)	Velocity (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-2 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-3 (SVE)	4"	4.5 - 9.5	2.5" or 3" ?							
VW-4 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-5 (SVE)	4"	4.5 - 14.5	2.5" or 3" ?							
VW-6 (SVE)	4"	5 - 12.5	2.5" or 3" ?	ND	4.05					
VW-7 (SVE)	4"	5 - 15	2.5" or 3" ?							
VW-8 (SVE)	4"	5 - 15	2.5" or 3" ?							
VW-9 (SVE)	4"	5 - 15	2.5" or 3" ?							
AS-1 (SVE)	2"	5 - 15	2"							
AS-2 (SVE)	2"	5 - 15	2"							
MW-1	4"	15 -30	—			N/A		N/A	N/A	
MW-2	4"	20 - 29	—			N/A		N/A	N/A	
MW-3	4"	12.5 - 32.5	—			N/A		N/A	N/A	
MW-4	4"	8.5 - 25.5	—			N/A		N/A	N/A	
MW-5	4"	8.5 -25	—			N/A		N/A	N/A	
MW-6	2"	8 - 25	—			N/A		N/A	N/A	
RW-1 (SVE)	6"	11 - 26	—							

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-1	2"	28.3-30.3	2"						N/A	
AS-2	2"	28.8-30.8	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: MFuller Date: 2-14-95

EMCON Project: 0805-123.01 -94-5C

EMCON

Operation and Maintenance Field Report

Aeration Tank - 2700 FPM (2")

Total Flow - 1200 FPM (3")

Well Flow - 25-30 FPM (3")

Dilution valve is closed

WF-1 = 101 ppm
AT-1 = 31.5 ppm
I-1 = 13.6 ppm

} PID calibrated with 100 ppm Isobutylene

Closed VW-6 - water over screen.

It appears all the 3" PVC ball valves are leaking by internally. I'm not sure if vacuum seen on all wells is induced or just because the valves are leaking.

Made adjustments to the Para-Tax
#1 Carbon pressure - not working and well flow not working but that could be because there is no flow.

NAME MAdler

DATE 2-14-95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0905-123.02

EMCON

Operation and Maintenance Field Report

Well field air flows on arrival = 50-100 FPM @ 26" wtr vac. 56°F

Changed Well fields to treat E

	VAC	Valve Position	DTF	DTW
AS-1	5" wtr.	CLOSED / now venting	6.28	16.26
RW-1	12-13" wtr.	OPEN	20.96'	21.30'
AS-2	1" wtr.	closed / not venting	7.04'	7.07'
VW-1	10-11" wtr	OPEN	7.39'	8.00'
WF-1	=(3")50-150 FPM @ 28" wtr VAC. 60°F			
AT-1	=(2")2000 FPM @ 21" wtr vac.			
VW-6	16" wtr.	Closed	ND	4.06'

WF-1 = 30.4 ppm (PID)

AT-1 = 25.6 ppm (PID)

T-1 = 13.4 ppm (PID)

FI-202 - needs to be replaced 0-100 CFM Dwyer

Firebox 1448 ST 1450 Stack 1410

Hour meter = 4074.66

Total Flow 50CFM

Total air flow to ox = .01 "wtr

Total pressure = .25" wtr.

NAME Mahler

DATE 2-15-95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0805-123.02

REMARKS: System on upon arrival & Took readings
Sampled I-1, WF-1, AT-1 & E-1

Total Flow = 48-56 cfm

I-1 = 26.3" WTR VAC. Unscheduled site visit ☐ or Scheduled site visit no. 4 of 14

THERMAL/CATALYTIC OXIDIZER (ThermTech Model Vac10, Serial #

Arrival Time (24:00 hour)	1217
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)	1333
Well Field WF-1 (2) (before dilution)	
Vacuum (In. of H2O)	25.7-26.2
Flow (velocity: ft/min) (pipe dia. 3")	75-175
Temperature (°F)	54
Dilution Air (pipe dia. 3")	closed
Dilution Air Flow (In. of H2O)	0
Temperature (°F)	—
Aeration Tank 2" (pipe dia. ?)	
Vacuum (In. of H2O)	20.5
Velocity (ft/min)	3250
Flow Rate (scfm)	45-46

After Blower (system) (I2) (pipe dia. 4")	
Pressure (In. of H2O)	.25
System Influent Flow (in. of H2O)	.015
Temperature (°F)	—
Effluent (E-1) [Stack dimensions:12"x12"]	
Effluent flow (In. of H2O)	—
Stack Temperature (°F)	1400
System	
Fire Box Temperature (°F)	1449
Set Point (°F)	1450
Total Hours	4219.97
Electric Meter (kwh)	05548
Natural Gas (%)	1424

FID monitoring & air sampling:every 2 weeks (BAAQMD permit specs)

FID (ppm) PID	I-1	WF-1 (2)	Aeration tank ATeff-air	E-1
Date:	33.4	156.0	12.3	8.9

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in vault box)	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (In. of H2O)	Velocity (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-2 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-3 (SVE)	4"	4.5 - 9.5	2.5" or 3" ?							
VW-4 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-5 (SVE)	4"	4.5 - 14.5	2.5" or 3" ?							
VW-6 (SVE)	4"	5 - 12.5	2.5" or 3" ?							
VW-7 (SVE)	4"	5 - 15	2.5" or 3" ?							
VW-8 (SVE)	4"	5 - 15	2.5" or 3" ?							
VW-9 (SVE)	4"	5 - 15	2.5" or 3" ?							
AS-1 (SVE)	2"	5 - 15	2"							
AS-2 (SVE)	2"	5 - 15	2"							
MW-1	4"	15 -30	—			N/A		N/A	N/A	
MW-2	4"	20 - 29	—			N/A		N/A	N/A	
MW-3	4"	12.5 - 32.5	—			N/A		N/A	N/A	
MW-4	4"	8.5 - 25.5	—			N/A		N/A	N/A	
MW-5	4"	8.5 -25	—			N/A		N/A	N/A	
MW-6	2"	8 - 25	—			N/A		N/A	N/A	
RW-1 (SVE)	6"	11 - 26	—							

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-1	2"	28.3-30.3	2"						N/A	
AS-2	2"	28.8-30.8	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: 2-21-95

EMCON Project: 0805-123.01 -94-5C

REMARKS: System on & running upon arrival • Tech readings

I-1 = 25-26" wtr. vac. Total flow 20-25 cfm

Increased vac to WF-1 to 40" wtr. Unscheduled site visit ☐ or Scheduled site visit no. _____ of 14

THERMAL/CATALYTIC OXIDIZER (ThermTech Model Vac10, Serial #

Arrival Time (24:00 hour)	1301
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)	1312
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	28
Flow (velocity: ft/min) (pipe dia. 3")	100-200
Temperature (°F)	58
Dilution Air (pipe dia. 3")	CLOSED
Dilution Air Flow (In. of H2O)	C
Temperature (°F)	
Aeration Tank (pipe dia. ?)	
Vacuum (In. of H2O)	21
Velocity (ft/min) 2"	2050-2100
Flow Rate (scfm)	47.5-48.5

After Blower (system) (I2) (pipe dia. 4")	
Pressure (In. of H2O)	.25
System Influent Flow (in. of H2O)	.01
Temperature (°F)	
Effluent (E-1) [Stack dimensions:12"x12"]	
Effluent flow (In. of H2O)	
Stack Temperature (°F)	1406
System	
Fire Box Temperature (°F)	1448
Set Point (°F)	1450
Total Hours	4386.60
Electric Meter (kwh)	06207
Natural Gas ~~(%)~~ CF	1579

FID monitoring & air sampling:every 2 weeks (BAAQMD permit specs)

FID (ppm)	I-1	I-2	Aeration tank ATeff-air	E-1
Date:				

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in vault box)	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (In. of H2O)	Velocity (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-2 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-3 (SVE)	4"	4.5 - 9.5	2.5" or 3" ?							
VW-4 (SVE)	4"	5 - 17	2.5" or 3" ?							
VW-5 (SVE)	4"	4.5 - 14.5	2.5" or 3" ?							
VW-6 (SVE)	4"	5 - 12.5	2.5" or 3" ?							
VW-7 (SVE)	4"	5 - 15	2.5" or 3" ?							
VW-8 (SVE)	4"	5 - 15	2.5" or 3" ?							
VW-9 (SVE)	4"	5 - 15	2.5" or 3" ?							
AS-1 (SVE)	2"	5 - 15	2"	8.50	12.4'	VENTING				
AS-2 (SVE)	2"	5 - 15	2"	9.56	9.53	VENTING				
MW-1	4"	15 -30	---			N/A		N/A	N/A	
MW-2	4"	20 - 29	---			N/A		N/A	N/A	
MW-3	4"	12.5 - 32.5	---			N/A		N/A	N/A	
MW-4	4"	8.5 - 25.5	---			N/A		N/A	N/A	
MW-5	4"	8.5 -25	---			N/A		N/A	N/A	
MW-6	2"	8 - 25	---			N/A		N/A	N/A	
RW-1 (SVE)	6"	11 - 26	---							

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-1	2"	28.3-30.3	2"				ND	10.55	N/A	
AS-2	2"	28.8-30.8	2"				NF	10.47	N/A	

Total Air Sparge Press. (psi)= 0 | Total Air Sparge Flow Rate (cfm)= 0 | Total Air Sparge Temp. (°F)= 0

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: T. Allen Date: 3-28-95

EMCON Project: 0805-123.01 -94-5C

h:\sailaja\arco\2035\fid-data.xls

EMCON

Operation and Maintenance Field Report

3-3-95 @ 1008
Tot. hrs = 4416.91

Five hour = 1455
set point = 1450
stack = 1370

Field 40" w.c. vac. 54
56°F
50-150 FPM (3")

Total Flow = [illegible] CFM
Total Dilution = [illegible] .01
Total press = .25

Dilution Air = .025

Aeration tank line closed - GWE off due to high Arsenic at E-1

Changed Chart.

NAME Miller

DATE 3-3-95

PROJECT NAME ARCO 2055

PROJECT NUMBER 0525-123.

EMCON

Operation and Maintenance Field Report

Met Greg Prada at Therm Tech on site. He was going to replace the controller but brought the wrong one. I showed him how to program the controller. They seem disorganized & unprepared to provide a good service. Restarted system. He was not sure when they would be back to finish the job.

NAME Miller

DATE 3-3-95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0805-1230-2

REMARKS:

TOTAL CFM = 46-56

Removed 2.5 gal water & trace of dark product that came into well AS-2 vent
Removed 3.0 gal water & 300ml. of dark product from AS-1 vent Removed 1.0 gal wat
Removed 1.5 gal water AS-2 sparge Unscheduled site visit ☐ or ☑ Scheduled site visit no. 6 from AS-1 of 14

THERMAL/CATALYTIC OXIDIZER (ThermTech Model Vac10, Serial #

Arrival Time (24:00 hour)	1036
System Status (on or off)	ON
Shutdown Time (24:00 hour)	
Alarm Lights on ?	
Restart Time (24:00 hour)	
Reading Time (24:00 hour)	1319
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	40
Flow (velocity: ft/min) (pipe dia. 3")	50-150
Temperature (°F)	56
Dilution Air (pipe dia. 3")	CLOSED 80%
Dilution Air Flow (In. of H2O)	.025
Temperature (°F)	—
Aeration Tank (pipe dia. ?)	CLOSED
Vacuum (In. of H2O)	0
Velocity (ft/min)	0
Flow Rate (scfm)	0

After Blower (system) (I2) (pipe dia. 4")	
Pressure (In. of H2O)	.25
System Influent Flow (in. of H2O)	.01
Temperature (°F)	[illegible]
Effluent (E-1) [Stack dimensions:12"x12"]	—
Effluent flow (In. of H2O)	—
Stack Temperature (°F)	1402
System	
Fire Box Temperature (°F)	1454
Set Point (°F)	1450
Total Hours	4540.10
Electric Meter (kwh)	06808
Natural Gas (%)	1701

FID monitoring & air sampling:every 2 weeks (BAAQMD permit specs)

FID (ppm)	I-1	I-2	Aeration tank ATeff-air	E-1
PID	cal. gas	100 ppm		
Date:	2.5	1.7	—	1.8

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in vault box)	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (In. of H2O)	Velocity (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	5 - 17	2.5" or 3" ?			Full open	28			
VW-2 (SVE)	4"	5 - 17	2.5" or 3" ?			CLOSED	16-18			
VW-3 (SVE)	4"	4.5 - 9.5	2.5" or 3" ?			CLOSED	0			
VW-4 (SVE)	4"	5 - 17	2.5" or 3" ?			CLOSED	26			
VW-5 (SVE)	4"	4.5 - 14.5	2.5" or 3" ?			CLOSED	1			
VW-6 (SVE)	4"	5 - 12.5	2.5" or 3" ?	ND	5.11	CLOSED	8			
VW-7 (SVE)	4"	5 - 15	2.5" or 3" ?			CLOSED	22			
VW-8 (SVE)	4"	5 - 15	2.5" or 3" ?			CLOSED	0			
VW-9 (SVE)	4"	5 - 15	2.5" or 3" ?			CLOSED	8			
AS-1 (SVE)	2"	5 - 15	2"	7.70	8.17	CLOSED/vent	0			
AS-2 (SVE)	2"	5 - 15	2"	ND	7.77	CLOSED/vent	0			
MW-1	4"	15 -30	—			N/A		N/A	N/A	
MW-2	4"	20 - 29	—			N/A		N/A	N/A	
MW-3	4"	12.5 - 32.5	—			N/A		N/A	N/A	
MW-4	4"	8.5 - 25.5	—			N/A		N/A	N/A	
MW-5	4"	8.5 -25	—			N/A		N/A	N/A	
MW-6	2"	8 - 25	—			N/A		N/A	N/A	
RW-1 (SVE)	6"	11 - 26	—	9.00	7.15	Full open	25			

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-1	2"	28.3-30.3	2"				ND	8.65	N/A	
AS-2	2"	28.8-30.8	2"				ND	8.50	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: 3-8-95

EMCON Project: 0805-123.01 -94-5C

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REMARKS: Tightenup wells AS-1 & AS-2 vent and Turned full open to system at 1345 after bailing wells Bailed 12 gallon of water out of VW-6
DTW@ 1427 = 10.56' DTW @ 1443 = 10.52 DTW@ 1455 = 10.50' (VW-6)
Turned VW-6 Full ON & RW-1 Closed Total Flow = 48-46cf
Lowered vacuum to raise concent. Unscheduled site visit ☐ or (Scheduled site visit no. ____ of 14

Tevela

THERMAL/CATALYTIC OXIDIZER (ThermTech Model Vac10, Serial #

Arrival Time (24:00 hour)		1036
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)		1531
Well Field	(I1) (before dilution)	WF-1
Vacuum (In. of H2O)		20
Flow (velocity: ft/min)	**(pipe dia. 3")**	25
Temperature (°F)		60
Dilution Air	**(pipe dia. 3")**	CLOSED 80%
Dilution Air Flow (In. of H2O)		.025
Temperature (°F)		—
Aeration Tank	**(pipe dia. ?)**	AT-1 CLOSED
Vacuum (In. of H2O)		0
Velocity (ft/min)		0
Flow Rate (scfm)		0

After Blower (system) (I2) (pipe dia. 4")	
Pressure (In. of H2O)	.25
System Influent Flow (in. of H2O)	.0075
Temperature (°F)	—
Effluent (E-1) [Stack dimensions:12"x12"]	
Effluent flow (In. of H2O)	
Stack Temperature (°F)	1404
System	
Fire Box Temperature (°F)	1454
Set Point (°F)	1450
Total Hours	4542.29
Electric Meter (kwh)	—
Natural Gas (%)	—

FID monitoring & air sampling:every 2 weeks (BAAQMD permit specs)

FID (ppm)	I-1	I-2	Aeration tank ATeff-air	E-1
PID				
Date:	1552	17.1	—	2.0

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	Pipe Dia (in vault box)	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (In. of H2O)	Velocity (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	5 - 17	2.5" or 3" ?			CLOSED				
VW-2 (SVE)	4"	5 - 17	2.5" or 3" ?			CLOSED				
VW-3 (SVE)	4"	4.5 - 9.5	2.5" or 3" ?			CLOSED				
VW-4 (SVE)	4"	5 - 17	2.5" or 3" ?			CLOSED				
VW-5 (SVE)	4"	4.5 - 14.5	2.5" or 3" ?			CLOSED				
VW-6 (SVE)	4"	5 - 12.5	2.5" or 3" ?			Full Open				
VW-7 (SVE)	4"	5 - 15	2.5" or 3" ?			CLOSED				
VW-8 (SVE)	4"	5 - 15	2.5" or 3" ?			CLOSED				
VW-9 (SVE)	4"	5 - 15	2.5" or 3" ?			CLOSED				
AS-1 (SVE)	2"	5 - 15	2"			Full Open				
AS-2 (SVE)	2"	5 - 15	2"			Full Open				
MW-1	4"	15 -30	—			N/A		N/A	N/A	
MW-2	4"	20 - 29	—			N/A		N/A	N/A	
MW-3	4"	12.5 - 32.5	—			N/A		N/A	N/A	
MW-4	4"	8.5 - 25.5	—			N/A		N/A	N/A	
MW-5	4"	8.5 -25	—			N/A		N/A	N/A	
MW-6	2"	8 - 25	—			N/A		N/A	N/A	
RW-1 (SVE)	6"	11 - 26	—			Closed				

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-1	2"	28.3-30.3	2"						N/A	
AS-2	2"	28.8-30.8	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: 3-8-95

EMCON Project: 0805-123.01 -94-5C

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

Remarks: System OFF - Ran unit on fresh air only to check High Temp (outside M. Ike Hedges of Therm Tech arrived after O.I called in A. - He switched Thermal couple sivitch, Controller - OK Sampled MW-5 (see next sheet) Bailed product from RW-1 and AS-1(vent) Unscheduled site visit [X] Scheduled site visit [] 9 bumber posts needs locks Changed chart paper

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

Arrival Time (24:00 hour)	0909	**Effluent (E-1) (12"x12")**	
System Status (on or off)	OFF	Stack Temperature (°F)	
Shutdown Time (24:00 hour)	—	**SYSTEM**	
Restart Time (24:00 hour)	—	Total Flow (3") (cfm) (before blower-same as Para-Fax)	
Reading Time (24:00 hour)	1019	Fire Box Temperature (°F)	
Well Field WF-1 (3")		Set Point (°F)	
Vacuum (in. of H2O)		TOTAL HOURS	4560.23
Velocity (ft/min)		Electric Meter (kwh)	07067
Temperature (°F)		Natural Gas (cf)	1720
Aeration Tank AT-1 (2")			
Vacuum (in. of H2O)			
Velocity (ft/min)			
Flow (scfm)			
After Blower I-2 (4") (AFTER DILUTION)			
Total Pressure (in. of H2O)			
Total Flow (in. of H2O)			
Influent I-1 (3") (BEFORE DILUTION)			
Vacuum (in. of H2O)			
Velocity (ft/min)			

AIR MONITORING

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

PID (ppm)	CAL GAS:					
Date:						
Date:						

Lab samples taken for analysis at: water - MW-5

PARA-FAX on/off Turned OFF

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

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (In. of H2O)	FID (ppm)	PID (ppm)	Bubbler (on/off)	Remarks
VW-1	4"	5'-17'							NA	
VW-2	4"	5'-17'							NA	
VW-3	4"	4.5'-9.5'							NA	
VW-4	4"	5'-17'							NA	
VW-5	4"	4.5'-14.5'							NA	
VW-6	4"	5'-12.5'							NA	
VW-7	4"	5'-15'							NA	
VW-8	4"	5'-15'							NA	
VW-9	4"	5'-15'							NA	
RW-1	6"	11'-26'	9.05	9.11			Removed 5 gal water		Removed 40 ml.	Product
AS-1 (vent)	2"	5'-15'	7.38	7.87			Removed 5 gal water		Removed 360 ml.	Product
AS-2 (vent)	2"	5'-15'	ND	7.25						

SPARGE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Pressure (psi)	Air Flow (scfm)	DO (ppm)	REMARKS
AS-1	2"	28.3'-30.3'	ND	9.13					
AS-2	2"	28.8'-30.8'	ND	9.00					

Total Sparge Data

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

Special Instructions:

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

Operator: MAdler Date: 4-19-95

Project# 0805-123.02

ARCO 2035 Soil Vapor Extraction System

APPENDIX D

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, SVE SYSTEM, FIRST QUARTER 1995

Columbia Analytical Services, Inc.

February 13, 1995

Service Request No.: S950138

Sailaja Yelamanchili
EMCON Associates
1921 Ringwood Ave.
San Jose, Ca 95131

RE: **ARCO Facility No. 2035 / EMCON Project # 0805-123.01**

Dear Ms. Yelamanchili:

Attached are the results of the vapor samples submitted to our laboratory on February 9, 1995. For your information, these analyses have been assigned our service request number S950138.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (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

CVR_PG.DOC 1/26/95

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

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123-01
Sample Matrix: Vapor

Service Request: S950138
Date Collected: 2/8/95
Date Received: S/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name:	E-1	I-1	Method Blank
Lab Code:	S950138-001	S950138-002	S950209-VB1
Date Analyzed:	2/9/95	2/9/95	2/9/95

Analyte	MRL			
Benzene	0.5	ND	21	ND
Toluene	0.5	1.5	93	ND
Ethylbenzene	0.5	ND	25	ND
Total Xylenes	1	3.0	110	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	ND	<100*	ND
C_5 - C_8 Hydrocarbons	20	ND	540	ND
C_9 - C_{12} Hydrocarbons	20	ND	340	ND
Gasoline Fraction (C_5-C_{12})	60	ND	880	ND

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

Approved By: _____ Date: 2/13/95

3S22/060194

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APPENDIX A

LABORATORY QC RESULTS

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123-01

Service Request: S950138
Date Analyzed: 2/9/95

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	15.1	94	85-115
Toluene	16	14.5	91	85-115
Ethylbenzene	16	14.6	91	85-115
Xylenes, Total	48	42.2	88	85-115
Gasoline	200	209	105	90-110

Approved By: _____ Date: 2/13/95

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123-01
Sample Matrix: Vapor

Service Request: S950138
Date Collected: 2/8/95
Date Received: S/9/95
Date Extracted: NA
Date Analyzed: 2/9/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name: I-1
Lab Code: S950138-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	20.7	20.9	20.8	1
Toluene	0.5	92.7	94.0	93.4	1
Ethylbenzene	0.5	24.8	25.5	25.2	3
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<100*	<100*	ND	<1
C_5 - C_8 Hydrocarbons	20	539	557	548	3
C_9 - C_{12} Hydrocarbons	20	340	349	345	3
Gasoline Fraction (C_5-C_{12})	60	879	906	893	3

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

Approved By: _____ Date: 2/13/95

DUP1S/060194

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APPENDIX B

CHAIN OF CUSTODY

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 2035-94-5C

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Sailaja Yelamanchile	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 3778697	Telephone no. (Consultant) 4084537300	Fax no. (Consultant) 405 453 0452
Consultant name EMCON	Address (Consultant)		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			X			2-8-95	1730		X											
E-1		1			X			2-8-95	1712		X											

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

Special QA/QC

Remarks: 0805-123.01

Lab number: 595-0138

Turnaround time

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

Condition of sample: 9 M2/9/95.

Temperature received:

Relinquished by sampler	Date 2-8-95	Time 1145	Received by 2/9/95.
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)

Columbia Analytical Services, Inc.

February 27, 1995

Service Request No. S950139

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

Re: **ARCO Facility No. 2035 / EMCON Project No. 0805-123.01**

Dear Ms. Yelamanchili:

Attached are the results of the vapor sample(s) submitted to our lab on February 9, 1995. For your reference, these analyses have been assigned our service request number S950139.

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

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

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

ACRONLST.DOC 12/22/94

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123.01
Sample Matrix: Vapor

Service Request: S950139
Date Collected: 2/8/95
Date Received: 2/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

		Sample Name:	**WF-1**	**RW-1**	**AS-1**
		Lab Code:	S950139-001	S950139-002	S950139-003
		Date Analyzed:	2/9/95	2/9/95	2/9/95
Analyte	**MRL**				
Benzene	0.5		110	ND	ND
Toluene	0.5		840	ND	ND
Ethylbenzene	0.5		140	ND	ND
Total Xylenes	1		490	ND	ND
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20		<400*	ND	ND
C_5 - C_8 Hydrocarbons	20		8,600	ND	ND
C_9 - C_{12} Hydrocarbons	20		2,000	ND	ND
Gasoline Fraction (C_5-C_{12})	60		11,000	ND	ND

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

Approved By: _____ Date: 2/15/95

3S22/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123.01
Sample Matrix: Vapor

Service Request: S950139
Date Collected: 2/8/95
Date Received: 2/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name:	**AS-2**	**AT-1**	**VW-1**
Lab Code:	S950139-004	S950139-005	S950139-006
Date Analyzed:	2/9/95	2/9/95	2/9/95

Analyte	**MRL**			
Benzene	0.5	ND	20	ND
Toluene	0.5	ND	21	ND
Ethylbenzene	0.5	ND	4.0	ND
Total Xylenes	1	ND	19	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	ND	ND	ND
C_5 - C_8 Hydrocarbons	20	ND	91	ND
C_9 - C_{12} Hydrocarbons	20	ND	46	ND
Gasoline Fraction (C_5-C_{12})	60	ND	140	ND

Approved By: Steven Sheer Date: 2/25/95

3S22/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123.01
Sample Matrix: Vapor

Service Request: S950139
Date Collected: 2/8/95
Date Received: 2/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name:	**VW-2**	**VW-6**	**VW-8**
Lab Code:	S950139-007	S950139-008	S950139-009
Date Analyzed:	2/9/95	2/9/95	2/9/95

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

Approved By: _____ Date: 2/15/95

3S22/060194

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Analytical Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123.01
Sample Matrix: Vapor

Service Request: S950139
Date Collected: 2/8/95
Date Received: 2/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name:	**Method Blank**
Lab Code:	S950209-VB1
Date Analyzed:	2/9/95

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: 2/15/95

3822/060194

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APPENDIX A

LABORATORY QC RESULTS

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123-01

Service Request: S950139
Date Analyzed: 2/9/95

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	15.1	94	85-115
Toluene	16	14.5	91	85-115
Ethylbenzene	16	14.6	91	85-115
Xylenes, Total	48	42.2	88	85-115
Gasoline	200	209	105	90-110

Approved By: Steve Shen Date: 2/15/95.

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123-01
Sample Matrix: Vapor

Service Request: S950139
Date Collected: 2/8/95
Date Received: S/9/95
Date Extracted: NA
Date Analyzed: 2/9/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name: WF-1
Lab Code: S950139-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	110	114	112	4
Toluene	0.5	844	869	857	3
Ethylbenzene	0.5	135	144	140	6
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<400*	<400*	ND	<1
C_5 - C_8 Hydrocarbons	20	8,860	8,800	8,830	1
C_9 - C_{12} Hydrocarbons	20	1,950	2,150	2,050	10
Gasoline Fraction (C_5-C_{12})	60	10,500	10,900	10,700	4

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

Approved By: _____ Date: 2/25/95

DUP1S/060194

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APPENDIX B

CHAIN OF CUSTODY

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No: 2035-94-5C

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Sailaja Yelamanchile	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 3778697	Telephone no. (Consultant) 4084537300	Fax no. (Consultant) 4084530452	Contract number 70077
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	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M8020/8020/8015 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			X			~~2-6-95~~	1730		X											
~~I-1~~		1			X			~~2-6-95~~	1712		X											
WF-1	1	1			X			2-8-95	1707		X											
RW-1	2	1			X				1328		X											
AS-1	3	1			X				1240		X											
AS-2	4	1			X				1204		X											
AT-1	5	1			X				1704		X											
VW-1	6	1			X				1314		X											
VW-2	7	1			X				1344		X											
VW-6	8	1			X				1148		X											
VW-8	9	1			X				1300		X											

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

Special QA/QC

Remarks: 0805-123.01

Lab number: 595-0139

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

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 2-8-95 Time 1145	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

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

RECEIVED
MAR 0 3 1995

GOLDEN STATE/CAS
LABORATORIES, INC.

March 1, 1995

Sailaja Yelamanchili
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131-1721

Re: **ARCO Facility #2035-Albany/Project #0805-123.02**

Dear Sailaja:

Enclosed are the results of the samples submitted to our lab on February 22, 1995. For your reference, these analyses have been assigned our service request number L951442.

All analyses were performed in accordance with our laboratory's quality assurance program. Golden State / CAS is certified for environmental analyses by the California Department of Health Services (Certificate # 1296/Expiration - August 1996).

Please call if you have any questions.

Respectfully submitted,

Golden State / CAS Laboratories, Inc.

Eydie Schwartz for
Dr. B. Gene Bennett
Laboratory Director

Stuart Sigman
Quality Assurance Coordinator

GB/kr

6925 CANOGA AVENUE ■ CANOGA PARK, CA 91303 ■ 818 587-5550 ■ FAX 818 587-5555

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Service Request:**	L951442
Project:	ARCO Products Company/#0805-123.02	**Date Collected:**	2/21/95
Sample Matrix:	Vapor	**Date Received:**	2/22/95
		Date Extracted:	NA

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

Sample Name:	**E-1**	**I-1**	**WF-1**
Lab Code:	L951442-001	L951442-002	L951442-003
Date Analyzed:	2/22/95	2/22/95	2/22/95

Analyte	**MRL**			
Benzene[1]	0.5	ND	ND	13
Toluene[1]	0.5	ND	1.3	81
Ethylbenzene[2]	0.5	ND	0.8	18
Total Xylenes[2]	1.0	ND	4.4	84
Total Volatile Hydrocarbons**	60	ND	ND	2500
C_1-C_4 Hydrocarbons*	20	ND	ND	130
C_5-C_8 Hydrocarbons*	20	ND	ND	2000
C_9-C_{12} Hydrocarbons*	20	ND	ND	340
Total Volatile Hydrocarbons**[a]	60	ND	ND	2300

NA	Not Applicable
1	Benzene and Toluene are included in the C_5-C_8 hydrocarbon fraction.
2	Ethylbenzene and Total Xylenes are included in the C_9-C_{12} hydrocarbon fraction due to the use of C_1-C_8 n-paraffins as the standard for Total Volatile Hydrocarbons.
*	Total Volatile Hydrocarbons quantified using n-paraffins with a range of C_1-C_8.
**	Result is rounded to two significant figures.
a	Gasoline Fraction (C_5-C_{12})
MRL	Method Reporting Limit
ND	None detected at or above the method reporting limit.

Approved By: Cydie Schwartz Date: 3/1/95

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-123.02
Sample Matrix: Vapor

Service Request: L951442
Date Collected: 2/21/95
Date Received: 2/22/95
Date Extracted: NA

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

	Sample Name:	AT-1	Method Blank
	Lab Code:	L951442-004	L951442-MB
	Date Analyzed:	2/23/95	2/22/95
Analyte	**MRL**		
Benzene[1]	0.5	1.3	ND
Toluene[1]	0.5	1.5	ND
Ethylbenzene[2]	0.5	ND	ND
Total Xylenes[2]	1.0	4.7	ND
Total Volatile Hydrocarbons**	60	ND	ND
C_1-C_4 Hydrocarbons*	20	ND	ND
C_5-C_8 Hydrocarbons*	20	ND	ND
C_9-C_{12} Hydrocarbons*	20	ND	ND
Total Volatile Hydrocarbons**[a]	60	ND	ND

NA Not Applicable
[1] Benzene and Toluene are included in the C_5-C_8 hydrocarbon fraction.
[2] Ethylbenzene and Total Xylenes are included in the C_9-C_{12} hydrocarbon fraction due to the use of C_1-C_8 n-paraffins as the standard for Total Volatile Hydrocarbons.
* Total Volatile Hydrocarbons quantified using n-paraffins with a range of C_1-C_8.
** Result is rounded to two significant figures.
[a] Gasoline Fraction (C_5-C_{12})
MRL Method Reporting Limit
ND None detected at or above the method reporting limit.

Approved By: Cydie Schwartz Date: 3/1/95

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-123.02
Sample Matrix: Vapor

Service Request: L951442
Date Collected: 2/21/95
Date Received: 2/22/95
Date Extracted: NA

Permanent Gases*
Units: % (v/v)

	Sample Name:	**WF-1**	**Method Blank**
	Lab Code:	L951442-003	L951442-MB
	Date Analyzed:	2/22/95	2/22/95
Analyte	**MRL**		
Carbon Dioxide	1	ND	ND
Oxygen	1	22	ND

NA Not Applicable
* Analysis performed using gas chromatography with a thermal conductivity detector.
MRL Method Reporting Limit
ND None detected at or above the method reporting limit

Approved By: Eydie Schwartz Date: 3/1/95

3S22/060194
PRMGSDUP.XLT - permgas2 3/1/95

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-123.02
Sample Matrix: Vapor

Service Request: L951442
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 2/23/95

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

Sample Name: BATCH QC
Lab Code: L951443-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	2670	2710	2690	1
Toluene	0.5	4680	4830	4760	3
Ethylbenzene	0.5	1080	1150	1120	6
Total Xylenes	1.0	4400	4770	4580	8
Total Volatile Hydrocarbon**	60	140000	140000	140000	<1
C_1-C_4 Hydrocarbons*	20	5190	5070	5130	2
C_5-C_8 Hydrocarbons*	20	117000	116000	116000	<1
C_9-C_{12} Hydrocarbons*	20	14700	16500	15600	12

NA Not Applicable
* Total Volatile Hydrocarbons quantified using n-paraffins with a range of C_1-C_8.
** Result is rounded to two significant figures.
MRL Method Reporting Limit

Approved By: Eydie Schwartz Date: 3/1/95

PRMGSDUP.XLT - 8020DA 3/1/95

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-123.02
Sample Matrix: Vapor

Service Request: L951442
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 2/22/95

Duplicate Summary
Permanent Gases*
% (v/v)

Sample Name: WF-1
Lab Code: L951442-003

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Carbon Dioxide	1	ND	ND	ND	NA
Oxygen	1	21.8	20.8	21.3	5

NA Not Applicable
* Analysis performed using gas chromatography with a thermal conductivity detector.
MRL Method Reporting Limit

Approved By: Eydie Schwartz Date: 3/1/95

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ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Sailaja Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 3778697	Telephone no. (Consultant) 4084537300	Fax no. (Consultant) 4084530452
Consultant name EMCON	Address (Consultant) 1921 Ringwood San Jose, CA		Contract number 07077

Method of shipment: Tech

Sample I.D.	Lab no. L95/442	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 ☐	CO_2 O_2
E-1	1				X			2-21-95	1412		X										
I-1	2				X			2-21-95	1432		X										
WF-1	3				X			2-21-95	1425		X										X
AT-1	4				X			2-21-95	1420		X										

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

Special QA/QC

Remarks: 0805-123.02

Lab number: L95/442 S950212

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: AMB

Relinquished by sampler	Date 2-21-95	Time 1707	Received by Joanne Brown
Relinquished by	Date 2/21/95	Time 17:30	Received by
Relinquished by	Date	Time	Received by laboratory — Date 2-22-95 — Time 0900

CAS-C: ALL.

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

Columbia Analytical Services, Inc.

March 23, 1995 Service Request No. S950287

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

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

Dear Ms. Yelamanchili:

Attached are the results of the vapor sample(s) submitted to our lab on March 10, 1995. For your reference, these analyses have been assigned our service request number S950287.

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

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S950287
Date Collected: 3/8/95
Date Received: 3/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name:	I-1	I-2	E-1
Lab Code:	S950287-001	S950287-002	S950287-003
Date Analyzed:	3/10/95	3/10/95	3/10/95

Analyte	MRL			
Benzene	0.5	99	ND	ND
Toluene	0.5	260	ND	ND
Ethylbenzene	0.5	100	ND	ND
Total Xylenes	1	500	2.4	2.3
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	<400 *	ND	ND
C_5 - C_8 Hydrocarbons	20	6,600	ND	ND
C_9 - C_{12} Hydrocarbons	20	2,300	ND	ND
Gasoline Fraction (C_5-C_{12})	60	8,900	ND	ND

Approved By: _____ Date: 3/23/95

3S22/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S950287
Date Collected: 3/8/95
Date Received: 3/9/95
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name:	**Method Blank**
Lab Code:	S950310-VB
Date Analyzed:	3/10/95

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: 3/23/95

3S22/060194

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APPENDIX A

LABORATORY QC RESULTS

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950287
Date Analyzed: 3/10/95

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	14.4	90	85-115
Ethylbenzene	16	14.3	89	85-115
Xylenes, Total	48	41.3	86	85-115
Gasoline	200	209	104	90-110

Approved By: _____ Date: 3/28/95

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950287
Date Collected: 3/8/95
Date Received: 3/9/95
Date Extracted: NA
Date Analyzed: 3/10/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name: I-1
Lab Code: S950287-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	99.4	97.2	98.3	2
Toluene	0.5	259	262	261	1
Ethylbenzene	0.5	101	102	102	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	<400	<400	<400	<1
C_5 - C_8 Hydrocarbons	20	6,650	6,850	6750	3
C_9 - C_{12} Hydrocarbons	20	2,260	2,300	2280	2
Gasoline Fraction (C_5-C_{12})	60	8,910	9,160	9035	3

Approved By: _____ Date: 3/23/95

DUP1S/060194

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APPENDIX B

CHAIN OF CUSTODY

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Sailaja Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 397 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 Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 8010/8010	EPA 8240/8240	EPA 8250/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
I-1	1	1		X	X			3-8-95			X											
I-2	2	1			X			↓			X											
E-1	3	1			X			↓			X											

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

Special QA/QC

Remarks: 0805-123.02

Lab number: 59.50287

Turnaround time

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

Condition of sample:

Temperature received:

	Date	Time	
Relinquished by sampler	3-9-95	0950	Received by
Relinquished by			Received by
Relinquished by			Received by laboratory: Joanne Brown — Date 3-9-95 — Time 0900

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

APPC-3292 (2-91)

APPENDIX E

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

REMARKS:

#1 Filter PI-104 - 10 PSI
PI-105 - 8.5 PSI

Need O-Ring for coalescing filter

need hr meter for well air solenoid valve

Unscheduled site visit ☐ or Scheduled site visit no. ____ of ??

GROUNDWATER EXTRACTION SYSTEM WITH AERATION AND CARBON ADSORPTION

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	
System Status (on or off)	
Shutdown Time (24:00 hour)	
Restart Time (24:00 hour)	
Reading Time (24:00 hour)	1754
RW-1 Well Head Pressure (psi)	
RW-1 pump flow rate (gals/min)	
RW-1AR-2 Depth to Water (ft)	
Totalizer (gallons:before discharge to sanitary sewer)	880
Total Flow Rate (gals/min)	
GAC-1 (inlet) Pressure (In ~~el H2O~~/psig)	5.0
GAC-2 Pressure (In ~~el H2O~~/psig)	4.5

SYSTEM CHECK LIST	Yes	No	Other
Alarm Trip?		X	
Change bag filters ?	X		
Check Scaltrol Unit ?		X	
Check Aeration Tank Baffles ?	X		OK

SAMPLE PARAMETERS	Temp. (°F)	pH units	EC
ATinf-gw (before aeration tank)			
I-1inf-gw (after AT and before GAC-1)			
I-2inf-gw (after GAC-1)			
E-1eff-gw (after GAC-2)			

Monitoring/Sampling Schedule*

Parameter	Sample Type	Results In	Sample ID	Frequency
Flow rate	N/A	Gals/min	N/A	Continuous
pH	Grab	Standard Units	I-1inf-gw, E-1eff-gw	Monthly
Temperature	Grab	° F	I-1inf-gw, E-1eff-gw	Monthly
BTEX	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
TPHG	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
EPA Priority Pollutant Metals**	Grab	mg/L	E-1eff-gw	One time during startup

***: Sampling is to be conducted one hour after initial system startup, weekly during the first month of operation and monthly thereafter. For startup sampling request a 24-hr turn-around-time for analysis.**

For weekly sampling, request a ~~48~~ 72hr turn-around-time for analysis.

****: Not a permit requirement; for our information.**

(list of metals: arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, silver and zinc).

Special Instructions:

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

Operator: Madden Date: 2-8-95

EMCON Project #: 805-123.01-94-5C

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EMCON

Operation and Maintenance Field Report

GWE – Totalizer = 628 gallons before startup

Started GWE at 1530

2-8-95 meter calibration: Temp = 61.3° EC = 1020/1000
pH 7 6.95/7.00 pH 10 10.02/10.00 pH 4 4.00

	Temp	EC	pH
E-1 (E)	57.5	1397	5.82
I-3 (D)	59.3	1670	6.51
I-2	59.5	1359	8.24
I-1 (A)	60.0	1500	6.31

aeration tank ~~pressure~~ vacuum = 24" wtr

air flow from aeration tank = > 5CCFM @ 24" wtr vac
PID = 53.3 ppm
WF-1 (Combined air from well field)
WF-1 = 1970 ppm 50 FPM (3") @ 58°F

I-1 = 395 ppm E-1 = 0.0 ppm

PID calibrated with 100 ppm Isobutylene.

Transfer pump – 2 min. 44 sec. OFF 27 sec. ON

RW-1 – pumping at approx 1.9 GPM

NAME MAdler

DATE 2-8-95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0805-123.01

REMARKS:
System off upon arrival - aeration tank high level
Totalizer = 990.1 gallons Restarted at 1156
High level float switch was being pulled into the tank by its own weight
I pulled it back out and tightened it as tight as the compression fitting would go. Took water samples at I-1, I-3, & E-1
#1 Filter 3psi in / 3psi out RW-1 DTW = 19.95' DTFP = 19.77'

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

GROUNDWATER EXTRACTION SYSTEM WITH AERATION AND CARBON ADSORPTION

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1115
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	
Restart Time (24:00 hour)	1156
Reading Time (24:00 hour)	1516
RW-1 Well Head Pressure (psi)	15
RW-1 pump flow rate (gals/min)	
RW-1 Depth to Water (ft)	19.95'
Totalizer (gallons:before discharge to sanitary sewer)	1328.7
Total Flow Rate (gals/min)	
GAC-1 (inlet) Pressure (In. of H2O (psig))	5.5
GAC-2 Pressure (In. of H2O (psig))	4.5

SYSTEM CHECK LIST	Yes	No	Other
Alarm Trip?	X		
Change bag filters ?		X	
Check Scaltrol Unit ?		X	
Check Aeration Tank Baffles ?		X	

SAMPLE PARAMETERS	Temp. (°F)	pH units	EC
ATinf-gw (before aeration tank) I-1	62.5	6.67	1045
Cinf-gw (after AT and before GAC-1)			
Ainf-gw (after GAC-1) I-3	59.4	7.30	1015
E-1eff-gw (after GAC-2)	59.4	6.80	~~1041~~ 1041

Monitoring/Sampling Schedule*

Parameter	Sample Type	Results In	Sample ID	Frequency
Flow rate	N/A	Gals/min	N/A	Continuous
pH	Grab	Standard Units	I-1inf-gw, E-1eff-gw	Monthly
Temperature	Grab	° F	I-1inf-gw, E-1eff-gw	Monthly
BTEX	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
TPHG	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
EPA Priority Pollutant Metals**	Grab	mg/L	E-1eff-gw	One time during startup

***: Sampling is to be conducted one hour after initial system startup, weekly during the first month of operation and monthly thereafter. For startup sampling request a 24-hr turn-around-time for analysis.**
For weekly sampling, request a ~~48~~ 72hr turn-around-time for analysis.
****: Not a permit requirement; for our information.**
(list of metals: arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, silver and zinc).

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

Operator: MAdler Date: 2-14-95 **EMCON Project #: 805-123.01-94-5C**

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REMARKS:
System on & running upon arrival. Met EBMUD on site took samples at E-1 only. Metals & EPA 624
Carbon bed #2 = S/N 17636
Carbon bed #1 = S/N 17635

#1 Filter in & out 3 psi / 2.5 PSI

Unscheduled site visit [X] or Scheduled site visit no. ____ of ??

GROUNDWATER EXTRACTION SYSTEM WITH AERATION AND CARBON ADSORPTION

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	0935
System Status (on or off)	ON
Shutdown Time (24:00 hour)	1254
Restart Time (24:00 hour)	1309
Reading Time (24:00 hour)	0940
RW-1 Well Head Pressure (psi)	
RW-1 pump flow rate (gals/min)	
RW-1AR-2 Depth to Water (ft)	21.30'
Totalizer (gallons:before discharge to sanitary sewer)	3073.0
Total Flow Rate (gals/min)	
GAC-1 (inlet) Pressure (In. of H2O/psig)	6.0
GAC-2 Pressure (In. of H2O/psig)	5.0

SYSTEM CHECK LIST	Yes	No	Other
Alarm Trip?		X	
Change bag filters ?		X	
Check Scaltrol Unit ?		X	
Check Aeration Tank Baffles ?		X	

SAMPLE PARAMETERS	Temp. (°F)	pH units	EC
ATinf-gw (before aeration tank)			
I-1inf-gw (after AT and before GAC-1)			
I-2inf-gw (after GAC-1)			
E-1eff-gw (after GAC-2)	57.3	7.89	826

Monitoring/Sampling Schedule*

Parameter	Sample Type	Results In	Sample ID	Frequency
Flow rate	N/A	Gals/min	N/A	Continuous
pH	Grab	Standard Units	I-1inf-gw, E-1eff-gw	Monthly
Temperature	Grab	°F	I-1inf-gw, E-1eff-gw	Monthly
BTEX	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
TPHG	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
EPA Priority Pollutant Metals**	Grab	mg/L	E-1eff-gw	One time during startup

***: Sampling is to be conducted one hour after initial system startup, weekly during the first month of operation and monthly thereafter. For startup sampling request a 24-hr turn-around-time for analysis. For weekly sampling, request a ~~48-hr~~ 72-hr turn-around-time for analysis.**

****: Not a permit requirement; for our information.**

(list of metals: arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, silver and zinc).

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

Operator: MAdler Date: 2-15-95

EMCON Project #: 805-123.01-94-5C

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EMCON

Operation and Maintenance Field Report

Several leaks developed on GWF - Repaired all 3 leaks - 1 on hose on #1 carbon. 2 - disassembled #2 Carbon bed fitting & re sealed - OK 3 - pressure relief valve after transfer pump leaking - Took apart and cleaned O-Rings - OK so far.

Station attendant said they smelled an oily smell in back room - they think its coming from the unit. I suggested they close the windows. The stack is plenty high 10' over window & results of E-1 were OK. Also it doesn't smell back there

NAME M Allen

DATE 2-15-95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0805-123.02

REMARKS:
System on & running upon arrival. Took readings & Sampled I-1(A) I-2, I-3(D), E-1(E)

RW-1 = 360 ml. per stroke at 19 strokes per minute (measured by disconnecting line from well prior to #1 Filter)
Line for bubbling air broke off in RW-1 - I removed 1" coupler & glued a 1" SCH x 1" thd Comp. in place will start next week.
Filter #1 IN - 4.5-5 psi out - 3.5 psi

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

GROUNDWATER EXTRACTION SYSTEM WITH AERATION AND CARBON ADSORPTION

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1237
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1303
RW-1 Well Head Pressure (psi) Ejector psig	17-18
RW-1 pump flow rate (gals/min) 5700 ml./min	
RW-1AR-2 Depth to Water (ft) DTF1 = 21.72	22.30
Totalizer (gallons:before discharge to sanitary sewer)	15498.9
Total Flow Rate (gals/min) 5700 ml/min	
GAC-1 (inlet) Pressure (In. of H2O/psig)	7.0
GAC-2 Pressure (In. of H2O/psig)	3.5

SYSTEM CHECK LIST	Yes	No	Other
Alarm Trip?		X	
Change bag filters ?		X	
Check Scaltrol Unit ?		X	
Check Aeration Tank Baffles ?		X	

SAMPLE PARAMETERS	Temp. (°F)	pH units	EC
~~ATinf-gw (before aeration tank)~~ I-1(A)	66.5	6.56	972
~~I-1inf-gw (after AT and before GAC-1)~~ I-2	67.3	8.32	970
~~I-3~~inf-gw (after GAC-1) I-3 (D)	67.6	8.11	971
E-1eff-gw (after GAC-2) E-1(E)	67.5	8.15	971

Monitoring/Sampling Schedule*

Parameter	Sample Type	Results In	Sample ID	Frequency
Flow rate	N/A	Gals/min	N/A	Continuous
pH	Grab	Standard Units	I-1inf-gw, E-1eff-gw	Monthly
Temperature	Grab	° F	I-1inf-gw, E-1eff-gw	Monthly
BTEX	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
TPHG	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
EPA Priority Pollutant Metals**	Grab	mg/L	E-1eff-gw	One time during startup

***: Sampling is to be conducted one hour after initial system startup, weekly during the first month of operation and monthly thereafter. For startup sampling request a 24-hr turn-around-time for analysis. For weekly sampling, request a 48-hr turn-around-time for analysis.**

****: Not a permit requirement; for our information.**

(list of metals: arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, silver and zinc).

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

Operator: MAdler Date: 2-21-95 **EMCON Project #: 805-123.01-94-5C**

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EMCON

Operation and Maintenance Field Report

Product Recovery

	DTFP	DTW	Product Removed	water Removed
AS-1 (SPARGE)	ND	10.55'	—	—
AS-1 (VENT)	8.50'	12.44'	2.5 gal.	.25 gal.
AS-2 (SPARGE)	ND	10.97'	—	—
AS-2 (VENT)	9.56'	9.59'	20 ml.	50 ml.
RW-1	20.38'	21.64'	1.25 gal.	1.25 gal.

Water & Product contained in drum in overpack drum, which is locked inside compound

NAME MAdler

DATE 2-28-95

PROJECT NAME ARCO 2035

PROJECT NUMBER 0805-123.02

REMARKS:
System on & running upon arrival • Took readings • sampled I-1 I-2 I-3 & E-1
Changed 1st filter only (100 micron) Backwashed 1st Carbon drum 5.5 psi
Removed 2.5 ml of red-dark brown product from AS-1 vent - bailed well dry
Removed 1.25 gal. of product & 1.25 gal of water from [illegible]
Pump counter = 340600
AIR COMP. HRS = 35.2
I-1 water is clear with small suspended matter

Unscheduled site visit ☐ or Scheduled site visit no. ______ of ??

GROUNDWATER EXTRACTION SYSTEM WITH AERATION AND CARBON ADSORPTION

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1301
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1329
RW-1 Well Head Pressure (psi) # jector press.	19.5
RW-1 pump flow rate (gals/min)	
RW-1AR-2 Depth to Water (ft) DTFP = 26.38	21.64
Totalizer (gallons:before discharge to sanitary sewer)	287876
Total Flow Rate (gals/min) Trans pump	4.8
GAC-1 (inlet) Pressure ~~(In. of H2O/~~psig)	10
GAC-2 Pressure ~~(In. of H2O/~~psig)	2.5

SYSTEM CHECK LIST	Yes	No	Other
Alarm Trip?		X	
Change bag filters ?	X only	#1 (100 micron)	
Check Scaltrol Unit ?		X	
Check Aeration Tank Baffles ?		X	

SAMPLE PARAMETERS	Temp. (°F)	pH units	EC
ATinf-gw (before aeration tank) I-1	64.0	6.62	775
I-2inf-gw (after AT and before GAC-1)	62.6	8.28	873
I-2inf-gw (after GAC-1) I-3(D)	62.0	7.79	844
E-1eff-gw (after GAC-2) (E)	63	7.75	838

Monitoring/Sampling Schedule*

Parameter	Sample Type	Results In	Sample ID	Frequency
Flow rate	N/A	Gals/min	N/A	Continuous
pH	Grab	Standard Units	I-1inf-gw, E-1eff-gw	Monthly
Temperature	Grab	°F	I-1inf-gw, E-1eff-gw	Monthly
BTEX	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
TPHG	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
EPA Priority Pollutant Metals**	Grab	mg/L	E-1eff-gw	One time during startup

***: Sampling is to be conducted one hour after initial system startup, weekly during the first month of operation and monthly thereafter. For startup sampling request a 24-hr turn-around-time for analysis. For weekly sampling, request a 48-hr turn-around-time for analysis.**

****: Not a permit requirement; for our information.**
(list of metals: arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, silver and zinc).

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

Operator: MAdiev Date: 2-28-95 **EMCON Project #: 805-123.01-94-5C**

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REMARKS:
Started GWE system but Sailaja called and informed me to keep it off. The arsenic level at E-1 is over the discharge limit so I shut the system right back off.

The system was shut down by Therm Tech on 3-1-95 @ 1610 GWE shut down when they turned the Therm Tech unit off.

Unscheduled site visit [X] or Scheduled site visit no. _____ of ??

GROUNDWATER EXTRACTION SYSTEM WITH AERATION AND CARBON ADSORPTION

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	
System Status (on or off)	
Shutdown Time (24:00 hour) * 3-1-95	1610
Restart Time (24:00 hour)	
Reading Time (24:00 hour)	1000
RW-1 Well Head Pressure (psi)	
RW-1 pump flow rate (gals/min)	
RW-1AR-2 Depth to Water (ft)	
Totalizer (gallons:before discharge to sanitary sewer)	31316.3
Total Flow Rate (gals/min)	
GAC-1 (inlet) Pressure (In. of H2O/psig)	
GAC-2 Pressure (In. of H2O/psig)	

SYSTEM CHECK LIST	Yes	No	Other
Alarm Trip?			
Change bag filters ?			
Check Scaltrol Unit ?			
Check Aeration Tank Baffles ?			

SAMPLE PARAMETERS	Temp. (°F)	pH units	EC
ATinf-gw (before aeration tank)			
I-1inf-gw (after AT and before GAC-1)			
I-2inf-gw (after GAC-1)			
E-1eff-gw (after GAC-2)			

Monitoring/Sampling Schedule*

Parameter	Sample Type	Results In	Sample ID	Frequency
Flow rate	N/A	Gals/min	N/A	Continuous
pH	Grab	Standard Units	I-1inf-gw, E-1eff-gw	Monthly
Temperature	Grab	° F	I-1inf-gw, E-1eff-gw	Monthly
BTEX	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
TPHG	Grab	µg/l	I-1inf-gw, E-1eff-gw	Monthly
EPA Priority Pollutant Metals**	Grab	mg/L	E-1eff-gw	One time during startup

***: Sampling is to be conducted one hour after initial system startup, weekly during the first month of operation and monthly thereafter. For [redacted]**

For weekly sampling, request a 48hr turn-around-time for analysis.

****: Not a permit requirement; for our information.**

(list of metals: arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, silver and zinc).

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

Operator: MAdler Date: 3-3-95

EMCON Project #: 805-123.01-94-5C

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

Remarks: System off due to Arsenic levels over discharge limit Turned system on to Sample E-1 & I-1 for Arsenic Field Filtered both samples and Took extra samples non filtered at E-1 & I-1 also took readings

Ran System from 1601 to 1628 then shut off system.

2min after taking RW-1 DTW retook DTW = 7.80

Unscheduled site visit [X] Scheduled site visit [ ]

SYSTEM PARAMETERS	
Arrival Time (24:00 hour)	1036
System Status (on or off)	OFF
Shutdown Time (24:00 hour)	1628
Restart Time (24:00 hour)	1601
Reading Time (24:00 hour)	1627
RW-1 Ejection Pressure (psi)	17
RW-1 Stroke volume (ml)	—
RW-1 Strokes per minute	—
RW-1 Stroke counter	421964
RW-1 DTFP (ft)	7.00
RW-1 DTW (ft)	7.15
Transfer pump flow rate (gpm)	—
GAC-1 Pressure (psi)	6.5
GAC-2 Pressure (psi)	3.0
#1 Filter IN (psi)	4
#1 Filter OUT (psi)	2
#2 Filter IN (psi)	17
#2 Filter OUT (psi)	10
Air compressor run time (hrs)	38.3
Air compressor discharge (psi)	90
Regulated discharge (psi)	65
RW-1 RUN TIME (hrs) 1601-1628	.5
TOTALIZER (gal)	31357.6

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

Notes:

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

Special Instructions:

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

Operator: MAdler Date: 3-8-95

ARCO 2035 Groundwater Extraction System
Project # 0805-123.02

APPENDIX F

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

Columbia Analytical Services, Inc.

February 13, 1995

Service Request No.: S950140

Sailaja Yelamanchili
EMCON Associates
1921 Ringwood Ave.
San Jose, Ca 95131

RE: **ARCO Facility No. 2035 / EMCON Project # 0805-123.01**

Dear Ms. Yelamanchili:

Attached are the results of the water samples submitted to our laboratory on February 9, 1995. For your information, these analyses have been assigned our service request number S950140.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (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

CVR_PG.DOC 1/26/95

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COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

ACRONLST.DOC 12/22/94

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Service Request:**	S950140
Project:	ARCO Facility No. 2035 / EMCON Project No. 0805-123.01	**Date Collected:**	2/8/95
Sample Matrix:	Water	**Date Received:**	2/9/95
		Date Extracted:	NA
		Date Analyzed:	2/9/95

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

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name	**Lab Code**				
E-1 (E)	S950140-001	ND	0.7	ND	ND	ND
I-3 (D)	S950140-002	ND	ND	ND	ND	ND
I-2	S950140-003	1,500	59	70	14	86
I-1 (A)	S940140-004	49,000	4,300	4,900	1,000	5,200
Method Blank	S950209-WB1	ND	ND	ND	ND	ND

Approved By: _____ Date: 2/13/95

5ABTXGAS/061694

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APPENDIX A

LABORATORY QC RESULTS

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123.01
Sample Matrix: Water

Service Request: S950140
Date Collected: 2/8/94
Date Received: 2/9/95
Date Extracted: NA
Date Analyzed: 2/9/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
E-1 (E)	S950140-001	94
I-3 (D)	S950140-002	93
I-2	S950140-003	114
I-1 (A)	S940140-004	96
MS	S950129-005MS	109
DMS	S950129-005DMS	108
Method Blank	S950209-WB1	95

CAS Acceptance Limits: 69-116

Approved By: _____ Date: 2/13/95

SUR1/062994

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123.01

Service Request: S950140
Date Analyzed: 2/8/94

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	27.4	110	85-115
Toluene	25	25.4	102	85-115
Ethylbenzene	25	25.0	100	85-115
Xylenes, Total	75	69.6	93	85-115
Gasoline	250	261	104	90-110

Approved By: _____ Date: 2/13/95

ICV25AL/060194

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Service Request:**	S950140
Project:	ARCO Facility No. 2035 / EMCON Project No. 0805-123.01	**Date Collected:**	2/8/94
Sample Matrix:	Water	**Date Received:**	2/9/95
		Date Extracted:	NA
		Date Analyzed:	2/9/95

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

Sample Name: Batch QC
Lab Code: S950129-005

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	1250	1250	645	1930	1960	103	105	67-121	2

Approved By: _____ Date: 2/13/95

DMS1S/060194

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APPENDIX B

CHAIN OF CUSTODY

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

ARC[redacted] Co[redacted]any
Division of AtlanticRichfieldCompany

Task Order No. 2035-94-SC

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Sailaja Yelamanchile	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 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 ☐
E-1(E)	1			X				2-8-95	1605		X									
I-3(D)	2			↓				↓	1610		X									
I-2	3			↓				↓	1615		X									
I-1(A)	4			↓				↓	1620		X									

Special detection Limit/reporting: [redacted]

Special QA/QC

Remarks: 0805-123,01

Lab number: 595-0140

Turnaround time

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

Condition of sample:

Temperature received:

Relinquished by sampler	Date 2-9-95	Time 1145	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory / Date / Time

01

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

APPC-3292 (2-91)

Columbia Analytical Services, Inc.

February 17, 1995

Service Request No.: S950173

Sailaja Yelamanchili
EMCON Associates
1921 Ringwood Ave.
San Jose, Ca 95131

RE: **ARCO Facility No. 2035 / EMCON Prject No. 0805-123.02**

Dear Ms. Yelamanchili

Attached are the results of the water samples submitted to our laboratory on February 14, 1995. For your information, these analyses have been assigned our service request number S950173.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (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

CVR_PG.DOC 1/26/95

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

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Service Request:**	S950173
Project:	ARCO Facility No. 2035 / EMCON Project No. 0805-123.02	**Date Collected:**	2/14/95
Sample Matrix:	Water	**Date Received:**	2/15/95
		Date Extracted:	NA
		Date Analyzed:	2/15/95

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

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name / **Lab Code**					
E-1 (E) S950173-001	ND	ND	ND	ND	ND
I-3 (D) S950173-002	ND	ND	ND	ND	ND
I-1 (A) S950173-003	33,000	4,300	5,800	970	5,600
Method Blank S950215-WB	ND	ND	ND	ND	ND

Approved By: Steven D. Green Date: 2/17/95

5ABTXGAS/061694

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APPENDIX A

LABORATORY QC RESULTS

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950173
Date Collected: 2/14/95
Date Received: 2/15/95
Date Extracted: NA
Date Analyzed: 2/15/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
E-1 (E)	S950173-001	79
I-3 (D)	S950173-002	86
I-1 (A)	S950173-003	81
E-1 (E) MS	S950173-001MS	93
E-1 (E) DMS	S950173-001DMS	88
Method Blank	S950215-WB	86

CAS Acceptance Limits: 69-116

Approved By: Steven N. Green Date: 2/17/95

SUR1/062994

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates **Service Request:** S950173
Project: ARCO Facility No. 2035 / EMCON Project No. 0805-123.02 **Date Analyzed:** 2/15/95

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.5	102	85-115
Toluene	25	24.6	98	85-115
Ethylbenzene	25	25.0	100	85-115
Xylenes, Total	75	73.9	99	85-115
Gasoline	250	231	92	90-110

Approved By: Steven Green Date: 2/17/95

ICV25AL/060194

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Service Request:**	S950173
Project:	ARCO Facility No. 2035 / EMCON Project No. 0805-123.02	**Date Collected:**	2/14/95
Sample Matrix:	Water	**Date Received:**	2/15/95
		Date Extracted:	NA
		Date Analyzed:	2/15/95

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

Sample Name: E-1 (E)
Lab Code: S950173-001

	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	226	214	90	86	67-121	5

Approved By: _____ Date: 2/17/95

DMS1S/060194

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

APPENDIX B

CHAIN OF CUSTODY

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Sailaja Yelamanchile	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

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 ☐
E-1(E)	1	2		X		X	X	2-14-95	1430		X									
I-3(D)	2	2		X		X	X	2-14-95	1435		X									
I-1(A)	3	2		X		X	X	2-14-95	1440		X									

Method of shipment: Tech.

Special detection Limit/reporting:

Special QA/QC:

Remarks: 0805-123.02

Lab number: S95-0173

Condition of sample:

Temperature received:

	Date	Time	
Relinquished by sampler	2-15-95	0815	Received by
Relinquished by			Received by
Relinquished by			Received by laboratory

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 72hrs. ☒
- 5 Business Days ☐
- Standard 10 Business Days ☐

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

Columbia Analytical Services, Inc.

February 24, 1995

Service Request No. S950211

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

Re: **ARCO Facility No. 2035**

Dear Ms. Yelamanchili:

Attached are the results of the water sample(s) submitted to our lab on February 21, 1995. For your reference, these analyses have been assigned our service request number S950211.

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

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

ACRONLST.DOC 12/22/94

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Service Request:**	S950211
Project:	ARCO Facility No. 2035 / EMCON Project No. 0805-123.02	**Date Collected:**	2/21/95
Sample Matrix:	Water	**Date Received:**	2/21/95
		Date Extracted:	NA
		Date Analyzed:	2/22/95

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

Analyte:		**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:		ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:		50	0.5	0.5	0.5	0.5
Sample Name	**Lab Code**					
E-1(E)	S950211-001	ND	ND	ND	ND	ND
I-3(D)	S950211-002	ND	ND	ND	ND	ND
I-2	S950211-003	340	7.2	8.8	1.9	37
I-1(A)	S950211-004	21,000	940	1,500	360	4,000
Method Blank	S950222-WB1	ND	ND	ND	ND	ND

Approved By: _____ Date: 2/24/95

5ABTXGAS/061694

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APPENDIX A

LABORATORY QC RESULTS

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

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

Service Request: S950211
Date Analyzed: 2/22/95

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.6	102	85-115
Toluene	25	24.8	99	85-115
Ethylbenzene	25	24.9	100	85-115
Xylenes, Total	75	73.7	98	85-115
Gasoline	250	247	99	90-110

Approved By: _____ Date: 2/24/95

ICV25AL/060194

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950211
Date Collected: 2/21/95
Date Received: 2/21/95
Date Extracted: NA
Date Analyzed: 2/22/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
E-1(E)	S950211-001	97
I-3(D)	S950211-002	99
I-2	S950211-003	104
I-1(A)	S950211-004	101
E-1(E) (MS)	S950211-001MS	101
E-1(E) (DMS)	S950211-001DMS	102
Method Blank	S950222-WB1	92

CAS Acceptance Limits: 69-116

Approved By: _____ Date: 2/24/95

SUR1/062994

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950211
Date Collected: 2/21/95
Date Received: 2/21/95
Date Extracted: NA
Date Analyzed: 2/22/95

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

Sample Name: E-1(E)
Lab Code: S950211-001

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Benzene	25	25	ND	26.3	25.6	105	102	75-135	3
Toluene	25	25	ND	25.1	24.6	100	98	73-136	2
Ethylbenzene	25	25	ND	25.6	24.9	102	100	69-142	3

Approved By: _____ Date: 2/24/95

DMS1S/060194

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

APPENDIX B

CHAIN OF CUSTODY

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 5121.00

Chain of Custody

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

Method of shipment: Tech

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	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(E)	1	2		X		X	X	2-21-95	1309		X										
I-3(D)	2	2		X		X	X	2-21-95	1312		X										
I-2	3	2		X		X	X	2-21-95	1316		X										
I-1(A)	4	2		X		X	X	2-21-95	1320		X										

Special detection Limit/reporting:

Special QA/QC:

Remarks: 0805-123.02

Lab number: 5950211

Turnaround time:
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐ 72 HRS ☒
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☐

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 2-21-95 Time 1709	Received by Joanne Brown CAS SJ	Date 2-21-95 Time 1710
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)

GOLDEN STATE/CAS
LABORATORIES, INC.

RECEIVED
MAR 0 1 1995

February 27, 1995

Sailaja Yelamanchili
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131-1721

Re: **ARCO Facility #2035-Oakland/Project #0805-123.02**

Dear Sailaja:

Enclosed are the results of the sample submitted to our lab on February 16, 1995. For your reference, these analyses have been assigned our service request number L951389.

All analyses were performed in accordance with our laboratory's quality assurance program. Golden State / CAS is certified for environmental analyses by the California Department of Health Services (Certificate # 1296/Expiration - August 1996).

Please call if you have any questions.

Respectfully submitted,

Golden State / CAS Laboratories, Inc.

Eydie Schwartz for
Dr. B. Gene Bennett
Laboratory Director

Stuart Sigman
Quality Assurance Coordinator

GB/kr

6925 CANOGA AVENUE ■ CANOGA PARK, CA 91303 ■ 818 587-5550 ■ FAX 818 587-5555

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-123.02
Sample Matrix: Water

Service Request: L951389
Date Collected: 2/15/95
Date Received: 2/16/95
Date Extracted: NA

Total Metals
Units: mg/L (ppm)

		Sample Name:	E-1 (E)	Method Blank
		Lab Code:	L951389-001	L951389-MB
		Date Analyzed:	2/16-23/95	2/16-23/95
Analyte	**EPA Method**	**MRL**		
Arsenic	3020/7060	0.005	0.010	ND
Cadmium	3010/6010	0.005	ND	ND
Chromium	3010/6010	0.01	ND	ND
Copper	3010/6010	0.01	ND	ND
Iron	3010/6010	0.05	ND	ND
Lead	3020/7421	0.002	ND	ND
Mercury	7470	0.001	ND	ND
Nickel	3010/6010	0.04	ND	ND
Silver	3010/6010	0.01	ND	ND
Zinc	3010/6010	0.01	0.01	ND

NA Not Applicable
MRL Method Reporting Limit
ND None detected at or above the method reporting limit

Approved By: Eydie Schwartz Date: 2/27/95

3S30EPA/060194

L951389.XLS - metgw 2/27/95

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-123.02
LCS Matrix: Water

Service Request: L951389
Date Collected: NA
Date Received: NA
Date Analyzed: 2/16-23/95

Laboratory Control Sample Summary
Total Metals
Units: mg/L (ppm)

Analyte	EPA Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Arsenic	7060	0.0400	0.0412	103	75-125
Cadmium	6010	0.100	0.095	95	75-125
Chromium	6010	0.500	0.479	96	75-125
Copper	6010	0.500	0.494	99	75-125
Iron	6010	5.00	4.90	98	75-125
Lead	7421	0.0400	0.0441	110	75-125
Mercury	7470	0.00500	0.00502	100	60-140
Nickel	6010	0.500	0.480	96	75-125
Silver	6010	0.100	0.095	95	75-125
Zinc	6010	0.500	0.473	95	75-125

NA Not Applicable

Approved By: Eydie Schwartz Date: 2/27/95

LCSEPA/060194
L951389.XLS - metlcsw 2/27/95

0002
Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Service Request:**	L951389
Project:	ARCO Products Company/#0805-123.02	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	2/16-23/95

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals
Units: mg/L (ppm)

Sample Name: BATCH QC
Lab Code: L951409-001

Analyte	MRL	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria	Relative Percent Difference
Arsenic	0.005	0.0400	ND	0.0418	0.0422	104	106	75-125	<1

NA Not Applicable
ND None Detected at or above the method reporting limit.

Approved By: Eydie Schwartz Date: 2/27/95

DMS1SMRL/060194
L951389.XLS - genmsmd (2) 2/27/95

0003
Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Service Request:**	L951389
Project:	ARCO Products Company/#0805-123.02	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	2/16-23/95

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals
Units: mg/L (ppm)

Sample Name: BATCH QC
Lab Code: L951409-004

Analyte	MRL	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria	Relative Percent Difference
Lead	0.002	0.0400	ND	0.0376	0.0370	94	92	75-125	2

NA Not Applicable
ND None Detected at or above the method reporting limit.

Approved By: Eydie Schwartz Date: 2/27/95

DMS1SMRL/060194
L951389.XLS - genmsmsl (3) 2/27/95

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Service Request:**	L951389
Project:	ARCO Products Company/#0805-123.02	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	2/16-23/95

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals
Units: mg/L (ppm)

Sample Name: BATCH QC
Lab Code: L951225-012

Analyte	MRL	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria	Relative Percent Difference
Mercury	0.001	0.00500	ND	0.00513	0.00519	103	104	60-140	1

NA Not Applicable
ND None Detected at or above the method reporting limit.

Approved By: Eydie Schwartz Date: 2/27/95

DMS1SMRL/060194
L951389.XLS - genmsmrl (4) 2/27/95

0005
Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-123.02
Sample Matrix: Water

Service Request: L951389
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 2/16-23/95

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals
Units: mg/L (ppm)

Sample Name: BATCH QC
Lab Code: L951409-002

Analyte	MRL	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria	Relative Percent Difference
Cadmium	0.005	0.100	ND	0.093	0.091	93	91	75-125	2
Chromium	0.01	0.500	ND	0.459	0.443	92	89	75-125	4
Copper	0.01	0.500	ND	0.482	0.467	96	93	75-125	3
Iron	0.05	5.00	ND	4.73	4.55	95	91	75-125	4
Nickel	0.04	0.500	ND	0.453	0.422	91	84	75-125	7
Silver	0.01	0.100	ND	0.093	0.091	93	91	75-125	2
Zinc	0.01	0.500	0.014	0.463	0.446	90	86	75-125	4

NA Not Applicable
ND None Detected at or above the method reporting limit.

Approved By: Eydie Schwartz Date: 2/27/95

DMS1SMRL/060194
L951389.XLS - genmsmrl 2/27/95

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ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 5121.06

Chain of Custody

ARCO Facility no. 2035	City (Facility) Oakland	Project manager (Consultant) Sailaja Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 5778697	Telephone no. (Consultant) 408453 7300	Fax no. (Consultant) 408453 0455	Contract number 070177
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	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 ☐	Metals *
E-1(E)	1	3		X		X	X	2-15-95	1031							X					X

* Metals : arsenic, cadmium, chromium, copper, cyanide(?), iron, lead, mercury, nickel, silver, zinc.

Special detection Limit/reporting

Special QA/QC

Remarks: 0805-123.02

4951589

Lab number: 950177

Turnaround time

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

Condition of sample:

Temperature received:

Relinquished by sampler: M Cole	Date 2-15-95	Time 1500	Received by: Joanie Brown CAS-SJ 1501
Relinquished by: Joanie Brown	Date 2-15-95	Time 1700	Received by:
Relinquished by:	Date	Time	Received by laboratory:	Date 2-16-95	Time 0900

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

SJ: 624 Lab: Metals *

Columbia Analytical Services inc.

March 1, 1995

Service Request No. S950177

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

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

Dear Ms. Yelamanchili:

Attached are the results of the water sample(s) submitted to our lab on February 15, 1995. For your reference, these analyses have been assigned our service request number S950177.

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.

Elaine R. Thomas for
Steven L. Green
Project Chemist

Annelise Jade Bazar
Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S950177
Date Collected: 2/15/95
Date Received: 2/15/95
Date Extracted: NA

Volatile Organic Compounds
EPA Method 8240
Units: ug/L (ppb)

	Sample Name:	E-1 (E)	Method Blank
	Lab Code:	S950177-001	S950227-WB
	Date Analyzed:	2/27/95	2/27/95
Analyte	**MRL**		
Chloromethane	10	ND	ND
Vinyl Chloride	10	ND	ND
Bromomethane	10	ND	ND
Chloroethane	10	ND	ND
Trichlorofluoromethane (CFC 11)	1	ND	ND
Trichlorotrifluoroethane (CFC 113)	10	ND	ND
1,1-Dichloroethene	1	ND	ND
Acetone	20	ND	ND
Carbon Disulfide	1	ND	ND
Methylene Chloride	10	ND	ND
trans-1,2-Dichloroethene	1	ND	ND
cis-1,2-Dichloroethene	1	ND	ND
2-Butanone (MEK)	10	ND	ND
1,1-Dichloroethane	1	ND	ND
Chloroform	1	ND	ND
1,1,1-Trichloroethane (TCA)	1	ND	ND
Carbon Tetrachloride	1	ND	ND
Benzene	1	ND	ND
1,2-Dichloroethane	1	ND	ND
Vinyl Acetate	10	ND	ND
Trichloroethene (TCE)	1	ND	ND
1,2-Dichloropropane	1	ND	ND
Bromodichloromethane	1	ND	ND
2-Chloroethyl Vinyl Ether	10	ND	ND
trans-1,3-Dichloropropene	1	ND	ND
4-Methyl-2-pentanone (MIBK)	10	ND	ND
2-Hexanone	10	ND	ND
Toluene	1	ND	ND
cis-1,3-Dichloropropene	1	ND	ND
1,1,2-Trichloroethane	1	ND	ND
Tetrachloroethene (PCE)	1	ND	ND
Dibromochloromethane	1	ND	ND
Chlorobenzene	1	ND	ND
Ethylbenzene	1	ND	ND
Styrene	1	ND	ND
Total Xylenes	5	ND	ND
Bromoform	1	ND	ND
1,1,2,2-Tetrachloroethane	1	ND	ND
1,3-Dichlorobenzene	1	ND	ND
1,4-Dichlorobenzene	1	ND	ND
1,2-Dichlorobenzene	1	ND	ND

Approved By: Elaine R. Thomas Date: 3/2/95

3S44/060194

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APPENDIX A

LABORATORY QC RESULTS

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950177
Date Collected: 2/15/95
Date Received: 2/15/95
Date Extracted: NA
Date Analyzed: 2/27/95

Surrogate Recovery Summary
Volatile Organic Compounds
EPA Method 8240

Sample Name	Lab Code	Percent Recovery 1,2-Dichloroethane-D_4	Toluene-D_8	4-Bromofluorobenzene
E-1 (E)	S950177-001	98	97	95
E-1 (E) MS	S950177-001MS	102	97	92
E-1 (E) DMS	S950177-001DMS	100	103	93
Method Blank	S950227-WB	101	102	96
CAS Acceptance Limits:		76-114	88-110	86-115

Approved By: Elaine R. Thomas Date: 3/2/95

SUR3/060194

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

Service Request: S950177
Date Analyzed: 2/24/95

Initial Calibration Verification (ICV) Summary
Volatile Organic Compounds
EPA Method 8240
Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Chloromethane	50	49.6	99	70-130
Vinyl Chloride	50	49.5	99	70-130
Bromomethane	50	52.5	105	70-130
Chloroethane	50	56.4	113	70-130
Acetone	50	40.5	81	70-130
1,1-Dichloroethene	50	48.5	97	70-130
Carbon Disulfide	50	48.7	97	70-130
Methylene Chloride	50	49.5	99	70-130
trans-1,2-Dichloroethene	50	50.1	100	70-130
cis-1,2-Dichloroethene	50	50.1	100	70-130
1,1-Dichloroethane	50	50.6	101	70-130
Vinyl Acetate	50	50.1	100	70-130
2-Butanone (MEK)	50	45.4	91	70-130
Chloroform	50	50.1	100	70-130
1,1,1-Trichloroethane (TCA)	50	49.5	99	70-130
Carbon Tetrachloride	50	48.6	97	70-130
Benzene	50	61.0	122	70-130
1,2-Dichloroethane	50	48.9	98	70-130
Trichloroethene (TCE)	50	59.4	119	70-130
1,2-Dichloropropane	50	60.2	120	70-130
Bromodichloromethane	50	57.8	116	70-130
2-Chloroethyl Vinyl Ether	50	40.7	81	70-130
2-Hexanone	50	51.6	103	70-130
trans-1,3-Dichloropropene	50	48.5	97	70-130
Toluene	50	62.1	124	70-130
cis-1,3-Dichloropropene	50	61.0	122	70-130
1,1,2-Trichloroethane	50	51.0	102	70-130
Tetrachloroethene (PCE)	50	49.5	99	70-130
Dibromochloromethane	50	50.4	101	70-130
Chlorobenzene	50	51.3	103	70-130
Ethylbenzene	50	53.3	107	70-130
o- Xylene	50	49.0	98	70-130
Styrene	50	48.0	96	70-130
Bromoform	50	63.6	127	70-130
1,1,2,2-Tetrachloroethane	50	52.9	106	70-130

Approved By: Elaine R. Thomas Date: 3/2/95

ICV41/060194

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950177
Date Collected: 2/15/95
Date Received: 2/15/95
Date Extracted: NA
Date Analyzed: 2/27/95

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds
EPA Method 8240
Units: ug/L (ppb)

Sample Name: E-1
Lab Code: S950177-001

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
1,1-Dichloroethene	50	50	ND	31.8	30.9	64	62	61-145	3
Trichloroethene	50	50	ND	54.9	55.6	110	111	71-120	1
Chlorobenzene	50	50	ND	56.7	55.9	113	112	75-130	1
Toluene	50	50	ND	51.0	53.2	102	106	76-125	4
Benzene	50	50	ND	46.2	47.3	92	95	76-127	2

Approved By: Elaine R. Thomas Date: 3/2/95

DMS1S/060194

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APPENDIX B

CHAIN OF CUSTODY

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

Due Mar 2

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

ARCO Facility no. 2035	City (Facility) Oakland	Project manager (Consultant) Sailaja Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 3778697	Telephone no. (Consultant) 408453 7300	Fax no. (Consultant) 408453 0852
Consultant name EMCON	Address (Consultant) 1921 Ringwood San Jose, CA.		Contract number 090977

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	Semi TCLP Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	Metals *
E-1(E)	1	3		X		X	X	2-15-95	1031							X					X
				* Metals: arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, silver, zinc,																	

Special detection Limit/reporting

Special QA/QC

Remarks

0805 - 13.02

Lab number 9501711

Turnaround time

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

Method of shipment: Tech.

Condition of sample:

Temperature received:

	Date	Time			
Relinquished by sampler	2-15-95	1500	Received by	Joanne Brown	CAS-SJ 1501
Relinquished by Joanne Brown	2-15-95	1700	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)

SJ: 624 Lab: Metals *.

Columbia Analytical Services inc.

March 6, 1995

Service Request No. S950242

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

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

Dear Ms. Yelamanchili:

Attached are the results of the water sample(s) submitted to our lab on March 1, 1995. For your reference, these analyses have been assigned our service request number S950242.

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

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COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Service Request:**	S950242
Project:	ARCO Facility No. 2035/EMCON Project No. 0805-123.02	**Date Collected:**	2/28/95
Sample Matrix:	Water	**Date Received:**	3/1/95
		Date Extracted:	NA
		Date Analyzed:	3/2,3/95

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

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name / **Lab Code**					
E-1(E) S950242-001	ND	ND	ND	ND	ND
I-3(D) S950242-002	ND	ND	ND	ND	ND
I-2 S950242-003	390	3.9	2.5	0.9	16
I-1(A) S950242-004	15,000	430	290	54	2,000
Method Blank S950301-WB1	ND	ND	ND	ND	ND

Approved By: _____ Date: 3-6-95

5ABTXGAS/061694

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APPENDIX A

LABORATORY QC RESULTS

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950242
Date Analyzed: 3/2/95

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.7	103	85-115
Toluene	25	25.1	100	85-115
Ethylbenzene	25	25.1	100	85-115
Xylenes, Total	75	73.5	98	85-115
Gasoline	250	253	101	90-110

Approved By: _____ Date: 3-6-95

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950242
Date Collected: 2/28/95
Date Received: 3/1/95
Date Extracted: NA
Date Analyzed: 3/2,3/95

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
E-1(E)	S950242-001	93
I-3(D)	S9502420992	91
I-2	S9502420993	80*
I-1(A)	S950242-004	96
I-1(A) (MS)	S950242-004MS	101
I-1(A) (DMS)	S950242-004DMS	87
Method Blank	S950301-WB1	91

CAS Acceptance Limits: 69-116

* The surrogate used for this sample was 4-bromofluorobenzene.

Approved By: _____ Date: 7-6-95

SUR1/062994

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: S950242
Date Collected: 2/28/95
Date Received: 3/1/95
Date Extracted: NA
Date Analyzed: 3/2/95

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

Sample Name: I-1(A)
Lab Code: S950242-004

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Benzene	2,500	2,500	426	3,060	3,340	105	117	75-135	9
Toluene	2,500	2,500	287	2,792	3,080	100	112	73-136	10
Ethylbenzene	2,500	2,500	53.9	2,581	2,822	101	111	69-142	9

Approved By: _____ Date: 3-6-95

DMS1S/060194

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APPENDIX B

CHAIN OF CUSTODY

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.36

Chain of Custody

ARCO Facility no. 2035	City (Facility) Albany	Project manager (Consultant) Sailaja Yelamanchili	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 415 277 8697	Telephone no. (Consultant) 408 453 7300	Fax no. (Consultant) 408 453 7452
Consultant name LFR/CA	Address (Consultant) 1921 Ringwood San Jose, CA.		Contract number 0707

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 ☐		
E-1(E)	1	2		X		X	X	2-28-95	1400		X											
I-3(N)	2	2		X		X	X		1403		X											
I-2	3	2		X		X	X		1409		X											
I-1(A)	4	2		X		X	X	↓	1413		X											

Special detection Limit/reporting

Special QA/QC

Remarks: 0505-123.02

Lab number: 9950242

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐ / 72 HRS ☒
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☐

Condition of sample:

Temperature received:

	Date	Time	
Relinquished by sampler	3-1-95	0830	Received by Joanne Brood CAS-SJ 3-1-95 0835
Relinquished by			Received by
Relinquished by			Received by laboratory

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

Columbia Analytical Services, Inc.

March 13, 1995

Service Request No.: K9501430

Sailaja Yelamanchili
EMCON
1921 Ringwood Avenue
San Jose, CA 95131-1721

Re: **Albany/Project ARCO 2035**

Dear Sailaja:

Enclosed are the results of the rush sample(s) submitted to our laboratory on March 10, 1995. For your reference, these analyses have been assigned our service request number K9501430.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (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. My extension is 239.

Respectfully submitted,

Columbia Analytical Services, Inc.

Howard Boorse
Project Chemist

HB/rr

17 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 206/577-7222 • Fax 206/636-1068

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
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NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON
Project: Albany /#ARCO 2035
Sample Matrix: Water

Service Request: K9501430
Date Collected: 3/8/95
Date Received: 3/10/95
Date Extracted: 3/13/95
Date Analyzed: 3/13/95

Dissolved Arsenic
EPA Method 200.8
Units: µg/L (ppb)

Sample Name	Lab Code	MRL	Result
E-1(E)	K9501430-001	0.5	7.0
I-1(A)	K9501430-002	0.5	7.6
Method Blank	K9501430-MB	0.5	ND

Approved By: _____ Date: 3/13/95

0 003

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	K9501430
Project:	Albany /#ARCO 2035	**Date Collected:**	3/8/95
Sample Matrix:	Water	**Date Received:**	3/10/95
		Date Extracted:	3/13/95
		Date Analyzed:	3/13/95

Matrix Spike/Duplicate Matrix Spike Summary
Dissolved Metals
Units: µg/L (ppb)

Sample Name: E-1(E)
Lab Code: K9501430-001

Analyte	MRL	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Arsenic	0.5	20	7.0	31.4	31.9	122	124	75-125	2

Approved By: _____ Date: 3/13/95

0 004

DMS1SMRL/102194
01430ICP.WM1 - DMS 3/13/95

[redacted] Company
Division of AtlanticRichfieldCompany

Task Order No. 8121.00

Chain of Custody

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

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 ☐	Metals
E-1(E)		1		X		X	X	3-8-95													X
I-1(A)		1		X		X	X	3-8-95													X

metal = Arsenic

Special detection Limit/reporting: As MRL = 0.0005mg/l by ICP-MS.

Special QA/QC

Remarks: 0805-123.02 Samples were field filtered

Lab number: 9502816

Method of shipment: Tech

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

Condition of sample:		Temperature received:
Relinquished by sampler	Date 3-9-95 Time 0900	Received by Jane Brown CAS-SJ 3-9-95 0900
Relinquished by	Date Time	Received by D Stoms 1015 3-10-95
Relinquished by Jane Brown CAS-SJ 3/9/95 w/Custody Seal	Date 3/9/95 Time 1800	Received by laboratory Date Time

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

CAS-K: Metals

RUSH