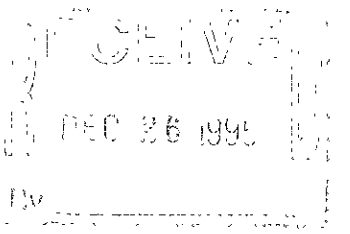
EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • **(408) 453-7300** • Fax (408) 437-9526

3756

Date December 22, 1995
Project 20805-120.004

To:

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



We are enclosing:

Copies	Description
1	Third quarter 1995 groundwater monitoring report results and remediation system performance evaluations report, retail service station, 10600 and 10700 MacArthur Boulevard, Oakland, CA

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

Comments:

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

John C. Young
Project Manager

cc: Kevin Graves, RWQCB - SFBR
Richard Gilcrease, Drake Builders
Michael Whelan, ARCO Products Company
Beth Dorris, ARCO Legal Department
David Larsen, EMCON
File

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

December 19, 1995
Project 20805-120.004

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

Re: Third quarter 1995 groundwater monitoring program results and remediation system performance evaluation report, SVE system at retail service station, 10600 MacArthur Boulevard, Oakland, California

Dear Mr. Whelan:

This letter presents the results of the third quarter 1995 groundwater monitoring program for the retail service station at 10600 MacArthur Boulevard, Oakland, California (Figure 1). Operation and performance data for the site's soil-vapor extraction (SVE) system are also presented. The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

BACKGROUND

Site History and Previous Assessments

There are four underground storage tanks (USTs), designated T1 through T4, in the western portion of the site. These tanks are replacements for four former USTs (FT1 through FT4) that were removed from the southern portion of the site in February 1990. A former waste-oil tank adjacent to the northeastern wall of the station building was removed in 1988. Four soil samples collected beneath the waste-oil tank were analyzed for volatile organic compounds (VOCs), including tetrachloroethene (PCE), even though ARCO Products Company (ARCO) does not use PCE in its operations. Analytical results indicated no detectable concentrations of PCE in the soil samples collected. The locations of the former tanks, existing tanks, on- and off-site groundwater monitoring wells, and on-site vapor extraction wells are shown in Figure 2.

Adjacent to and immediately southeast of the station is a portion of the former Truck Manufacturing Plant (now a parking lot for Foothill Square Shopping Center). Aerial photographs suggest the possible presence of fuel tanks, fuel dispensers, and storage drums on several portions of the former Truck Manufacturing Plant. Since groundwater monitoring

began in 1989, PCE has been detected in groundwater from both on- and off-site monitoring wells. The highest concentrations of PCE have typically been detected in well MW-6, in the deeper water-bearing zone upgradient from the site, on the former Truck Manufacturing Plant site.

Since 1988, ARCO has conducted several site assessment investigations both on and off site to delineate the lateral and vertical extent of gasoline-impacted soils and groundwater at the site. A total of six on- and off-site groundwater monitoring wells (MW-1, MW-3 through MW-6, and MW-8) and one recovery well (RW-1) screened in the deeper water-bearing zone were installed to evaluate the groundwater flow direction of the deeper water-bearing zone, and to determine the lateral and vertical extent of petroleum-hydrocarbon-impacted soils and groundwater at the site. Wells MW-2 and MW-7 were installed on and off site to evaluate groundwater quality in the shallow water-bearing zone. Wells MW-1 through MW-8, WGR-3, and RW-1 are monitored quarterly.

On- and Off-Site Soil-Vapor Extraction Systems

ARCO installed twenty six 3/4-inch galvanized steel probes off site at the former Truck Manufacturing Plant, to remediate soils impacted by gasoline above the shallow water-bearing zone. The probes and well WGR-3 were connected via subsurface piping to a remediation compound on the ARCO site. This SVE well configuration was operated by EVAX Technologies (EVAX) from September 6, 1990, to March 21, 1991. The EVAX treatment system consisted of a propane-fired internal combustion (IC) engine. Pacific Environmental Group (PEG) replaced the IC engine with a 500 standard cubic foot per minute (scfm) gas-fired Anguil catalytic oxidizer (Cat-ox) and operated the off-site SVE system from June 12, 1991, to August 25, 1992.

A second phase of SVE construction was completed at the ARCO site in July 1992. A total of seven on-site SVE wells (VW-1 through VW-7) was installed and used, along with on-site well MW-2, to remediate hydrocarbon-impacted vadose-zone and capillary-fringe soils in the shallow water-bearing zone on site. Hydrocarbon vapor extracted from these wells is drawn by a 1.5-horsepower (hp) regenerative blower through subsurface remediation piping to the existing Cat-ox in the on-site remediation compound. The on-site SVE system was operated by PEG from August 25 to October 5, 1992. RESNA Industries, Inc. (RESNA, formerly Applied Geosystems), operated the SVE system from October 6, 1992, to May 1994. Operation of the SVE system is regulated under Bay Area Air Quality Management District (BAAQMD) Permit to Operate No. 5998. In December 1993, the SVE system was shut down because of low hydrocarbon concentrations in extracted vapor from the wells. The system was pulsed during first quarter 1994. After the site was transferred from RESNA to EMCON in October 1994, EMCON restarted the system in December 1994.

MONITORING PROGRAM FIELD PROCEDURES

EMCON performed the third quarter 1995 groundwater monitoring event on August 29, 1995. Field work this quarter included (1) measuring depths to groundwater and subjectively analyzing groundwater for the presence of floating product in wells MW-1 through MW-8, RW-1, and WGR-3, (2) purging and subsequently sampling groundwater monitoring wells MW-1 through MW-8, RW-1, and WGR-3 for laboratory analysis, and (3) directing a state-certified laboratory to analyze the groundwater samples. Copies of all field data sheets from the third quarter 1995 groundwater monitoring event are included in Appendix A.

MONITORING PROGRAM RESULTS

Results of the third quarter 1995 groundwater monitoring event are summarized in Table 1 and illustrated in Figure 2. Concentrations of PCE in groundwater are illustrated in Figure 3. Historical groundwater elevation data, including top-of-casing elevations, depth-to-water measurements, calculated groundwater elevations, floating-product thickness measurements, and groundwater flow direction and gradient data, are summarized in Table 2. Table 3 summarizes historical laboratory data for analysis of petroleum hydrocarbons and their constituents. Table 4 summarizes historical laboratory data for analysis of metals. Historical laboratory data for VOC analyses are summarized in Table 5. Table 6 summarizes historical floating-product recovery data for wells MW-2 and MW-7. Copies of the third quarter 1995 analytical results and chain-of-custody documentation are included in Appendix B.

Groundwater elevation data collected on August 29, 1995, were used in calculating groundwater elevations for third quarter 1995. Consistent with previous quarters, EMCON used groundwater elevation data from wells MW-1, MW-3, and MW-8 to determine the local groundwater flow direction and gradient. Based on these data, EMCON believes the small variance in groundwater elevations observed across the site results in a relatively flat hydraulic gradient, which may be superimposed upon by regional groundwater flow patterns. Figure 2 illustrates groundwater elevations and TPHG and benzene analytical data for third quarter 1995.

Groundwater samples from the deeper water-bearing zone wells, MW-1, MW-3 through MW-6, MW-8, RW-1, and off-site well WGR-3, did not contain detectable concentrations of TPHG or benzene. Method reporting limits for TPHG and benzene were 50 µg/L and 0.5 µg/L, respectively; in wells MW-1 and MW-3 through MW-6, and RW-1, detection limits were raised because of the presence of PCE in the samples.

Groundwater samples from wells MW-2 and MW-7, screened in the shallow water-bearing zone, contained 4,500 and 86,000 µg/L TPHG, respectively, and 170 and

380 µg/L benzene, respectively. The low concentrations of benzene reported for these wells, as compared to their respective TPHG concentrations, indicate the lighter-end constituents of gasoline are being removed through vapor extraction, volatilization, or natural degradation.

Groundwater samples from wells MW-8 and WGR-3, screened in the deeper water-bearing zone, did not contain detectable concentrations of VOCs (Table 5). Samples from wells MW-1, MW-3 through MW-6, and RW-1, screened in the deeper water-bearing zone, contained concentrations of PCE from 130 to 2,900 µg/L (Figure 3). Samples from wells MW-2 and MW-7, screened in the shallow water-bearing zone, did not contain detectable concentrations of chlorinated VOCs including PCE.

A total of 18.54 gallons of floating product has been recovered from wells MW-2 and MW-7 since 1991 (Table 6). No floating product has been recovered since 1992.

REMEDIAL PERFORMANCE EVALUATION - SVE SYSTEM

EMCON restarted the on-site SVE system on December 22, 1994. System operation and performance data since restart of the system in December 1994 are detailed in Tables 7 and 8. Please refer to *Fourth Quarter 1994 Groundwater Monitoring Results and Remediation System Performance Evaluation Report* (EMCON, March 1995) for operation and performance data for the on- and off-site SVE systems between September 1990 and May 1994.

The SVE system operated for a total of 17.9 days during the 87-day reporting period (20.6 percent operational) from July 10 to October 10, 1995. Because of a problem with the fresh-air-dilution valve which needed replacement, the SVE system remained shut down until August 1, 1995. The system was shut down for the remainder of the quarter on August 22, 1995, because petroleum hydrocarbon concentrations in extracted vapor influent to the system continued to remain below 100 parts per million by volume (ppmv) (low hydrocarbon removal rates).

Based on the information provided by EVAX, PEG, and RESNA, approximately 7,666 pounds (1,236 gallons) of petroleum hydrocarbons were removed by the on- and off-site SVE systems from September 1990 to December 22, 1994. Approximately 45 pounds (or 7.3 gallons) of hydrocarbons were recovered by SVE system operation during this 87-day period. A total of approximately 7,759 pounds (or 1,252 gallons) of hydrocarbons has been recovered from the site since system startup in September 1990. The calculations and assumptions for estimating hydrocarbon removal rates for the SVE system are shown in Table 7. Table 9 summarizes the operational status of the individual vapor extraction wells during third quarter 1995.

Copies of the analytical results and chain-of-custody records for air samples collected during this reporting period are enclosed in Appendix C. Copies of all original operation and maintenance field data sheets generated during third quarter 1995 are provided in Appendix D.

LIMITATIONS

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

SITE STATUS UPDATE

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

Third Quarter 1995 Activities

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

Work Anticipated for Fourth Quarter 1995

- Prepare and submit quarterly groundwater monitoring results and SVE system performance evaluation report for third quarter 1995.
- Perform quarterly groundwater monitoring for fourth quarter 1995.
- Continue with on- and off-site SVE remediation. The SVE system will be pulsed on and off to maximize hydrocarbon removal rates.

Please call if you have questions.

Sincerely,

EMCON

David Larsen
Project Coordinator

Lalli 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, Third Quarter 1995
- Table 2 - Historical Groundwater Elevation Data
- Table 3 - Historical Groundwater Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 4 - Historical Groundwater Analytical Data, Metals
- Table 5 - Historical Groundwater Analytical Data, Volatile Organic Compounds
- Table 6 - Approximate Cumulative Floating Product Recovered
- Table 7 - Soil-Vapor Extraction System Operation and Performance Data
- Table 8 - Field Vapor Monitoring Results and Destruction Efficiency
- Table 9 - Soil-Vapor Extraction Well Data
- Figure 1 - Site Location
- Figure 2 - Groundwater Data, Third Quarter 1995
- Figure 3 - Tetrachloroethene (PCE) Concentrations in Groundwater, Third Quarter 1995
- Appendix A - Field Data Sheets, Third Quarter 1995 Groundwater Monitoring Event
- Appendix B - Analytical Results and Chain-of-Custody Documentation, Groundwater Monitoring, Third Quarter 1995
- Appendix C - Analytical Results and Chain-of-Custody Documentation for SVE System Air Samples, Third Quarter 1995
- Appendix D - Operation and Maintenance Field Data Sheets for On-Site SVE System, Third Quarter 1995

cc: Barney Chan, ACHCSA
Kevin Graves, RWQCB-SFBR
Richard Gilcrease, Drake Builders
Beth Dorris, ARCO Legal Department
John Young, EMCON

Table 1
Groundwater Monitoring Data
Third Quarter 1995

10600 and 10700 MacArthur Boulevard
Oakland, California

Date. 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	08-29-95	55.92	28.44	27.48	ND	FG	FG	08-29-95	<60*	<0.5	<0 5	<0.5	<0.5	--	<1	--	--
MW-2	08-29-95	55.10	17.14	37.96	ND	FG	FG	08-29-95	4500	170	20	150	330	--	71	--	--
MW-3	08-29-95	56.55	29.15	27.40	ND	FG	FG	08-29-95	<700*	<0.5	<0.5	<0 5	<0.5	--	<20	--	--
MW-4	08-29-95	55 98	28.56	27.42	ND	FG	FG	08-29-95	<1100*	<1**	<1**	<1**	<1**	--	<20	--	--
MW-5	08-29-95	55 43	28.21	27 22	ND	FG	FG	08-29-95	<120*	<0.5	<0.5	<0.5	<0.5	--	<5	--	--
MW-6	08-29-95	61 21	34.03	27.18	ND	FG	FG	08-29-95	<600*	<0 5	<0.5	<0.5	<0.5	--	<20	--	--
MW-7	08-29-95	58.22	21 70	36.52	ND	FG	FG	08-29-95	86000	380	260	1100	5000	--	<10	--	--
MW-8	08-29-95	53.65	26 44	27.21	ND	FG	FG	08-29-95	<50	<0 5	<0.5	<0 5	<0.5	--	3	--	--
RW-1	08-29-95	56.32	28 98	27.34	ND	FG	FG	08-29-95	<200*	<0.5	<0.5	<0 5	<0 5	--	<5	--	--
WGR-3	08-29-95	NR	21.41	NR	ND	NR	NR	08-29-95	<50	<0.5	<0.5	<0.5	<0.5	--	10	--	--

ft-MSL: elevation in feet, relative to mean sea level
MWN· ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United Statest Environmental Protection Agency
MTBE: methyl-tert-butyl ether
TRPH: total recoverable petroleum hydrocarbons
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
ND: none detected
FG. flat gradient; the groundwater gradient over the local area was nearly flat
*: raised method reporting limit due to matrix interference; the sample contains a single non-fuel component eluting in the gasoline range and quantitated as gasoline (possibly PCE), and the chromatogram does not match the typical gasoline fingerprint
- - : not analyzed
** raised method reporting limit due to matrix interference requiring sample dilution
NR: not reported; data not available or not measurable

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-1	04-17-89	55 91	33 04	22 87	ND	NR	NR
MW-1	04-24-89	55 91	33.84	22 07	ND	NR	NR
MW-1	10-13-89	55.91	37.19	18.72	ND	NR	NR
MW-1	02-01-90	55.91	36 73	19.18	ND	NR	NR
MW-1	07-31-90	55.91	36.42	19.49	ND	NR	NR
MW-1	08-01-90	55.91	36.41	19.50	ND	NR	NR
MW-1	08-28-90	55.91	36.88	19.03	ND	NR	NR
MW-1	10-30-90	55.91	37.73	18 18	ND	NR	NR
MW-1	11-20-90	55 91	37.92	17 99	ND	NR	NR
MW-1	12-19-90	55 91	37.90	18.01	ND	NR	NR
MW-1	01-30-91	55.91	38 06	17.85	ND	NR	NR
MW-1	02-27-91	55.91	37.66	18.25	ND	NR	NR
MW-1	03-20-91	55.91	36.77	19.14	ND	NR	NR
MW-1	04-30-91	55.91	34.63	21.28	ND	NR	NR
MW-1	05-31-91	55.91	34.83	21.08	ND	NR	NR
MW-1	07-24-91	55.91	35.96	19.95	ND	NR	NR
MW-1	08-06-91	55 91	36.21	19 70	ND	NR	NR
MW-1	09-03-91	55.91	36 74	19.17	ND	NR	NR
MW-1	10-17-91	55.91	37 57	18.34	ND	NR	NR
MW-1	11-05-91	55.91	37.65	18.26	ND	NR	NR
MW-1	12-24-91	55.91	38.14	17.77	ND	NR	NR
MW-1	01-19-92	55.91	37.62	18.29	ND	NR	NR
MW-1	02-20-92	55.91	36.23	19.68	ND	NR	NR
MW-1	03-10-92	55 91	34.58	21.33	ND	NR	NR
MW-1	04-20-92	55 91	32.82	23 09	ND	NR	NR
MW-1	05-15-92	55.91	33.17	22.74	ND	NR	NR
MW-1	06-30-92	55.91	34.55	21.36	ND	NR	NR
MW-1	07-15-92	55.91	34 90	21.01	ND	NR	NR
MW-1	08-25-92	55.92	35 34	20.58	ND	NR	NR
MW-1	09-09-92	55.92	35 71	20.21	ND	NR	NR
MW-1	10-31-92	55.92	36.62	19.30	ND	NR	NR
MW-1	11-20-92	55.92	36.90	19.02	ND	NR	NR
MW-1	12-16-92	55.92	36.18	19.74	ND	NR	NR
MW-1	01-22-93	55 92	32.24	23.68	ND	NR	NR
MW-1	02-12-93	55.92	30.65	25.27	ND	NR	NR
MW-1	03-26-93	55.92	28.36	27.56	ND	NR	NR
MW-1	04-30-93	55 92	28.45	27 47	ND	NR	NR
MW-1	05-12-93	55.92	28.88	27.04	ND	NR	NR
MW-1	06-17-93	55.92	29 67	26.25	ND	NR	NR
MW-1	08-18-93	55.92	31.44	24.48	ND	NR	NR
MW-1	11-10-93	55.92	33.33	22.59	ND	NR	NR
MW-1	02-04-94	55.92	24.48	31.44	ND	NR	NR
MW-1	05-02-94	55.92	31.66	24.26	ND	NR	NR
MW-1	08-03-94	55 92	32.54	23.38	ND	SW	0.002
MW-1	12-06-94	55.92	31.89	24 03	ND	W	0.001
MW-1	03-10-95	55.92	26.26	29 66	ND	NNE	0.003
MW-1	06-05-95	55.92	25.71	30.21	ND	FG	FG
MW-1	08-29-95	55.92	28 44	27.48	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date. 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-2	04-17-89	55.35	17 20	38.15	ND	NR	NR
MW-2	04-24-89	55 35	17.83	37 52	ND	NR	NR
MW-2	10-13-89	55 35	^20.15	^35 20	0.03	NR	NR
MW-2	02-01-90	55.35	NR	NR	NR	NR	NR
MW-2	07-31-90	55.35	18 90	36.45	ND	NR	NR
MW-2	08-01-90	55.35	^18.23	^37.03	1.04	NR	NR
MW-2	08-28-90	55.35	^21.25	^34.10	0.83	NR	NR
MW-2	10-30-90	55 35	^24.21	^31.14	1.04	NR	NR
MW-2	11-20-90	55.35	^25.08	^30 27	0.60	NR	NR
MW-2	12-19-90	55.35	^18.23	^37.12	ND	NR	NR
MW-2	01-30-91	55.35	^19.47	^35.88	0.03	NR	NR
MW-2	02-27-91	55.35	^18.84	^36.51	0.02	NR	NR
MW-2	03-20-91	55.35	^16.02	^39.33	0.01	NR	NR
MW-2	04-30-91	55.35	16.55	38.80	Sheen	NR	NR
MW-2	05-31-91	55.35	^18.41	^36.94	0.01	NR	NR
MW-2	07-24-91	55.35	19.81	35.54	Sheen	NR	NR
MW-2	08-06-91	55.35	^20.59	^34.76	0.14	NR	NR
MW-2	09-03-91	55.35	^23.23	^32 12	0.54	NR	NR
MW-2	10-17-91	55.35	^24 81	^30.54	0.20	NR	NR
MW-2	11-05-91	55.35	^18.88	^36.47	0.01	NR	NR
MW-2	12-24-91	55 35	^19.34	^36.01	0 09	NR	NR
MW-2	01-19-92	55.35	18 00	37 35	Sheen	NR	NR
MW-2	02-20-92	55.35	14.81	40.54	Skimmer	NR	NR
MW-2	03-10-92	55.35	14.95	40.40	Skimmer	NR	NR
MW-2	04-20-92	55.35	16.13	39.22	ND	NR	NR
MW-2	05-15-92	55 35	17.66	37.69	ND	NR	NR
MW-2	06-30-92	55.35	19.11	36.24	Sheen	NR	NR
MW-2	07-15-92	55.35	19.50	35.85	ND	NR	NR
MW-2	08-25-92	55.10	^21.35	^33.73	0.05	NR	NR
MW-2	09-09-92	55.10	^22 70	^32.40	0.05	NR	NR
MW-2	10-31-92	55.10	22.34	32.76	ND	NR	NR
MW-2	11-20-92	55.10	^19.85	^32.25	0.02^^	NR	NR
MW-2	12-16-92	55.10	NR	NR	NR	NR	NR
MW-2	01-22-93	55.10	13.10	42.00	ND	NR	NR
MW-2	02-12-93	55.10	14.71	40.39	0.05^^	NR	NR
MW-2	03-26-93	55.10 Not surveyed: well was inaccessible					
MW-2	04-30-93	55.10	15.48	39 62	ND	NR	NR
MW-2	05-12-93	55 10	^15.81	^39.29	0.01	NR	NR
MW-2	06-17-93	55.10	18.45	36.65	ND	NR	NR
MW-2	08-18-93	55.10	NR	NR	NR	NR	NR
MW-2	11-10-93	55.10	21.24	33.86	ND^^	NR	NR
MW-2	02-04-94	55.10	16.42	38.68	ND	NR	NR
MW-2	05-02-94	55.10	16.15	38.95	ND	NR	NR
MW-2	08-03-94	55.10 Not surveyed: well was inaccessible due to a parked vehicle					
MW-2	12-06-94	55.10	14.74	40.36	Sheen	W	0.001
MW-2	03-10-95	55.10	13.98	41.12	ND	NNE	0.003
MW-2	06-05-95	55.10	15.65	39.45	ND	FG	FG
MW-2	08-29-95	55.10	17.14	37.96	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-3	04-24-89	56.55	34.47	22.08	ND	NR	NR
MW-3	10-13-89	56.55	37.60	18 95	ND	NR	NR
MW-3	02-01-90	56.55	37.20	19 35	ND	NR	NR
MW-3	07-31-90	56.55	36.90	19.65	ND	NR	NR
MW-3	08-01-90	56.55	36.87	19 68	ND	NR	NR
MW-3	08-28-90	56.55	37.33	19.22	ND	NR	NR
MW-3	10-30-90	56.55	38 15	18.40	ND	NR	NR
MW-3	11-20-90	56.55	38.33	18.22	ND	NR	NR
MW-3	12-19-90	56.55	38.30	18.25	ND	NR	NR
MW-3	01-30-91	56.55	DRY	DRY	ND	NR	NR
MW-3	02-27-91	56.55	38.11	18.44	ND	NR	NR
MW-3	03-20-91	56.55	37.26	19.29	ND	NR	NR
MW-3	04-30-91	56.55	35.02	21.53	ND	NR	NR
MW-3	05-31-91	56 55	35.26	21.29	ND	NR	NR
MW-3	07-24-91	56.55	36.40	20.15	ND	NR	NR
MW-3	08-06-91	56.55	36.66	19.89	ND	NR	NR
MW-3	09-03-91	56.55	37.20	19.35	ND	NR	NR
MW-3	10-17-91	56.55	38.04	18 51	ND	NR	NR
MW-3	11-05-91	56 55	38.08	18.47	ND	NR	NR
MW-3	12-24-91	56.55	DRY	DRY	ND	NR	NR
MW-3	01-19-92	56.55	38.07	18 48	ND	NR	NR
MW-3	02-20-92	56.55	36.71	19 84	ND	NR	NR
MW-3	03-10-92	56.55	34.96	21.59	ND	NR	NR
MW-3	04-20-92	56.55	33.20	23.35	ND	NR	NR
MW-3	05-15-92	56.55	33.70	22.85	ND	NR	NR
MW-3	06-30-92	56.55	34.97	21.58	ND	NR	NR
MW-3	07-15-92	56.55	35.35	21.20	ND	NR	NR
MW-3	08-25-92	56.55	35.94	20.61	ND	NR	NR
MW-3	09-09-92	56.55	36.19	20.36	ND	NR	NR
MW-3	10-31-92	56.55	36.13	20.42	ND	NR	NR
MW-3	11-20-92	56.55	37.40	19.15	ND	NR	NR
MW-3	12-16-92	56.55	36.68	19.87	ND	NR	NR
MW-3	01-22-93	56.55	32.58	23.97	ND	NR	NR
MW-3	02-12-93	56.55	30.86	25.69	ND	NR	NR
MW-3	03-26-93	56.55	28.60	27.95	ND	NR	NR
MW-3	04-30-93	56.55	28.79	27.76	ND	NR	NR
MW-3	05-12-93	56.55	29.17	27.38	ND	NR	NR
MW-3	06-17-93	56.55	30.11	26 44	ND	NR	NR
MW-3	08-18-93	56.55	31 91	24.64	ND	NR	NR
MW-3	11-10-93	56.55	33.80	22.75	ND	NR	NR
MW-3	02-04-94	56.55	33.58	22.97	ND	NR	NR
MW-3	05-02-94	56.55	32 16	24 39	ND	NR	NR
MW-3	08-03-94	56.55	33 09	23 46	ND	SW	0.002
MW-3	12-06-94	56.55	32.46	24.09	ND	W	0.001
MW-3	03-10-95	56.55	26.74	29.81	ND	NNE	0.003
MW-3	06-05-95	56.55	26.34	30.21	ND	FG	FG
MW-3	08-29-95	56.55	29.15	27.40	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date. 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-4	04-17-89	55.94	33.87	22 07	ND	NR	NR
MW-4	04-24-89	55.94	33 76	22.18	ND	NR	NR
MW-4	10-13-89	55.94	37 03	18.91	ND	NR	NR
MW-4	02-01-90	55.94	36 57	19.37	ND	NR	NR
MW-4	07-31-90	55.94	36.39	19 55	ND	NR	NR
MW-4	08-01-90	55.94	36.32	19.62	ND	NR	NR
MW-4	08-28-90	55.94	36.79	19.15	ND	NR	NR
MW-4	10-30-90	55.94	37.62	18.32	ND	NR	NR
MW-4	11-20-90	55.94	37.82	18.12	ND	NR	NR
MW-4	12-19-90	55.94	37.74	18.20	ND	NR	NR
MW-4	01-30-91	55.94	37.97	17.97	ND	NR	NR
MW-4	02-27-91	55.94	37.52	18.42	ND	NR	NR
MW-4	03-20-91	55.94	36.69	19.25	ND	NR	NR
MW-4	04-30-91	55.94	34.48	21.46	ND	NR	NR
MW-4	05-31-91	55.94	34.73	21.21	ND	NR	NR
MW-4	07-24-91	55 94	35.86	20.08	ND	NR	NR
MW-4	08-06-91	55.94	36.15	19.79	ND	NR	NR
MW-4	09-03-91	55.94	36.66	19 28	ND	NR	NR
MW-4	10-17-91	55.94	37.49	18.45	ND	NR	NR
MW-4	11-05-91	55.94	37.54	18.40	ND	NR	NR
MW-4	12-24-91	55.94	38.01	17.93	ND	NR	NR
MW-4	01-19-92	55.94	37.48	18.46	ND	NR	NR
MW-4	02-20-92	55.94	36.11	19.83	ND	NR	NR
MW-4	03-10-92	55.94	34.96	20.98	ND	NR	NR
MW-4	04-20-92	55.94	32.60	23.34	ND	NR	NR
MW-4	05-15-92	55 94	33 12	22.82	ND	NR	NR
MW-4	06-30-92	55.94	34.06	21.88	ND	NR	NR
MW-4	07-15-92	55.94	NR	NR	NR	NR	NR
MW-4	08-25-92	55.98	35.22	20.76	ND	NR	NR
MW-4	09-09-92	55.98	35 63	20.35	ND	NR	NR
MW-4	10-31-92	55.98	33.84	22.14	ND	NR	NR
MW-4	11-20-92	55.98	36.87	19 11	ND	NR	NR
MW-4	12-16-92	55.98	36 09	19 89	ND	NR	NR
MW-4	01-22-93	55.98	31.98	24 00	ND	NR	NR
MW-4	02-12-93	55.98	30.31	25 67	ND	NR	NR
MW-4	03-26-93	55.98	27.97	28.01	ND	NR	NR
MW-4	04-30-93	55.98	28.24	27.74	ND	NR	NR
MW-4	05-12-93	55.98	28.60	27.38	ND	NR	NR
MW-4	06-17-93	55.98	29.54	26.44	ND	NR	NR
MW-4	08-18-93	55.98	31.37	24.61	ND	NR	NR
MW-4	11-10-93	55.98	33.27	22.71	ND	NR	NR
MW-4	02-04-94	55.98	33.07	22.91	ND	NR	NR
MW-4	05-02-94	55.98	31.60	24.38	ND	NR	NR
MW-4	08-03-94	55.98	32.53	23.45	ND	SW	0.002
MW-4	12-06-94	55.98	31.91	24.07	ND	W	0.001
MW-4	03-10-95	55.98	26.22	29.76	ND	NNE	0.003
MW-4	06-05-95	55.98	25.79	30.19	ND	FG	FG
MW-4	08-29-95	55.98	28.56	27.42	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-5	04-17-89	55.43	33.17	22.26	ND	NR	NR
MW-5	04-24-89	55.43	33.06	22.37	ND	NR	NR
MW-5	10-13-89	55.43	36.33	19.10	ND	NR	NR
MW-5	02-01-90	55.43	35.96	19.47	ND	NR	NR
MW-5	07-31-90	55.43	35.70	19.73	ND	NR	NR
MW-5	08-01-90	55.43	35.69	19.74	ND	NR	NR
MW-5	08-28-90	55.43	36.14	19.29	ND	NR	NR
MW-5	10-30-90	55.43	36.94	18 49	ND	NR	NR
MW-5	11-20-90	55 43	37.09	18 34	ND	NR	NR
MW-5	12-19-90	55 43	37.05	18.38	ND	NR	NR
MW-5	01-30-91	55.43	37.26	18.17	ND	NR	NR
MW-5	02-27-91	55.43	36 81	18.62	ND	NR	NR
MW-5	03-20-91	55 43	36.04	19.39	ND	NR	NR
MW-5	04-30-91	55.43	33.75	21.68	ND	NR	NR
MW-5	05-31-91	55.43	34.01	21.42	ND	NR	NR
MW-5	07-24-91	55.43	35.20	20.23	ND	NR	NR
MW-5	08-06-91	55.43	35.48	19.95	ND	NR	NR
MW-5	09-03-91	55.43	36.00	19.43	ND	NR	NR
MW-5	10-17-91	55 43	36.84	18.59	ND	NR	NR
MW-5	11-05-91	55 43	36.86	18.57	ND	NR	NR
MW-5	12-24-91	55 43	37.31	18.12	ND	NR	NR
MW-5	01-19-92	55.43	36.95	18.48	ND	NR	NR
MW-5	02-20-92	55.43	35.39	20 04	ND	NR	NR
MW-5	03-10-92	55.43	33.67	21 76	ND	NR	NR
MW-5	04-20-92	55 43	31.80	23.63	ND	NR	NR
MW-5	05-15-92	55.43	32.37	23.06	ND	NR	NR
MW-5	06-30-92	55.43	34 00	21.43	ND	NR	NR
MW-5	07-15-92	55.43	34 32	21.11	ND	NR	NR
MW-5	08-25-92	55.43	35.76	19.67	ND	NR	NR
MW-5	09-09-92	55.43	34 97	20.46	ND	NR	NR
MW-5	10-31-92	55.43	35.97	19.46	ND	NR	NR
MW-5	11-20-92	55.43	36.26	19.17	ND	NR	NR
MW-5	12-16-92	55.43	35.45	19.98	ND	NR	NR
MW-5	01-22-93	55.43	31.05	24.38	ND	NR	NR
MW-5	02-12-93	55.43	29.42	26.01	ND	NR	NR
MW-5	03-26-93	55 43	27.07	28.36	ND	NR	NR
MW-5	04-30-93	55.43	27.40	28.03	ND	NR	NR
MW-5	05-12-93	55 43	27.83	27.60	ND	NR	NR
MW-5	06-17-93	55.43	28.84	26.59	ND	NR	NR
MW-5	08-18-93	55.43	30.75	24.68	ND	NR	NR
MW-5	11-10-93	55 43	32.70	22.73	ND	NR	NR
MW-5	02-04-94	55.43	32.45	22.98	ND	NR	NR
MW-5	05-02-94	55.43	31.06	24.37	ND	NR	NR
MW-5	08-03-94	55.43	32.05	23.38	ND	SW	0.002
MW-5	12-06-94	55.43	31.44	23.99	ND	W	0.001
MW-5	03-10-95	55.43	25 62	29.81	ND	NNE	0.003
MW-5	06-05-95	55.43	25.30	30.13	ND	FG	FG
MW-5	08-29-95	55.43	28.21	27.22	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date. 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-6	06-30-92	61.21	35.50	25.71	ND	NR	NR
MW-6	07-15-92	61 21	39 89	21.32	ND	NR	NR
MW-6	08-25-92	61 21	34 90	26.31	ND	NR	NR
MW-6	09-09-92	61.21	Not surveyed· well was paved over				
MW-6	10-31-92	61.21	NR	NR	NR	NR	NR
MW-6	11-20-92	61 21	Not surveyed well was paved over				
MW-6	12-16-92	61 21	NR	NR	NR	NR	NR
MW-6	01-22-93	61.21	36.52	24 69	ND	NR	NR
MW-6	02-12-93	61.21	35.65	25.56	ND	NR	NR
MW-6	03-28-93	61.21	33.33	27.88	ND	NR	NR
MW-6	04-30-93	61.21	33.56	27.65	ND	NR	NR
MW-6	05-12-93	61 21	33 95	27 26	ND	NR	NR
MW-6	06-17-93	61.21	34.90	26.31	ND	NR	NR
MW-6	08-18-93	61.21	36.72	24.49	ND	NR	NR
MW-6	11-10-93	61.21	38.64	22.57	ND	NR	NR
MW-6	02-04-94	61.21	38.48	22.73	ND	NR	NR
MW-6	05-02-94	61.21	37.02	24.19	ND	NR	NR
MW-6	08-03-94	61.21	37.97	23.24	ND	SW	0.002
MW-6	12-06-94	61.21	37 33	23.88	ND	W	0 001
MW-6	03-10-95	61.21	31.54	29.67	ND	NNE	0.003
MW-6	06-05-95	61.21	31.15	30.06	ND	FG	FG
MW-6	08-29-95	61.21	34 03	27.18	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-7	06-30-92	58 22	23.70	34 52	ND	NR	NR
MW-7	07-15-92	58.22	23.10	35.12	ND	NR	NR
MW-7	08-25-92	58.22	34.23	23 99	ND	NR	NR
MW-7	09-09-92	58.22	^26.30	^31 92	1.31	NR	NR
MW-7	10-31-92	58.22	35.44	22.78	ND	NR	NR
MW-7	11-20-92	58.22	^23 47	^34.75	0.02	NR	NR
MW-7	12-16-92	58.22	^19 07	^39.15	0.04	NR	NR
MW-7	01-22-93	58.22	^16 56	^41 66	0.02	NR	NR
MW-7	02-12-93	58.22	^18 22	^40 00	0.04	NR	NR
MW-7	03-26-93	58.22	18.04	40.18	ND	NR	NR
MW-7	04-30-93	58.22	19.34	38.88	NR	NR	NR
MW-7	05-12-93	58.22	^19.80	^38.42	0.01	NR	NR
MW-7	06-17-93	58.22	^22.63	^35.59	0.01	NR	NR
MW-7	08-18-93	58.22	22.44	35.78	0.01	NR	NR
MW-7	11-10-93	58.22	24.51	33.71	ND^^	NR	NR
MW-7	02-04-94	58.22	20.78	37.44	ND	NR	NR
MW-7	05-02-94	58.22	20.51	37.71	ND	NR	NR
MW-7	08-03-94	58.22	22.66	35.56	ND	SW	0.002
MW-7	12-06-94	58.22	18.37	## 39.86	0.02	W	0.001
MW-7	03-10-95	58.22	17.69	40.53	ND^^	NNE	0.003
MW-7	06-05-95	58.22	19.68	38.54	ND	FG	FG
MW-7	08-29-95	58.22	21.70	36.52	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-8	08-25-92	53.65	NR	NR	NR	NR	NR
MW-8	09-09-92	53 65	33.20	20.45	ND	NR	NR
MW-8	10-31-92	53.65	37 12	16.53	ND	NR	NR
MW-8	11-24-92	53.65	34.45	19 20	ND	NR	NR
MW-8	12-16-92	53.65	NR	NR	NR	NR	NR
MW-8	01-22-93	53.65	28.59	25.06	ND	NR	NR
MW-8	02-12-93	53.65	27.57	26.08	ND	NR	NR
MW-8	03-26-93	53.65	25 16	28 49	ND	NR	NR
MW-8	04-30-93	53.65	25 50	28.15	ND	NR	NR
MW-8	05-12-93	53.65	25 95	27.70	ND	NR	NR
MW-8	06-17-93	53 65	NR	NR	NR	NR	NR
MW-8	08-18-93	53.65	28.97	24.68	ND	NR	NR
MW-8	11-10-93	53 65	30.96	22.69	ND	NR	NR
MW-8	02-04-94	53.65	30.73	22.92	ND	NR	NR
MW-8	05-02-94	53.65	29 26	24.39	ND	NR	NR
MW-8	08-03-94	53.65	30 33	23 32	ND	SW	0.002
MW-8	12-06-94	53.65	29.66	23 99	ND	W	0 001
MW-8	03-10-95	53.65	23.60	30.05	ND	NNE	0 003
MW-8	06-05-95	53.65	23.48	30.17	ND	FG	FG
MW-8	08-29-95	53.65	26.44	27.21	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
RW-1	11-05-91	56.32	37.89	18.43	ND	NR	NR
RW-1	12-24-91	56.32	38.35	17.97	ND	NR	NR
RW-1	01-19-92	56 32	37.82	18 50	ND	NR	NR
RW-1	02-20-92	56 32	36.42	19.90	ND	NR	NR
RW-1	03-10-92	56.32	34.74	21.58	ND	NR	NR
RW-1	04-20-92	56 32	32.90	23.42	ND	NR	NR
RW-1	05-15-92	56 32	33 43	22 89	ND	NR	NR
RW-1	06-30-92	56.32	34.74	21.58	ND	NR	NR
RW-1	07-15-92	56.32	35.12	21.20	ND	NR	NR
RW-1	08-25-92	56.32	36.75	19.57	ND	NR	NR
RW-1	09-09-92	56.32	35 99	20.33	ND	NR	NR
RW-1	10-31-92	56 32	34 32	22 00	ND	NR	NR
RW-1	11-20-92	56.32	37.11	19.21	ND	NR	NR
RW-1	12-16-92	56.32	36.40	19 92	ND	NR	NR
RW-1	01-22-93	56.32	32.30	24.02	ND	NR	NR
RW-1	02-12-93	56.32	30.64	25.68	ND	NR	NR
RW-1	03-26-93	56.32	28.32	28.00	ND	NR	NR
RW-1	04-30-93	56.32	28.55	27.77	ND	NR	NR
RW-1	05-12-93	56.32	28.94	27.38	ND	NR	NR
RW-1	06-17-93	56.32	29.89	26.43	ND	NR	NR
RW-1	08-18-93	56.32	31.74	24.58	ND	NR	NR
RW-1	11-10-93	56.32	33.61	22.71	ND	NR	NR
RW-1	02-04-94	56.32	33.43	22.89	ND	NR	NR
RW-1	05-02-94	56.32	31.96	24.36	ND	NR	NR
RW-1	08-03-94	56.32	32.90	23.42	ND	SW	0.002
RW-1	12-06-94	56.32	32.24	24.08	ND	W	0.001
RW-1	03-10-95	56.32	26.48	29.84	Sheen	NNE	0.003
RW-1	06-05-95	56.32	26.20	30.12	ND	FG	FG
RW-1	08-29-95	56.32	28.98	27.34	ND	FG	FG

Table 2
Historical Groundwater Elevation Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
WGR-3	05-02-94	NR	20.06	NR	ND	NR	NR
WGR-3	08-03-94	NR	22.30	NR	ND	NR	NR
WGR-3	12-06-94	NR	17.52	NR	ND	NR	NR
WGR-3	03-10-95	NR	15.20	NR	ND	NR	NR
WGR-3	06-05-95	NR	19.25	NR	ND	NR	NR
WGR-3	08-29-95	NR	21.41	NR	ND	NR	NR

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 or not measurable
SW: southwest
W: west
NNE: north-northeast
FG: flat gradient; the groundwater gradient over the local area was nearly flat
^: Depth to water (DTW) and groundwater elevation (GWE) were adjusted as follows: The thickness of the floating product (FPT) and the depth to water were recorded. The recorded thickness of floating product was then multiplied by 0.80 to obtain an approximate value for the displacement of water by the floating product. The approximate displacement value was then subtracted from the measured depth to water to obtain a calculated depth to water (potentiometric surface) GWE = TOC - [DTW - (FPT x 0.8)]
^^: floating product entered the well during purging
DRY: dry well; groundwater was not detected
##. corrected elevation (Z'), such that: Z' = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	04-24-89	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	10-13-89	<20	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	02-01-90	91#	<0.3	<0.3	<0.3	0.36	--	--	--	--
MW-1	07-31-90	<20	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	10-30-90	<50	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-1	01-30-91	<50	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-1	04-30-91	<30	<0 3	<0 3	<0.3	<0 3	--	--	--	--
MW-1	08-06-91	<30	<0.3	<0 3	<0 3	<0.3	--	--	--	--
MW-1	11-05-91	<30	<0 3	<0.3	<0.3	<0 3	--	--	--	--
MW-1	03-10-92	<50	<0 5	<0.5	<0.5	<0 5	--	--	--	--
MW-1	06-30-92	<50	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-1	09-09-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	11-20-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	02-12-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	05-12-93	<100*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	08-18-93	<51*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	11-10-93	<50	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-1	02-04-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-1	05-02-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-1	08-03-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-1	12-06-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-1	03-10-95	<57*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-1	06-05-95	<84*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-1	08-29-95	<60*	<0.5	<0.5	<0.5	<0.5	--	<1	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-2	04-24-89	165000	13000	21000	2100	12700	--	--	--	--
MW-2	10-13-89	Not sampled: well contained floating product								
MW-2	02-01-90	Not sampled. well contained floating product								
MW-2	07-31-90	240000	14000	24000	3000	17000	--	--	--	--
MW-2	10-30-90	Not sampled. well contained floating product								
MW-2	01-30-91	Not sampled well contained floating product								
MW-2	04-30-91	Not sampled: well contained floating product								
MW-2	08-06-91	Not sampled: well contained floating product								
MW-2	11-05-91	Not sampled: well contained floating product								
MW-2	03-10-92	220000	8200	13000	4500	22000	--	--	--	--
MW-2	06-30-92	130000	10000	16000	4700	24000	--	--	--	--
MW-2	09-09-92	Not sampled: well contained floating product								
MW-2	11-20-92	Not sampled. well contained floating product								
MW-2	02-12-93	Not sampled. well contained floating product								
MW-2	05-12-93	Not sampled well contained floating product								
MW-2	08-18-93	Not sampled:								
MW-2	11-10-93	Not sampled: floating product entered well during purging								
MW-2	02-04-94	2100	110	5.6	26	110	--	--	--	--
MW-2	05-02-94	3400	130	21	73	180	--	--	--	--
MW-2	08-03-94	Not sampled: well was inaccessible due to a parked vehicle								
MW-2	12-07-94	26000	570	43	220	1100	--	--	--	--
MW-2	03-11-95	2800	88	12	16	200	--	--	--	--
MW-2	06-05-95	1800	59	10	53	130	--	--	--	--
MW-2	08-29-95	4500	170	20	150	330	--	71	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

10600 and 10700 MacArthur Boulevard
Oakland, California

Date. 12-08-95

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-3	04-24-89	560#	0.54	0.75	<0.5	<0.5	--	--	--	--
MW-3	10-12-89	450#	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	02-01-90	360#	<0.3	<0.3	<0.3	0.85	--	--	--	--
MW-3	08-01-90	440#	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-3	10-30-90	340#	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	01-30-91	Not sampled: dry well								
MW-3	04-30-91	Not sampled: well was inaccessible due to construction								
MW-3	08-06-91	430#	<0.3	<0 3	<0.3	<0.3	--	--	--	--
MW-3	11-05-91	290#	<1.5	<1.5	<1.5	<1.5	--	--	--	--
MW-3	03-10-92	<360*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-3	06-30-92	<530*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	09-09-92	<290*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	11-20-92	<270*	<0.5	<0.5	<2.4**	<1.8**	--	--	--	--
MW-3	02-12-93	<500*	<0.5	<0.5	<0.5	<0 5	--	--	--	--
MW-3	05-12-93	<670*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	08-18-93	<590*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-3	11-10-93	<400*	<0 5	<0.5	<0.5	<0 9**	--	--	--	--
MW-3	02-04-94	<190*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	05-02-94	<480*	<0.5	<0 5	<0.5	<0.9**	--	--	--	--
MW-3	08-03-94	<250*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	12-06-94	<380*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	03-11-95	<440*	<0.5	<0.5	<0.5	0.7	--	--	--	--
MW-3	06-05-95	<970*	<1**	<1**	1.1	1.8	--	--	--	--
MW-3	08-29-95	<700*	<0.5	<0.5	<0.5	<0.5	--	<20	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

10600 and 10700 MacArthur Boulevard
Oakland, California

Date. 12-08-95

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-4	04-24-89	2500#	270	1 4	<0.5	85	--	--	--	--
MW-4	10-13-89	760#	0.86	<0.5	1.2	<0.5	--	--	--	--
MW-4	02-01-90	680#	<0.3	<0.3	<0.3	1.6	--	--	--	--
MW-4	07-31-90	470#	<0.5	<0.5	<0 5	<0.5	--	--	<500	240
MW-4	10-30-90	430#	<0 5	<0.5	<0 5	<0.5	--	--	<500	<100
MW-4	01-30-91	<50	<0.5	<0.5	1 2	<0.5	--	--	<500	<100
MW-4	04-30-91	600#	<0.3	0.3	<0 3	0.43	--	--	--	--
MW-4	08-06-91	520#	<0 3	<0.3	<0.3	<0.3	--	--	--	--
MW-4	11-05-91	900#	<3.0***	<3 0***	<3.0***	<3 0***	--	--	--	--
MW-4	03-10-92	<730*	<0.5	<0.5	<0.5	<0 5	--	--	<2500	--
MW-4	06-30-92	<670*	<0.5	<0.5	<2.3**	500	--	--	500	--
MW-4	09-09-92	<470*	<0.5	<0 5	<0.5	<0.5	--	--	3600	--
MW-4	11-20-92	<680*	<0.5	<0 5	<6.3**	<3 2**	--	--	800	--
MW-4	02-12-93	<860*	<0.5	<0.5	<0.5	<0.5	--	--	25000	--
MW-4	05-12-93	<670*	<0.5	<0.5	<1.4**	<1.3**	--	--	120000	--
MW-4	08-18-93	<700*	<0.5	<0.5	<0.5	<0.5	--	--	<500	--
MW-4	11-10-93	<460*	<0.5	<0.5	<0.5	<1.3**	--	--	<500	--
MW-4	02-04-94	<480*	<0.5	<0.5	<0.5	1.4	--	--	<500	--
MW-4	05-02-94	<490*	<0 5	<0.5	<0 5	<0.9**	--	--	5900	--
MW-4	08-03-94	<400*	<0 5	<0.5	<0 5	<0.5	--	--	<500	--
MW-4	12-06-94	<970*	<2.5**	<2 5**	<2.5**	<2 5**	--	--	1800	--
MW-4	03-11-95	<780*	<1.0**	<1.0**	<1.0**	1	--	--	<500	--
MW-4	06-05-95	<1200*	<1**	<1**	<1**	<1**	--	--	600	--
MW-4	08-29-95	<1100*	<1**	<1**	<1**	<1**	--	<20	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 12-08-95

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-5	04-24-89	130#	0.67	<0.5	<0.5	<0.5	--	--	--	--
MW-5	10-13-89	75#	<0.5	<0 5	<0.5	<0.5	--	--	--	--
MW-5	02-01-90	81#	0.94	0 88	<0.3	1.8	--	--	--	--
MW-5	07-31-90	110#	<0 5	<0.5	<0 5	<0.5	--	--	--	--
MW-5	10-30-90	<50	<0 5	<0.5	<0 5	<0.5	--	--	--	--
MW-5	01-30-91	<50	<0.5	<0.5	<0 5	<0 5	--	--	--	--
MW-5	04-30-91	120#	<0 3	<0.3	<0.3	<0 3	--	--	--	--
MW-5	08-06-91	<30	<0 3	<0.3	<0.3	<0 3	--	--	--	--
MW-5	11-05-91	77#	1	3.6	0.6	2.6	--	--	--	--
MW-5	03-10-92	<110*	<0.5	<0 5	<0.5	<0.6**	--	--	--	--
MW-5	06-30-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	09-09-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	11-24-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	02-12-93	<150*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	05-12-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	08-18-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	11-10-93	<50	<0.5	<0.5	<0.5	<1.4**	--	--	--	--
MW-5	02-04-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	05-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	08-03-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	12-06-94	<550*	<0.5	0.6	1.1	2	--	--	--	--
MW-5	03-10-95	<110*	<0.5	<0 5	<0.5	<0.5	--	--	--	--
MW-5	06-05-95	<130*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-5	08-29-95	<120*	<0.5	<0.5	<0.5	<0.5	--	<5	--	--
MW-6	06-30-92	<850*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-6	09-09-92	Not sampled: well was paved over								
MW-6	11-20-92	Not sampled: well was paved over								
MW-6	02-12-93	<1900*	<2.5***	<2 5***	<2 5***	<2.5***	--	--	--	--
MW-6	05-12-93	<1600*	<2.5***	<2 5***	<2.5***	<2 5***	--	--	--	--
MW-6	08-18-93	<1500*	<2.5***	<2.5***	<2.5***	<2.5***	--	--	--	--
MW-6	11-10-93	<1000*	<2.5***	<2.5***	<2.5***	<2.5***	--	--	--	--
MW-6	02-04-94	<830*	<2.5***	<2.5***	<2.5***	3.1	--	--	--	--
MW-6	05-02-94	<860*	<1***	<1***	<1***	1.3	--	--	--	--
MW-6	08-03-94	<660*	<1***	<1***	<1***	<1***	--	--	--	--
MW-6	12-07-94	<720*	<1**	<1**	<1**	<1**	--	--	--	--
MW-6	03-11-95	<390*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-6	06-05-95	<750*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-6	08-29-95	<600*	<0.5	<0.5	<0.5	<0.5	--	<20	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-7	06-30-92	71000	5100	6600	2300	14000	--	--	--	--
MW-7	09-09-92	Not sampled: well contained floating product								
MW-7	11-20-92	Not sampled: well contained floating product								
MW-7	02-12-93	Not sampled. well contained floating product								
MW-7	05-12-93	Not sampled well contained floating product								
MW-7	08-18-93	Not sampled: well contained floating product								
MW-7	11-10-93	Not sampled: floating product entered the well during purging								
MW-7	02-04-94	40000	900	980	1100	9700	--	--	--	--
MW-7	05-02-94	38000	640	600	930	7200	--	--	--	--
MW-7	08-03-94	47000	1000	1200	1500	10000	--	--	--	--
MW-7	12-07-94	260000	<200***	380	2200	11000	--	--	--	--
MW-7	03-11-95	Not sampled. floating product entered the well during purging								
MW-7	06-05-95	36000	90	51	450	2000	--	--	--	--
MW-7	08-29-95	86000	380	260	1100	5000	--	<10	--	--
MW-8	09-09-92	<50	3.4	<0 5	<0.5	0 7	--	--	--	--
MW-8	11-24-92	<50	<0.5	<0 5	<0.5	<0.5	--	--	--	--
MW-8	02-12-93	<50	<0 5	<0.5	<0 5	<0.5	--	--	--	--
MW-8	05-12-93	<50	<0.5	<0 5	<0.5	<0.5	--	--	--	--
MW-8	08-18-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	11-10-93	<50	<0.5	<0.5	<0.5	1.1	--	--	--	--
MW-8	02-04-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	05-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	08-03-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	12-07-94	<50	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-8	03-10-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	06-05-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	08-29-95	<50	<0.5	<0.5	<0.5	<0.5	--	3	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
RW-1	11-05-91	750#	4.8	3.7	<3 0	<3.0	--	--	--	--
RW-1	03-10-92	<140*	<0.5	<0.5	<0.5	<0 6**	--	--	--	--
RW-1	06-30-92	<400*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
RW-1	09-09-92	<520*	<0 5	<0.5	<0 5	<0.5	--	--	--	--
RW-1	11-24-92	<650*	<0.5	<0.5	<8.6**	<7.2**	--	--	--	--
RW-1	02-12-93	<260*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
RW-1	05-12-93	<240*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
RW-1	08-18-93	<230*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
RW-1	11-10-93	<380*	<0.5	<0.5	<0.5	<0.8**	--	--	--	--
RW-1	02-04-94	<540*	<0.5	<0.5	<0 5	<1.5**	--	--	--	--
RW-1	05-02-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--	--
RW-1	08-03-94	<140*	<0 5	<0.5	<0.5	<0.5	--	--	--	--
RW-1	12-07-94	<79*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
RW-1	03-10-95	<180*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
RW-1	06-05-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
RW-1	08-29-95	<200*	<0.5	<0.5	<0.5	<0.5	--	<5	--	--
WGR-3	05-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
WGR-3	08-03-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
WGR-3	12-07-94	<50	<0.5	<0 5	<0.5	0.6	--	--	--	--
WGR-3	03-11-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
WGR-3	06-05-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
WGR-3	08-29-95	<50	<0.5	<0.5	<0.5	<0.5	--	10	--	--

TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United Statest Environmental Protection Agency
MTBE: Methyl-tert-butyl ether
TRPH: total recoverable petroleum hydrocarbons
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
- - : not analyzed
based on new results, the chromatogram peaks previously interpreted to be TPHG and BTEX have been reinterpreted to be a single peak hydrocarbon (possibly PCE)
*: raised method reporting limit due to matrix interference; the sample contains a single non-fuel component eluting in the gasoline range and quantitated as gasoline (possibly PCE), and the chromatogram does not match the typical gasoline fingerprint
**: raised method reporting limit due to matrix interference requiring sample dilution
***: raised method reporting limit due to high analyte concentration requiring sample dilution

Table 4
Historical Groundwater Analytical Data
Metals

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample FieldDate	Cadmium EPA 6010 µg/L	Chromium EPA 6010 µg/L	Lead EPA 7421 µg/L	Nickel EPA 6010 µg/L	Zinc EPA 6010 µg/L
MW-1	04-24-89	Sampling for additional parameters was not initiated				
MW-2	04-24-89	Sampling for additional parameters was not initiated				
MW-3	04-24-89	Sampling for additional parameters was not initiated				
MW-4	04-24-89	--	--	--	--	--
MW-4	10-13-89	--	--	--	--	--
MW-4	02-01-90	--	--	--	--	--
MW-4	07-31-90	--	--	--	--	--
MW-4	10-30-90	--	--	--	--	--
MW-4	01-30-91	--	--	--	--	--
MW-4	04-30-91	--	--	--	--	--
MW-4	08-06-91	<10	65	6.7	140	96
MW-4	11-05-91	Sampling for additional parameters was discontinued				
MW-5	04-24-89	Sampling for additional parameters was not initiated				
MW-6	06-30-92	Sampling for additional parameters was not initiated				
MW-7	06-30-92	Sampling for additional parameters was not initiated				
MW-8	09-09-92	Sampling for additional parameters was not initiated				
RW-1	11-05-91	Sampling for additional parameters was not initiated				
WGR-3	05-02-94	Sampling for additional parameters was not initiated				

EPA: United Statest Environmental Protection Agency
µg/L: micrograms per liter
- - : not analyzed

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	09-03-91	4.5	ND	ND	ND	--	ND	ND	ND	ND
MW-1	11-06-91	<2.0	<2.0	<2.0	<2.0	--	ND	ND	ND	ND
MW-1	03-10-92	8.2	ND	ND	ND	--	ND	ND	ND	ND
MW-1	06-30-92	15	ND	ND	ND	--	ND	ND	ND	ND
MW-1	09-09-92	6	ND	ND	ND	--	ND	ND	ND	ND
MW-1	11-20-92	2	ND	ND	ND	--	ND	ND	ND	ND
MW-1	02-12-93	92	ND	ND	ND	--	ND	ND	ND	ND
MW-1	05-12-93	280	ND	ND	ND	--	ND	ND	ND	ND
MW-1	08-18-93	120	ND	ND	ND	--	ND	ND	ND	ND
MW-1	11-10-93	46	ND	ND	ND	--	ND	ND	ND	ND
MW-1	02-04-94	22	<1	<1	<1	--	<1	<1	<1	<5
MW-1	05-02-94	35	<1	<1	<1	--	<1	<1	<1	<5
MW-1	08-03-94	14	<1	--	<1	--	<1	<1	<1	<5
MW-1	12-06-94	17	<1	--	<1	--	<1	<1	<1	<5
MW-1	03-10-95	170	<1	--	<1	--	<1	<1	<1	<5
MW-1	06-05-95	210	<5	--	<5	--	<5	<5	<5	<25
MW-1	08-29-95	130	<1	--	<1	--	<1	<1	<1	<5

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-2	09-03-91	Not sampled: well contained floating product								
MW-2	11-06-91	Not sampled: well contained floating product								
MW-2	03-10-92	0 9	ND	5.4	ND	--	ND	ND	ND	ND
MW-2	06-30-92	<2000	<2000	<2000	<2000	--	9300	18000	4200	27000
MW-2	09-09-92	Not sampled· well contained floating product								
MW-2	11-20-92	Not sampled· well contained floating product								
MW-2	02-12-93	Not sampled· well contained floating product								
MW-2	05-12-93	Not sampled. well contained floating product								
MW-2	08-18-93	Not sampled:								
MW-2	11-10-93	Not sampled floating product entered the well during purging								
MW-2	02-04-94	<1	<1	<1	<1	--	170	9	36	160
MW-2	05-02-94	<1	<1	<1	<1	--	140	21	79	190
MW-2	08-03-94	Not sampled: well was inaccessible due to a parked car								
MW-2	12-06-94	<5	<5	--	<5	--	620	28	220	1200
MW-2	03-11-95	<1	<1	--	<1	--	110	12	15	240
MW-2	06-05-95	<1	<1	--	<1	--	83	14	72	190
MW-2	08-29-95	<5	<5	--	<5	--	220	26	210	450

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-3	09-03-91	1600	ND	ND	ND	--	ND	ND	ND	ND
MW-3	11-06-91	400	ND	ND	ND	--	ND	ND	ND	ND
MW-3	03-10-92	980	5.6	ND	1	3.4	ND	ND	ND	ND
MW-3	06-30-92	1500	ND	ND	ND	--	ND	ND	ND	ND
MW-3	09-09-92	800	ND	ND	ND	--	ND	ND	ND	ND
MW-3	11-20-92	690	ND	ND	ND	--	ND	ND	ND	ND
MW-3	02-12-93	1200	ND	ND	ND	--	ND	ND	ND	ND
MW-3	05-12-93	1600	ND	ND	ND	--	ND	ND	ND	ND
MW-3	08-18-93	1300	ND	ND	ND	--	ND	ND	ND	ND
MW-3	11-10-93	1300	ND	ND	ND	--	ND	ND	ND	ND
MW-3	02-04-94	91	<5	<5	<5	--	<5	<5	<5	<25
MW-3	05-02-94	1600	<20	<20	<20	--	<20	<20	<20	<100
MW-3	08-03-94	680	<20	--	<20	--	<20	<20	<20	<100
MW-3	12-06-94	1100	<25	--	<25	--	<25	<25	<25	<125
MW-3	03-11-95	1700	<10	--	<10	--	<10	<10	<10	<50
MW-3	06-05-95	2500	<20	--	<20	--	<20	<20	<20	<100
MW-3	08-29-95	1600	<20	--	<20	--	<20	<20	<20	<100

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-4	07-31-90	1600	7.5	0.7	ND	--	ND	ND	ND	ND
MW-4	10-30-90	3600	8.1	0.7	ND	--	ND	ND	ND	ND
MW-4	01-30-91	4900	12	ND	ND	--	ND	ND	ND	ND
MW-4	04-30-91	2200	ND	ND	ND	--	ND	ND	ND	ND
MW-4	08-06-91	1700	ND	ND	ND	--	ND	ND	ND	ND
MW-4	09-03-91	2000	ND	ND	ND	--	ND	ND	ND	ND
MW-4	11-06-91	1000	6.3	ND	ND	--	ND	ND	ND	ND
MW-4	03-10-92	2300	13	ND	4	--	ND	ND	ND	ND
MW-4	06-30-92	1800	ND	ND	ND	--	ND	ND	ND	ND
MW-4	09-09-92	1300	ND	ND	ND	--	ND	ND	ND	ND
MW-4	11-20-92	1700	ND	ND	ND	--	ND	ND	ND	ND
MW-4	02-12-93	1800	ND	ND	ND	--	ND	ND	ND	ND
MW-4	05-12-93	1500	ND	ND	ND	--	ND	ND	ND	ND
MW-4	08-18-93	1800	ND	ND	ND	--	ND	ND	ND	ND
MW-4	11-10-93	1800	ND	ND	ND	--	ND	ND	ND	ND
MW-4	02-04-94	1900	<20	<20	<20	--	<20	<20	<20	<100
MW-4	05-02-94	1700	<20	<20	<20	--	<20	<20	<20	<100
MW-4	08-03-94	1200	<20	--	<20	--	<20	<20	<20	<100
MW-4	12-06-94	2200	<20	--	<20	--	<20	<20	<20	<100
MW-4	03-11-95	2600	<20	--	<20	--	<20	<20	<20	<100
MW-4	06-05-95	3100	<20	--	<20	--	<20	<20	<20	<100
MW-4	08-29-95	2900	<20	--	<20	--	<20	<20	<20	<100

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-5	08-06-91	7.3	ND	ND	ND	--	ND	ND	ND	ND
MW-5	09-03-91	25	ND	ND	ND	--	ND	ND	ND	ND
MW-5	11-06-91	12	ND	ND	ND	--	ND	ND	ND	ND
MW-5	03-10-92	300	1.3	ND	ND	--	ND	ND	ND	ND
MW-5	06-30-92	30	ND	ND	ND	--	ND	ND	ND	ND
MW-5	09-09-92	120	ND	ND	ND	--	ND	ND	ND	ND
MW-5	11-24-92	93	ND	ND	ND	--	ND	ND	ND	ND
MW-5	02-12-93	210	ND	ND	ND	--	ND	ND	ND	ND
MW-5	05-12-93	50	ND	ND	ND	--	ND	ND	ND	ND
MW-5	08-18-93	80	ND	ND	ND	--	ND	ND	ND	ND
MW-5	11-10-93	42	ND	ND	ND	--	ND	ND	ND	ND
MW-5	02-04-94	39	<1	<1	<1	--	<1	<1	<1	<5
MW-5	05-02-94	35	<1	<1	<1	--	<1	<1	<1	<5
MW-5	08-03-94	25	<1	--	<1	--	<1	<1	<1	<5
MW-5	12-06-94	1800	<20	--	<20	-	<20	<20	<20	<100
MW-5	03-10-95	270	<5	--	<5	--	<5	<5	<5	<25
MW-5	06-05-95	310	<5	--	<5	--	<5	<5	<5	<25
MW-5	08-29-95	240	<5	--	<5	--	<5	<5	<5	<25

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-6	06-30-92	2400	ND	ND	ND	--	ND	ND	ND	ND
MW-6	09-09-92	Not sampled· well was paved over								
MW-6	11-20-92	Not sampled well was paved over								
MW-6	02-12-93	4200	ND	ND	ND	--	ND	ND	ND	ND
MW-6	05-12-93	3500	ND	ND	ND	--	ND	ND	ND	ND
MW-6	08-18-93	3000	ND	ND	ND	--	ND	ND	ND	ND
MW-6	11-10-93	3900	ND	ND	ND	--	ND	ND	ND	ND
MW-6	02-04-94	2900	<50	<50	<50	--	<50	<50	<50	<250
MW-6	05-02-94	2000	<50	<50	<50	--	<50	<50	<50	<250
MW-6	08-03-94	1400	<50	--	<50	--	<50	<50	<50	<250
MW-6	12-06-94	2000	<50	--	<50	--	<50	<50	<50	<250
MW-6	03-11-95	1300	<20	--	<20	--	<20	<20	<20	<100
MW-6	06-05-95	2000	<20	--	<20	--	<20	<20	<20	<100
MW-6	08-29-95	1300	<20	--	<20	--	<20	<20	<20	<100

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-7	06-30-92	<1000	<1000	<1000	<1000	--	5100	6800	2300	16000
MW-7	09-09-92	Not sampled: well contained floating product								
MW-7	11-20-92	Not sampled: well contained floating product								
MW-7	02-12-93	Not sampled: well contained floating product								
MW-7	05-12-93	Not sampled: well contained floating product								
MW-7	08-18-93	Not sampled: well contained floating product								
MW-7	11-10-93	Not sampled: floating product entered the well during purging								
MW-7	02-04-94	<50	<50	<50	<50	--	940	950	1100	9100
MW-7	05-02-94	<50	<50	<50	<50	--	440	400	660	5200
MW-7	08-03-94	<50	<50	--	<50	--	640	770	960	6200
MW-7	12-06-94	<50	<50	--	<50	--	230	180	750	4800
MW-7	03-11-95	Not sampled: floating product entered the well during purging								
MW-7	06-05-95	<10	<10	--	<10	--	86	27	420	1400
MW-7	08-29-95	<10	<10	--	<10	--	410	230	1100	5000

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-8	09-09-92	37	ND	ND	ND	--	4	ND	ND	ND
MW-8	11-24-92	2	ND	ND	ND	--	ND	ND	ND	ND
MW-8	02-12-93	<1	<1	<1	<1	--	ND	ND	ND	ND
MW-8	05-12-93	<1	<1	<1	<1	--	ND	ND	ND	ND
MW-8	08-18-93	<1	<1	<1	<1	--	ND	ND	ND	ND
MW-8	11-10-93	<1	<1	<1	<1	--	ND	ND	ND	ND
MW-8	02-04-94	<1	<1	<1	<1	--	<1	<1	<1	<5
MW-8	05-02-94	<1	<1	<1	<1	--	<1	<1	<1	<5
MW-8	08-03-94	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	12-06-94	2	<1	--	<1	--	<1	<1	<1	<5
MW-8	03-10-95	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	06-05-95	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	08-29-95	<1	<1	--	<1	--	<1	<1	<1	<5

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
RW-1	11-06-91	980	ND	ND	ND	--	ND	ND	ND	ND
RW-1	03-10-92	400	1.7	ND	ND	--	ND	ND	ND	ND
RW-1	06-30-92	1100	ND	ND	ND	--	ND	ND	ND	ND
RW-1	09-09-92	1500	ND	ND	ND	--	ND	ND	ND	ND
RW-1	11-24-92	1500	ND	ND	ND	--	ND	ND	ND	ND
RW-1	02-12-93	620	ND	ND	ND	--	ND	ND	ND	ND
RW-1	05-12-93	500	ND	ND	ND	--	ND	ND	ND	ND
RW-1	08-18-93	470	ND	ND	ND	--	ND	ND	ND	ND
RW-1	11-10-93	1500	ND	ND	ND	--	ND	ND	ND	ND
RW-1	02-04-94	2200	<20	<20	<20	--	<20	<20	<20	<100
RW-1	05-02-94	45	<1	<1	<1	--	<1	<1	<1	<5
RW-1	08-03-94	350	4	--	<1	--	<1	<1	<1	<5
RW-1	12-06-94	340	<5	--	<5	--	<5	<5	<5	<25
RW-1	03-10-95	260	<5	--	<5	--	<5	<5	<5	<25
RW-1	06-05-95	59	<1	--	<1	--	<1	<1	<1	<5
RW-1	08-29-95	570	<5	--	<5	--	<5	<5	<5	<25

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	benzene	Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WGR-3	05-02-94	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	08-03-94	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	12-06-94	4	<1	--	<1	--	<1	<1	<1	<5
WGR-3	03-11-95	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	06-05-95	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	08-29-95	<1	<1	--	<1	--	<1	<1	<1	<5

µg/L: micrograms per liter
- - : not analyzed or not reported
ND not detected at or above the method detection limit

Table 6
Approximate Cumulative Floating Product Recovered

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Well Designation	Date	Floating Product Recovered gallons
MW-2 and MW-7	1991	18.15
MW-2 and MW-7	1992	0.39
MW-2 and MW-7	1993	0.00
MW-2 and MW-7	1994	0 00
MW-2 and MW-7	1995	0.00
	1991 to 1995 Total:	18.54

Table 7
Soil-Vapor Extraction System
Operation and Performance Data

Location: 10600 and 10700 MacArthur Boulevard
Oakland, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Start-Up Date: 09-06-90
Reporting Period From: 09-06-90
To: 10-05-95

Date Begin:		09-06-90	12-22-94	01-12-95	02-14-95	03-13-95
Date End:		12-22-94	01-12-95	02-14-95	03-13-95	04-11-95
Mode of Oxidation:		Catalytic (12)	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		0.0	11.7	33.0	27.0	29.0
Days of Downtime:		0.0	9.3	0.0	0.0	0.0
Vapor Monitoring Concentrations						
On-site Well Field:	mg/m3 as gasoline (1)	NA (13)	116	<60	<60	4.4
	ppmv as gasoline (2) (3)	NA	32	<17	<17	1.2
	mg/m3 as benzene	NA	<0.5	<0.5	<0.5	<0.16
	ppmv as benzene (4)	NA	<0.1	<0.2	<0.2	<0.05
Off-site Well Field:	mg/m3 as gasoline	NA	closed	closed	<60	4.9
	ppmv as gasoline	NA	closed	closed	<17	1.4
	mg/m3 as benzene	NA	closed	closed	<0.5	<0.16
	ppmv as benzene	NA	closed	closed	<0.2	<0.05
System Influent:	mg/m3 as gasoline	NA	116	<60	<60	<3.6
	ppmv as gasoline	NA	32	<17	<17	<1.0
	mg/m3 as benzene	NA	<0.5	<0.5	<0.5	<0.16
	ppmv as benzene	NA	<0.1	<0.2	<0.2	<0.05
System Effluent:	mg/m3 as gasoline	NA	<60	<60	<60	4.6
	ppmv as gasoline	NA	<17	<17	<17	1.3
	mg/m3 as benzene	NA	<0.5	<0.5	<0.5	<0.16
	ppmv as benzene	NA	<0.1	<0.2	<0.2	<0.05
On-site Well Field Flow Rate, scfm (5):		NA	82.6	57.3	72.4	71.1
Off-site Well Field Flow Rate, scfm:		NA	closed	closed	10.9	11.0
System Influent Flow Rate, scfm:		NA	82.6	57.3	83.3	82.1
Total Process Flow Rate, scfm:		NA	500.0	500.0	500.0	500.0
Destruction Efficiency, percent (6):		NA	95.7	100.0	100.0	NA
Emission Rates (pounds per day) (7)						
Gasoline:		NA	<0.45	<0.31	<0.45	0.03
Benzene:		NA	<0.00	<0.00	<0.00	<0.00
Operating Hours This Period:		NA	280.5	792.0	648.0	696.0
Operating Hours To Date:		NA	280.5	1072.5	1720.5	2416.5
Pounds/ Hour Removal Rate, as gasoline (8):		NA	0.036	0.013	0.019	0.001
Pounds Removed This Period, as gasoline (9):		NA	10.06	10.19	12.12	0.77
Pounds Removed To Date, as gasoline (10):		7665.5	7675.6	7685.8	7697.9	7698.6
Gallons Removed This Period, as gasoline (11):		NA	1.62	1.64	1.96	0.12
Gallons Removed To Date, as gasoline:		1236.4	1238.1	1239.7	1241.7	1241.8

Table 7
Soil-Vapor Extraction System
Operation and Performance Data

Location: 10600 and 10700 MacArthur Boulevard
Oakland, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Start-Up Date: 09-06-90
Reporting Period From: 09-06-90
To: 10-05-95

Date Begin:	04-11-95	05-08-95	06-08-95
Date End:	05-08-95	06-08-95	07-10-95
Mode of Oxidation:	Catalytic	Catalytic	Catalytic
Days of Operation:	27.0	11.1	0.0
Days of Downtime:	0.0	19.9	32.0
Vapor Monitoring Concentrations			
On-site Well Field: mg/m3 as gasoline (1)	<60	<60	NA
ppmv as gasoline (2) (3)	<17	<17	NA
mg/m3 as benzene	<0.5	<0.5	NA
ppmv as benzene (4)	<0.2	<0.2	NA
Off-site Well Field: mg/m3 as gasoline	<60	<60	NA
ppmv as gasoline	<17	<17	NA
mg/m3 as benzene	<0.5	<0.5	NA
ppmv as benzene	<0.2	<0.2	NA
System Influent: mg/m3 as gasoline	<60	<60	NA
ppmv as gasoline	<17	<17	NA
mg/m3 as benzene	<0.5	<0.5	NA
ppmv as benzene	<0.2	<0.2	NA
System Effluent: mg/m3 as gasoline	<60	<60	NA
ppmv as gasoline	<17	<17	NA
mg/m3 as benzene	<0.5	<0.5	NA
ppmv as benzene	<0.2	<0.2	NA
On-site Well Field Flow Rate, scfm (5):	73.2	76.2	0.0
Off-site Well Field Flow Rate, scfm:	8.7	8.2	0.0
System Influent Flow Rate, scfm:	75.5	75.6	0.0
Total Process Flow Rate, scfm:	500.0	500.0	0.0
Destruction Efficiency, percent (6):	NA	NA	NA
Emission Rates (pounds per day) (7)			
Gasoline:	<0.41	<0.41	0.00
Benzene:	<0.00	<0.00	0.00
Operating Hours This Period:	648.6	266.9	0.0
Operating Hours To Date:	3065.1	3332.0	3332.0
Pounds/ Hour Removal Rate, as gasoline (8):	0.017	0.017	0.000
Pounds Removed This Period, as gasoline (9):	11.00	4.53	0.00
Pounds Removed To Date, as gasoline (10):	7709.6	7714.2	7714.2
Gallons Removed This Period, as gasoline (11):	1.77	0.73	0.00
Gallons Removed To Date, as gasoline:	1243.6	1244.3	1244.3

Table 7
Soil-Vapor Extraction System
Operation and Performance Data

Location: 10600 and 10700 MacArthur Boulevard
Oakland, California

Vapor Treatment Unit: Anguil Energy Systems
Remedi-Cat, 500cfm
Catalytic Oxidizer

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Start-Up Date: 09-06-90
Reporting Period From: 09-06-90
To: 10-05-95

Date Begin:	07-10-95	08-08-95	09-07-95
Date End:	08-08-95	09-07-95	10-05-95
Mode of Oxidation:	Catalytic	Catalytic	Catalytic
Days of Operation:	7.0	10.9	0.0
Days of Downtime:	22.0	19.1	28.0
Vapor Monitoring Concentrations			
On-site Well Field: mg/m3 as gasoline (1)	350	350	NA
ppmv as gasoline (2) (3)	96	96	NA
mg/m3 as benzene	3.6	3.6	NA
ppmv as benzene (4)	1.1	1.1	NA
Off-site Well Field: mg/m3 as gasoline	<60	<60	NA
ppmv as gasoline	<15	<15	NA
mg/m3 as benzene	<0.5	<0.5	NA
ppmv as benzene	<0.1	<0.1	NA
System Influent: mg/m3 as gasoline	340	340	NA
ppmv as gasoline	93	93	NA
mg/m3 as benzene	3.3	3.3	NA
ppmv as benzene	1	1	NA
System Effluent: mg/m3 as gasoline	<60	<60	NA
ppmv as gasoline	<15	<15	NA
mg/m3 as benzene	<0.5	<0.5	NA
ppmv as benzene	<0.1	<0.1	NA
On-site Well Field Flow Rate, scfm (5):	83.5	83.5	0.0
Off-site Well Field Flow Rate, scfm:	8.2	8.2	0.0
System Influent Flow Rate, scfm:	82.5	82.5	0.0
Total Process Flow Rate, scfm:	500.0	500.0	0.0
Destruction Efficiency, percent (6):	82.4 (14)	82.4 (14)	NA
Emission Rates (pounds per day) (7)			
Gasoline:	<0.44	<0.44	0.00
Benzene:	<0.00	<0.00	0.00
Operating Hours This Period:	167.4	261.7	0.0
Operating Hours To Date:	3499.4	3761.1	3761.1
Pounds/ Hour Removal Rate, as gasoline (8):	0.105	0.105	0.000
Pounds Removed This Period, as gasoline (9):	17.57	27.47	0.00
Pounds Removed To Date, as gasoline (10):	7731.7	7759.2	7759.2
Gallons Removed This Period, as gasoline (11):	2.83	4.43	0.00
Gallons Removed To Date, as gasoline:	1247.1	1251.6	1251.6

Table 7
Soil-Vapor Extraction System
Operation and Performance Data

Location: 10600 and 10700 MacArthur Boulevard Oakland, California	Vapor Treatment Unit: Anguil Energy Systems Remedi-Cat, 500cfm Catalytic Oxidizer
Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date: 09-06-90 Reporting Period From: 09-06-90 To: 10-05-95

CURRENT REPORTING PERIOD:	07-10-95	to	10-05-95
DAYS / HOURS IN PERIOD:	87.0	2088.0	
DAYS / HOURS OF OPERATION:	17.9	429.1	
DAYS / HOURS OF DOWN TIME:	69.1	1658.9	
PERCENT OPERATIONAL:		20.6 %	
PERIOD POUNDS REMOVED:	45.0		
PERIOD GALLONS REMOVED:	7.3		
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):		82.5	

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 (rounded as appropriate)
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 (rounded as appropriate)
5. scfm: flow in standard cubic feet per minute at one atmosphere and 70 degrees Farenheit
6. destruction efficiency, percent = ([system influent concentration (as gasoline in mg/m3) - system effluent concentration (as gasoline in mg/m3)] / system influent concentration (as gasoline in mg/m3)) x 100 percent
7. emission rates (pounds per day) = system effluent concentration (as gasoline or benzene in mg/m3) x system influent flow rate (scfm) x 0.02832 m3/ft3 x 1440 minutes/day x 1 pound/454,000 mg
8. pounds/ hour removal rate (as gasoline) = system influent concentration (as gasoline in mg/m3) x system influent flow rate (scfm) x 0.02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
9. pounds removed this period (as gasoline) = pounds/ hour removal rate x hours of operation
10. Pounds removed data for the period from September 6, 1990 through December 22, 1994, were reported by EVAX, PEG, and RESNA. Please refer to *Fourth Quarter 1994 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, EMCON March 1995,* for additioanl data for system operation before December 1994.
11. gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0.1613 gallons/pound of gasoline
12. The existing catalytic oxidation unit was used as the off-gas abatement device for the site, with the exception of the period from September 6, 1990 to March 21, 1991, when EVAX used an internal combustion engine as the abatement device.
13. NA: not analyzed, not available, or not applicable
14. Although the destruction efficiency appeared to be less than 90 percent, laboratory analytical results collected during this period indicate the effluent TVHG and benzene concentrations in off-gas discharged to the atmosphere were below laboratory detection limits, indicating compliance with BAAQMD discharge requirements.

Table 8
Soil-Vapor Extraction System
Field Vapor Monitoring Results and Destruction Efficiencies

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95

Field Date	Field Vapor Monitoring Results (1)				Destruction Efficiency (2)
	On-Site Well Field (I-1)	Off-Site Well Field (Off Site)	Total System Influent (I-2)	System Effluent (E-1)	
	ppmv (3)	ppmv	ppmv	ppmv	percent
12/22/94	24.6	closed	24.6	2.1	91.5
01/05/95	20.9	closed	20.9	1.3	93.8
01/31/95	0.2	closed	0.2	0.0	100.0
02/09/95	0.2	closed	0.2	0.0	100.0
03/03/95	0.2	0.2	0.3	0.5	-66.7 (4)
03/27/95	0.9	0.0	0.5	0.0	100.0
04/14/95	1.2	0.1	1.0	0.1	90.0
05/24/95	1.4	0.1	0.8	0.0	100.0

1. Concentrations are reported in ppmv as measured by a flame-ionization detector (FID).
2. destruction efficiency (percent) = [(I-2 - E-1) / I-2] * 100
3. ppmv: parts per million by volume
4. The system was in compliance with permit conditions despite the negative destruction efficiency because laboratory analytical results for system influent and effluent air samples collected between February 14 and March 13, 1995, indicate nondetectable levels of TVHG (gasoline) and benzene (i.e., no emissions)

Table 9
Soil-Vapor Extraction Well Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95
Project Number: 0805-120.04

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
12-22-94	open	<15 LAB	13.1	open	68 LAB	13.0	open	28 LAB	12 0	open	<15 LAB	13 1
01-17-95	closed	NA	NA	open	NA	NA	open	NA	NA	closed	NA	NA
02-16-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
03-27-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
05-24-95	System was shut doun											
08-01-95	System was restarted											
08-01-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
08-23-95	System was shut doun											

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

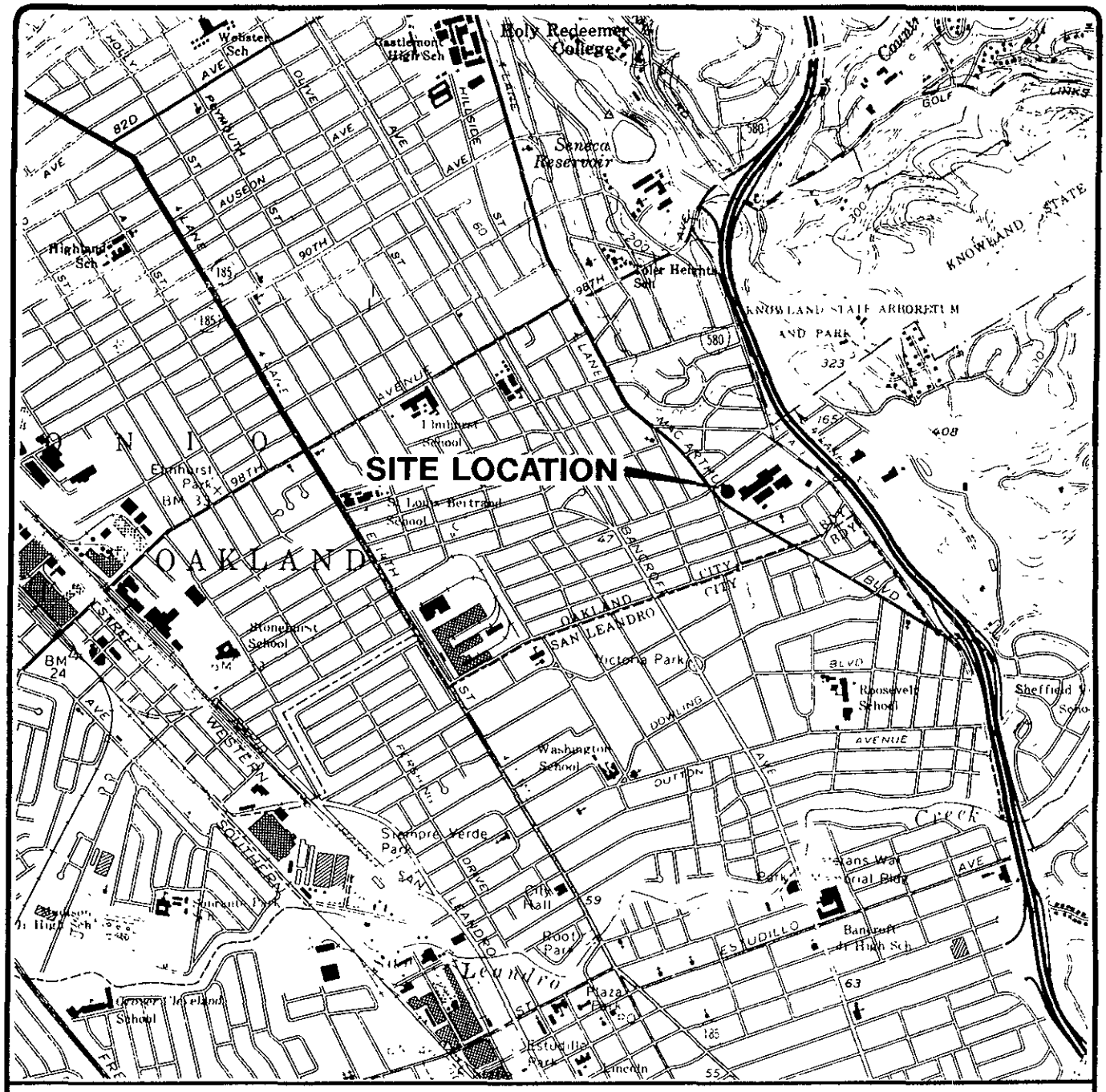
Table 9
Soil-Vapor Extraction Well Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 12-08-95
Project Number: 0805-120.04

Date	Well Identification											
	VW-5			VW-7			MW-2					
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-22-94	open	<15 LAB	13.0	open	<15 LAB	13.1	open	<15 LAB	7.0			
01-17-95	closed	NA	NA	closed	NA	NA	open	NA	NA			
02-16-95	open	NA	NA	open	NA	NA	open	NA	NA			
03-27-95	open	NA	NA	open	NA	NA	open	NA	NA			
05-24-95	System was shut doun											
08-01-95	System was restarted											
08-01-95	open	NA	NA	open	NA	NA	open	NA	NA			
08-23-95	System was shut doun											

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



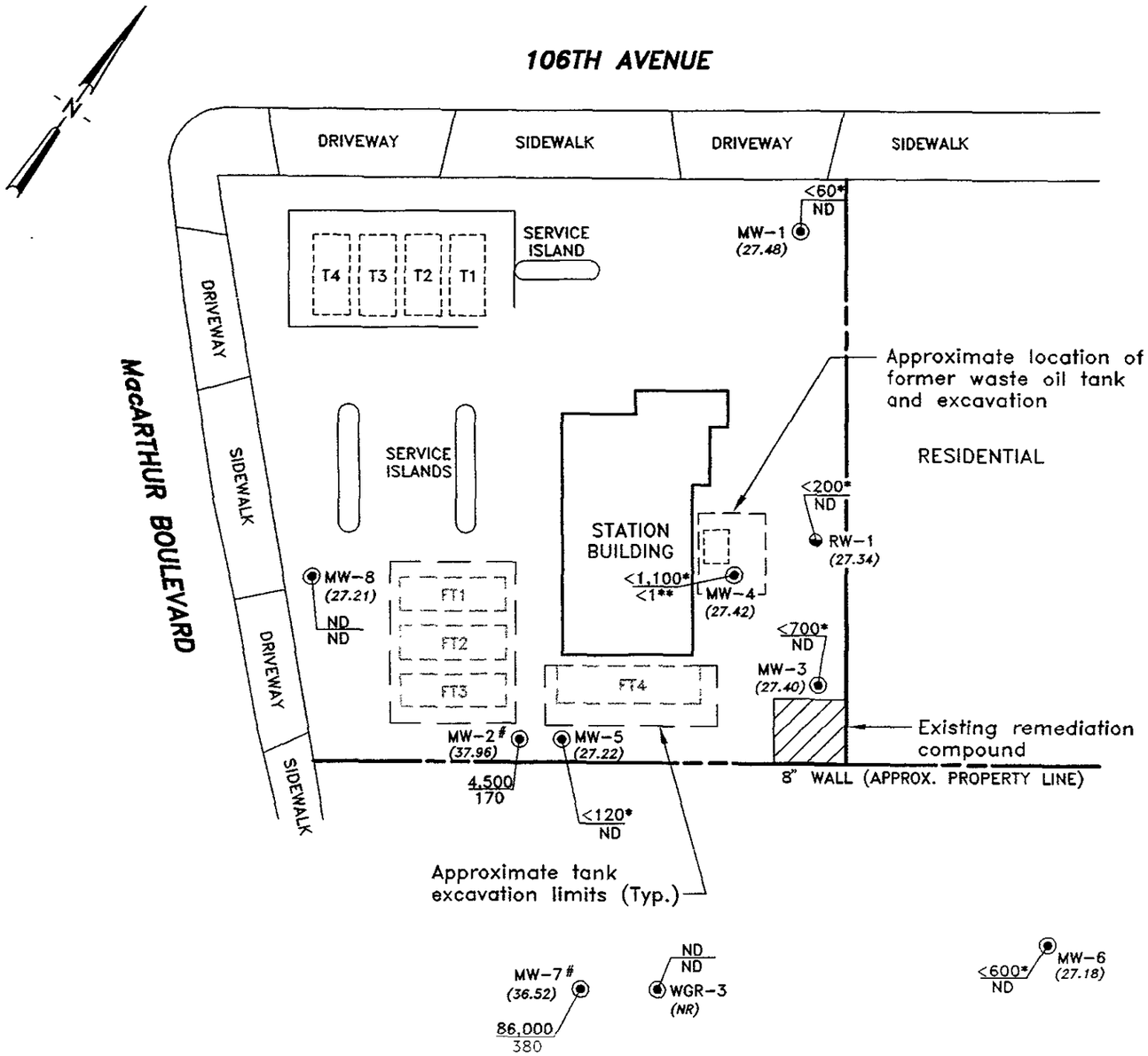
EMCON

10600 AND 10700 MACARTHUR BLVD.
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORINA

SITE LOCATION

FIGURE
1

PROJECT NO.
805-120.04



EXPLANATION

- Groundwater monitoring well
- Recovery well
- Existing underground storage tank
- Former underground storage tank
- (27.48) Groundwater elevation (Ft.–MSL); measured 8/29/95
- <60* / ND — TPHG concentration in groundwater (µg/L); sampled 8/29/95 / Benzene concentration in groundwater (µg/L); sampled 8/29/95
- * Raised method reporting limit due to matrix interference; the sample contains a single non–fuel component eluting in the gasoline range and quantitated as gasoline (possibly PCE). The chromatogram does not match the typical gasoline fingerprint
- ** Raised method reporting limit due to matrix interference requiring sample dilution
- # Well screened in shallow water–bearing zone; not used in contouring
- ND *Not detected at or above the method reporting limit for TPHG (50 µg/L) or benzene (0.5 µg/L)*

NOTE: Cannot be contoured due to relatively flat gradient (<0.001) at the site.

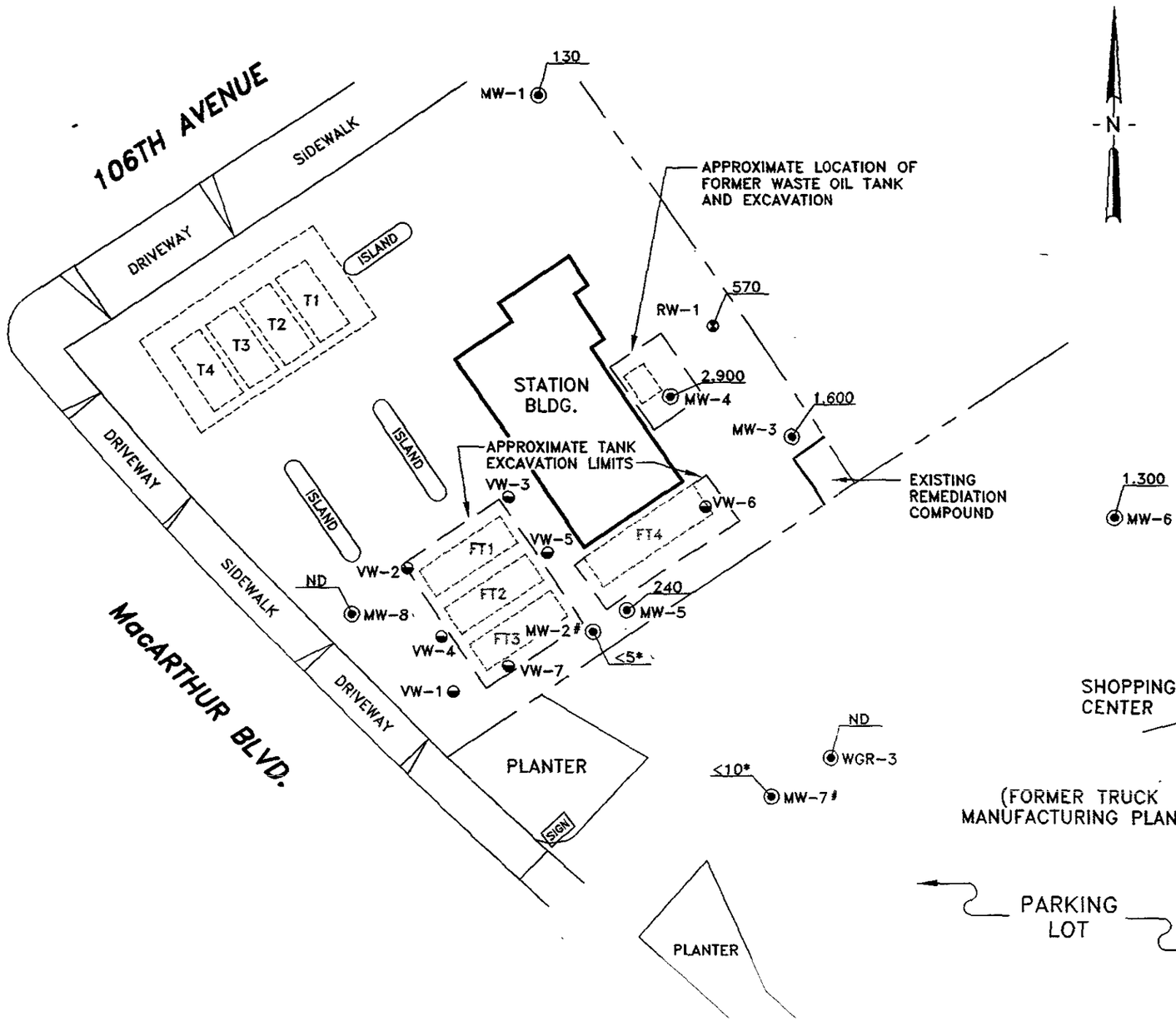
EMCON

SCALE: 0 30 60 FEET

10600 AND 10700 MACARTHUR BLVD.
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

TPHG AND BENZENE CONCENTRATIONS IN GROUNDWATER
THIRD QUARTER 1995

FIGURE NO
2
PROJECT NO.
805–120.04



EXPLANATION

- Groundwater monitoring well
- Recovery well
- Vapor extraction well
- Existing* underground storage tank
- Former underground storage tank
- 570 — PCE concentration in groundwater (µg/L); sampled 8/29/95
- ND — Not detected at or above the method reporting limit for PCE (1 µg/L)
- * — *Raised method reporting limit due to high analyte concentration requiring sample dilution*
- # — Well screened in shallow water-bearing zone.

Base map modified from RESNA, 1993

EMCON

SCALE: 0 30 60 FEET

10600 AND 10700 MACARTHUR BLVD.
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

TETRACHLOROETHENE (PCE) CONCENTRATIONS IN GROUNDWATER
THIRD QUARTER 1995

FIGURE NO. 3

PROJECT NO. 805-120.04

G:\805-120\PCE REV 0 11/27/95 09:57:07 klt DJ

APPENDIX A

FIELD DATA SHEETS, THIRD QUARTER 1995 GROUNDWATER MONITORING EVENT

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 1775-202.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland, CA DATE : 8/29/95

ARCO STATION # : 276 FIELD TECHNICIAN : DG / J.W. DAY : Tue

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-8	X	X	X	None	Slp	26.44	26.44	ND	NA	47.7	
2	WGR-3	X	X	X	ARCO	Yes	21.41	21.41	ND	NA	26.8	
3	MW-1	X	X	X	3499	X	28.44	28.44	ND	NA	38.8	
4	MW-5	X	X	X	3499	X	28.21	28.21	ND	NA	46.8	
5	RW-1	X	X	X	None	Slp	28.98	28.98	ND	NA	48.5	Needs Slp Cap
6	MW-6	X	X	X	ARCO	X	34.03	34.03	ND	NA	51.7	Lwc Cracked, Needs Lock will not fit
7	MW-3	X	X	X	ARCO	X	29.15	29.15	ND	NA	38.4	
8	MW-4	X	X	X	ARCO	X	28.56	28.56	ND	NA	47.9	
9	MW-2	X	X	X	None	Slp	17.14	17.14	ND	NA	25.3	
10	MW-7	X	X	X	ARCO	X	21.70	21.70	ND	NA	36.6	

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-202.01 SAMPLE ID: MW-1

PURGED BY: D. Gamblin CLIENT NAME: ARCO 276

SAMPLED BY: D. Gamblin LOCATION: Oakland, 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.):	1.69
DEPTH TO WATER (feet):	28.44	CALCULATED PURGE (gal.):	5.08
DEPTH OF WELL (feet):	38.8	ACTUAL PURGE VOL. (gal.):	5.5

DATE PURGED: 8/29/95 Start (2400 Hr) 1352 End (2400 Hr) 1401

DATE SAMPLED: 8/29/95 Start (2400 Hr) 1405 End (2400 Hr) 1406

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1355	2.0	6.28	3000	72.6	Brn	Mod
1358	3.5	6.30	3010	72.1	Brn	Mod
1401	5.5	6.29	3010	71.7	Brn	Mod

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

COLOR (COBALT 0 - 500): NR

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
X 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 #: ARCO

REMARKS: ___

Meter Calibration: Date: 8/29/95 Time: 1238 Meter Serial #: 4972 Temperature °F: ___

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

Location of previous calibration: WGR-3

Signature: [signature] Reviewed By: [signature] Page 1 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-202-01 SAMPLE ID: MW-2 (25)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO-276

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND CA

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

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

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 5.33

DEPTH TO WATER (feet): 17.14 CALCULATED PURGE (gal.): 15.99

DEPTH OF WELL (feet): 25.3 ACTUAL PURGE VOL. (gal.): 18

DATE PURGED: 08-29-95 Start (2400 Hr) 1554 End (2400 Hr) 1602

DATE SAMPLED: 08-29-95 Start (2400 Hr) — End (2400 Hr) 1607

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1557	6	6.55	414	75.5	CLEAR	CLEAN
1600	12	6.52	426	73.1	CLEAR	CLEAN
1602	18	6.51	423	73.0	CLEAR	CLEAN

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

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

Field QC samples collected at this well: NO

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

Other: ___

SAMPLING EQUIPMENT

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

Other: ___

WELL INTEGRITY: OK LOCK #: BOX

REMARKS: ___

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

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

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 2 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 877520.01 SAMPLE ID: MW-3

PURGED BY: D. Gamblin CLIENT NAME: ARCO-276

SAMPLED BY: D. Gamblin LOCATION: Oakland, 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.): 1.51

DEPTH TO WATER (feet): 29.15 CALCULATED PURGE (gal.): 4.53

DEPTH OF WELL (feet): 38.4 ACTUAL PURGE VOL. (gal.): 5.0

DATE PURGED: 8/29/95 Start (2400 Hr) 1436 End (2400 Hr) 1445

DATE SAMPLED: 8/29/95 Start (2400 Hr) 1453 End (2400 Hr) 1454

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1439	2.0	6.45	1709	72.8	Brn	Heavy
1442	3.5	6.36	1672	70.0	Brn	Heavy
1445	5.0	6.40	1749	69.1	Brn	Heavy

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
X 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 #: ARCO

REMARKS: ___

Meter Calibration: Date: 8/29/95 Time: 1238 Meter Serial #: 4972 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 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775.202.01 SAMPLE ID: MW-4

PURGED BY: D. Gamberlin CLIENT NAME: ARCO 276

SAMPLED BY: D. Gamberlin LOCATION: Oakland, 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.):	3.16
DEPTH TO WATER (feet):	28.56	CALCULATED PURGE (gal.):	9.48
DEPTH OF WELL (feet):	47.9	ACTUAL PURGE VOL. (gal.):	9.5

DATE PURGED: 8/29/95 Start (2400 Hr) 1505 End (2400 Hr) 1516

DATE SAMPLED: 8/29/95 Start (2400 Hr) 1516 End (2400 Hr) 1520

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1509	3.5	6.63	2090	72.5	Tan	Mod
1513	7.0	6.64	2150	71.7	Tan	Mod.
1516	9.5	6.63	2150	71.1	Tan	Mod

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
X 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 #: ARCO

REMARKS: ___

Meter Calibration: Date: 8/29/95 Time: 1238 Meter Serial #: 4972 Temperature °F: ___

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

Location of previous calibration: WWR-3

Signature: [signature] Reviewed By: [signature] Page 4 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-202-01 SAMPLE ID: MW-5 (56)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 276

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 5.61

DEPTH TO WATER (feet): 28.21 CALCULATED PURGE (gal.): 16.83

DEPTH OF WELL (feet): 36.8 ACTUAL PURGE VOL. (gal.): 18

DATE PURGED: 08-29-95 Start (2400 Hr) 1345 End (2400 Hr) 1352

DATE SAMPLED: 08-29-95 Start (2400 Hr) ___ End (2400 Hr) 1355

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1348	6	6.29	618	71.0	CLEAR	TRACE
1350	12	6.27	652	70.8	CLEAR	TRACE
1352	18	6.28	688	70.6	CLEAR	TRACE

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

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

WELL INTEGRITY: OK LOCK #: 3459

REMARKS: ___

Meter Calibration: Date: 8-29-95 Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: [signature] Reviewed By: [signature] Page 5 of 10

EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 1775-202.01 SAMPLE ID: MW-6
PURGED BY: D. Gandolfo CLIENT NAME: ARCO 376
SAMPLED BY: D. Gandolfo LOCATION: Oakland, 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.): 2.89
DEPTH TO WATER (feet): 34.03 CALCULATED PURGE (gal.): 8.66
DEPTH OF WELL (feet): 51.7 ACTUAL PURGE VOL. (gal.): 9.0

DATE PURGED: 8/29/95 Start (2400 Hr) 1325 End (2400 Hr) 1337
DATE SAMPLED: 8/29/95 Start (2400 Hr) 1340 End (2400 Hr) 1341

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1329	3.0	6.50	1840	71.1	Brn	Heavy
1333	6.0	6.57	1971	70.2	Brn	Heavy
1337	9.0	6.59	1957	70.4	Brn	Heavy

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ___ Centrifugal Pump
- ___ Submersible Pump
- ___ Well Wizard™
- ___ Bailer (Teflon®)
- X 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 #: ARCO

REMARKS:

Meter Calibration: Date: 8/29/95 Time: 1238 Meter Serial #: 4972 Temperature °F: ___

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

Location of previous calibration: WGR

Signature: D. Gandolfo Reviewed By: [signature] Page 6 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-202.01 SAMPLE ID: MW-7

PURGED BY: D. Gamblin CLIENT NAME: ARCO 276

SAMPLED BY: D Gamblin LOCATION: Oakland, 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.): 2.43

DEPTH TO WATER (feet): 21.70 CALCULATED PURGE (gal.): 7.30

DEPTH OF WELL (feet): 36.6 ACTUAL PURGE VOL. (gal.): 7.5

DATE PURGED: 8/29/95 Start (2400 Hr) 1550 End (2400 Hr) 1602

DATE SAMPLED: 8/29/95 Start (2400 Hr) 1605 End (2400 Hr) 1606

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1555	2.5	6.30	671	72.9	Grey	Light
1558	5.0	6.23	670	72.2	Grey	Light
1602	7.5	6.22	660	71.8	Grey	Light

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

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
X 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 #: ARCO

REMARKS: Spots of Sheen on Purgewater

Meter Calibration: Date: 8/29/95 Time: 1238 Meter Serial #: 4972 Temperature °F: ___

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

Location of previous calibration: WGR-3

Signature: [signature] Reviewed By: [signature] Page 7 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-202-01 | SAMPLE ID: MW-8 (47)

PURGED BY: J WILLIAMS | CLIENT NAME: ARCO 276

SAMPLED BY: J WILLIAMS | LOCATION: OAKLAND CA

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

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

CASING ELEVATION (feet/MSL): NR | VOLUME IN CASING (gal.): 13.88

DEPTH TO WATER (feet): 26.44 | CALCULATED PURGE (gal.): 41.66

DEPTH OF WELL (feet): 47.7 | ACTUAL PURGE VOL. (gal.): 42

DATE PURGED: 08-29-95 | Start (2400 Hr) 1258 | End (2400 Hr) 1514

DATE SAMPLED: 08-29-95 | Start (2400 Hr) — | End (2400 Hr) 1316

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1304	14	6.41	482	73.3	CLEAR	TRACE
1308	28	6.37	487	72.4	CLEAR	TRACE
1314	42	6.42	480	72.4	BROWN	HEAVY

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

Other: ___

SAMPLING EQUIPMENT

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

Other: ___

WELL INTEGRITY: OK | LOCK #: BOX

REMARKS: ___

Meter Calibration: Date: 8-29-95 | Time: 1231 | Meter Serial #: 9020 | Temperature °F: 76.8

(EC 1000 1363 / ___) (DI ___) (pH 7 7.07 / 7.00) (pH 10 9.97 / 10.00) (pH 4 3.96 / ___)

Location of previous calibration: ___

Signature: [signature] | Reviewed By: [signature] | Page 8 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-202-01 SAMPLE ID: RW-1 (48)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO-276

SAMPLED BY: J WILLIAMS LOCATION: OAKLAND CA

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

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ___ 4.5 ___ 6 ✓ (6.44) Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 28.69

DEPTH TO WATER (feet): 28.98 CALCULATED PURGE (gal.): 86.08

DEPTH OF WELL (feet): 48.5 ACTUAL PURGE VOL. (gal.): 87

DATE PURGED: 08-29-95 Start (2400 Hr) 1441 End (2400 Hr) 1521

DATE SAMPLED: 08-29-95 Start (2400 Hr) — End (2400 Hr) 1525

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1454	29	6.83	1034	73.3	CLEAR	CLEAR
1507	58	6.83	1067	69.7	CLEAR	CLEAR
1521	87	6.84	1075	69.1	CLEAR	CLEAR

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

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)

___ Centrifugal Pump ___ Bailer (PVC)

✓ Submersible Pump ___ Bailer (Stainless Steel)

___ Well Wizard™ ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)

___ DDL Sampler ___ Bailer (Stainless Steel)

___ Dipper ___ Submersible Pump

___ Well Wizard™ ___ Dedicated

Other: ___

WELL INTEGRITY: ___ LOCK #: ___

REMARKS: ___

Meter Calibration: Date: 8-29-95 Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: [signature] Reviewed By: [signature] Page 9 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-202.01 SAMPLE ID: WGR-3

PURGED BY: D. Gamberlin CLIENT NAME: ARCO 276

SAMPLED BY: D. Gamberlin LOCATION: Oakland, 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.):	3.52
DEPTH TO WATER (feet):	21.41	CALCULATED PURGE (gal.):	10.56
DEPTH OF WELL (feet):	26.8	ACTUAL PURGE VOL. (gal.):	6.0

DATE PURGED: 8/29/95 Start (2400 Hr) 1253 End (2400 Hr) 1303

DATE SAMPLED: 8/29/95 Start (2400 Hr) 1310 End (2400 Hr) 1311

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1258	2 5.0	5.26	434	73.0	Brown	Mod
1303	Well Dry at	6.09				
			~~592~~			
1311		5.36	592	78.3		

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

(COBALT 0 - 500): NR

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

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
X Bailer (PVC)
___ Bailer (Teflon®)
___ 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 #: ARCO

REMARKS: DTW at Sampling - 24.14

Meter Calibration: Date: 8/29/95 Time: 1238 Meter Serial #: 4972 Temperature °F: 83.5

(EC 1000 916 / 1000) (DI 42) (pH 7 7.26 / 7.00) (pH 10 9.67 / 1000) (pH 4 369 / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 10 of 10

APPENDIX B

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

20805-120.004
ARCO 276

Columbia Analytical Services inc.

September 14, 1995 Service Request No: S9501067

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-120.04 / TO# 17075.00 / 0276 Oakland**

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on August 30, 1995. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above - to help expedite our service please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 15, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely:

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

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

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S951067
Project:	0805-120.04 / TO# 17075.00 / 0276 Oakland	**Date Collected:**	8/29/95
Sample Matrix:	Water	**Date Received:**	8/30/95
		Date Extracted:	NA
		Date Analyzed:	9/7,8/95

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-8 (47)	S951067-001	ND	ND	ND	ND	ND
WGR-3 (26)	S951067-002	ND	ND	ND	ND	ND
MW-1 (38)	S951067-003	<60 *	ND	ND	ND	ND
MW-5 (36)	S951067-004	<120 *	ND	ND	ND	ND
RW-1 (48)	S951067-005	<200 *	ND	ND	ND	ND
MW-6 (51)	S951067-006	<600 *	ND	ND	ND	ND
MW-3 (38)	S951067-007	<700 *	ND	ND	ND	ND
MW-4 (47)	S951067-008	<1,100 *	<1 **	<1 **	<1 **	<1 **
MW-2 (25)	S951067-009	4,500	170	20	150	330
MW-7 (36)	S951067-010	86,000	380	260	1,100	5,000
Method Blank	S950907-WB	ND	ND	ND	ND	ND
Method Blank	S950908-WB	ND	ND	ND	ND	ND

* Raised MRL due to matrix interference. This sample contains a single component eluting in the gasoline range, quantified as gasoline. The chromatogram does not match the typical gasoline fingerprint.

** Raised MRL due to matrix interference requiring sample dilution.

5ABTXGAS/061694

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland
Sample Matrix: Water

Service Request: S951067
Date Collected: 8/29/95
Date Received: 8/30/95
Date Extracted: NA

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

	Sample Name:	MW-8 (47)	WGR-3 (26)	MW-1 (38)
	Lab Code:	S951067-001	S951067-002	S951067-003
	Date Analyzed:	9/5/95	9/5/95	9/5/95
Analyte	**MRL**			
Chloromethane	10	ND	ND	ND
Vinyl Chloride	10	ND	ND	ND
Bromomethane	10	ND	ND	ND
Chloroethane	10	ND	ND	ND
Trichlorofluoromethane (CFC 11)	1	ND	ND	ND
Trichlorotrifluoroethane (CFC 113)	10	ND	ND	ND
1,1-Dichloroethene	1	ND	ND	ND
Acetone	20	ND	ND	ND
Carbon Disulfide	1	ND	ND	ND
Methylene Chloride	10	ND	ND	ND
trans-1,2-Dichloroethene	1	ND	ND	ND
cis-1,2-Dichloroethene	1	ND	ND	ND
2-Butanone (MEK)	10	ND	ND	ND
1,1-Dichloroethane	1	ND	ND	ND
Chloroform	1	ND	ND	ND
1,1,1-Trichloroethane (TCA)	1	ND	ND	ND
Carbon Tetrachloride	1	ND	ND	ND
Benzene	1	ND	ND	ND
1,2-Dichloroethane	1	ND	ND	ND
Vinyl Acetate	10	ND	ND	ND
Trichloroethene (TCE)	1	ND	ND	ND
1,2-Dichloropropane	1	ND	ND	ND
Bromodichloromethane	1	ND	ND	ND
2-Chloroethyl Vinyl Ether	10	ND	ND	ND
trans-1,3-Dichloropropene	1	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	10	ND	ND	ND
2-Hexanone	10	ND	ND	ND
Toluene	1	ND	ND	ND
cis-1,3-Dichloropropene	1	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND
Tetrachloroethene (PCE)	1	ND	ND	130
Dibromochloromethane	1	ND	ND	ND
Chlorobenzene	1	ND	ND	ND
Ethylbenzene	1	ND	ND	ND
Styrene	1	ND	ND	ND
Total Xylenes	5	ND	ND	ND
Bromoform	1	ND	ND	ND
1,1,2,2-Tetrachloroethane	1	ND	ND	ND
1,3-Dichlorobenzene	1	ND	ND	ND
1,4-Dichlorobenzene	1	ND	ND	ND
1,2-Dichlorobenzene	1	ND	ND	ND
Methyl-tert-butyl ether	1	3	10	ND

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland
Sample Matrix: Water

Service Request: S951067
Date Collected: 8/29/95
Date Received: 8/30/95
Date Extracted: NA

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

	Sample Name:	MW-5 (36) *	RW-1 (48) *	MW-6 (51) *
	Lab Code:	S951067-004	S951067-005	S951067-006
	Date Analyzed:	9/5/95	9/6/95	9/5/95
Analyte	**MRL**			
Chloromethane	10	<50	<50	<200
Vinyl Chloride	10	<50	<50	<200
Bromomethane	10	<50	<50	<200
Chloroethane	10	<50	<50	<200
Trichlorofluoromethane (CFC 11)	1	<5	<5	<20
Trichlorotrifluoroethane (CFC 113)	10	<50	<50	<200
1,1-Dichloroethene	1	<5	<5	<20
Acetone	20	<100	<100	<400
Carbon Disulfide	1	<5	<5	<20
Methylene Chloride	10	<50	<50	<200
trans-1,2-Dichloroethene	1	<5	<5	<20
cis-1,2-Dichloroethene	1	<5	<5	<20
2-Butanone (MEK)	10	<50	<50	<200
1,1-Dichloroethane	1	<5	<5	<20
Chloroform	1	<5	<5	<20
1,1,1-Trichloroethane (TCA)	1	<5	<5	<20
Carbon Tetrachloride	1	<5	<5	<20
Benzene	1	<5	<5	<20
1,2-Dichloroethane	1	<5	<5	<20
Vinyl Acetate	10	<50	<50	<200
Trichloroethene (TCE)	1	<5	<5	<20
1,2-Dichloropropane	1	<5	<5	<20
Bromodichloromethane	1	<5	<5	<20
2-Chloroethyl Vinyl Ether	10	<50	<50	<200
trans-1,3-Dichloropropene	1	<5	<5	<20
4-Methyl-2-pentanone (MIBK)	10	<50	<50	<200
2-Hexanone	10	<50	<50	<200
Toluene	1	<5	<5	<20
cis-1,3-Dichloropropene	1	<5	<5	<20
1,1,2-Trichloroethane	1	<5	<5	<20
Tetrachloroethene (PCE)	1	240	570	1,300
Dibromochloromethane	1	<5	<5	<20
Chlorobenzene	1	<5	<5	<20
Ethylbenzene	1	<5	<5	<20
Styrene	1	<5	<5	<20
Total Xylenes	5	<25	<25	<100
Bromoform	1	<5	<5	<20
1,1,2,2-Tetrachloroethane	1	<5	<5	<20
1,3-Dichlorobenzene	1	<5	<5	<20
1,4-Dichlorobenzene	1	<5	<5	<20
1,2-Dichlorobenzene	1	<5	<5	<20
Methyl-tert-butyl ether	1	<5	<5	<20

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland
Sample Matrix: Water

Service Request: S951067
Date Collected: 8/29/95
Date Received: 8/30/95
Date Extracted: NA

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

		Sample Name:	MW-3 (38) *	MW-4 (47) *	MW-2 (25) *
		Lab Code:	S951067-007	S951067-008	S951067-009
		Date Analyzed:	9/5/95	9/5/95	9/11/95
Analyte	**MRL**				
Chloromethane	10		<200	<200	<50
Vinyl Chloride	10		<200	<200	<50
Bromomethane	10		<200	<200	<50
Chloroethane	10		<200	<200	<50
Trichlorofluoromethane (CFC 11)	1		<20	<20	<5
Trichlorotrifluoroethane (CFC 113)	10		<200	<200	<50
1,1-Dichloroethene	1		<20	<20	<5
Acetone	20		<400	<400	<100
Carbon Disulfide	1		<20	<20	<5
Methylene Chloride	10		<200	<200	<50
trans-1,2-Dichloroethene	1		<20	<20	<5
cis-1,2-Dichloroethene	1		<20	<20	<5
2-Butanone (MEK)	10		<200	<200	<50
1,1-Dichloroethane	1		<20	<20	<5
Chloroform	1		<20	<20	<5
1,1,1-Trichloroethane (TCA)	1		<20	<20	<5
Carbon Tetrachloride	1		<20	<20	<5
Benzene	1		<20	<20	220
1,2-Dichloroethane	1		<20	<20	<5
Vinyl Acetate	10		<200	<200	<50
Trichloroethene (TCE)	1		<20	<20	<5
1,2-Dichloropropane	1		<20	<20	<5
Bromodichloromethane	1		<20	<20	<5
2-Chloroethyl Vinyl Ether	10		<200	<200	<50
trans-1,3-Dichloropropene	1		<20	<20	<5
4-Methyl-2-pentanone (MIBK)	10		<200	<200	<50
2-Hexanone	10		<200	<200	<50
Toluene	1		<20	<20	26
cis-1,3-Dichloropropene	1		<20	<20	<5
1,1,2-Trichloroethane	1		<20	<20	<5
Tetrachloroethene (PCE)	1		1,600	2,900	<5
Dibromochloromethane	1		<20	<20	<5
Chlorobenzene	1		<20	<20	<5
Ethylbenzene	1		<20	<20	210
Styrene	1		<20	<20	<5
Total Xylenes	5		<100	<100	450
Bromoform	1		<20	<20	<5
1,1,2,2-Tetrachloroethane	1		<20	<20	<5
1,3-Dichlorobenzene	1		<20	<20	<5
1,4-Dichlorobenzene	1		<20	<20	<5
1,2-Dichlorobenzene	1		<20	<20	<5
Methyl-tert-butyl ether	1		<20	<20	71

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland
Sample Matrix: Water

Service Request: S951067
Date Collected: 8/29/95
Date Received: 8/30/95
Date Extracted: NA

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

	Sample Name:	MW-7 (36) *	Method Blank	Method Blank
	Lab Code:	S951067-010	S950905-WB	S950906-WB
	Date Analyzed:	9/5/95	9/5/95	9/5/95
Analyte	**MRL**			
Chloromethane	10	<100	ND	ND
Vinyl Chloride	10	<100	ND	ND
Bromomethane	10	<100	ND	ND
Chloroethane	10	<100	ND	ND
Trichlorofluoromethane (CFC 11)	1	<10	ND	ND
Trichlorotrifluoroethane (CFC 113)	10	<100	ND	ND
1,1-Dichloroethene	1	<10	ND	ND
Acetone	20	<200	ND	ND
Carbon Disulfide	1	<10	ND	ND
Methylene Chloride	10	<100	ND	ND
trans-1,2-Dichloroethene	1	<10	ND	ND
cis-1,2-Dichloroethene	1	<10	ND	ND
2-Butanone (MEK)	10	<100	ND	ND
1,1-Dichloroethane	1	<10	ND	ND
Chloroform	1	<10	ND	ND
1,1,1-Trichloroethane (TCA)	1	<10	ND	ND
Carbon Tetrachloride	1	<10	ND	ND
Benzene	1	410	ND	ND
1,2-Dichloroethane	1	<10	ND	ND
Vinyl Acetate	10	<100	ND	ND
Trichloroethene (TCE)	1	<10	ND	ND
1,2-Dichloropropane	1	<10	ND	ND
Bromodichloromethane	1	<10	ND	ND
2-Chloroethyl Vinyl Ether	10	<100	ND	ND
trans-1,3-Dichloropropene	1	<10	ND	ND
4-Methyl-2-pentanone (MIBK)	10	<100	ND	ND
2-Hexanone	10	<100	ND	ND
Toluene	1	230	ND	ND
cis-1,3-Dichloropropene	1	<10	ND	ND
1,1,2-Trichloroethane	1	<10	ND	ND
Tetrachloroethene (PCE)	1	<10	ND	ND
Dibromochloromethane	1	<10	ND	ND
Chlorobenzene	1	<10	ND	ND
Ethylbenzene	1	1,100	ND	ND
Styrene	1	<10	ND	ND
Total Xylenes	5	5,000	ND	ND
Bromoform	1	<10	ND	ND
1,1,2,2-Tetrachloroethane	1	<10	ND	ND
1,3-Dichlorobenzene	1	<10	ND	ND
1,4-Dichlorobenzene	1	<10	ND	ND
1,2-Dichlorobenzene	1	<10	ND	ND
Methyl-tert-butyl ether	1	<10	ND	ND

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland
Sample Matrix: Water

Service Request: S951067
Date Collected: 8/29/95
Date Received: 8/30/95
Date Extracted: NA

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

	Sample Name:	**Method Blank**
	Lab Code:	S950911-WB
	Date Analyzed:	9/11/95
Analyte	**MRL**	
Chloromethane	10	ND
Vinyl Chloride	10	ND
Bromomethane	10	ND
Chloroethane	10	ND
Trichlorofluoromethane (CFC 11)	1	ND
Trichlorotrifluoroethane (CFC 113)	10	ND
1,1-Dichloroethene	1	ND
Acetone	20	ND
Carbon Disulfide	1	ND
Methylene Chloride	10	ND
trans-1,2-Dichloroethene	1	ND
cis-1,2-Dichloroethene	1	ND
2-Butanone (MEK)	10	ND
1,1-Dichloroethane	1	ND
Chloroform	1	ND
1,1,1-Trichloroethane (TCA)	1	ND
Carbon Tetrachloride	1	ND
Benzene	1	ND
1,2-Dichloroethane	1	ND
Vinyl Acetate	10	ND
Trichloroethene (TCE)	1	ND
1,2-Dichloropropane	1	ND
Bromodichloromethane	1	ND
2-Chloroethyl Vinyl Ether	10	ND
trans-1,3-Dichloropropene	1	ND
4-Methyl-2-pentanone (MIBK)	10	ND
2-Hexanone	10	ND
Toluene	1	ND
cis-1,3-Dichloropropene	1	ND
1,1,2-Trichloroethane	1	ND
Tetrachloroethene (PCE)	1	ND
Dibromochloromethane	1	ND
Chlorobenzene	1	ND
Ethylbenzene	1	ND
Styrene	1	ND
Total Xylenes	5	ND
Bromoform	1	ND
1,1,2,2-Tetrachloroethane	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
Methyl-tert-butyl ether	1	ND

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland
Sample Matrix: Water

Service Request: S951067
Date Collected: 8/29/95
Date Received: 8/30/95
Date Extracted: NA
Date Analyzed: 9/7,8/95

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-8 (47)	S951067-001	95
WGR-3 (26)	S951067-002	93
MW-1 (38)	S951067-003	96
MW-5 (36)	S951067-004	93
RW-1 (48)	S951067-005	95
MW-6 (51)	S951067-006	95
MW-3 (38)	S951067-007	96
MW-4 (47)	S951067-008	97
MW-2 (25)	S951067-009	102
MW-7 (36)	S951067-010	113
MW-2 (25) MS	S951067-009MS	110
MW-2 (25) DMS	S951067-009DMS	111
Method Blank	S950907-WB	106
Method Blank	S950908-WB	98

CAS Acceptance Limits: 69-116

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland

Service Request: S951067
Date Analyzed: 9/7/95

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	23.3	93	85-115
Toluene	25	23.2	93	85-115
Ethylbenzene	25	22.7	91	85-115
Xylenes, Total	75	69.2	92	85-115
Gasoline	250	247	99	90-110

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S951067
Project:	0805-120.04 / TO# 17075.00 / 0276 Oakland	**Date Collected:**	8/29/95
Sample Matrix:	Water	**Date Received:**	8/30/95
		Date Extracted:	NA
		Date Analyzed:	9/7/95

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

Sample Name: MW-2 (25)
Lab Code: S951067-009

	Spike Level		Sample	Spike Result		Percent Recovery			
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	CAS Acceptance Limits	**Relative Percent Difference**
Gasoline	5,000	5,000	4,500	9,400	9,500	98	100	67-121	1

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland
Sample Matrix: Water

Service Request: S951067
Date Collected: 8/29/95
Date Received: 8/30/95
Date Extracted: NA
Date Analyzed: 9/5-11/95

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
MW-8 (47)	S951067-001	102	100	96
WGR-3 (26)	S951067-002	102	99	94
MW-1 (38)	S951067-003	99	99	97
MW-5 (36)	S951067-004	99	99	95
RW-1 (48)	S951067-005	100	99	101
MW-6 (51)	S951067-006	97	98	104
MW-3 (38)	S951067-007	98	99	101
MW-4 (47)	S951067-008	98	98	96
MW-2 (25)	S951067-009	104	100	103
MW-7 (36)	S951067-010	100	99	97
MW-1 (38) MS	S951067-003MS	102	101	93
MW-1 (38) DMS	S951067-003DMS	98	101	89
Method Blank	S950907-WB	103	99	96
Method Blank	S950908-WB	98	100	109
Method Blank	S950911-WB	104	101	97
CAS Acceptance Limits:		76-114	88-110	86-115

SUR3/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland

Service Request: S951067
Date Analyzed: 8/24/95

Initial Calibration Verification (ICV) Summary
Volatile Organic Compounds
EPA Method 624
Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Chloromethane	50	50.1	100	70-130
Vinyl Chloride	50	53.0	106	70-130
Bromomethane	50	53.2	106	70-130
Chloroethane	50	53.4	107	70-130
Acetone	50	59.7	119	70-130
1,1-Dichloroethene	50	56.5	113	70-130
Carbon Disulfide	50	52.8	106	70-130
Methylene Chloride	50	54.6	109	70-130
trans-1,2-Dichloroethene	50	56.0	112	70-130
cis-1,2-Dichloroethene	50	55.6	111	70-130
1,1-Dichloroethane	50	56.2	112	70-130
Vinyl Acetate	50	45.8	92	70-130
2-Butanone (MEK)	50	53.8	108	70-130
Chloroform	50	56.6	113	70-130
1,1,1-Trichloroethane (TCA)	50	56.8	114	70-130
Carbon Tetrachloride	50	54.3	109	70-130
Benzene	50	48.0	96	70-130
1,2-Dichloroethane	50	56.7	113	70-130
Trichloroethene (TCE)	50	47.6	95	70-130
1,2-Dichloropropane	50	47.3	95	70-130
Bromodichloromethane	50	46.8	94	70-130
2-Chloroethyl Vinyl Ether	50	62.6	125	70-130
2-Hexanone	50	60.8	122	70-130
trans-1,3-Dichloropropene	50	48.6	97	70-130
Toluene	50	47.9	96	70-130
cis-1,3-Dichloropropene	50	46.6	93	70-130
1,1,2-Trichloroethane	50	57.6	115	70-130
Tetrachloroethene (PCE)	50	53.6	107	70-130
Dibromochloromethane	50	51.5	103	70-130
Chlorobenzene	50	51.0	102	70-130
Ethylbenzene	50	48.4	97	70-130
o- Xylene	50	50.1	100	70-130
Styrene	50	48.3	97	70-130
Bromoform	50	49.1	98	70-130
1,1,2,2-Tetrachloroethane	50	49.6	99	70-130

ICV41/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-120.04 / TO# 17075.00 / 0276 Oakland
Sample Matrix: Water

Service Request: S951067
Date Collected: 8/29/95
Date Received: 8/30/95
Date Extracted: NA
Date Analyzed: 9/5/95

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

Sample Name: MW-1 (38)
Lab Code: S951067-003

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	250	250	ND	283	282	113	113	61-145	<1
Trichloroethene	250	250	ND	282	283	113	113	71-120	<1
Chlorobenzene	250	250	ND	280	278	112	111	75-130	<1
Toluene	250	250	ND	273	271	109	108	76-125	<1
Benzene	250	250	ND	270	269	108	108	76-127	<1

DMS1S/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 17015.00

Chain of Custody

ARCO Facility no. 0276	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 453-0489
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave San Jose, CA 95131		Contract number

L953342

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 + MTBE	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-8	(47)	1		X		X	HCL	8/29/95	1316		X					X						
WGR-3	(26)	2		X		X	HCL		1310		X					X						
MW-1	(38)	3		X		X	HCL		1405		X					X						
MW-5	(36)	4		X		X	HCL		1355		X					X						
RW-1	(48)	5		X		X	HCL		1525		X					X						
MW-6	(51)	6		X		X	HCL		1340		X					X						
MW-3	(38)	7		X		X	HCL		1453		X					X						
MW-4	(47)	8		X		X	HCL		1519		X			X		X						
MW-2	(25)	9		X		X	HCL		1607		X					X						
MW-7	(36)	10		X		X	HCL	↓	1605		X					X						

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks:
4-40ml HCL VOAs
2-1Liter HCL Glass MW-4
#0805-120.01

Lab number: L953342 S9501067

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

Condition of sample: OK @ Intact		Temperature received: Cool cool OK	
Relinquished by sampler	Date 8/30/95 Time 845	Received by Joanne Brown CAS-SF	
Relinquished by	Date Time	Received by	
Relinquished by Joanne Brown	Date 8/30/95 Time 1700	Received by laboratory	Date 8/31/95 Time 700

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

CAS-SF: GBTEX, 624 CAS-L: 418.1 Due 9/14

APPENDIX C

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

Columbia Analytical Services, Inc.

August 10, 1995 Service Request No. S950959

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

Re: **0805-120.04 / TO# 2452.00 / 276 Oakland**

Dear Ms. Voruganti:

Attached are the results of the vapor sample(s) submitted to our lab on August 1, 1995. For your reference, these analyses have been assigned our service request number S950959.

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

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950959
Project:	0805-120.04/TO# 2452.00/276 Oakland	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**OFFSITE**	**I-1**	**I-2**
Lab Code:	S950959-001	S950959-002	S950959-003
Date Analyzed:	8/2/95	8/2/95	8/2/95

Analyte	**MRL**			
Benzene	0.5	ND	3.6	3.3
Toluene	0.5	ND	13	12
Ethylbenzene	0.5	ND	4.6	4.6
Total Xylenes	1	ND	13	13
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20	ND	ND	ND
C_5 - C_8 Hydrocarbons	20	ND	290	280
C_9 - C_{12} Hydrocarbons	20	ND	63	63
Gasoline Fraction (C_5-C_{12})	60	ND	350	340

Approved By: _____ Date: 8/10/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950959
Project:	0805-120.04/TO# 2452.00/276 Oakland	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

	Sample Name:	**E-1**	**Method Blank**
	Lab Code:	S950959-004	S950802-VB1
	Date Analyzed:	8/2/95	8/2/95
Analyte	**MRL**		
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	1	ND	ND
Total Volatile Hydrocarbons			
C_1 - C_4 Hydrocarbons	20	ND	ND
C_5 - C_8 Hydrocarbons	20	ND	ND
C_9 - C_{12} Hydrocarbons	20	ND	ND
Gasoline Fraction (C_5-C_{12})	60	ND	ND

Approved By: _____ Date: 8/10/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950959
Project:	0805-120.04/TO# 2452.00/276 Oakland	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**OFFSITE**	**I-1**	**I-2**
Lab Code:	S950959-001	S950959-002	S950959-003
Date Analyzed:	8/2/95	8/2/95	8/2/95

Analyte	**MRL**			
Benzene	0.1	ND	1.1	1.0
Toluene	0.1	ND	3.4	3.2
Ethylbenzene	0.1	ND	1.1	1.0
Total Xylenes	0.2	ND	3.0	2.9
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	5	ND	ND	ND
C_5 - C_8 Hydrocarbons	5	ND	79	76
C_9 - C_{12} Hydrocarbons	5	ND	17	17
Gasoline Fraction (C_5-C_{12})	15	ND	96	93

Approved By: _____ Date: 8/10/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S950959
Project:	0805-120.04/TO# 2452.00/276 Oakland	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:		**E-1**	**Method Blank**
Lab Code:		S950959-004	S950802-VB1
Date Analyzed:		8/2/95	8/2/95
Analyte	**MRL**		
Benzene	0.1	ND	ND
Toluene	0.1	ND	ND
Ethylbenzene	0.1	ND	ND
Total Xylenes	0.2	ND	ND
Total Volatile Hydrocarbons			
C_1 - C_4 Hydrocarbons	5	ND	ND
C_5 - C_8 Hydrocarbons	5	ND	ND
C_9 - C_{12} Hydrocarbons	5	ND	ND
Gasoline Fraction (C_5-C_{12})	15	ND	ND

Approved By: _____ Date: 8/10/95

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	L953065
Project:	ARCO Products Company #276/#0805-120.04	**Date Collected:**	8/1/95
Sample Matrix:	Vapor	**Date Received:**	8/1/95
		Date Extracted:	NA

Permanent Gases*
Units: % (v/v)

	Sample Name:	**I-2**	**Method Blank**
	Lab Code:	L953065-001	L953065-MB
	Date Analyzed:	8/3/95	8/3/95
Analyte	**MRL**		
Carbon Dioxide	1	7	ND
Oxygen	1	11	ND

* Analysis performed using gas chromatography with a thermal conductivity detector.

Approved By: _____ Date: 8/10/95

3S22/120594

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-120.04/TO# 2452.00/276 Oakland
Sample Matrix: Vapor

Service Request: S950959
Date Collected: 8/1/95
Date Received: 8/1/95
Date Extracted: NA
Date Analyzed: 8/2/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: Batch QC
Lab Code: S950958-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	1.02	1.04	1.03	2
Toluene	0.5	1.72	1.82	1.77	6
Ethylbenzene	0.5	0.52	0.53	0.53	2
Xylenes, Total	1	3.44	3.62	3.53	5
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	ND	ND	ND	<1
C_5 - C_8 Hydrocarbons	20	82.6	88.0	85.3	6
C_9 - C_{12} Hydrocarbons	20	20.9	20.8	20.9	<1
Gasoline Fraction (C_5-C_{12})	60	106	109	108	3

Approved By: _____ Date: 8/10/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-120.04/TO# 2452.00/276 Oakland
Sample Matrix: Vapor

Service Request: S950959
Date Collected: 8/1/95
Date Received: 8/1/95
Date Extracted: NA
Date Analyzed: 8/2/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: Batch QC
Lab Code: S950958-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	0.32	0.33	0.33	2
Toluene	0.1	0.46	0.48	0.47	6
Ethylbenzene	0.1	0.12	0.12	0.12	2
Xylenes, Total	0.2	0.79	0.83	0.81	5
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	ND	ND	ND	<1
C_5 - C_8 Hydrocarbons	5	23.5	24.2	23.9	3
C_9 - C_{12} Hydrocarbons	5	5.7	5.7	5.7	<1
Gasoline Fraction (C_5-C_{12})	15	29.2	30.0	29.6	3

Approved By: _____ Date: 8/10/95

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-120.04/TO# 2452.00/276 Oakland

Service Request: S950959
Date Analyzed: 8/2/95

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

Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	16	17.8	111	85-115
Toluene	16	17.3	108	85-115
Ethylbenzene	16	16.4	103	85-115
Xylenes, Total	48	46.7	97	85-115
Gasoline	200	210	105	90-110

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

Approved By: _____ Date: 8/10/95

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: ARCO Products Company #276/#0805-120.04
Sample Matrix: Vapor

Service Request: L953065
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 8/3/95

Duplicate Summary
Permanent Gases*
% (v/v)

Sample Name: I-2
Lab Code: L953065-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Carbon Dioxide	1	6.73	6.73	6.73	<1
Oxygen	1	10.6	10.1	10.4	5

Approved By: _____ Date: 8/10/95

DUP1A/120594

ARCO Products Company

Division of AtlanticRichfieldCompany

Task Order No. 2452.00

Chain of Custody

ARCO Facility no. 276	City (Facility) Oakland	Project manager (Consultant) V. Vorugant;	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 408 3778697	Telephone no. (Consultant) 408 4537300	Fax no. (Consultant) 408-453-0452
Consultant name	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: Gas EPA 8015/8020	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM5520E	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 ☐	O2, CO2
OFF Site		1			X			8-1-95	1319		X											
I-1		1			X				1323		X											
I-2		2			X				1327		X											X
E-1		1			X				1315		X											

Special detection Limit/reporting: please report TPHG + BTEX in mg/m³ also CO2 O2 in % volume

Special QA/QC

Remarks: 0805-120.04

Lab number: 495-3065 595959

Turnaround time

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

Condition of sample: Inflated		Temperature received: RT	
Relinquished by sampler	Date 8-1-95	Time 1703	Received by Joanne Brown
Relinquished by	Date 8/1/95	Time 17:30	Received by
Relinquished by	Date	Time	Received by laboratory — Date 8-2-95 — Time 0900

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

APPC-3292 (2-91)

CAS-S: GBTEX CAS-LICOR Due 8/15

APPENDIX D

OPERATION AND MAINTENANCE FIELD DATA SHEETS FOR ON-SITE SVE SYSTEM, THIRD QUARTER 1995

Remarks: System OFF on arrival Replaced atm dilution valve 4" Eclipse Tried to adjust for less dilution in unit but CO2 ? putting flame out. Could not increase vacuum. Restarted at 12:42 Unit running good Changed Chart Paper.

Sampled I-1, I-2, OFF-Site & E-1

Blower Hrs. on: 267.2

Unscheduled site visit [] Scheduled site visit [X]

SYSTEM PARAMETERS (500 SCFM Gas-Fired ANGUIL Catalytic Oxidizer/ Serial # 01169107)

Arrival Time (24:00 hour)	1210	**Effluent (6") E-1** Stack Temperature (°F)	605
System Status (on or off)	OFF	Total Flow (scfm) (flow meter)	72
Shutdown Time (24:00 hour)	—	*Fire Box Temperature (°F)*	612
Restart Time (24:00 hour)	1242	Set Point (°F)	610
Reading Time (24:00 hour)	1320	**TOTAL HOURS**	267.6
ON SITE Well Field (4") I-1		CatOx (Amps)	
Vacuum (in. of H2O)	5.2	Blower (Amps)	
Velocity (ft/min)	950	Main (Amps)	
Temperature (°F)	79	Natural Gas (cf)	1137
OFF SITE Well Field (2") Off Site		**AIR MONITORING**	
Vacuum (in. of H2O)	5.6 - 6.1	**FID (ppm)** Date:	Amb / I-2 / I-1 / Off Site / E-1
Velocity (ft/min)	350 - 400	(without carbon filter)	
Total Influent (After Blower) (3") I-2		(with carbon filter)	
Total Pressure (in. of H2O)	9.9 - 10.1	**PID (ppm)** CAL GAS:	
Total Flow (in. of H2O)	.15 - .18	Date:	
Temperature (°F)	122	**Lab samples taken for analysis at:**	I-1 I-2 OFF-Site & E-1
Total Vapor Condensate on site (gal)	40		

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H2O)	FID (ppm)	PID (ppm)	REMARKS
VW-1	4"	8'-18'							
VW-2	4"	8'-18'							
VW-3	4"	8'-18'							
VW-4	4"	9'-19'							
VW-5	4"	8'-18'							
VW-7	4"	7.5'-17.5'							
MW-2	2"	15'-25'							

Special Instructions:

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

Operator: MAdler Date: 8-1-95

Project# 0805-120.04
ARCO 0276 Soil Vapor Extraction System

Remarks:

Found unit off - Unknown reason for shutdown. Temp chart looks OK - Restarted System at 16:30 To check how system is doing. Ran on fresh air only - OK

Shut off system at 17:05 Cleaned Pad. Total hours = 696.0

Took DTW in MW-2

Unscheduled site visit ☐ Scheduled site visit ☒

SYSTEM PARAMETERS (500 SCFM Gas-Fired ANGUIL Catalytic Oxidizer/ Serial # 01169107)

Arrival Time (24:00 hour)	1615	**Effluent (6") E-1** Stack Temperature (°F)	
System Status (on or off)	OFF	Total Flow (scfm) (flow meter)	
Shutdown Time (24:00 hour)		Fire Box Temperature (°F)	
Restart Time (24:00 hour)	1630	Set Point (°F)	
Reading Time (24:00 hour)		**TOTAL HOURS**	695.8
ON SITE Well Field (4") I-1		CatOx (Amps)	
Vacuum (in. of H2O)		Blower (Amps)	
Velocity (ft/min)		Main (Amps)	
Temperature (°F)		Natural Gas (cf)	1284
***OFF SITE Well Field* (2") Off Site**			
Vacuum (in. of H2O)			
Velocity (ft/min)			
Total Influent (After Blower) (3") I-2			
Total Pressure (in. of H2O)			
Total Flow (in. of H2O)			
Temperature (°F)			
Total Vapor Condensate on site (gal)	~~40~~		

AIR MONITORING

FID (ppm) Date:	Amb	I-2	I-1	Off Site	E-1
(without carbon filter)					
(with carbon filter)					
PID (ppm)	CAL GAS:				
Date:					

Lab samples taken for analysis at:

WELL FIELD

SVE WELL ID	Well Diameter	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (in. of H2O)	FID (ppm)	PID (ppm)	REMARKS
VW-1	4"	8'-18'							
VW-2	4"	8'-18'							
VW-3	4"	8'-18'							
VW-4	4"	9'-19'							
VW-5	4"	8'-18'							
VW-7	4"	7.5'-17.5'							
MW-2	2"	15'-25'	ND	16.91					

Special Instructions:

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

Operator: MAdler Date: 5/23/95

Project# 0805-120.04
ARCO 0276 Soil Vapor Extraction System