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

Date June 18, 1996
Project 20805-120.006

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	First quarter 1996 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.

ENVIRONMENTAL PROTECTION
96 JUN 26 PM 2:45

John C. Young
Project Manager

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

ARCO Products Company

Date:

June 18, 1996

Re: ARCO Station #

10600 MacArthur Boulevard • Oakland, CA
First Quarter 1996 Groundwater Monitoring Results and
Remediation System Performance Evaluation Report

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

Submitted by:

Michael R. Whelan

Michael R. Whelan
Environmental Engineer

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

June 3, 1996
Project 20805-120.006

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

Re: First quarter 1996 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 first quarter 1996 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.

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.

Please call if you have questions.

Sincerely,

EMCON

Sailaja Yelamanchili
Staff Engineer

John C. Young, R.G. 6407
Project Manager

REGISTERED GEOLOGIST
JOHN CHARLES YOUNG
EKP
7/96
NO. 6407
STATE OF CALIFORNIA

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June 3, 1996

ARCO QUARTERLY REPORT

Address: 10600 and 10700 MacArthur Boulevard,	Oakland, California
EMCON Project No.	20805-120.006
ARCO Environmental Engineer/Phone No.:	Michael Whelan /(408) 453-1640
EMCON Project Manager/Phone No.:	John Young /(408) 453-7300
Primary Agency/Regulatory ID No.:	ACHCSA /Barney Chan
Reporting Period	January 1, 1996 to April 1, 1996

WORK PERFORMED THIS QUARTER (First- 1996):

1. Conducted quarterly groundwater monitoring and sampling.
2. Prepared and submitted quarterly report for fourth quarter 1995.
3. Operation of soil-vapor extraction (SVE) system.
4. Installed oxygen releasing compounds (ORCs) into groundwater wells MW-2 and MW-7, on January 16, 1996, to further stimulate natural biodegradation.

WORK PROPOSED FOR NEXT QUARTER (Second- 1996):

1. Perform quarterly groundwater monitoring and sampling.
2. Continue operation of SVE system.
3. Prepare and submit quarterly report for first quarter 1996.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring and Operation and Maintenance of Remediation Systems Stimulate natural biodegradation with ORCs. SVE system was shut down on 3-26-96, due to high groundwater levels. The system will be restarted when groundwater recedes.
Frequency of Sampling:	Quarterly (groundwater), Monthly (SVE)
Frequency of Monitoring:	Quarterly (groundwater), Monthly (SVE)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Cumulative FP Recovered to Date :	18.54 gallons, Wells MW-2 and MW-7
FP Recovered This Quarter :	None
Bulk Soil Removed to Date :	564 cubic yards of TPH-impacted soil
Bulk Soil Removed This Quarter :	None
Water Wells or Surface Waters, within 2000 ft., impacted by site:	None
Current Remediation Techniques:	SVE System
Approximate Depth to Groundwater:	22.16 feet
Groundwater Gradient (Average):	0.004 ft/ft toward north-northeast

SVE QUARTERLY OPERATION AND PERFORMANCE:

Equipment Inventory:	Anguil Energy Systems Remedi-Cat, 500 cfm, Catalytic Oxidizer For the period from September 6, 1990 through December 22, 1994, please refer to *Fourth Quarter 1994 Groundwater Monitoring Results and Remediation System Performance Evaluation Report,* (EMCON, March 1995), for system operation before December 1994.
Operating Mode:	Catalytic Oxidation
BAAQMD Permit #, A/N:	5998
TPH Conc. End of Period (lab):	NA (Not Available)
Benzene Conc. End of Period (lab):	NA
Flowrate End of Period:	197.8 scfm
HC Destroyed This Period:	29.0 pounds
HC Destroyed to Date:	7,810.6 pounds
Utility Usage	
Electric (KWH):	2,323
Gas/Propane (CF):	183
Operating Hours This Period:	520.2 hours
Percent Operational:	23.8% System was pulsed for one month during the first quarter of 1996.
Operating Hours to Date:	4282.8 hours
Unit Maintenance:	NA
Number of Auto Shut Downs:	0
Destruction Efficiency Permit Requirement:	90%
Percent TPH Conversion:	NA Laboratory analytical results collected during this period indicated the TVHG and benzene concentrations in vapor influent to and effluent from the unit were below laboratory detection limits.
Stack Temperature:	550°F
Source Flow:	197.8 scfm
Process Flow:	500 scfm
Source Vacuum:	9.0 inches of water

ATTACHED:

- Table 1 - Groundwater Monitoring Data, First Quarter 1996
- 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 - Soil-Vapor Extraction Well Data
- Figure 1 - Site Location
- Figure 2 - TPHG and Benzene Concentrations in Groundwater, First Quarter 1996
- Figure 3 - Tetrachloroethene (PCE) Concentrations in Groundwater, First Quarter 1996
- Figure 4 - Soil-Vapor Extraction and Treatment System, Historical Well Field Influent TVHG and Benzene Concentrations

- Figure 5 - Soil-Vapor Extraction and Treatment System, Historical Hydrocarbon Removal Rates
- Appendix A - Field Data Sheets, First Quarter 1996 Groundwater Monitoring Event
- Appendix B - Analytical Results and Chain-of-Custody Documentation, First Quarter 1996 Groundwater Monitoring Event
- Appendix C - SVE System Monitoring Data Log Sheets
- Appendix D - Field Data Sheets, Operation and Maintenance Visits, First Quarter 1996
- Appendix E - Analytical Results and Chain-of-Custody Documentation for Soil-Vapor Extraction System Samples, First Quarter 1996

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

Table 1
Groundwater Monitoring Data
First Quarter 1996

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	02-28-96	55.92	24 99	30.93	ND	NNE	0.004	02-28-96	<50	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-2	02-28-96	55.10	12 46	42 64	ND	NNE	0.004	02-28-96	330	18	0 9	13	13	--	--	--	--
MW-3	02-28-96	56.55	25.32	31.23	ND	NNE	0.004	02-28-96	<500*	<0 5	<0.5	<0 5	<0.5	--	--	--	--
MW-4	02-28-96	55.98	24.77	31.21	ND	NNE	0 004	02-28-96	<1000*	<1**	<1**	<1**	<1**	--	--	0.7	--
MW-5	02-28-96	55.43	24 07	31.36	ND	NNE	0 004	02-28-96	<400*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-6	02-28-96	61.21	30 18	31.03	ND	NNE	0 004	02-28-96	<500*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-7	02-28-96	58.22	16 54	41.68	ND	NNE	0.004	02-28-96	29000	<20***	<20***	180	1000	--	--	--	--
MW-8	02-28-96	53.65	22.16	31.49	ND	NNE	0.004	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
RW-1	02-28-96	56.32	25.12	31.20	ND	NNE	0 004	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
WGR-3	02-28-96	NR	14.90	NR	ND	NNE	0 004	02-28-96	<50	<0 5	<0.5	1.5	1.6	--	--	--	--

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
NNE: north-northeast
- - : not analyzed
*: 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 MRL due to high analyte concentration requiring a dilution

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20805-120.006

Table 2
Historical Groundwater Elevation Data
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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
MW-1	11-16-95	55.92	30 85	25.07	ND	SW	0.003
MW-1	02-28-96	55.92	24 99	30.93	ND	NNE	0.004
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
MW-2	11-16-95	55.10 Not surveyed: well was inaccessible					
MW-2	02-28-96	55 10	12.46	42 64	ND	NNE	0.004
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
MW-3	11-16-95	56.55	31.50	25 05	ND	SW	0.003
MW-3	02-28-96	56.55	25.32	31 23	ND	NNE	0.004
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
MW-4	11-16-95	55.98	31.00	24.98	ND	SW	0.003
MW-4	02-28-96	55.98	24.77	31.21	ND	NNE	0.004

Table 2
Historical Groundwater Elevation Data
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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
MW-5	11-16-95	55.43	30.63	24 80	ND	SW	0.003
MW-5	02-28-96	55 43	24.07	31 36	ND	NNE	0.004
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
MW-6	11-16-95	61.21	36 40	24.81	ND	SW	0.003
MW-6	02-28-96	61.21	30 18	31.03	ND	NNE	0.004
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
MW-7	11-16-95	58.22	23.02	35.20	ND	SW	0.003
MW-7	02-28-96	58.22	16.54	41.68	ND	NNE	0.004
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
MW-8	11-16-95	53.65	28.90	24.75	ND	SW	0.003
MW-8	02-28-96	53.65	22.16	31.49	ND	NNE	0.004

Table 2
Historical Groundwater Elevation Data
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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
RW-1	11-16-95	56.32	31.34	24.98	ND	SW	0.003
RW-1	02-28-96	56 32	25.12	31.20	ND	NNE	0.004
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
WGR-3	11-16-95	NR	22.50	NR	ND	SW	0 003
WGR-3	02-28-96	NR	14.90	NR	ND	NNE	0.004

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
##: 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
*: For previous historical groundwater elevation data please refer to *Fourth Quarter 1995 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Retail Service Station 10600 and 10700 MacArthur Boulevard,Oakland, California, (EMCON, March 22, 1996).*

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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	--	--
MW-1	11-16-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
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	--	--
MW-2	11-16-95	Not surveyed: well was inaccessible								
MW-2	02-28-96	330	18	0.9	13	13	--	--	--	--
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	--	--
MW-3	11-16-95	<500*	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-3	02-28-96	<500*	<0 5	<0.5	<0.5	<0.5	--	--	--	--
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	--	--
MW-4	11-16-95	<900*	<0.5	<0.5	<0 5	<0.5	<6**	--	<0.5	--
MW-4	02-28-96	<1000*	<1**	<1**	<1**	<1**	--	--	0.7	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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-5	11-16-95	<500*	<0.5	<0.5	<0.5	0.7	<20**	--	--	--
MW-5	02-28-96	<400*	<0.5	<0.5	<0 5	<0 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	--	--
MW-6	11-16-95	<500*	<0.5	<0 5	<0.5	<0.5	<3	--	--	--
MW-6	02-28-96	<500*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
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-7	11-16-95	1400000	610	590	7800	3300	<4000***	--	--	--
MW-7	02-28-96	29000	<20***	<20***	180	1000	--	--	--	--
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	--	--
MW-8	11-16-95	<50	<0.5	<0.5	<0.5	<0.5	6	9	--	--
MW-8	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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	--	--
RW-1	11-16-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
RW-1	02-28-96	<50	<0.5	<0.5	<0 5	<0 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	--	--
WGR-3	11-16-95	<50	<0.5	<0.5	<0.5	<0.5	3	--	--	--
WGR-3	02-28-96	<50	<0.5	<0.5	1.5	1.6	--	--	--	--

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
*: 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
^. For previous historical analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Retail Service Station 10600 and 10700 MacArthur Boulevard,Oakland, California, (EMCON, March 22, 1996).*

Table 4
Historical Groundwater Analytical Data
Metals

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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
MW-1	11-16-95	45	<1	--	<1	<1	<1	<1	<1	<5
MW-1	02-28-96	97	<1	<1	<1	--	<1	<1	<1	<5
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
MW-2	11-16-95	Not surveyed: well was inaccessible								
MW-2	02-28-96	<1	<1	<1	<1	--	18	<1	13	14

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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
MW-3	11-16-95	1100	<20	--	<20	<20	<20	<20	<20	<100
MW-3*	02-28-96	1100	<10	<10	<10	--	<10	<10	<10	<50
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
MW-4	11-16-95	2100	<20	--	<20	<20	<20	<20	<20	<100
MW-4*	02-28-96	2400	<20	<20	<20	--	<20	<20	<20	<100

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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
MW-5	11-16-95	940	<5	--	<5	<5	<5	<5	<5	<25
MW-5*	02-28-96	1100	<10	<10	<10	--	<10	<10	<10	<50
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
MW-6	11-16-95	1300	<20	--	<20	<20	<20	<20	<20	<100
MW-6*	02-28-96	960	<20	<20	<20	--	<20	<20	<20	<100

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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
MW-7	11-16-95	<20	<20	--	<20	<20	360	220	1700	10000
MW-7*	02-28-96	<10	<10	<10	<10	--	<10	<10	87	760
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
MW-8	11-16-95	<1	<1	--	<1	<1	<1	<1	<1	<5
MW-8	02-28-96	3	<1	<1	<1	--	<1	<1	<1	<5

Table 5
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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	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
RW-1	11-16-95	140	<1	--	<1	<1	<1	<1	<1	<5
RW-1	02-28-96	6	<1	<1	<1	--	<1	<1	<1	<5
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
WGR-3	11-16-95	<1	<1	--	<1	<1	<1	<1	<1	<5
WGR-3	02-28-96	<1	<1	<1	<1	--	<1	<1	<1	<5

µg/L: micrograms per liter
- - : not analyzed or not reported
*: For previous historical analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Retail Service Station 10600 and 10700 MacArthur Boulevard,Oakland, California, (EMCON, March 22, 1996).*

Table 6
Approximate Cumulative Floating Product Recovered

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-13-96

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
MW-2 and MW-7	1996	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: 04-01-96
System was shut down on 3-26-96.

Date Begin:		09-06-90	12-22-94	01-01-95	02-01-95	03-01-95
Date End:		12-22-94	01-01-95	02-01-95	03-01-95	04-01-95
Mode of Oxidation:		Catalytic (14)	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		0.0	4.9	26.4	28.0	31.0
Days of Downtime:		0.0	26.2	4.6	0.0	0.0
Average Vapor Concentrations (1)						
On-site WF Influent:	ppmv (2) as gasoline	NA (15)	32	<15	<15	1.2
	mg/m3 (3) as gasoline	NA	116	<60	<60	4.4
	ppmv as benzene	NA	<0.1	<0.1	<0.1	<0.05
	mg/m3 as benzene	NA	<0.3	<0.5	<0.5	<0.16
Off-site WF Influent:	ppmv as gasoline	NA	closed	closed	<15	1.4
	mg/m3 as gasoline	NA	closed	closed	<60	4.9
	ppmv as benzene	NA	closed	closed	<0.1	<0.05
	mg/m3 as benzene	NA	closed	closed	<0.5	<0.16
System Influent:	ppmv as gasoline	NA	32	<15	<15	<1.0
	mg/m3 as gasoline	NA	116	<60	<60	<3.6
	ppmv as benzene	NA	<0.1	<0.1	<0.1	<0.05
	mg/m3 as benzene	NA	<0.3	<0.5	<0.5	<0.16
System Effluent:	ppmv as gasoline	NA	<15	<15	<15	1.3
	mg/m3 as gasoline	NA	<54	<60	<60	4.6
	ppmv as benzene	NA	<0.1	<0.1	<0.1	<0.05
	mg/m3 as benzene	NA	<0.3	<0.5	<0.5	<0.16
Average On-site Well Field Flow Rate (4), scfm (5):		NA	81.6	53.7	62.0	71.3
Average Off-site Well Field Flow Rate (4), scfm:		NA	closed	closed	17.6	47.8
Average System Influent Flow Rate (4), scfm:		NA	81.6	53.7	79.6	119.1
Total Process Flow Rate, scfm:		NA	500.0	500.0	500.0	500.0
Average Destruction Efficiency (6), percent (7):		NA	53.4 (16)	NA	NA	NA
Average Emission Rates (8), pounds per day (9)						
Gasoline:		NA	0.40	0.29	0.43	0.05
Benzene:		NA	0.00	0.00	0.00	0.00
Operating Hours This Period:		NA	116.5	633.4	672.0	744.0
Operating Hours To Date:		NA	116.5	749.9	1421.9	2165.9
Pounds/ Hour Removal Rate, as gasoline (10):		NA	0.035	0.012	0.018	0.004
Pounds Removed This Period, as gasoline (11):		NA	4.13	7.64	12.01	3.08
Pounds Removed To Date, as gasoline (12):		7665.5	7669.6	7677.3	7689.3	7692.4
Gallons Removed This Period, as gasoline (13).		NA	0.67	1.23	1.94	0.50
Gallons Removed To Date, as gasoline:		1236.4	1237.1	1238.3	1240.3	1240.8

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: 04-01-96
System was shut down on 3-26-96.

Date Begin:		04-01-95	05-01-95	08-01-95	09-01-95	10-01-95
Date End:		05-01-95	08-01-95	09-01-95	10-01-95	01-01-96
Mode of Oxidation:		Catalytic	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		30.0	18.7	17.9	0.0	0.0
Days of Downtime:		0.0	73.3	13.1	30.0	92.0
Average Vapor Concentrations (1)						
On-site WF Influent:	ppmv (2) as gasoline	<15	<15	95	NA	NA
	mg/m3 (3) as gasoline	<60	<60	350	NA	NA
	ppmv as benzene	<0.1	<0.1	1.1	NA	NA
	mg/m3 as benzene	<0.5	<0.5	3.6	NA	NA
Off-site WF Influent:	ppmv as gasoline	<15	<15	<15	NA	NA
	mg/m3 as gasoline	<60	<60	<60	NA	NA
	ppmv as benzene	<0.1	<0.1	<0.1	NA	NA
	mg/m3 as benzene	<0.5	<0.5	<0.5	NA	NA
System Influent:	ppmv as gasoline	<15	<15	93	NA	NA
	mg/m3 as gasoline	<60	<60	340	NA	NA
	ppmv as benzene	<0.1	<0.1	1	NA	NA
	mg/m3 as benzene	<0.5	<0.5	3.3	NA	NA
System Effluent:	ppmv as gasoline	<15	<15	<15	NA	NA
	mg/m3 as gasoline	<60	<60	<60	NA	NA
	ppmv as benzene	<0.1	<0.1	<0.1	NA	NA
	mg/m3 as benzene	<0.5	<0.5	<0.5	NA	NA
Average On-site Well Field Flow Rate (4), scfm (5):		74.5	79.6	83.5	0.0	0.0
Average Off-site Well Field Flow Rate (4), scfm:		37.1	33.6	34.2	0.0	0.0
Average System Influent Flow Rate (4), scfm:		111.6	113.3	117.7	0.0	0.0
Total Process Flow Rate, scfm:		500.0	500.0	500.0	0.0	0.0
Average Destruction Efficiency (6), percent (7):		NA	NA	82.4 (16)	NA	NA
Average Emission Rates (8), pounds per day (9)						
Gasoline:		0.60	0.61	0.63	NA	NA
Benzene:		0.01	0.01	0.01	NA	NA
Operating Hours This Period:		720.0	447.9	428.8	0.0	0.0
Operating Hours To Date:		2885.9	3333.8	3762.6	3762.6	3762.6
Pounds/ Hour Removal Rate, as gasoline (10):		0.025	0.025	0.154	0.000	0.000
Pounds Removed This Period, as gasoline (11):		18.04	11.39	66.11	0.00	0.00
Pounds Removed To Date, as gasoline:		7710.4	7721.8	7787.9	7787.9	7787.9
Gallons Removed This Period, as gasoline (12):		2.91	1.84	10.66	0.00	0.00
Gallons Removed To Date, as gasoline:		1243.7	1245.5	1256.2	1256.2	1256.2

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: 04-01-96
System was shut down on 3-26-96.

Date Begin:	01-01-96	02-01-96	03-01-96
Date End:	02-01-96	03-01-96	04-01-96
Mode of Oxidation:	Catalytic	Catalytic	Catalytic
Days of Operation:	12.8	1.5	7.4
Days of Downtime:	18.2	27.5	23.6
Average Vapor Concentrations (1)			
On-site WF Influent: ppmv (2) as gasoline	<15	NA	NA
mg/m3 (3) as gasoline	<60	NA	NA
ppmv as benzene	<0.1	NA	NA
mg/m3 as benzene	<0.5	NA	NA
Off-site WF Influent: ppmv as gasoline	<15	NA	NA
mg/m3 as gasoline	<60	NA	NA
ppmv as benzene	<0.1	NA	NA
mg/m3 as benzene	<0.5	NA	NA
System Influent: ppmv as gasoline	<15	NA	NA
mg/m3 as gasoline	<60	NA	NA
ppmv as benzene	<0.1	NA	NA
mg/m3 as benzene	<0.5	NA	NA
System Effluent: ppmv as gasoline	<15	NA	NA
mg/m3 as gasoline	<60	NA	NA
ppmv as benzene	<0.1	NA	NA
mg/m3 as benzene	<0.5	NA	NA
Average On-site Well Field Flow Rate (4), scfm (5):	174.1	178.4	178.4
Average Off-site Well Field Flow Rate (4), scfm.	17.2	19.4	19.4
Average System Influent Flow Rate (4), scfm:	191.3	197.8	197.8
Total Process Flow Rate, scfm:	500.0	500.0	500.0
Average Destruction Efficiency (6), percent (7):	82.4 (16)	NA	NA
Average Emission Rates (8), pounds per day (9)			
Gasoline:	1.03	NA	NA
Benzene:	0.01	NA	NA
Operating Hours This Period:	306.9	35.5	177.8
Operating Hours To Date:	4069.5	4105.0	4282.8
Pounds/ Hour Removal Rate, as gasoline (10):	0.043	0.044	0.044
Pounds Removed This Period, as gasoline (11):	13.18	1.58	7.90
Pounds Removed To Date, as gasoline:	7801.1	7802.7	7810.6
Gallons Removed This Period, as gasoline (12):	2.13	0.25	1.27
Gallons Removed To Date, as gasoline:	1258.3	1258.6	1259.8

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: 04-01-96 System was shut down on 3-26-96.

CURRENT REPORTING PERIOD:	01-01-96	to	04-01-96
DAYS / HOURS IN PERIOD:	91.0	2184.0	
DAYS / HOURS OF OPERATION:	21.7	520.2	
DAYS / HOURS OF DOWN TIME:	69.3	1663.8	
PERCENT OPERATIONAL:		23.8	%
PERIOD POUNDS REMOVED:	22.7		
PERIOD GALLONS REMOVED:	3.7		
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):		194.0	

1. Average concentrations are based on discrete sample results reported during the month; refer to Appendix C for discrete sample results.
2. ppmv: parts per million by volume
3. mg/m3: milligrams per cubic meter
4. Average flow rates (time weighted average) are based on instantaneous flow rates recorded during the month; refer to Appendix C for instantaneous flow data.
5. scfm: flow in standard cubic feet per minute at one atmosphere and 70 degrees Fahrenheit
6. Average destruction efficiencies are calculated using monthly average concentrations; refer to Appendix C for instantaneous destruction efficiency data.
7. 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
8. Average emission rates are calculated using monthly average concentrations and flow rates; refer to Appendix C for instantaneous emission rate data.
9. 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
10. pounds/ hour removal rate (as gasoline) = well field influent concentration (as gasoline in mg/m3) x well field influent flow rate (scfm) x 0 02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
11. pounds removed this period (as gasoline) = pounds/ hour removal rate x hours of operation
12. 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 additional data for system operation before December 1994.*
13. gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0 1613 gallons/pound of gasoline
14. 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.
15. NA: not analyzed, not available, or not applicable
16. 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 Well Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-29-96
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											
01-16-96	System was restarted											
01-16-96	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
03-26-96	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 8
Soil-Vapor Extraction Well Data

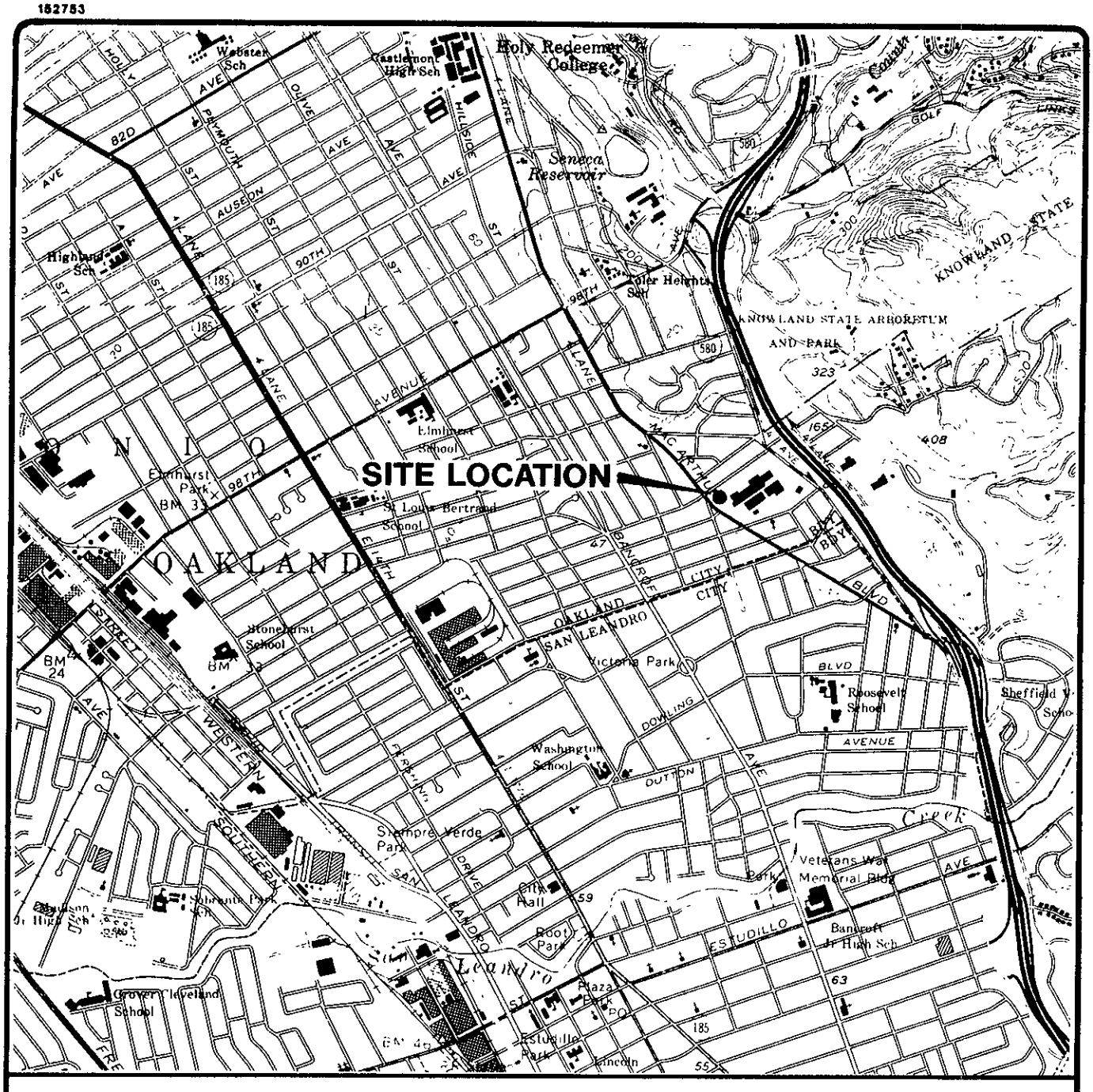
10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 05-29-96
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											
01-16-96	System was restarted											
01-16-96	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
03-26-96	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

152753



Base map from USGS 7.5' Quad. Maps:
Oakland East and San Leandro, California.
Photorevised 1980.

Scale : 0 2000 4000 Feet

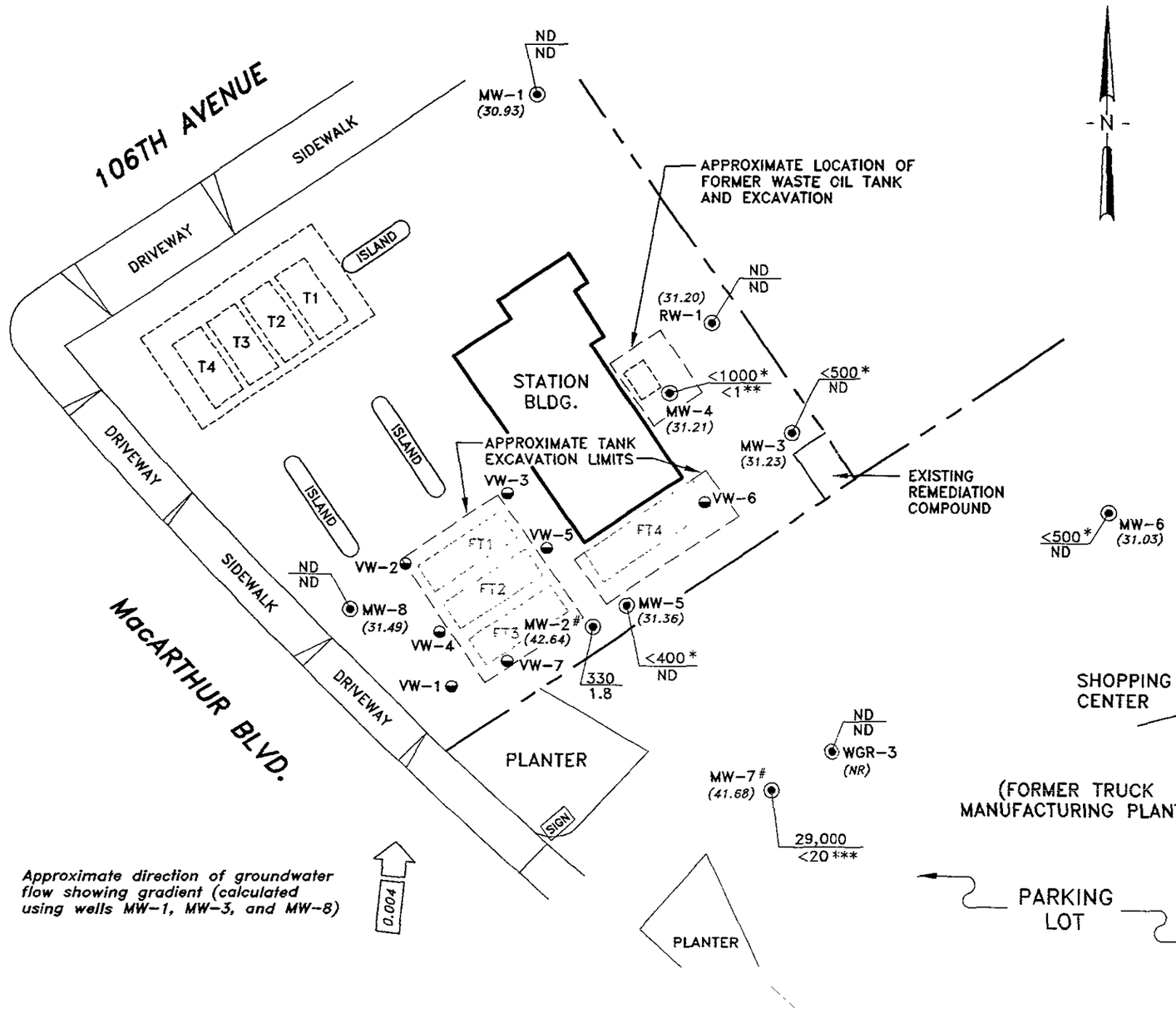
- N -

EMCON

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

SITE LOCATION

FIGURE
1
PROJECT NO.
805-120.06



EXPLANATION

- ◉ Groundwater monitoring well
- ◒ Vapor extraction well
- Existing underground storage tank
- Former underground storage tank
- (30.93) Groundwater elevation (Ft.–MSL); measured 2/28/96
- <500* / ND — TPHG concentration in groundwater (ug/L); sampled 2/28/96
- <500* / ND — Benzene concentration in groundwater (ug/L); sampled 2/28/96
- * 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
- *** Raised method reporting limit due to high analyte concentration 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 ug/L) or benzene (0.5 ug/L)
- NR Not recorded

Base map modified from PESA, 1995

EMCON

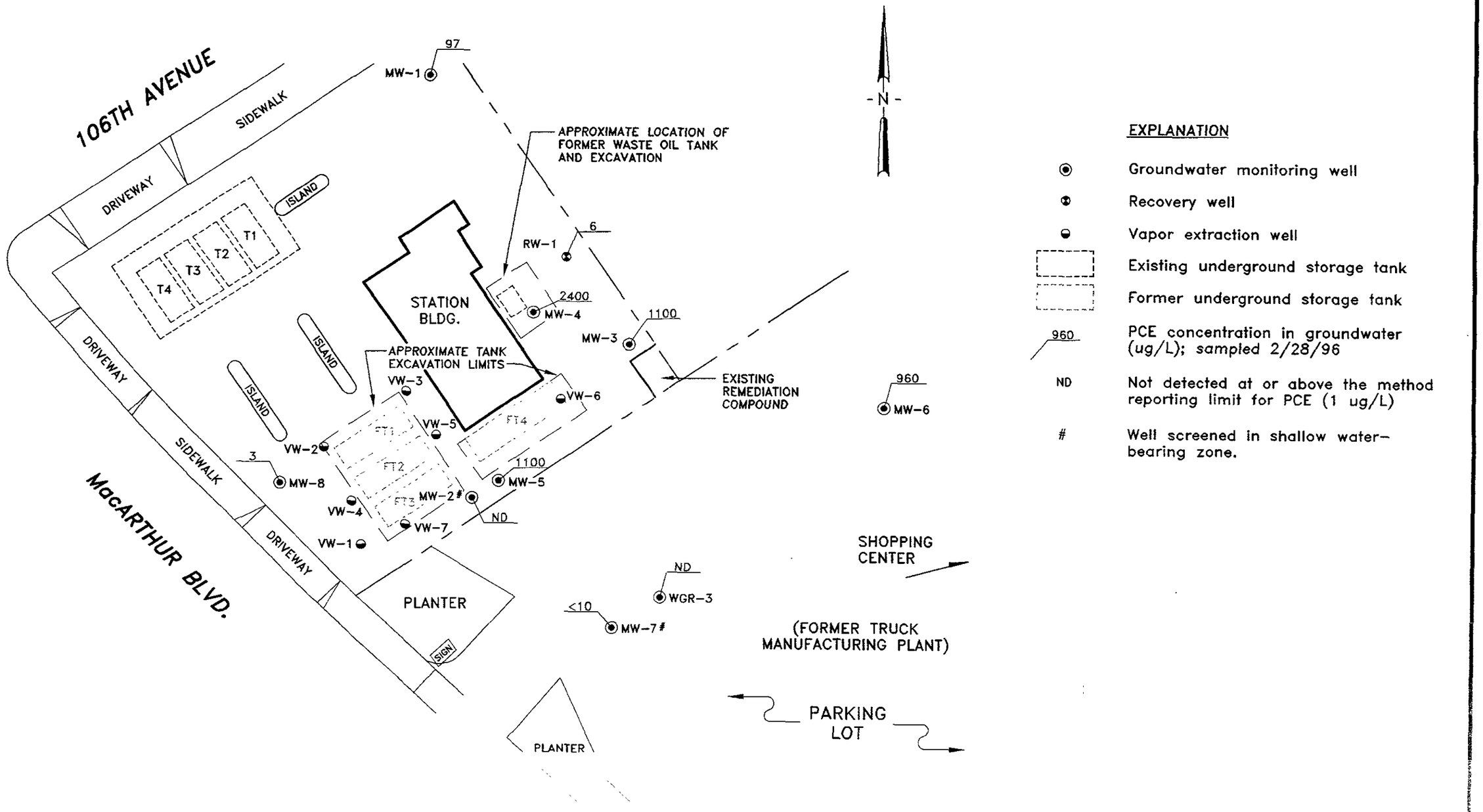
SCALE: 0 30 60 FEET

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

TPHG AND BENZENE CONCENTRATIONS IN GROUNDWATER
FIRST QUARTER 1996

FIGURE NO.
2
PROJECT NO.
805–120.006

G:\805-120\GOOA REV 0 05/03/96 10:24:29 DD DJ



Base map modified from PESA 1997

EMCON

SCALE: 0 30 60 FEET

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

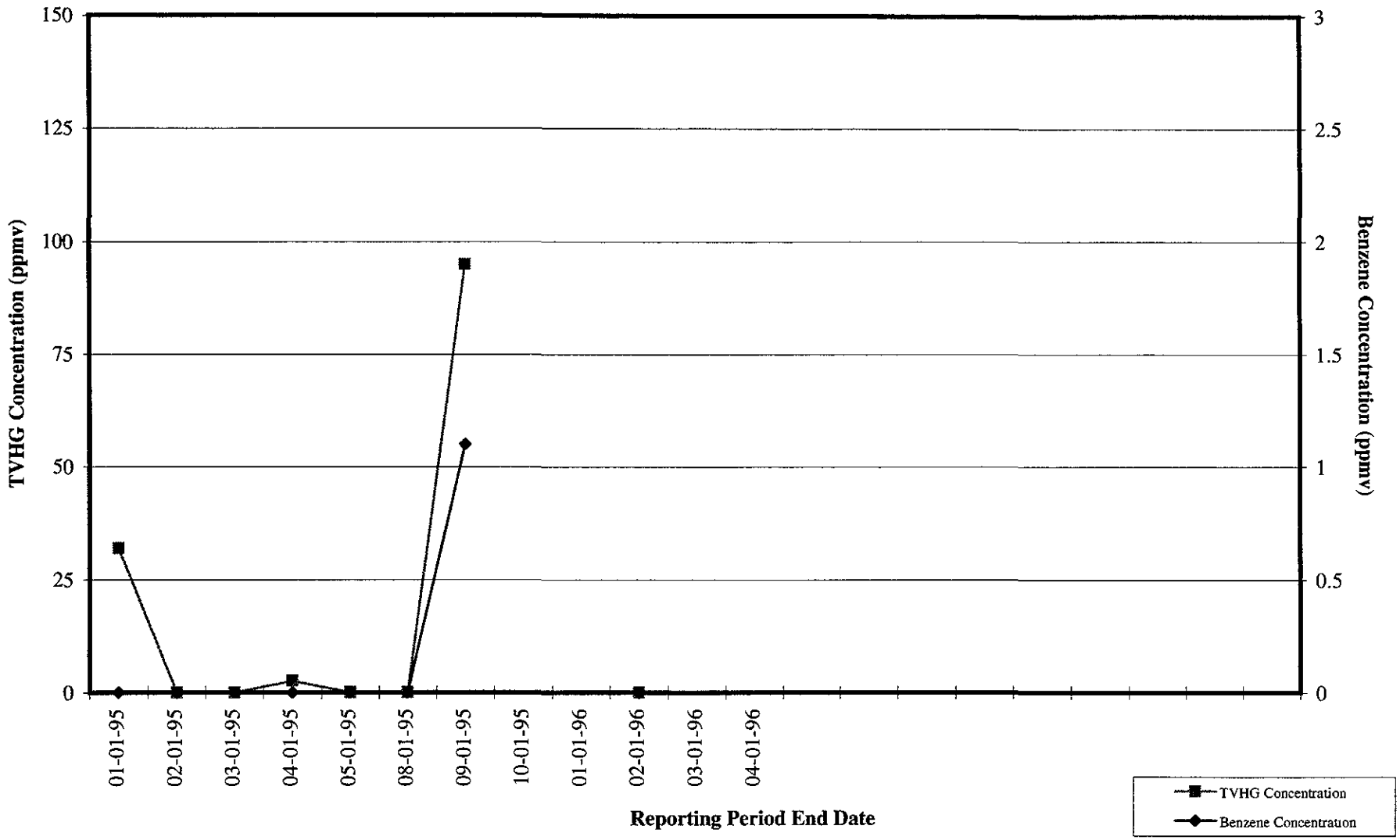
TETRACHLOROETHENE (PCE) CONCENTRATIONS IN GROUNDWATER
FIRST QUARTER 1996

FIGURE NO.
3
PROJECT NO
805-120.006

G:\805-120\PCE REV 0 05/03/96 10:12:16 DD DJ

Figure 4

ARCO Service Station 276
Soil-Vapor Extraction and Treatment System
Historical Well Field Influent TVHG and Benzene Concentrations

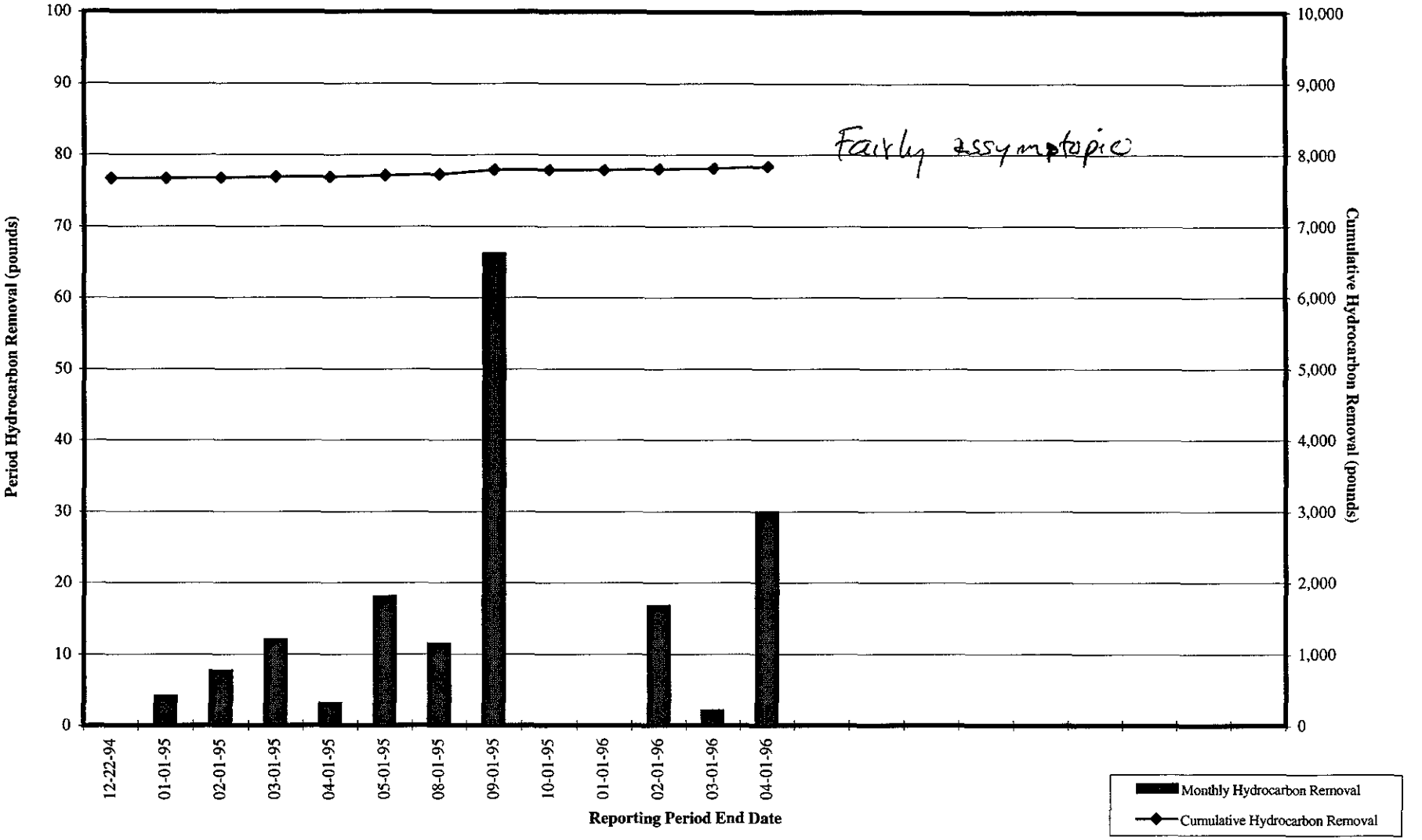


TVHG: total volatile hydrocarbons as gasoline
ppmv: parts per million by volume

esj/h.\0276\0276tdb.xls\SVE Model:imi
20805-120.006

Figure 5

10600 and 10700 MacArthur Boulevard
On-Site Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates



Based on data from EVAX, PEG, and RESNA, approximately 7,666 pounds of hydrocarbon were removed between September 6, 1990 and December 22, 1994.

esj/h:\0276\0276tdb xls\SVE Model:imi
20805-120.006

APPENDIX A

FIELD DATA SHEETS, FIRST QUARTER 1996 GROUNDWATER MONITORING EVENT

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 21775-202.002 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : WEDNESDAY

ARCO STATION # : 276 FIELD TECHNICIAN : M. Ross / J Williams DAY : 2-28-96

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	OK	Yes	Yes	NO	NO	22.16	22.16	NA	NA	47.8	SCAP CAP
2	WGR-3	OK	Yes	Yes	Yes	Yes	14.90	14.90	NA	NA	27.0	
3	MW-1	OK	Yes	Yes	Yes	Yes	24.99	24.99	NA	NA	38.8	water in box
4	MW-5	OK	Yes	Yes	Yes	Yes	24.07	24.07	NA	NA	47.0	
5	RW-1	OK	Yes	Yes	NO	NO	25.12	25.12	NA	NA	48.9	water in box - well cap cracked
6	MW-6	OK	Yes	Yes	Yes	Yes	30.13	30.13	NA	NA	48.7	water in box broken well cap
7	MW-3	OK	YES	YES	YES	YES	25.32	25.32	NA	NA	38.4	
8	MW-4	OK	YES	YES	YES	YES	24.77	24.77	NA	NA	48.0	
9	MW-2	OK	YES	YES	YES	YES	12.46	12.46	NA	NA	25.4	
10	MW-7	OK	YES	YES	YES	YES	16.54	16.54	NA	NA	36.7	

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202.002 SAMPLE ID: MW-1 (38)

PURGED BY: M. Ross CLIENT NAME: ARCO 276

SAMPLED BY: M. Ross 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.):	2.25
DEPTH TO WATER (feet):	24.99	CALCULATED PURGE (gal.):	6.76
DEPTH OF WELL (feet):	38.8	ACTUAL PURGE VOL. (gal.):	7.0

DATE PURGED: 2-28-96 Start (2400 Hr) 1230 End (2400 Hr) 1244

DATE SAMPLED: 2-28-96 Start (2400 Hr) 1250 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1235	2.5	6.49	2320	64.3	Light Brn	Trace
1239	5.0	6.64	2550	65.1	Light Brn	Trace
1244	7.0	6.56	2520	65.4	Light Brn	Trace

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

NA (COBALT 0 - 500)

NA (NTU 0 - 200 or 0 - 1000)

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

WELL INTEGRITY: Good LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: 1100 Meter Serial #: 9810 Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: Mike Ross Reviewed By: SIA Page 1 of 10

Rev 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 2175-202.002 SAMPLE ID: MW-7 (25)

PURGED BY: M. Ross CLIENT NAME: Arco 276

SAMPLED BY: M. Ross 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.):	8.45
DEPTH TO WATER (feet):	12.46	CALCULATED PURGE (gal.):	25.36
DEPTH OF WELL (feet):	25.4	ACTUAL PURGE VOL. (gal.):	25.5

DATE PURGED: 2-28-96 Start (2400 Hr) 1340 End (2400 Hr) 1350

DATE SAMPLED: 2-28-96 Start (2400 Hr) 1400 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1343	8.5	6.66	376	62.7	dk	dk
1347	17.0	6.58	360	60.8	dk	dk
1350	25.5	6.57	394	61.7	dk	dk

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

NA (COBALT 0 - 500)

NA (NTU 0 - 200 or 0 - 1000)

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: GOOD LOCK #: Arco

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: 1100 Meter Serial #: 9210 Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: Mike Ross Reviewed By: SH Page 2 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-200-002 SAMPLE ID: MW-3 (38)

PURGED BY: S. WILLIAMS CLIENT NAME: ARCO 276

SAMPLED BY: — 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.): 2.12

DEPTH TO WATER (feet): 25.42 CALCULATED PURGE (gal.): 6.36

DEPTH OF WELL (feet): 38.4 ACTUAL PURGE VOL. (gal.): 6.5

DATE PURGED: 02-28-96 Start (2400 Hr) 1210 End (2400 Hr) 1217

DATE SAMPLED: — Start (2400 Hr) — End (2400 Hr) 1220

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1213	3.5	6.92	1543	67.9	BROWN	HEAVY
1215	4.5	6.65	1495	69.8	BROWN	HEAVY
1217	6.5	6.61	1495	69.9	BROWN	HEAVY

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

COLOR (COBALT 0 - 500): NR

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

Other: ___

SAMPLING EQUIPMENT

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

Other: ___

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: ___ Meter Serial #: 9208 Temperature °F: ___

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

Location of previous calibration: ___

Signature: [signature] Reviewed By: SA Page 3 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202-002 SAMPLE ID: MW-4 (48)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 276

SAMPLED BY: ↓ 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.):	3.77
DEPTH TO WATER (feet):	24.77	CALCULATED PURGE (gal.):	11.38
DEPTH OF WELL (feet):	48.0	ACTUAL PURGE VOL. (gal.):	11.5

DATE PURGED: 02-28-96 Start (2400 Hr) 1243 End (2400 Hr) 1248

DATE SAMPLED: ↓ Start (2400 Hr) — End (2400 Hr) 1255

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1245	~~4~~	6.76	1930	64.0	BROWN	HEAVY
1247	8	6.78	1936	66.0	BROWN	HEAVY
1248	11.5	6.81	1942	66.7	BROWN	HEAVY

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

Other: ___

SAMPLING EQUIPMENT

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

Other: ___

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: ___ Meter Serial #: 9208 Temperature °F: ___

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

Location of previous calibration: ___

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

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 2175-202.002 SAMPLE ID: MW-5 (47')

PURGED BY: M. Ross CLIENT NAME: ARCO 276

SAMPLED BY: M. Ross 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.): 14.98

DEPTH TO WATER (feet): 24.07 CALCULATED PURGE (gal.): 14.94

DEPTH OF WELL (feet): 47.0 ACTUAL PURGE VOL. (gal.): 45.0

DATE PURGED: 2-28-96 Start (2400 Hr) 1300 End (2400 Hr) 1315

DATE SAMPLED: 2-28-96 Start (2400 Hr) 1325 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1305	15.0	6.54	1120	65.5	clr	clr
1310	30.0	6.39	1173	66.2	clr	clr
1315	45.0	6.38	1132	66.0	clr	clr

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

COLOR (COBALT 0 - 500): NA

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: Good LOCK #: Arco

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: 1100 Meter Serial #: 9210 Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: Mike Ross Reviewed By: ___ Page 5 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202-002 SAMPLE ID: MW-6 (48)

PURGED BY: J. WILLIAM CLIENT NAME: ARCO 276

SAMPLED BY: " 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): N/A VOLUME IN CASING (gal.): 3.01

DEPTH TO WATER (feet): 30.24 CALCULATED PURGE (gal.): 9.04

DEPTH OF WELL (feet): 48.7 ACTUAL PURGE VOL. (gal.): 9.5

DATE PURGED: 02-28-96 Start (2400 Hr) 1140 End (2400 Hr) 1149

DATE SAMPLED: " Start (2400 Hr) — End (2400 Hr) 1152

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1143	3.5	7.01	1724	67.9	BROWN	HEAVY
1145	6.5	7.04	1629	72.8	BROWN	HEAVY
1149	9.5	7.00	1620	72.0	BROWN	MOD

D. O. (ppm): N/A ODOR: NONE N/A (COBALT 0 - 500) N/A (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: N/A

Parameters field filtered at this well: N/A

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: ___ Meter Serial #: 9208 Temperature °F: ___

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

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 6 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-120-C06 SAMPLE ID: MW-7 (36)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 276

SAMPLED BY: " 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.): 3.27

DEPTH TO WATER (feet): 16.55 CALCULATED PURGE (gal.): 9.82

DEPTH OF WELL (feet): 36.6 ACTUAL PURGE VOL. (gal.): 10.0

DATE PURGED: 02-28-96 Start (2400 Hr) 1320 End (2400 Hr) 1226

DATE SAMPLED: " Start (2400 Hr) — End (2400 Hr) 1232

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1323	3.5	6.45	484	66.5	BROWN	HEAVY
1225	7	6.25	442	67.5	BROWN	MOD
1226	10	6.20	442	67.7	BROWN	MOD

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

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

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

___ 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 #: ___

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: ___ Meter Serial #: 9208 Temperature °F: ___

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

Location of previous calibration: ___

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

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 2275-202.002 SAMPLE ID: MW-8 (47)

PURGED BY: M. Ross CLIENT NAME: ARCO 276

SAMPLED BY: M. Ross LOCATION: OAKLAND, CA

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

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ T.96 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NA	VOLUME IN CASING (gal.):	16.75
DEPTH TO WATER (feet):	22.16	CALCULATED PURGE (gal.):	50.25
DEPTH OF WELL (feet):	47.8	ACTUAL PURGE VOL. (gal.):	50.5

DATE PURGED: 2-28-96 Start (2400 Hr) 1104 End (2400 Hr) 1125

DATE SAMPLED: 2-28-96 Start (2400 Hr) 1135 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1112	17.0	6.51	655	64.1	clr	clr
1118	34.0	6.53	613	65.5	clr	clr
1125	50.5	6.45	615	65.2	clr	clr

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

Color: NA (COBALT 0 - 500)

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

___ 2" Bladder Pump
___ 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: GOOD LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: 1100 Meter Serial #: 9210 Temperature °F: 57.3

(EC 1000 1026 / 1000) (DI —) (pH 7 684 / 700) (pH 10 934 / 1000) (pH 4 ___ / —)

Location of previous calibration: —

Signature: Mike Ross Reviewed By: SA Page 8 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21795-202.002 SAMPLE ID: RW-1 (48)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 276

SAMPLED BY: ↓ LOCATION: OAKLAND, CA

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

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ___ 4.5 ___ 6 ✓ (4.41) Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 34.66

DEPTH TO WATER (feet): 25.12 CALCULATED PURGE (gal.): 103.98

DEPTH OF WELL (feet): 48.7 ACTUAL PURGE VOL. (gal.): 105

DATE PURGED: 02-28-96 Start (2400 Hr) 1106 End (2400 Hr) 1115

DATE SAMPLED: ↓ Start (2400 Hr) — End (2400 Hr) 1120

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1104	35	6.87	1720	64.8	CLEAR	TRACE
1110	70	6.91	1683	65.6	CLEAR	CLEAR
1115	105	6.87	1680	65.5	CLEAR	CLEAR

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

COLOR: NR (COBALT 0 - 500)

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

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

Other: ___

SAMPLING EQUIPMENT

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

Other: ___

WELL INTEGRITY: OK LOCK #: NONE

REMARKS: ___

Meter Calibration: Date: 2-28-96 Time: 1047 Meter Serial #: 9208 Temperature °F: 64.0

(EC 1000 1016 / 1000) (DI —) (pH 7 7.00 / 7.00) (pH 10 9.98 / 10.00) (pH 4 4.04 / —)

Location of previous calibration: ___

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

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21225-202-002 SAMPLE ID: WGR-3(27)

PURGED BY: M. Ross CLIENT NAME: ARCO 276

SAMPLED BY: M. Ross 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.):	7.90
DEPTH TO WATER (feet):	14.90	CALCULATED PURGE (gal.):	23.71
DEPTH OF WELL (feet):	27.0	ACTUAL PURGE VOL. (gal.):	19.0

DATE PURGED: 2-23-96 Start (2400 Hr) 1155 End (2400 Hr) 1208

DATE SAMPLED: 2-23-96 Start (2400 Hr) 1220 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1158	8.0	6.21	1788	64.9	clr	clr
1207	16.0	6.32	[redacted]405	65.2	clr	clr
1208	[redacted]	DRY at 19.0 Gallons				
1215	DTW → 23.01					
1220	Recharge	6.35	446	63.8	clr	clr

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

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

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

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: GOOD LOCK #: ARCO

REMARKS: DRY at 19.0 gallons

Meter Calibration: Date 2-23-96 Time: 1100 Meter Serial #: 9210 Temperature °F: ___

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

Location of previous calibration: MW-8

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

APPENDIX B

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, FIRST QUARTER 1996 GROUNDWATER MONITORING EVENT

Columbia
Analytical
Services inc.

March 13, 1996

Service Request No: S9600330

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **276 Oakland / 20805-120.006 / TO#19350.00**

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on February 28, 1996. 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 16, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely,

Steven L. Green
Project Chemist

Cristina V. Kayama for

Greg Anderson
Regional QA Coordinator

SLG/jk

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:**	S9600330
Project:	276 Oakland / 20805-120.006/TO#19350.00	**Date Collected:**	2/28/96
Sample Matrix:	Water	**Date Received:**	2/28/96
		Date Extracted:	NA
		Date Analyzed:	3/8-11/96

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) S9600330-001	ND	ND	ND	ND	ND
WGR-3(27) S9600330-002	ND	ND	ND	1.5	1.6
MW-1(38) S9600330-003	ND	ND	ND	ND	ND
MW-5(47) S9600330-004	<400*	ND	ND	ND	ND
RW-1(48) S9600330-005	ND	ND	ND	ND	ND
MW-6(48) S9600330-006	<500*	ND	ND	ND	ND
MW-3(38) S9600330-007	<500*	ND	ND	ND	ND
MW-4(48) S9600330-008	<1000*	<1**	<1**	<1**	<1**
MW-2(25) S9600330-009	330	18	0.9	13	13
MW-7(36) S9600330-010	29000	<20***	<20***	180	1000
Method Blank S9600308-WB	ND	ND	ND	ND	ND
Method Blank S9600311-WB	ND	ND	ND	ND	ND

* Raised MRL due to matrix interference. The sample contains a single non-fuel 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 a dilution.

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00
Sample Matrix: Water

Service Request: S9600330
Date Collected: 2/28/96
Date Received: 2/28/96
Date Extracted: NA

Volatile Organic Compounds
EPA Method 624
Units: ug/L (ppb)

	Sample Name:	**MW-8(47)**	**WGR-3(27)**	**MW-1(38)**
	Lab Code:	S9600330-001	S9600330-002	S9600330-003
	Date Analyzed:	3/10/96	3/10/96	3/10/96
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	3	ND	97
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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00
Sample Matrix: Water

Service Request: S9600330
Date Collected: 2/28/96
Date Received: 2/28/96
Date Extracted: NA

Volatile Organic Compounds
EPA Method 624
Units: ug/L (ppb)

	Sample Name:	MW-5(47)*	RW-1(48)	MW-6(48)*
	Lab Code:	S9600330-004	S9600330-005	S9600330-006
	Date Analyzed:	3/11/96	3/11/96	3/10/96
Analyte	**MRL**			
Chloromethane	10	<100	ND	<200
Vinyl Chloride	10	<100	ND	<200
Bromomethane	10	<100	ND	<200
Chloroethane	10	<100	ND	<200
Trichlorofluoromethane (CFC 11)	1	<10	ND	<20
Trichlorotrifluoroethane (CFC 113)	10	<100	ND	<200
1,1-Dichloroethene	1	<10	ND	<20
Acetone	20	<200	ND	<400
Carbon Disulfide	1	<10	ND	<20
Methylene Chloride	10	<100	ND	<200
trans-1,2-Dichloroethene	1	<10	ND	<20
cis-1,2-Dichloroethene	1	<10	ND	<20
2-Butanone (MEK)	10	<100	ND	<200
1,1-Dichloroethane	1	<10	ND	<20
Chloroform	1	<10	ND	<20
1,1,1-Trichloroethane (TCA)	1	<10	ND	<20
Carbon Tetrachloride	1	<10	ND	<20
Benzene	1	<10	ND	<20
1,2-Dichloroethane	1	<10	ND	<20
Vinyl Acetate	10	<100	ND	<200
Trichloroethene (TCE)	1	<10	ND	<20
1,2-Dichloropropane	1	<10	ND	<20
Bromodichloromethane	1	<10	ND	<20
2-Chloroethyl Vinyl Ether	10	<100	ND	<200
trans-1,3-Dichloropropene	1	<10	ND	<20
4-Methyl-2-pentanone (MIBK)	10	<100	ND	<200
2-Hexanone	10	<100	ND	<200
Toluene	1	<10	ND	<20
cis-1,3-Dichloropropene	1	<10	ND	<20
1,1,2-Trichloroethane	1	<10	ND	<20
Tetrachloroethene (PCE)	1	1100	6	960
Dibromochloromethane	1	<10	ND	<20
Chlorobenzene	1	<10	ND	<20
Ethylbenzene	1	<10	ND	<20
Styrene	1	<10	ND	<20
Total Xylenes	5	<50	ND	<100
Bromoform	1	<10	ND	<20
1,1,2,2-Tetrachloroethane	1	<10	ND	<20
1,3-Dichlorobenzene	1	<10	ND	<20
1,4-Dichlorobenzene	1	<10	ND	<20
1,2-Dichlorobenzene	1	<10	ND	<20

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

3S44/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00
Sample Matrix: Water

Service Request: S9600330
Date Collected: 2/28/96
Date Received: 2/28/96
Date Extracted: NA

Volatile Organic Compounds
EPA Method 624
Units: ug/L (ppb)

	Sample Name:	**MW-3(38)***	**MW-4(48)***	**MW-2(25)**
	Lab Code:	S9600330-007	S9600330-008	S9600330-009
	Date Analyzed:	3/10/96	3/10/96	3/11/96
Analyte	**MRL**			
Chloromethane	10	<100	<200	ND
Vinyl Chloride	10	<100	<200	ND
Bromomethane	10	<100	<200	ND
Chloroethane	10	<100	<200	ND
Trichlorofluoromethane (CFC 11)	1	<10	<20	ND
Trichlorotrifluoroethane (CFC 113)	10	<100	<200	ND
1,1-Dichloroethene	1	<10	<20	ND
Acetone	20	<200	<400	ND
Carbon Disulfide	1	<10	<20	ND
Methylene Chloride	10	<100	<200	ND
trans-1,2-Dichloroethene	1	<10	<20	ND
cis-1,2-Dichloroethene	1	<10	<20	ND
2-Butanone (MEK)	10	<100	<200	ND
1,1-Dichloroethane	1	<10	<20	ND
Chloroform	1	<10	<20	ND
1,1,1-Trichloroethane (TCA)	1	<10	<20	ND
Carbon Tetrachloride	1	<10	<20	ND
Benzene	1	<10	<20	18
1,2-Dichloroethane	1	<10	<20	ND
Vinyl Acetate	10	<100	<200	ND
Trichloroethene (TCE)	1	<10	<20	ND
1,2-Dichloropropane	1	<10	<20	ND
Bromodichloromethane	1	<10	<20	ND
2-Chloroethyl Vinyl Ether	10	<100	<200	ND
trans-1,3-Dichloropropene	1	<10	<20	ND
4-Methyl-2-pentanone (MIBK)	10	<100	<200	ND
2-Hexanone	10	<100	<200	ND
Toluene	1	<10	<20	ND
cis-1,3-Dichloropropene	1	<10	<20	ND
1,1,2-Trichloroethane	1	<10	<20	ND
Tetrachloroethene (PCE)	1	1100	2400	ND
Dibromochloromethane	1	<10	<20	ND
Chlorobenzene	1	<10	<20	ND
Ethylbenzene	1	<10	<20	13
Styrene	1	<10	<20	ND
Total Xylenes	5	<50	<100	14
Bromoform	1	<10	<20	ND
1,1,2,2-Tetrachloroethane	1	<10	<20	ND
1,3-Dichlorobenzene	1	<10	<20	ND
1,4-Dichlorobenzene	1	<10	<20	ND
1,2-Dichlorobenzene	1	<10	<20	ND

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

3S44/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00
Sample Matrix: Water

Service Request: S9600330
Date Collected: 2/28/96
Date Received: 2/28/96
Date Extracted: NA

Volatile Organic Compounds
EPA Method 624
Units: ug/L (ppb)

	Sample Name:	**MW-7(36)***	**Method Blank**	**Method Blank**
	Lab Code:	S9600330-010	S9600310-WB	S9600311-WB
	Date Analyzed:	3/10/96	3/10/96	3/11/96
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	<10	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	<10	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	87	ND	ND
Styrene	1	<10	ND	ND
Total Xylenes	5	760	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

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

3S44/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	L9601613
Project:	276 Oakland/#20805-120.006/TO#19350.00	**Date Collected:**	2/28/96
Sample Matrix:	Water	**Date Received:**	2/28/96
		Date Extracted:	3/4/96
		Date Analyzed:	3/4/96

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

Sample Name	Lab Code	MRL	Result
MW-4 (48)	L9601613-001	0.5	0.7
Method Blank	L9601613-MB	0.5	ND

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00
Sample Matrix: Water

Service Request: S9600330
Date Collected: 2/28/96
Date Received: 2/28/96
Date Extracted: NA
Date Analyzed: 3/8-11/96

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α–Trifluorotoluene
MW-8(47)	S9600330-001	105	108
WGR-3(27)	S9600330-002	105	107
MW-1(38)	S9600330-003	100	108
MW-5(47)	S9600330-004	99	109
RW-1(48)	S9600330-005	106	109
MW-6(48)	S9600330-006	99	111
MW-3(38)	S9600330-007	100	109
MW-4(48)	S9600330-008	98	108
MW-2(25)	S9600330-009	93	105
MW-7(36)	S9600330-010	85	115
MW-2(25)MS	S9600330-009MS	100	109
MW-2(25)DMS	S9600330-009DMS	107	107
Method Blank	S9600308-WB	100	104
Method Blank	S9600311-WB	92	98
	CAS Acceptance Limits:	69-116	69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9600330
Project:	276 Oakland / 20805-120.006/TO#19350.00	**Date Collected:**	2/28/96
Sample Matrix:	Water	**Date Received:**	2/28/96
		Date Extracted:	NA
		Date Analyzed:	3/8/96

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: S9600330-009

	Spike Level		Sample	Spike Result		Percent Recovery			
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	CAS Acceptance Limits	**Relative Percent Difference**
Gasoline	5000	5000	330	5100	5100	95	95	67-121	<1

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00

Service Request: S9600330
Date Analyzed: 3/8/96

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.2	101	85-115
Toluene	25	25.0	100	85-115
Ethylbenzene	25	25.0	100	85-115
Xylenes, Total	75	74.0	99	85-115
Gasoline	250	237	95	90-110

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00
Sample Matrix: Water

Service Request: S9600330
Date Collected: 2/28/96
Date Received: 2/28/96
Date Extracted: NA
Date Analyzed: 3/10,11/96

Surrogate Recovery Summary
Volatile Organic Compounds
EPA Method 624

		Percent Recovery		
Sample Name	**Lab Code**	1,2-Dichloroethane-D_4	Toluene-D_8	4-Bromofluorobenzene
MW-8(47)	S9600330-001	94	91	113
WGR-3(27)	S9600330-002	94	91	109
MW-1(38)	S9600330-003	93	92	112
MW-5(47)	S9600330-004	94	91	98
RW-1(48)	S9600330-005	93	90	105
MW-6(48)	S9600330-006	94	90	106
MW-3(38)	S9600330-007	94	92	99
MW-4(48)	S9600330-008	95	91	104
MW-2(25)	S9600330-009	92	89	107
MW-7(36)	S9600330-010	94	91	106
MW-5(47)MS	S9600330-004MS	94	90	108
MW-5(47)DMS	S9600330-004DMS	95	91	108
Method Blank	S9600310-WB	96	89	114
Method Blank	S9600311-WB	92	92	103
CAS Acceptance Limits:		76-114	88-110	86-115

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00
Sample Matrix: Water

Service Request: S9600330
Date Collected: 2/28/96
Date Received: 2/28/96
Date Extracted: NA
Date Analyzed: 3/10/96

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds
EPA Method 624
Units: ug/L (ppb)

Sample Name: MW-5(47)
Lab Code: S9600330-004

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
1,1-Dichloroethene	50	50	ND	240	230	480	460	61-145	4
Trichloroethene	50	50	ND	270	260	540	520	71-120	4
Chlorobenzene	50	50	ND	250	250	500	500	75-130	<1
Toluene	50	50	ND	210	210	420	420	76-125	<1
Benzene	50	50	ND	230	22	460	44	76-127	165

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 276 Oakland / 20805-120.006/TO#19350.00

Service Request: S9600330
Date Analyzed: 3/10/96

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	54	108	70-130
Vinyl Chloride	50	58	116	70-130
Bromomethane	50	55	110	70-130
Chloroethane	50	57	114	70-130
Acetone	50	47	94	70-130
1,1-Dichloroethene	50	51	102	70-130
Carbon Disulfide	50	59	118	70-130
Methylene Chloride	50	53	106	70-130
trans-1,2-Dichloroethene	50	58	116	70-130
cis-1,2-Dichloroethene	50	55	110	70-130
1,1-Dichloroethane	50	57	114	70-130
Vinyl Acetate	50	60	120	70-130
2-Butanone (MEK)	50	52	104	70-130
Chloroform	50	56	112	70-130
1,1,1-Trichloroethane (TCA)	50	59	118	70-130
Carbon Tetrachloride	50	61	122	70-130
Benzene	50	56	112	70-130
1,2-Dichloroethane	50	53	106	70-130
Trichloroethene (TCE)	50	57	114	70-130
1,2-Dichloropropane	50	55	110	70-130
Bromodichloromethane	50	53	106	70-130
2-Hexanone	50	54	108	70-130
trans-1,3-Dichloropropene	50	52	104	70-130
Toluene	50	61	122	70-130
cis-1,3-Dichloropropene	50	54	108	70-130
1,1,2-Trichloroethane	50	55	110	70-130
Tetrachloroethene (PCE)	50	58	116	70-130
Dibromochloromethane	50	56	112	70-130
Chlorobenzene	50	53	106	70-130
Ethylbenzene	50	58	116	70-130
o- Xylene	50	54	108	70-130
Styrene	50	52	104	70-130
Bromoform	50	55	110	70-130
1,1,2,2-Tetrachloroethane	50	51	102	70-130

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	L9601613
Project:	276 Oakland/#20805-120.006/TO#19350.00	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	3/4/96
		Date Analyzed:	3/4/96

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

	True Value		Result		Percent Recovery			
Analyte	LCS	DLCS	LCS	DLCS	LCS	DLCS	CAS Acceptance Limits	**Relative Percent Difference**
TRPH	2.00	2.00	1.82	1.82	91	91	75-125	<1

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 9350.00

Chain of Custody

ARCO Facility no. 276	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no (Consultant) (408)453-7300	Fax no. (Consultant) (408)453-0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131		Contract number

	Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
1	MW-8(47)		4		X		X	HCL	2-28-96	1135		X					X						
2	WGR-3(27)		4		X		X	HCL	↓	1220		X					X						
3	MW-1(38)		4		X		X	HCL		1250		X					X						
4	MW-5(47)		4		X		X	HCL		1325		X					X						
5	RW-1(48)		4		X		X	HCL		1120		X					X						
6	MW-6(48)		4		X		X	HCL		1152		X					X						
7	MW-3(38)		4		X		X	HCL		1220		X					X						
8	MW-4(48)		6		X		X	HCL		1255		X			X		X						
9	MW-2(25)		4		X		X	HCL		1400		X					X						
10	MW-7(36)		4		X		X	HCL	↓	1232		X					X						

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 4-40ml HCL VOAs (All Wells) 2-1 liter HCL Glass (MW-4) #70805-120.006

Lab number: 59600330

Turnaround time
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days 3/13 ☒

Condition of sample: ok		Temperature received: Cool	
Relinquished by sampler: Mike Whelan	Date: 2-28-96	Time: 1630	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Joanne Brown — Date: 2-29-96 — Time: 1630

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

APPENDIX C

SVE SYSTEM MONITORING DATA LOG SHEETS

10600 and 10700 MacArthur Boulevard
SVE SYSTEM
MONITORING DATA

Reporting Period.
01/01/96 00:00
02/01/96 00:00

Hours in Period: 744.0
Days in Period: 31.00

Operation + Down Hours: 744.0
Operation + Down Days: 31.00

Reading Date & Time	Field Monitoring Data: Flow Rates: On-site Well Field Flow Rate	Off-site Well Field Flow Rate	System Influent Flow Rate	FID or PID Results: On-site Well Field	Off-site Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Laboratory Monitoring Data: On-site Well Field Influent: Gasoline		Benzene		Off-site Well Field Influent: Gasoline		Benzene		System Influent: Gasoline		Benzene		System Effluent: Gasoline		Benzene		Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	scfm	ppm	ppm	ppm	ppm	%		ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	%	ppd	ppd						
01/01/96 00:00																														696.00				
01/16/96 11:26	0.0	0.0	0.0																										371.43	696.00	0.00	0.00	371.43	15.48
01/16/96 11:30	174.1	17.2	191.3						12.45	<15	<60	<0.1	<0.5	<15	<60	<0.1	<0.5	<15	<60	<0.1	<0.5	<15	<60	<0.1	<0.5	NR	1.31	0.01	0.07	696.07	0.07	0.00	0.00	0.00
02/01/96 00:00	174.1	17.2	191.3																										372.5	1002.90	306.83	12.78	65.67	2.74
Period Totals:																													744.00		306.90	12.79	437.10	18.21
Averages:	174.1	17.2	191.3							<15	<60	<0.1	<0.5	<15	<60	<0.1	<0.5	<15	<60	<0.1	<0.5	<15	<60	<0.1	<0.5	NR	1.03	0.01						

10600 and 10700 MacArthur Boulevard
SVE SYSTEM
MONITORING DATA

Reporting Period:
02/01/96 00:00
03/01/96 00:00

Hours in Period: 696.0
Days in Period: 29.00

Operation + Down Hours: 696 0
Operation + Down Days: 29.00

Reading Date & Time	Field Monitoring Data: Flow Rates: On-site Well Field Flow Rate	Off-site Well Field Flow Rate	System Influent Flow Rate	FID or PID Results: On-site Well Field	Off-site Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Laboratory Monitoring Data: On-site Well Field Influent: Gasoline	Benzene	Off-site Well Field Influent: Gasoline	Benzene	System Influent: Gasoline	Benzene	System Effluent: Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	scfm	ppm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	ppd	ppd						
02/01/96 00 00																						1002.90				
02/28/96 12:40	178 4	19.4	197.8																		660.67	1003 07	0 17	0.01	660 50	27.52
03/01/96 00 00	178.4	19.4	197.8																		35.33	1038.40	35 33	1.47	0 00	0.00
Period Totals:																					696.00		35 50	1.48	660 50	27 52
Averages:	178.4	19.4	197.8																							

10600 and 10700 MacArthur Boulevard
SVE SYSTEM
MONITORING DATA

Reporting Period:
03/01/96 00:00
04/01/96 00:00

Hours in Period: 744.0
Days in Period: 31.00

Operation + Down Hours: 744 0
Operation + Down Days. 31.00

	Field Monitoring Data								Laboratory Monitoring Data																		
	Flow Rates			FID or PID Results					On-site Well Field Influent		Off-site Well Field Influent		System Influent		System Effluent												
Reading Date & Time	On-site Well Field Flow Rate	Off-site Well Field Flow Rate	System Influent Flow Rate	On-site Well Field	Off-site Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	scfm	ppm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	ppd	ppd						
03/01/96 00:00																						1038 40				
03/26/96 09:53	178.4	19.4	197.8																		609.88	1216 20	177 80	7.41	432.08	18.00
04/01/96 00:00	0.0	0.0	0 0																		134.12	1216 20	0 00	0.00	134.12	5.59
Period Totals																					744.00		177.80	7.41	566 20	23 59
Averages	178.4	19.4	197 8																							

APPENDIX D

FIELD DATA SHEETS, OPERATION AND MAINTENANCE VISITS, FIRST QUARTER 1996

ARCO 0276 . 10600 MacArthur Blvd.,Oakland,Ca. Soil Vapor Extraction System . EMCON Project # 20805-120.004

006

Remarks: Arrived on Site at 1049 HRS. System OFF upon arrival Heavy Rain in Area today. System Starts After Several tries. Sample I-1, OFF Site wells, E-1, INFL FOR GAS BTXE Per V. Vorganti Install Oxygen Sockes in wells MW-2 MW-7

MW-2 15.30 DTW TD = 25.3
MW-7 19.29 DTW. TD = 36.6
MW-2 Sockes installed 16' to 20'
MW-7 Sockes installed 20' to 25'

Unscheduled site visit [] Scheduled site visit ■

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

Arrival Time (24:00 hour)	1049	**Effluent (6") E-1** Stack Temperature (°F)	602
System Status (on or off)	OFF	Total Flow (scfm) (flow meter)	65
Shutdown Time (24:00 hour)	—	Fire Box Temperature (°F)	612
Restart Time (24:00 hour)	1126	Set Point (°F)	1010
Reading Time (24:00 hour)	1130	**TOTAL HOURS** Unable to Locate	on First Visit
ON SITE Well Field (4") I-1		CatOx (Amps)	
Vacuum (in. of H2O)	8.9	Blower (Amps)	
Velocity (ft/min) in H_2O 0.25	4"well	Main (Amps)	
Temperature (°F)	58	Natural Gas (cf)	1321000
OFF SITE Well Field (2") Off Site		**AIR MONITORING**	
Vacuum (in. of H2O)	8.9	FID (ppm) Date: (without carbon filter)	Amb / I-2 / I-1 / Off Site / E-1
Velocity (ft/min)	600→1000	(with carbon filter)	
Total Influent (After Blower) (3") I-2		PID (ppm) CAL GAS:	
Total Pressure (in. of H2O)	0.1 +	Date:	
Total Flow (in. of H2O)	0.47	**Lab samples taken for analysis at:**	
Temperature (°F)	94		
Total Vapor Condensate on site (gal)	0.5		

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'		15.3					TD = 25.3

↳ 4" CAP OFF 27.6 TD = 25.3

Special Instructions:

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

Operator: L RATH Date: 116.96

Project# 20805-120.004
ARCO 0276 Soil Vapor Extraction System

Remarks: Arrived on site at 0943 HRS. System OFF upon Arrival.

Leave OFF FOR 1 Month Pulse.

Electric inside Building 07593

Unscheduled site visit ☐ Scheduled site visit ☐

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

Arrival Time (24:00 hour)	0943	**Effluent (6") E-1** Stack Temperature (°F)	
System Status (on or off)	OFF	Total Flow (scfm) (flow meter)	OFF
Shutdown Time (24:00 hour)	1 MO OFF Pulse	Fire Box Temperature (°F)	
Restart Time (24:00 hour)	—	Set Point (°F)	
Reading Time (24:00 hour)	100	**TOTAL HOURS**	
ON SITE Well Field (4") I-1	OFF	CatOx (Amps)	
Vacuum (in. of H2O)		Blower (Amps)	
Velocity (ft/min)		Main (Amps)	
Temperature (°F)		Natural Gas (cf)	1432000
OFF SITE Well Field (2") Off Site		**AIR MONITORING**	
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)			

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'							

Special Instructions:

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

Project# 20805-120.004

Operator: L. BATH **Date:** 2-13-96 **ARCO 0276 Soil Vapor Extraction System**

ARCO 0276 . 10600 MacArthur Blvd.,Oakland,Ca. Soil Vapor Extraction System . EMCON Project # 20805-120.004

Remarks: Arrived on Site at 1214 HRS System OFF FOR Quarterly monitoring
Emcon Samplers on Site. System HRS at 1215 = 1002.9 HRS
Turn System on at 1230 HRS.

Replace 5 Oxygen Socks in MW-7

Vacuum hrs at 12:40 = 1003.07

Unscheduled site visit ☐ Scheduled site visit ☑

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

Arrival Time (24:00 hour)	1214	**Effluent (6") E-1** Stack Temperature (°F)	550
System Status (on or off)	OFF	Total Flow (scfm) (flow meter)	66
Shutdown Time (24:00 hour)	NA	Fire Box Temperature (°F)	610
Restart Time (24:00 hour)	1230	Set Point (°F)	610
Reading Time (24:00 hour)	1240	**TOTAL HOURS** at 1214 HRS	1002.9
ON SITE Well Field (4") I-1		CatOx (Amps)	
Vacuum (in. of H2O)	90	Blower (Amps)	
Velocity (ft/min)	0.26	Main (Amps)	
Temperature (°F)	55	Natural Gas (cf)	1436000
OFF SITE Well Field (2") Off Site		**AIR MONITORING**	
Vacuum (in. of H2O)	90		
Velocity (ft/min)	800-1000		
Total Influent (After Blower) (3") I-2			
Total Pressure (in. of H2O)	.1 +		
Total Flow (in. of H2O)	047		
Temperature (°F)	94		
Total Vapor Condensate on site (gal)	0		

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'							

Special Instructions:

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

Operator: L. Hart Date: 2-28-96

Project# 20805-120.004
ARCO 0276 Soil Vapor Extraction System

Remarks: Arrived on site at 0938 HRS System OFF upon arrival Process blower Running. Change temp chart. Turn system OFF Per V. Vamganti 1003 /

Leave System OFF Due to high water levels Per J. Young.

2.5 in H2O Vacuum on System !
Slight GAS Smell Ground Natural gas METER.

Unscheduled site visit [] Scheduled site visit [x]

SYSTEM PARAMETERS (500 SCFM Gas-Fired ANGUIL Catalytic Oxidizer/ Serial # 01169107)			
Arrival Time (24:00 hour)	0938	Effluent (6") E-1 Stack Temperature (°F)	
System Status (on or off)	OFF	Total Flow (scfm) (flow meter)	NR
Shutdown Time (24:00 hour) Blower	1003	Fire Box Temperature (°F)	72
Restart Time (24:00 hour)	NA	Set Point (°F)	610
Reading Time (24:00 hour)	0953	TOTAL HOURS 0953 HRS	01216.2
ON SITE Well Field (4") I-1	OFF	CatOx (Amps)	NR
Vacuum (in. of H2O)		Blower (Amps)	
Velocity (ft/min)		Main (Amps)	
Temperature (°F)		Natural Gas (cf)	1493000
OFF SITE Well Field (2") Off Site	OFF		
Vacuum (in. of H2O)			
Velocity (ft/min)			
Total Influent (After Blower) (3") I-2	OFF		
Total Pressure (in. of H2O)			
Total Flow (in. of H2O)			
Temperature (°F)			
Total Vapor Condensate on site (gal)	10		

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'							

Special Instructions:

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

Operator: L. RATH Date: 3-26-96

Project# 20805-120.004
ARCO 0276 Soil Vapor Extraction System

APPENDIX E

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION FOR SOIL-VAPOR EXTRACTION SYSTEM SAMPLES, FIRST QUARTER 1996

Columbia Analytical Services inc.

January 30, 1996

Service Request No: S9600102

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

Re: **20805-120.006/TO#1923.00/276 Oakland**

Dear Ms. Voruganti:

The following pages contain analytical results for sample(s) received by the laboratory on January 16, 1996. 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 9, 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:**	S9600102
Project:	20805-120.006 /19273.00 / 276 Oakland	**Date Collected:**	1/16/96
Sample Matrix:	Vapor	**Date Received:**	1/16/96
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**I-1**	**INFL**	**E-1**
Lab Code:	S9600102-001	S9600102-002	S9600102-003
Date Analyzed:	1/17/96	1/17/96	1/17/96

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

3822/0a0194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9600102
Project:	20805-120.006 /19273.00 / 276 Oakland	**Date Collected:**	1/16/96
Sample Matrix:	Vapor	**Date Received:**	1/16/96
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name:	**Offsite Wells**	**Method Blank**
Lab Code:	S9600102-004	S960117-VB
Date Analyzed:	1/17/96	1/17/96

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9600102
Project:	20805-120.006 /19273.00 / 276 Oakland	**Date Collected:**	1/16/96
Sample Matrix:	Vapor	**Date Received:**	1/16/96
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

		Sample Name:	**I-1**	**INFL**	**E-1**
		Lab Code:	S9600102-001	S9600102-002	S9600102-003
		Date Analyzed:	1/17/96	1/17/96	1/17/96
Analyte	**MRL**				
Benzene	0.1		ND	ND	ND
Toluene	0.1		ND	ND	ND
Ethylbenzene	0.1		ND	ND	ND
Total Xylenes	0.2		ND	ND	ND
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5		ND	ND	ND
C_5 - C_8 Hydrocarbons	5		ND	ND	ND
C_9 - C_{12} Hydrocarbons	5		ND	ND	ND
Gasoline Fraction (C_5-C_{12})	15		ND	ND	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9600102
Project:	20805-120.006 /19273.00 / 276 Oakland	**Date Collected:**	1/16/96
Sample Matrix:	Vapor	**Date Received:**	1/16/96
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name:	**Offsite Wells**	**Method Blank**
Lab Code:	S9600102-004	S960117-VB
Date Analyzed:	1/17/96	1/17/96

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

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-120.006 /19273.00 / 276 Oakland
Sample Matrix: Vapor

Service Request: S9600102
Date Collected: 1/16/96
Date Received: 1/16/96
Date Extracted: NA
Date Analyzed: 1/17/96

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3

Sample Name: Batch QC
Lab Code: S9600089-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	0.6	0.6	1	<1
Toluene	0.5	4.5	4.5	5	<1
Ethylbenzene	0.5	3.0	3.1	3.0	3
Xylenes, Total	1	24	24	24	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	20	ND	ND	ND	NA
C_5 - C_8 Hydrocarbons	20	66	64	65	3
C_9 - C_{12} Hydrocarbons	20	110	110	110	<1
Gasoline Fraction (C_5-C_{12})	60	180	180	180	<1

DUP1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-120.006 /19273.00 / 276 Oakland
Sample Matrix: Vapor

Service Request: S9600102
Date Collected: 1/16/96
Date Received: 1/16/96
Date Extracted: NA
Date Analyzed: 1/17/96

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: ppmV

Sample Name: Batch QC
Lab Code: S9600089-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.1	0.2	0.2	0.2	<1
Toluene	0.1	1.2	1.2	1.2	<1
Ethylbenzene	0.1	0.7	0.7	0.7	<1
Xylenes, Total	0.2	5.5	5.5	5.5	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	5	ND	ND	ND	NA
C_5 - C_8 Hydrocarbons	5	18	18	18	<1
C_9 - C_{12} Hydrocarbons	5	30	30	30	<1
Gasoline Fraction (C_5-C_{12})	15	50	50	50	<1

DUP1S/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19273.00

Chain of Custody

ARCO Facility no. 276	City (Facility) Oakland CA	Project manager (Consultant)	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 4085377697	Telephone no. (Consultant) 4084537300	Fax no. (Consultant) 4084530452
Consultant name Emcon	Address (Consultant) 1921 Ringwood Ave SJ. CA		Contract number

Method of shipment: Tech

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 GAS	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
I-1	1	1			AIR			1-16-96	1300		X											
INFL	2	1			AIR				1330		X											
E-1	3	1			AIR				1245		X											
OFF Site wells	4	1			AIR				1315		X											

Special detection Limit/reporting: Report in PPMV/and mg/m3

Special QA/QC

Remarks: 20805-120.006

Lab number: 9960102

Turnaround time

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

Condition of sample:		Temperature received:
Relinquished by sampler: Lee Ratin	Date 1-16-96 Time 1525	Received by
Relinquished by	Date Time	Received by
Relinquished by	Date Time	Received by laboratory: Claire A. Lindu — Date 1/16/96 — Time 1525

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