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

Date December 17, 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	Third quarter 1996 groundwater monitoring report results and remediation system performance evaluations report, retail service station, 10600 MacArthur Boulevard, Oakland, CA

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

Comments:

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

John C. Young
Project Manager

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

ARCO Products Company

Date: December 12, 1996

Re: ARCO Station # 10600 MacArthur Boulevard • Oakland, CA
Third 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:

Kyle Christie
Environmental Engineer

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

December 17, 1996
Project 20805-120.006

Kyle Christie
ARCO Products Company
P.O. Box 5077
Buena Park, California 90622-5077

Re: Third 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. Christie:

This letter presents the results of the third 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

Krishnaveni M.
Krishnaveni Meka
Staff Engineer

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

REGISTERED GEOLOGIST
JOHN CHARLES YOUNG
7/98
NO. 6407
STATE OF CALIFORNIA

December 17, 1996

ARCO QUARTERLY REPORT

Address: 10600 MacArthur Boulevard,	Oakland, California
EMCON Project No.:	20805-120.006
ARCO Environmental Engineer/Phone No.:	Kyle Christie /(714) 670-5303
EMCON Project Manager/Phone No.:	John Young /(408) 453-7300
Primary Agency/Regulatory ID No.:	ACHCSA /Barney Chan
Reporting Period:	July 1, 1996 to October 1, 1996

WORK PERFORMED THIS QUARTER (Third- 1996):

1. Conducted quarterly groundwater monitoring and sampling for third quarter 1996.
2. Stimulated natural biodegradation with oxygen releasing compounds (ORCs) in groundwater monitoring wells MW-2 and MW-7.
3. Prepared and submitted quarterly report for second quarter 1996.

WORK PROPOSED FOR NEXT QUARTER (Fourth- 1996):

1. Perform quarterly groundwater monitoring and sampling for fourth quarter 1996.
2. Continue monitoring dissolved oxygen in groundwater monitoring wells MW-2 and MW-7.
3. Prepare and submit quarterly report for third quarter 1996.
4. Submit risk-based corrective action (RBCA) evaluation report to ACHCSA.

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 and low hydrocarbon concentrations in extracted soil vapors.
Frequency of Sampling:	Quarterly (groundwater)
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:	21.84 feet
Groundwater Gradient (Average):	Flat Gradient

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. SVE system was shut down on 3-26-96, due to high groundwater levels and low hydrocarbon concentrations in extracted soil vapors.
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:	NA
HC Destroyed This Period:	0.0 pounds
HC Destroyed to Date:	7,810.6 pounds
Utility Usage	
Electric (KWH):	0
Gas (Therms):	24
Operating Hours This Period:	0.0 hours
Percent Operational:	0.0%
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
Stack Temperature:	NA
Source Flow:	0.0 scfm
Process Flow:	0.0 scfm
Source Vacuum:	0.0 inches of water

ATTACHED:

- Table 1 - Groundwater Monitoring Data, Third Quarter 1996
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 3 - Historical Groundwater Analytical Data, Volatile Organic Compounds
- Table 4 - Approximate Cumulative Floating Product Recovered
- Table 5 - Soil-Vapor Extraction System Operation and Performance Data
- Table 6 - Soil-Vapor Extraction Well Data
- Figure 1 - Site Location
- Figure 2 - TPHG and Benzene Concentrations in Groundwater, Third Quarter 1996
- Figure 3 - Tetrachloroethene (PCE) Concentrations in Groundwater, Third 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, Third Quarter 1996 Groundwater Monitoring Event
- Appendix B - Analytical Results and Chain-of-Custody Documentation, Third Quarter 1996 Groundwater Monitoring Event
- Appendix C - SVE System Monitoring Data Log Sheets
- Appendix D - Field Data Sheets, Operation and Maintenance Visits, Third Quarter 1996

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

Table 1
Groundwater Monitoring Data
Third Quarter 1996

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96

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	08-19-96	55 92	28 04	27 88	ND	FG	FG	08-19-96	<50	<0 5	<0 5	<0 5	<0 5	<3	- -	- -	-
MW-2	08-19-96	55 10	16 84	38 26	ND	FG	FG	08-21-96	880	45	1	15	31	80	- -	- -	- -
MW-3	08-19-96	56 55	28.71	27 84	ND	FG	FG	08-19-96	<400*	<0 5	<0 5	<0 5	<0 5	<3	- -	- -	- -
MW-4	08-19-96	55 98	28 17	27.81	ND	FG	FG	08-19-96	<800*	<0 5	<0 5	<0 5	<0.5	<7**	- -	0 8	-
MW-5	08-19-96	55.43	27 82	27.61	ND	FG	FG	08-21-96	<50	<0 5	<0.5	<0 5	<0 5	29	- -	-	- -
MW-6	08-19-96	61 21	33 54	27 67	ND	FG	FG	08-19-96	<300*	<0 5	<0 5	<0 5	<0 5	<3	- -	- -	- -
MW-7	08-19-96	58 22	21 84	36 38	ND	FG	FG	08-21-96	45000	340	200	820	3400	<300***	- -	- -	- -
MW-8	08-19-96	53 65	26 70	26 95	ND	FG	FG	08-21-96	<50	<0 5	<0.5	<0 5	<0 5	18	- -	- -	- -
RW-1	08-19-96	56 32	28 51	27 81	ND	FG	FG	08-21-96	<50	<0 5	<0.5	<0 5	<0 5	<3	- -	- -	- -
WGR-3	08-19-96	NR	21.38	NR	ND	FG	FG	08-19-96	<50	<0 5	<0 5	<0 5	<0.5	17	- -	- -	- -

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft foot per foot
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L micrograms per liter
EPA: United Statest Environmental Protection Agency
MTBE: methyl-tert-butyl ether
TRPH: *total recoverable petroleum hydrocarbons*
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
ND: none detected
FG flat gradient; the groundwater gradient over the local area was nearly flat
- -: not analyzed or not applicable
* 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.

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96

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	02-04-94	55 92	24.48	31 44	ND	NR	NR	02-04-94	<50	<0 5	<0.5	<0 5	<0 5	--	--	--	--
MW-1	05-02-94	55 92	31.66	24.26	ND	NR	NR	05-02-94	<50	<0.5	<0.5	<0 5	<0 5	--	--	--	--
MW-1	08-03-94	55 92	32.54	23 38	ND	SW	0 002	08-03-94	<50	<0.5	<0.5	<0 5	<0 5	--	--	-	--
MW-1	12-06-94	55.92	31 89	24 03	ND	W	0.001	12-06-94	<50	<0 5	<0 5	<0.5	<0 5	--	--	--	-
MW-1	03-10-95	55 92	26 26	29 66	ND	NNE	0 003	03-10-95	<57*	<0.5	<0 5	<0 5	<0.5	--	-	--	-
MW-1	06-05-95	55 92	25 71	30 21	ND	FG	FG	06-05-95	<84*	<0 5	<0 5	<0 5	<0 5	--	-	--	--
MW-1	08-29-95	55 92	28.44	27.48	ND	FG	FG	08-29-95	<60*	<0.5	<0.5	<0 5	<0 5	--	<1	-	--
MW-1	11-16-95	55 92	30 85	25 07	ND	SW	0.003	11-16-95	<50	<0 5	<0.5	<0 5	<0 5	<3	--	--	--
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-1	05-28-96	55 92	24 92	31 00	ND	FG	FG	05-28-96	<50	<0 5	<0.5	<0 5	<0 5	<3	-	--	--
MW-1	08-19-96	55.92	28.04	27 88	ND	FG	FG	08-19-96	<50	<0.5	<0.5	<0.5	<0 5	<3	--	-	-
MW-2	02-04-94	55 10	16.42	38 68	ND	NR	NR	02-04-94	2100	110	5.6	26	110	--	--	-	--
MW-2	05-02-94	55 10	16 15	38 95	ND	NR	NR	05-02-94	3400	130	21	73	180	--	--	-	--
MW-2	08-03-94	55 10	Not surveyed· well was inaccessible due to a parked ve					08-03-94	Not sampled well was inaccessible due to a parked vehicle								
MW-2	12-06-94	55 10	14.74	40 36	Sheen	W	0 001	12-07-94	26000	570	43	220	1100	--	--	--	--
MW-2	03-10-95	55 10	13 98	41 12	ND	NNE	0 003	03-11-95	2800	88	12	16	200	--	--	--	--
MW-2	06-05-95	55 10	15 65	39 45	ND	FG	FG	06-05-95	1800	59	10	53	130	--	--	--	-
MW-2	08-29-95	55 10	17 14	37.96	ND	FG	FG	08-29-95	4500	170	20	150	330	--	71	--	--
MW-2	11-16-95	55.10	Not surveyed· well was inaccessible					11-16-95	Not surveyed· well was inaccessible								
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-2	05-28-96	55.10	15 23	39.87	ND	FG	FG	05-28-96	1200	48	3	28	75	87	--	--	--
MW-2	08-19-96	55.10	16.84	38 26	ND	FG	FG	08-21-96	880	45	1	15	31	80	--	--	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 11-22-96

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-3	02-04-94	56 55	33.58	22 97	ND	NR	NR	02-04-94	<190*	<0.5	<0 5	<0 5	<0 5	--	--	--	--
MW-3	05-02-94	56.55	32 16	24 39	ND	NR	NR	05-02-94	<480*	<0 5	<0 5	<0 5	<0 9**	--	--	--	--
MW-3	08-03-94	56.55	33.09	23 46	ND	SW	0 002	08-03-94	<250*	<0.5	<0 5	<0 5	<0 5	--	--	--	--
MW-3	12-06-94	56.55	32 46	24 09	ND	W	0 001	12-06-94	<380*	<0 5	<0 5	<0 5	<0 5	--	--	--	--
MW-3	03-10-95	56 55	26 74	29 81	ND	NNE	0 003	03-11-95	<440*	<0 5	<0 5	<0.5	0 7	--	--	-	--
MW-3	06-05-95	56.55	26 34	30 21	ND	FG	FG	06-05-95	<970*	<1**	<1**	1 1	1 8	--	--	--	--
MW-3	08-29-95	56.55	29 15	27 40	ND	FG	FG	08-29-95	<700*	<0.5	<0 5	<0.5	<0 5	--	<20	--	--
MW-3	11-16-95	56 55	31 50	25.05	ND	SW	0.003	11-16-95	<500*	<0.5	<0 5	<0 5	<0 5	<3	--	-	--
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-3	05-28-96	56.55	25 46	31.09	ND	FG	FG	05-28-96	<600*	<0.5	<0 5	<0 5	<0 5	<3	--	--	-
MW-3	08-19-96	56.55	28.71	27 84	ND	FG	FG	08-19-96	<400*	<0.5	<0.5	<0 5	<0.5	<3	--	--	--
MW-4	02-04-94	55 98	33 07	22 91	ND	NR	NR	02-04-94	<480*	<0 5	<0.5	<0.5	1 4	--	--	<500	--
MW-4	05-02-94	55.98	31 60	24 38	ND	NR	NR	05-02-94	<490*	<0.5	<0 5	<0 5	<0 9**	--	--	5900	--
MW-4	08-03-94	55 98	32.53	23 45	ND	SW	0 002	08-03-94	<400*	<0.5	<0.5	<0 5	<0.5	--	--	<500	--
MW-4	12-06-94	55.98	31 91	24.07	ND	W	0 001	12-06-94	<970*	<2.5**	<2 5**	<2 5**	<2 5**	--	--	1800	--
MW-4	03-10-95	55.98	26.22	29 76	ND	NNE	0.003	03-11-95	<780*	<1 0**	<1.0**	<1 0**	1	--	--	<500	-
MW-4	06-05-95	55 98	25 79	30 19	ND	FG	FG	06-05-95	<1200*	<1**	<1**	<1**	<1**	--	--	600	--
MW-4	08-29-95	55.98	28 56	27 42	ND	FG	FG	08-29-95	<1100*	<1**	<1**	<1**	<1**	-	<20	--	--
MW-4	11-16-95	55 98	31 00	24 98	ND	SW	0 003	11-16-95	<900*	<0 5	<0.5	<0 5	<0 5	<6**	--	<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-4	05-28-96	55 98	24.91	31.07	ND	FG	FG	05-28-96	<900*	<0.5	<0 5	<0 5	<0.5	<6**	--	<0.5	-
MW-4	08-19-96	55 98	28 17	27.81	ND	FG	FG	08-19-96	<800*	<0 5	<0.5	<0 5	<0.5	<7**	--	0 8	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96

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-5	02-04-94	55 43	32 45	22 98	ND	NR	NR	02-04-94	<50	<0 5	<0.5	<0 5	<0 5	--	--	--	--
MW-5	05-02-94	55.43	31 06	24 37	ND	NR	NR	05-02-94	<50	<0 5	<0.5	<0 5	<0 5	--	--	--	-
MW-5	08-03-94	55 43	32 05	23 38	ND	SW	0.002	08-03-94	<50	<0.5	<0 5	<0.5	<0 5	--	--	--	--
MW-5	12-06-94	55 43	31 44	23.99	ND	W	0 001	12-06-94	<550*	<0 5	0 6	1 1	2	--	--	--	--
MW-5	03-10-95	55 43	25 62	29 81	ND	NNE	0.003	03-10-95	<110*	<0 5	<0.5	<0 5	<0.5	--	--	--	--
MW-5	06-05-95	55.43	25.30	30.13	ND	FG	FG	06-05-95	<130*	<0 5	<0.5	<0.5	<0 5	--	--	--	--
MW-5	08-29-95	55.43	28.21	27 22	ND	FG	FG	08-29-95	<120*	<0 5	<0.5	<0 5	<0.5	--	<5	--	--
MW-5	11-16-95	55 43	30 63	24 80	ND	SW	0.003	11-16-95	<500*	<0 5	<0.5	<0.5	0 7	<20**	--	--	--
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-5	05-28-96	55 43	24 42	31.01	ND	FG	FG	05-28-96	<100*	<0 5	<0 5	<0.5	<0.5	11	--	--	--
MW-5	08-19-96	55 43	27.82	27.61	ND	FG	FG	08-21-96	<50	<0.5	<0 5	<0 5	<0 5	29	--	--	--
MW-6	02-04-94	61 21	38 48	22 73	ND	NR	NR	02-04-94	<830*	<2.5***	<2.5***	<2.5***	3 1	--	--	--	--
MW-6	05-02-94	61 21	37 02	24.19	ND	NR	NR	05-02-94	<860*	<1***	<1***	<1***	1 3	--	--	--	--
MW-6	08-03-94	61 21	37.97	23 24	ND	SW	0.002	08-03-94	<660*	<1***	<1***	<1***	<1***	--	--	--	--
MW-6	12-06-94	61 21	37 33	23.88	ND	W	0 001	12-07-94	<720*	<1**	<1**	<1**	<1**	--	--	--	--
MW-6	03-10-95	61.21	31 54	29 67	ND	NNE	0.003	03-11-95	<390*	<0 5	<0 5	<0 5	<0.5	--	--	--	--
MW-6	06-05-95	61 21	31 15	30.06	ND	FG	FG	06-05-95	<750*	<0.5	<0 5	<0.5	<0 5	--	--	--	--
MW-6	08-29-95	61.21	34 03	27 18	ND	FG	FG	08-29-95	<600*	<0 5	<0.5	<0 5	<0.5	--	<20	--	--
MW-6	11-16-95	61 21	36 40	24.81	ND	SW	0 003	11-16-95	<500*	<0 5	<0 5	<0.5	<0 5	<3	--	--	--
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-6	05-28-96	61 21	30 29	30 92	ND	FG	FG	05-28-96	<400*	<0 5	<0 5	<0 5	<0 5	<3	--	--	--
MW-6	08-19-96	61.21	33.54	27 67	ND	FG	FG	08-19-96	<300*	<0 5	<0.5	<0.5	<0.5	<3	--	--	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96

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-7	02-04-94	58.22	20.78	37.44	ND	NR	NR	02-04-94	40000	900	980	1100	9700	--	--	--	--
MW-7	05-02-94	58 22	20 51	37 71	ND	NR	NR	05-02-94	38000	640	600	930	7200	--	--	--	--
MW-7	08-03-94	58 22	22 66	35 56	ND	SW	0.002	08-03-94	47000	1000	1200	1500	10000	--	--	--	--
MW-7	12-06-94	58.22	18.37	## 39 86	0 02	W	0 001	12-07-94	260000	<200***	380	2200	11000	--	--	--	--
MW-7	03-10-95	58 22	17 69	40 53	ND^^	NNE	0 003	03-11-95	Not sampled: floating product entered the well during purging								
MW-7	06-05-95	58 22	19 68	38.54	ND	FG	FG	06-05-95	36000	90	51	450	2000	--	--	--	--
MW-7	08-29-95	58.22	21 70	36 52	ND	FG	FG	08-29-95	86000	380	260	1100	5000	--	<10	--	--
MW-7	11-16-95	58 22	23 02	35.20	ND	SW	0.003	11-16-95	1400000	610	590	7800	3300	<4000***	--	--	--
MW-7	02-28-96	58 22	16.54	41.68	ND	NNE	0.004	02-28-96	29000	<20***	<20***	180	1000	--	--		--
MW-7	05-28-96	58 22	19 29	38 93	ND	FG	FG	05-28-96	50000	<100***	100	510	2300	<500***	--	--	--
MW-7	08-19-96	58 22	21 84	36 38	ND	FG	FG	08-21-96	45000	340	200	820	3400	<300***	--	--	--
MW-8	02-04-94	53 65	30.73	22.92	ND	NR	NR	02-04-94	<50	<0.5	<0 5	<0 5	<0 5	--	--	--	--
MW-8	05-02-94	53 65	29 26	24 39	ND	NR	NR	05-02-94	<50	<0.5	<0 5	<0 5	<0 5	--	-	--	--
MW-8	08-03-94	53 65	30 33	23 32	ND	SW	0.002	08-03-94	<50	<0 5	<0 5	<0 5	<0 5	--	--	--	--
MW-8	12-06-94	53 65	29.66	23 99	ND	W	0.001	12-07-94	<50	<0 5	<0 5	<0 5	<0.5	--	--	--	--
MW-8	03-10-95	53.65	23 60	30 05	ND	NNE	0.003	03-10-95	<50	<0 5	<0.5	<0 5	<0 5	--	--	--	--
MW-8	06-05-95	53 65	23.48	30.17	ND	FG	FG	06-05-95	<50	<0 5	<0 5	<0 5	<0.5	--	--	--	--
MW-8	08-29-95	53.65	26.44	27 21	ND	FG	FG	08-29-95	<50	<0.5	<0 5	<0 5	<0 5	--	3	--	--
MW-8	11-16-95	53 65	28 90	24 75	ND	SW	0 003	11-16-95	<50	<0 5	<0 5	<0 5	<0 5	6	9	--	--
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	--	--	--	--
MW-8	05-28-96	53 65	22.62	31 03	ND	FG	FG	05-28-96	<50	<0 5	<0 5	<0 5	<0.5	5	--	--	--
MW-8	08-19-96	53.65	26.70	26 95	ND	FG	FG	08-21-96	<50	<0.5	<0 5	<0 5	<0 5	18	--	--	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96

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
RW-1	02-04-94	56 32	33 43	22 89	ND	NR	NR	02-04-94	<540*	<0 5	<0.5	<0.5	<1 5**	--	--	--	--
RW-1	05-02-94	56 32	31 96	24 36	ND	NR	NR	05-02-94	<50	<0 5	<0.5	<0.5	<0 5	--	--	--	--
RW-1	08-03-94	56 32	32 90	23 42	ND	SW	0 002	08-03-94	<140*	<0 5	<0 5	<0 5	<0 5	--	--	--	--
RW-1	12-06-94	56 32	32 24	24 08	ND	W	0.001	12-07-94	<79*	<0 5	<0 5	<0 5	<0 5	--	--	--	--
RW-1	03-10-95	56 32	26 48	29 84	Sheen	NNE	0.003	03-10-95	<180*	<0 5	<0 5	<0 5	<0 5	--	--	--	--
RW-1	06-05-95	56.32	26 20	30 12	ND	FG	FG	06-05-95	<50	<0 5	<0 5	<0 5	<0 5	--	--	--	--
RW-1	08-29-95	56 32	28.98	27 34	ND	FG	FG	08-29-95	<200*	<0 5	<0.5	<0 5	<0 5	--	<5	--	--
RW-1	11-16-95	56 32	31.34	24 98	ND	SW	0.003	11-16-95	<50	<0 5	<0 5	<0 5	<0 5	<3	--	--	-
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	--	--	--	--
RW-1	05-28-96	56 32	25.26	31 06	ND	FG	FG	05-28-96	<50	<0 5	<0 5	<0 5	<0 5	<3	--	--	--
RW-1	08-19-96	56 32	28 51	27 81	ND	FG	FG	08-21-96	<50	<0 5	<0 5	<0 5	<0 5	<3	--	--	-
WGR-3	05-02-94	NR	20 06	NR	ND	NR	NR	05-02-94	<50	<0.5	<0.5	<0 5	<0.5	--	--	--	-
WGR-3	08-03-94	NR	22 30	NR	ND	NR	NR	08-03-94	<50	<0.5	<0.5	<0 5	<0 5	--	--	--	--
WGR-3	12-06-94	NR	17.52	NR	ND	NR	NR	12-07-94	<50	<0 5	<0.5	<0 5	0 6	--	--	--	--
WGR-3	03-10-95	NR	15 20	NR	ND	NR	NR	03-11-95	<50	<0 5	<0 5	<0 5	<0 5	--	--	--	--
WGR-3	06-05-95	NR	19 25	NR	ND	NR	NR	06-05-95	<50	<0 5	<0 5	<0 5	<0 5	--	--	--	--
WGR-3	08-29-95	NR	21 41	NR	ND	NR	NR	08-29-95	<50	<0 5	<0 5	<0 5	<0 5	--	10	--	--
WGR-3	11-16-95	NR	22 50	NR	ND	SW	0.003	11-16-95	<50	<0 5	<0 5	<0.5	<0 5	3	--	--	--
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	--	--	--	--
WGR-3	05-28-96	NR	18.33	NR	ND	FG	FG	05-28-96	<50	<0.5	<0 5	<0.5	<0 5	20	--	--	--
WGR-3	08-19-96	NR	21.38	NR	ND	FG	FG	08-19-96	<50	<0.5	<0 5	<0 5	<0.5	17	--	--	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994-Present^

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96

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

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 States 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
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*
^^: floating product entered the well during purging
* 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*
--: not analyzed or not applicable
^: For previous historical groundwater elevation and 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 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date. 11-22-96

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	Ethylbenzene	Total 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-1	05-28-96	160	<5	<5	<5	--	<5	<5	<5	<25
MW-1	08-19-96	77	<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
MW-2	05-28-96	<1	<1	<1	<1	--	44	<1	22	62
MW-2	08-21-96	<1	<1	<1	<1	--	49	<1	17	40

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 11-22-96

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	Ethylbenzene	Total 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-3	05-28-96	1700	<20	<20	<20	--	<20	<20	<20	<100
MW-3	08-19-96	1200	<20	<20	<20	--	<20	<20	<20	<100
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
MW-4	05-28-96	2700	<20	<20	<20	--	<20	<20	<20	<100
MW-4	08-19-96	2600	<20	<20	<20	--	<20	<20	<20	<100

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date. 11-22-96

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	Ethylbenzene	Total 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-5	05-28-96	360	<5	<5	<5	--	<5	<5	<5	<25
MW-5	08-21-96	150	<1	<1	2	--	<1	<1	<1	<5
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
MW-6	05-28-96	970	<20	<20	<20	--	<20	<20	<20	<100
MW-6	08-19-96	820	<20	<20	<20	--	<20	<20	<20	<100

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 11-22-96

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	Ethylbenzene	Total 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-7	05-28-96	<10	<10	<10	<10	--	74	36	340	1600
MW-7	08-21-96	<1	<1	<1	<1	--	260	200	800	3200
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
MW-8	05-28-96	<1	<1	<1	<1	--	<1	<1	<1	<5
MW-8	08-21-96	<1	<1	<1	<1	--	<1	<1	<1	<5

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96

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	Ethylbenzene	Total 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
RW-1	05-28-96	12	<1	<1	<1	--	<1	<1	<1	<5
RW-1	08-21-96	100	<1	<1	<1	--	<1	<1	<1	<5

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1994-Present*

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 11-22-96

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	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WGR-3	05-02-94	<1	<1	<1	<1	- -	<1	<1	<1	<5
WGR-3	08-03-94	<1	<1	- -	<1	- -	<1	<1	<1	<5
WGR-3	12-06-94	4	<1	- -	<1	- -	<1	<1	<1	<5
WGR-3	03-11-95	<1	<1	- -	<1	- -	<1	<1	<1	<5
WGR-3	06-05-95	<1	<1	- -	<1	- -	<1	<1	<1	<5
WGR-3	08-29-95	<1	<1	- -	<1	- -	<1	<1	<1	<5
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
WGR-3	05-28-96	<1	<1	<1	<1	- -	<1	<1	<1	<5
WGR-3	08-19-96	<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 4
Approximate Cumulative Floating Product Recovered

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96

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 1996 Total	18.54

Table 5
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
Operation and Performance Data From: 09-06-90
To: 10-01-96
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 5
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
Operation and Performance Data From: 09-06-90
To: 10-01-96
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 (12)	7710.4	7721.8	7787.9	7787.9	7787.9
Gallons Removed This Period, as gasoline (13):	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 5
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
Operation and Performance Data From: 09-06-90
To: 10-01-96
System was shut down on 3-26-96.

Date Begin.		01-01-96	02-01-96	03-01-96	04-01-96	05-01-96
Date End:		02-01-96	03-01-96	04-01-96	05-01-96	06-01-96
Mode of Oxidation:		Catalytic	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		12.8	1.5	7.4	0.0	0.0
Days of Downtime:		18.2	27.5	23.6	30.0	31.0
Average Vapor Concentrations (1)						
On-site WF Influent:	ppmv (2) as gasoline	<15	NA	NA	NA	NA
	mg/m3 (3) as gasoline	<60	NA	NA	NA	NA
	ppmv as benzene	<0.1	NA	NA	NA	NA
	mg/m3 as benzene	<0.5	NA	NA	NA	NA
Off-site WF Influent:	ppmv as gasoline	<15	NA	NA	NA	NA
	mg/m3 as gasoline	<60	NA	NA	NA	NA
	ppmv as benzene	<0.1	NA	NA	NA	NA
	mg/m3 as benzene	<0.5	NA	NA	NA	NA
System Influent.	ppmv as gasoline	<15	NA	NA	NA	NA
	mg/m3 as gasoline	<60	NA	NA	NA	NA
	ppmv as benzene	<0.1	NA	NA	NA	NA
	mg/m3 as benzene	<0.5	NA	NA	NA	NA
System Effluent:	ppmv as gasoline	<15	NA	NA	NA	NA
	mg/m3 as gasoline	<60	NA	NA	NA	NA
	ppmv as benzene	<0.1	NA	NA	NA	NA
	mg/m3 as benzene	<0.5	NA	NA	NA	NA
Average On-site Well Field Flow Rate (4), scfm (5):		174.1	178.4	178.4	0.0	0.0
Average Off-site Well Field Flow Rate (4), scfm:		17.2	19.4	19.4	0.0	0.0
Average System Influent Flow Rate (4), scfm:		191.3	197.8	197.8	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):		82.4 (16)	NA	NA	NA	NA
Average Emission Rates (8), pounds per day (9)						
Gasoline:		1.03	NA	NA	NA	NA
Benzene		0.01	NA	NA	NA	NA
Operating Hours This Period.		306.9	35.5	177.8	0.0	0.0
Operating Hours To Date:		4069.5	4105.0	4282.8	4282.8	4282.8
Pounds/ Hour Removal Rate, as gasoline (10).		0.043	0.000	0.000	0.000	0.000
Pounds Removed This Period, as gasoline (11):		13.18	0.00	0.00	0.00	0.00
Pounds Removed To Date, as gasoline (12):		7801.1	7801.1	7801.1	7801.1	7801.1
Gallons Removed This Period, as gasoline (13):		2.13	0.00	0.00	0.00	0.00
Gallons Removed To Date, as gasoline.		1258.3	1258.3	1258.3	1258.3	1258.3

Table 5
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
Operation and Performance Data From: 09-06-90
To: 10-01-96
System was shut down on 3-26-96.

Date Begin:		06-01-96	07-01-96	08-01-96	09-01-96
Date End:		07-01-96	08-01-96	09-01-96	10-01-96
Mode of Oxidation:		Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		0.0	0.0	0.0	0.0
Days of Downtime:		30 0	31.0	31.0	30.0
Average Vapor Concentrations (1)					
On-site WF Influent:	ppmv (2) as gasoline	NA	NA	NA	NA
	mg/m3 (3) as gasoline	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA
Off-site WF Influent:	ppmv as gasoline	NA	NA	NA	NA
	mg/m3 as gasoline	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA
System Influent:	ppmv as gasoline	NA	NA	NA	NA
	mg/m3 as gasoline	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA
System Effluent:	ppmv as gasoline	NA	NA	NA	NA
	mg/m3 as gasoline	NA	NA	NA	NA
	ppmv as benzene	NA	NA	NA	NA
	mg/m3 as benzene	NA	NA	NA	NA
Average On-site Well Field Flow Rate (4), scfm (5):		0.0	0.0	0.0	0.0
Average Off-site Well Field Flow Rate (4), scfm:		0.0	0.0	0.0	0.0
Average System Influent Flow Rate (4), scfm		0.0	0.0	0.0	0.0
Total Process Flow Rate, scfm:		0.0	0.0	0.0	0.0
Average Destruction Efficiency (6), percent (7):		NA	NA	NA	NA
Average Emission Rates (8), pounds per day (9)					
Gasoline		NA	NA	NA	NA
Benzene:		NA	NA	NA	NA
Operating Hours This Period:		0.0	0.0	0.0	0.0
Operating Hours To Date.		4282.8	4282.8	4282.8	4282.8
Pounds/ Hour Removal Rate, as gasoline (10):		0.000	0.000	0.000	0.000
Pounds Removed This Period, as gasoline (11):		0.00	0 00	0.00	0.00
Pounds Removed To Date, as gasoline (12):		7801.1	7801.1	7801.1	7801.1
Gallons Removed This Period, as gasoline (13):		0.00	0.00	0.00	0.00
Gallons Removed To Date, as gasoline		1258.3	1258.3	1258.3	1258.3

Table 5
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 Operation and Performance Data From: 09-06-90 To: 10-01-96 System was shut down on 3-26-96.

CURRENT REPORTING PERIOD:	07-01-96	to	10-01-96
DAYS / HOURS IN PERIOD:	92	2208.0	
DAYS / HOURS OF OPERATION	0	0.0	
DAYS / HOURS OF DOWN TIME:	92	2208.0	
PERCENT OPERATIONAL:		0.0	%
PERIOD POUNDS REMOVED:	0.0		
PERIOD GALLONS REMOVED:	0.0		
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):		0.0	

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 6
Soil-Vapor Extraction Well Data

10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96
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 6
Soil-Vapor Extraction Well Data

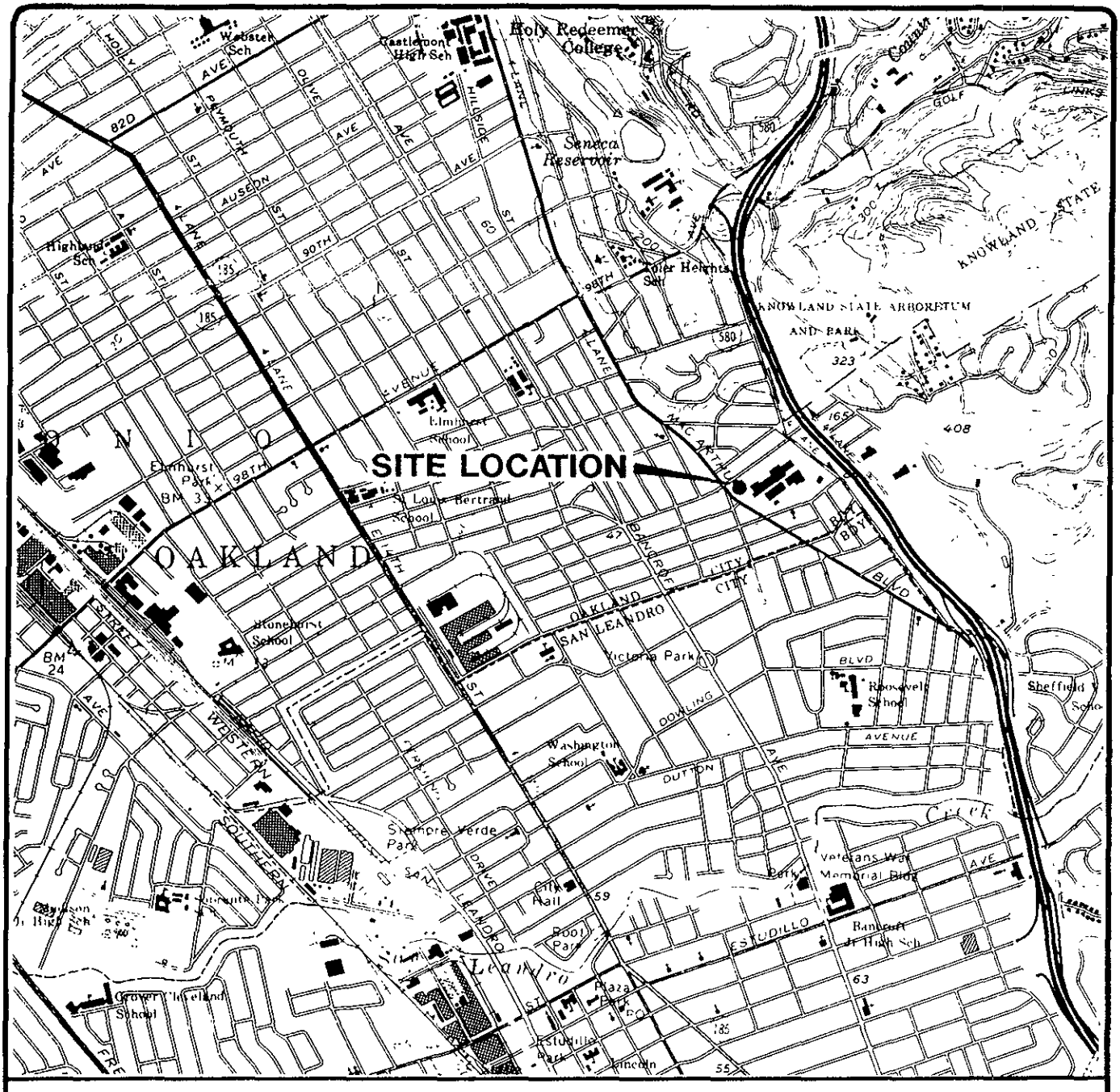
10600 and 10700 MacArthur Boulevard
Oakland, California

Date 11-22-96
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

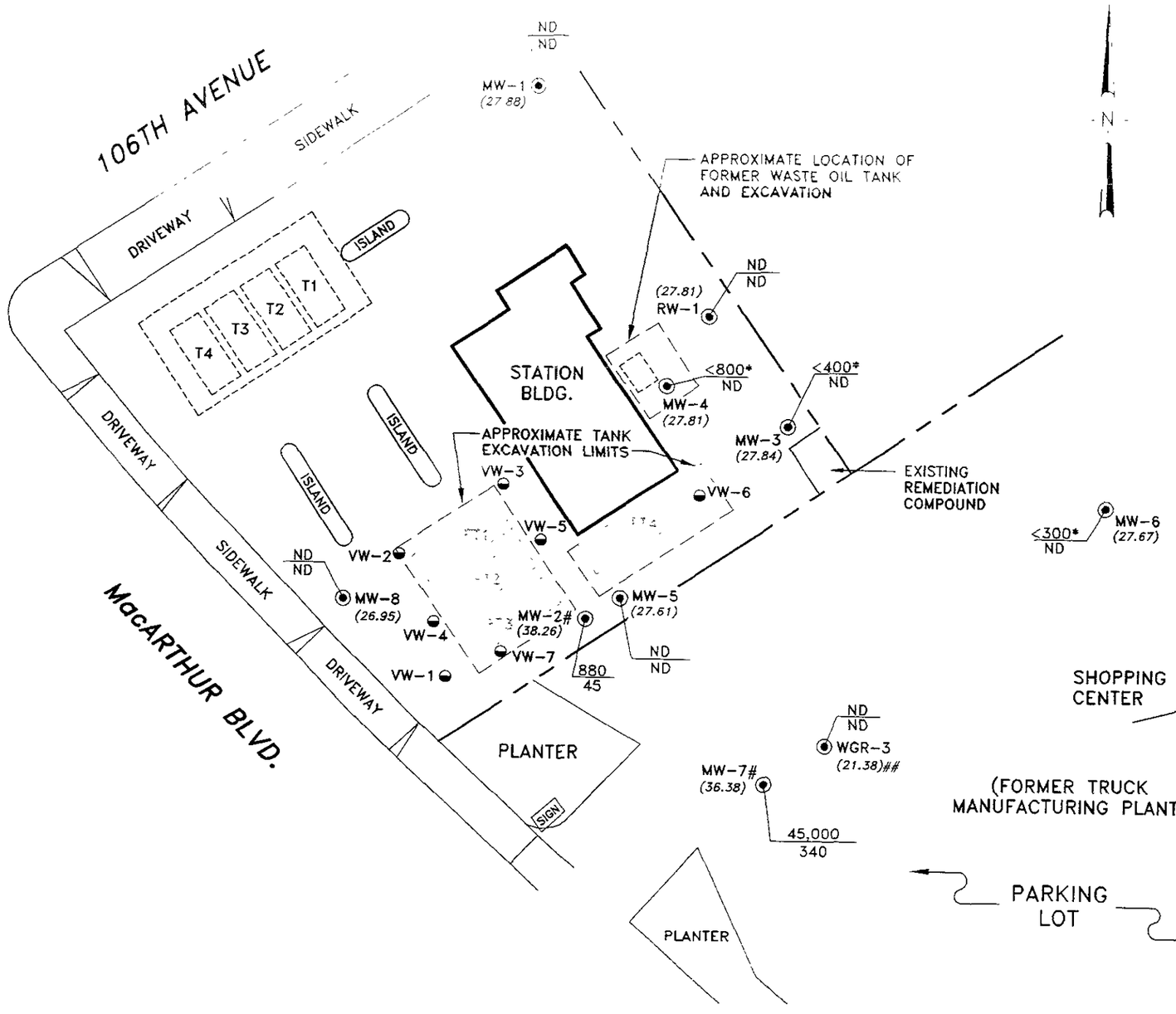


EMCON

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
- (27.61) Groundwater elevation (Ft.–MSL); measured 8/19/96
- 880 / 45 — TPHG concentration in groundwater (ug/L); sampled 8/19/96 & 8/21/96; Benzene concentration in groundwater (ug/L); sampled 8/19/96 & 8/21/96
- * 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
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)
- NR Not recorded
- # Well screened in shallow water–bearing zone; not used in contouring
- ## Depth to water; well not surveyed

Note: Not contoured because of relatively flat gradient.

Base map modified from RESNA, 1993

EMCON

SCALE: 0 30 60 FEET

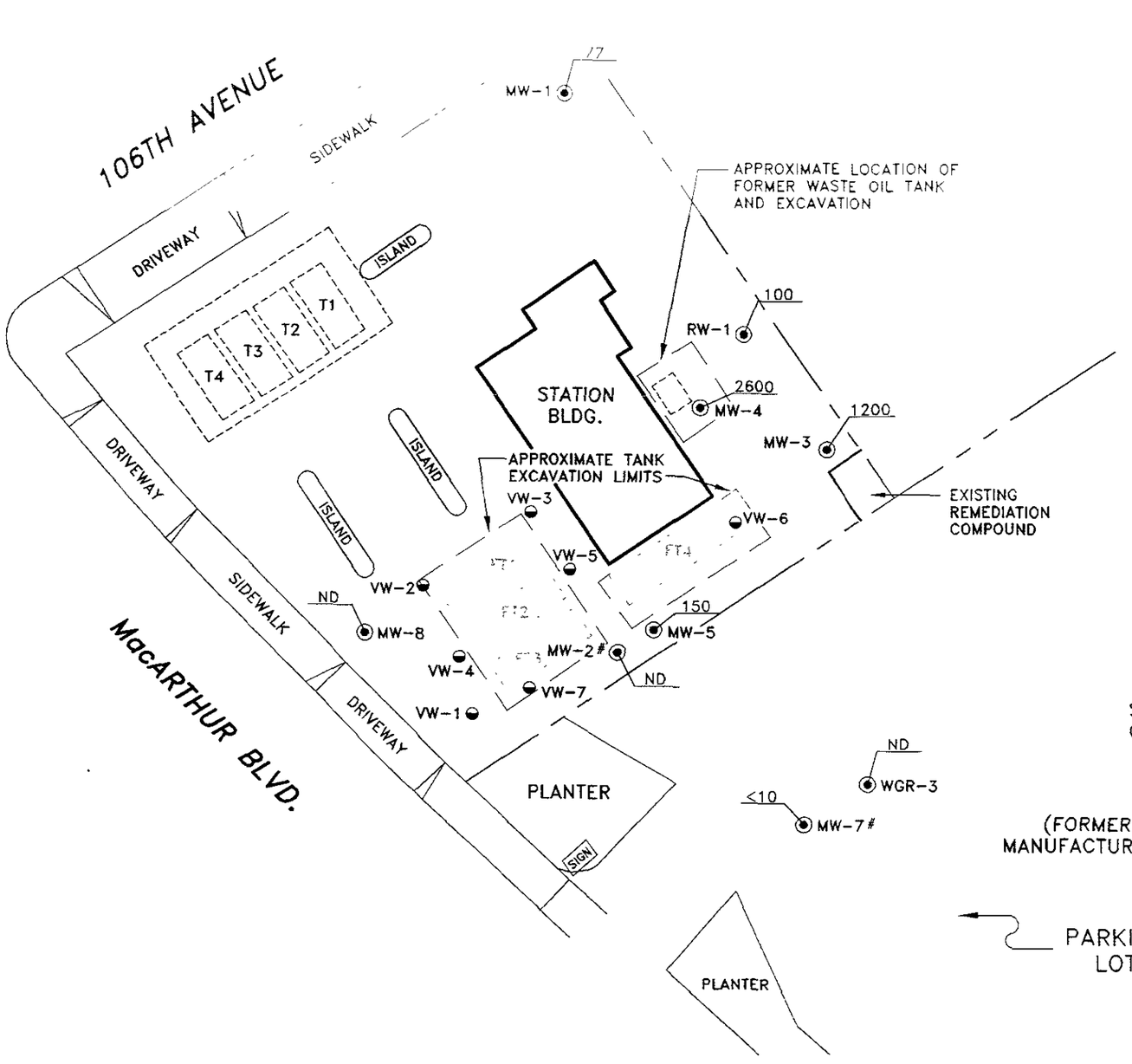
10600 AND 10700 MACARTHUR BLVD.
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

TPHG AND BENZENE CONCENTRATIONS IN GROUNDWATER
THIRD QUARTER 1996

FIGURE NO. **2**

PROJECT NO. 805–120.006

G:\805-120\G00A REV 0 11/20/96 12:32:41 DD DJ



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Existing underground storage tank
- Former underground storage tank
- 820 — PCE concentration in groundwater (ug/L); sampled 8/19/96 & 8/21/96
- ND — Not detected at or above the method reporting limit for PCE (1 ug/L)
- # — Well screened in shallow water-bearing zone.

Base map modified from RESNA, 1993

EMCON

SCALE: 0 30 60 FEET

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

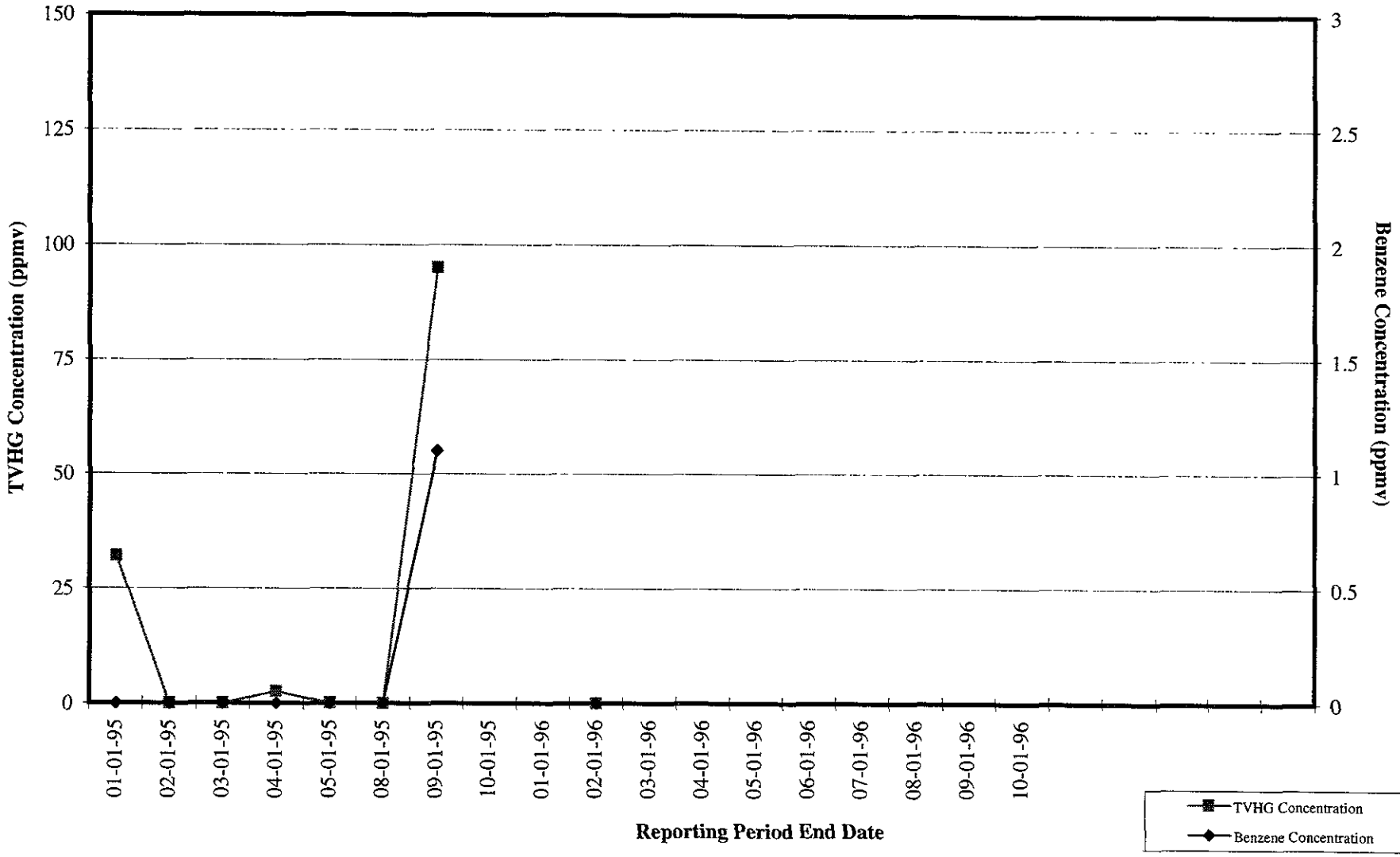
TETRACHLOROETHENE (PCE) CONCENTRATIONS IN GROUNDWATER
THIRD QUARTER 1996

FIGURE NO.
3
PROJECT NO.
805-120.006

G:\805 120\PCE REV 0 11/20/96 12:42:33 DD DJ

Figure 4

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

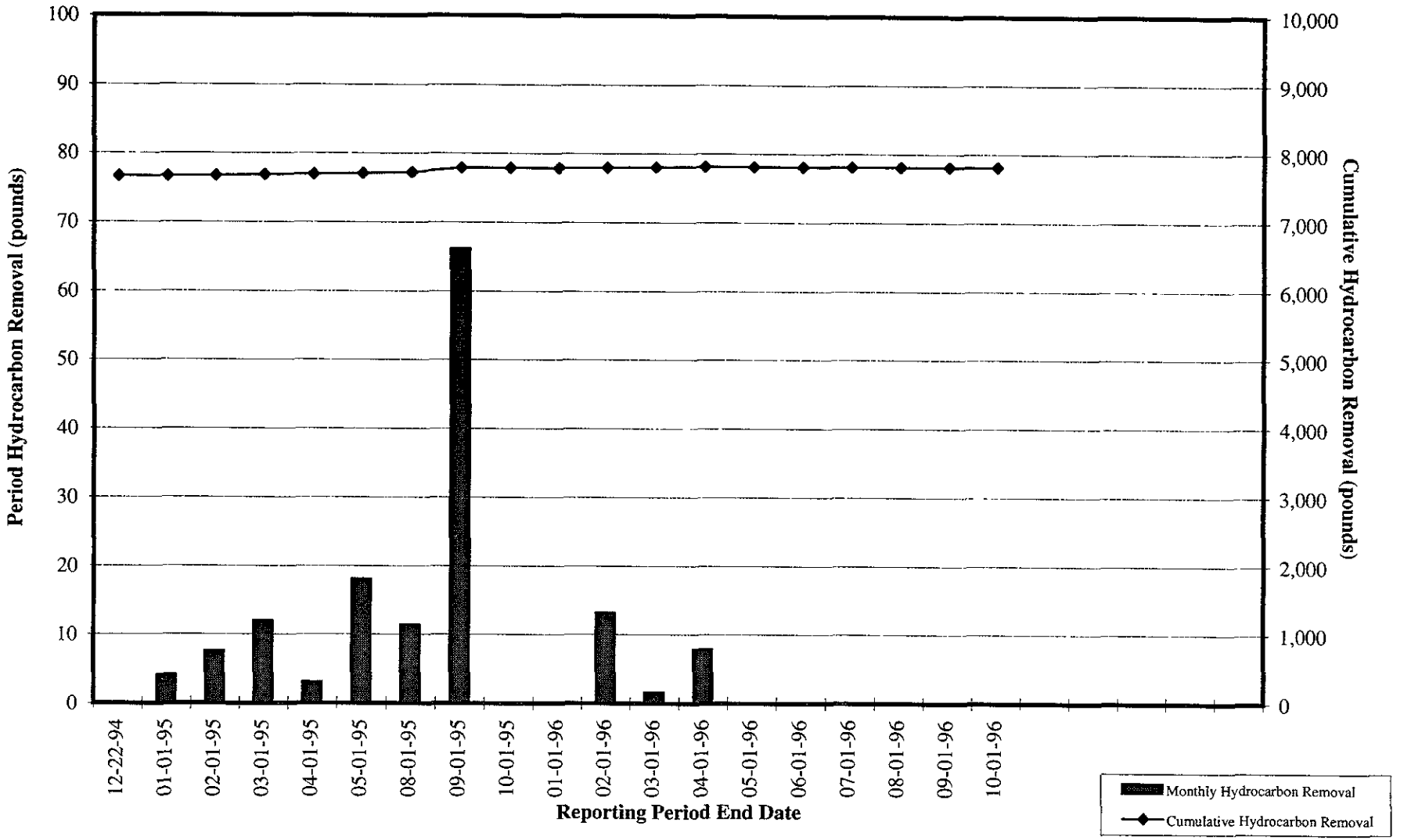


TVHG: total volatile hydrocarbons as gasoline
ppmv: parts per million by volume

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, THIRD QUARTER 1996 GROUNDWATER MONITORING EVENT

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

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

ARCO STATION # : 276 FIELD TECHNICIAN : M. ROSS DAY : 8-19-96

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket Present	Lock Number	Type Of 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-1	OK	YES	NO	YES	LW	28.04	28.04	NA	NA	38.7	
2	MW-8	OK	YES	NO	NO	SLOTTED CAP	26.7	26.7	NA	NA	47.7	
3	RW-1	OK	YES	NO	NO	SLOTTED CAP	28.51	28.51	NA	NA	48.9	
4	WGR-3	OK	YES	NO	ARCO	LW	21.32	21.32	NA	NA	27.2	
5	MW-5	OK	YES	NO	~~NONE~~ YES	[illegible]	27.82	27.82	NA	NA	47.0	PLEASE REPLACE WELL CAP
6	MW-6	OK	YES	YES	NONE	LW SLOTTED	33.54	33.54	NA	NA	50.9	PLEASE REPLACE WELL CAP
7	MW-3	OK	NO	NO	LW	ARCO	28.71	28.71	NA	NA	33.6	
8	MW-4	OK	NO	NO	LW	ARCO	28.17	28.17	NA	NA	47.6	
9	MW-2	OK	YES	NO	NO	SLOTTED	16.84	16.84	NA	NA	25.4	
10	MW-7	OK	YES	NO	YES	LW	21.84	21.84	NA	NA	55.0	
		~~OK~~	~~YES~~	~~NO~~	~~YES~~	~~LW~~	~~23.19~~	~~23.19~~			~~47.6~~	

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21175.202.002 SAMPLE ID: MW-1

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.): 1.71

DEPTH TO WATER (feet): 23.04 CALCULATED PURGE (gal.): 5.22

DEPTH OF WELL (feet): 38.7 ACTUAL PURGE VOL. (gal.): 5.5

DATE PURGED: 8-19-96 Start (2400 Hr) 1146 End (2400 Hr) 1157

DATE SAMPLED: 8-19-96 Start (2400 Hr) 1205 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1150	2.0	6.70	2400	70.4	Light Brn	Mod
1153	4.0	6.53	2310	69.2	"	"
1157	5.5	6.52	2380	68.7	"	"

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

WELL INTEGRITY: GOOD LOCK #: —

REMARKS: ___

Meter Calibration: Date: 8-19-96 Time: 1145 Meter Serial #: 9210 Temperature °F: 79.4

(EC 1000 10.19 / 1002) (DI —) (pH 7 701 / 700) (pH 10 10.21 / 1000) (pH 4 402 / —)

Location of previous calibration: —

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

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WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202-002 SAMPLE ID: MW-2 (25)

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.): 5.59

DEPTH TO WATER (feet): 16.84 CALCULATED PURGE (gal.): 16.77

DEPTH OF WELL (feet): 25.4 ACTUAL PURGE VOL. (gal.): 18.0

DATE PURGED: 08-21-96 Start (2400 Hr) 1404 End (2400 Hr) 1417

DATE SAMPLED: ↓ Start (2400 Hr) — End (2400 Hr) 1416

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1406	6	6.99	668	74.9	CLEAR	CLEAR
1409	12	6.49	530	73.9	CLEAR	CLEAR
1412	18	6.40	525	73.2	CLEAR	CLEAR

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

Other: ___

SAMPLING EQUIPMENT

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

Other: ___

WELL INTEGRITY: OK LOCK #: BOX

REMARKS: ___

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

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

Location of previous calibration: ___

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

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WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21795-202.002 SAMPLE ID: MW-3

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.): 1.61

DEPTH TO WATER (feet): 28.71 CALCULATED PURGE (gal.): 4.84

DEPTH OF WELL (feet): 38.6 ACTUAL PURGE VOL. (gal.): 5.0

DATE PURGED: 8-19-96 Start (2400 Hr) 1323 End (2400 Hr) 1356

DATE SAMPLED: 8-19-96 Start (2400 Hr) 1345 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1328	2.0	6.86	1500	66.1	BRN	HEAVY
1331	3.5	6.81	1477	66.1	"	"
1336	5.0	6.74	1450	66.1	"	"

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		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: 8-19-96 Time: 1145 Meter Serial #: 9210 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Mike Ross Reviewed By: ___ Page 3 of 10

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202.022 SAMPLE ID: MW-4

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.):	3.17
DEPTH TO WATER (feet):	28.17	CALCULATED PURGE (gal.):	9.52
DEPTH OF WELL (feet):	47.6	ACTUAL PURGE VOL. (gal.):	10.00

DATE PURGED: 8-17-96 Start (2400 Hr) 1348 End (2400 Hr) 1402

DATE SAMPLED: 8-17-96 Start (2400 Hr) 1410 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1353	3.5	7.09	1730	65.9	BRN	Heavy
1358	7.0	7.04	1848	66.2	"	"
1402	10.0	7.04	1895	65.9	"	"

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: 8-19-96 Time: 1145 Meter Serial #: 9210 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Mike Ross Reviewed By: [illegible] Page 4 of 10

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WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202-002 SAMPLE ID: MW-5 (46)

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.): 12.53

DEPTH TO WATER (feet): 27.87 CALCULATED PURGE (gal.): 35.59

DEPTH OF WELL (feet): 47.0 ACTUAL PURGE VOL. (gal.): 39

DATE PURGED: 08-21-96 Start (2400 Hr) 1329 End (2400 Hr) 1346

DATE SAMPLED: " Start (2400 Hr) ___ End (2400 Hr) 1344

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1333	13	6.26	682	76.6	CLEAR	TRACE
1337	26	6.17	806	72.6	CLEAR	TRACE
1340	39	6.15	810	73.1	CLEAR	TRACE

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

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

Field QC samples collected at this well: ND

Parameters field-filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)

___ Centrifugal Pump ___ Bailer (PVC)

✓ Submersible Pump ___ Bailer (Stainless Steel)

___ Well Wizard™ ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)

___ DDL Sampler ___ Bailer (Stainless Steel)

___ Dipper ___ Submersible Pump

___ Well Wizard™ ___ Dedicated

Other: ___

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: 8-21-96 Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-8

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

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WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202.002 SAMPLE ID: MW-6

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.): 2.83

DEPTH TO WATER (feet): 33.54 CALCULATED PURGE (gal.): 8.50

DEPTH OF WELL (feet): 50.9 ACTUAL PURGE VOL. (gal.): 8.5

DATE PURGED: 8-19-96 Start (2400 Hr) 1242 End (2400 Hr) 1254

DATE SAMPLED: 8-19-96 Start (2400 Hr) 1305 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1247	3.0	6.76	1979	66.6	Light brown	mod
1250	6.0	6.99	1940	66.2	"	"
1254	8.5	7.01	1930	66.3	"	"

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

(COBALT 0 - 500): NA

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

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

WELL INTEGRITY: Good LOCK #: None

REMARKS: ___

Meter Calibration: Date: 8-19-96 Time: 1145 Meter Serial #: 9210 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Mike Ross Reviewed By: SH Page 6 of 10

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WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202-002 SAMPLE ID: MW-7

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.): 5.41

DEPTH TO WATER (feet): 21.84 CALCULATED PURGE (gal.): 16.24

DEPTH OF WELL (feet): 55.0 ACTUAL PURGE VOL. (gal.): 17

DATE PURGED: 08-21-96 Start (2400 Hr) 1440 End (2400 Hr) 1447

DATE SAMPLED: " Start (2400 Hr) ___ End (2400 Hr) 1455

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1443	6	6.26	570	75.4	CLEAR	TRACE
1445	12	6.29	6.32	72.9	GRAY	HEAVY
1447	17	6.26	639	73.1	GRAY	HEAVY

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

COLOR (COBALT 0 - 500): NA

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK LOCK #: ___

REMARKS: ___

Meter Calibration: Date: 8-21-96 Time: ___ Meter Serial #: ___ 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: 21775-202-002 SAMPLE ID: MW-8 (47)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 276

SAMPLED BY: J LOCATION: Oakland CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 13.72

DEPTH TO WATER (feet): 26.7 CALCULATED PURGE (gal.): 41.16

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

DATE PURGED: 08-21-96 Start (2400 Hr) 1155 End (2400 Hr) 1207

DATE SAMPLED: J Start (2400 Hr) ~ End (2400 Hr) 1212

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1200	14	5.97	611	73.0	CLEAR	TRACE
1203	28	5.94	627	73.1	BROWN	MOD
1207	42	6.00	623	73.4	BROWN	HEAVY

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NA

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK LOCK #: BOX

REMARKS: ___

Meter Calibration: Date: 8-20-96 Time: ___ Meter Serial #: ___ Temperature °F: 75.0

(EC 1000 1074 / 1000) (DI ___) (pH 7 7.00 / 7.00) (pH 10 9.92 / 10.09) (pH 4 4.05 / ___)

Location of previous calibration: ___

Signature: Joe Williams Reviewed By: SA Page 8 of 10

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WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202-007 SAMPLE ID: RW-1 (48)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 276

SAMPLED BY: " LOCATION: Oakland

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

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ___ 4.5 ___ 6 ✓ (4.44) Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 299.7

DEPTH TO WATER (feet): 28.51 CALCULATED PURGE (gal.): 899.1

DEPTH OF WELL (feet): 48.9 ACTUAL PURGE VOL. (gal.): 900

DATE PURGED: 08-21-96 Start (2400 Hr) 1245 End (2400 Hr) 1307

DATE SAMPLED: " Start (2400 Hr) ___ End (2400 Hr) 1312

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1253	30	6.68	1317	72.7	CLEAR	CLEAR
1259	60	6.71	1413	70.6	CLEAR	CLEAR
1307	90	6.69	1415	69.2	CLEAR	CLEAR

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: ___ LOCK #: ___

REMARKS: ___

Meter Calibration: Date: 8-21-96 Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-8

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

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WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-202.002 SAMPLE ID: WGR-3

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 ✓ (1.36) 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NA	VOLUME IN CASING (gal.):	3.20
DEPTH TO WATER (feet):	21.38	CALCULATED PURGE (gal.):	11.40
DEPTH OF WELL (feet):	27.2	ACTUAL PURGE VOL. (gal.):	8.0

DATE PURGED: 8-19-96 Start (2400 Hr) 1216 End (2400 Hr) 1227

DATE SAMPLED: 8-19-96 Start (2400 Hr) 1235 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1220	4.0	6.68	514	68.2	Light Brown	Trace
1227	8.0	6.49	509	68.1	"	"
	DRY at 8.0 GALLONS					
	DTW →		25.05			
1235	Recharge	6.59	515	67.5	clr	clr

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

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

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

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

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

WELL INTEGRITY: Good LOCK #: Arco

REMARKS: Dry at 8.0 Gallons

Meter Calibration: Date: 8-19-96 Time: 1145 Meter Serial #: 9210 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Mike Ross Reviewed By: [illegible] Page 10 of 10

APPENDIX B

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

Columbia Analytical Services inc.

September 5, 1996

Service Request No: S9601380

Mr. 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 August 22, 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 20, 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

2059 Junction Avenue ▪ San Jose, California 95131 ▪ Telephone 408/428-1280 ▪ 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)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	L9603655
Project:	276-Oakland/#20805-120.006/TO#19350.00	**Date Collected:**	8/19/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	8/28/96
		Date Analyzed:	8/28/96

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

Sample Name	Lab Code	MRL	Result
MW-4 (47)	L9603655-001	0.5	0 8
Method Blank	L9603655-MB	0.5	ND

1AMRL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9601380
Date Collected: 8/19,21/96
Date Received: 8/22/96
Date Extracted: NA

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

	Sample Name:	**MW-1 (50)**	**MW-8 (47)**	**RW-1 (48)**
	Lab Code:	S9601380-001	S9601380-002	S9601380-003
	Date Analyzed:	8/26/96	8/26/96	9/3/96
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	77	ND	100
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	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA

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

		Sample Name:	**WGR-3 (27)**	**MW-5 (46)**	**MW-6 (50)***
		Lab Code:	S9601380-004	S9601380-005	S9601380-006
		Date Analyzed:	8/26/96	9/3/96	8/26/96
Analyte	**MRL**				
Chloromethane	10		ND	ND	<200
Vinyl Chloride	10		ND	ND	<200
Bromomethane	10		ND	ND	<200
Chloroethane	10		ND	ND	<200
Trichlorofluoromethane (CFC 11)	1		ND	ND	<20
Trichlorotrifluoroethane (CFC 113)	10		ND	ND	<200
1,1-Dichloroethene	1		ND	ND	<20
Acetone	20		ND	ND	<400
Carbon Disulfide	1		ND	ND	<20
Methylene Chloride	10		ND	ND	<200
trans-1,2-Dichloroethene	1		ND	ND	<20
cis-1,2-Dichloroethene	1		ND	2	<20
2-Butanone (MEK)	10		ND	ND	<200
1,1-Dichloroethane	1		ND	ND	<20
Chloroform	1		ND	ND	<20
1,1,1-Trichloroethane (TCA)	1		ND	ND	<20
Carbon Tetrachloride	1		ND	ND	<20
Benzene	1		ND	ND	<20
1,2-Dichloroethane	1		ND	ND	<20
Vinyl Acetate	10		ND	ND	<200
Trichloroethene (TCE)	1		ND	ND	<20
1,2-Dichloropropane	1		ND	ND	<20
Bromodichloromethane	1		ND	ND	<20
2-Chloroethyl Vinyl Ether	10		ND	ND	<200
trans-1,3-Dichloropropene	1		ND	ND	<20
4-Methyl-2-pentanone (MIBK)	10		ND	ND	<200
2-Hexanone	10		ND	ND	<200
Toluene	1		ND	ND	<20
cis-1,3-Dichloropropene	1		ND	ND	<20
1,1,2-Trichloroethane	1		ND	ND	<20
Tetrachloroethene (PCE)	1		ND	150	820
Dibromochloromethane	1		ND	ND	<20
Chlorobenzene	1		ND	ND	<20
Ethylbenzene	1		ND	ND	<20
Styrene	1		ND	ND	<20
Total Xylenes	5		ND	ND	<100
Bromoform	1		ND	ND	<20
1,1,2,2-Tetrachloroethane	1		ND	ND	<20
1,3-Dichlorobenzene	1		ND	ND	<20
1,4-Dichlorobenzene	1		ND	ND	<20
1,2-Dichlorobenzene	1		ND	ND	<20

* The MRL is elevated due to high analyte concentration requiring sample 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: S9601380
Date Collected: 8/19,21/96
Date Received: 8/22/96
Date Extracted: NA

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

	Sample Name:	MW-3 (38)*	MW-4 (47)*	MW-2 (25)
	Lab Code:	S9601380-007	S9601380-008	S9601380-009
	Date Analyzed:	8/27/96	8/27/96	8/29/96
Analyte	**MRL**			
Chloromethane	10	<200	<200	ND
Vinyl Chloride	10	<200	<200	ND
Bromomethane	10	<200	<200	ND
Chloroethane	10	<200	<200	ND
Trichlorofluoromethane (CFC 11)	1	<20	<20	ND
Trichlorotrifluoroethane (CFC 113)	10	<200	<200	ND
1,1-Dichloroethene	1	<20	<20	ND
Acetone	20	<400	<400	ND
Carbon Disulfide	1	<20	<20	ND
Methylene Chloride	10	<200	<200	ND
trans-1,2-Dichloroethene	1	<20	<20	ND
cis-1,2-Dichloroethene	1	<20	<20	ND
2-Butanone (MEK)	10	<200	<200	ND
1,1-Dichloroethane	1	<20	<20	ND
Chloroform	1	<20	<20	ND
1,1,1-Trichloroethane (TCA)	1	<20	<20	ND
Carbon Tetrachloride	1	<20	<20	ND
Benzene	1	<20	<20	49
1,2-Dichloroethane	1	<20	<20	ND
Vinyl Acetate	10	<200	<200	ND
Trichloroethene (TCE)	1	<20	<20	ND
1,2-Dichloropropane	1	<20	<20	ND
Bromodichloromethane	1	<20	<20	ND
2-Chloroethyl Vinyl Ether	10	<200	<200	ND
trans-1,3-Dichloropropene	1	<20	<20	ND
4-Methyl-2-pentanone (MIBK)	10	<200	<200	ND
2-Hexanone	10	<200	<200	ND
Toluene	1	<20	<20	ND
cis-1,3-Dichloropropene	1	<20	<20	ND
1,1,2-Trichloroethane	1	<20	<20	ND
Tetrachloroethene (PCE)	1	1,200	2,600	ND
Dibromochloromethane	1	<20	<20	ND
Chlorobenzene	1	<20	<20	ND
Ethylbenzene	1	<20	<20	17
Styrene	1	<20	<20	ND
Total Xylenes	5	<100	<100	40
Bromoform	1	<20	<20	ND
1,1,2,2-Tetrachloroethane	1	<20	<20	ND
1,3-Dichlorobenzene	1	<20	<20	ND
1,4-Dichlorobenzene	1	<20	<20	ND
1,2-Dichlorobenzene	1	<20	<20	ND

* The MRL is elevated due to high analyte concentration requiring sample dilution.

3S14/060191

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Service Request: S9601380
Date Collected: 8/19,21/96
Date Received: 8/22/96
Date Extracted: NA

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

	Sample Name:	MW-7 (54)*	Method Blank	Method Blank
	Lab Code:	S9601380-010	S960826-WB1	S960827-WB1
	Date Analyzed:	8/27/96	8/26/96	8/27/96
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	260	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	200	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	800	ND	ND
Styrene	1	<10	ND	ND
Total Xylenes	5	3,200	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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA

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

		Sample Name:	**Method Blank**	**Method Blank**
		Lab Code:	S960829-WB1	S960903-WB1
		Date Analyzed:	8/29/96	9/3/96
Analyte	**MRL**			
Chloromethane	10		ND	ND
Vinyl Chloride	10		ND	ND
Bromomethane	10		ND	ND
Chloroethane	10		ND	ND
Trichlorofluoromethane (CFC 11)	1		ND	ND
Trichlorotrifluoroethane (CFC 113)	10		ND	ND
1,1-Dichloroethene	1		ND	ND
Acetone	20		ND	ND
Carbon Disulfide	1		ND	ND
Methylene Chloride	10		ND	ND
trans-1,2-Dichloroethene	1		ND	ND
cis-1,2-Dichloroethene	1		ND	ND
2-Butanone (MEK)	10		ND	ND
1,1-Dichloroethane	1		ND	ND
Chloroform	1		ND	ND
1,1,1-Trichloroethane (TCA)	1		ND	ND
Carbon Tetrachloride	1		ND	ND
Benzene	1		ND	ND
1,2-Dichloroethane	1		ND	ND
Vinyl Acetate	10		ND	ND
Trichloroethene (TCE)	1		ND	ND
1,2-Dichloropropane	1		ND	ND
Bromodichloromethane	1		ND	ND
2-Chloroethyl Vinyl Ether	10		ND	ND
trans-1,3-Dichloropropene	1		ND	ND
4-Methyl-2-pentanone (MIBK)	10		ND	ND
2-Hexanone	10		ND	ND
Toluene	1		ND	ND
cis-1,3-Dichloropropene	1		ND	ND
1,1,2-Trichloroethane	1		ND	ND
Tetrachloroethene (PCE)	1		ND	ND
Dibromochloromethane	1		ND	ND
Chlorobenzene	1		ND	ND
Ethylbenzene	1		ND	ND
Styrene	1		ND	ND
Total Xylenes	5		ND	ND
Bromoform	1		ND	ND
1,1,2,2-Tetrachloroethane	1		ND	ND
1,3-Dichlorobenzene	1		ND	ND
1,4-Dichlorobenzene	1		ND	ND
1,2-Dichlorobenzene	1		ND	ND

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA

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

Sample Name:	**MW-1 (50)**	**MW-8 (47)**	**RW-1 (48)**
Lab Code:	S9601380-001	S9601380-002	S9601380-003
Date Analyzed:	8/23/96	8/23/96	8/23/96

Analyte	**MRL**			
TPH as Gasoline	50	ND	ND	ND
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
Methyl *tert*-Butyl Ether	3	ND	18	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA

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

		Sample Name:	**WGR-3 (27)**	**MW-5 (46)**	**MW-6 (50)**
		Lab Code:	S9601380-004	S9601380-005	S9601380-006
		Date Analyzed:	8/23/96	8/23/96	8/23/96
Analyte	**MRL**				
TPH as Gasoline	50		ND	ND	<300*
Benzene	0.5		ND	ND	ND
Toluene	0.5		ND	ND	ND
Ethylbenzene	0.5		ND	ND	ND
Total Xylenes	0.5		ND	ND	ND
Methyl *tert*-Butyl Ether	3		17	29	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.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA

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

		Sample Name:	**MW-3 (38)**	**MW-4 (47)**	**MW-2 (25)**
		Lab Code:	S9601380-007	S9601380-008	S9601380-009
		Date Analyzed:	8/26/96	8/26-27/96	8/26/96
Analyte	**MRL**				
TPH as Gasoline	50		<400*	<800*	880
Benzene	0.5		ND	ND	45
Toluene	0.5		ND	ND	1
Ethylbenzene	0.5		ND	ND	15
Total Xylenes	0.5		ND	ND	31
Methyl *tert*-Butyl Ether	3		ND	<7**	80

* 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.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA

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

	Sample Name:	**MW-7 (54)**	**Method Blank**	**Method Blank**
	Lab Code:	S9601380-010	S960823-WB1	S960826-WB1
	Date Analyzed:	8/26/96	8/23/96	8/26/96
Analyte	**MRL**			
TPH as Gasoline	50	45,000	ND	ND
Benzene	0.5	340	ND	ND
Toluene	0.5	200	ND	ND
Ethylbenzene	0.5	820	ND	ND
Total Xylenes	0.5	3,400	ND	ND
Methyl *tert*-Butyl Ether	3	<300***	ND	ND

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA

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

Sample Name:	**Method Blank**
Lab Code:	S960827-WB1
Date Analyzed:	8/26/96

Analyte	**MRL**	
TPH as Gasoline	50	ND
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
Methyl *tert*-Butyl Ether	3	ND

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	L9603655
Project:	276-Oakland/#20805-120.006/TO#19350.00	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	8/28/96
		Date Analyzed:	8/28/96

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	2.09	2.09	1.82	1.89	87	90	75-125	4

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

DLCS/032395

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: S9601380
Date Collected: 8/19,21/96
Date Received: 8/22/96
Date Extracted: NA
Date Analyzed: 08/26-09/03/96

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-1 (50)	S9601380-001	103	98	103
MW-8 (47)	S9601380-002	102	101	102
RW-1 (48)	S9601380-003	106	102	107
WGR-3 (27)	S9601380-004	102	98	100
MW-5 (46)	S9601380-005	104	101	105
MW-6 (50)	S9601380-006	105	100	98
MW-3 (38)	S9601380-007	101	100	110
MW-4 (47)	S9601380-008	102	101	108
MW-2 (25)	S9601380-009	109	99	107
MW-7 (54)	S9601380-010	105	100	106
MW-7(54) (MS)	S9601380-010MS	105	99	106
MW-7(54) (DMS)	S9601380-010DMS	107	98	112
Method Blank	S960826-WB1	105	97	102
Method Blank	S960827-WB1	113	95	105
Method Blank	S960829-WB1	109	97	104
Method Blank	S960903-WB1	109	104	106
CAS Acceptance Limits:		76-114	88-110	86-115

SUR3/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA
		Date Analyzed:	8/27/96

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

Sample Name: MW-7(54)
Lab Code: S9601380-010

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
1,1-Dichloroethene	500	500	ND	540	520	108	104	61-145	4
Trichloroethene	500	500	ND	520	540	104	108	71-120	4
Chlorobenzene	500	500	ND	490	500	98	100	75-130	2
Toluene	500	500	200	720	720	104	104	76-125	<1
Benzene	500	500	260	760	770	100	102	76-127	1

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA
		Date Analyzed:	8/23-27/96

Surrogate Recovery Summary
BTEX, MTBE 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-1 (50)	S9601380-001	112	98
MW-8 (47)	S9601380-002	109	102
RW-1 (48)	S9601380-003	110	101
WGR-3 (27)	S9601380-004	111	101
MW-5 (46)	S9601380-005	112	98
MW-6 (50)	S9601380-006	100	98
MW-3 (38)	S9601380-007	111	100
MW-4 (47)	S9601380-008	111	104
MW-2 (25)	S9601380-009	106	110
MW-7 (54)	S9601380-010	107	110
MW-8 (47) (MS)	S9601380-002MS	106	108
MW-8 (47) (DMS)	S9601380-002DMS	107	107
Method Blank	S960823-WB1	110	93
Method Blank	S960826-WB1	112	93
Method Blank	S960827-WB1	113	100
	CAS Acceptance Limits:	69-116	69-116

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Collected:**	8/19,21/96
Sample Matrix:	Water	**Date Received:**	8/22/96
		Date Extracted:	NA
		Date Analyzed:	8/23/96

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

Sample Name: ME-8 (47)
Lab Code: S9601380-002

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

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9601380
Project:	276 Oakland / 20805-120.006 / TO#19350.00	**Date Analyzed:**	8/23/96

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	25.3	101	85-115
Toluene	25	24.6	98	85-115
Ethylbenzene	25	25.4	102	85-115
Xylenes, Total	75	78.9	105	85-115
Gasoline	250	241	96	90-110
Methyl *tert*-Butyl Ether	50	56	112	85-115

ICV25AL/060194

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 Youre	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408)453-7300	Fax no. (Consultant) (408)453-0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131		Contract number

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 4-40ml HCL VOAs (All wells) MW-4 add 2-1liter glass HCL #20405-120.06

Lab number: 5960138O

	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 8240/8260 NO MTBE	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
1	MW-1(50)		4		X		X	HCL	8-19-96	1205		X					X				
2	MW-8(47)		4		X		X	HCL	8-21-96	1212		X					X				
3	RW-1(48)		4		X		X	HCL	8-21-96	1312		X					X				
4	WGR-36(51)		4		X		X	HCL	8-19-96	1235 1235		X					X				
5	MW-5(46)		4		X		X	HCL	8-21-96	1344		X					X				
6	MW-6(50)		4		X		X	HCL	8-19-96	1305		X					X				
7	MW-3(38)		4		X		X	HCL	8-19-96	1345		X					X				
8	MW-4(47)		6		X		X	HCL	8-19-96	1410		X			X		X				
9	MW-2(25)		4		X		X	HCL	8-21-96	1416		X					X				
10	MW-7(54)		4		X		X	HCL	8-21-96	1455		X					X				

Condition of sample: ok		Temperature received: Cool	
Relinquished by sampler: Dan Gibbs	Date 8/22/96 Time 1210	Received by: Joanne Brown CAS	8-22-96 12:10
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date Time

Turnaround time

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

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

APPENDIX C

SVE SYSTEM MONITORING DATA LOG SHEETS

10600 and 10700 MacArthur Boulevard
SVE SYSTEM
MONITORING DATA

Reporting Period
07/01/96 00:00
08/01/96 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						
07/01/96 00:00																						1216.20					
08/01/96 00 00	0 0	0 0	0 0																		744 00	1216 20	0 00	0 00	744 00	31 00
Period Totals:																					744 00		0 00	0.00	744 00	31 00
Averages:	0 0	0 0	0.0																							

10600 and 10700 MacArthur Boulevard
SVE SYSTEM
MONITORING DATA

Reporting Period:
08/01/96 00 00
09/01/96 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						
08/01/96 00.00																						1216.20				
09/01/96 00:00	0.0	0 0	0 0																		744 00	1216 20	0 00	0 00	744 00	31 00
Period Totals																					744.00		0.00	0 00	744 00	31 00
Averages	0.0	0.0	0 0																							

10600 and 10700 MacArthur Boulevard
SVE SYSTEM
MONITORING DATA

Reporting Period:
09/01/96 00:00
10/01/96 00:00

Hours in Period: 720.0
Days in Period: 30.00

Operation + Down Hours: 720.0
Operation + Down Days: 30.00

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						
09/01/96 00:00																														1216.20				
09/03/96 00:00	0.0	0.0	0.0																										48.00	1216.20	0.00	0.00	48.00	2.00
10/01/96 00:00	0.0	0.0	0.0																										672.00	1216.20	0.00	0.00	672.00	28.00
Period Totals:																													720.00		0.00	0.00	720.00	30.00
Averages:	0.0	0.0	0.0																															