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

Date June 18, 1996
Project 20805-129.003

To:

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

We are enclosing:

Copies	Description
1	First quarter 1996 groundwater monitoring results and remediation system performance evaluation report, ARCO Service Station 2169, Oakland, California

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

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

John C. Young
Project Manager

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

ARCO Products Company

Date:
June 18, 1996

Re: ARCO Station # 2169 • 889 West Grand Avenue • Oakland, CA
First Quarter 1996 Groundwater Monitoring Results and
Remediation System Performance Evaluation Report

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

Submitted by:

Michael R. Whelan

Michael R. Whelan
Environmental Engineer

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

June 10, 1996
Project 20805-129.003

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

Re: First quarter 1996 groundwater monitoring program results and remediation system performance evaluation report, ARCO service station 2169, Oakland, California

Dear Mr. Whelan:

This letter presents the results of the first quarter 1996 groundwater monitoring program at ARCO Products Company (ARCO) service station 2169, 889 West Grand Avenue, Oakland, California (Figure 1). Operation and performance data for the interim soil-vapor extraction (SVE) and air-sparge (AS) remediation systems at the site are also presented. The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations. Pertinent site features, including the locations of existing on-site monitoring and vapor extraction wells are shown in Figure 2.

LIMITATIONS

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

Please call if you have questions.

Sincerely,

EMCON

Sailaja Yelamanchili
Staff Engineer

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

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

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June 10, 1996

ARCO QUARTERLY REPORT

Station No.: 2169	Address: 889 West Grand Avenue, Oakland, California
EMCON Project No.	20805-129.003
ARCO Environmental Engineer/Phone No.:	Michael Whelan / (408) 453-1640
EMCON Project Manager/Phone No.:	John C. Young /(408) 453-7300
Primary Agency/Regulatory ID No.:	ACHCSA /Susan Hugo

WORK PERFORMED THIS QUARTER (First- 1996):

1. Conducted quarterly groundwater monitoring and sampling.
2. Prepared and submitted quarterly report for fourth quarter 1995.
3. SVE system has been shut down since October 12, 1995. SVE system was restarted on January 18, 1996 but a blower failure caused system to shut down.
4. Historical groundwater analytical data suggests the groundwater monitoring samples for wells A-5 and A-6 appear to have been switched in either the laboratory or the field. The first quarter 1996 analytical results for wells A-5 and A-6 are consistent with quarters prior to fourth quarter 1995.

WORK PROPOSED FOR NEXT QUARTER (Second- 1996):

1. Perform quarterly groundwater monitoring and sampling.
2. Prepare and submit quarterly report for first quarter 1996.
3. Replace the blower motor and restart the SVE and air-sparge systems.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring and Operation and Maintenance of Remediation Systems
Frequency of Sampling:	Quarterly (groundwater), Monthly (SVE and Air-Sparge)
Frequency of Monitoring:	Quarterly (groundwater), Monthly (SVE and Air-Sparge)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Cumulative FP Recovered to Date :	4.8 gallons, Wells ADR-1 and ADR-2
FP Recovered This Quarter :	None
Bulk Soil Removed to Date :	2,196 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 and Air-Sparge Systems
Approximate Depth to Groundwater:	8.70 feet
Groundwater Gradient (Average):	0.003 ft/ft toward northwest (consistent with past events)

SVE QUARTERLY OPERATION AND PERFORMANCE:

Equipment Inventory:	Therm Tech Model VAC-25, 250 cfm, Thermal/Catalytic Oxidizer
Operating Mode:	Catalytic Oxidation
BAAQMD Permit #:	12119
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:	NA
HC Destroyed to Date:	7,287.9 pounds
Utility Usage	
Electric (KWH):	31 KWH
Gas/Propane (Therms):	4 Therms
Operating Hours This Period:	None
Percent Operational:	0%
Operating Hours to Date:	4243.5 hours
Unit Maintenance:	NA
Number of Auto Shut Downs:	System manually shut down on 10-12-95.
Destruction Efficiency Permit Requirement:	90%
Percent TPH Conversion:	NA
Stack Temperature:	NA
Source Flow:	NA
Process Flow:	NA
Source Vacuum:	NA

ATTACHED:

- Table 1 - Groundwater Monitoring Data, First Quarter 1996
- Table 2 - Historical Groundwater Elevation Data
- Table 3 - Historical Groundwater Analytical Data
- Table 4 - Approximate Cumulative Floating Product Recovery Data
- Table 5 - Soil Vapor Extraction System Operation and Performance Data
- Table 6 - Soil-Vapor Extraction Well Data
- Table 7 - Air-Sparge System Operation and Performance Data
- Figure 1 - Site Location
- Figure 2 - Site Plan
- Figure 3 - Groundwater Data, First Quarter 1996
- Figure 4 - Historical SVE System Influent TVHG and Benzene Concentrations
- Figure 5 - Historical SVE System Hydrocarbon Removal Rates
- Appendix A - Field Data Sheets, First Quarter 1996 Groundwater Monitoring Event
- Appendix B - Analytical Results and Chain of Custody Documentation, First Quarter 1996 Groundwater Monitoring Event
- Appendix C - SVE System Monitoring Data Log Sheets
- Appendix D - Operation and Maintenance Field Data Sheets, SVE and Air-Sparge Systems, First Quarter 1996

cc: Susan Hugo, ACHCSA
Kevin Graves, RWQCB-SFBR

Table 1
Groundwater Monitoring Data
First Quarter 1996

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

Date: 05-07-96

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	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
A-1	03-01-96	14.16	8 78	5.38	ND	NW	0.003	03-13-96	1300	300	74	29	73	100	--	--
A-2	03-01-96	14.55	9.34	5.21	ND	NW	0.003	03-13-96	<50	<0.5	0.6	<0.5	1.3	<9	--	--
A-3	03-01-96	15.75	9.90	5.85	ND	NW	0.003	03-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
A-4	03-01-96	15.25	8.55	6.70	ND	NW	0.003	03-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
A-5	03-01-96	13.51	8.11	5 40	ND	NW	0.003	03-13-96	11000	860	960	380	1600	<100	--	--
A-6	03-01-96	13.51	8.21	5 30	ND	NW	0.003	03-13-96	1400	<3	<15	<7	<10	<20	--	--
AR-1	03-01-96	15 61	8.19	7.42	ND	NW	0.003	03-13-96	150	3.8	0.5	1 4	1.3	<3	--	--
AR-2	03-01-96	15 28	9.83	5.45	ND	NW	0.003	03-13-96	190	26	2.6	3 3	13	200	--	--
ADR-1	03-01-96	13.95	8.76	5.19	ND	NW	0 003	03-13-96	89000	370	1000	840	8100	<500	--	--
ADR-2	03-01-96	14.64	8.74	5.90	ND	NW	0 003	03-13-96	29000	1100	1200	710	3800	<500	--	--

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United Statest Environmental Protection Agency
MTBE: methyl-tert-butyl ether
TPHD. total petroleum hydrocarbons as diesel, California DHS LUFT Method
ND: none detected
NW: northwest
- - : not analyzed

Table 2
Historical Groundwater Elevation Data
1994 - Present***

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

Date: 05-07-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
A-1	02-09-94	14.16	10.09	4.07	ND	NR	NR
A-1	05-04-94	14.16	10 68	3.48	ND	NW	0.004
A-1	08-10-94	14.16	10.28	3.88	ND	WNW	0.007
A-1	11-16-94	14.16	9.75	4.41	ND	NW	0.005
A-1	03-24-95	14.16	8.10	6.06	ND	NW	0.009
A-1	06-05-95	14.16	11 13	3.03	ND	NW	0.002
A-1	08-17-95	14.16	11.71	2.45	ND	W	0.001
A-1	12-04-95	14.16	12.28	1.88	ND	NNW	0 002
A-1	03-01-96	14.16	8.78	5.38	ND	NW	0.003
A-2	02-09-94	14.55	10.67	3.88	ND	NR	NR
A-2	05-04-94	14.55	11.25	3 30	ND	NW	0.004
A-2	08-10-94	14.55	11.56	2.99	ND	WNW	0.007
A-2	11-16-94	14.55	10.31	4.24	ND	NW	0.005
A-2	03-24-95	14.55	8.64	5.91	ND	NW	0.009
A-2	06-05-95	14.55	11.72	2.83	ND	NW	0.002
A-2	08-17-95	14.55	12.35	2.20	ND	W	0 001
A-2	12-04-95	14.55	12.74	1.81	ND	NNW	0.002
A-2	03-01-96	14 55	9.34	5.21	ND	NW	0.003
A-3	02-09-94	15.75	11.32	4.43	ND	NR	NR
A-3	05-04-94	15.75	11.99	3.76	ND	NW	0.004
A-3	08-10-94	15.75	11.12	4.63	ND	WNW	0.007
A-3	11-16-94	15.75	11.02	4 73	ND	NW	0.005
A-3	03-24-95	15 75	8.83	6.92	ND	NW	0.009
A-3	06-05-95	15.75	12.44	3.31	ND	NW	0 002
A-3	08-17-95	15.75	13.04	2.71	ND	W	0 001
A-3	12-04-95	15.75	13.57	2 18	ND	NNW	0.002
A-3	03-01-96	15.75	9.90	5.85	ND	NW	0.003
A-4	02-09-94	15.25	10.01	5.24	ND	NR	NR
A-4	05-04-94	15.25	11.08	4.17	ND	NW	0.004
A-4	08-10-94	15.25	11 75	3.50	ND	WNW	0.007
A-4	11-16-94	15.25	9.78	5.47	ND	NW	0.005
A-4	03-24-95	15.25	7.20	8.05	ND	NW	0 009
A-4	06-05-95	15.25	11 70	3 55	ND	NW	0.002
A-4	08-17-95	15.25	12.28	2.97	ND	W	0.001
A-4	12-04-95	15.25	12 63	2.62	ND	NNW	0.002
A-4	03-01-96	15.25	8.55	6.70	ND	NW	0.003

Table 2
Historical Groundwater Elevation Data
1994 - Present***

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

Date 05-07-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
A-5	02-09-94	13 51	9.44	4.07	ND	NR	NR
A-5	05-04-94	13 51	10.00	3.51	ND	NW	0.004
A-5	08-10-94	13.51	10.76	2.75	ND	WNW	0.007
A-5	11-16-94	13.51	9.09	4 42	ND	NW	0.005
A-5	03-24-95	13.51	7.40	6.11	ND	NW	0.009
A-5	06-05-95	13.51	10 43	3.08	ND	NW	0.002
A-5	08-17-95	13 51	11.15	2.36	ND	W	0.001
A-5	12-04-95	13.51	11 42	2.09	ND	NNW	0.002
A-5	03-01-96	13.51	8.11	5.40	ND	NW	0.003
A-6	02-09-94	13.51	9.48	4.03	ND	NR	NR
A-6	05-04-94	13 51	10.07	3.44	ND	NW	0.004
A-6	08-10-94	13.51	10.77	2 74	ND	WNW	0 007
A-6	11-16-94	13.51	9.14	4 37	ND	NW	0 005
A-6	03-24-95	13.51	7.89	5.62	ND	NW	0.009
A-6	06-05-95	13.51	10 06	3.45	ND	NW	0.002
A-6	08-17-95	13.51	11.10	2.41	ND	W	0.001
A-6	12-04-95	13 51	11.52	1.99	ND	NNW	0.002
A-6	03-01-96	13 51	8.21	5.30	ND	NW	0.003
AR-1	02-09-94	15.61	11 08	4.53	ND	NR	NR
AR-1	05-04-94	15.61	11.83	3.78	ND	NW	0.004
AR-1	08-10-94	15.61	11.09	4.52	ND	WNW	0.007
AR-1	11-16-94	15.61	10.19	5.42	ND	NW	0.005
AR-1	03-24-95	15.61	7 25	8.36	ND	NW	0.009
AR-1	06-05-95	15.61	11 37	4.24	ND	NW	0.002
AR-1	08-17-95	15 61	12.40	3.21	ND	W	0.001
AR-1	12-04-95	15.61	12.90	2.71	ND	NNW	0.002
AR-1	03-01-96	15.61	8.19	7 42	ND	NW	0.003
AR-2	02-09-94	15.28	11.33	3.95	ND	NR	NR
AR-2	05-04-94	15.28	11.88	3.40	ND	NW	0 004
AR-2	08-10-94	15.28	12.48	2.80	ND	WNW	0.007
AR-2	11-16-94	15.28	10 95	4.33	ND	NW	0.005
AR-2	03-24-95	15 28	9.13	6.15	ND	NW	0.009
AR-2	06-05-95	15 28	12.09	3.19	ND	NW	0.002
AR-2	08-17-95	15.28	12.78	2.50	ND	W	0.001
AR-2	12-04-95	15.28	11.44	3.84	ND	NNW	0.002
AR-2	03-01-96	15.28	9.83	5.45	ND	NW	0.003

Table 2
Historical Groundwater Elevation Data
1994 - Present***

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

Date: 05-07-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
ADR-1	02-09-94	13.95	9.90	4.05	ND	NR	NR
ADR-1	05-04-94	13 95	10.50	3.45	ND	NW	0.004
ADR-1	08-10-94	13 95	10.36	3.59	ND	WNW	0.007
ADR-1	11-16-94	13.95	9.64	4.31	Sheen	NW	0 005
ADR-1	03-24-95	13.95	8 04	** 5.92	0.01	NW	0.009
ADR-1	06-05-95	13.95	11.02	2.93	ND	NW	0 002
ADR-1	08-17-95	13.95	11.86	2.09	ND	W	0 001
ADR-1	12-04-95	13.95	10.05	3.90	ND	NNW	0.002
ADR-1	03-01-96	13.95	8.76	5.19	ND	NW	0 003
ADR-2	02-09-94	14 64	10.73	3.91	ND	NR	NR
ADR-2	05-04-94	14.64	11.31	3.33	ND	NW	0.004
ADR-2	08-10-94	14.64	9.81	** 4.90	0.10	WNW	0.007
ADR-2	11-16-94	14.64	9.84	** 4.87	0.09	NW	0 005
ADR-2	03-24-95	14.64	8.41	NR*	>3.00*	NR*	NR*
ADR-2	06-05-95	14.64	11.45	NR*	>3 00*	NR*	NR*
ADR-2	08-17-95	14.64	12.10	** 2.56	0.03	W	0.001
ADR-2	12-04-95	14 64	10.93	** 3.73	0.03	NNW	0.002
ADR-2	03-01-96	14 64	8.74	5.90	ND	NW	0.003

ft-MSL: elevation in feet, relative to mean sea level
MWN: groundwater flow direction and gradient apply to the entire monitoring well network
ND: none detected
NR: not reported; data not available or not measurable
NW: northwest
WNW: west-northwest
W: west
NNW: north-northwest
*: well contained more than 3 feet of floating product; exact product thickness and groundwater elevation could not be measured
**: [corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0 73 = density ratio of oil to water
***: For previous historical groundwater elevation data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results and Remediation System Performance Evaluation Report, ARCO Service Station 2169, 889 West Grand Avenue, Oakland, California,* (EMCON, March 4, 1996).

Table 3
Historical Groundwater Analytical Data
1994 - Present*

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

Date: 05-07-96

Well Designation	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L	TPHD LUFT Method µg/L
A-1	02-09-94	3000	560	150	66	190	--	--	^650
A-1	05-04-94	1300	250	61	27	110	--	--	^2100
A-1	08-10-94	27000	3700	1100	540	3000	--	--	^3000
A-1	11-16-94	2100	460	6.4	62	120	--	--	^^^^640
A-1	03-24-95	1200	230	39	34	66	--	--	^^^^160
A-1	06-05-95	1500	310	27	36	76	--	--	^710
A-1	08-18-95	1600	470	35	48	110	120	--	^240
A-1	12-04-95	1200	240	17	25	56	--	120	--
A-1	03-13-96	1300	300	74	29	73	100	--	--
A-2	02-09-94	^^260	<0.6	<0 5	<0.5	<0.5	--	--	--
A-2	05-04-94	<50	<0.5	<0 5	<0.5	<0.5	--	--	--
A-2	08-10-94	690	47	25	3.9	86	--	--	--
A-2	11-16-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-2	03-24-95	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-2	06-05-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	08-17-95	<50	<0.5	<0.5	<0.5	<0 5	12	--	--
A-2	12-04-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-2	03-13-96	<50	<0 5	0 6	<0.5	1 3	<9	--	--
A-3	02-09-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-3	05-04-94	<50	<0.5	<0 5	<0.5	<0.5	--	--	--
A-3	08-10-94	<50	<0.5	<0 5	<0.5	<0 5	--	--	--
A-3	11-16-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-3	03-24-95	<50	<0.5	<0.5	<0 5	<0.5	--	--	--
A-3	06-05-95	Not sampled: not scheduled for chemical analysis							
A-3	08-17-95	Not sampled not scheduled for chemical analysis							
A-3	12-04-95	Not sampled: not scheduled for chemical analysis							
A-3	03-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
A-4	02-09-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
A-4	05-04-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-4	08-10-94	<50	<0.5	<0.5	<0.5	<0 5	--	--	--
A-4	11-16-94	<50	<0.5	<0.5	<0 5	<0.5	--	--	--
A-4	03-24-95	<50	<0.5	<0.5	<0 5	<0.5	--	--	--
A-4	06-05-95	Not sampled· not scheduled for chemical analysis							
A-4	08-17-95	Not sampled: not scheduled for chemical analysis							
A-4	12-04-95	Not sampled: not scheduled for chemical analysis							
A-4	03-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--

Table 3
Historical Groundwater Analytical Data
1994 - Present*

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

Date: 05-07-96

Well Designation	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L	TPHD LUFT Method µg/L
A-5	02-09-94	2200	190	130	130	310	--	--	--
A-5	05-09-94	13000	1000	1500	490	2000	--	--	--
A-5	08-10-94	11000	730	930	310	1300	--	--	--
A-5	11-16-94	2600	160	220	130	400	--	--	--
A-5	03-24-95	3300	200	310	130	460	--	--	--
A-5	06-05-95	57000	2700	4600	1500	6800	--	--	--
A-5	08-18-95	34000	1600	2700	1100	5100	<28	--	--
A-5	12-04-95	61	<0.5	<0.5	<0.5	<0.5	--	--	--
A-5	03-13-96	11000	860	960	380	1600	<100	--	--
A-6	02-09-94	640	<2.9	<3.7	<2.4	<8.2	--	--	--
A-6	05-04-94	260	<0 5	<1.5	<1.5	<0 5	--	--	--
A-6	08-10-94	300	<0 6	<2.5	<0.8	<1	--	--	--
A-6	11-16-94	250	<0.5	<1.5	<0.6	<1.5	--	--	--
A-6	03-24-95	120	<0.5	<1	<0.5	<1.5	--	--	--
A-6	06-05-95	160	<0.5	<0.6	<0.5	<0.5	--	--	--
A-6	08-18-95	530	<0 5	<0.5	<2 4	<4.2	6	--	--
A-6	12-04-95	28000	1600	1800	880	3600	--	--	--
A-6	03-13-96	1400	<3	<15	<7	<10	<20	--	--
AR-1	02-09-94	26000	2900	450	920	3000	--	--	^4200
AR-1	05-04-94	36000	3400	360	1400	3700	--	--	^7200
AR-1	08-10-94	6100	120	66	65	530	--	--	^2900
AR-1	11-16-94	1200	66	20	34	210	--	--	^^^^560
AR-1	03-24-95	270	14	0.6	2.5	2.1	--	--	^^^^130
AR-1	06-05-95	190	10	<0.5	0.8	0.5	--	--	^580
AR-1	08-17-95	960	110	12	4.5	150	14	--	<50
AR-1	12-04-95	<50	1.5	<0 5	<0.5	0.8	--	--	--
AR-1	03-13-96	150	3.8	0 5	1.4	1.3	<3	--	--
AR-2	02-09-94	^^82	<0.5	<0 5	<0.5	<0 5	--	--	<50
AR-2	05-04-94	<50	<0.5	<0.5	<0 5	<0 5	--	--	<50
AR-2	08-10-94	200	5	1.7	2.7	38	--	--	^55
AR-2	11-16-94	<50	0.8	<0.5	<0.5	<0 5	--	--	<50
AR-2	03-24-95	<50	6.2	<0 5	<0.5	0.6	--	--	<50
AR-2	06-05-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	<50
AR-2	08-18-95	<50	<0.5	<0.5	<0.5	<0.5	4	--	<50
AR-2	12-13-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
AR-2	03-13-96	190	26	2.6	3.3	13	200	--	--

Table 3
Historical Groundwater Analytical Data
1994 - Present*

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

Date: 05-07-96

Well Designation	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L	TPHD LUFT Method µg/L
ADR-1	02-09-94	3000	380	140	59	240	--	--	^110
ADR-1	05-04-94	2100	490	93	68	140	--	--	^60
ADR-1	08-10-94	150000	5400	15000	3600	24000	--	--	^^^4800
ADR-1	11-16-94	Not sampled: well contained floating product							
ADR-1	03-24-95	Not sampled: well contained floating product							
ADR-1	06-05-95	23000	310	420	300	1900	--	--	^13000
ADR-1	08-18-95	4400	150	120	95	620	120	--	^4500
ADR-1	12-13-95	8800	100	130	120	990	--	--	--
ADR-1	03-13-96	89000	370	1000	840	8100	<500	--	--
ADR-2	02-09-94	83000	6300	6100	2000	11000	--	--	12000
ADR-2	05-04-94	36000	4600	2600	930	4500	--	--	^4200
ADR-2	08-10-94	Not sampled: well contained floating product							
ADR-2	11-16-94	Not sampled well contained floating product							
ADR-2	03-24-95	Not sampled. well contained floating product							
ADR-2	06-05-95	Not sampled. well contained floating product							
ADR-2	08-17-95	Not sampled. well contained floating product							
ADR-2	12-13-95	Not sampled. well contained floating product							
ADR-2	03-13-96	29000	1100	1200	710	3800	<500	--	--

TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United Statest Environmental Protection Agency
MTBE: Methyl-tert-butyl ether
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
- - : not analyzed
^: sample contains a lower boiling point hydrocarbon quantitated as diesel; chromatogram does not match the typical diesel fingerprint
^^: sample contains a single non-fuel component eluting in the gasoline range, and quantified as gasoline
^^^: sample contains a mixture of diesel and a lower boiling point hydrocarbon quantitated as diesel; chromatogram does not match the typical diesel fingerprint
^^^^: sample contains components eluting in the diesel range, quantified as diesel; chromatogram does not match the typical diesel fingerprint
*: For previous historical analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results and Remediation System Performance Evaluation Report, ARCO Service Station 2169, 899 West Grand Avenue, Oakland, California*, (EMCON, March 4, 1996).

Table 4
Approximate Cumulative Floating Product Recovered

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

Date: 05-07-96

Well Designation	Date	Floating Product Recovered gallons
ADR-1	1994	0.0
ADR-2		0.0
ADR-1	1995	0.0
ADR-2		4.8
ADR-1	1996	0.0
ADR-2		0.0
	1994 to 1996 Total:	4.8

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

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

Start-Up Date: 06-02-94
Reporting Period From: 06-02-94
To: 04-01-96

Beginning Date:	06-02-94	06-02-94	06-07-94	06-16-94	06-22-94
Ending Date:	06-02-94	06-07-94	06-16-94	06-22-94	06-30-94
Down-time (days):	0.00	0.00	0.93	0.00	3.57
Total Operation (days):	0.07	5.05	8.07	6 05	4.43
Total Operation (hours):	1.7	121.3	193.7	145.2	106.3
Operation Hours to Date:	1.7	123.0	316.7	462.0	568.2
TPH Concentrations					
Average Influent (ppmv):	18,000	16,000	830	1,100	230
Average Effluent (ppmv):	ND	45	ND	4.9	75.0
Benzene Concentrations					
Average Influent (ppmv):	250	420	17	24	3 8
Average Effluent (ppmv):	ND	0.30	ND	0.08	0.78
Flow Rates					
Average Influent (scfm):	61.1	131.5	145.3	194.1	176.7
Average Dilution (scfm):	184.2	97.8	69.9	0.0	0.0
Average Effluent (scfm):	268.6	252 3	289.7	264.4	288 9
TPH-G Recovery Data					
Recovery Rate (lbs/hr):	11.12	21.26	1.22	2.16	0.41
Recovery Rate (lbs/day):	266.80	510.34	29.25	51 77	9.86
Destruction Efficiency (%):	100.00	99.46	100.00	99.39	46 70
Product Recovered (lbs):	18.68	2579.35	236.08	313.27	43.64
Product Recovered to Date (lbs):	18.68	2598.02	2834.10	3147.37	3191.01
Product Recovered to Date (gal):	3.11	433.00	472.35	524.56	531.83
Benzene Recovery Data					
Recovery Rate (lbs/hr):	0.185	0.670	0.030	0.056	0.008
Recovery Rate (lbs/day):	4.447	16.076	0.719	1.355	0.195
Destruction Efficiency (%):	100.00	99.86	100.00	99.56	66.45
Product Recovered (lbs):	0.311	81.249	5.802	8.202	0.865
Product Recovered to Date (lbs):	0.311	81.561	87.363	95.565	96.430
Product Recovered to Date (gal):	0.043	11.250	12.050	13.181	13.301

Page 1 Footnotes
ppmv: parts per million by volume
scfm: standard cubic feet per minute
lbs/hr: pounds per operational hour
lbs/day: pounds per day
lbs. pounds
gal. gallons
ND: None Detected; Recovery data calculated using laboratory detection limits
Notes:
1. Molecular weights used in recovery calculations are 65 for TPH and 78 for benzene.
2. Densities used in recovery calculations are 6 0 lbs/gal for TPH and 7 25 lbs/gal for benzene
3 All data and calculations on this page were prepared by GeoStrategies, Inc (GSI), as presented in *Letter Report, Vapor Extraction Start Up and Quarterly Groundwater Monitoring, Second Quarter 1994,* (GSI, September 1994)

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

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

Start-Up Date: 06-02-94
Reporting Period From: 06-02-94
To: 04-01-96

Date Begin:		07-01-94	08-01-94	09-01-94	12-01-94	01-01-95
Date End:		08-01-94	09-01-94	12-01-94	01-01-95	02-01-95
Mode of Oxidation:		Therm-Ox	Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:		10.66	17.26	34.73	16.08	25 62
Days of Downtime:		20.34	13 74	56.27	14 92	5.38
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline	1983	680	450	1500	<15
	mg/m3 (3) as gasoline	5333	1800	1200	5600	<60
	ppmv as benzene	29	7.6	2.9	7	<0 1
	mg/m3 as benzene	95	25	9 4	22	<0.5
System Influent:	ppmv as gasoline	1983	680	450	400	<15
	mg/m3 as gasoline	5333	1800	1200	1600	<60
	ppmv as benzene	29	7 6	2.9	1.9	<0.1
	mg/m3 as benzene	95	25	9.4	6	<0.5
System Effluent:	ppmv as gasoline	17	44	4.1	<15	<15
	mg/m3 as gasoline	46	118	11 1	<60	<60
	ppmv as benzene	0.15	0.7	0.04	<0.1	<0.1
	mg/m3 as benzene	0.49	2.3	0 143	<0.5	<0.5
Average Well Field Flow Rate (4), scfm (5):		198.3	212.6	214.3	17 7	16.7
Average System Influent Flow Rate (4), scfm:		198.3	212.6	214.3	120.1	164.3
Average Destruction Efficiency (6), percent (7):		99.1	93.4	99.1	96.3	NA
Average Emission Rates (8), pounds per day (9)						
Gasoline.		0.82	2.25	0.21	0 65	0.89
Benzene:		0.01	0.04	0.00	0 01	0 01
Operating Hours This Period:		255.95	414.28	833.57	385.86	614.80
Operating Hours To Date:		256.0	670 2	1503.8	1889 7	2504 5
Pounds/ Hour Removal Rate, as gasoline (10):		3 96	1.43	0.96	0.37	0.00
Pounds Removed This Period, as gasoline (11):		1013.1	593.4	802.3	143.1	2.3
Pounds Removed To Date, as gasoline:		4204.1	4797.4	5599.7	5742.9	5745.2
Gallons Removed This Period, as gasoline (12):		163.4	95.7	129.4	23.1	0.4
Gallons Removed To Date, as gasoline:		678.1	773.8	903.2	926.3	926.7

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

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

Start-Up Date: 06-02-94
Reporting Period From: 06-02-94
To: 04-01-96

Date Begin:		02-01-95	07-01-95	08-01-95	09-01-95	10-01-95
Date End:		07-01-95	08-01-95	09-01-95	10-01-95	11-01-95
Mode of Oxidation:		Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox	Cat-Ox
Days of Operation:		0.00	14.42	19.27	27.18	11.59
Days of Downtime.		150 00	16.58	11.73	2.82	19.41
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline	NA (13)	1567	1975	1400	250
	mg/m3 (3) as gasoline	NA	5767	7175	5200	900
	ppmv as benzene	NA	12	10	3.1	0.6
	mg/m3 as benzene	NA	40	33	10	1.7
System Influent:	ppmv as gasoline	NA	200	270	230	66
	mg/m3 as gasoline	NA	740	970	920	240
	ppmv as benzene	NA	1.6	1	0.6	0.1
	mg/m3 as benzene	NA	5.2	3.3	1 8	<0.5
System Effluent:	ppmv as gasoline	NA	23	<15	<15	<15
	mg/m3 as gasoline	NA	83	<60	<60	<60
	ppmv as benzene	NA	<0 1	<0.1	<0.1	<0.1
	mg/m3 as benzene	NA	<0.5	<0 5	<0.5	<0 5
Average Well Field Flow Rate (4), scfm (5):		0.0	27.9	43 0	58.1	67.0
Average System Influent Flow Rate (4), scfm:		0.0	197.6	166.8	167.9	174.1
Average Destruction Efficiency (6), percent (7):		NA	88.8	93 8	93.5	75.0
Average Emission Rates (8), pounds per day (9)						
Gasoline:		0.00	1.47	0.90	0.90	0.94
Benzene:		0.00	0 01	0 01	0.01	0 01
Operating Hours This Period:		0.00	346.17	462.40	652.27	278.16
Operating Hours To Date		2504.5	2850.6	3313.0	3965.3	4243 5
Pounds/ Hour Removal Rate, as gasoline (10):		0 00	0.60	1.15	1 13	0.23
Pounds Removed This Period, as gasoline (11):		0 0	208.5	533.9	737 6	62.8
Pounds Removed To Date, as gasoline:		5745.2	5953.6	6487.6	7225 1	7287.9
Gallons Removed This Period, as gasoline (12):		0.0	33.6	86.1	119.0	10.1
Gallons Removed To Date, as gasoline:		926 7	960.3	1046.4	1165.4	1175.5

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2169	Vapor Treatment Unit: ThermTech Model VAC-25, 250cfm Thermal/ Catalytic Oxidizer
Location: 889 West Grand Avenue, Oakland, California	
Consultant: EMCON, 1921 Ringwood Avenue, San Jose, California	Start-Up Date: 06-02-94
	Reporting Period From: 06-02-94
	To: 04-01-96

Date Begin:		11-01-95	01-01-96
Date End:		01-01-96	04-01-96
Mode of Oxidation:		Cat-Ox	Cat-Ox
Days of Operation:		0.00	0.00
Days of Downtime:		61.00	91.00
Average Vapor Concentrations (1)			
Well Field Influent:	ppmv (2) as gasoline	NA	NA
	mg/m3 (3) as gasoline	NA	NA
	ppmv as benzene	NA	NA
	mg/m3 as benzene	NA	NA
System Influent:	ppmv as gasoline	NA	NA
	mg/m3 as gasoline	NA	NA
	ppmv as benzene	NA	NA
	mg/m3 as benzene	NA	NA
System Effluent:	ppmv as gasoline	NA	NA
	mg/m3 as gasoline	NA	NA
	ppmv as benzene	NA	NA
	mg/m3 as benzene	NA	NA
Average Well Field Flow Rate (4), scfm (5):		0.0	0.0
Average System Influent Flow Rate (4), scfm:		0.0	0.0
Average Destruction Efficiency (6), percent (7):		0.0	0.0
Average Emission Rates (8), pounds per day (9)			
Gasoline:		0.00	0.00
Benzene:		0.00	0.00
Operating Hours This Period:		0.00	0.00
Operating Hours To Date:		4243.5	4243.5
Pounds/ Hour Removal Rate, as gasoline (10):		0.00	0 00
Pounds Removed This Period, as gasoline (11):		0.0	0.0
Pounds Removed To Date, as gasoline:		7287.9	7287 9
Gallons Removed This Period, as gasoline (12):		0.0	0.0
Gallons Removed To Date, as gasoline:		1175.5	1175.5

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 2169	Vapor Treatment Unit: ThermTech Model VAC-25, 250cfm Thermal/ Catalytic Oxidizer
Location: 889 West Grand Avenue, Oakland, California	
Consultant: EMCON, 1921 Ringwood Avenue, San Jose, California	Start-Up Date: 06-02-94
	Reporting Period From: 06-02-94
	To 04-01-96

CURRENT REPORTING PERIOD.	01-01-96	to	04-01-96
DAYS / HOURS IN PERIOD:	91.0	2184.0	
DAYS / HOURS OF OPERATION:	0.0	0.0	
DAYS / HOURS OF DOWN TIME:	91.0	2184.0	
PERCENT OPERATIONAL:		0.0 %	
PERIOD POUNDS REMOVED:	0.0		
PERIOD GALLONS REMOVED	0.0		
AVERAGE WELL FIELD FLOW RATE (scfm):		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
For the period from July 1 to December 1, 1994, ppmv results were converted to mg/m3 using the following formula:
concentration (as gasoline in mg/m3) = [concentration (as gasoline in ppmv) x 65 lb/lb-mole / 24.05 (lb/m3/lb-mole of air)/mg] (rounded as appropriate)
concentration (as benzene in mg/m3) = [concentration (as benzene in ppmv) x 78 lb/lb-mole / 24.05 (lb/m3/lb-mole of air)/mg] (rounded as appropriate)
For the period from December 1, 1994, to July 1, 1995, ppmv results were converted to mg/m3 using the following formula:
concentration (as gasoline in mg/m3) = [concentration (as gasoline in ppmv) x 87 lb/lb-mole / 24 05 (lb/m3/lb-mole of air)/mg] (rounded as appropriate)
concentration (as benzene in mg/m3) = [concentration (as benzene in ppmv) x 78 lb/lb-mole / 24.05 (lb/m3/lb-mole of air)/mg] (rounded as appropriate)
After July 1, 1995, all vapor results were reported by the laboratory in ppmv and mg/m3.
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. gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0.1613 gallons/pound of gasoline
13. NA: not applicable, not analyzed, or not available

Table 6
Soil-Vapor Extraction Well Data

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

Date: 05-17-96

Date	Well Identification											
	A-1			A-2			A-3			A-4		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
For SVE well monitoring data prior to January 1, 1995, please refer to the third quarter 1995 groundwater monitoring report for this site.												
01-13-95	passive	NA	0	passive	NA	0	passive	NA	0	passive	NA	0
01-26-95	passive	NA	0	passive	NA	0	passive	NA	0	passive	NA	0
07-17-95	System was shut down on January 26, 1995.			System was restarted on July 17, 1995.								
07-17-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
07-25-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-22-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
09-21-95	closed	NA	0	closed	NA	0	closed	NA	0	closed	NA	0
09-21-95	open	NA	46	closed	NA	0	closed	NA	0	closed	NA	0
09-21-95	open	600 LAB	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
10-12-95	open	NA	36	closed	NA	-1	closed	NA	0	closed	NA	0
10-12-95	System was manually shut down.											

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

Table 6
Soil-Vapor Extraction Well Data

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

Date: 05-17-96

Date	Well Identification											
	AV-1			AV-2			AV-3			AV-4		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
For SVE well monitoring data prior to January 1, 1995, please refer to the third quarter 1995 groundwater monitoring report for this site.												
01-13-95	passive	NA	15	passive	NA	0	passive	NA	0	open	463 PID	16
01-26-95	passive	NA	27	passive	NA	0	passive	NA	0	open	1.8 FID	30
07-17-95	System was shut down on January 26, 1995.			System was restarted on July 17, 1995								
07-17-95	open	NA	NA	open	NA	NA	open	NA	NA	closed	NA	NA
07-25-95	open	1026 PID	42	open	1364 PID	42	open	869 PID	42	closed	NA	NA
07-25-95	open	1200 LAB	NA	open	1600 LAB	NA	open	980 LAB	NA	closed	NA	NA
08-22-95	open	NA	42	open	NA	44	open	NA	44	closed	NA	NA
09-21-95	open	NA	43	open	NA	47	open	NA	47	closed	NA	0
09-21-95	open	NA	46	open	NA	46	open	NA	46	closed	NA	1
10-12-95	open	NA	44	open	NA	43	open	NA	43	closed	NA	1
10-12-95	System was manually shut down.											

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

Table 6
Soil-Vapor Extraction Well Data

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

Date: 05-17-96

Date	Well Identification											
	AV-5			AV-6			AV-7			AR-2		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
For SVE well monitoring data prior to January 1, 1995, please refer to the third quarter 1995 groundwater monitoring report for this site.												
01-13-95	passive	NA	1	open	46 PID	16	passive	NA	0	passive	NA	0
01-26-95	open	2.2 FID	30	open	2.3 FID	30	passive	NA	0	passive	NA	0
07-17-95	System was shut down on January 26, 1995.			System was restarted on July 17, 1995								
07-17-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
07-25-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	closed	NA	NA
08-22-95	closed	NA	NA	closed	NA	NA	closed	NA	NA	open	NA	44
09-21-95	closed	NA	0	closed	NA	0	closed	NA	0	open	NA	48
09-21-95	closed	NA	0	open	NA	46	closed	NA	0	open	NA	46
09-21-95	closed	NA	NA	open	2300 LAB	NA	closed	NA	NA	open	NA	NA
10-12-95	closed	NA	0	open	NA	42	closed	NA	0	open	NA	43
10-12-95	System was manually shut down											

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

Table 6
Soil-Vapor Extraction Well Data

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

Date: 05-17-96

Date	Well Identification											
	ADR-1			ADR-2								
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
For SVE well monitoring data prior to January 1, 1995, please refer to the third quarter 1995 groundwater monitoring report for this site.												
01-13-95	open	58 PID	16	open	160 PID	16						
01-26-95	open	2.2 FID	30	open	4.4 FID	30						
07-17-95	System was shut down on January 26, 1995.			System was restarted on July 17, 1995								
07-17-95	open	NA	NA	open	NA	NA						
07-25-95	open	1184 PID	42	open	1057 PID	42						
07-25-95	open	1400 LAB	NA	open	1300 LAB	NA						
08-22-95	open	NA	44	open	NA	44						
09-21-95	open	NA	48	open	NA	47						
09-21-95	open	NA	45	open	NA	46						
10-12-95	open	NA	43	open	NA	44						
10-12-95	System was manually shut down.											

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

Table 7
Air-Sparge System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Air-Sparge Unit:*
3-horsepower Conde blower
5-horsepower air compressor

Start-Up Date: 07-15-94
Reporting Period From: 07-15-94
To: 04-01-96
System was shut down on 10-12-96

Date Begin:	07-15-94	08-01-94	08-01-94	08-01-94	08-15-94	09-13-94
Date End:	08-01-94	08-01-94	08-01-94	08-15-94	09-13-94	11-28-94
Days of Operation:	5.5	0.0	0.1	19.3	27.2	0.0
Days of Downtime:	10.5	0.0	0.0	11.7	2.8	76.0
Air-Sparge Well Status:						
AS-1	open	open	open	open	open	closed
AS-2	open	open	open	open	open	closed
AS-3	open	open	open	open	open	closed
AS-4	open	open	open	open	open	closed
AS-5	open	open	open	open	open	closed
Air-Sparge Well Pressure (psig) (1):						
AS-1	2.8	2.8	3.0	2.0	2.4	0.0
AS-2	3.0	3.0	2.8	2.2	2.4	0.0
AS-3	3.6	3.6	3.8	3.1	2.2	0.0
AS-4	3.1	3.1	3.4	3.0	2.8	0.0
AS-5	2.8	2.8	3.2	2.8	3.2	0.0
Total Air-Sparge Flow Rate (scfm) (2):	25.0	29.0	29.0	27.0	29.0	0.0
Total Air-Sparge Pressure (psig):	5.0	2.8	2.8	2.6	3.0	0.0
Dissolved Oxygen (mg/L) (3):						
Air-Sparge Wells:						
AS-1	NA (4)	NA	NA	NA	NA	1.4
AS-2	NA	NA	NA	NA	NA	1.2
AS-3	NA	NA	NA	NA	NA	1.2
AS-4	NA	NA	NA	NA	NA	0.8
AS-5	NA	NA	NA	NA	NA	1.4
Depth to Water (ft-BGS) (5):						
Air-Sparge Wells:						
AS-1	NA	NA	NA	NA	NA	10.55
AS-2	NA	NA	NA	NA	NA	11.29
AS-3	NA	NA	NA	NA	NA	10.78
AS-4	NA	NA	NA	NA	NA	10.27
AS-5	NA	NA	NA	NA	NA	10.65

Table 7
Air-Sparge System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Air-Sparge Unit:*
3-horsepower Conde blower
5-horsepower air compressor

Start-Up Date: 07-15-94
Reporting Period From: 07-15-94
To: 04-01-96
System was shut down on 10-12-96

Date Begin:	11-28-94	01-03-95	02-03-95	03-31-95	07-25-95	08-10-95
Date End:	01-03-95	02-03-95	03-31-95	06-28-95	08-10-95	08-22-95
Days of Operation:	0.0	0.0	0.0	0.0	2.1	0.0
Days of Downtime:	36.0	31.0	56.0	89.0	14.0	12.0
Air-Sparge Well Status:						
AS-1	closed	closed	closed	closed	open	open
AS-2	closed	closed	closed	closed	closed	closed
AS-3	closed	closed	closed	closed	closed	closed
AS-4	closed	closed	closed	closed	open	open
AS-5	closed	closed	closed	closed	closed	closed
Air-Sparge Well Pressure (psig) (1):						
AS-1	0.0	0.0	0.0	0.0	8.9	5.5
AS-2	0.0	0.0	0.0	0.0	0.0	0.0
AS-3	0.0	0.0	0.0	0.0	0.0	0.0
AS-4	0.0	0.0	0.0	0.0	2.0	2.3
AS-5	0.0	0.0	0.0	0.0	0.0	0.0
Total Air-Sparge Flow Rate (scfm) (2):	0.0	0.0	0.0	0.0	2.0	2.0
Total Air-Sparge Pressure (psig):	0.0	0.0	0.0	0.0	50	45
Dissolved Oxygen (mg/L) (3):						
Air-Sparge Wells:						
AS-1	NA	NA	NA	NA	1.1	NA
AS-2	NA	NA	NA	NA	NA	NA
AS-3	NA	NA	NA	NA	NA	NA
AS-4	NA	NA	NA	NA	1.4	NA
AS-5	NA	NA	NA	NA	1.0	NA
Depth to Water (ft-BGS) (5):						
Air-Sparge Wells:						
AS-1	NA	NA	8.79	NA	11.75	NA
AS-2	NA	NA	9.37	NA	NA	NA
AS-3	NA	NA	8.93	NA	NA	NA
AS-4	NA	NA	8.43	NA	11.31	NA
AS-5	NA	NA	8.80	NA	11.62	NA

Table 7
Air-Sparge System
Operation and Performance Data

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

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Air-Sparge Unit:*
3-horsepower Conde blower
5-horsepower air compressor

Start-Up Date: 07-15-94
Reporting Period From: 07-15-94
To: 04-01-96
System was shut down on 10-12-96

Date Begin:	08-22-95	09-21-95	10-12-95	01-01-96
Date End:	09-21-95	10-12-95	01-01-96	04-01-96
Days of Operation:	10.9	NA	NA	NA
Days of Downtime:	18.6	NA	NA	NA
Air-Sparge Well Status:				
AS-1	open	closed	closed	closed
AS-2	closed	closed	closed	closed
AS-3	closed	closed	closed	closed
AS-4	open	closed	closed	closed
AS-5	open	closed	closed	closed
Air-Sparge Well Pressure (psig) (1):				
AS-1	7.0	0.0	0.0	0.0
AS-2	0.0	0.0	0.0	0.0
AS-3	0.0	0.0	0.0	0.0
AS-4	1.5	0.0	0.0	0.0
AS-5	1.0	0.0	0.0	0.0
Total Air-Sparge Flow Rate (scfm) (2):	6.0	0.0	0.0	0.0
Total Air-Sparge Pressure (psig):	45	0	0	0
Dissolved Oxygen (mg/L) (3):				
Air-Sparge Wells:				
AS-1	NA	7.4	NA	NA
AS-2	NA	NA	NA	NA
AS-3	NA	NA	NA	NA
AS-4	NA	1.5	NA	NA
AS-5	NA	1.6	NA	NA
Depth to Water (ft-BGS) (5):				
Air-Sparge Wells:				
AS-1	NA	12.12	NA	NA
AS-2	NA	NA	NA	NA
AS-3	NA	NA	NA	NA
AS-4	NA	11.78	NA	NA
AS-5	NA	12.05	NA	NA

Table 7
Air-Sparge System
Operation and Performance Data

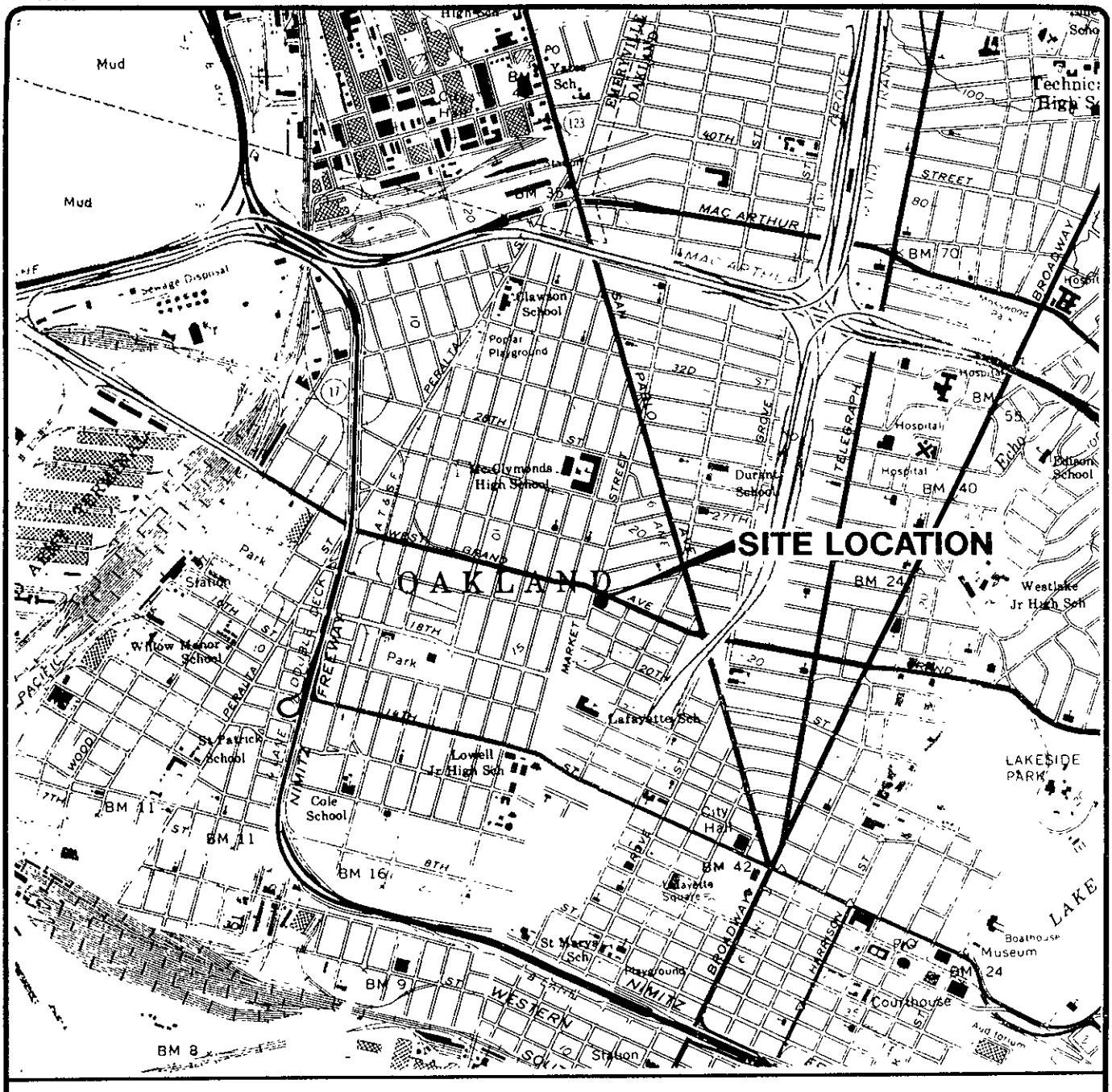
Facility Number: 2169	Air-Sparge Unit:*
Location: 889 West Grand Avenue Oakland, California	3-horsepower Conde blower 5-horsepower air compressor
Consultant: EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date: 07-15-94 Reporting Period From: 07-15-94 To: 04-01-96 System was shut down on 10-12-96

CURRENT REPORTING PERIOD:	01-01-96	to	04-01-96
DAYS / HOURS IN PERIOD:	91.0		2184
DAYS / HOURS OF OPERATION:	NA		NA
DAYS / HOURS OF DOWN TIME:	NA		NA
PERCENT OPERATIONAL:			NA

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

* During the period from July 15, 1994 to July 25, 1995 the air-sparge system used a 3-horsepower Conde blower. On July 25, 1995, it was replaced with a 5-horsepower air compressor.

152753



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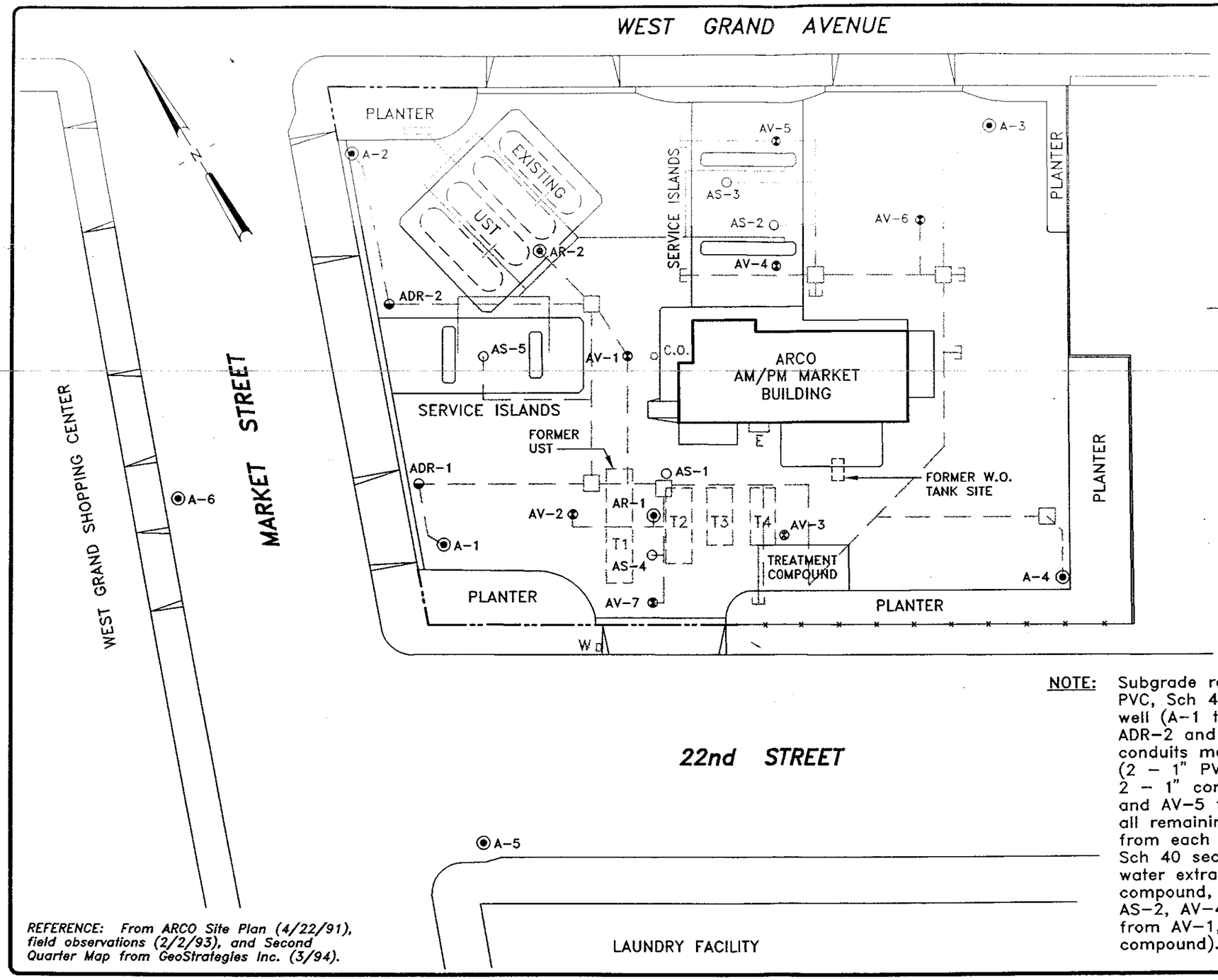
ARCO PRODUCTS COMPANY
SERVICE STATION 2169, 889 WEST GRAND AVE.
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

SITE LOCATION

FIGURE
1
PROJECT NO.
805-129.03



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Groundwater monitoring/vapor extraction well
- Air sparging well
- Junction box
- Centerline of trench carrying subgrade remediation piping (See note below)
- Stub-out (pipes capped below grade). A brass monument marker exists above the stub-out location
- C.O. Sewer clean out
- E Existing electrical panel
- W Water meter

Wells A-1, A-2, A-3, A-4, and AR-2 also serve as vapor extraction wells.

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

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

emcon

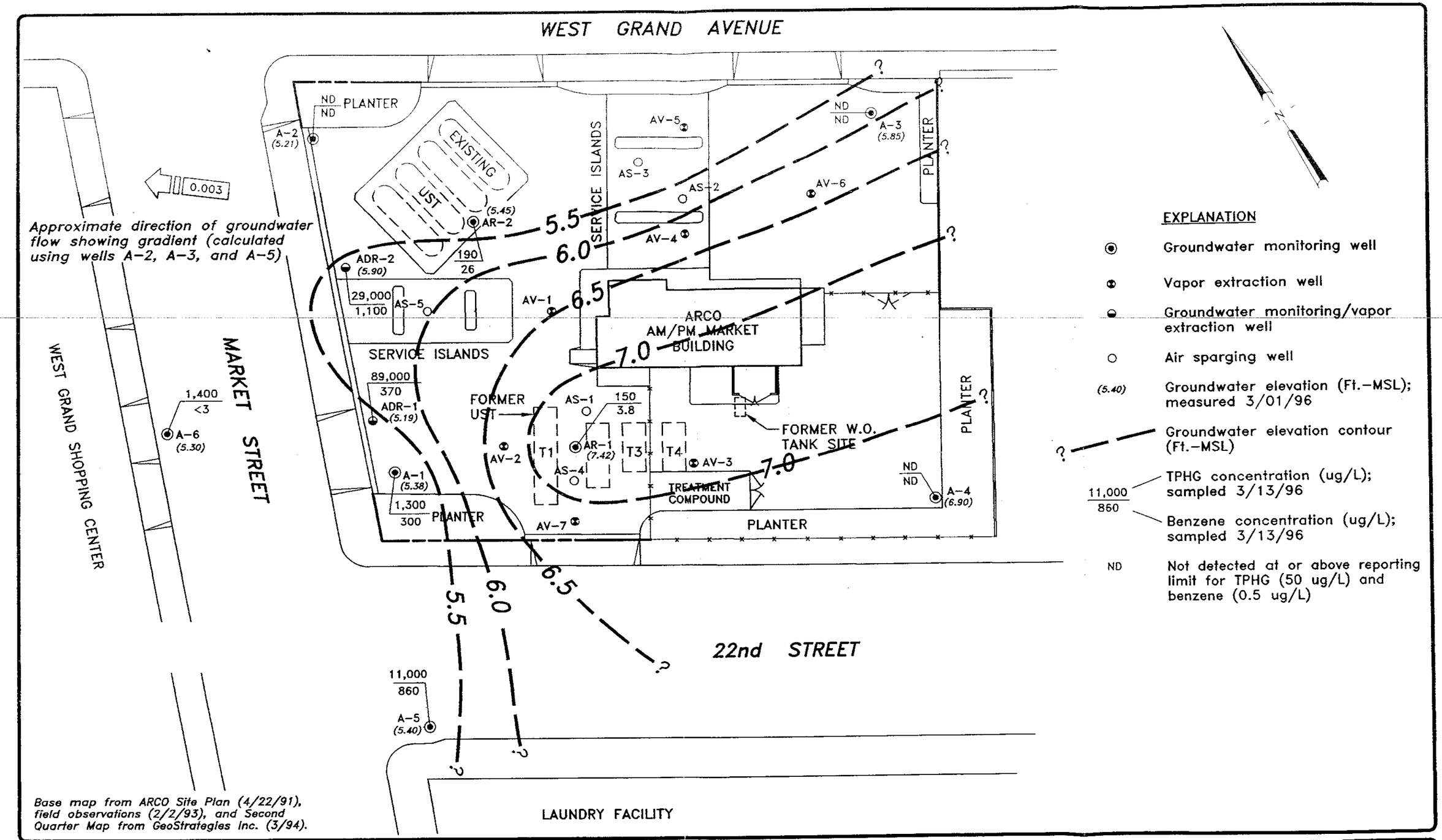
SCALE: 0 40 80 FEET

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

SITE PLAN

FIGURE NO. 2

PROJECT NO. 805-129.03



EMCON

SCALE: 0 40 80 FEET

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

GROUNDWATER DATA
FIRST QUARTER 1996

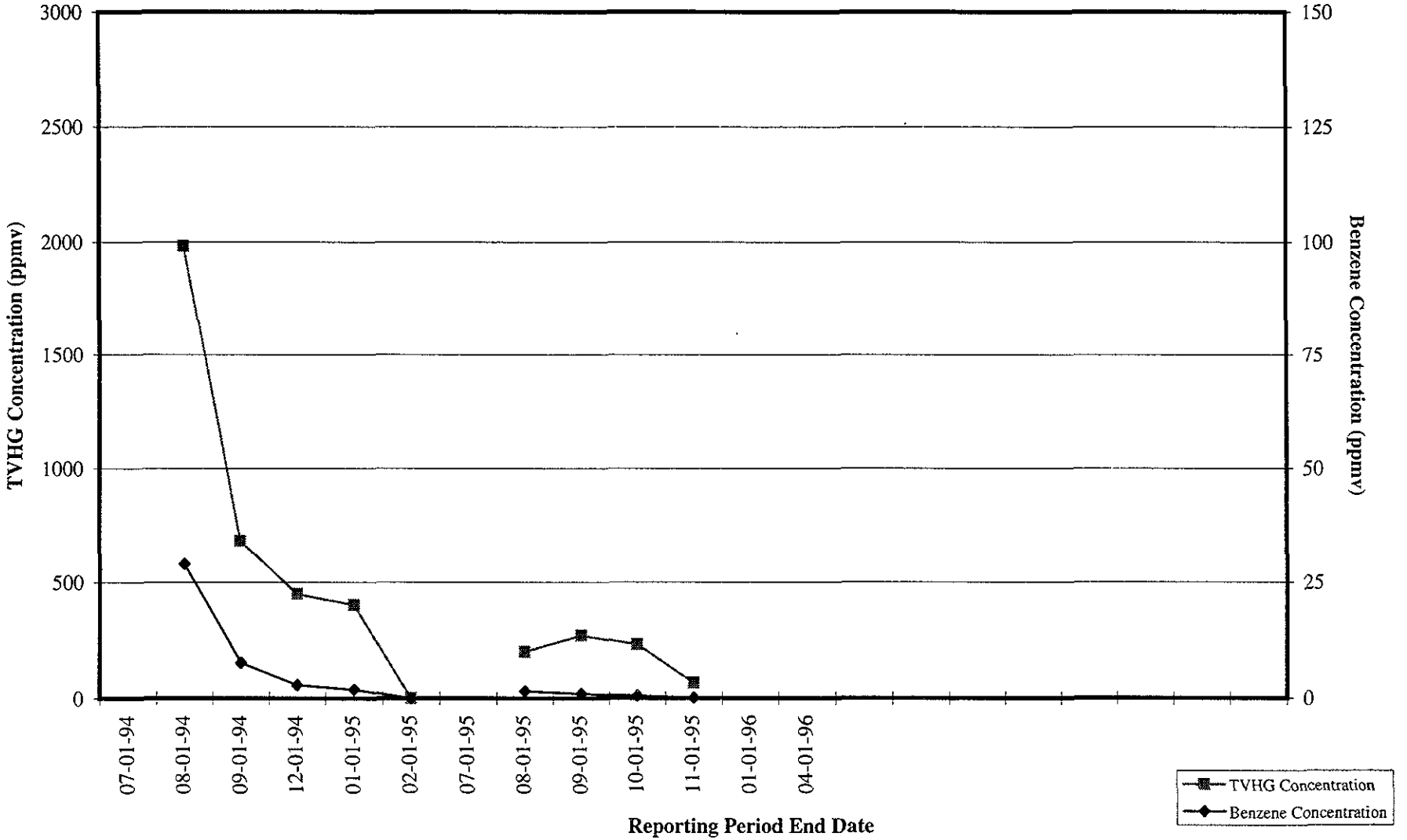
FIGURE NO.
3

PROJECT NO.
805-129.003

G:\805-129\G00 REV 0 06/10/96 12:58:58 DD DJ

Figure 4

ARCO Service Station 2169
Soil-Vapor Extraction and Treatment System
Historical System Influent TVHG and Benzene Concentrations

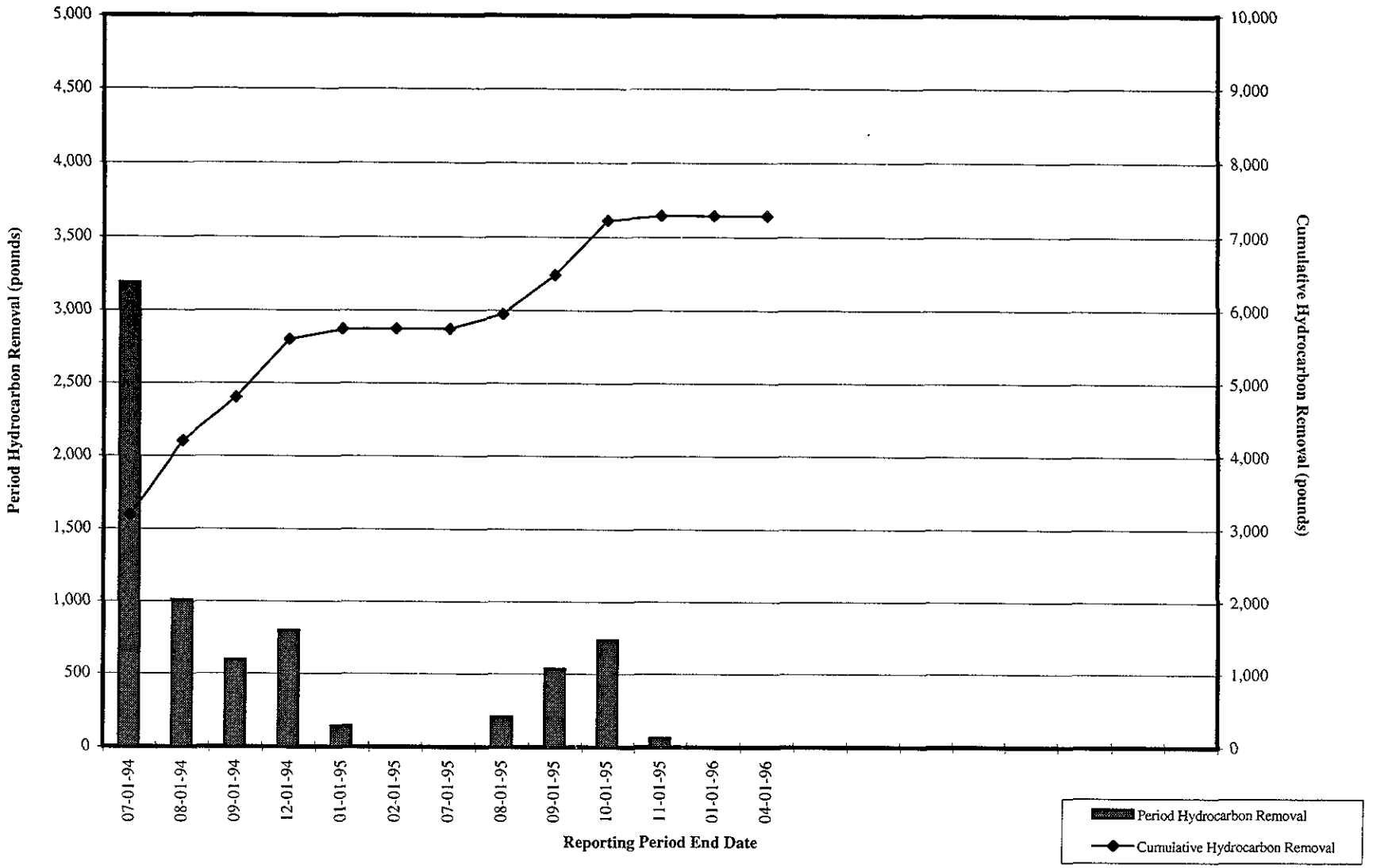


TVHG total volatile hydrocarbons as gasoline
ppmv: parts per million by volume

esj/h:\2169\2169tdb.xls\SVE Model:imi
20805-129.003

Figure 5

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



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20805-129.003

APPENDIX A

FIELD DATA SHEETS, FIRST QUARTER 1996 GROUNDWATER MONITORING EVENT

MW-2 Seminary
MW-3
MW-4
MW-5 2-VOAs
MW-1

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 21775-235.002 STATION ADDRESS : 899 West Grand Avenue, Oakland DATE : 3-1-96

ARCO STATION # : 2169 FIELD TECHNICIAN : M. ROSS DAY : FRIDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	A-2	OK	YES	YES	NO	NO	9.34	9.34	NA	NA	25.3	* water in Box
2	A-3	OK	YES	YES	NO	NO	9.90	9.90	NA	NA	29.2	* water in BOX T.O.C.
3	A-4	OK	YES	YES	NO	NO	8.55	8.55	NA	NA	28.5	* Water in Box T.O.C
4	AR-2	OK	YES	YES	NO	NO	9.83	9.83	NA	NA	29.2	
5	A-6	OK	YES	NO	YES	YES	8.21	8.21	NA	NA	27.8	
6	AR-1	OK	YES	YES	NO	NO	8.19	8.19	NA	NA	28.0	Water in Box T.O.C
7	A-1	OK	YES	YES	NO	NO	8.78	8.78	NA	NA	24.5	Water in Box T.O.C
8	A-5	OK	YES	NO	YES	YES	8.11	8.11	NA	NA	29.4	Water in Box T.O.C
9	ADR-1	OK	YES	YES	NO	NO	8.76	8.76	NA	NA	21.8	
10	ADR-2	OK	YES	NO	NO	NO	8.74	8.74	NA	NA	26.3	

SURVEY POINTS ARE TOP OF WELL CASINGS

* NO BOLTS IN LID

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: A-1 (24')

PURGED BY: M. GALLEGOS / T. WILLIAMS CLIENT NAME: ARCO #2169

SAMPLED BY: " LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	5.96
DEPTH TO WATER (feet):	8.23	CALCULATED PURGE (gal.):	17.89
DEPTH OF WELL (feet):	24.5	ACTUAL PURGE VOL. (gal.):	18.0

DATE PURGED: 3-13-96 Start (2400 Hr) 1250 End (2400 Hr) 1254

DATE SAMPLED: " Start (2400 Hr) 1300 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1252	6.0	7.10	1318	70.6	Cloudy	Light +
1253	12.0	6.98	1296	70.5	"	"
1254	18.0	6.93	1296	70.7	"	"

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

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

WELL INTEGRITY: Good LOCK #: none

REMARKS: All Samples taken

Meter Calibration: Date: 3/13/96 Time: ___ Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: A-2

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

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: A-2 (25')

PURGED BY: M. GALLEGOS / T. WILLIAMS CLIENT NAME: ARCO #2169

SAMPLED BY: \" LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL):	N/R	VOLUME IN CASING (gal.):	6.05
DEPTH TO WATER (feet):	8.7	CALCULATED PURGE (gal.):	18.17
DEPTH OF WELL (feet):	25.3	ACTUAL PURGE VOL. (gal.):	18.5

DATE PURGED: 3-13-96 Start (2400 Hr) 1032 End (2400 Hr) 1036

DATE SAMPLED: \" Start (2400 Hr) 1042 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1041	6.0	6.44	979	68.3	BRN	MOD
1035	12.0	6.76	1007	69.1	cloudy	MOD
1034	18.5	6.83	1013	69.3	clear	Light

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

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

WELL INTEGRITY: Good LOCK #: ARCO-KEY

REMARKS: all samples taken

Meter Calibration: Date: 3/13/96 Time: 1030 Meter Serial #: 9204 Temperature °F: 55.3

(EC 1000 1000 / 1000) (DI ___) (pH 7 6.99 / 700) (pH 10 1009 / 1000) (pH 4 402 / —)

Location of previous calibration: ___

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

Rev 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: A-3 (29')

PURGED BY: M. Gallegos / J. Williams CLIENT NAME: ARCO # 2169

SAMPLED BY: \" LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL):	N/R	VOLUME IN CASING (gal.):	7.32
DEPTH TO WATER (feet):	9.22	CALCULATED PURGE (gal.):	21.97
DEPTH OF WELL (feet):	29.2	ACTUAL PURGE VOL. (gal.):	22.0

DATE PURGED: 3-13-96 Start (2400 Hr) 1049 End (2400 Hr) 1053

DATE SAMPLED: \" Start (2400 Hr) 1100 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1051	7.5	7.51	969	66.9	BRN	Hvy
1052	15.0	7.56	1008	67.0		
1053	22.0	7.57	1002	67.1	\"	\"

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

COLOR: NR (COBALT 0 - 500)

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

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

WELL INTEGRITY: Good LOCK #: Arco-key

REMARKS: All Samples Taken

Meter Calibration: Date: 3/13/96 Time: ___ Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: A-2

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

Rev 3. 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: A-4 (28')

PURGED BY: M.GALLEGOS/TWILLIAMS CLIENT NAME: ARCO #2166

SAMPLED BY: V LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 7.61

DEPTH TO WATER (feet): 7.27 CALCULATED PURGE (gal.): 22.80

DEPTH OF WELL (feet): 28.5 ACTUAL PURGE VOL. (gal.): 23.0

DATE PURGED: 3-13-96 Start (2400 Hr) 1110 End (2400 Hr) 1113

DATE SAMPLED: V Start (2400 Hr) 1117 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1111	7.5	7.27	650	65.5	BRN	MOD
1112	15.0	7.20	878	65.8	CLOUDY	MOD
1113	23.0	7.16	884	66.0	"	"

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
V 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 #: Arrakey

REMARKS: All samples taken

Meter Calibration: Date: 3/13/96 Time: ___ Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: ___

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

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: A-5(29')

PURGED BY: M.Gallegos/T.Williams CLIENT NAME: ARCO #2169

SAMPLED BY: " LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 3.53

DEPTH TO WATER (feet): 7.73 CALCULATED PURGE (gal.): 10.61

DEPTH OF WELL (feet): 29.4 ACTUAL PURGE VOL. (gal.): 11.0

DATE PURGED: 3-13-96 Start (2400 Hr) 1308 End (2400 Hr) 1311

DATE SAMPLED: " Start (2400 Hr) 1317 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1309	3.5	7.33	1023	71.1	BRN	HEAVY
1310	7.0	7.04	1002	68.1	cloudy	mod
1311	11.0	7.06	1006	67.9	"	"

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

WELL INTEGRITY: Good LOCK #: ALCO-Kov

REMARKS: All samples taken

Meter Calibration: Date: 3/13/96 Time: ___ Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: A-2

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

Rev 3. 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: A-6 (27')

PURGED BY: M. GALLEGOS / T. WILLIAMS CLIENT NAME: ARCO #2166

SAMPLED BY: " LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 3.32

DEPTH TO WATER (feet): 7.47 CALCULATED PURGE (gal.): 9.96

DEPTH OF WELL (feet): 27.8 ACTUAL PURGE VOL. (gal.): @ 7.0

DATE PURGED: 3-13-96 Start (2400 Hr) 1151 End (2400 Hr) 1154

DATE SAMPLED: " Start (2400 Hr) 1200 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1152	3.5	7.01	1056	69.4	BRN	Heavy
1154	7.0	7.02	1110	69.6	"	"
___	Well	dried	at 7.0	Gallons	___	___
1200	Vicinity	6.93	1115	70.6	___	___
___	___	___	___	___	___	___

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: Good LOCK #: ARCO Key

REMARKS: All Samples taken

Meter Calibration: Date: 3/13/96 Time: ___ Meter Serial #: 9204 Temperature °F ___

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

Location of previous calibration: #2

Signature: [signature] Reviewed By ___ Page 6 of 16

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: AR-1 (28')

PURGED BY: M. GallegOs / T. Williams CLIENT NAME: ARCO #2169

SAMPLED BY: √ LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 29.03

DEPTH TO WATER (feet): 6.25 CALCULATED PURGE (gal.): 87.09

DEPTH OF WELL (feet): 28.0 ACTUAL PURGE VOL. (gal.): 87.5

DATE PURGED: 3-13-96 Start (2400 Hr) 1219 End (2400 Hr) 1230

DATE SAMPLED: √ Start (2400 Hr) 1234 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1221	29.0	7.43	942	69.5	BRN	mod
1225	58.0	7.66	969	70.9	Clear	Light
1230	87.5	7.74	974	70.4	"	clear

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

NR (COBALT 0 - 500)

NR (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

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

Other ___

SAMPLING EQUIPMENT

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

Other ___

WELL INTEGRITY: Good LOCK #: [redacted]

REMARKS: All Samples taken

Meter Calibration: Date: 3/13/96 Time: ___ Meter Serial #: 9204 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: 21775-235.002 SAMPLE ID: AR-2(29')

PURGED BY: M. GALLEGOS / J. WILLIAMS CLIENT NAME: ARCO #2169

SAMPLED BY: V LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	13.04
DEPTH TO WATER (feet):	9.23	CALCULATED PURGE (gal.):	39.14
DEPTH OF WELL (feet):	29.2	ACTUAL PURGE VOL. (gal.):	39.5

DATE PURGED: 3-13-96 Start (2400 Hr) 1130 End (2400 Hr) 1134

DATE SAMPLED: V Start (2400 Hr) 1142 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1121	13.0	7.36	928	64.8	cloudy	mod
1132	26.0	7.23	1054	65.8	"	"
1134	39.5	7.16	1055	66.2	clear	Light

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

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

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

WELL INTEGRITY: Good LOCK #: ARCO-KEY

REMARKS: All Samples taken

Meter Calibration: Date: 3/13/96 Time. ___ Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: A-2

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

Rev 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: ADR-1 (21)

PURGED BY: M. GALLEGOS / T. WILLIAMS CLIENT NAME: ARCO # 2169

SAMPLED BY: ↓ LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	8.84
DEPTH TO WATER (feet):	8.08	CALCULATED PURGE (gal.):	26.89
DEPTH OF WELL (feet):	21.8	ACTUAL PURGE VOL. (gal.):	27.0

DATE PURGED: 3-13-96 Start (2400 Hr) 1335 End (2400 Hr) 1339

DATE SAMPLED: ↓ Start (2400 Hr) 1344 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1337	9.0	6.81	1389	73.4	clear	light
1338	18.0	6.82	1377	72.2	"	clear
1339	27.0	6.82	1371	71.7	"	"

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

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

WELL INTEGRITY: Good LOCK #: None

REMARKS: All Samples taken

Meter Calibration: Date: 3/13/96 Time: ___ Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: A-2

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

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-235.002 SAMPLE ID: ADR-2(26')

PURGED BY: M.GALLEGOS/TWILLIAMS CLIENT NAME: ARCO# 2169

SAMPLED BY: √ LOCATION: OAKLAND, CA

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	9.74
DEPTH TO WATER (feet):	8.78	CALCULATED PURGE (gal.):	29.24
DEPTH OF WELL (feet):	23.7	ACTUAL PURGE VOL. (gal.):	21.0

DATE PURGED: 3-13-96 Start (2400 Hr) 1410 End (2400 Hr) 1415

DATE SAMPLED: √ Start (2400 Hr) 1422 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1413	10.0	6.89	1395	68.7	BLK	HEAVY
1415	20.0	6.85	1510	70.6		
		well dried at 21.0 gallons				
1424	recharge	7.00	1466	68.8	√	√

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

WELL INTEGRITY: GOOD LOCK #: None.

REMARKS: All samples taken

Meter Calibration: Date: 3/13/96 Time: ___ Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: A-2

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

APPENDIX B

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

Columbia Analytical Services inc.

March 28, 1996

Service Request No: S9600418

Mr. John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: 2169 Oakland/Project No. 20805-129.003/TO#19350.00

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on March 14, 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 11, 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,

Christina V. Rayburn for

Steve Green
Project Chemist

Greg Anderson
Regional QA Coordinator

CVR/smh

2950 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)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	S9600418
Project:	2169 Oakland/#20805-129.003/TO#19350.00	**Date Collected:**	3/13/96
Sample Matrix:	Water	**Date Received:**	3/14/96
		Date Extracted:	3/21-22/96

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

	Sample Name:	A-2(25)	A-3(29)	A-4(28)
	Lab Code:	S9600418-001	S9600418-002	S9600418-003
	Date Analyzed:	3/21/96	3/21/96	3/21/96
Analyte	**MRL**			
TPH as Gasoline	50	ND	ND	ND
Benzene	0.5	ND	ND	ND
Toluene	0.5	0.6	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	1.3	ND	ND
Methyl-tert-butyl ether	3	<9*	ND	ND

* The MRL is elevated because of matrix interferences and because the sample required diluting.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON
Project: 2169 Oakland/#20805-129.003/TO#19350.00
Sample Matrix: Water

Service Request: S9600418
Date Collected: 3/13/96
Date Received: 3/14/96
Date Extracted: 3/21-22/96

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

Sample Name:	**AR-2(29)**	**A-6(27)**	**AR-1(28)**
Lab Code:	S9600418-004	S9600418-005	S9600418-006
Date Analyzed:	3/21/96	3/21/96	3/25/96

Analyte	**MRL**			
TPH as Gasoline	50	190	1400	150
Benzene	0.5	26	<3*	3.8
Toluene	0.5	2.6	<15**	0.5
Ethylbenzene	0.5	3.3	<7**	1.4
Total Xylenes	0.5	13	<10**	1.3
Methyl-tert-butyl ether	3	200	<20*	ND

* The MRL is elevated due to high analyte concentration requiring sample dilution
** The MRL is elevated because of matrix interferences and because the sample required diluting.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	S9600418
Project:	2169 Oakland/#20805-129.003/TO#19350.00	**Date Collected:**	3/13/96
Sample Matrix:	Water	**Date Received:**	3/14/96
		Date Extracted:	3/21-22/96

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

Sample Name:	**A1(24)**	**A-5(29)**	**ADR-1(21)**
Lab Code:	S9600418-007	S9600418-008	S9600418-009
Date Analyzed:	3/25/96	3/25/96	3/25/96

Analyte	**MRL**			
TPH as Gasoline	50	1300	11000	89000
Benzene	0.5	300	860	370
Toluene	0.5	74	960	1000
Ethylbenzene	0.5	29	380	840
Total Xylenes	0.5	73	1600	8100
Methyl-tert-butyl ether	3	100	<100*	<500*

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

3822/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON
Project: 2169 Oakland/#20805-129.003/TO#19350.00
Sample Matrix: Water

Service Request: S9600418
Date Collected: 3/13/96
Date Received: 3/14/96
Date Extracted: 3/21-22/96

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

	Sample Name:	ADR-2(26)	Method Blank	Method Blank
	Lab Code:	S9600418-010	S960321-WB	S960325-WB
	Date Analyzed:	3/25/96	3/21/96	3/25/96
Analyte	**MRL**			
TPH as Gasoline	50	29000	ND	ND
Benzene	0.5	1100	ND	ND
Toluene	0.5	1200	ND	ND
Ethylbenzene	0.5	710	ND	ND
Total Xylenes	0.5	3800	ND	ND
Methyl-tert-butyl ether	3	<500*	ND	ND

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	S9600418
Project:	2169 Oakland/#20805-129.003/TO#19350.00	**Date Collected:**	3/13/96
Sample Matrix:	Water	**Date Received:**	3/14/96
		Date Extracted:	3/21-22/96

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

Sample Name:	**Method Blank**
Lab Code:	S960326-WB
Date Analyzed:	3/26/96

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

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

3S22/060194

APPENDIX A

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON
Project: 2169 Oakland/#20805-129.003/TO#19350.00
Sample Matrix: Water

Service Request: S9600418
Date Collected: 3/13/96
Date Received: 3/14/96
Date Extracted: NA
Date Analyzed: 3/21-26/96

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
A-2(25)	S9600418-001	91	101
A-3(29)	S9600418-002	94	93
A-4(28)	S9600418-003	92	102
AR-2(29)	S9600418-004	93	107
A-6(27)	S9600418-005	86	105
AR-1(28)	S9600418-006	77	87
A1(24)	S9600418-007	88	110
A-5(29)	S9600418-008	90	109
ADR-1(21)	S9600418-009	93	108
ADR-2(26)	S9600418-010	89	101
Method Blank	S960321-WB	92	97
Method Blank	S960325-WB	89	104
Method Blank	S960326-WB	89	109
CAS Acceptance Limits:		69-116	69-116

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	S9600418
Project:	2169 Oakland/#20805-129.003/TO#19350 00	**Date Collected:**	3/13/96
Sample Matrix:	Water	**Date Received:**	3/14/96
		Date Extracted:	NA
		Date Analyzed:	3/21/96

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

Sample Name: A-2(25)
Lab Code: S9600418-001

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	250	250	ND	267	263	107	105	67-121	1

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	S9600418
Project:	2169 Oakland/#20805-129.003/TO#19350.00	**Date Analyzed:**	3/21/96

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	24.3	97	85-115
Toluene	25	24.2	97	85-115
Ethylbenzene	25	23.8	95	85-115
Xylenes, Total	75	72.7	97	85-115
Gasoline	250	255	102	90-110
Methyl-tert-butyl Ether	50	43	86	85-115

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19350.00

Chain of Custody

ARCO Facility no. 2169 | City (Facility) Oakland | Project manager (Consultant) John Young

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

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 incl. MTBE EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☒ (Place on Hold)	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
A-2(25')	1	2		X		X	HCL	3/13/96	1042		X											
A-3(29')	2	2		X		X	HCL	↓	1100		X											
A-4(28')	3	2		X		X	HCL		1117		X											
AR-2(29')	4	4		X		X	HCL		1142		X	X										
A-6(27')	5	2		X		X	HCL		1200		X											
AR-1(28')	6	4		X		X	HCL		1234		X	X										
A-1(24')	7	4		X		X	HCL		1300		X	X										
A-5(29')	8	2		X		X	HCL		1337		X											
ADR-1(21')	9	4		X		X	HCL		1344		X	X										
ADR-2(20')	10	4		X		X	HCL	↓	1422		X	X										

Laboratory name: CAS

Contract number:

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40ml HCL VOAs (All Wells)
2-1liter NP Glass (A-1, AR-1, AR-2, ADR-1+2) PLACE ON HOLD
#20805-129.003

Lab number: S9600418

Turnaround time:
- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒ 3/28

Condition of sample: | Temperature received:

Relinquished by sampler	Date	Time	Received by
[signature]	3/14/96	12:55	

Relinquished by	Date	Time	Received by

Relinquished by	Date	Time	Received by laboratory	Date	Time
			Joanne Brown	3-14-96	12:55

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

R8/S2

APPENDIX C
SVE SYSTEM MONITORING DATA LOG SHEETS

APPENDIX D

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