the IT group

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#3858

August 24, 1999
Project 791643

Mr. Paul Supple
ARCO Products Company
PO Box 6549
Moraga, California 94570

Re: Quarterly Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Second Quarter 1999, for ARCO Service Station No. 2035, Located at 1001 San Pablo Avenue, Albany, California

Dear Mr. Supple:

Pinnacle Environmental Solutions, a member of The IT Group (Pinnacle), is submitting the attached report which presents the results of the second quarter 1999 groundwater monitoring program at ARCO Products Company (ARCO) Service Station No. 2035, located at 1001 San Pablo Avenue, Albany, California. Operation and performance data for the site's soil-vapor extraction system (SVE) and groundwater remediation systems are also presented. The monitoring program complies with the Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

Pinnacle recommends changing the monitoring schedule for this site from quarterly to semi-annual monitoring. Unless instructed otherwise by ACHCSA, the next groundwater monitoring event will take place in the fourth quarter 1999.

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, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the product of the scope and limitations of work performed during the monitoring event.

Please call if you have questions.

Sincerely,

Pinnacle

Glen VanderVeen
Project Manager

Mark Capps, R.G.
Project Geologist

Attachment: Quarterly Groundwater Monitoring Report, Second Quarter 1999

cc: Barney Chan, ACHCSA
James A. Lestrange, Property Owner
Muriel & Emile Turpin, Trustees

Date: August 24, 1999

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.: 2035 Address: 1001 San Pablo Avenue, Albany, California
Pinnacle Project No.: 791643
ARCO Environmental Engineer/Phone No.: Paul Supple /(925) 299-8891
Pinnacle Project Manager/Phone No.: Glen VanderVeen /(510) 740-5807
Primary Agency/Regulatory ID No.: ACHCSA /Barney Chan

WORK PERFORMED THIS QUARTER (SECOND - 1999):

1. Prepared and submitted quarterly groundwater monitoring report for first quarter 1999.
2. Performed quarterly groundwater monitoring and sampling for second quarter 1999.
3. Continued bubbling air into well RW-1 to introduce dissolved oxygen into the groundwater, thereby enhancing biodegradation of petroleum hydrocarbons in groundwater in the vicinity of the well.
4. As recommended by ACHCSA, MTBE concentrations in MW-3 and MW-4 were confirmed by EPA method 8260.
5. Operated SVE system from 06/10/99 to 06/24/99. System shut down on 06/24/99 due to low influent hydrocarbon concentrations.

WORK PROPOSED FOR NEXT QUARTER (THIRD - 1999):

1. Prepare and submit quarterly groundwater monitoring report for second quarter 1999.
2. No environmental work is scheduled at the site during the third quarter 1999.
3. Continue bubbling air into well RW-1.
4. Operate SVE system, if influent concentrations and mass extraction rate warrants.
5. Connect tank backfill well to SVE system.

QUARTERLY MONITORING:

Current Phase of Project:	Quarterly Groundwater Monitoring and Operation and Maintenance of Remediation Systems SVE and Enhanced Bioremediation
Frequency of Sampling:	Semi-annual (2nd/4th quarter): MW-1 through MW-6, RW-1
Frequency of Monitoring:	Quarterly (groundwater), Monthly (SVE)
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Cumulative FP Recovered to Date	27.9 gallons, Wells AS-1, AS-2, RW-1, VW-1, VW-2, and VW-7
FP Recovered This Quarter :	None
Bulk Soil Removed to Date :	605 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 Bubbling in RW-1
Average Depth to Groundwater:	10.4 feet
Groundwater Flow Direction and Gradient (Average):	0.03 ft/ft toward west-southwest

SVE QUARTERLY OPERATION AND PERFORMANCE:

Equipment Inventory:	Therm Tech Model VAC-10 Thermal/Catalytic Oxidizer
Operating Mode:	Catalytic Oxidation
BAAQMD Permit #:	10931
TPH Conc. End of Period (lab):	100 ppmv
Benzene Conc. End of Period (lab):	0.5 ppmv
SVE Flowrate End of Period:	74.9 cfm
Total HC Recovered This Period:	0.069 pounds
Total HC Recovered to Date:	3042.4 pounds
Utility Usage	
Electric (KWH):	0 KWH
Gas (Therms):	0 Therms
Operating Hours This Period (SVE):	336.55 hours
Operating Hours to Date (SVE):	8872.83 hours
Percent Operational (SVE):	16.5%
Operating Hours This Period (GWE):	0.0 hours
Percent Operational (GWE):	0.0%
Unit Maintenance:	Routine monthly maintenance
Number of Auto Shut Downs:	0
Destruction Efficiency Permit Requirement:	98.5% (POC >2,000 ppmv); 97% (POC >200 ppmv); 90% (POC <200 ppmv)
Percent TPH Conversion:	94%
Average Stack Temperature:	728°F
Average SVE Source Flow:	67 cfm
Average SVE Process Flow:	74.9 cfm
Average Source Vacuum:	35 inches of water

DISCUSSION

- Pinnacle recommends changing the monitoring schedule for this site from quarterly to semi-annual monitoring. Unless instructed otherwise by ACHCSA, the next groundwater monitoring event will take place in the fourth quarter 1999.

ATTACHMENTS:

- Table 1 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 2 - Operational Uptime Information for the SVE System
- Table 3 - Flow Rates and Analytical Results of Air Sample Analyses
- Table 4 - Extraction and Emission Rates
- Figure 1 - Groundwater Analytical Summary Map
- Figure 2 - Groundwater Elevation Contour Map
- Appendix A - Sampling and Analysis Procedures
- Appendix B - Certified Analytical Reports and Chain-of-Custody Documentation
- Appendix C - Field Data Sheets
- Appendix D - Certified Analytical Reports and Chain-of-Custody Documentation for SVE System

Table 1
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station No. 2035
1001 San Pablo Avenue, Albany, California

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 8240/8260	TRPH EPA 418.1
		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
MW-1	03-24-95	41.41	6.21	35.20	ND	NW	0.037	03-24-95	8800	3600	<50	62	99	--	--	--
MW-1	05-24-95	41.41	9.37	32.04	ND	WNW	0.013	05-24-95	4800	2000	<20	52	<20	--	--	--
MW-1	08-22-95	41.41	10.30	31.11	ND	SW	0.012	08-22-95	780	310	<2.5	12	<2.5	14	--	--
MW-1	11-09-95	41.41	12.25	29.16	ND	WSW	0.01	11-09-95	58	14	<0.5	<0.5	<0.5	--	--	--
MW-1	02-27-96	41.41	9.08	32.33	ND	SW	0.009	02-27-96	2700	930	12	18	32	51	--	--
MW-1	04-22-96	41.41	9.11	32.30	ND	WSW	0.014	04-22-96	2700	1000	<10	22	<10	<60	--	--
MW-1	08-15-96	41.41	10.37	31.04	ND	SW	0.011	08-15-96	300	52	<0.5	0.9	<0.5	22	--	--
MW-1	12-10-96	41.41	8.79	32.62	ND	WSW	0.023	12-10-96	270	63	0.7	<0.5	1	25	--	--
MW-1	03-27-97	41.41	9.80	31.61	ND	WSW	0.026	03-27-97	1500	610	<5	15	7	56	--	--
MW-1	05-22-97	41.41	9.65	31.76	ND	WSW	0.024	05-22-97	110	5.5	<0.5	<0.5	0.7	10	--	--
MW-1	09-04-97	41.41	10.22	31.19	ND	W	0.019	09-04-97	180	40	<0.5	1.2	0.5	26	--	--
MW-1	11-03-97	41.41	10.68	30.73	ND	SW	0.038	11-03-97	83	8	<0.5	<0.5	<0.5	13	--	--
MW-1	02-20-98	41.41	6.92	34.49	ND	W	0.031	02-20-98	1800	540	7	27	31	46	--	--
MW-1	05-18-98	41.41	9.28	32.13	ND	W	0.02	05-18-98	4500	1300	20	57	20	<60	--	--
MW-1	08-20-98	41.41	10.05	31.36	ND	W	0.02	08-21-98	530	110	<5	<5	<5	400	--	--
MW-1	10-20-98	41.41	10.42	30.99	ND	W	0.02	10-20-98	66	9.1	<0.5	<0.5	<0.5	8	--	--
MW-1	02-16-99	41.41	8.10	33.31	ND	W	0.03	02-16-99	1200	390	<5	<5	6	45	--	--
MW-1	05-24-99	41.41	9.53	31.88	ND	WSW	0.03	05-24-99	1300	600	3	13	3	26	--	--
MW-2	03-24-95	40.38	6.96	33.42	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
MW-2	05-24-95	40.38	10.02	30.36	ND	WNW	0.013	05-24-95	Not sampled: well sampled semi-annually, during the first and third quarters							
MW-2	08-22-95	40.38	10.87	29.51	ND	SW	0.012	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-2	11-09-95	40.38	13.12	27.26	ND	WSW	0.01	11-09-95	Not sampled: well sampled semi-annually, during the first and third quarters							
MW-2	02-27-96	40.38	10.25	30.13	ND	SW	0.009	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-2	04-22-96	40.38	9.98	30.40	ND	WSW	0.014	04-22-96	Not sampled: well sampled semi-annually, during the first and third quarters							
MW-2	08-15-96	40.38	11.10	29.28	ND	SW	0.011	08-15-96	<50	<0.5	<0.5	<0.5	<0.5	4	--	--
MW-2	12-10-96	40.38	10.00	30.38	ND	WSW	0.023	12-10-96	Not sampled: well sampled semi-annually, during the first and third quarters							
MW-2	03-27-97	40.38	10.38	30.00	ND	WSW	0.026	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	12	--	--
MW-2	05-22-97	40.38	10.65	29.73	ND	WSW	0.024	05-22-97	Not sampled: well sampled semi-annually, during the first and third quarters							
MW-2	09-04-97	40.38	10.87	29.51	ND	W	0.019	09-04-97	<50	<0.5	<0.5	<0.5	<0.5	19	--	
MW-2	11-03-97	40.38	11.25	29.13	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	18	--	--

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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 8240/8260	TRPH EPA 418.1
		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
MW-2	02-20-98	40.38	7.69	32.69	ND	W	0.031	02-20-98	<50	0.5	<0.5	<0.5	<0.5	12	--	--
MW-2	05-18-98	40.38	9.88	30.50	ND	W	0.02	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	10	--	--
MW-2	08-20-98	40.38	10.62	29.76	ND	W	0.02	08-21-98	<50	<0.5	<0.5	<0.5	<0.5	3	--	--
MW-2	10-20-98	40.38	11.00	29.38	ND	W	0.02	10-20-98	<50	<0.5	<0.5	<0.5	<0.5	31	--	--
MW-2	02-16-99	40.38	9.04	31.34	ND	W	0.03	02-16-99	<50	<0.5	<0.5	<0.5	<0.5	13	--	--
MW-2	05-24-99	40.38	9.90	30.48	ND	WSW	0.03	05-24-99	<50	0.6	<0.5	<0.5	<0.5	47	--	--
MW-3	03-24-95	41.44	7.29	34.15	ND	NW	0.037	03-24-95	51	0.8	<0.5	2.4	<0.5	--	--	<500
MW-3	05-24-95	41.44	9.53	31.91	ND	WNW	0.013	05-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	<500
MW-3	08-22-95	41.44	11.19	30.25	ND	SW	0.012	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	79	--	<500
MW-3	11-09-95	41.44	12.77	28.67	ND	WSW	0.01	11-09-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	600
MW-3	02-27-96	41.44	9.41	32.03	ND	SW	0.009	02-27-96	120	3.6	<0.5	2.2	3.7	90	--	<0.5
MW-3	04-22-96	41.44	9.63	31.81	ND	WSW	0.014	04-22-96	<50	<0.5	<0.5	<0.5	<0.5	90	--	--
MW-3	08-15-96	41.44	11.12	30.32	ND	SW	0.011	08-15-96	<50	<0.5	<0.5	<0.5	<0.5	54	--	--
MW-3	12-10-96	41.44	10.34	31.10	ND	WSW	0.023	12-10-96	71	<0.5	<0.5	<0.5	<0.5	130	--	--
MW-3	03-27-97	41.44	10.28	31.16	ND	WSW	0.026	03-27-97	<100	<1	<1	<1	<1	170	--	--
MW-3	05-22-97	41.44	10.40	31.04	ND	WSW	0.024	05-22-97	<100	<1	<1	<1	<1	95	--	--
MW-3	09-04-97	41.44	10.75	30.69	ND	W	0.019	09-04-97	<50	<0.5	<0.5	<0.5	<0.5	37	--	--
MW-3	11-03-97	41.44	11.44	30.00	ND	SW	0.038	11-03-97	<200	<2	<2	<2	<2	130	--	--
MW-3	02-20-98	41.44	7.48	33.96	ND	W	0.031	02-20-98	<200	<2	5	<2	8	140	--	<0.5
MW-3	05-18-98	41.44	9.87	31.57	ND	W	0.02	05-18-98	<100	<1	<1	<1	<1	150	--	<0.5
MW-3	08-20-98	41.44	10.72	30.72	ND	W	0.02	08-21-98	<200	<2	<2	<2	<2	210	--	<0.5
MW-3	10-20-98	41.44	11.30	30.14	ND	W	0.02	10-20-98	<200	<2	<2	<2	<2	270	--	<0.5
MW-3	02-16-99	41.44	8.60	32.84	ND	W	0.03	02-16-99	<500	<5	<5	<5	<5	700	--	--
MW-3	05-24-99	41.44	9.87	31.57	ND	WSW	0.03	05-24-99	<50	<0.5	<0.5	<0.5	<0.5	150	140	--
MW-4	03-24-95	40.33	5.92	34.41	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
MW-4	05-24-95	40.33	9.23	31.10	ND	WNW	0.013	05-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
MW-4	08-22-95	40.33	10.61	29.72	ND	SW	0.012	08-22-95	<50	<0.5	<0.5	<0.5	<0.5	99	--	--
MW-4	11-09-95	40.33	11.97	28.36	ND	WSW	0.01	11-09-95	<50	<0.5	<0.5	<0.5	<0.5	--	89	--
MW-4	02-27-96	40.33	8.84	31.49	ND	SW	0.009	02-27-96	<50	0.8	<0.5	<0.5	<0.5	<3	--	--

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		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
MW-4	04-22-96	40.33	9.15	31.18	ND	WSW	0.014	04-22-96	Not sampled: well sampled annually, during the first quarter							
MW-4	08-15-96	40.33	10.35	29.98	ND	SW	0.011	08-15-96	Not sampled: well sampled annually, during the first quarter							
MW-4	12-10-96	40.33	8.70	31.63	ND	WSW	0.023	12-10-96	Not sampled: well sampled annually, during the first quarter							
MW-4	03-27-97	40.33	9.75	30.58	ND	WSW	0.026	03-27-97	<5000	<50	<50	<50	<50	4200	--	--
MW-4	05-22-97	40.33	9.91	30.42	ND	WSW	0.024	05-22-97	Not sampled: well sampled annually, during the first quarter							
MW-4	09-04-97	40.33	10.25	30.08	ND	W	0.019	09-04-97	Not sampled: well sampled annually, during the first quarter							
MW-4	11-03-97	40.33	10.79	29.54	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-4	02-20-98	40.33	6.78	33.55	ND	W	0.031	02-20-98	<2000	<20	<20	<20	<20	3300	--	--
MW-4	05-18-98	40.33	9.26	31.07	ND	W	0.02	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-4	08-20-98	40.33	10.10	30.23	ND	W	0.02	08-21-98	<50	<0.5	<0.5	<0.5	<0.5	9	--	--
MW-4	10-20-98	40.33	10.43	29.90	ND	W	0.02	10-20-98	<50	<0.5	<0.5	<0.5	<0.5	17	--	--
MW-4	02-16-99	40.33	8.56	31.77	ND	W	0.03	02-16-99	<500	<5	<5	<5	<5	400	--	--
MW-4	05-24-99	40.33	9.52	30.81	ND	WSW	0.03	05-24-99	<50	<0.5	<0.5	<0.5	<0.5	10	7.6	--
MW-5	03-24-95	41.84	6.23	35.61	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
MW-5	05-24-95	41.84	9.61	32.23	ND	WNW	0.013	05-24-95	Not sampled: well sampled annually, during the first quarter							
MW-5	08-22-95	41.84	11.12	30.72	ND	SW	0.012	08-22-95	Not sampled: well sampled annually, during the first quarter							
MW-5	11-09-95	41.84	12.52	29.32	ND	WSW	0.01	11-09-95	Not sampled: well sampled annually, during the first quarter							
MW-5	02-27-96	41.84	9.52	32.32	ND	SW	0.009	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-5	04-22-96	41.84	9.44	32.40	ND	WSW	0.014	04-22-96	Not sampled: well sampled annually, during the first quarter							
MW-5	08-15-96	41.84	10.83	31.01	ND	SW	0.011	08-15-96	Not sampled: well sampled annually, during the first quarter							
MW-5	12-10-96	41.84	9.20	32.64	ND	WSW	0.023	12-10-96	Not sampled: well sampled annually, during the first quarter							
MW-5	03-27-97	41.84	10.10	31.74	ND	WSW	0.026	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-5	05-22-97	41.84	10.28	31.56	ND	WSW	0.024	05-22-97	Not sampled: well sampled annually, during the first quarter							
MW-5	09-04-97	41.84	10.73	31.11	ND	W	0.019	09-04-97	Not sampled: well sampled annually, during the first quarter							
MW-5	11-03-97	41.84	11.23	30.61	ND	SW	0.038	11-03-97	Not sampled: well sampled annually, during the first quarter							
MW-5	02-20-98	41.84	6.67	35.17	ND	W	0.031	02-20-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-5	05-18-98	41.84	9.61	32.23	ND	W	0.02	05-18-98	Not sampled: well sampled annually, during the first quarter							
MW-5	08-20-98	41.84	10.58	31.26	ND	W	0.02	08-21-98	Not sampled: well sampled annually, during the first quarter							
MW-5	10-20-98	41.84	10.66	31.18	ND	W	0.02	10-20-98	Not sampled: well sampled annually, during the first quarter							
MW-5	02-16-99	41.84	8.35	33.49	ND	W	0.03	02-16-99	Not sampled							

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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 8240/8260	TRPH EPA 418.1
		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
MW-5	05-24-99	41.84	9.95	31.89	ND	WSW	0.03	05-24-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-6	03-24-95	40.13	9.03	31.10	ND	NW	0.037	03-24-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
MW-6	05-24-95	40.13	12.45	27.68	ND	WNW	0.013	05-24-95	Not sampled: well sampled annually, during the first quarter							
MW-6	08-22-95	40.13	13.32	26.81	ND	SW	0.012	08-22-95	Not sampled: well sampled annually, during the first quarter							
MW-6	11-09-95	40.13	14.13	26.00	ND	WSW	0.01	11-09-95	Not sampled: well sampled annually, during the first quarter							
MW-6	02-27-96	40.13	11.86	28.27	ND	SW	0.009	02-27-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-6	04-22-96	40.13	12.35	27.78	ND	WSW	0.014	04-22-96	Not sampled: well sampled annually, during the first quarter							
MW-6	08-15-96	40.13	13.18	26.95	ND	SW	0.011	08-15-96	Not sampled: well sampled annually, during the first quarter							
MW-6	12-10-96	40.13	11.94	28.19	ND	WSW	0.023	12-10-96	Not sampled: well sampled annually, during the first quarter							
MW-6	03-27-97	40.13	13.10	27.03	ND	WSW	0.026	03-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--
MW-6	05-22-97	40.13	13.00	27.13	ND	WSW	0.024	05-22-97	Not sampled: well sampled annually, during the first quarter							
MW-6	09-04-97	40.13	13.30	26.83	ND	W	0.019	09-04-97	Not sampled: well sampled annually, during the first quarter							
MW-6	11-03-97	40.13	13.42	26.71	ND	SW	0.038	11-03-97	<50	<0.5	<0.5	<0.5	<0.5	19	--	--
MW-6	02-20-98	40.13	10.57	29.56	ND	W	0.031	02-20-98	<100	<1	<1	<1	<1	95	--	--
MW-6	05-18-98	40 13	12.64	27.49	ND	W	0.02	05-18-98	<100	<1	<1	<1	<1	180	--	--
MW-6	08-20-98	40.13	13.13	27.00	ND	W	0.02	08-21-98	<100	<1	<1	<1	<1	180	--	--
MW-6	10-20-98	40.13	13.48	26.65	ND	W	0.02	10-20-98	<100	<1	<1	<1	<1	180	--	--
MW-6	02-16-99	40.13	11.92	28.21	ND	W	0.03	02-16-99	<200	<2	<2	<2	<2	200	--	--
MW-6	05-24-99	40.13	12.80	27.33	ND	WSW	0.03	05-24-99	<50	<0.5	<0.5	<0.5	<0.5	120	--	--
RW-1	03-24-95	40.33	9.32	31.02**	0.01	NW	0.037	03-24-95	11000	560	660	150	1700	--	--	--
RW-1	05-24-95	40.33	9.75	30.60**	0.03	WNW	0.013	05-24-95	Not sampled: well contained floating product							
RW-1	08-22-95	40.33	10.86	29.48**	0.02	SW	0.012	08-22-95	Not sampled: well contained floating product							
RW-1	11-09-95	40.33	20.61	19.72	ND	WSW	0.01	11-09-95	1600	79	46	13	240	--	--	--
RW-1	02-27-96	40.33	16.56	23.77	ND	SW	0.009	02-27-96	210	44	7.5	2.5	24	29	--	--
RW-1	04-22-96	40.33	9.65	30.68	ND	WSW	0.014	04-22-96	36000	7400	3700	580	3400	<300	--	--
RW-1	08-15-96	40.33	10.60	29.73	ND	SW	0.011	08-15-96	1800	31	38	15	150	<30	--	--
RW-1	12-10-96	40.33	8.72	31.61	ND	WSW	0.023	12-10-96	25000	1900	1000	330	3200	<100	--	--
RW-1	03-27-97	40.33	10.33	30.00	ND	WSW	0.026	03-27-97	7200	1900	59	95	240	480	--	--
RW-1	05-22-97	40.33	10.10	30.23	ND	WSW	0.024	05-22-97	3000	630	84	45	340	<60	--	--

Table 1
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station No. 2035
1001 San Pablo Avenue, Albany, California

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 8240/8260	TRPH EPA 418.1
		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
RW-1	09-04-97	40.33	10.42	29.91	ND	W	0.019	09-04-97	7100	120	55	14	160	<60	--	--
RW-1	11-03-97	40.33	9.10	31.23	ND	SW	0.038	11-03-97	<200	14	19	3	19	140	--	--
RW-1	02-20-98	40.33	7.49	32.84	ND	W	0.031	02-20-98	3800	1000	85	64	220	950	--	--
RW-1	05-18-98	40.33	8.90	31.43	ND	W	0.02	05-18-98	<200	45	<2	2	4	220	--	--
RW-1	08-20-98	40.33	11.06	29.27	ND	W	0.02	08-21-98	480	200	<2	<2	30	180	--	--
RW-1	10-20-98	40.33	11.12	29.21	ND	W	0.02	10-20-98	110	36	2.9	<0.5	4.1	5	--	--
RW-1	02-16-99	40.33	7.70	32.63	ND	W	0.03	02-17-99	250	61	2	2	19	94	--	--
RW-1	05-24-99	40.33	11.12	29.21	ND	WSW	0.03	05-24-99	4500	2000	7	<2	180	35	--	--

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
EPA: United States Environmental Protection Agency
TRPH: total recoverable petroleum hydrocarbons
MTBE: Methyl tert-butyl ether
ft/ft: foot per foot
µg/L: micrograms per liter
mg/L: milligrams per liter
ND: none detected
NR: not reported; data not available
WSW: west-southwest
- -: not analyzed or not applicable
*: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results and Remediation System Performance Evaluation Report, ARCO Service Station 2035, Albany, California*, (EMCON, March 25, 1996).
**: [corrected elevation (Z')] = Z + (h * 0.73); where Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

Table 2
Operational Uptime Information for the Soil Vapor Extraction System (1997 - present)

ARCO Service Station No. 2035
1001 San Pablo Avenue, Albany, California

Date End	Hr-Meter Arrival	Operating Hours To Date	No. of Days Between Site Visits			Percent Uptime	Cumulative Days (begin 12/93)	
			Total Days	Uptime	Days Down		Total Days	Total Uptime
11/01/97		6873.20					1425	335
12/01/97	11484.46	7211.10	30	14	16	47%	1455	349
01/27/98	11484.46	7211.10	57	0	57	0%	1512	349
08/12/98	11484.46	7211.10	197	0	197	0%	1709	349
09/02/98	11484.69	7211.33	21	0	21	0%	1730	349
10/19/98	12279.71	8006.35	47	33	14	70%	1777	382
11/10/98	12809.36	8536.00	22	22	0	100%	1799	404
01/22/99	12809.36	8536.00	73	0	73	0%	1872	404
02/11/99	12809.53	8536.17	20	0	20	0%	1892	404
04/01/99	12809.64	8536.28	49	0	49	0%	1941	404
06/10/99	12810.03	8536.67	70	0	70	0%	2011	404
06/24/99	13146.19	8872.83	14	14	0	100%	2025	418

Table 3
Soil Vapor Extraction System
Flow Rates and Analytical Results of Air Samples
(1997 - present)

Arco Service Station No. 2035
1001 San Pablo Avenue, Albany, California

Date	Sample Location	Vacuum (in. H20)	Velocity (fpm)	Flowrate[1] (scfm)	Analyses (ppmv)					
					TPHG	Benzene	Toluene	Ethylbenzene	Xylene	MTBE
12/01/97	Influent			221.4	160	0.6	<0.1	1.6	2.5	
	Effluent				8	<0.1	0.1	<0.1	0.3	
01/27/98	Influent	NA	NA	NA	NA	NA	NA	NA	NA	
	Effluent									
08/12/98	Influent	NA	NA	NA	NA	NA	NA	NA	NA	
	Effluent									
09/02/98	Influent	30	600	27	610	<1	<1	2	3	
	Effluent		1050	92.4	9	<0.1	<0.1	0.1	<0.2	
10/19/98	Influent	20	500	23	64	<0.1	0.7	<0.1	<0.2	
	Effluent		1200	106.5	<5	<0.1	<0.1	<0.1	<0.2	
11/10/98	Influent	20	500	23	8	<0.1	0.1	<0.1	<0.2	
	Effluent		1200	106.5	<5	<0.1	<0.1	<0.1	<0.2	
06/10/99	Influent	35	1500	67	100	0.5	3	<0.1	0.9	<1
	Effluent		975	74.9	<5	<0.1	<0.1	<0.1	<0.2	<1

[1] Influent Flow Rate, cfm = (Velocity, fpm)(Influent Pipe Area, sq. ft.)(406.8 in.H20 - Vacuum, in.H20) / (406.8 in.H20)
where Influent Pipe Diameter = 3"
Effluent Flow Rate, cfm = (Velocity, fpm)(Effluent Pipe Area, sq.ft.)[(460° R + 77° F)/(460° R + Vapor Temp F)]
where Effluent (after blower) Pipe Diameter = 4"

Table 4
Soil Vapor Extraction System
Extraction Rates, Emission Rates, Destruction Efficiency, and Mass Removed
(1997 - present)

Arco Service Station No. 2035
1001 San Pablo Avenue, Albany, California

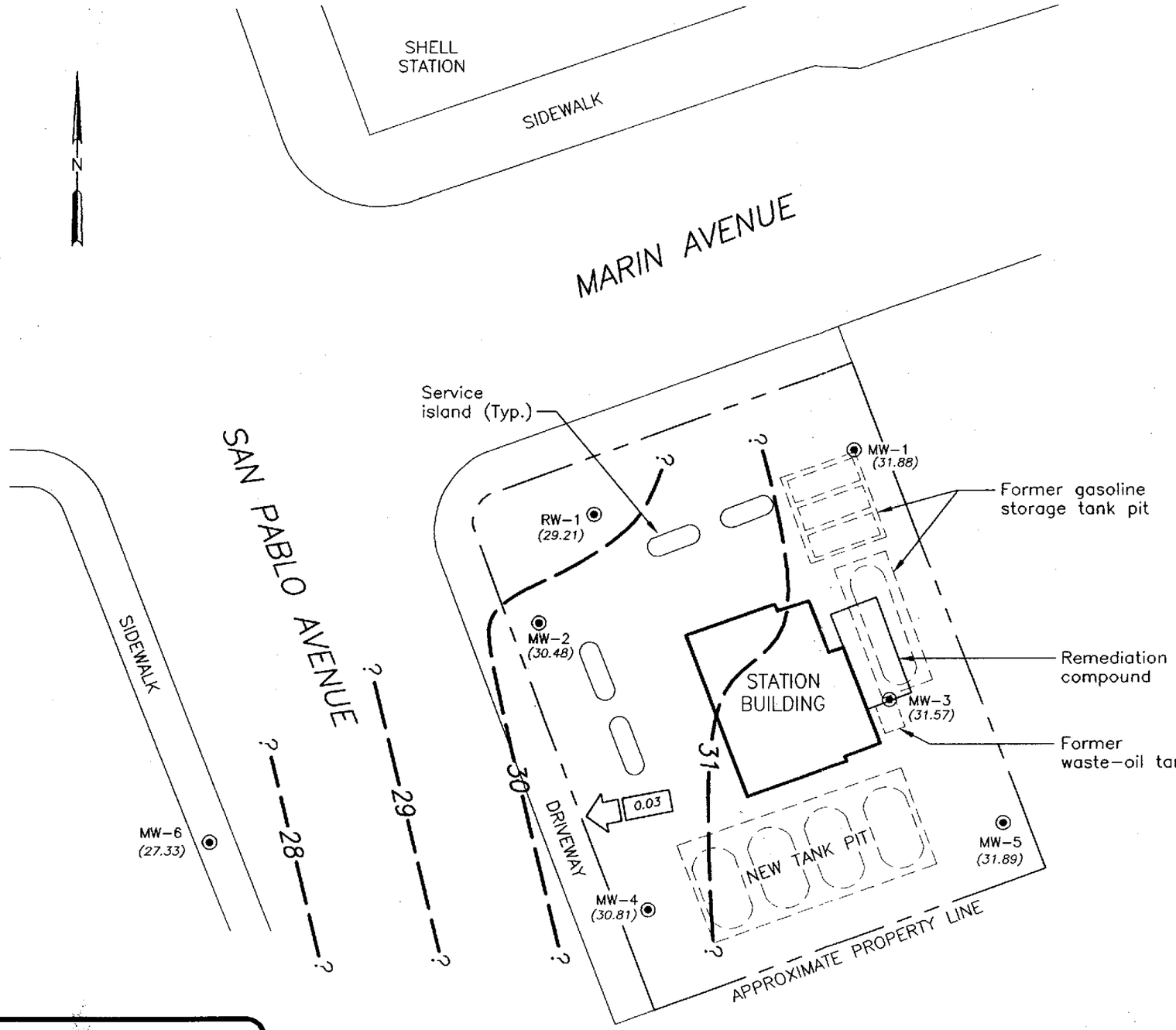
Date End	Extraction Rate from Wellfield[1]		Emission Rate to Atmosphere[2]		Destruction Efficiency[3]		Period Removal[4]		Cumulative Removal	
	TPHG (lbs/day)	Benzene (lbs/day)	TPHG (lbs/day)	Benzene (lbs/day)	TPHG (%)	Benzene (%)	TPHG (lbs)	Benzene (lbs)	TPHG (lbs)	Benzene (lbs)
12/01/97	13.0165	0.0381	0.6508	<0.0064	95%	NC	183.3	0.5367	3022.6	250.5
09/02/98	6.1116	<0.0078	0.3057	<0.0027	95%	NC	0.0586	0.0000	3022.7	250.5
10/19/98	0.5485	<0.0007	<0.1956	<0.0031	NC	NC	18.17	0.0000	3040.8	250.5
11/10/98	0.0686	<0.0007	<0.1956	<0.0031	NC	NC	1.513	0.0000	3042.3	250.5
06/10/99	2.4715	0.0097	<0.1375	<0.0021	94%	NC	0.0690	0.0003	3042.4	250.5

[1] Extraction Rate, lbs/day = (Influent Flow, cfm)(Influent conc., ppmv)(g/mole)(60 min/hr)(24 hr/day)(28.3 L/cf) / (10^6)(24.45 moles/L)(453.6 g/lb)
where TPHG = 100 g/mole and Benzene = 78.1 g/mole; Influent conc. = 0, if reported as non-detect

[2] Emission Rate, lbs/day = (Effluent Flow, cfm)(Effluent conc., ppmv)(g/mole)(60 min/hr)(24 hr/day)(28.3 L/cf) / (10^6)(24.45 moles/L)(453.6 g/lb)
where TPHG = 100 g/mole and Benzene = 78.1 g/mole; Effluent conc. = Method Reporting Limit, if reported as non-detect

[3] Destruction Efficiency, % = (Extraction Rate - Emission Rate)(100) / (Extraction Rate); NC = Not Calculated due to non-detection.

[4] Period Removal, lbs = (Extraction Rate)(Uptime)



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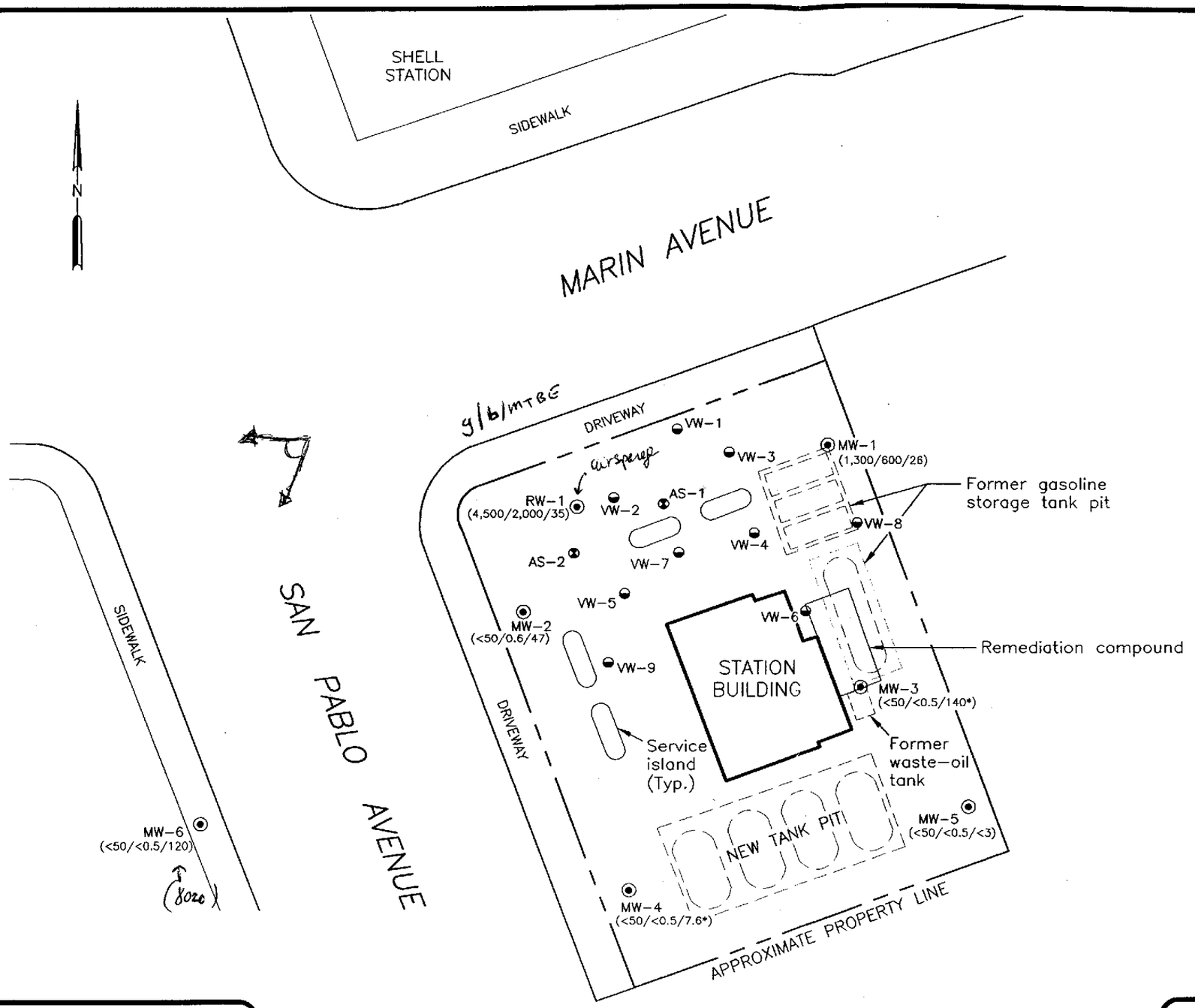
1" 1/2" 0" 1"

Pinnacle
ENVIRONMENTAL SOLUTIONS
A DIVISION OF EMCON

DATE JUNE 1999
DWN KAB
APP
REV
PROJECT NO.
20805-123.006

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 2035, 1001 SAN PABLO AVE.
ALBANY, CALIFORNIA
GROUNDWATER ELEVATION CONTOURS
SECOND QUARTER 1999



EXPLANATION

- ◉ Groundwater monitoring well
- ◒ Vapor extraction well
- ⊗ Air sparge well
- (1,300/600/26) Concentration of total petroleum hydrocarbons as gasoline (TPHG), benzene, and MTBE in groundwater (ug/L); samples collected 5/24/99
- < Not detected at or above the indicated laboratory detection limit
- * Analyzed by EPA Method 8260

MW	DO
2	0.64
3	0.91
4	0.87
5	0.78
6	0.76
RW	0.69

0 30 60
SCALE IN FEET

1" 1/2" 0" 1"

IMAGE Files: <No Images>
XREF Files: <No Xrefs>
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Pinnacle
ENVIRONMENTAL SOLUTIONS
A DIVISION OF EMCON

DATE JUNE 1999
DWN KAB
APP
REV
PROJECT NO.
20805-123.006

FIGURE 1
ARCO PRODUCTS COMPANY
SERVICE STATION 2035, 1001 SAN PABLO AVE.
ALBANY, CALIFORNIA
GROUNDWATER ANALYTICAL SUMMARY
SECOND QUARTER 1999